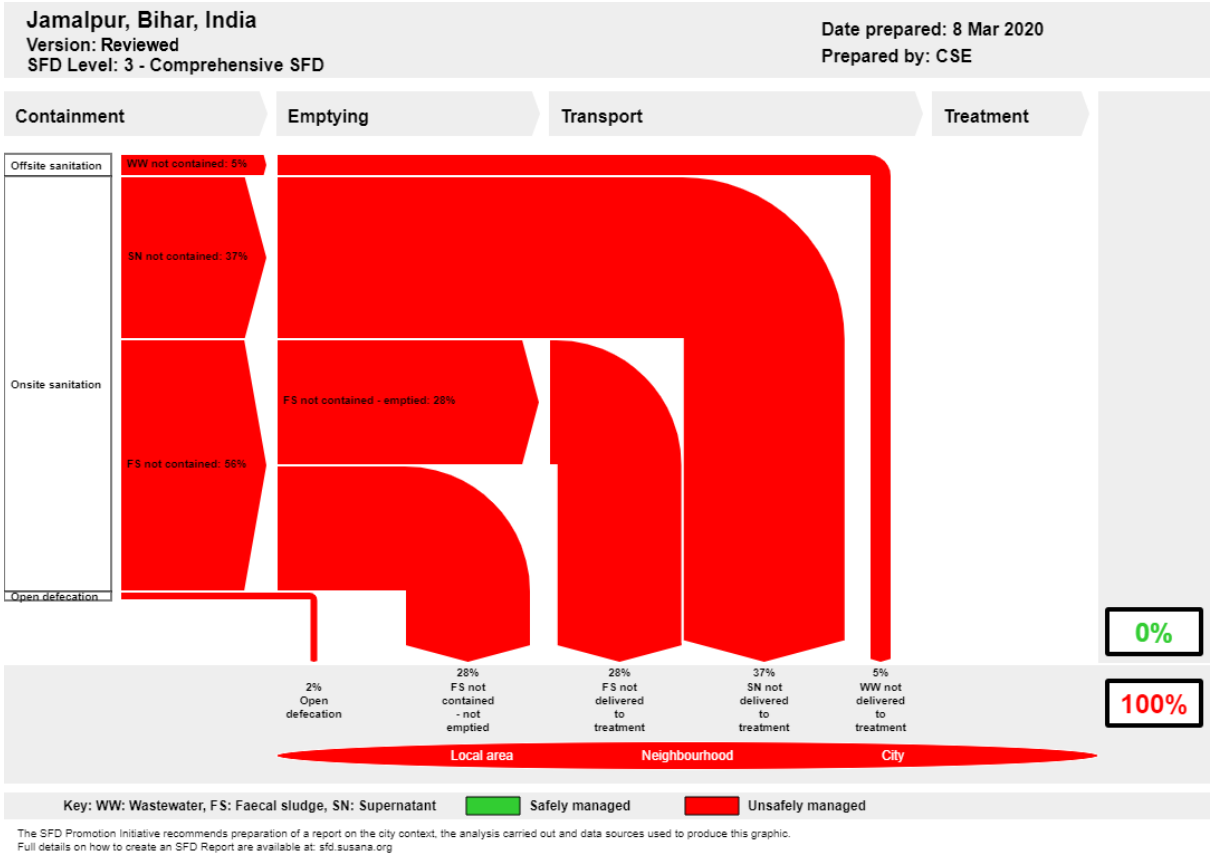
SFD Lite Report

Jamalpur
India

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

Date of production/ last update: 13/04/2020

1 The SFD Graphic



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

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 Gesellschaft für Internationale Zusammenarbeit (GIZ). We would like to thank Shri Suryananadan Singh, Executive Officer; Mr. Ravi Kumar, City Manager; Mr. Satyanarayan Mandal, Sanitary and Food Inspector; Mr. Rohit Kumar, Computer operator; Mr. Kailash Prasad, Mr. Dilip Kumar, Ward In-charge etc., for providing all the required secondary data and cooperating for KII & FGDs.

Collaborating partners:

- Jamalpur Nagar Parishad (JNP), Jamalpur, Bihar

Date of production: 13/04/2020

3 General city information

Jamalpur is also known as the Rail City of Bihar. It was established during the British rule for manufacture and repair of wagons, coaches, cranes, Jack [1] . The city is located at a distance of 170 km east of Patna and 470 km North West of Kolkata. It is well connected with the rest of the country through rail and road networks.

The average annual rainfall of the district is 1231 mm and about 80% of the rainfall is received during June to September by south-west monsoon. Ground water level varies from 3mbgl to 10mbgl [2]. During summer, temperatures rise up to 42^{0}C, while in winter it dips down 2^{0}C. The city has a diverse landscape ranging from hills to flood plains. The major geomorphic units are rocky upland, pedi plain and alluvial plain.

As per Census 2011, Jamalpur Nagar Parishad (JNP) has population of 105,434 of which 56,072 are males while 49,362 are females.[3] Jamalpur Nagar Parishad has a total administration of over 20,372 households. As per CDP, the city had 15 slums housing 5% of the city population but currently there are no notified slums. The population of Jamalpur is projected to be 1.52 lakhs in 2030[1]. Currently the population of the city is 130530 residing in 25218 households as per the survey done by JNP for census 2021[4].

Census Year	Population	Growth Rate (%)	Source
1991	86112		
2001	96983	1.26	Census 2001
2011	105,434	0.87	Census 2011
2020	130530	2.66	JNP

Table 1: Population Growth rate Jamalpur City

4 Service outcomes

Jamalpur, Bihar, India, 8 Mar 2020. SFD Level: 1 - Initial SFD
Population: 130530
Proportion of tanks: septic tanks: 50%, fully lined tanks: 50%, lined, open bottom tanks: 100%

System label	Pop	W4c	W5c	F3	F4	F5	S4e	S5e
System description	Proportion of population using this type of system	Proportion of wastewater in open sewer or storm drain system, which is delivered to treatment plants	Proportion of wastewater delivered to treatment plants, which is treated	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
T1A1C6 User interface discharges directly to open drain or storm sewer	5.0	0.0	0.0					
T1A2C6 Septic tank connected to open drain or storm sewer	29.0			50.0	0.0	0.0	0.0	0.0
T1A3C6 Fully lined tank (sealed) connected to an open drain or storm sewer	44.0			50.0	0.0	0.0	0.0	0.0
T1A5C10 Lined pit with permeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of	20.0			50.0	0.0	0.0		
T1B11 C7 TO C9 Open defecation	2.0							

[1] City Development Plan Jamalpur 2010-2030.

[2] Central Ground Water Board (CGWB), Ground water year book, Bihar 2015-2016

[3] District Census Handbook 2011 for Jamalpur (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

[4] Departmental data received through Key Informant Interviews with Shri Suryanandan Singh (Executive Officer) and Mr. Ravi Kumar (City Manager) from Jamalpur Nagar Parishad. The population is predicted for the upcoming 2021 census by municipality.

Table 2: SFD Matrix for Jamalpur (CSE 2020)

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

4.1 Offsite Systems

As per Key Informative Interviews (KII – 1, 2, 3, 2020) with Executive Officer, City manager and Sanitary Inspector, there is no sewerage network in Jamalpur city[5]. However, in field observation and HH survey it was found that there are certain wards in the area where household toilets are directly connected to open drains. Therefore, T1A1C6 system is considered as 5% of the total population of Jamalpur city, to be sure about this figure it was further triangulated with masons, government desludgers, manual desludgers and sanitatary staff while making the SFD graphic[6].

4.2 On-site Sanitation Systems

Containment: In the absence of a sewer network the major population is dependent on Onsite Sanitation Systems (OSS). As per field observation, Key Informative Interviews and Focus group discussions with relevant stakeholders such as ULB officials, masons, desludging service providers and ward representatives, 95% of the population is dependent on OSS [7]. The most prevalent containment systems in Jamalpur are Fully lined tank (FLT) connected to open drain (FLTOD), Septic tanks connected to open drains (STOD) and Lined pits with semi-permeable walls and open bottom with no outlet/overflow

Figure 1: Septic Tank equipped with ventilation pipe, Fully Lined tank and Lined Pit semi-permeable wall and open bottom (Source: Harsh/CSE, 2020)

Out of this 95% population dependent on OSS, 44% have fully lined tanks (FLTOD) (T1A3C6). Mostly these tanks were either in square shape or rectangular shape in the middle and higher income groups but in lower income areas FLTs were made of 4-6 rings (3 ft diameter and 1.25 m depth) laid one over another and fixed with a layer of plaster. 29% of the population are dependent on septic tanks (STOD) with 2-3 chambers (T1A2C6). It could be observed from field survey and HH survey that the septic tanks

[5] As per KII with Shri Suryanandan Singh (Executive officer), Mr. Ravi Kumar (City manager) and Mr. Satyanarayan Mandal (sanitary inspector), city of Jamalpur never had a sewerage network, the percentage of sewerage network described in Census 2011 were in reality, households connected directly to open drains.

[6] The 5% of system T1A1C6 is considered after triangulating the information given by masons, government emptiers, manual emptiers and sanitary staff. It was commonly observed in ward 24, 21, 12, and 11 in the city.

[7] Informed in KII with Mr Satyanarayan Mandal (Sanitary Inspector) and Focus group discussions with masons and analysis of Household sample survey done with 179 HHs covering all the wards of the city.

Figure 2: Septic tank with three chambers under construction (Source: Harsh/CSE, 2020)

cannot be called as contained systems as they are connected to open drains. Since there is no monitoring or standardization followed in the construction of containment systems by ULB, the usual practice is to construct very large capacity tanks with 2-3 chambers so that cleaning or emptying period of tanks is extended to 8-10 years (Field observation).

The third type of OSS seen commonly in the economically weaker section of Jamalpur city is lined pit semi-permeable wall and open bottom (LSO) (T2A5C10) which constituted 20% of the total population[8]. System T2A5C10 were found to be upgraded version of systems like unlined pit with or without slab or service latrines [9]. LSO is usually prefabricated cement rings stacked over each other with a cap on the top. The size of the pre-fabricated rings was generally found to be 3 meter in diameter and 0.30 meters in width. Usually 6 to 8 rings are stacked over each other as found in the HH sample survey.

According Swachha Bharat Mission's (SBM) Individual Household Latrines (IHHL) data, 1400 toilets have been provided to households having no toilets or to households with insanitary toilets[10]. Based on our field visit and our understanding from HH survey, containment system of IHHL funded under SBM is equally divided between FLTOD and LSO [11].

Figure 3: Community toilet maintained by Sulabh Shauchalay (Source: Harsh/CSE 2020)

Community Toilets/Public Toilets: In Jamalpur, there are 9 community toilets[12]. There are 7 CTs and 2 PTs inside Jamalpur municipal boundary. These toilets are connected to STOD. These septic tanks do not fulfil the requirement of the sewerage management system as stated in the CPHEEO (Central Public Health & Environmental Engineering Organization) manual on sewerage and sewage treatment (field observation). The average size of septic tanks in CT was found to be 25 cubic meters whereas in PT it was 30 cubic meters. The community toilets and public toilets were not very well serviced especially near commercial areas [13]. There are 7 CTs are under Jamalpur Nagar Parishad, whereas out of two PTs one is operated by Sulabh International and one is under petrol pump.

[8] FGD with masons to understand the local masonry practices in constructing containment systems, the type and size of containment systems hugely depend on monetary requirements and space availability.

[9] In FGD with manual emptiers and masons it was revealed that all the earlier systems like unlined pits, latrine served by humans or animals have been demolished by ULB or people have self-upgraded their systems.

[10] Data obtained from Jamalpur Nagar Parishad extracted from Swachh Bharat Mission website

[11] As discussed with Sanitary Inspectors and City Manager: The financial help given by government is not enough to make bricks septic tanks with huge sizes. Hence, HHs in the LIG spectrum who received toilet fund preferred concrete tanks which may or may not be sealed.

[12] Data obtained from Jamalpur Nagar Nigam, KII with Mr. Ravi Kumar (City Manager) and field observation.

[13] City Manager informed that maintenance of CT is maintained by JNP and PT is done by private contractors.

Even though the city has been declared and recertified as Open Defecation Free city, the practise of defecating and urinating in the open continues due to accessibility issues[14]. The maximum travel distance from household to community toilet is considered to be 500 m. Hence, 2% of the population is considered to practise open defecation in SFD analysis.

Emptying and Transportation: The city is majorly dependent on mechanized and non-mechanized private desludging service providers for emptying faecal sludge (FS) from household containment systems. JNP itself owns one vacuum truck. It is equipped with a motorised pump, storage tank and a 200 ft long hose pipe to access narrow roads and congested areas. The private operators are based in Munger city which is 8km away from Jamalpur and they charge INR 5000-6000 (65-78 USD) per trip [15]. The emptying charge of the government operated truck mounted vacuum tanker is INR 1700 (22USD) per trip. During the survey it was found that in the economically weaker section of the society, non-mechanized means of desludging is preferred. Manual emptiers who are from a community locally called as "Doms" community work in groups of 3 to 5 people for emptying services. There are around 80 people in this community, who run this as a side business of manual emptying of contaminants in the city. They manually lift the sludge using a bucket and a shovel. The sludge removed is disposed in nearby open drains or surroundings [16] (figure-4). They charge INR 500 per ft depth of the containment system. They are almost involved in the business of selling pig meat and working in the ULB as safai karamcharis on contract basis[17].

Figure 4: Tank emptied by manual emptiers from Dom community (Source: Harsh/CSE, 2020)

Considering all the prevalent conditions of the city and the resources available for providing emptying services, it is assumed that 50% of the households are emptying their containment systems on time for preparation of the SFD graphic.

Figure 5: Desludging vehicle owned by ULB (Source: Harsh/CSE, 2020)

[14] During field observation, it was observed that community toilets were not located within accessible distance by each household.

[15] Household survey and KII with Mr. Illias Ahmed (Reporter, Hindustan Times) who is closely working on highlighting the infrastructural issues of the city

[16] FGD with manual emptiers from *Dom* community, they usually work in groups of 3 or 4 and charge INR 500 per ft depth of the containment system.

[17] In an interview with the executive officer it was informed about the contractual staff for road, drains and street cleaning usually *Dom* community persons are employed by default.

Figure 6: Open drains in Jamalpur

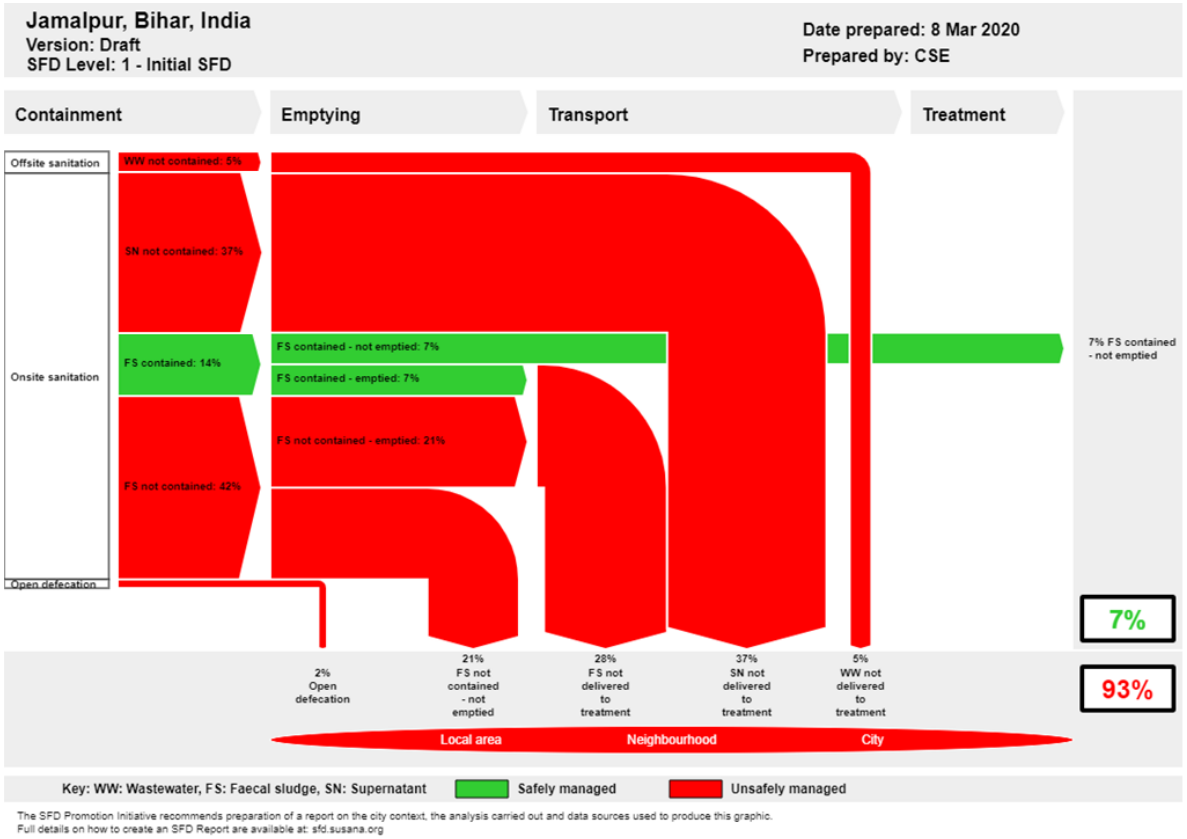
As mentioned before, there is no functional sewer line in Jamalpur and all the black water and grey water generated from households is transported by open drains and discharged into agricultural fields (field observation). The septage emptied by manual emptiers is discretely dumped into any nearby open drain (figure-6).

Treatment/Disposal: Currently there is no treatment plant for wastewater or faecal sludge generated in the city. Therefore, in columns S5e and W5c in the SFD matrix, shows 0% treated.

5 Data and assumptions

- Secondary data is based on Census 2011 http://censusindia.gov.in/DigitalLibrary/Archive_home.aspx and City Development Plan (2010-2030) which is used as a reference for the comprehensive study
- 80% of water supplied is wastewater generated
- 50% of the contents of septic tanks and fully lined tanks 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 50% for all types of containment system as observed in the survey.
- 100% of the contents in the Lined pit impermeable wall and open bottom and Lined pit semi-permeable wall and open bottom is FS.
- The proportion of various onsite sanitation systems mentioned in the report is based on a rapid field visit by the authors to the town and various rounds of discussions with different stakeholders (data on containment systems available from census 2011 is updated based on surveys, key informant interviews, focus group discussions).

6 Context adapted SFD Graphic



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 15% of the population flows through open drains. The solid FS collected in the septic tank is considered to be contained and hence 14% of FS is contained (represented green in colour at containment stage). Followed by this, 7% FS contained is emptied, remaining 7% is FS remains in the tank which is contained and never 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 93% population is not managed according to the context adapted SFD.

7 List of data sources

Reports and literature

- District Census Handbook 2011 for Jamalpur (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
- Central Ground Water Board, Ground water year book, Bihar 2015-2016
- Swachhata Survekshan Report, Jamalpur, Bihar (2019-2020).

- 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 Shri Suryanandan Singh (Executive Officer, Jamalpur Nagar Nigam)
- KII-2, 2020; Interview with Mr. Ravi Kumar (City Manager, Jamalpur Nagar Nigam)
- KII-3, 2020; Interview with Shri Satyanarayan Mandal (Sanitary and Food Inspector, Jamalpur Nagar Nigam)
- KII-4, 2020; Interview with Mr. Illias Ahmed Hussain (Reporter Hindustan News)
- KII-5, 2020; Interview with Mr. Manish Kumar (City AMRUT cell Nodal Person, Jamalpur)

Focus Group Discussions (FGD)

- FGD-1, 2020; Focus Group Discussion with masons (3 no's)
- FGD-2, 2020; Focus Group Discussion with manual emptier (6 no's)
- FGD-3, 2020; Focus Group Discussion with ward members
- FGD-4,2020, Focus Group Discussion with Mr. Kailash Prasad, Mr. Kailash Prasad, Mr. Dilip Kumar (Ward Parshad, Jamalpur Nagar Nigam)

Field Observations

- Survey of Public toilet (2) and community toilets (7)
- Visit to railway colony
- Visit to Water Treatment Plant under railways
- Visit to approximate 100 households covering Lower Income Groups (LIG), Middle Income Groups (MIG) and Higher Income Groups (HIG) spread throughout the city.
- Visit to current FS discharge locations.

SFD Promotion Initiative

Jamalpur, India, 2020

Produced by:

CSE, Harsh Yadava

CSE, Shrutaswinee Hazarika

Editing:

CSE, Dr Suresh Kumar Rohilla

CSE, Praveen Chature

This SFD lite report is available from:

www.sfd.susana.org