

Draft SFD Lite Report

Sircilla India

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

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1 The SFD Graphic

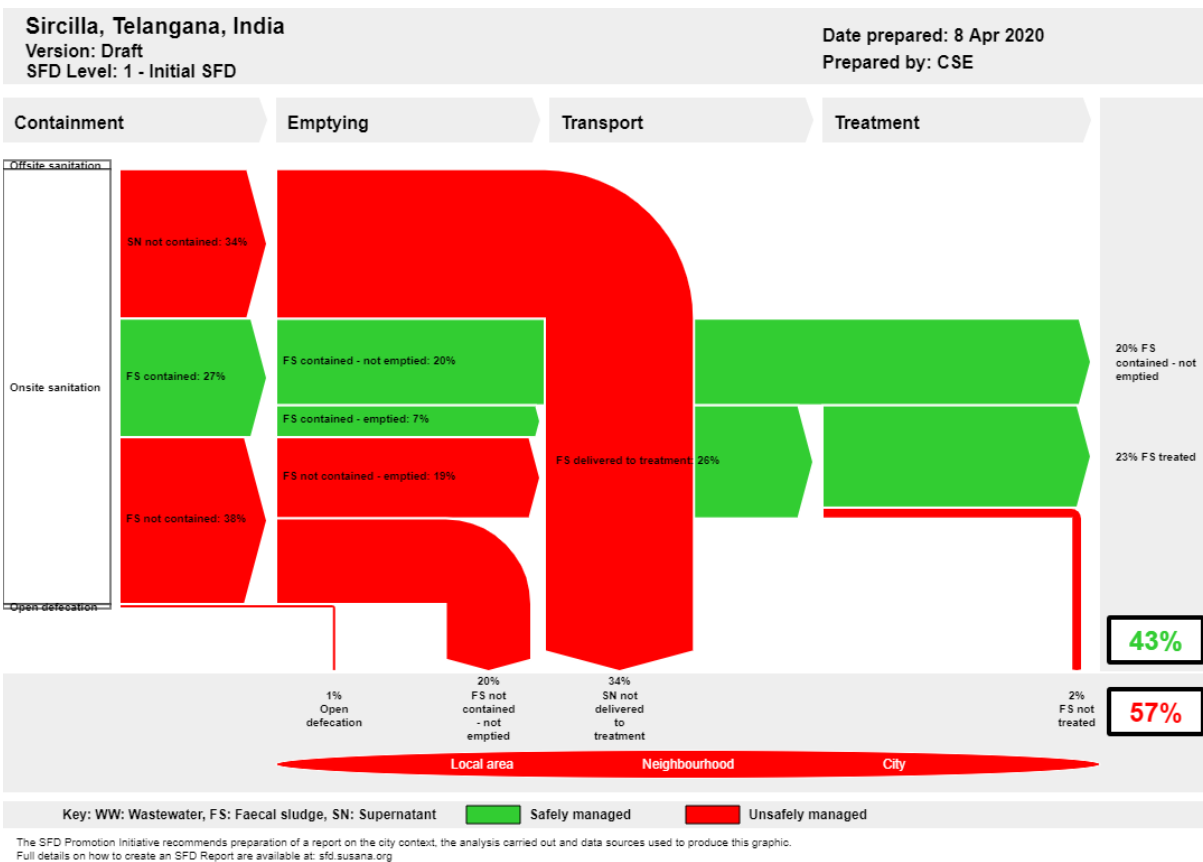


Figure 1: SFD Graphic for Sircilla City

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 Bill and Melinda Gates Foundation (BMGF). We would like to thank Mr V. Sammaiah, Municipal Commissioner, Mr Menche Srinivas, Municipal Vice – Chairperson and Mr Vijay Kumar, Municipal Assistant Manager for providing all the required secondary data and cooperating for Key Informant Interviews (KIIs) & Focussed Group Discussions (FGDs).
- This report would not have been possible without constant support of Mr Raghu Soma, Environmental Engineer, Mr Sai Kiran, FSTP Incharge who helped in conducting sample surveys and FGDs in the field.

Collaborating partners:

- Sircilla Municipality, Sircilla, Telangana, India

Date of production: 08/04/2020

3 General city information

Sircilla is an Indian town with district headquarters in Rajanna Sircilla in state of Telangana. It is geographically located at 18° 25' North and 78°48' East . Sircilla has a tropical climate with an average annual temperature of ~28° C and an average annual rainfall of 715 mm (Detailed Preject Report on Storm Water Drainage, 2019). The risk of groundwater contamination is estimated to be low as most of city's population derives its drinking water from surface water source i.e. Maner River.

Table 1: Decadal Growth Rate of Core city and Agglomerate Sircilla City (SM merged with 7 surrounding villages)

Decadal Growth Rate (core city)			Population calculated for 2020		
Year	Population	Growth rate (%)	Year	Core city population	Merged Village population
1991	50048	-	2011	75640	8815
2001	65314	23	2020	84666	9867
2011	75640	16	Total Population	94533	

Source: SM, 2020; Census 991, 2001, 2011; SM/CSE, 2020

According to census 2011, the core city was spread on 15.25 sq. km. with a population of 75550 (State census 2011, Sircilla, Karimnagar, Andhra Pradesh). In 2018, Telangana government finalized the compliance report of Sircilla Municipality on taking over the charge on seven adjacent villages. Officially in 2019, the villages were merged into the core city increasing the area by 55.47 sq. km. The current total population is interpolated from the projected population (City Sanitation Plan, 2017-core city). For preparing SFD, the total population considered is 100,169 which includes floating population. The city is administratively governed by Sircilla Municipality (SM) which comes under Rajanna Sircilla district.

4 Service outcomes

Table 2: SFD Matrix for Sircilla (CSE, 2020)

Sircilla, Telangana, India, 8 Apr 2020. SFD Level: 1 - Initial SFD

Population: 100169

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	2.0	100.0	100.0	100.0		
T1A2C6 Septic tank connected to open drain or storm sewer	11.0	50.0	100.0	90.0	0.0	0.0
T1A2C8 Septic tank connected to open ground	2.0	100.0	100.0	90.0		
T1A3C6 Fully lined tank (sealed) connected to an open drain or storm sewer	57.0	50.0	100.0	90.0	0.0	0.0
T1A3C8 Fully lined tank (sealed) connected to open ground	2.0	50.0	100.0	90.0		
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	25.0	50.0	100.0	90.0		
T1B11 C7 TO C9 Open defecation	1.0					

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

4.1 Offsite Systems

There is no sewerage network present in the city.

4.2 On-site Sanitation Systems

Containment: Based on sample household survey, KIIs and FGDs with relevant stakeholders it is estimated that 99% population is dependent on the On-site Sanitation Systems (OSS) (Field Observation; KII- 3, 2020; FGD-1 & 2, 2020). The containment systems prevalent in the city are septic tank (ST) connected to soak pit (T1A2C5, 2%), septic tank connected to open drain or storm sewer (T1A2C6, 11%), septic tank connected to open ground (T1A2C8, 2%), fully lined tank (FLT) connected to open drain or storm sewer (T1A3C6, 57%), fully lined tank connected to open ground (T1A3C8, 2%), lined pit with semi- permeable walls and open bottom and no outlet or overflow (T1A5C10, 25%) (Field Observation; FGD-1&3, 2020).



Figure 2: Eclipse model FLT in a house (Source: Mudit/CSE, 2020)

All of the commercial buildings including public toilets have septic tanks with an outlet connected to open drains; this take in the population visiting the city for work purpose. The maximum number of HHs in core city prefers to construct eclipse model type tanks (referred as FLTs) (Field Observation; KII- 3, 2020). These are pre constructed oval or circular shaped tanks with improper

baffle wall. The size of this readymade frame is around 6*4*8 feet and its construction cost varies from 10-12 K (134.60 – 161.52 USD) (FGD- 1, 2020). HHs living in merged villages and at the periphery of the core city majorly have single and twin pit system (Field Observation). These pits are generally 3 feet in diameter and 4 to 6 rings in depth; where the depth of each ring varies from 1 to 1.5 feet (FGD-1, 2020). The rings are made of cement mortar and serves as impermeable lining whereas the bottom is not plastered. These are less costly than other type of containments prevailing in the city.

Community Toilets/Public Toilets: Mainly floating population utilizes the facility of mobile toilet and bio toilet provided near Maner river during the festival season (Field Observation, KII- 3, 2020). There are total 6 Bio toilets present in the city at different locations (KII-3, 2020). Emptying frequency of these bio toilet and mobile toilet is taken as 100%. Septic tank of bio toilet is connected to soak pit (T1A2C5) and of mobile toilet opens into the ground (T1A2C8).

2020)



Figure 3: Bio toilet and Mobile toilet present at Maner river used for public events (Source: Vandana/CSE, 2020)

There is no community toilet (CT) existing in Sircilla. People who travels mainly use the public toilets (PT) placed at the busy areas, such as bus stand. Total PTs are 10, having size 10*4*8 with one or two baffle walls. Frequency of desludging of public toilets is approximately 3 months (KII-3, 2020). Different welfare societies take care of construction, operation and maintenance of the public toilets.



Figure 4: Public toilet near municipality and septic tank of a public toilet (Source: Vandana/CSE, 2020)

The core Sircilla city has achieved Open Defecation Free status (ODF) in year 2019; whereas, in the recently merged villages a significant proportion of the people do practice open defecation in the nearby fields. This represents 1% in the SFD of agglomeration. The desludgers in the town lives in the informal settlements and also defecates in open (Field Observation; FGD-3, 2020).

Emptying: The city is dependent on private desludging service providers for emptying faecal sludge (FS) as SM does not own any FS desludging machine (KII-3, 2020). There are 4 operators each with one vacuum tanker plying in the city (FGD-2, 2020). The vacuum tankers are equipped with a motorised pump, storage tank of 4500 L and one with 3500 L capacity and a 200 ft long hose to access containment systems in narrow roads and congested areas. No manual emptying practiced in city.



Figure 5: Truck mounted vacuum tanker (Source: Vandana/CSE, 2020)

Desludging is usually carried out by 3-4 people (1 Driver + 3 Helpers) and a fee of INR 2000-2500 (26.48 – 33.11 USD); depending upon the location and community (KII-3, 2020). Emptying is done on demand and on an average 3-4 trips overall are done per day (KII-3&10, 2020). The average time taken for emptying pit latrines is ~ 20 minutes; whereas, in case of STs or FLTs it is ~ 30-40 minutes. Advertisements of emptiers could be seen on electric poles, wall paintings, etc (field observations). Depending upon the type of OSS, emptying frequency differs widely across the city. Most of the containment structures are recently constructed in the time span of 1 to 3 years and has not emptied yet. HHs empty their containments on average of 5 to 7 years (KII-3, 2020). HHs are constructing new toilets and transforming the old pit latrines into FLTs, hence, the population using their systems with emptying (F3) is estimated to be 50% from the systems T1A2C6, T1A3C6, T1A3C8 and T1A5C10.



Figure 7: Emptying process captured of a twin pit system (Source: Vandana/CSE, 2020)

Transportation: The emptied septage is transported through the truck mounted vacuum tankers. The average distance covered to dispose emptied septage is around 10 km. FS getting emptied is delivered to the treatment facility (FSTP), thus F4 is considered to be 100%. A record is maintained on daily basis at FSTP (KII-3&12, 2020).



Figure 6: WW flowing towards agriculture lands (Source: Vandana/CSE,2020)

Around 85% of the wastewater (WW) including supernatant (SN) from containments which was supposed to flow to Thummala Kunta & Damara Kunta (designated water bodies) is diverted to agricultural fields and is used by the farmers for irrigation purposes (Field observation, KII-3,2020). Rest 15% WW is going to Kothe Cheru Lake, where effluent treatment plant trials are already taking place (KII-3, 2020).

Treatment/Disposal: There is one FSTP in the city with the design capacity 18 m3 per day. It is operational since June 24, 2019. The plant uses nature based treatment technology i.e. unplanted drying bed for FS and DWWTs for treating wastewater. The plant consists of two treatment units with treatment capacity of 9 KLD each. It is planned to use the digested sludge cake in co- composting with the organic waste in 1:2 ratio. During the field visit it has been observed that the plant is operational from around 10 months. To depict the ground reality, F5 is considered as 90% as co-composting is not done yet.



Figure 8: Sludge drying bed in FSTP (Source: Vandana/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.

- 80% of water supplied is wastewater generated
- 50% of the contents of tanks and pits 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 as 100% for floating population who is dependent on mobile toilet and bio toilet and 50% assuming 5-6 years as the threshold, based on the size of the tank and no. of people dependent on that system. Also, most of the tanks are recently constructed.

6 Context adapted SFD Graphic

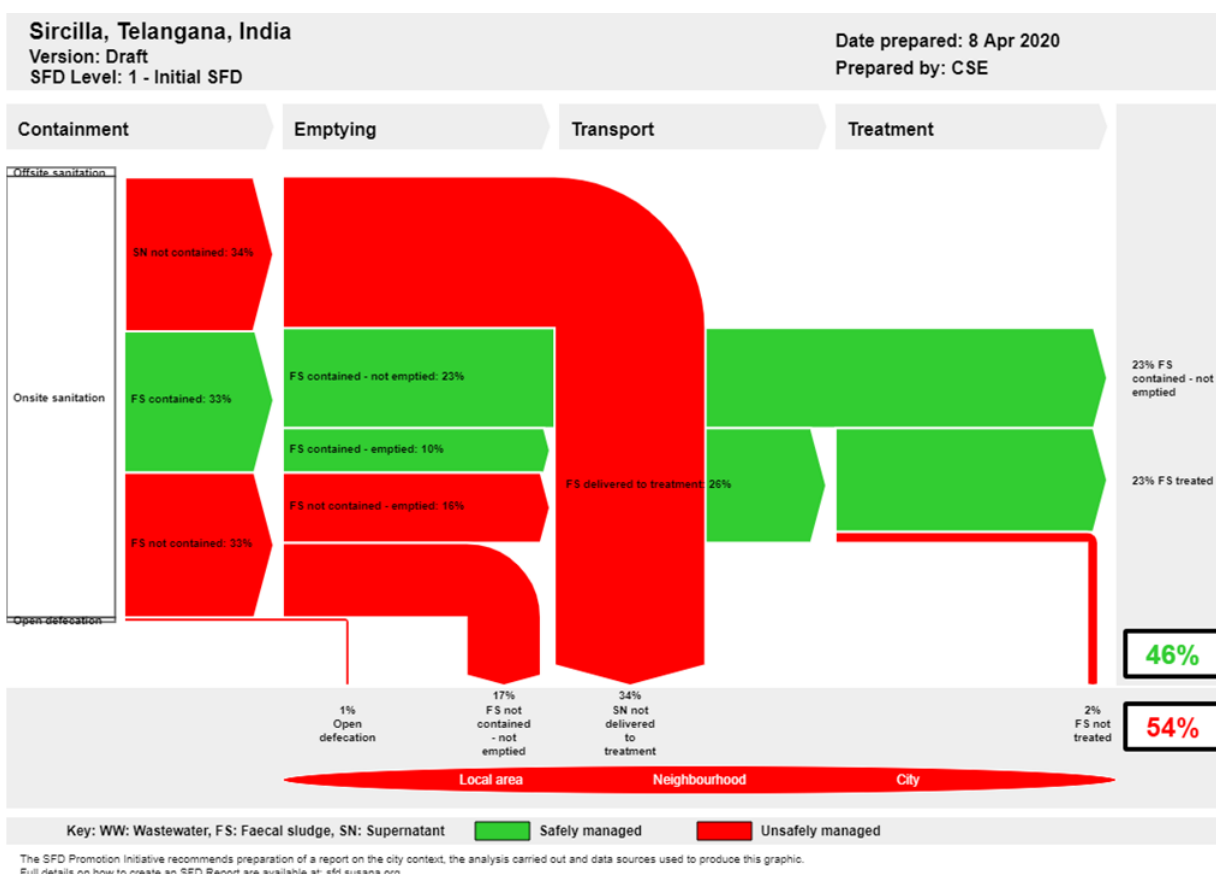


Figure 9: Context adapted SFD Graphic for Sircilla

The context adapted SFD is prepared to showcase the difference 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 is solid FS, rest of the 50% is assumed to be supernatant.

Supernatant generated from septic tanks connected to open drain is considered to be unsafely managed (represented red in color). The solid FS collected in the septic tank (attributed to 11% population) is considered contained as it is neither polluting the ground water nor the solid excreta is overflowing in the open drain. Hence, out of 33% FS contained (represented green in colour, 6% of FS is from septic tank. 3% FS contained from septic tank is emptied and rest 3% FS remains in the tank which is contained and never emptied. Overall, 23% FS contained is not emptied, which includes the other sanitation systems.

7 List of data sources

Reports and literature

- District Census Handbook 2011 for Andhra Pradesh Town (housing census; percentage of households to total households by amenities and assets) DCHB_town_release_2800 <http://censusindia.gov.in/DigitalLibrary/MFTTableSeries.aspx>
- District Census Handbook 2011 for Andhra Pradesh Village (housing census; percentage of households to total households by amenities and assets) DCHB_village_release_2800
- State Census 2011, Sircilla, Karimnagar
- <https://www.census2011.co.in/data/town/802912-sircilla-andhra-pradesh.html>
- City Sanitation Plan, 2016 Sircilla Municipality
- Ground Water brochure, 2013, Karim Nagar district, Andhra Pradesh,
- Ground Water Year Book, 2015 -16, Telangana,
- Detailed Project Report for Storm water Drainage System, Sircilla Municipality
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- NMCG. 2011a. National Mission for Clean Ganga. [Online] [Accessed 15 February 2020] Available at: http://nmcg.nic.in/about_nmcg.aspx
- SFD Report, Sircilla (2019)

Key Informant Interviews (KII)

- KII-1, 2020; Interview with Mr V. Sammaiah, Municipal Commissioner, Sircilla
- KII-2, 2020; Interview with Mr Vijay Kumar, Municipal Assistant Manager, Sircilla
- KII-3, 2020; Interview with Mr Raghu Soma, Environmental Engineer, Sircilla
- KII-4, 2020; Interview with Mr Nagraj, Environmental Engineer, Subordinate, Sircilla
- KII-5, 2020; Interview with Mr Varun, Municipal Assistant Engineer, Sircilla
- KII-6, 2020; Interview with Mr Prabhakar, Technical Officer, Sircilla
- KII-7, 2020; Interview with Mr MancheNivas, Municipal Vice chairperson, Sircilla

- KII-8, 2020; Interview with Mr Venkat Raman, Sanitary Inspector, Sircilla
- KII-9, 2020; Interview with Mr S. K. Umar, Jawan Supervisor, Sircilla
- KII-10, 2020; Interview with Mr Nagraj, Private Desludger, Sircilla
- KII-11, 2020; Interview with Mr Srinivas, Private Desludger, Sircilla
- KII-12, 2020; Interview with Mr Sai Kiran, FSTP Operator, Sircilla

Focus Group Discussions (FGD)

- FGD-1, 2020; Focus Group Discussion with masons
- FGD-2, 2020; Focus Group Discussion with private desludging operators
- FGD-3, 2020; Focus Group Discussion with ward members

Field Observations

- Survey of Public toilet (04)
- Visit to all the Nullah tapping locations
- Visit to Faecal Sludge Treatment Plant
- Visit to approximate 50 households covering Lower Income Groups (LIG), Middle Income Groups (MIG), Higher Income Groups (HIG), Slum settlement and newly merged villages spread throughout the city.
- Visit to current FS discharge locations

Sircilla, India, 2020

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