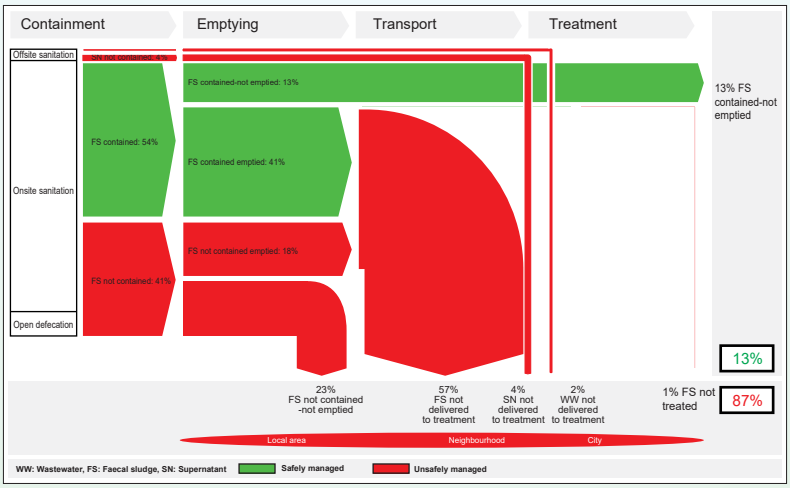
Freshwater Action Network South Asia

Freshwater Action Network South Asia-Bangladesh

SFD Report

Barishal City Corporation



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SFD Report

Barishal City Corporation Bangladesh

Final Report

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SKS Foundation & CSIRS-UIU

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SFD Report Barishal City Corporation, Bangladesh, 2024

Produced by:

SKS Foundation, Gaibandha, Bangladesh

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This Executive Summary and SFD Report are available from:

www.sfd.susana.org.

Foreword

The government and development organizations are promoting city-centered facilities to meet Bangladesh's rapid urbanization needs. Being an advocacy network in the WASH sector, the FANSA-Bangladesh is running its advocacy for the promotion of safely managed sanitation services (SMSS) following the city-wide inclusive sanitation (CWIS) approach. Being the FANSA-Bangladesh Secretariat, SKS Foundation has been implementing the project *Rising for Rights for Strengthening Civil Society Networks in South Asia to Achieve SDG 6* along with other members of the network. The Project covers the cities/towns under 3 geophysical locations namely Barishal City Corporation, Barishal; Sreemangal Municipality, Moulvibazar; and Gaibandha Municipality & Muktinagar Union, Gaibandha.

FANSA-Bangladesh realizes that to effectively promote SMSS following the CWIS approach through the duty-bearers, an analysis of the existing sanitation situation of the target city/town is imperative. Concerning this, SKS Foundation along with the Association of Voluntary Actions for Society (AVAS), the implementing FANSA-Bangladesh member in Barishal conducted a comprehensive study to dig out the overall sanitation situation of the Barishal City Corporation.

The study focused on assessing the sanitation situation and preparing a Shit Flow Diagram (SFD) for Barishal City Corporation covering the service provision & standards. The study found that only 13% of excreta in Barishal City is safely managed. Barishal City Corporation lacks a centralized sewer system, and most households rely on on-site sanitation systems. Although 66% of the containments get emptied, in absence of an FSTP, the common practice is disposing of the sludge in drains or water bodies using the canal networks of this coastal city. The urban poor predominantly depend on inadequate sanitation solutions, with many using direct pit latrines posing health risks. Existing waste management practices also lead to environmental degradation & health hazards, highlighting the urgent need for improved sanitation infrastructure and regular waste collection across the city.

The City Corporation authority has taken a lot of initiatives in recent years to improve the full sanitation value chain. The City Corporation is also eager to engage private stakeholders in this sector. However, there's an urgent need for comprehensive solutions to address the sanitation gaps focusing on the urban poor community. The SFD for Barishal City Corporation was developed reflecting on the local context. The SFD was designed following the model from www.sfd.susana.org that will help the respective duty-bearers for informed decisions to prioritize their efforts and resources to accelerate the safely managed sanitation actions in Barishal City Corporation.

I express my heartfelt thanks & gratitude to Dr. Md. Mujibur Rahman, Professor, Department of Civil Engineering & Director, CSIRS-UIU, and his team members for conducting the Study & sharing the results through this SFD Report.

I appreciate AVAS and my colleagues at SKS Foundation for their efforts in initiating and supporting the conduction of the study by organizing the community people & stakeholders consulted to make the study informative & purposeful.

Rasel Ahmed Liton
Chief Executive
SKS Foundation

Abbreviations

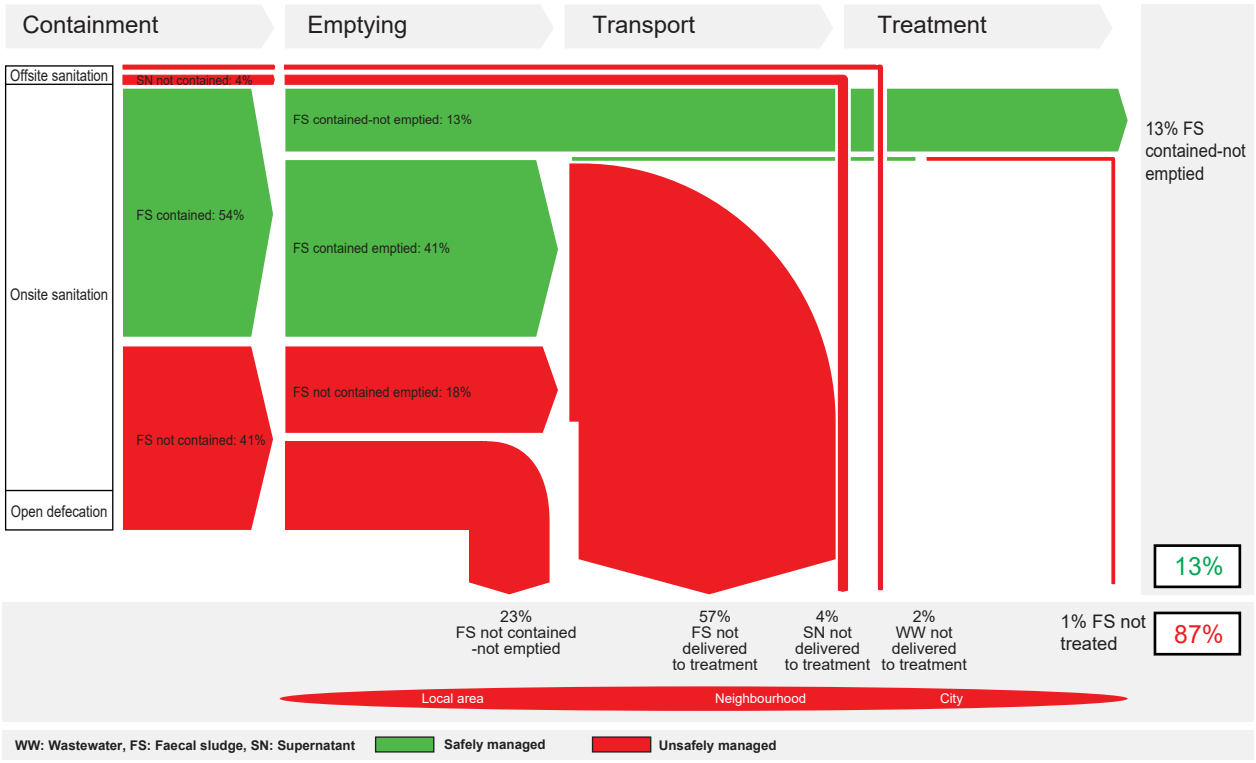
DoE	Department of Environment
DPHE	Department of Public Health Engineering
FANSA	Freshwater Action Network South Asia
FGD	Focus Group Discussion
FS	Faecal Sludge
FSM	Faecal Sludge Management
FSTP	Faecal Sludge Treatment Plant
IRF-FSM	Institutional and Regulatory Framework for Faecal Sludge Management
KII	Key Informant Interviews
LGED	Local Government Engineering Department
MoEF	Ministry of Environment and Forest
NGO	Non-Government Organization
SFD	Shit Flow Diagram

1. The SFD Graphic

Barishal City Corporation, Barishal, Bangladesh

SFD Level: 2 Intermediate SFD

Date prepared: 16 Sep 2024
Prepared by: SKS Foundation & CSIRS-UIU



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. Diagram information

SFD Level:

Intermediate-Level 2 Report

Produced by:

- Center for Smart Infrastructure Resilience and Sustainability (CSIRS) of United International University (UIU)

- This report is a part of the project “Rising for Rights for Strengthening Civil Society Network in South Asia to Achieve SDG 6” of SKS Foundation (The FANSA-Bangladesh Secretariat)

Collaborating partners:

Barishal City Corporation played vital role in collecting and sharing data, and producing this SFD graphic and SFD report.

Status:

Final SFD Report

Date of production: 23/09/2024

3. General city information

Barishal is a rapidly growing city located 235 km from Dhaka, alongside the Kirtankhola River and well-connected by road and water. Established as a Pourashava in 1869 and becoming a City Corporation in 2002, it covers an area of 58.05 square kilometers with a road network of 543 km and a drainage network of 148 km. The city is relatively flat and is bordered by the Baleshwar River to the west, the Bay of Bengal to the south, and the Meghna River to the east.

Several canals flow through Barishal, and while the city is classified as flood-free, inadequate drainage leads to waterlogging during the monsoon. According to the Population and Housing Census of 2022, the population was 419,484, with an estimated growth rate of 0.89%, bringing the 2024 estimate to around 427,018. Barishal experiences a tropical monsoon climate, with warm, humid summers and cool, dry winters, receiving about 90% of its annual rainfall from May to October, and an average rainfall of around 2,128 mm.

4. Service outcomes

The SFD graphic analysis indicates that only 13% of excreta in Barishal City is safely managed, while 87% remains unsafely managed. The unsafely managed excreta stem from various sources: 2% from untreated wastewater, 57% of faecal sludge (both contained and not contained) not delivered to treatment and 23% FS not contained and not emptied.

Barishal lacks a centralized sewer system, and most households rely on on-site sanitation systems like pit latrines and septic tanks. Although 66% of the containments have been emptied, in absence of a FSTP the common practice is to dispose the sludge in drains or water bodies.

Groundwater contamination risks are low, but lateral separation between sanitation facilities and water sources varies.

Data credibility is supported by extensive household surveys, KIIs, and FGDs, though some assumptions were necessary due to data gaps.

5. Service delivery context

Under the Local Government Act (2009), the Barishal City Corporation is responsible for managing the fecal waste generated within the city. The Department of Public Health Engineering (DPHE) and the Local Government Engineering Department (LGED) are tasked with supporting fecal sludge management (FSM) efforts.

Currently, Barishal has limited mechanical sludge collection capabilities and relies on vacuum trucks for septic tank services. However, the city faces challenges such as inadequate infrastructure, insufficient funding for sanitation projects, and a lack of long-term strategies to meet the growing demand for services, particularly in underserved areas.

The urban poor predominantly depend on inadequate sanitation solutions, with many using direct pit latrines that pose health risks, especially during the rainy season. While some areas have access to septic tanks, these efforts are insufficient. The distribution of sanitation services varies widely, and existing waste management practices often lead to environmental degradation and health hazards, highlighting the urgent need for improved sanitation infrastructure and regular waste collection across the city.

6. Overview of stakeholders

The city corporation authority is the lead government institution in delivery of Water, Sanitation and Hygiene (WASH) services in the city. The municipality has taken a lot of initiatives with the development partners in recent years to improve the full sanitation value chain.

In addition, a good number of local entrepreneurs are producing rings, slabs and other products to meet local demand. The municipality is eager to engage private stakeholders in this sector, through a GO-NGO partnership approach.

Table 1: Key Stakeholders

Key Stakeholders	Institutions / Organizations
Public Institutions	Barishal City Corporation, DPHE, Ministry of Local Government
Non-governmental Organizations	SKS Foundation, AVAS, WSUP
Private Sector	Sanitation Workers, Local Sanitation Vendors.
Development Partners, Donors	N/A
Others	N/A

7. Process of SFD development

The Shit Flow Diagram (SFD) for Barishal City Corporation was developed using the standard SFD methodology, with some adaptations to reflect the local context. The data required for developing the SFD was collected through a combination of household surveys, Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs). Data was collected using the mWater tool for household surveys, which provided quantitative data on sanitation practices, access to facilities, and service provision across various wards. Additionally, KIIs and FGDs with key stakeholders gave critical qualitative insights into the real challenges and gaps in the sanitation service chain.

- Data availability: Due to limited recent census data, some population estimates and sanitation coverage figures may have been based on projections or smaller-scale surveys. This could introduce some margin of error in the percentages presented.
- Informal settlements: The standard SFD methodology may not fully capture the complex sanitation realities in Barishal's informal settlements, where practices can be highly variable and difficult to quantify precisely.

- Seasonal variations: Barishal's location in a flood-prone region means that sanitation practices and infrastructure effectiveness may vary significantly between dry and wet seasons. The SFD represents an average annual situation, which may not reflect these temporal variations.

The distinction between contained systems that are emptied versus not emptied may be somewhat fluid in practice, as emptying frequencies can vary widely among households.

While the SFD provides a valuable overview of Barishal's sanitation situation, it's important to note that it represents a simplified model of a complex system. Local officials and sanitation experts should use this SFD as a starting point for discussion and further investigation, rather than as a definitive representation of on-the-ground realities.

The SFD Graphic Generator tool used to create this diagram has some limitations in visualizing nuanced aspects of Barishal's situation. For example:

- It doesn't capture the informal reuse of fecal sludge in agriculture, which may be significant in peri-urban areas.
- The tool doesn't easily allow for representation of the impact of flooding on sanitation infrastructure.
- The binary "safely managed" vs. "unsafely managed" categorization may oversimplify the spectrum of sanitation practices in the city.

Despite these limitations, this SFD provides a valuable tool for identifying major sanitation challenges and prioritizing interventions in Barishal City Corporation. It should be used in conjunction with local knowledge and more detailed studies to inform sanitation planning and policy decisions.

8. Credibility of data

The baseline survey conducted in July 2024 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 City Corporation officials, town level coordination committee, households, social workers, business persons, pit emptiers and the citizens including women in all the wards of the City Corporation. Finally, data from all these sources were triangulated to produce the SFD matrix, the SFD graphic and the SFD report. However, there were some gaps in the collected data, to account that, assumptions were made based on historical trends and estimates from the city officials.

9. List of data sources

- Bangladesh Bureau of Statistics. (2022). Population and Housing Census 2022. Ministry of Planning. Government of the People's Republic of Bangladesh.
- Bangladesh Rural Water Supply and Sanitation Project (BRWSSP), Arsenic Management Division, Department of Public Health Engineering (DPHE). (2017). Hydrogeological Screening, Slug Test and Geophysical Logging on Observation Well Units.
- Barishal City Corporation. (n.d.). Retrieved September 18, 2024, from https://barishalcity.gov.bd
- CWIS-FSM Support Cell, DPHE. (2022). SFD Lite Report, Barishal City Corporation, Bangladesh. Retrieved September 19, 2024, from https://www.susana.org/_resources/-documents/default/3-5105-7-1666779165.pdf
- Department of Public Health Engineering (DPHE), Government of the People's Republic of Bangladesh. (2020). 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."
- Legislative and Parliamentary Affairs Division. (2009). Local Government (City Corporation) Act. Government of the People's Republic of Bangladesh.
- Local Government Division. (2017). Institutional and Regulatory Framework for Faecal Sludge Management (FSM) City Corporations. Ministry of Local Government, Rural Development and Co-operatives, Government of the People's Republic of Bangladesh.
- Local Government Division. (2005). National Sanitation Strategy. Ministry of Local Government, Rural Development and Co-operatives, Government of the People's Republic of Bangladesh.

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1 City context

Barishal is a rapidly growing city located 235 km from Dhaka, situated alongside the Kirtankhola River and well-connected by road and water. Established as a Pourashava in 1869, it became a City Corporation in 2002. Barishal is one of the 12 City Corporations in the country. The City Corporation spans an area of 58.05 square kilometers. Currently, Barishal City Corporation features a road network of 543 km and a drainage network of 148 km. Its geographical coordinates are 22°42′17″ N, 90°22′12″ E. The topography of the City Corporation is relatively flat. Its boundaries are as follows: to the north and west, Barishal and the Baleshwar River (which separates the district from Jessore); to the south, the Bay of Bengal; and to the east, the Meghna River and its estuary. The district stretches approximately 85 miles from north to south, and including the southern Shahbazpur Island, its width is about 60 miles. (Barishal City Corporation, n.d.).

The Kirtankhola River runs along the southeast side of Barishal City Corporation, with several canals, including Napiter Khal, Chanmari Khal, Jel Khal, Nabogram Khal, Sagordi Khal, Bhatar Khal, and Lakutia Khal, flowing through the city. According to Bangladesh's flood zoning map, Barishal is classified as a flood-free zone, having experienced no flooding events in the past 12 years. However, the city's drainage network is inadequate, resulting in waterlogging in many areas during the monsoon due to drainage congestion. Some secondary drains are in place to transport stormwater and domestic wastewater to the rivers and canals (CWIS-FSM Support Cell, DPHE, 2022).

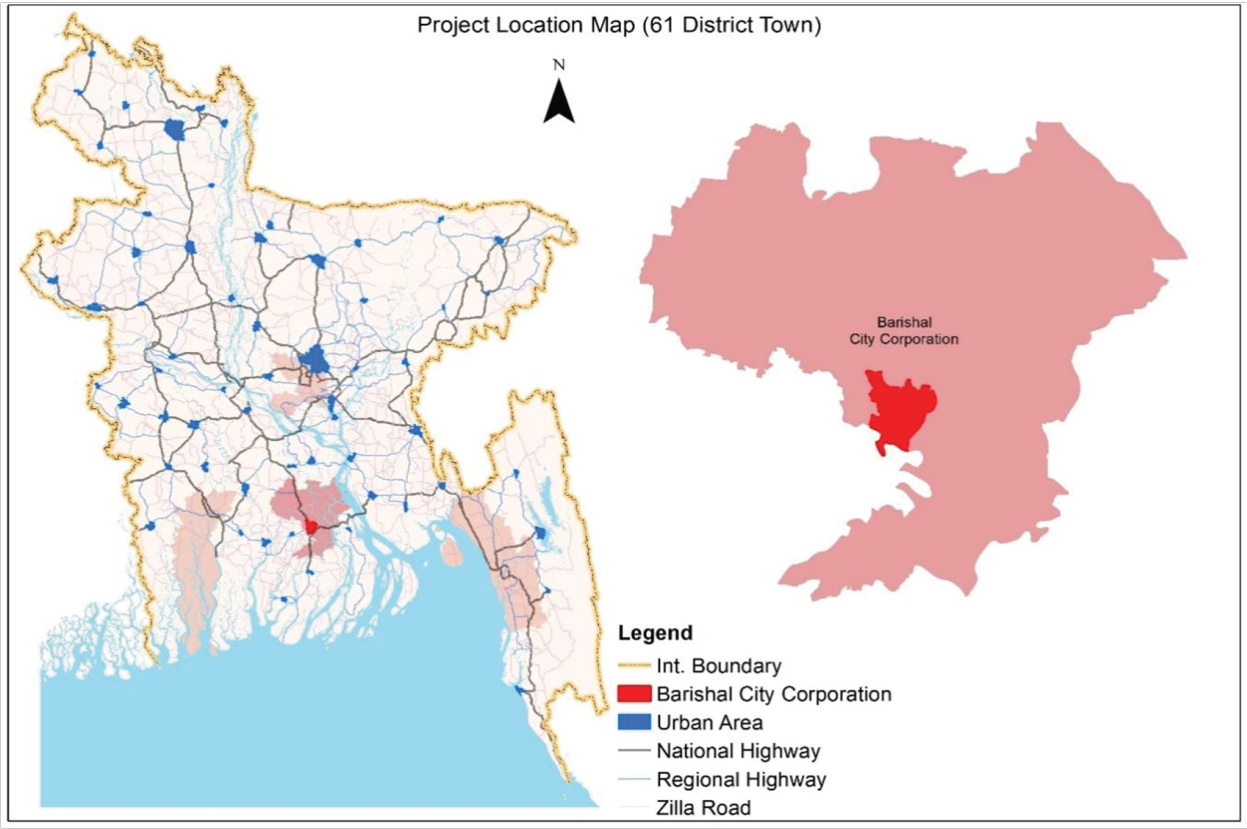


Figure 1: Barishal City Corporation Location Map

Table 1: City Profile

Population parameters	Numbers
Estimated population, 2024	427,018
Households, 2022	105,200
Area, sq.km	58.05
Total roads, km	543
Total drains, km	148

According to the population census in 2022 by the Bangladesh Bureau of Statistics (BBS), the Barishal city population was 419,484 with a density of 7232 people per square kilometer. The annual population growth in Barishal is 0.89%. Considering this, the present (2024) population is estimated to be around 427,018 (Table 1).

According to the Bangladesh Meteorological Department (1981-2017), Barishal City and its surroundings experience a tropical monsoon climate, characterized by warm, humid summers and cool, dry winters. A climatological station within the City Corporation has provided weather data for this period. Approximately 90% of the total annual rainfall occurs from May to October, while the driest months are from November to March. The maximum mean temperature ranges from 30.8°C to 33.4°C between April and August, while the minimum mean temperatures in January range from 11.9°C to 13.3°C. The annual average rainfall is around 2,128 mm, according to the BMD data.

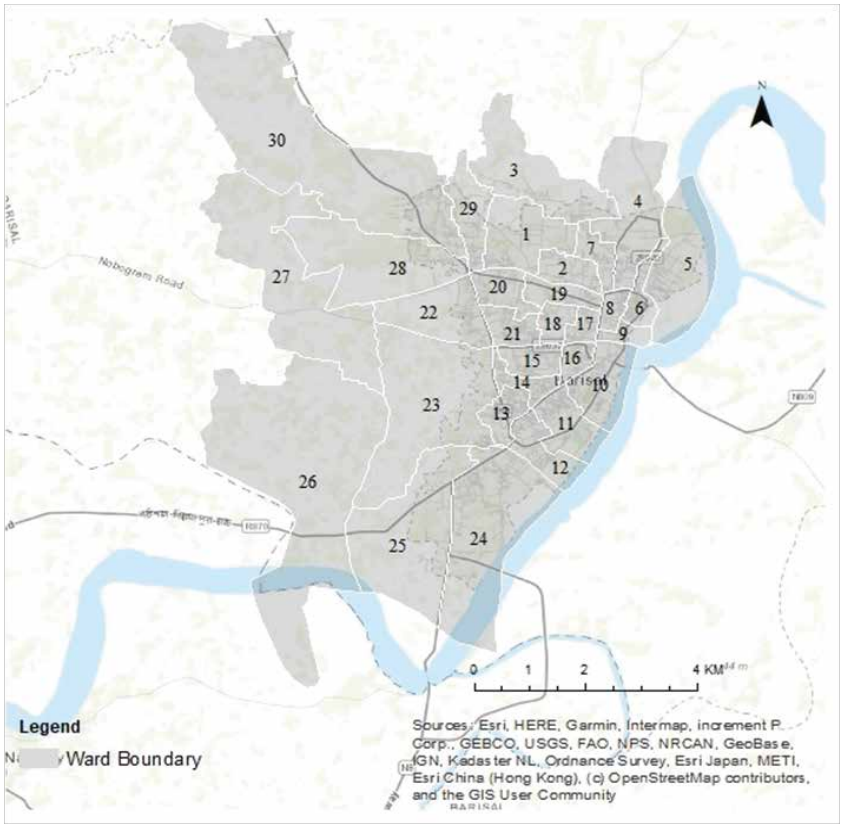


Figure 2: Barishal City Corporation Ward Boundary Map.

2 Service Outcomes

2.1 Overview

Data on sanitation situation were collected through a household survey. Further details are presented in Appendix 2. The results obtained after the triangulation and validation of the data with all the data sources including literature reviews, Key Informant Interviews (KIIs) and a validation workshop is presented in this section.

List A: Where does the toilet discharge to? (i.e. what type of containment technology, if any?)	List B: What is the containment technology connected to? (i.e. where does the outlet or overflow discharge to, if anything?)									
	to centralised combined sewer	to centralised foul/separate sewer	to decentralised combined sewer	to decentralised foul/separate sewer	to soakpit	to open drain or storm sewer	to water body	to open ground	to 'don't know where'	no outlet or overflow
No onsite container. Toilet discharges directly to destination given in List B					Significant risk of GW pollution / Low risk of GW pollution		T1A1C7			Not Applicable
Septic tank					T2A2C5 / T1A2C5	T1A2C6	T1A2C7		T1A2C9	
Fully lined tank (sealed)					Significant risk of GW pollution / Low risk of GW pollution					
Lined tank with impermeable walls and open bottom	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	T1A4C6	T1A4C7	T1A4C8	T1A4C9	Significant risk of GW pollution / Low risk of GW pollution
Lined pit with semi-permeable walls and open bottom	Not Applicable									Significant risk of GW pollution / T1A5C10
Unlined pit										Significant risk of GW pollution / Low risk of GW pollution
Pit (all types), never emptied but abandoned when full and covered with soil										Significant risk of GW pollution / T1B7C10
Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil										
Toilet failed, damaged, collapsed or flooded										
Containment (septic tank or tank or pit latrine) failed, damaged, collapsed or flooded										
No toilet. Open defecation	Not Applicable									Not Applicable

Figure 3 : Barishal City Corporation SFD Selection Grid

2.1.1 Offsite System

There is no dedicated sewage system in Barishal City Corporation. However, the household survey found that in some parts of the city there is no onsite container and the toilet is directly connected to nearby water body.

2.1.2 Onsite System

The city does not have a dedicated sewerage system and most sanitation systems available in the town are classified as onsite systems (98%). The most common on-site containment system is a pit latrine in the households of Barishal. However, in recent years, it has become common practice to build septic tanks when constructing new buildings. The number of septic tanks is likely to increase in the near future. A small portion of the population use community latrines, which use septic tank technology. Most commercial enterprises have septic tanks in their buildings. However, many households do not follow the regulations and dispose of the untreated liquid waste into the environment. Some number of households use soak pits and the majority disposes of the liquid waste in nearby drains, open ground or water bodies.

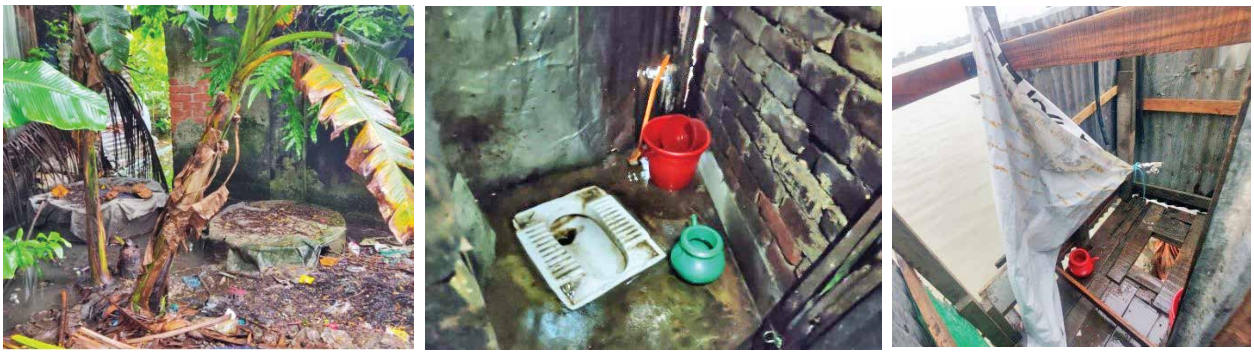


Figure 4: Sanitation Scenario in Barishal City Corporation

2.1.3 Technologies and Methods used

The entire population of Barishal City Corporation uses a toilet of some sort. These toilets are connected to a range of containment systems, including (Table 2):

- Toilet discharges directly to water body (T1A1C7).
- Septic tank connected to soak pit (T1A2C5).
- Septic tank connected to open drain or storm sewer (T1A2C6).
- Septic tank connected to open water body (T1A2C7).
- Septic tank connected to don't know where (T1A2C9).
- Lined tank with impermeable walls and open bottom, connected to an open drain or storm sewer (T1A4C6).
- Lined tank with impermeable walls and open bottom, connected to a water body (T1A4C7).
- Lined tank with impermeable walls and open bottom, connected to don't know where (T1A4C9).
- Lined pit with semi-permeable walls and open bottom, no outlet or overflow (T1A5C10).
- Pits (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow (T1B7C10).
- Septic tank connected to a soak pit, where there is a 'significant risk' of groundwater pollution (T2A2C5)

2.2 SFD Matrix

The following table 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. For the offsite systems (toilet discharging to water body), it shows the proportion of population using this system.

Containment: Barishal City Corporation largely relies on onsite sanitation systems. The survey found that 21.8% of the households have septic tanks connected to soak pit (T1A2C5). In addition, almost 21% of the containments are septic tanks connected to open drain or a water body (T1A2C6 and (T1A2C7). The survey also revealed that, 14% of the containments are lined tank with impermeable walls and open bottom, connected to a water body (T1A4C7). Also, 6.3% are lined tank with impermeable walls and open bottom, connected to open drain (T1A4C6). Moreover, 27.3% were found to be lined pit with semi-permeable walls and open bottom, no outlet or overflow (T1A5C10). 4.8% of the containments are pits that have never been emptied but abandoned when full (T1B7C10).

Emptying: The survey found that almost 66% of the containments have been emptied. Most of the withdrawal (62%) is done manually using bucket and rope. This method highly risks the health and safety of the workers. 89.7% of the septic tanks that are connected to soak pits have been emptied and 5.1% of such is delivered to dumping ground. Additionally, 71.4% of lined tank with impermeable wall and open bottom, connected to a water body have been emptied.

A major issue for Barishal City Corporation is that a substantial portion of the emptied sludge (95%) is disposed of in open drains or water bodies. This practice severely contaminates the water bodies within the city corporation.

Transport & Treatment: In Barishal City Corporation there are some vacu-tug for sludge transportation to the designated dumping ground. A significant number of people are using the formal services of pit emptying given by the City Corporation. There are also some private sweepers, who empty pits and septic tanks manually using a bucket and rope, with little support and no safety protocol.

From the survey, it is found that there is a large portion of pit latrines are found in Barishal City Corporation. Almost 55% of them are not emptied. Among them a large amount latrines are direct pit latrine and other amount of latrines are alternative twin pit latrine. Most of the latrine's sludge is being treated onsite in the pit. However in the absence of a FSTP, emptied sludge are open in the environment causing significant environmental pollution. Since, there is no FSTP in Barishal, the values of column F5 is set to zero.

Open Defecation

From the survey, it was found that Barishal City Corporation is free from open defecation.

Table 2: SFD Matrix

Barishal City Corporation, Barishal, Bangladesh, 16 Sep 2024. SFD Level: 2 - Intermediate SFD
Population: 427,018
Proportion of tanks: septic tanks: 81%, fully lined tanks: 100%, lined, open bottom tanks: 93%

Containment						
System type	Population	FS emptying	FS transport	FS treatment	SN transport	SN treatment
	Pop	F3	F4	F5	S4e	S5e
System label and description	Proportion of population using this type of system (p)	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	21.8	89.7	5.1	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	16.3	0.0	0.0	0.0	0.0	0.0
T1A2C7 Septic tank connected to open water body	4.5	0.0	0.0	0.0		
T1A2C9 Septic tank connected to 'don't know where'	1.0	100.0	25.0	0.0		
T1A4C6 Lined tank with impermeable walls and open bottom, connected to an open drain or storm sewer	6.3	100.0	0.0	0.0	0.0	0.0
T1A4C7 Lined tank with impermeable walls and open bottom, connected to a water body	14.0	71.4	0.0	0.0		

Containment						
System type	Population	FS emptying	FS transport	FS treatment	SN transport	SN treatment
	Pop	F3	F4	F5	S4e	S5e
System label and description	Proportion of population using this type of system (p)	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
T1A4C8 Lined tank with impermeable walls and open bottom, connected to open ground	1.3	80.0	0.0	0.0		
T1A4C9 Lined tank with impermeable walls and open bottom, connected to 'don't know where'	0.8	100.0	0.0	0.0		
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	27.3	98.2	0.0	0.0		
T1B7C10 Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	4.8					
T2A2C5 Septic tank connected to soak pit, where there is a 'significant risk' of groundwater pollution	0.3	100.0	100.0	0.0		

2.2.1 Risk of groundwater contamination

According to the SFD Lite Report of Barishal City Corporation by CWIS-FSM Support Cell, DPHE (2022), a bore hole with a hand pump or motorized pump is the most common drinking water source. Among households, 50% rely on their own tube well with an electric motor, 9% use a hand pump tube well, and 19% have access to a water supply facility.

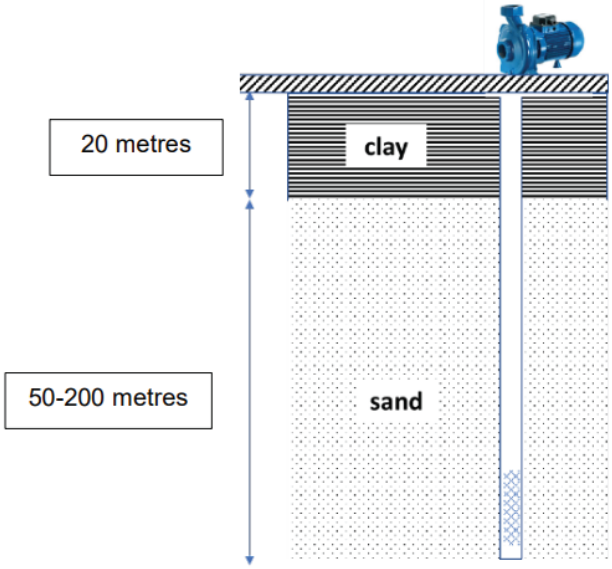


Figure 5: Soil Profile in Barishal District (SFD Lite Report, 2022 DPHE)

The report also highlights that 25% of sanitation facilities are located within 10 meters of groundwater sources. Additionally, due to the region's topography, sanitation facilities are not located uphill of the groundwater sources. Moreover, 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 revealed that drinking water in Barishal is drawn from confined aquifers at depths of 25m to 200m using pumps. Given these findings, the risk of groundwater contamination in the city is considered low.

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

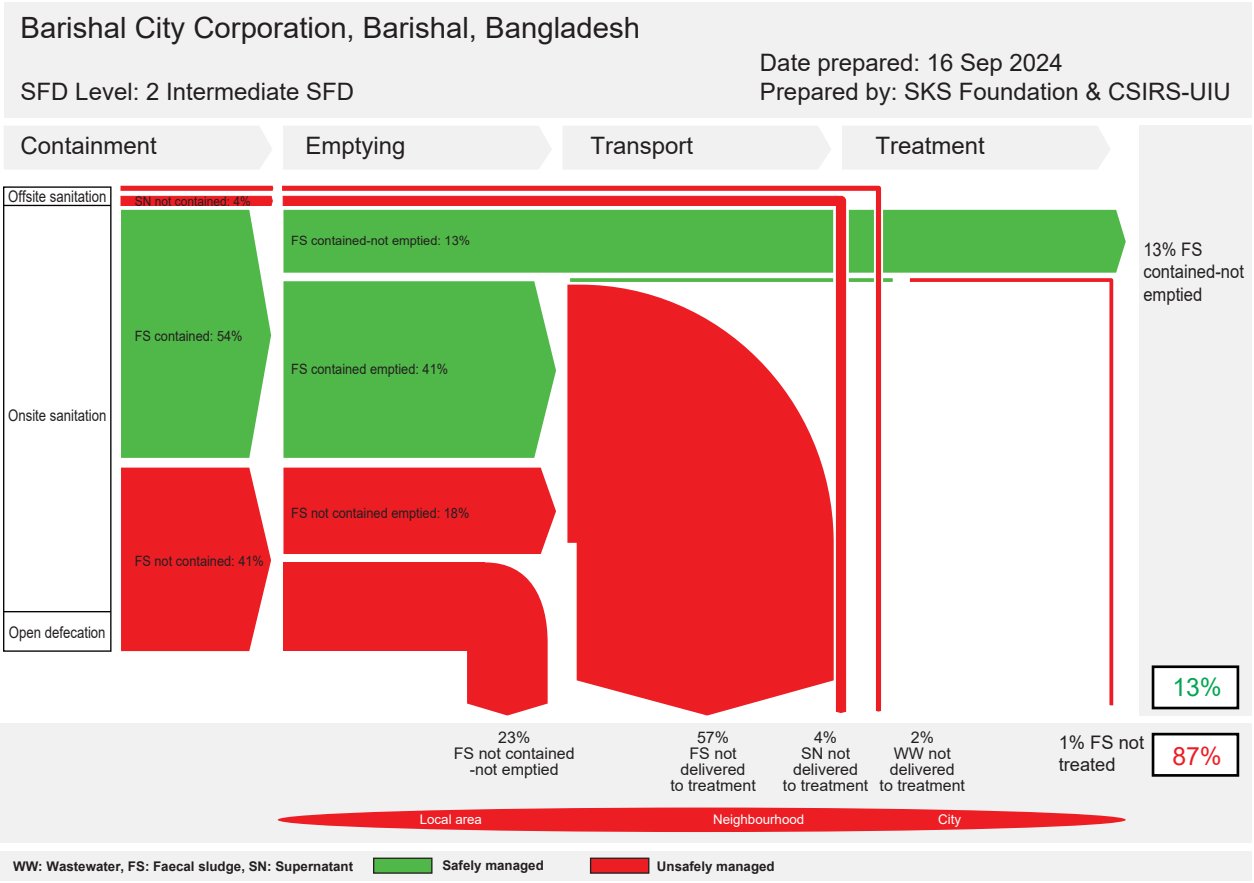
2.2.2 Summary of Assumptions

The data used in the SFD Matrix comes from various sources, including field surveys, Key Informant Interviews (KII) and Focus Group Discussion (FGD). The following assumptions are made for developing the SFD for Barishal City Corporation:

- Estimate of population growth are based on extrapolations from available census data and may not fully capture recent changes.
- The proportion of FS in septic tanks, fully lined tanks and lined, open bottom tanks are considered as per the guidance given in the Sustainable Sanitation Alliance (SuSanA) website.
- From the household surveys, if the respondents could state that the GW level at the time of construction of containment was relatively close to containment bottom, then it is considered that there is “significant risk” of GW pollution.
- There is no faecal sludge treatment facility in Barishal. However, there is a dumping ground maintained by the Municipality.
- The field survey found that, in some cases pit latrines are connected to open drains or water bodies. Usually, this containment technology should not have any outlet. So, in such instances, it is defined as Lined tank with impermeable walls and open bottom.

2.3 SFD Graphic

The outcome of the SFD graphic shows that thirteen percent (13%) of the excreta flow is classified as safely managed, and the remaining eighty seven percent (87%) is classified as unsafely managed.



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

Figure 7: SFD Graphics

It should be noted that the proportion of safely managed excreta mostly originates from pits and septic tanks that have never been emptied, which might pose groundwater risk in the future. Some key issues affecting sanitation service delivery in Barishal is the lack of FSTP and well-coordinated sludge transport system. The unsafely managed excreta originate from the following sources:

- FS not delivered to treatment 57%
- FS not contained-not emptied 23%
- Supernatant not delivered to treatment 4%
- WW not delivered to treatment 2%
- FS not treated 1%

In the SFD Lite Report for Barishal City Corporation (CWIS-FSM Support Cell, DPHE, 2022), it was found that 75% of the FS was unsafely managed. However, this recent assessment indicates a further deterioration, with the percentage of unsafely managed FS increasing to 86%. This worsening situation underscores the need for urgent interventions, such as expanding safe sanitation services, improving waste treatment capacity, and implementing stricter regulatory enforcement to reserve this negative trend.

3 Service delivery context

3.1 Policy, legislation and regulation

3.1.1 Policy

According to the regulatory guidelines, it is a major responsibility of the city corporation to manage all kind of wastes, specifically 'solid waste and 'liquid waste'. However, there is no specific instructions regarding 'faecal sludge'. Faecal sludge is considered a different type of waste. With the characteristics of both solid and liquid waste, faecal sludge needs to be managed using specific technologies and treatment options. It is clear that the responsibility of management of faecal sludge lies with the city corporation. The institutional and regulatory framework for Faecal Sludge Management (FSM) states that the Department of Public Health Engineering (DPHE) and the local government engineering department (LGED) shall support the implementation of the FSM system in the municipality. This is a clear indication that the DPHE and LGED should be included as the key institutions in developing the institutional framework on FSM in Barishal City corporation. It is to take steps to include provision of infrastructure for the implementation of FSM services in its master plan. However, most city corporation have yet to even create a master plan, even though they may seek expert support from the external sources to assist with this complex process. Also, in the absence of a building code for septic tanks, it is not a requirement that development of multi-storey buildings include construction of septic tanks.

3.1.2 Institutional roles

The responsibility of management of faecal sludge lies with the city corporation. The City Corporations can formulate necessary rules, regulations or by-laws (within the framework of the City Corporation Act 2009), if needed, for carrying out the specific roles and responsibilities outlined in The Institutional Regulatory Framework for FSM (City Corporations). The DPHE and LGED provide technical assistance, and the city corporation is responsible for FSM services, including engaging and supporting all stakeholders (the government, non-government organizations, development partners, research organizations, civil society and the media) in raising awareness, developing FSM infrastructure and effective delivery of FSM services.

3.1.3 Service provision

Barishal City Corporation has some vacu-tug for mechanical collection of sludge from septic tanks or pits. Using a vacuum cleaner has become common practice in these days at Barishal City Corporation. For reaching narrow roads, special types of vehicles or other innovative withdrawal equipment (e.g., pumps) and transport vehicles are needed for wider coverage.

3.1.4 Service standards

City corporations are responsible for the execution of the entire FSM service chain. They are also in charge with ensuring that this is carried out in compliance with existing rules and regulations on the disposal of liquid effluent and quality of end products such as compost, and without adversely affecting health and the environment.

Until further treatment facilities are built, fecal sludge will continue to be disposed of in pits or trenches dug on land designated by the municipality. The Ministry of the Environment and Forestry through the Department of Environment is responsible for ensuring that all relevant environmental laws, regulations and principles are followed to the letter by all concerned throughout the FSM service chain.

3.2 Planning

3.2.1 Service targets

The municipality has set foundational service targets aimed at enhancing sanitation, particularly by increasing toilet access and decreasing open defecation. However, these goals are mostly aspirational in the absence of a comprehensive faecal sludge management plan. The municipality's capacity to achieve its objectives is hindered by insufficient infrastructure, including the lack of treatment facilities and transport vehicles. Furthermore, there is a lack of a long-term strategy to address the growing demand for sanitation services, especially in densely populated or underserved regions.

3.2.2 Investments

Investment in sanitation infrastructure and services is inadequate. TK97.39 crore of the total municipal budget is allocated for sanitation and environmental development, which is insufficient to address the city's growing needs. The limited budget restricts the city corporation's ability to invest in much-needed facilities, such as additional fecal sludge treatment plants, expanded drainage systems, and improved waste collection services. Currently, there are only 205 sanitation workers employed by the city corporation, but their efforts are hampered by a lack of proper equipment and support.

3.3 Equity

In Barishal City Corporation, the urban poor primarily rely on basic sanitation and waste management services that are often inadequate and inconsistent. Many households depend on direct pit latrines, which pose significant health risks, particularly during the rainy season when they tend to overflow. While some areas benefit from septic tanks provided by NGOs or local authorities, these efforts fall short of meeting the broader demand. Waste management services are irregular, with solid waste frequently left in open spaces, exacerbating environmental degradation and disease transmission. Additionally, inadequate drainage systems contribute to water contamination and flooding in poorer areas. Despite some progress, the existing services are insufficient to effectively address the needs of the urban poor, underscoring the urgent need for improved infrastructure, regular waste collection, and enhanced sanitation facilities.

3.3.1 Current choice of services for the urban people

In Barishal City Corporation, the current sanitation services available to the urban poor are notably inadequate and unevenly distributed across various wards. In Ward-10, a significant portion of households, about 90-95%, have toilets connected to sewage lines that discharge directly into the Kirtankhola River, while most families continue to use direct pit latrines. The situation is similar in Ward-9, where direct pit latrines are prevalent, and many residents resort to emptying their waste into nearby rivers or waterways due to a lack of septic tanks, causing severe environmental and public health concerns. Wards 22 and 5 reflect a mix of some progress and ongoing challenges, with a small percentage of households in Ward-5 adopting septic tanks, though the majority still rely on direct pit latrines. The groundwater level across these wards varies, with some areas experiencing depths of over 200 to 500 feet. In densely populated areas like Ward-11, the sanitation infrastructure is strained, particularly in regions like Bangabandhu Colony and West Kaunia, where most latrines are either directly connected to polluted water bodies or are direct pit latrines that exacerbate health risks, especially during the rainy season. The limited efforts by NGOs and the City Corporation to provide septic tanks have not been sufficient to meet the growing demand, underscoring the need for more comprehensive and sustainable sanitation solutions throughout the city.

3.3.2 Plans and measures to reduce inequity

Plans and measures to reduce inequity, while some efforts have been made by non-governmental organizations such as SKS Foundation to raise awareness and promote hygiene, much work remains to be done. The city has recognized the pressing need to address the disparities in sanitation services, especially in underprivileged areas like Ward-9 and Ward-11. Initiatives aimed at increasing access to proper sanitation facilities, particularly in slum areas and among low-income families, are being prioritized. Efforts include the installation of septic tanks in areas where direct pit latrines are prevalent and the improvement of drainage systems to prevent contamination of water sources. Additionally, there are plans to increase government support and involve more NGOs in expanding educational programs to promote better hygiene practices and reduce health risks. These measures are crucial to ensuring that all residents, regardless of their economic status, have access to safe and adequate sanitation services.

3.4 Outputs

3.4.1 Monitoring and reporting access to services

In the Institutional and Regulatory Framework (IRF) for FSM, different institutions have been identified for playing effective roles in the overall planning, development, implementation, practice and monitoring and evaluation of faecal sludge management in municipalities. The Ministry of Environment and Forest (MoEF) through the Department of Environment (DoE) shall ensure that all relevant environmental laws, regulations and principles are strictly followed by all concerned throughout the FSM service chain.

3.5 Expansion

3.5.1 Stimulating demand for services

The municipality and non-governmental organizations like SKS Foundation need to take a proactive approach to stimulating demand for improved sanitation services. This involves not only enhancing public awareness about the health risks associated with inadequate sanitation but also promoting the benefits of transitioning to safer, more sustainable options. By educating the community on the long-term advantages of proper sanitation, both in terms of health and environmental impact, these organizations can encourage a shift towards better practices. Additionally, providing financial incentives or subsidies for installing improved sanitation facilities could further motivate households to make the necessary changes.

3.5.2 Strengthening service provider roles

To address the sanitation crisis, the roles of service providers must be strengthened. This requires building the capacity of local service providers to effectively manage and maintain sanitation infrastructure, including the collection and treatment of waste. Collaboration between the municipality, NGOs, and private sector players is essential to ensure that service providers are adequately trained, equipped, and supported. By fostering partnerships and ensuring accountability, the quality and reach of sanitation services can be significantly improved, ultimately leading to better health outcomes for the entire community.

4 Stakeholder Engagement

Stakeholder engagement in Barishal City Corporation highlighted the critical sanitation challenges faced across multiple wards. Community members, ward councilors, and local volunteers discussed the widespread use of direct pit latrines, insufficient septic tank installations, and the practice of discharging waste

into rivers and waterways. The stakeholders emphasized the severe health and environmental risks posed by these practices, particularly in densely populated and slum areas. They called for urgent government intervention, improved sanitation infrastructure, better waste management systems, and community awareness initiatives to address these pressing issues and promote healthier living conditions.

4.1 Key Informant Interviews (KIIs)

Key informants from various wards in Barishal City Corporation described significant sanitation challenges, including widespread use of direct pit latrines, lack of septic tanks, and improper waste disposal methods. In Ward-10, Ward-11, and Ward-22, most toilets are directly connected to sewage lines or waterways, contributing to severe environmental and public health issues. The situation is particularly dire in slum areas, where pit latrines overflow during the rainy season, exacerbating health risks. Local officials emphasized the urgent need for sustainable sanitation solutions and increased government support to improve hygiene conditions.

- Mrs. Tania reported on the sanitation situation in Ward-10 (KDC slum area), noting that 90-95% of toilets are connected to sewage lines that ultimately lead to the Kirtankhola River. The majority of families use direct pit latrines, with a few using septic tanks, although these are not connected to the drainage system. The groundwater level is below 200 feet deep.
- Mr. Rinku highlighted the severe sanitation issues in Ward-9, where direct pit latrines are widely used, and residents often empty them into rivers or nearby waterways. He also pointed out the shortage of septic tanks, which has led to significant environmental and public health deterioration. He stressed the urgent need for comprehensive sanitation solutions.
- Mrs. Shirin Sultana expressed concern over the limited use of direct pit latrines in Ward-22. She acknowledged the efforts to install septic tanks but emphasized the need for more resources and education to promote better sanitation practices. She also mentioned that the groundwater level exceeds 200 feet.
- Barsha Akhter, a local volunteer in Ward-22, shared her observations that most families in the ward use direct pit latrines. The sanitation facilities are inadequate, and the drainage system is poor. She stressed the urgent need for comprehensive sanitation improvements, noting that the water level is over 500 feet deep.
- Adnan Ali offered a slightly optimistic view of sanitation in Ward-5, where 2-3% of households have installed septic tanks. However, he also noted that the majority still rely on direct pit latrines, emphasizing the need for continued efforts to promote septic tank installation and improve overall sanitation standards.
- Md Mamun Ahmed described the critical sanitation challenges in Ward-6, where direct pit latrines are widely used, and waste is often emptied into drains or nearby waterways. The lack of sufficient septic tanks exacerbates health and environmental issues. He highlighted the urgent need for comprehensive sanitation solutions.
- Mojibur Rahman, the Ward Councilor of Ward-11, underscored the urgent need for better sanitation infrastructure due to the rapidly growing population. He noted that in the refugee area known as Bangabandhu Colony, about 85% of the latrines are direct pit latrines, posing significant health risks. He emphasized the importance of transitioning to more sustainable sanitation systems and pointed out the lack of government-provided toilet facilities in the ward.

- In West Kaunia (Ward-11), the majority of residents are middle or lower middle class, and about 60% of the toilets are directly connected to the nearby Rayer Khal, which leads to significant water pollution. Additionally, 30% of the latrines are direct pit latrines, contributing to poor hygiene. Md. Awal Molla, the Ward Councilor, noted that while some NGOs and the City Corporation have provided septic tanks, these efforts are insufficient. The rainy season exacerbates the situation, causing the Khal and drains to overflow and spread pollution. He stressed the critical need for more comprehensive sanitation solutions.
- In another part of Ward-11, a significant number of households are located along the riverbank, where some toilets discharge waste directly into the river, leading to severe water pollution and health risks. The local population uses this river water for daily activities, except for drinking. Additionally, 80% of the latrines are direct pit latrines. During the rainy season, the area floods, causing waste from the pits to surface, creating dangerous hygiene conditions. Md. Zainal Abedin Howlader, the Ward Councilor, mentioned the difficulty of maintaining hygiene due to the dense population and narrow walking paths, which prevent the use of mechanical devices for pit latrine cleaning. He emphasized the urgent need for more comprehensive sanitation solutions.
- Ms Nasima Akter from Ward-10 reported similar sanitation challenges, noting that while there have been some improvements, many households still use direct pit latrines, with most emptying waste into nearby waterways. She called for greater support from the city corporation to build more hygienic sanitation facilities.

Figure 8: KII with local community of Barishal City Corporation

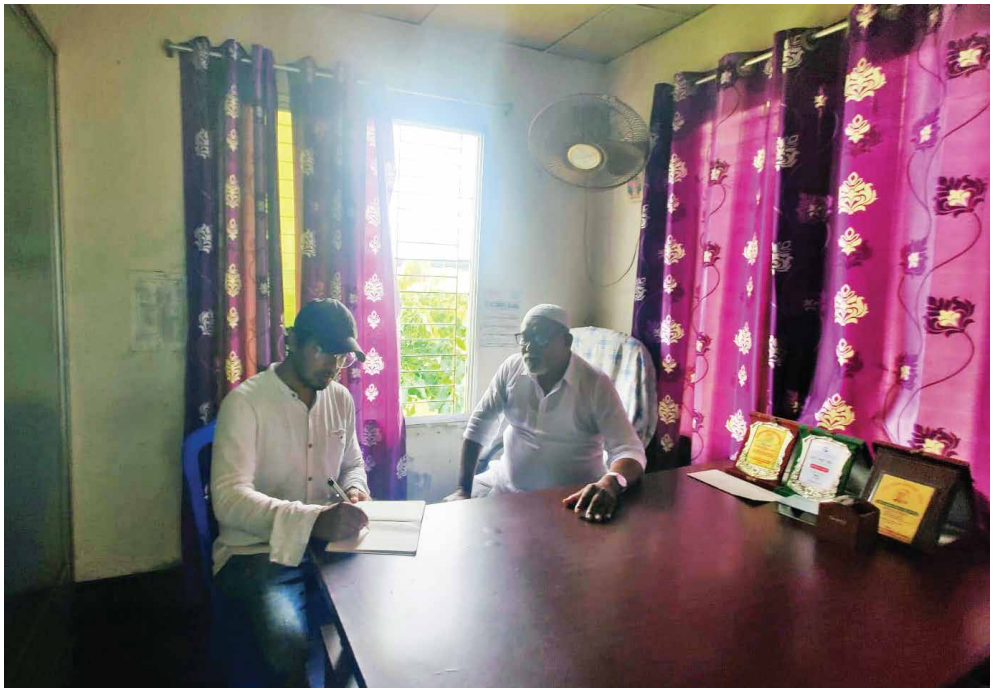


Figure 9: KII with Ward Councilor

4.2 Focus Group Discussions (FGDs)

During FGDs in Barishal City Corporation, participants highlighted the severe sanitation challenges in densely populated slum areas and lower-middle-class communities. The use of pit latrines is widespread, with poor maintenance leading to frequent overflows, especially during the rainy season. The lack of proper waste management and inadequate drainage systems results in contaminated water, posing significant health risks. Participants stressed the need for better sanitation facilities, regular waste collection, improved drainage, and community awareness programs to enhance hygiene practices.

4.3 Observations of Service Providers

Service providers operating in Barishal City Corporation have highlighted several critical issues regarding sanitation in the area. They observed that in slum areas and lower-middle-class communities, sanitation facilities are severely inadequate. The widespread use of direct pit latrines, particularly during the rainy season, leads to significant health risks as these latrines frequently overflow, contaminating the surrounding environment. Service providers also noted that many toilets are either connected to poorly maintained drainage systems or discharge waste directly into nearby rivers and waterways, further exacerbating water pollution and public health hazards.

Moreover, the service providers expressed concerns about the lack of proper waste management systems. Solid waste is often left in open spaces, contributing to the spread of diseases. They observed that the efforts by NGOs and local authorities to provide septic tanks and improved latrines are not sufficient to meet the growing needs of the densely populated areas. Additionally, in some wards, particularly Ward-11, service providers pointed out that the narrow pathways in slum areas hinder the use of mechanical equipment for cleaning pit latrines, making regular maintenance a challenge.

Overall, service providers emphasized the urgent need for more comprehensive and sustainable sanitation solutions, regular waste collection, and community education programs to improve hygiene practices and reduce the health risks associated with poor sanitation in Barishal City Corporation.

4.4 Cross-Verification of Data

Data from various sources, including KIIs and FGDs, consistently reveal that inadequate sanitation infrastructure and poor waste management practices are pervasive issues across multiple wards in Barishal City Corporation. The cross-verification of data underscores the critical need for comprehensive sanitation solutions, improved waste management systems, and increased community awareness to address the severe health and environmental challenges faced by residents, particularly in slum areas and densely populated communities.

5 Acknowledgements

We would like to express our sincere gratitude to all those who contributed to the development of this report. Our heartfelt thanks go to the local authorities of Barishal City Corporation and the Ministry of Local Government for their support and collaboration throughout the process.

We appreciate the efforts of local NGOs and community-based organizations for their invaluable input and assistance in data collection and fieldwork. Special thanks to the private sector partners who provided critical insights into waste management practices and challenges.

Finally, we thank all the community members who participated in the surveys, key informant interviews, and focus group discussions, providing essential information and perspectives that shaped the findings of this report.

Your collective efforts and support have been instrumental in addressing the sanitation challenges faced by Barishal City Corporation, and we look forward to continued collaboration in future endeavors.

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7 Appendix

7.1 Appendix 1: Stakeholder identification

Name	Designation
1. Tania Akhter	Volunteer, Ward-10
2. Mr. Rinku	Councilor, Ward-9
3. Shirin Sultana 4.	Councilor, Ward-22
4. Barsha Akhter	Councilor, Ward-25
5. Adnan Ali	Councilor, Ward-5
6. Md Mamun Ahmed	Councilor, Ward-6
7. Mojibur Rahman	Councilor, Ward-11
8. Md. Awal Molla	Councilor, Ward-1
9. Md. Zainal Abedin Howlader	Councilor, Ward-10
10. Nasima Akter	Pouroshova worker
11. Maksumul Hakim Reza	Executive Engineer, Barishal City Corporation
12. Mr. Prodip	Focal from AVAS

7.2 Appendix 2: Household Survey

In-depth information and data were collected for the town which included project documents, master plans, and baseline reports from town and national levels, statistical data like population and household income expenditure, satellite images, and Open Street Maps (OSM). Traditional paper questionnaire was not used rather android powered tab was deployed to collect household information. Questions were converted to appropriate format to use in mWater. Data collected through mWater are directly stored in a web-based database which is connected online with a website designed for this study.

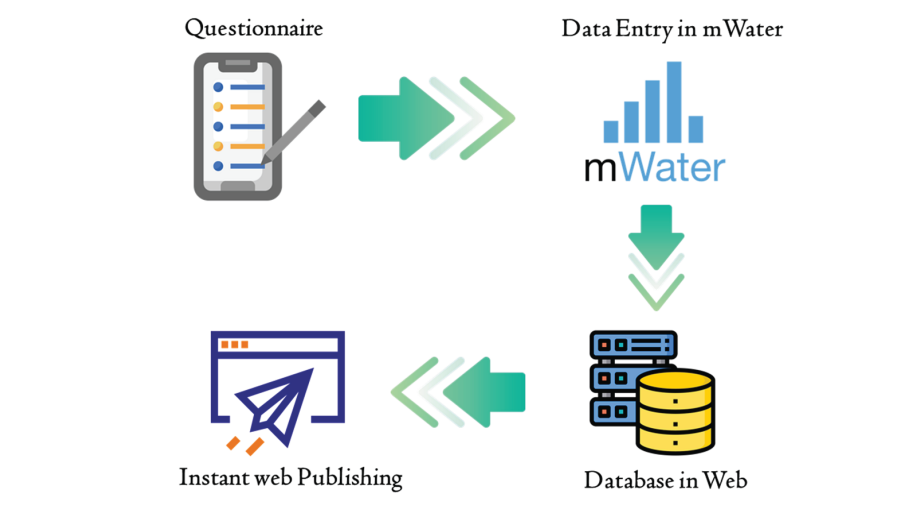

Figure 10: Workflow of mWater on HH survey.

mWater has been used for several reasons. It ensures the quality of data collection. It saves time and error in data entry. Moreover, for data analyst and field supervisor, it is convenient to examine data in real-time. It helps to prepare maps and visualize the spatial pattern of any phenomena. Extensive household questionnaire surveys were conducted for around 400 households for Barishal City Corporation. This sample size ensures, at least, a confidence level of 95% with a margin of error of 5%. Different type of information is collected like demographic, socio-economic, household characteristics, status of water supply, existing practices of sanitation including faecal and solid waste management at the household and town levels, gender, financial and environmental status. The steps in field survey consist of downloading the mobile App and then conducting the questionnaire survey and finally transferring data to the central server. During the time of the questionnaire survey, geo-coordinates of the household and a photograph of the respondent (with her/his permission) were taken.

In addition to ensure the field data quality, the data collection team (8-10 enumerators) were properly trained. A set of different questions were asked during the survey on the full sanitation value chain. Few of the relevant questions on sanitation were: 1) User interface of the toilet, 2) Type of containment, 3) Type of building, 4) Outlets from the septic tanks, 5) Desludging of septic tanks and latrine pits, 6) Desludging frequency, 7) Responsibility of desludging, 8) Desludging process, 9) Location of sludge disposal, 10) Water supply source and risk of contamination and 11) Transportation, treatment and reuse of faecal sludge.

SFD Promotion Initiative

Barishal City Corporation, Bangladesh, 2024

Produced by:

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