SFD Lite Report

Sakhipur
Bangladesh

This SFD Lite Report was prepared by
WaterAid Bangladesh & CWIS-FSM Support Cell, DPHE

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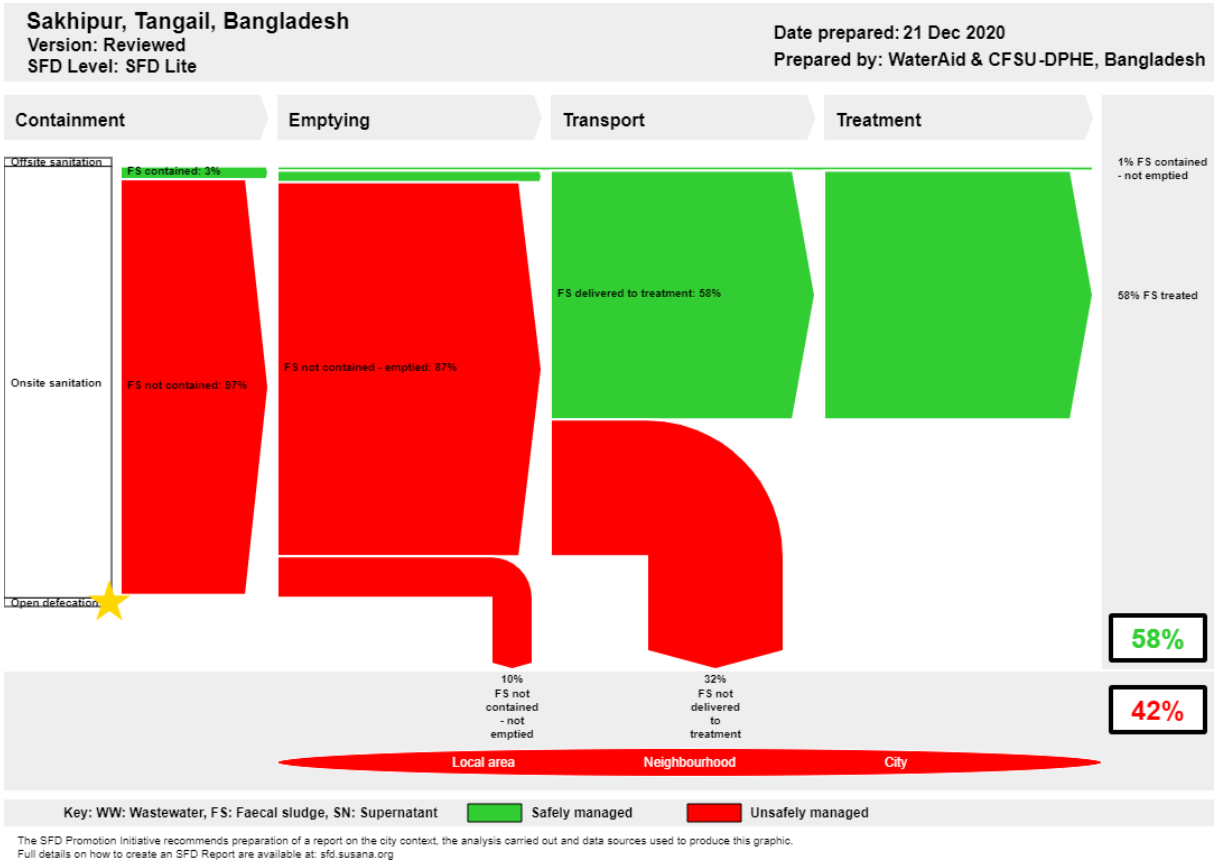
1 The SFD Graphic



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

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Collaborating partners:

- Bangladesh Association for Social Advancement (BASA) and Sakhipur municipality played vital roles in collecting and sharing data, and producing this SFD lite report.
- Centre for Science and Environment (CSE) for providing technical support in preparing the SFD graphic and report.
- CWIS-FSM Support Cell, Department of Public Health Engineering (DPHE) for providing technical support and knowledge on finalisation of SFD lite report.

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3 General city information

Sakhipur, recognized as municipality, is a town of Sakhipur Upazila which is located about 39 km by road from Tangail and 77 km northwest of Dhaka city, the capital of Bangladesh. Sakhipur became a *Pourashava* (municipality) in October 2000. It has an annual income of 6 million Bangladeshi Taka (BDT) over the last three years which makes it an 'A' category *Pourashava*. Sakhipur municipality consists of 9 wards and 18 *mohallas* covering an area of 13.77 square kilometres (BBS, 2011).

According to the Census of Bangladesh Bureau of Statistics (BBS) in 2011, the number of households in Sakhipur municipality is 7,473 and the total population is 30,028. With a national population growth rate of 1.37 (MSVSB, 2018; BBS, 2019), the estimated total population in 2020 is about 33,940 with population density of around 2,465 per square kilometre which is very high as compared to the national population density of 1,265 per square kilometre. The literacy rate is 57.6% (BBS, 2011).

The city does not have a dedicated sewerage system though everyone in the city has access to toilet, hence no open defecation. The whole city mainly relies on onsite sanitation systems like pit latrines and septic tanks. However, currently, installation of septic tanks is on the rise. Both fully lined tanks (container type) and properly designed septic tanks are usually called septic tanks. Generally, septic tanks are used in institutions, community and public toilets while people mostly construct fully lined tanks at household level.

Majority of households in Sakhipur municipality are dependent on groundwater sources.The groundwater is typically extracted from a depth of 30-40 feet (9-12 metres). Around 82.09% of the people use tube-well as the source of drinking water while 0.67% use tap, 0.47% rely on pond and 16.83% corresponds to other sources (BBS, 2011). There is no provision of municipal water supply. Risk of groundwater pollution is high throughout the municipality.

4 Service outcomes

Sakhipur, Tangail, Bangladesh, 21 Dec 2020. SFD Level: SFD Lite
Population: 33940
Proportion of tanks: septic tanks: 100%, fully lined tanks: 100%, lined, open bottom tanks: 1

System label	Pop	F3	F4	F5
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
T1A3C10 Fully lined tank (sealed), no outlet or overflow	3.0	90.0	100.0	100.0
T1A3C9 Fully lined tank (sealed) connected to 'don't know where'	2.0	90.0	50.0	100.0
T1A4C7 Lined tank with impermeable walls and open bottom, connected to a water body	30.0	90.0	25.0	100.0
T2A2C5 Septic tank connected to soak pit, where there is a 'significant risk' of groundwater pollution	5.0	90.0	100.0	100.0
T2A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	60.0	90.0	80.0	100.0

Table 1: SFD Matrix for Sakhipur

The outcome of the SFD graphic shows that fifty eight percent (58%) of the excreta flow is classified as safely managed, and the remaining forty two (42%) percent is classified as unsafely managed. Overview on technologies and methods used for different sanitation systems through the sanitation service chain is as follows:

4.1 Offsite Systems

The city does not have any dedicated sewerage system.

4.2 On-site Sanitation Systems

Containment: Almost all the households in the city have their own latrine which is connected to single pits, twin pits, or septic tanks. Most of the septic tanks in household level are actually fully lined tanks and some are properly designed septic tanks with high desludging period in community, institutions and public toilets. However, very few of the latrines are environmentally safe. Most of those who do not have latrines use community or shared latrines. Very few people use their neighbour's latrine.

Baseline Survey in 2015 states that 5% of the toilets have septic tanks as the containment system, and 95% have pits (Baseline, 2015). However, in recent years, most of the households and communities have constructed fully lined tanks or septic tanks (KII3 and KII4). Now, around 5% of city population uses septic tanks and 5% fully lined tanks while around 90% of the people use pits in the city (KII3, KII4, FGDs, HH survey, 2020). According to the type of connectivity and features of containment technologies, the discharging points of the toilets are categorized as: 5% population uses septic tanks connected to soak pits (T2A2C5), 3% and 2% uses fully lined tanks with no outlet or overflow (T1A3C10) and connected to 'don't know where' (T1A3C9) respectively, 30% utilizes lined tanks with impermeable walls and open bottom connected to open water bodies (T1A4C7) and 60% of the population rely on lined pits with semi-permeable walls and open bottom with no outlet or overflow (T2A5C10).

At containment stage, the city's excreta of only 3% population are contained while 97% are not contained. Septic tanks are mostly connected to soakpits. Only 4.17% of septic tanks are connected to open water bodies which is actually <0.5% of the total containment technologies. So, this technology is ignored during SFD generation. Fully lined tanks are of small size, mainly container type (Figure 1).

Figure 1: Containment technologies and their connections in Sakhipur.

Groundwater Pollution: The depth to groundwater in the city is more than 30 feet (9 metres). The most common drinking water production technology is protected wells and most of the people use groundwater as their drinking water source. Lateral separation between sanitation facilities and water source varies from one area to another. Considering all these factors, it is estimated using the decision matrix in the SFD Graphic Generator that there is significant risk of groundwater pollution in the city.

Emptying: Around 90% of households with lined pits which have no outlet or overflow empty their pits regularly either manually or mechanically. Around 20% of these people still practice the manual emptying for several reasons, mainly because the vacu-tug cannot have access to those containment systems due to narrow roads, low income people cannot afford the cost of service, some are not yet sensitized, etc. Around 90% of households with lined tanks that are connected to the water bodies claim that they have not emptied them in its lifetime using any service. This can be attributed to the fact that they are connected to low land or water bodies and some are emptied manually, a portion of which were not mentioned as emptied.

On the other hand, almost 90% of households or communities with both septic tanks and fully lined tanks have emptied them at least once since 2015.

There are two types of emptying services in the municipality (Figure 2). The municipality operates vacu-tug, but customers have to apply to the municipality for this service, and there is high demand for the service. All the households who empty their septic tanks, avail the mechanical service. Unfortunately, some of the pit users cannot avail this service. There are also some private sweepers, who empty pits using a bucket and rope. In practice, septic tanks are emptied only when a tank is full or malfunctioned.

Figure 2: Septic tanks and pit emptying (mechanically and manually) in Sakhipur.

Transportation: The city currently has 1 functional vacu-tug with capacity of 1,000L which has been used as sludge transport system. It can complete a maximum of 8 trips per day. However, in some cases, private sweepers transport sludge at night in buckets and dump it into holes, dug on open ground or simply into open drains, ditches or by the railway line.

Figure 3: Vacu-tug (transports FS to treatment plant) and dumping FS in open ground.

Treatment/Disposal: The municipality has a treatment plant which is fully functional. Around 60,000-70,000 litres of faecal sludge is collected and treated in this plant each month. 100% of the faecal sludge that comes to the plant gets treated. Produced compost of the plant is used by the farmers to grow different kinds of vegetables (KII5). So far, the result is good. Effluent from the plant is discharged into the environment after proper treatment complying with national standards.

Figure 4: Sakhipur Faecal Sludge Treatment Plant (Co-compost plant).

Figure 5: Produced Compost and its use in Sakhipur.

4.3 Open Defecation:

From HH surveys, KIIs and FGDs, it is found that there is no practice of open defecation.

5 Data and assumptions

The availability of quantitative data on sanitation services in Sakhipur is limited. However, the baseline survey conducted in July, 2015 contains detailed data on different stages of sanitation value chain. This survey consisted of household interviews and desk review of relevant documents.

The SFD graphic relied on this data source along with desk-based research, key informant interviews, focus group discussions, treatment plant data records and sample household surveys. Finally, data from all these sources were triangulated to produce the SFD graphic.

The last census was carried out about 10 years ago. So, the actual population, household and sanitation data is not updated yet. Most of the households with septic tanks do not know the actual type, size and design desludging periods. Also, a large number of pit users are unaware about if they emptied their pits or not. Due to all these data gaps, some assumptions have been made to produce the SFD graphic.

Following assumptions were made for developing the SFD graphic for Sakhipur.

- The proportion of FS in septic tanks, fully lined tanks and all types of pits were all set to 100%, as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.
- The population growth rate for Sakhipur Municipality in recent years is not available. So, the cumulative national growth rate (1.37%) is added with the last census data (BBS, 2011) to estimate the total population in 2020, which is 33,940 people.

- Though, all people generally call both properly design septic tanks and fully lined tanks as ‘septic tanks’; during household and community visits, it was found that most of the households use fully lined tanks which have ‘no outlet no overflow’ or connected to ‘do not know where’. But in case of community, institutions or public toilets, they have proper septic tanks, mostly connected to a soak pit. So, it is assumed that the total 10% of ‘septic tanks’ are equally distributed as fully lined tanks (sealed) (system T1A3C9, 2% and system T1A3C10, 3%) and septic tanks (system T2A2C5, 5%).
- Around 30% of pits are directly connected to open drains or open water bodies. Open drains are available in small number in Sakhipur. So, it is assumed that all of the connections are to open water bodies and the containment technology is defined as lined tank with impermeable walls and open bottom (system T1A4C7, 30%).
- Around 90% of HHs are now emptying their pits regularly with desludging frequency of 1-2 years depending on whether it is a single or a twin pit system. Thus, variable F3 for system T2A5C10 is set to 90%.
- From baseline report 2015, it is found that 90% of HHs emptied septic tank for at least once. Farther data is not available. Though, from KIIs and FGDs, it is found that the construction and emptying of them has been increased. The FSTP record shows that 90% of HHs emptied their septic tank for at least once since 2015. It is assumed that the desludging frequency for properly designed large size septic tanks which are mostly used in communities, institutions and public toilets is 5 years while for fully lined tanks that are used in household level is 3 years. Thus, variable F3 for systems T1A3C9, T1A3C10, T1A4C7 and T2A2C5 is set to 90%.
- Most of the pits are now emptied mechanically and FS from around 80% of them is transported to the FSTP and hence, variable F4 for system T2A5C10 is set to 80%.
- Most of FS emptied from lined tanks with impermeable walls and open bottom is manually dumped in water bodies. So, it is assumed that only 25% of this emptied FS is delivered to the treatment facility and hence, variable F4 for system T1A4C7 is set to 25%.
- FS from 90% of fully lined tanks (sealed) connected to 'don't know where' is emptied both manually and mechanically. It is assumed that 50% of this emptied FS is delivered to the treatment plant and hence, variable F4 for system T1A3C9 is set to 50%.
- All septic tanks are emptied mechanically and all FS is transported to the FSTP. Thus, variable F4 for systems T2A2C5 and T1A3C10 is set to 100%.
- The treatment plant is fully functional. So, it can treat 100% of faecal sludge that gets delivered there. Thus, variable F5 for all sanitation systems is set to 100%.

5.1 Comparison with the SFD report from 2018:

In this section, a comparison of the data sources and results produced with respect to a previous SFD report published in 2018, which was also produced by WaterAid Bangladesh (Sakhipur SFD Report, 2018) is presented. Table 2 shows the comparison of data gathered in the two SFD reports.

Table 2: Comparison of data gathered in the two SFD reports.

	SFD level 2 report (2018)	SFD lite report (2020)
Sources of data	Household survey, 1 KII, no FGDs and 5 secondary sources (reports, papers).	Household survey, 6 KIIs, 4 FGDs and 6 secondary sources (reports, papers).
Service delivery context description	Information on policy, legislation and regulation of the sanitation service delivery chain is provided.	Some information on policy, legislation and regulation of the sanitation service delivery chain is provided.
Data validation	One field visit.	Four field visits.
Findings validation	Discussions were held with conservancy staff, town level coordination committee members and sweepers.	Discussions were held with conservancy staff, municipality officer, FSTP staff and emptiers.

Table 3 depicts a comparison of the sanitation systems in the city according to the two SFD reports.

Table 3: Comparison of sanitation systems according to the two SFD reports.

Sanitation systems	Groundwater risk	SFD level 2 report (2018)	SFD lite report (2020)
Septic tank connected to a soak pit	High	1% (T2A2C5)	5% (T2A2C5)
Septic tank connected to open water body	-	4% (T1A2C7)	-
Fully lined tank (sealed) connected to 'don't know where'	-	-	2% (T1A3C9)
Fully lined tank (sealed), no outlet or overflow	-	-	3% (T1A3C10)
Lined tank with impermeable walls and open bottom, connected to a water body	-	-	30% (T1A4C7)
Lined pits with semi-permeable walls and open bottoms, no outlet or overflow	High	95% (T2A5C10)	60% (T2A5C10)
SFD graphic outcome	-	43% safely managed excreta. 57% unsafely managed excreta.	58% safely managed excreta. 42% unsafely managed excreta.

As seen in Table 2 and in Table 3, It is well noticed that the depth of the data gathered by this report is greater. The main differences rely on the disaggregation of the data related to the sanitation options and the greater number of KIIs, FGDs and field visits carried out. As a consequence, the SFD graphic outcome is also different by around 15%.

6 List of data sources

Reports and literature

- BBS, 2011, Census of Bangladesh Bureau of Statistics.
- BBS, SID and Ministry of Planning, 2019, Bangladesh Statistics 2019.
- BASA-WaterAid, 2015, Baseline Survey on Faecal Sludge, Solid waste and Poultry litter Management in Shakhipur Municipality.
- IRF, 2017, Institutional and Regulatory Framework for FSM: Section on municipalities.
- Paurashava Act, 2009.
- SFD Report Sakhipur, Bangladesh, 2018.

Key Informant Interviews (KII)

- KII1, Project Officer, WaterAid Bangladesh.
- KII2, Project Manager, BASA.
- KII3, Secretary, Sakhipur municipality.
- KII4, Asst. Engineer, Sakhipur municipality.
- KII5, Plant Protection officer, Department of Agriculture Extension (DAE, Sakhipur).
- KII6, Septic tank emptier, Sakhipur FSTP.

Figure 6: KIIs with different stakeholders in Sakhipur.

Focus Group Discussions (FGD)

- FGD1, Sakhipur Co-compost plant workers group, Plant workers, Sakhipur Co-compost plant.
- FGD2, Sakhipur-Team Project Staffs, BASA.
- FGD3, Agricultural field Farmers, Farmers School.
- FGD4, Manual Emptying service- worker group, Pit Emptiers, Informal group.

Figure 7: Focus Group Discussions in Sakhipur.

Field Visits

- Public and community toilets.
- Sakhipur Faecal sludge Treatment Plant.
- Households (for random survey).
- Farmer School.

SFD Sakhipur, Bangladesh, 2020

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