



SFD Lite Report

Pabna Municipality Bangladesh

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

Date of production/ last update: 19/04/2021

1 The SFD Graphic

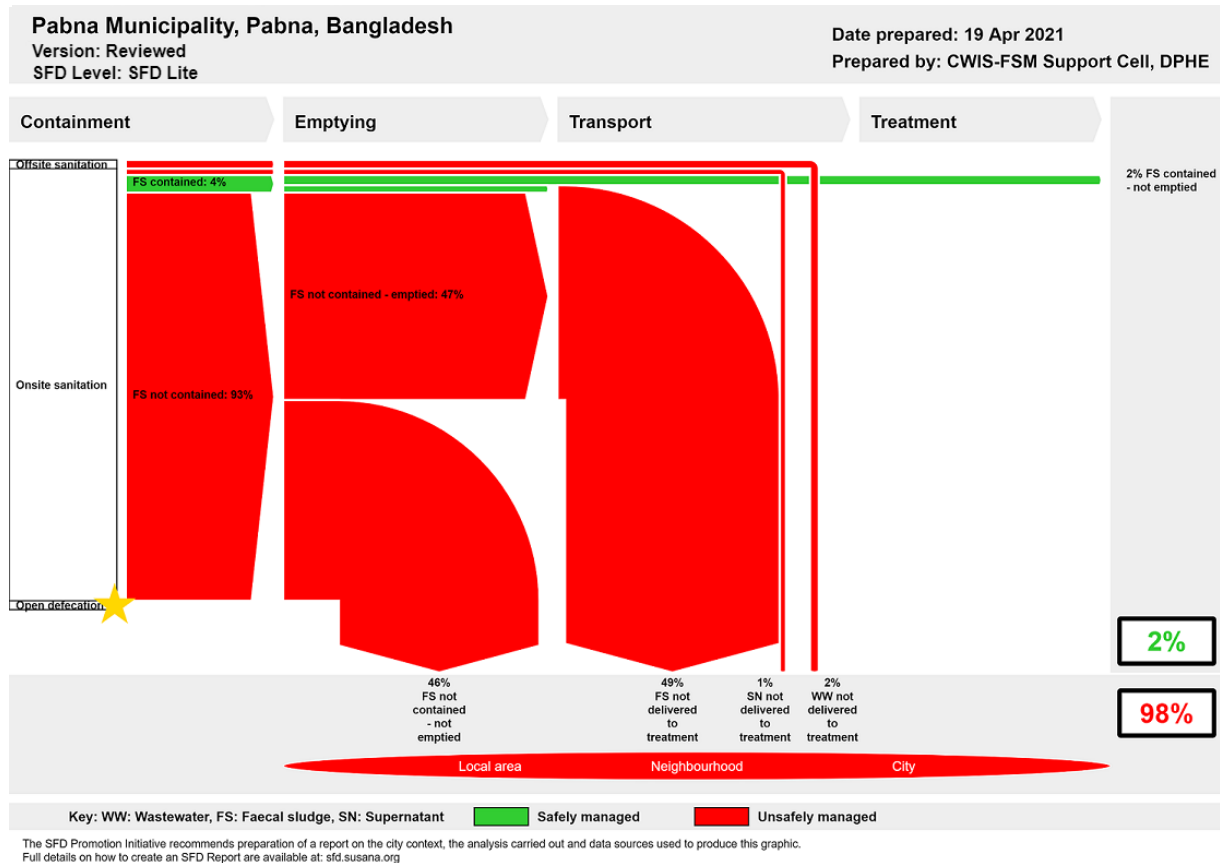


Figure 1: SFD Graphic for Pabna municipality.

2 SFD Lite information

Produced by:

- Dr. Abdullah Al-Muyeed, Chief Operating Officer, CWIS-FSM Support Cell, Shishir Kumar Biswas, Project Director, Feasibility for Implementing of Solid Waste and Faecal Sludge Management System in 53 District Level Municipalities and 8 City Corporations, Department of Public Health Engineering (DPHE) and Suman Kanti Nath, Technical Expert, CWIS-FSM Support Cell, Department of Public Health Engineering (DPHE), Bangladesh.
- This report was compiled as part of the Baslene Survey of 61 Town project of DPHE . We would like to thank Mr. Md. Kamrul Hasan Mintu, Mayor, Pabna Municipality , Mr. Md. Saidul Islam, Secretary, Pabna Municipality; Mr.Md.Tabibur Rahman, Executive Engineer, Pabna Municipality. Municipality for providing all the required primary and secondary data and cooperating for Key Informant Interviews (KIIs) & Focussed Group Discussions (FGDs). This report would not have been possible to produce without constant support of Mr. Md. Kamrul Hasan Mintu, Mayor, Municipality, who helped in conducting sample surveys and FGDs in the field.

Collaborating partners:

- DevCon, Tiller and Pabna municipality played vital roles in collecting and sharing data, and producing this SFD graphic and SFD lite report.

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3 General city information

Pabna is a fast-growing city, which is 153 km away from the Dhaka city. It is beside the Isamoti River and well connected with road, water, and railways. It is one of the oldest towns in the sub-continent and was declared Municipality in 1876. Pabna is one of the 53 district level Municipalities in the country.

Table 1: City profile.

Population parameters	
Estimated population, 2020	198,427
Households, 2020	42,848
Area, sq.km	27.20
Total roads, km	213
Total drains, km	191

According to the population census in 2011 by the Bangladesh Bureau of Statistics (BBS), the Pabna city population was 144,442. The urban population growth in Bangladesh is 3.5% per year. Considering 10% floating population, such as farmers and traders, comes to the city every day, the present (2020) population is estimated to be around 198,427.

The Municipality covers an area of 27.20 square kilometres. At present, Pabna municipality has 213 km of road out of which 162 km is bituminous road, 4.5 km is Herring-Bone-Bond (HBB) road, 20.10 km is cement concrete road, 1.8 km is Water Bound Macadam (WBM) road and 24.60 km corresponds to earthen road. The city has about 191 km of drains which includes 86.8 km of Brick drain, 41.0 km of RCC drain, 8.8 km of primary drain and 54.4 km of earthen drain (Table 1).

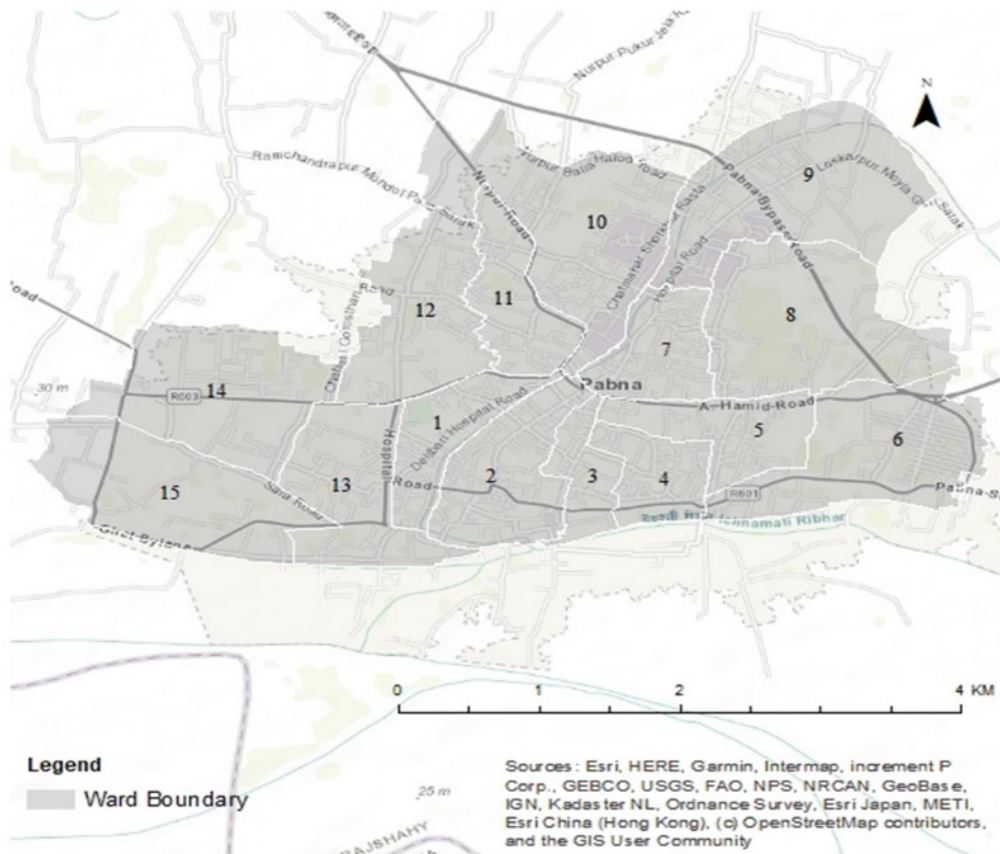


Figure 2: Pabna Municipality Ward Boundary Map.

The geographical coordinates of Pabna are: 24°00'23.18" N and 89°14'13.92" E (Figure 2). In the context of Bangladesh, the municipality area is almost flat. Most areas are almost flat. The elevation of land is approximately 16 m. Isamoti River passed through the municipality. The municipality falls in Physiographic Unit Ganges River Floodplain. The general soil type has mainly Deeply Flooded Phases. General soil types predominantly include calcareous dark grey floodplain soils and calcareous brown floodplain soils.

According to the Bangladesh Meteorological Department, the city area and surrounding area experiences a tropical monsoon climate. It is characterized by warm, humid summers and cool, and dry winters. There is no climatological station within the municipality. The closest meteorological station of Bangladesh Meteorological Department is located in Ishwardi which is about 25 km away from the Municipality area. Weather data from this station is collected from 1981 to 2017. About 90% of the total annual rainfall occurs in the period from May through October and the driest months of the years are November to March. The maximum mean temperature observed is 32.1-35.8°C between April-August, with the minimum mean temperatures of between 10.3-12°C in January. The annual average rainfall is about 1,656 mm, according to BMD (1981-2017).

Isamoti River passed through the Municipality. Several canal/khal passed through the municipality. According to the flood zoning map of Bangladesh, the municipality is in a flood zone (in the last 12 years, flooding event happens). However, the drainage network of the city is not adequate. Every year, municipality areas face water logging during monsoon for drainage congestion. There are some secondary drains carrying storm water and domestic wastewater to the outfalls the rivers and canals.

The population density in the 15 wards of the city is shown in Figure 3. The density is high in the centre and south, ranging from 20,001 to 21,266 per sq km. The population density in the East and West are lower, ranging from 4,499 to 5,000 per sq km.

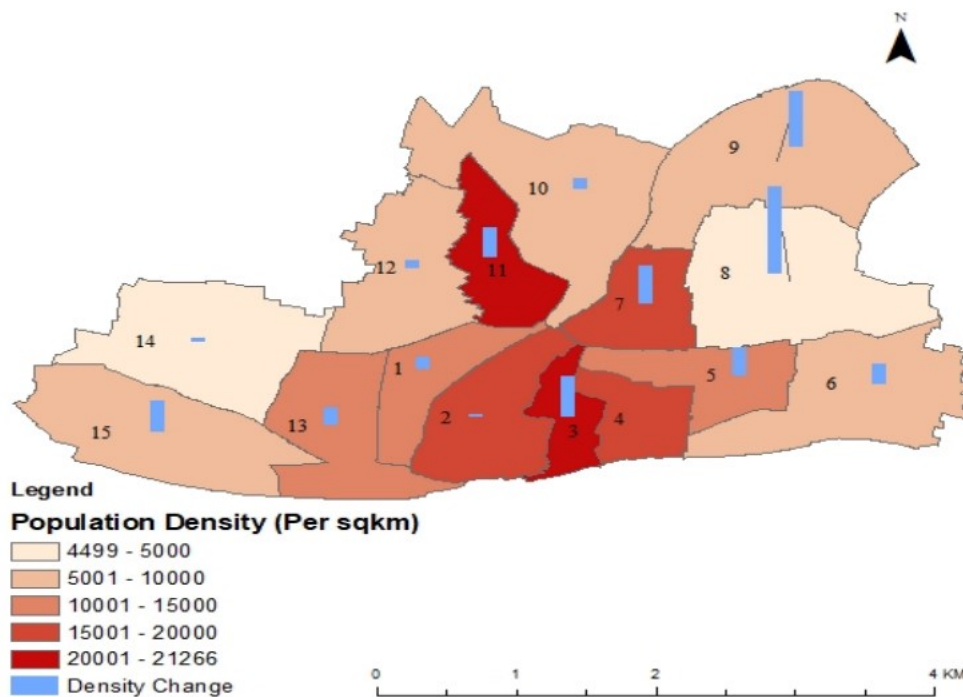


Figure 3: Population density in different Wards of Pabna municipality.

4 Service outcomes

Pabna Municipality, Pabna, Bangladesh , 19 Apr 2021. SFD Level: SFD Lite

Population: 198427

Proportion of tanks: septic tanks: 84%, fully lined tanks: 0%, lined, open bottom tanks: 100%

Containment						
System type	Population	Emptying	Transport	Treatment	Transport	Treatment
	Pop	F3	F4	F5	S4e	S5e
System label and 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
T1A1C7 Toilet discharges directly to water body	2.0					
T1A2C5 Septic tank connected to soak pit	4.0	50.0	0.0	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	9.0	15.0	0.0	0.0	0.0	0.0
T1A2C8 Septic tank connected to open ground	5.0	15.0	0.0	0.0		
T1A2C9 Septic tank connected to 'don't know where'	10.0	15.0	0.0	0.0		
T2A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	15.0	0.0	0.0	0.0		
T2A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	55.0	80.0	0.0	0.0		

Table 2: SFD Matrix for Pabna.

The outcome of the SFD graphic shows that only two percent (2%) of the excreta flow is classified as safely managed, and the remaining ninety eight (98%) percent is classified as unsafely managed (Figure 1). The unsafely managed excreta originate from wastewater not delivered to treatment (2%), Faecal Sludge (FS) not contained - emptied but not delivered to treatment (49%), FS not contained - not emptied (46%) and 1% of supernatant not delivered to treatment. The safely managed excreta come from FS contained but not emptied (2%).

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. However, during field observation and Household (HH) survey, it was found that there are certain areas where the population use toilets discharging directly to water bodies (T1A1C7, 2%) and septic tanks are directly connected to open drains (Figure 4). Therefore, T1A2C6 system is considered as 9% of the total population of the city to generate the SFD graphic. In the absence of sewerage system, the faecal sludge and the supernatant in T1A2C6 is directly discharged into the river or other.

4.2 On-site Sanitation Systems

The percentages presented in Table 2 and discussed in this section are based on data collected through household survey, Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) (Figure 4).



Figure 4: Household survey and consultations. Left: Household survey. Right: Consultation meeting.

Containment: Almost all the households in the city (98.3%) have their own latrine which is connected to single pits, twin pits, or septic tanks. A portion of the septic tanks at household level are actually fully lined tanks and the major portions are properly designed septic tanks with high desludging period in community, institutions and public toilets. However, very few of the latrines are environmentally safe. From the household survey, it was found that, around 28% of the city population uses septic tanks as the containment system, 55% of the toilets have single pit systems and 15% of the people use double pits in the city (KII, FGDs, HH survey, 2020).

According to the type of connectivity and features of containment technologies, the discharging points of the toilets are categorized as: 4% uses septic tanks connected to soak pits (T1A2C5), 9% of the population uses septic tanks connected to open drain (T1A2C6), 5% population are in use of septic tanks connected to open ground (T1A2C8), 10% utilizes septic tanks connected to 'don't know where' (T1A2C9), 15% uses lined tanks with impermeable walls and open bottom, no outlet or overflow (T1A4C10) and 55% of the population rely on lined pits with semi-permeable walls and open bottom with no outlet or overflow (T2A5C10). Thus, at containment stage, the city's excreta of only 4% of the population are contained. Figure 5 shows examples of these sanitation systems.



Figure 5: Containment technologies and their connections in Pabna. Left: Septic tank connected to nearby water body. Right: Toilet pipe connected to open drain.

Groundwater Pollution: The depth to groundwater in the city is more than 11 feet (3.4 metres). The most common drinking water production technology is borehole with hand pump or motorised pump. Lateral separation between sanitation facilities and water source varies from one area to another. 32% of the water sources have a distance of 0-3 metres and 63% of the water sources have a distance of 3-10 metres. Considering all these factors, it is considered that there is a significant risk of groundwater contamination in the city.

Emptying: Around 65% of the septic tanks are never desludged and the outlets of such septic tanks are mostly connected to drains and open environment. Only a small portion (15%) are connected to soakway pits. We have considered the tank or pit as emptied if it has been emptied at least once in the last 3 years. In Pabna municipality, among the septic tanks, which are desludged within 10 years interval, 50% of the septic tanks are desludged within three years and 70% of the septic tanks are desludged within five years. Desludging of the septic tanks or pits are mostly (96%) done by private sweepers. Only in a few households, desludging is done by municipal sweepers (1%). Around 95% of these withdrawal is done manually using bucket and rope for several reasons. This method highly risks the health and safety of the workers. A substantial number (3.5%) use manual pump and 1.5% use electric pumps. Municipal authority has a vacu-tag, but there are no vacu-tag services.

Transportation: Around half of the sludge (50%) withdrawn from the septic tanks and latrine pits by the cleaners is disposed of in a dug hole and covered with soil. Around 40% of the sludge is disposed of in the open environment like a drain, open ground and water bodies.

Treatment/Disposal: Presently, there is no wastewater or faecal sludge treatment facilities in the town.

4.3 Open Defecation:

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

5 Data and assumptions

The baseline survey conducted in October 2020 contains detailed data on different stages of the sanitation value chain. The SFD graphic relied on these data, collected during sample household surveys, along with key informant interviews and focus group discussions. 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 Pabna:

- ✓ The proportion of FS in septic tanks, fully line tanks and line, open bottom tanks are considered 84%, 0% and 100% respectively, as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.
- ✓ According to the Census 2011, conducted by the Bangladesh Bureau of Statistics (BBS), the Pabna city population was 144,442. The Urban population growth in Pabna is considered as 2.2% and the present (2020) population is estimated to be around 198,427.
- ✓ There are around 15% of twin pit latrines as containment systems. So, it is assumed that all these twin pit containment technology is defined as lined tank with impermeable walls and open bottom (system T2A4C10, 15%).

- ✓ There are around 55% of single pit latrines as containment systems. So, it is assumed that all these single pit containment technology is defined as lined tank with impermeable walls and open bottom, no outlet or overflow (system T2A5C10, 55%).
- ✓ For system T1A2C5 (septic tanks connected to soak pits), since they are well-constructed as per the field visit observation, they were considered to be located in areas of low risk of groundwater contamination.
- ✓ Around 50% of HHs have emptied their pits with desludging frequency of 0-3 years. Thus, variable F3 for system T1A2C5 is set to 50%.
- ✓ Lined pit with semi-permeable walls and open bottom, no outlet or overflow, is considered as single pit latrine. Thus, variable F3 for system T2A5C10 is set to 80%.
- ✓ 65% of septic tanks connected to the environment are never emptied. Only 15% of these types of septic tanks are emptied with desludging frequency of 1-3 years. Thus, variable F3 for systems T1A2C6, T1A2C8 and T1A2C9 is set to 15%. Moreover, variables S4e and S5e related to the discharge of supernatant for system T1A2C6 are set to 0%.
- ✓ Lined tank with impermeable walls and open bottom, no outlet or overflow, is considered as twin pits. Thus, variable F3 for system T2A4C10 is set to 0%.
- ✓ Since there is no wastewater or faecal sludge treatment facilities in the town, variables F4 and F5 for all systems are set to 0%.

6 List of Sources

Key Informant Interviews (KII)

- KII with Mayor, Pabna Municipality.
- KII with Secretary, Pabna Municipality.
- KII with Conservancy Inspector, Pabna Municipality.
- KII with Councilor, Pabna Municipality.
- Facilitators: Abu Zubair, Field Coordinator, Tiller.

Focus Group Discussions (FGD)

- A group of representatives from Bazar Committee.
- Sweepers and waste collectors.
- A group of representatives from Educational Institutions.
- Masons association (Septic tank builders).
- Slum Dweller.



Figure 5: Focus Group Discussions in Pabna.

Pabna Municipality, Bangladesh, 2021

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Suman Kanti Nath, Technical Expert, CWIS-FSM Support Cell

Department of Public Health Engineering (DPHE), Bangladesh

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