SFD Lite Report

Kurigram Municipality Bangladesh

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

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1 The SFD Graphic

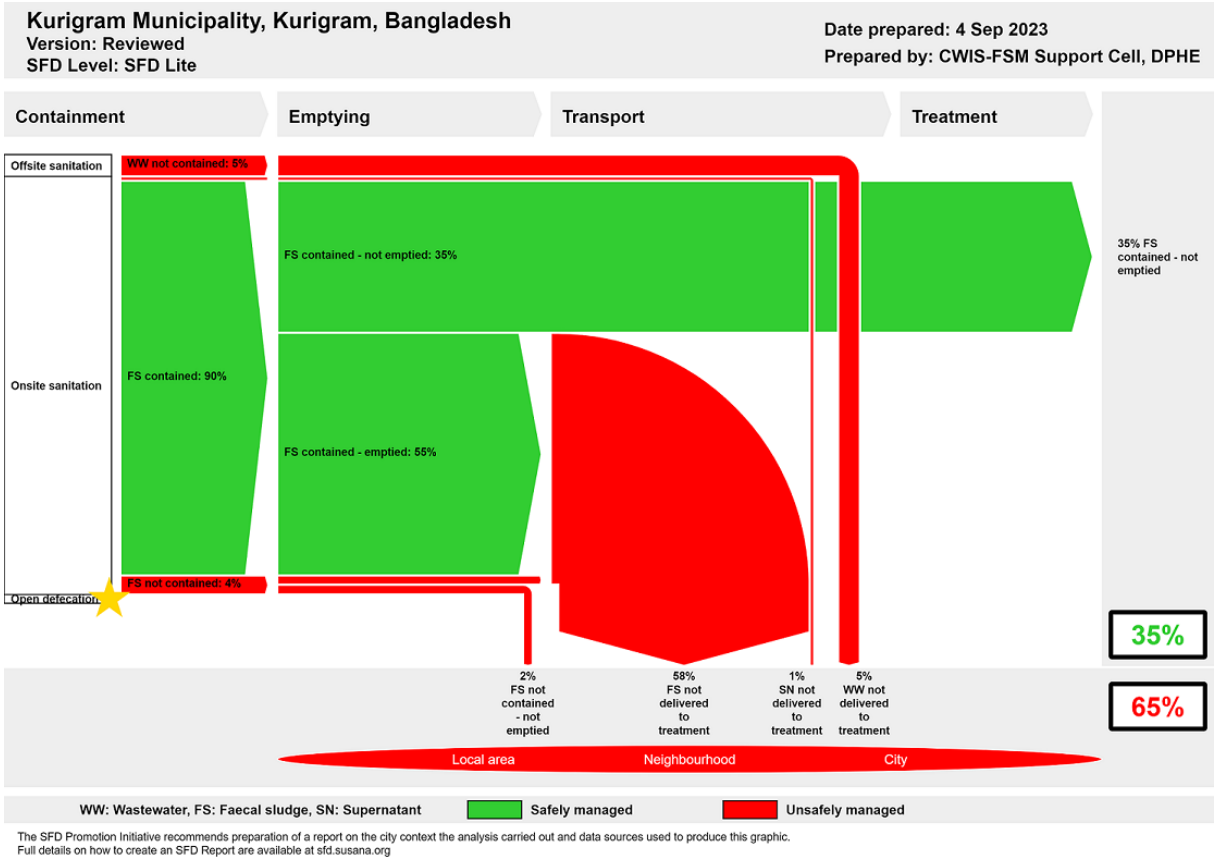

Figure 1: SFD Graphic for Kurigram Municipality.

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 Md. Tawhidur Rahaman, Technical Expert, CWIS-FSM Support Cell, Department of Public Health Engineering (DPHE), Bangladesh.

Collaborating partners:

- DevCon, Tiller and Kurigram 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

Kurigram is a fast-growing city, which is 339 km away from the Dhaka. It is beside the Dharla River and is well connected with road and railways. It is one of the oldest towns in the sub-continent and was declared Municipality in 1972. Kurigram is one of the 53 district level municipalities in the country (Figure 2). The geographical coordinates of Kurigram are in between 26°14' north latitudes and in between 89°27' and 89°54' east longitudes. [1]

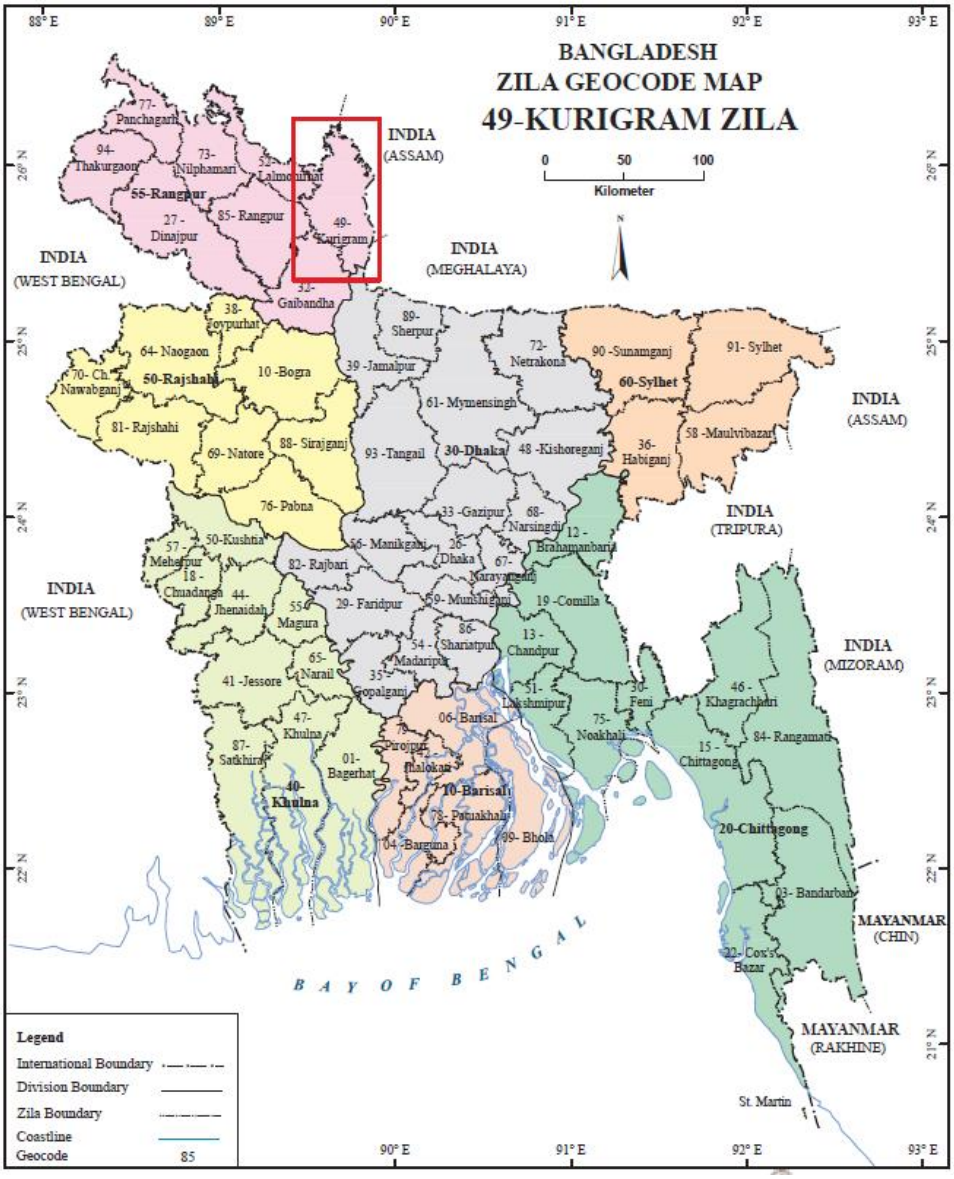

Figure 2: Kurigram Municipality Location Map (BBS, 2017).

According to the population census in 2011 by the Bangladesh Bureau of Statistics (BBS), Kurigram population was 77,252. The urban population growth in Kurigram is 2% 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 101,500 (Table 1).

[1] https://en.banglapedia.org/index.php/Kurigram_District

Table 1: City profile (Source: KII with the Executive Engineer, Kurigram Municipality).

Population parameters	Value
Estimated population, 2020	101,500
Households, 2020	22,573
Area, sq.km	27.04
Total roads, km	163.89
Total drains, km	41.13

The Municipality covers an area of 27.04 square kilometres (Figure 3). At present Kurigram Municipality has 163.89 km of road of which 104.48 km is pucca road, 2.63 km semi-pucca road and 55.78 km katcha road. The city has about 41.13 km of drain which includes 5.93 km primary drain, 9.79 km secondary drain, 21.91 km tertiary drain and 3.50 km katcha drain.

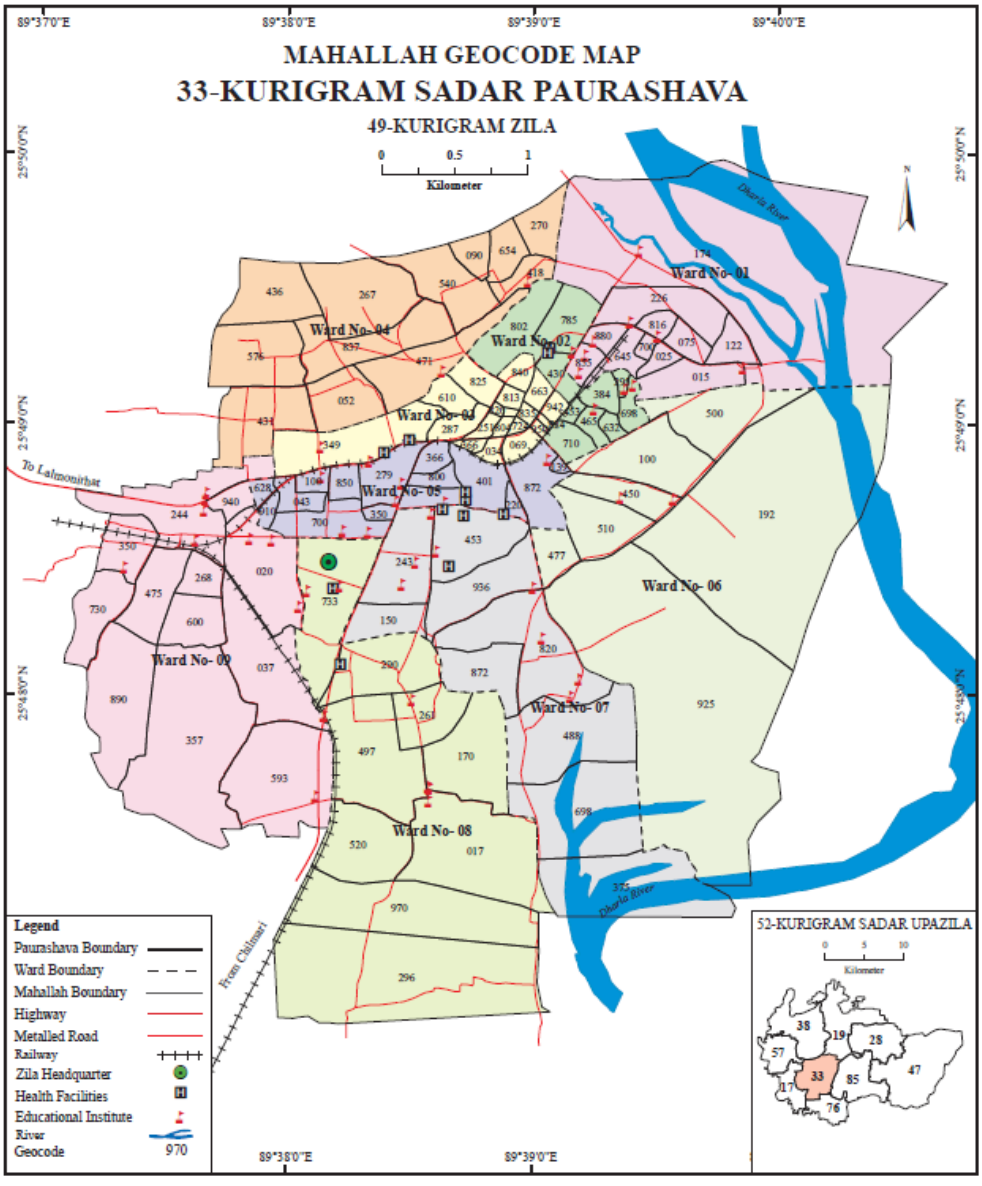

Figure 3: Kurigram Municipality Ward Boundary Map (BBS, 2017).

According to the Bangladesh Meteorological Department, the city area and surrounding area experience 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 Rangpur which is about 43km 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 31.7-32.2°C between April-August, with the minimum mean temperatures of between 10.7-12.7°C in January. The annual average rainfall is about 2,236 mm, according to BMD (1981-2017). [2]

The Dholla River passes east side of the municipality. Several canals Charhorikhsh canal, Tenarypara canal, Pipepara, Adorsho Pourabazar, Mazida college and CMB Khal flow through the city. According to the flood zoning map of Bangladesh shown (BMD, 2012), the city is in a flood-free zone (no flooding event in the last 12 years). However, the drainage network of the city is not adequate. Every year, many areas face water logging during monsoon for drainage congestion. There are some secondary drains carrying stormwater and domestic wastewater to the rivers and canals. [3]

The household survey results show that the majority of the occupation is business (38%) followed by labourer (20%) and private service (11%). The survey assessed the different types of building structure in the city which are pucca (houses single or multi-storied built with substantial materials such as brick, cement, and concrete), semi pucca houses (either the roof or the walls, but not both, are not made of pucca materials), tin-shed (roof of the house mad of corrugated iron sheets) and thatched (roof and walls made of temporary materials like bamboo, paper boards, polyethylene sheets, etc. [4]

[2] *http://bmd.gov.bd/p/Rainfall-Situation-202*
[3] *KII and field visit during Baseline survey 2020*
[4] *KII and field visit during Baseline survey 2020*

Service outcomes

The city does not have a dedicated sewerage system and most sanitation systems available in the town are classified as onsite systems (95.0%). The main types of toilet facilities are septic tanks connected to a soak pit, to an open drain, or to a water body, lined tanks or lined pits, with no outlet or overflow.

Table 2 summarizes the sanitation systems in use, as well as estimates of the population connected to each system. For the onsite sanitation systems, it shows the proportions of each from which faecal sludge is then emptied, transported to treatment and treated.

Kurigram Municipality, Kurigram, Bangladesh, 4 Sep 2023. SFD Level: SFD Lite
Population: 101500
Proportion of tanks: septic tanks: 89%, fully lined tanks: 0%, lined, open bottom tanks: 100%

Containment								
System type	Population	WW transport	WW treatment	FS emptying	FS transport	FS treatment	SN transport	SN treatment
	Pop	W4c	W5c	F3	F4	F5	S4e	S5e
System label and description	Proportion of population using this type of system (p)	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 Toilet discharges directly to open drain or storm sewer	5.0	0.0	0.0					
T1A2C5 Septic tank connected to soak pit	14.1			52.0	0.0	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	4.3			49.0	0.0	0.0	0.0	0.0
T1A2C7 Septic tank connected to open water body	0.5			49.0	0.0	0.0		
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	4.0			88.0	0.0	0.0		
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	72.1			63.0	0.0	0.0		

Table 2: SFD Matrix for Kurigram Municipality.

The figures shown in Table 2 and elaborated in the following section are derived from information obtained through Household (HH) survey, Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs) (as shown in Figure 4).

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

3.1 Offsite Systems

The city does not have a dedicated sewerage system. However, during field observation and HH survey, it was found that there is a certain area where toilets are directly connected to open drains or storm sewer. Similarly, a portion of septic tanks is directly connected to open drains or storm sewer. Therefore, T1A1C6 system is considered as 5.0% of the total population of the city to generate the SFD graphic. Similarly, the T1A2C6 system is considered as 4.3% of the total population of the city to generate the SFD graphic. In the absence of a sewerage system, the faecal sludge and the supernatant in T1A2C6 are directly discharged into the river or the environment untreated.

3.2 On-site Sanitation Systems

Figure 4: Household survey and consultations. (Source: *Feasibility study 2020-21/DPHE).*

Containment: Almost all the households (95.0%) in the city have their latrine which is connected to single pits, twin pits, septic tanks, or discharged directly into the environment (e.g., open-drain or storm sewer). From a household survey, it is found that 18.9% of the city population uses septic tanks as the containment system, 72.1% of the toilets have single pit systems, and 4.0% of people use double pits in the city. About 5.0% do not have any type of containment and discharges directly to the environment (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: 14.1% of the population uses septic tanks connected to soak pits (T1A2C5), 4.3% of the population uses septic tanks connected to open drain (T1A2C6), 0.5% of the population uses septic tanks connected to water bodies (T1A2C7), 4.0% of the population uses lined tanks with impermeable walls and open bottom no outlet or overflow (T1A4C10) and 72.1% of the population relies on lined pits with semi-permeable walls and open bottom with no outlet or overflow (T1A5C10) (KII, FGDs, HH survey, 2020). Thus, at the containment stage, the city's excreta of 90% of the population are contained. Figure 6 shows pictures of these technologies in operation.

Groundwater Pollution: The depth to groundwater in the city ranges from 1-3 m. The most common drinking water production technology is a borehole with a hand pump or motorized pump. Among them, 43% of the households use piped water, 24% use own hand pump tubewell and about 11% of the households use their own tubewell fitted with electric motor.

Lateral separation between sanitation facilities and water sources varies from one area to another. Tubewells of different sizes and depths are generally used to pump water from the subsurface confined aquifers.

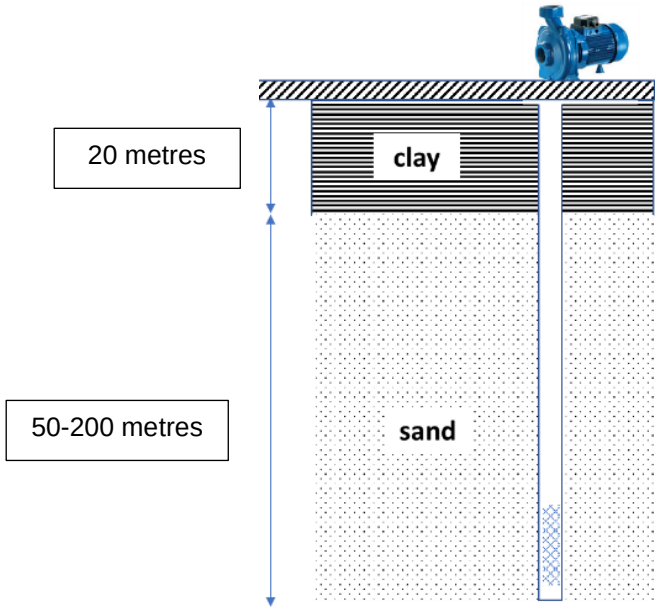

Figure 5: Soil profile in Kurigram district and location of tubewell screen.

During the household visit and FGDs, it was found that less than 25% of sanitation facilities are located within 10 metres from the groundwater source. Besides, due to the geographical situation, sanitation facilities are not located uphill of the groundwater sources. According to a survey report on 'Hydrogeological screening, slug test and geophysical logging on observation well units', conducted by the Department of Public Health Engineering (DPHE) on March 2017, drinking water is collected from the confined aquifer (25m – 200m) through pumps. Hence, considering all these factors, it is considered that there is not any significant risk of groundwater contamination in the city. Therefore, a low risk of groundwater contamination is considered in the city.

Figure 6: Containment technologies and their connections in Kurigram. Left: Toilet Pit open to a nearby water body, Right: Toilet pipe connected to open environment. (Source: *Feasibility study 2020-21/DPHE).*

Emptying: Households relying on septic tanks have to arrange themselves for emptying of the septic tank. It is observed from the baseline survey that most of the septic tanks have been constructed in the last 4-5 years. According to the survey from 2020, the frequency of emptying of septic tanks or covered pits varies from 1 to 10 years depending upon the size, uses, etc.

However, about 52% of the septic tanks, connected to the soak pit are emptied within 2-5 years. About 49% of the septic tanks connected to open drains or water bodies are emptied within 4-5 years. Almost 63% of single pit latrines are emptied within 1-2 years. Besides the above information, it is also revealed during the discussion in FGDs and household visits, the demand for desludging septic tanks would increase shortly. Desludging of the septic tanks or pit is mostly (97%) done by private sweepers. Only in a few households, desludging is done by municipal sweepers (1.42%), family members (1.08%), and private agencies less than one percent (0.5%). Around 94 % of this withdrawal is done manually using a bucket and rope. This method highly risks the health and safety of the workers. A few numbers (4%) use electric pumps and some use manual pump (2%) – these reflect the use of the higher level of technologies by some of the workers. The municipality has one vacutug available[5].

Transportation: The sludge withdrawn from the septic tanks and latrine pits by the cleaners is disposed of in various places. Based on the survey from 2020, it is observed that about 81.9% of the respondents who use any kind of containment system informed that faecal sludge (sludge from the septic tank or covered pit latrines) is disposed of in a dug hole covered with soil away from the house. Besides, 18.1% of the faecal sludge is disposed of in the open environment like a drain, open ground, and water bodies.

Treatment/Disposal: Presently, there are no treatment facilities in the town.

3.3 Open Defecation

From HH surveys, KIIs and FGDs, it was found that 100% of citizens use some kind of toilet in the Municipality. Thus, from the sanitation point of view, the town is considered an open defecation-free town.

3.4 SFD Graphic

The outcome of the SFD graphic shows that only thirty five percent (35%) of the excreta flow is classified as safely managed, and the remaining sixty five percent (65%) is classified as unsafely managed (Figure 7).

[5] In the last few years, mechanical vacuum trucks have been provided to several municipal authorities from different government and non-government sources. But municipal authorities have shortage of expert manpower and service delivery mechanism to operate the vehicles. Recent years, the situation is improving. Institutional Regulatory Framework (IRF) and National Action Plan (NAP) have been approved by government. Different service delivery and business models have been developed in few cities. Capacity building program of local government institutions are conducting by govt. institutions and development partners. A significant improvement in FSM will be found within few years.

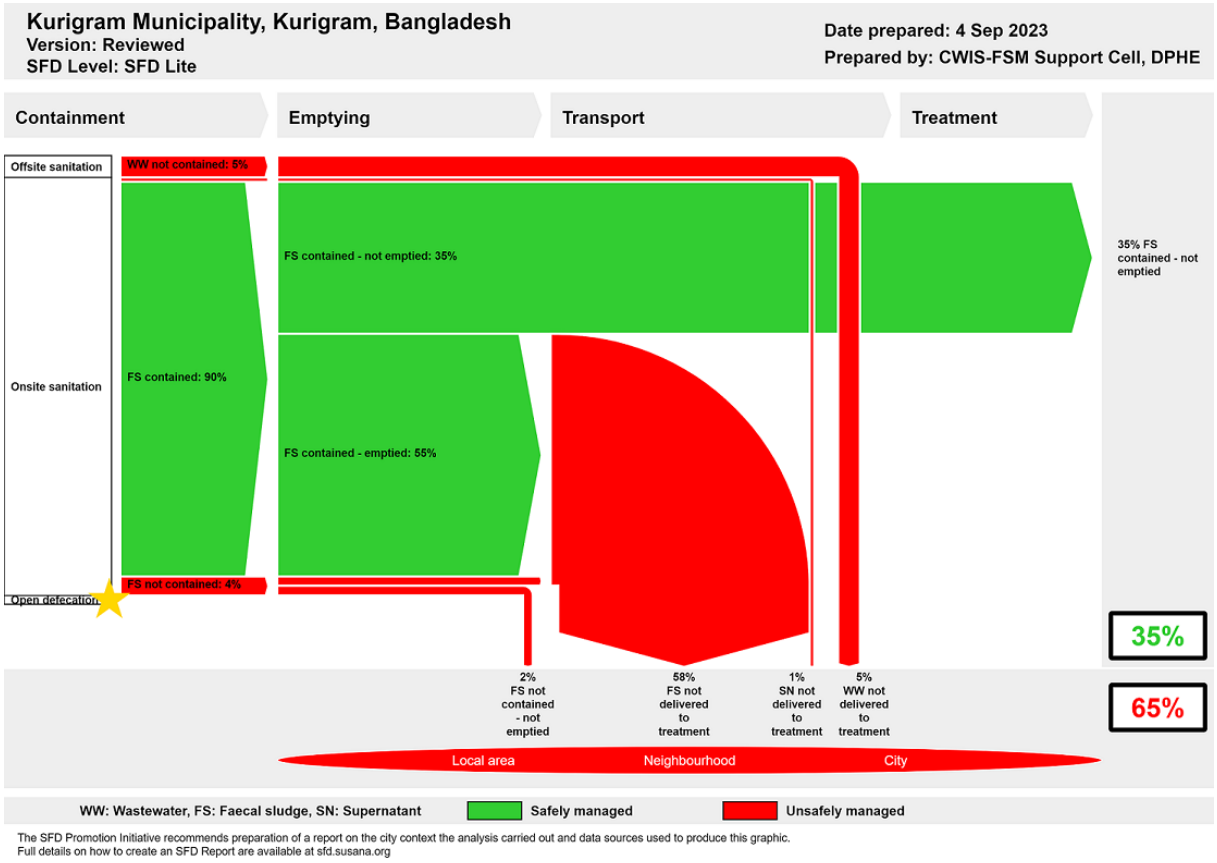

Figure 7: SFD Graphic for Kurigram Municipality.

The unsafely managed excreta originated from wastewater not delivered to treatment (5%), Faecal Sludge (FS) both contained and not contained - not delivered to treatment (58%), FS not contained - not emptied (2%) and 1% of supernatant not delivered to treatment.

The safely managed excreta originate from FS contained - not emptied (35%). This 35% resembles the FS stored in containments without significant risk to groundwater pollution. Thus, the safely managed percentage of FS generated by this 35% of the population is temporary until the FS from the containments is emptied. Therefore, these systems will require emptying services in the short and medium term as they fill up.

4 Data and assumptions

The baseline survey conducted in September 2020 contains detailed data on different stages of the sanitation value chain. The SFD matrix is generated from these data, collected during sample household surveys, along with informal interviews, open-ended consultations, key informant interviews and focus group discussions with the Municipality officials, town level coordination committee, households, social workers, business persons, pit emptiers and the citizens including women in all the wards of the Municipality. The SFD matrix was generated from these data. Finally, data from all these sources were triangulated to produce the SFD matrix, the SFD graphic and the SFD lite report.

The last census was carried out about 10 years ago. So, the actual population, household, and sanitation data are 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 of the emptying events and frequency of their pits or not. Due to all these data gaps, some assumptions have been made to produce the SFD graphic. These assumptions were shared with key informants at the Municipality and accepted by them.

Following assumptions were made for developing the SFD graphic for Kurigram Municipality:

- ✓ The proportion of FS in septic tanks: fully lined tanks, and lined, open bottom tanks are considered 89%, 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 population census in 2011 by the Bangladesh Bureau of Statistics (BBS), Kurigram population was 77,252. The urban population growth in Kurigram is 2% 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 101,500 (Table 1).
- ✓ There are around 4.0% of twin pit latrines in the containment system. So, it is assumed that all these twin pit containment technologies are defined as a lined tank with impermeable walls and open bottom (system T1A4C10, 4.0%). Based on the household survey, variable F3 for system T1A4C10 is set to 88%.
- ✓ There are around 72.1% of single pit latrines in the containment systems. So, it is assumed that all these single pit containment technologies are defined as lined pits with semi-permeable walls and open bottom, no outlet or overflow, where there is no ‘significant risk’ of groundwater pollution (system T1A5C10, 72.1%). Most of the single pit latrines are found to be emptied within 1-2 years. Based on the household survey, variable F3 for system T1A5C10 was set to 63%.
- ✓ 14.1% of septic tanks are connected to soak pits (system T1A2C5). They are well-constructed as per the field visit observation. The risk of groundwater contamination was deemed low, therefore that option was selected in the SFD Matrix.
- ✓ Around 52% of HHs have emptied their septic tank with a soak pit with a desludging frequency of 2-5 years. Based on the household survey, variable F3 for system T1A2C5 is set to 52%.
- ✓ There are 4.8% of septic tanks connected to the open drain or to water bodies which are emptied within 2-5 years. Based on the household survey, variable F3 for systems T1A2C6 and T1A2C7 is set to 49%.
- ✓ Wastewater in T1A1C6 and supernatant in T1A2C6 are directly discharged into the river or the environment untreated. Therefore, variables W4c, W5c, S4e and S5e were set to 0%.

✓ Since there are no wastewater or faecal sludge treatment facilities in the town and all the collected FS is disposed untreated into the environment, variables F4 and F5 for all systems are considered to be 0%.

5 List of Sources

Reports, literature and website

- Bangladesh Bureau of Statistics (BBS), 2011.
- Population and Housing Census, 2011.
- Baseline Survey of the project "Feasibility for Implementing of Solid Waste and Faecal Sludge Management System in 53 District Level Municipalities and 8 Municipalitys", Department of Public Health Engineering (DPHE), Dhaka, Bangladesh (December 2020).
- Report on 'Hydrogeological Screening, Slug Test and Geophysical Logging on Observation Well Units' under *Bangladesh Rural Water Supply and Sanitation Project (BRWSSP),* Arsenic Management Division, Department of Public Health Engineering (DPHE) (March 2017)
- The revised 'National Strategy for Water Supply and Sanitation, 2021'
- 'At a Glance: Kurigram Municipality', by Municipality office
- https://www.gps-latitude-longitude.com/gps-coordinateshttp://bmd.gov.bd/p/Rainfall-Situation-202
- https://en.banglapedia.org/index.php/Kurigram_District

Key Informant Interviews (KIIs) (September 2020 to December 2020)

- KII with Mayor, Kurigram Municipality.
- KII with Conservancy Inspector, Kurigram Municipality.
- KII with Sanitary inspector, Kurigram Municipality.
- KII with Engineer, Kurigram Municipality.
- Facilitators: Md. Mynul Islam Hemel, Field Coordinator, Tiller.

Figure 8: KIIs with different stakeholders in Kurigram. (Source: *Feasibility study 2020-21/DPHE).*

Focus Group Discussions (FGDs) (September 2020 to December 2021)

- FSM Sweepers and Service Providers.

- First Stage Solid Waste Collector.
- Slum Dwellers.

Figure 9: Focus Group Discussions in Kurigram. (Source: *Feasibility study 2020-21/DPHE).*

Additional information

- This report was compiled as part of the Baseline Survey of the project, ***"Feasibility for Implementing of Solid Waste and Faecal Sludge Management System in 53 District Level Municipalities and 8 City Corporations", (December 2020).***

- The project was implemented under the supervision of the Department of Public Health Engineering (DPHE). In-depth information and data were collected for the towns which included project documents, master plans and baseline reports from the Municipality and national levels, statistical data like population and household income expenditure, GIS data and other geospatial data and satellite images, and open street maps (OSM). The Field Survey of the project was conducted from 01 January 2020 to 24 March 2020 and from 04 July 2020 to 30 November 2020. The field survey includes household surveys, key informant interviews, focus group discussions, and physical feature surveys. A central server has been established to monitor FSM and SWM databases under the project. The results of the study are shared with the municipal authority and are considered as a basis for preparing investment projects by the government and development partners, and sustainable plans for operating and maintaining the systems by the municipal authorities.

- We would like to thank Mr. Md. Kaziul Islam, Mayor, Kurigram Municipality, Mr. Md. Atikur Rahman, Executive Engineer, Kurigram Municipality, for providing all the required primary and secondary data and cooperating for Key Informant Interviews (KIIs) & Focused Group Discussions (FGDs). This report would not have been possible to produce without the constant support of Mr. Md. Kaziul Islam, Mayor, KurigramMunicipality, who helped in conducting sample surveys and FGDs in the field.

- We also acknowledge the support of the Centre for Science and Environment, India for the promotion of SFD in Bangladesh.

Kuigram Municipality, Bangladesh, 2024

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)

Md. Tawhidur Rahaman, Technical Expert, CWIS-FSM Support Cell

Department of Public Health Engineering (DPHE), Bangladesh

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SFD Promotion Initiative