



SFD Lite Report

Srivilliputhur India

This SFD Lite Report was prepared by Kalasalingam
Academy of Research and Education (KARE).

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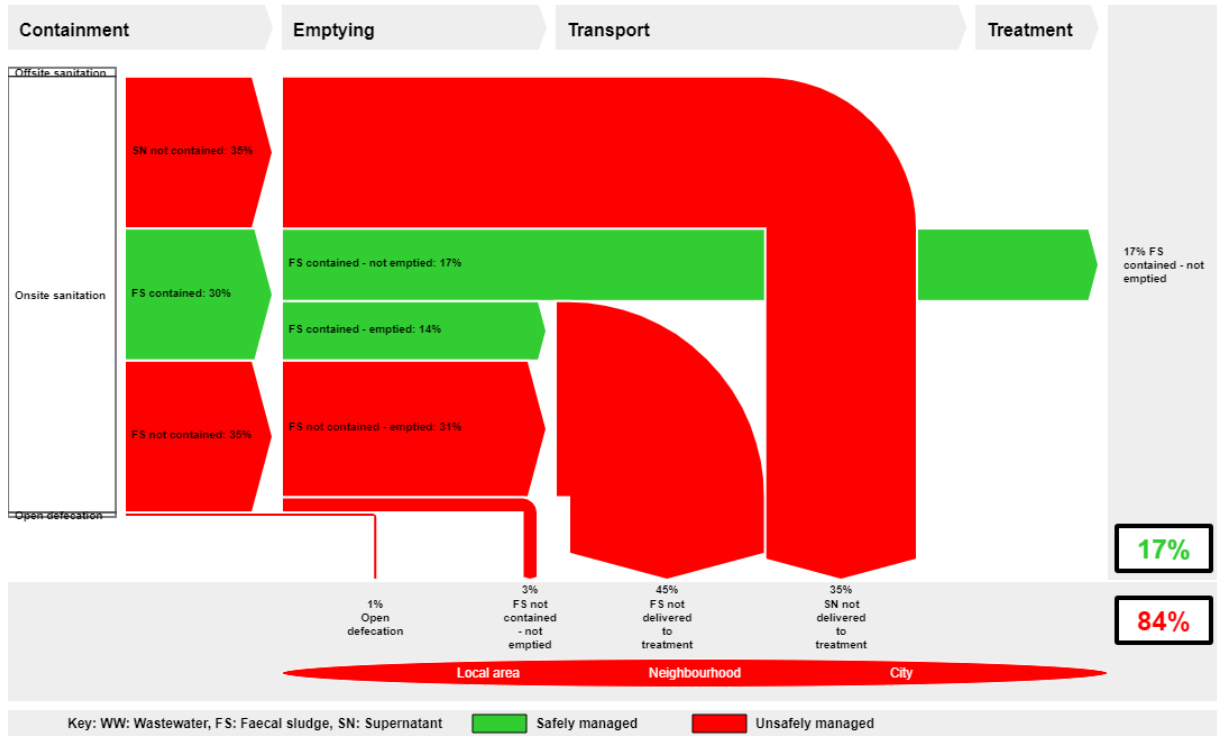
1 The SFD Graphic

Srivilliputhur, Tamilnadu, India

Version: Reviewed
SFD Level: SFD lite

Date prepared: 20 Mar 2021

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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

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Collaborating partners:

- Centre for Science and Environment, New Delhi, India.

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3 General city information

Srivilliputhur is a town and promoted as a first-grade municipality in the year 1984 located in north of Rajapalayam in Virudhunagar district in the Indian state of Tamilnadu. As of 2011, the town had a population of 75,396.

The town is known for its famous Lord Andal temple which is a 192 (58.5 m) feet long tower structured temple, lord said to be as vatapatsayee. Srivilliputhur is located at 9.51610N 77.630 E (Figure 1). The town is located at the foothills of Western Ghats 77 km south west of Madurai. The town is also famous for the wild life sanctuary for Grizzled Giant Squirrel established in 1894.

Shenbagathoppu is a forest located 8 km west of Srivilliputhur. It has an average elevation of 137.2 m above mean sea level. There is notable mineral source available in and around the Srivilliputhur and it receives a scanty rainfall with an average of 811 mm annually, which is lesser than the state average of 1,008 mm. Many rare endemic varieties of flora and fauna are found along the mountain slopes.

Srivilliputhur has an aera of 5.718 km² containing 33 wards and an elected councillor for each of these wards. The functions of the municipality are developed into various departments, comprising: General administration/personnel engineering, Revenue, Public Health, City Planning and Information Technology (IT), all are under a municipal commissioner. As of 1994, the space allocated for various activities in Srivilliputhur are given in the Table 1.



Figure 1: Map view of Srivilliputhur.

Table 1: Usage of land space for different activities in Srivilliputhur town.

% of Land (approx.)	Space (Hectares)	Activity
45	255.11	Residential
3	17.89	Commercial
3	15.04	Industrial
5	30.808	Public & Semi Public
2	12.677	Education
24	238.61	Agriculture & Irrigation

4 Service outcomes

Table 1: SFD Matrix for Srivilliputhur.

Srivilliputhur, Tamilnadu, India, 20 Mar 2021. SFD Level: SFD Lite

Population: 75373

Proportion of tanks: septic tanks: 50%, fully lined tanks: 100%, lined, open bottom tanks: 100%

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	69.0	90.0	0.0	0.0	0.0	0.0
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	30.0	45.0	0.0	0.0		
T1B11 C7 TO C9 Open defecation	1.0					

4.1 Containment

A total of approximately 69% of the households in Srivilliputhur are equipped with septic tanks where the supernatant is discharged to open drain or storm sewer (T1A2C6). An example of a septic tank and emptying of fecal sludge is depicted in Figure 2. Lined pits with semi-permeable walls and open bottom where there is a 'low risk' of groundwater pollution are utilized by 30% of the population (T1A5C10). Open defecation is practised by 1% of the population (T1B11 C7 to C9).

It is been noted that there are no community toilets in Srivilliputhur except public toilets for the combined society use (KII2, 2019). Table 2 shows water supply and wastewater generation from various wards of the Srivilliputhur municipality.



Figure 2: Example of onsite system (septic tank) and access to containment.

Table 2: Water supply and wastewater generation from various wards of the Srivilliputhur municipality.

Zone	Ward Numbers	No. of Streets	Population	Buildings / Houses	Water supply (L) Based on 90LPCD	Grey water generation (L) Based on 80% conversion LPCD	Black Water generation m ³ / per year
1	1, 2, 3, 4, 5(l), 6(l)	36	14,981	4,686	1,348,290	1,078,632	84,348
2	5(l), 6(l), 7, 8, 9, 10(l), 12, 13(l), 14, 15(l)	30	17,851	5,872	1,606,590	1,285,272	105,696
3	13(l), 15(l), 16, 17, 18, 19, 21, 22, 23	29	15,954	6,334	1,435,860	1,148,688	114,012
4	10(l), 27, 28, 29	14	7,048	2,342	634,320	507,456	42,156
5	11, 20, 24, 25, 26, 30, 31, 32, 33	45	19,539	6,872	1,758,510	1,406,808	123,696

The Graphic Generator required information about the proportion of each type of on-site container facilities where the fecal sludge is being stored or hold. In case the septic tanks are connected to soak pits or open ground, it is recommended to use the default 100% value, and if the septic tanks are connected to the sewer network or open drains, a 50% value can be used. Similarly, the faecal sludge content in pits is recommended to set it to 100%, as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.

When the groundwater table is higher, systems with lined tank, semipermeable walls and open bottom shall bear the risk of contaminating the groundwater. But in this case, the groundwater level is about 250 feet (76.2 m) and therefore, there is a low risk of ground water pollution.

4.2 Emptying and transportation

In some areas of the town, having no separate sewerage network, the supernatant from septic tanks is connected to the open drains. Currently, underground drainage systems are being constructed by the town municipality department which will lead to the connection of these underground drainages to the treatment plant which is under planning. The underground drains will be used by the households for the proper conveyance of sewage and shall work as sewers in most watery cases in order to avoid clogging problems (KII2, 2019). These treatment plant facilities will be implemented in Srivilliputhur in the upcoming years.

Most of the time, these open drains are laden with grey water from the individual households and solid waste (due to littering). Often, these small and medium sized open drains get blocked as per the information and problems discussed with the nearby house owner (KII4, 2019), and ultimately results in regular water logging during monsoon and also sometimes back flow of wastewater from sewers. Due to these regular water logging problems, the municipality faces a huge amount of problems in maintenance and cleaning of these waste drains (Figure 3 and Figure 4).



Figure 3: Blockage of open medium sized drains.



Figure 4: Flowing of wastewater from main open drains.

It is observed that in many areas of the town, black water is discharged into the open fields, whereas the grey water is discharged into open/storm water drains. In many cases, the public urinals are directly discharged into the open drains. Private truck agencies are in use to empty the faecal sludge from onsite systems. As per the interview conducted with a lorry driver (KII3, 2019) around 12-15 vacuum trucks having capacities of 6,000 litres are in use. Figure 5 shows the emptying of a septic tank.



Figure 5: Emptying of a septic tank.

Moreover, according to the same interview (KII3, 2019), most of the time 10 trucks per day are used in emptying the onsite systems but there are some major issues related to emptying and transport facilities. For example, due to the unavailability of a treatment plant, these trucks get emptied at the land away from the town. In order to save fuel, some of the trucks are getting emptied in any nearby open land, the side of highways, in any unused agricultural land, barren land or in the main open drains. All emptied faecal sludge is disposed without treatment plant since currently there are no treatment plants available.

Thus, for all sanitation systems, variable F4 (proportion of faecal sludge emptied, which is delivered to treatment plants) variable S4d (proportion of supernatant in sewer system that is delivered to treatment plants) and variable S4e (proportion of supernatant in open drain or storm sewer system, which is delivered to treatment plants) are set to 0% in all systems.

4.3 Treatment

As of this day, Srivilliputhur municipality lacks any treatment facilities for treating wastewater or faecal sludge. Thus, for all sanitation systems, variable F5 (proportion of faecal sludge delivered to treatment plants, which is treated), variable S5d (proportion of supernatant in sewer system that is delivered to treatment plants, which is treated) and variable S5e (proportion of supernatant in open drain or storm sewer system that is delivered to treatment plants, which is treated) are set to 0% in all systems.

Under the Swacch Bharath Abhiyan of the Government of India and Tamil nadu State Government initiative, a 30 KiloLitres per Day (KLD) Faecal Sludge Treatment Plant (FSTP) is under construction for Srivilliputhur Municipality as shown in Figure 6. The under construction FSTP is predominantly meant for the treatment of Faecal Sludge and is expected to be fully functional by the end of December 2021. The FSTP consists of (i) Screening chamber (ii) Anaerobic digester (iii) Sludge Drying bed (iv) Collection Wells (based on the contour) (v) Anaerobic upward filter (vi) Horizontal planted filter (vii) polishing unit and (viii) wet lands.



Figure 6. Under construction 30 KLD capacity FSTP at Srivilliputhur (dated: January 2021).

4.4 Reuse and Disposal

Due to the unavailability of any treatment plant in the town for both municipal sewage water and the sanitation waste water (fecal sludge waste), there is no other way than to dispose the fecal sludge wastewater in an open land for emptying the truck loaded with fecal sludge waste coming from various parts of the town. This disposal site is for temporary use since a FSTP is under construction for treatment of fecal sludge in the future as stated in the previous section.

4.5 SFD Graphic

It is estimated that around 17% of city's excreta is being managed safely and around 84% is being unsafely managed as shown in the SFD graphic (data do not add up to 100% due to rounding). The town can be brought under open defecation free town, because the town has very less percent of open defecation problem (less than 1%). However, some of the ward areas (away), at the boundary region of the town are having open defecation, which is observed due to the unavailability of self-toilet. Therefore, it was decided to include those minor practices in the SFD graphic (1%). It is been noted that no community toilets are there other than public toilets for the combined society use (KII2, 2019). The 17% of the total safely managed excreta corresponds to safely managed faecal sludge that

comes from faecal sludge not emptied from onsite systems (T1A2C6 and T1A5C10). In the medium- to long-term, as the population and population density increases, this practice would not be sustainable and improve sanitation management services may be required since those systems eventually will require emptying services.

The unsafely managed excreta (84%) originated from faecal sludge not contained-not emptied (3%), faecal sludge not delivered to treatment (45%), supernatant not delivered to treatment (35%) and open defecation (1%).

4.6 Groundwater Contamination

There is no proper data available to understand the groundwater table and the soil characteristics of Srivilliputhur Municipality. So, the information was collected from KII2 (2020). It was estimated that 30% of drinking water supply is from Shembagathope and 70% from combined water supply scheme from Tamarabarani river. As per the Central Groundwater Board, the district of Virudhnagar is under Red Zone category with respect to usage of groundwater for drinking purposes. For all practical reasons, the groundwater must be used only for all non-drinking purposes. The groundwater is available only beyond 30 metres and soil type is mainly of deep red loam, black soil and red sandy soil. The lateral separation between sanitation facilities and groundwater sources with less than 10 metres is considered greater than 25%. More than 25% of sanitation facilities are found uphill of groundwater sources. So, it has been estimated that there is low risk of groundwater pollution in Srivilliputhur municipality.

5 Data and assumptions

The data for the SFD matrix were estimated using the data collected from the household survey carried out by Chandra Prakash (Kalasalingam Academy of Research and Education), in Srivilliputhur in 2019. The collected data were further discussed with the sanitation experts and finalized with key informants of Srivilliputhur municipality.

The proportions of FS in septic tanks, fully lined tanks and lined tanks with impermeable walls and open bottom were set to 50%, 100% and 100%, respectively, according to the relative proportions of the systems in the municipality, as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.

The proportion of emptied faecal sludge for different types of containment connected to different technologies (variable F3) was estimated on the basis of the data collected from the household survey and Key Informant Interviews. Assumptions made are about the percentage of damaged and closed septic tanks which are around less than 500 houses which gives a less than 1% and finalized with the municipality key informants.

6 List of data sources

- *Centre for Science and Environment, New Delhi, India.*
- *Srivilliputhur Municipality Corporation, Srivilliputhur, Tamilnadu, India.*
- *Kalasalingam Academy of Research and Education (KARE), Tamilnadu, India.*
- *KII1 (2019): Discussion with a senior biological expert, centre for biotechnology, KARE, Tamilnadu, India.*
- *KII2 (2019): Interview with a municipality sanitation officer Mr. Palanaiguru, Srivilliputhur Municipality.*
- *KII3 (2019): Interview with a lorry driver (who empties nearly 8-10 septic tanks a day), Srivilliputhur.*
- *KII4 (2019): Interview with a house owner Mr. Rajeshwaran Achankulam (house near a main open drain), Srivilliputhur.*
- *KII5 (2019): Interview with the compost yard In-charge Mr. P Velumani, Srivilliputhur.*

SFD Promotion Initiative



SFD Srivilliputhur, India, 2020

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