

SFD Lite Report

Ghatail Municipality, Tangail Bangladesh

This SFD Lite Report was prepared by
Onushandhani Creeds (O.CREEDS) Ltd.
and CWIS-FSM Support Cell, DPHE

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1 The SFD Graphic

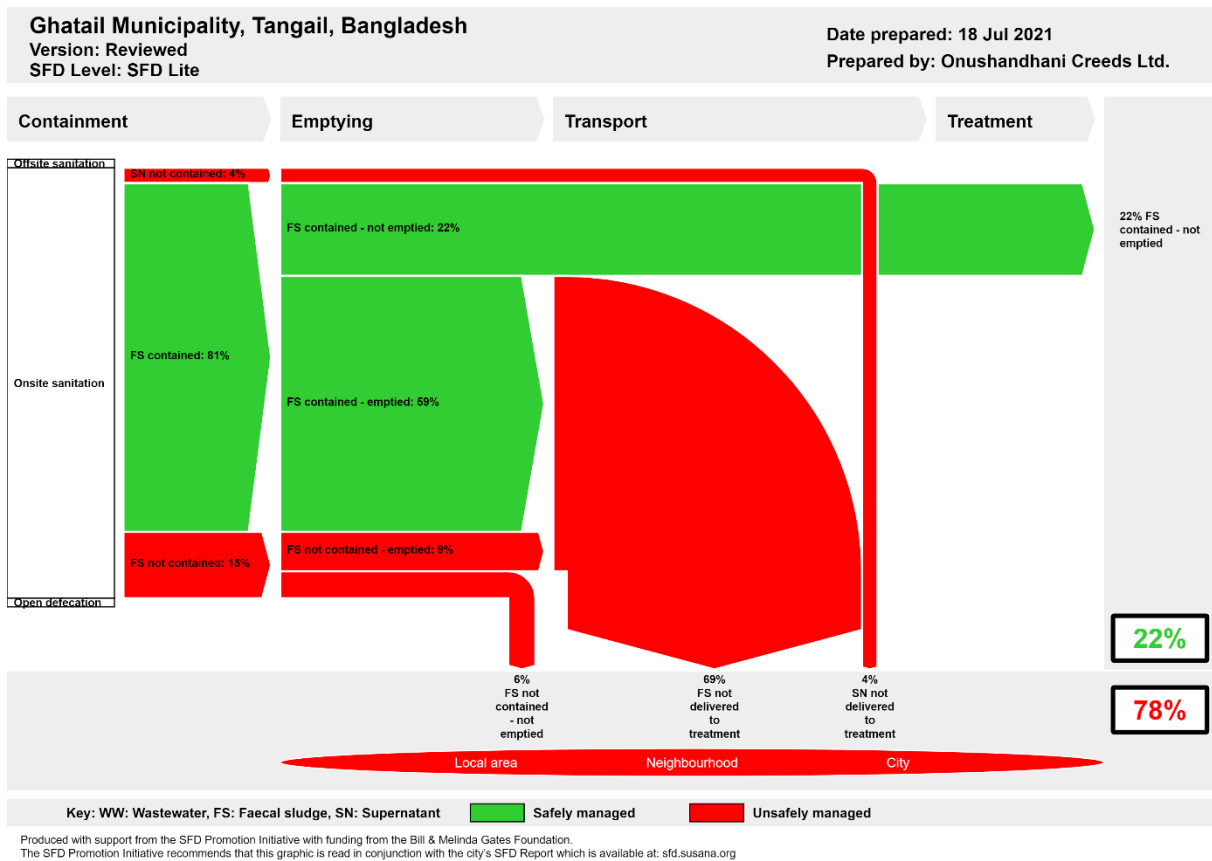


Figure 1: SFD Graphic for Ghatail municipality.

2 SFD Lite information

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- This report was compiled as part of the Rapid Assessment, conducted during the baseline data collection of the '**Arsenic Risk Reduction Project**' on 14-15 July 2021. The project was implemented under the supervision of the Department of Public Health Engineering (DPHE). Information and data were collected which included project documents, master plans and town information 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 rapid assessment was conducted from 14 July 2021 to 15 July 2021. It includes household surveys, key informant interviews, and physical feature surveys. Total 120 households have been surveyed in the 9 wards of Ghatail Municipality. KIIs were conducted with the Administrative Officer and Sanitary Inspector of the municipality.
- We would like to thank Md. Ishak Ali, Administrative officer, Ghatail Municipality; Md. Abul Kashem, Sanitary Inspector, Ghatail Municipality, Md. Raisul Islam, Assistant Engineer, DPHE, Ghatail Upazila, Local Masons, Emptier of Ghatail municipality for providing all the required primary and secondary data and cooperating for Key Informant Interviews (KIIs) & Focussed Group Discussions (FGDs). We would also convey our gratitude to Md. Shahadat Hossain, CEO, O.CREEDS Ltd for his guidance and directions to prepare the report.



Collaborating partners:

- Ghatail Municipality, Tangail District, Bangladesh
- Centre for Science and Environment (CSE), New Delhi, India
- CWIS-FSM Support Cell, DPHE, Bangladesh.

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3 General city information

Ghatail Municipality is a sub-district town of Ghatail Upazilla under Tangail District, which is located about 33 Km North of Tangail Sadar Upazila and 114 Km northwest of Dhaka City. It is directly linked with the Dhaka-Tangail highway. The municipality is crossed over by Jhinai River. Ghatail beel (wetland) is another main water body beside the town.

Table 1: City Profile (Source: Ghatail Municipality at a glance & KII with Municipality Administrative Officer)

Population parameters	
Estimated population, 2021	45,939
Households, 2021	10,209
Area, sq. km	11.02

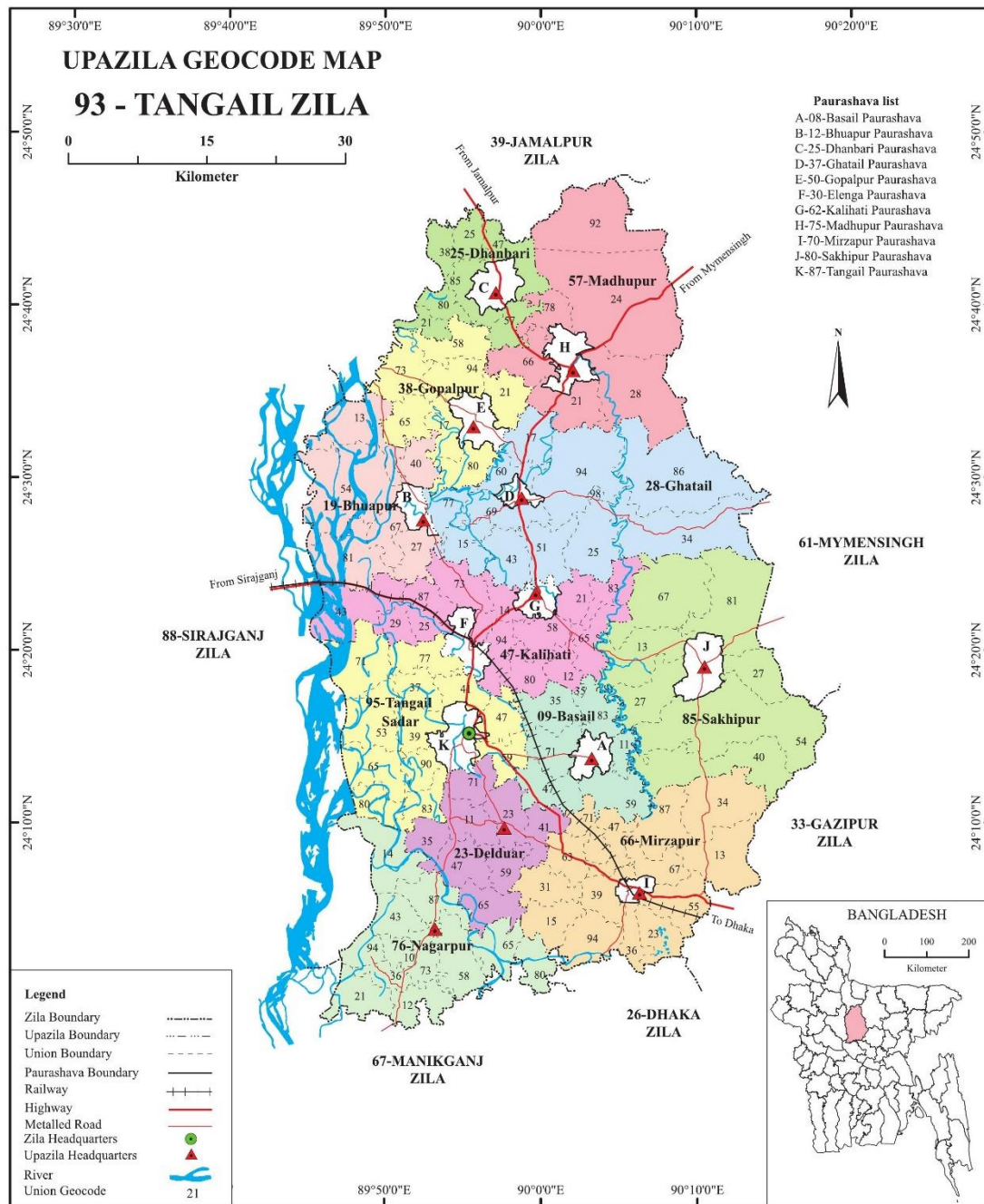


Figure 2: Ghatail municipality Location Map (BBS/ GIS report 2017)

According to the population census in 2011 by the Bangladesh Bureau of Statistics (BBS), the municipality population was 35,245. The urban population growth in Ghatail is considered 2% per year. Considering 6%-8% floating population, such as farmers and traders, comes to the city every day, the present (2021) population is estimated to be around 45,939. (Table 1 City Profile).

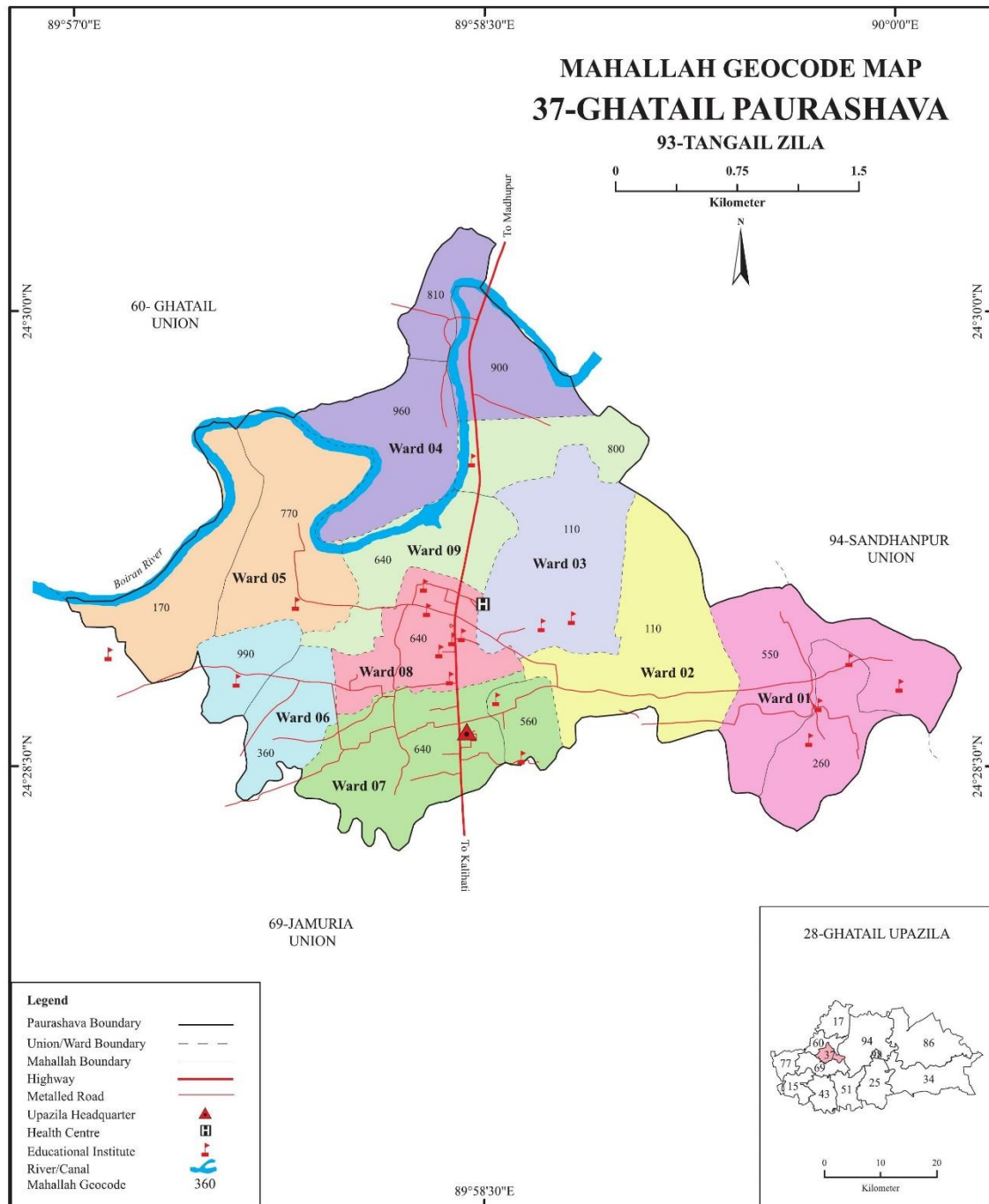


Figure 3: Ghatail municipality Ward Boundary Map (BBS/ GIS report 2017)

The municipality covers an area of 11.02 square kilometers¹. The geographical coordinates of Ghatail Municipality are 24°28'0"N latitudes and 89°58'0"E longitudes². In the context of Bangladesh, the topography of Ghatail municipality is majorly plain. It is elevated 14 m (46 feet) above sea level. Most of the land is used for agricultural purposes (Source: KII with Administrative Officer, Ghatail Municipality).

¹ Source: 'At a Glance: Ghatail Municipality', by municipal office

² Source: <https://www.gps-latitude-longitude.com/gps-coordinates>

According to the Bangladesh Meteorological Department (1981-2017)³, the city area and surrounding area experience a tropical monsoon climate. It is characterized by warm, humid summers and cool, and dry winters. About 90% of the total annual rainfall occurs in the period from May through October and the driest months of the year are November to March. The maximum mean temperature observed is 25-39°C between April-August, with the minimum mean temperatures of between 12-18°C in November-January. The annual average rainfall is about 1,493.2 mm, according to BMD (1981-2017).

There is no pipeline water supply system in the municipality. The main source of water for drinking and household purpose is either hand tubewell or tubewell with a submersible pump or electric pump. The depth of these tube wells varies from 30-45 meters in different areas. (Source: KII with Administrative Officer, Ghatail Municipality)

There is a solid waste collection and disposal service, operated by the conservancy department of the municipality within the core town area. However, in some areas (ward no. 4, 5 and 6), solid waste is dumped in nearby dustbins or water bodies or open ground. There is no sewerage system within the city. (Source: Field Survey, July'2021).

The main rivers are Bangshi, Jhenai, Lohajang, Salisunda. According to the flood zoning map of Bangladesh (BMD, 2012), the city is in a flood-free zone (in the last 12 years no flooding event happened). However, the drainage network of the city is not adequate⁴.

³ <http://bmd.gov.bd/p/Rainfall-Situation-202>

⁴ KII and field visit during household survey 2021

4 Service outcomes

Ghatail Municipality, Tangail, Bangladesh, 18 Jul 2021. SFD Level: SFD Lite

Population: 45939

Proportion of tanks: septic tanks: 79%, fully lined tanks: 0%, lined, open bottom tanks: 100%

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
T1A2C5 Septic tank connected to soak pit	21.0	72.0	0.0	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	17.0	61.0	0.0	0.0	0.0	0.0
T1A2C9 Septic tank connected to 'don't know where'	2.0	61.0	0.0	0.0		
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	12.0	53.0	0.0	0.0		
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	42.0	98.0	0.0	0.0		
T1B7C10 Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	6.0					

Table 2: SFD Matrix for Ghatail municipality. (Source: Ashifur/O.CREEDS Ltd/2021)

The outcome of the SFD graphic shows that only twenty-two percent (22%) of the excreta flow is classified as safely managed, and the remaining seventy-eight (78%) percent is classified as unsafely managed (Figure 1). The unsafely managed excreta originate from Faecal Sludge (FS) emptied but not delivered to treatment (69%), FS not contained - not emptied (6%) and 4% of supernatant (SN) was not delivered to treatment. The safely managed excreta originate from FS contained - not emptied (22%).

The percentages presented in Table 2 and discussed in the next section are based on data collected through household surveys, key informant interviews (KII) and physical feature surveys (Figure 3).

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 a dedicated sewerage system. However, during field observation and HH survey, it was found that there is a certain area where septic tanks are directly connected to open drains or storm sewer. Therefore, the T1A2C6 system is considered as 16.7% of the total population of the city to generate the SFD graphic. In the absence of a sewerage system, the supernatant in T1A2C6 is directly discharged into the river or the environment untreated.

4.2 On-site Sanitation Systems



Figure 4: Household survey and KII. Left: Household survey. Right: KII meeting.
(Source: rapid assessment, July 2021)

Containment: All the households (100%) in the city have their own latrine which is connected to single pits, twin pits, or septic tanks. From the rapid assessment, it was found that 40% of the city population uses septic tanks as the containment system, 42% of the toilets have single pit systems, 12% of people use double pit system and 6.7% of the toilets have pits (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow (KII, household visit and rapid assessment, 2021).

According to the type of connectivity and features of containment technologies, the discharging points of the toilets are categorized as 21% of the population uses septic tanks connected to soak pits (T1A2C5), 17% of them use septic tanks connected to open drain (T1A2C6), 2% utilizes septic tanks connected to 'don't know where' (T1A2C9), 12% of the population uses lined tank with impermeable walls and open bottom, no outlet or overflow (T1A4C10), 42% of the population rely on the lined pit with semi-permeable walls and open bottom, no outlet or overflow (T1A5C10) and 6.7% of population use pit (all types), which are never emptied but abandoned when full and covered with soil, no outlet or overflow (T1B7C10). Thus, at the containment stage, the city's excreta of only 81% of the population are contained. Figure 5 shows pictures of some of these sanitation technologies in operation.



Figure 5: Left: Septic tank connected to a nearby drain. Right: Septic tank connected to soak pit.
(Source: Field Survey, July 2021)



Left: Single Pit Latrine



Right: Double Pit Latrine



Left: Septic Tank



Right: Double Pit



Left: Outlet connected to the uncovered drain



Right: Single Pit

Figure 6: Containment technologies and their connections in Ghatail.
(Source: Field Survey, July 2021)

Groundwater Pollution: The groundwater level below the ground surface is 20-35 m. The most common drinking water production technology is tubewell with a hand pump or motorized pump. Over 35% of the households use their own tubewell fitted with an electric motor and 65% use own hand pump tubewell. Lateral separation between sanitation facilities and water sources varies from one area to another. The main source of drinking water is tube well. Tube wells of different sizes and depths are generally used to pump water from the confined aquifers. During the household visit and FGDs, it is found that less

than 25% of sanitation facilities are located within 10 meters from the groundwater source. Besides, due to the geographical situation, sanitation facilities are not located uphill of the groundwater sources. Tube wells of different sizes and depths are generally used to pump water from the confined aquifers. During the household visit and FGDs, it is found that less than 25% of sanitation facilities are located within 10 meters 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), drinking water is collected from the confined aquifer (20 m – 200 m) through pumps. Therefore, a low risk of groundwater contamination is considered in the city.

Emptying: Households relying on septic tanks and pits have to arrange themselves for emptying of the faecal sludge. It is observed from the rapid assessment that most of the septic tanks have been constructed in the last 4-6 years. According to the rapid assessment, the frequency of emptying of septic tanks or covered pits varies from 1 to 10 years depending upon the size, uses, etc.

In Ghatail Municipality, about 72% of the septic tanks, connected to the soak pit are emptied within 2-5 years. About 61% of the septic tanks connected to open drains, open ground or water bodies are emptied within 4-5 years. The single pit latrines are emptied more frequently. Almost 98% of single pit latrines and 53% of double 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 pits is fully (100%) done by private sweepers. Around 30 % of this withdrawal is done manually using a bucket and rope. This manual method has high risks for the health and safety of the workers. A significant number (70%) of emptying are done using electric pumps – this reflects the use of the safe and improved technologies for sludge emptying by some of the workers. The municipal authority has no mechanical emptying truck for sludge emptying and transportation⁵. (*Data source: Field survey, 2021*).

Transportation: The sludge withdrawn from the septic tanks and latrine pits by the cleaners is disposed of in various places. About 75% of the sludge is disposed of in the open environment like a drain and water bodies. According to the survey, it was found that the sweepers have motorized pumps. They withdraw the sludges and dispose of them to the nearby drains or water bodies with pipes. About 25% of the sludge is disposed of in dug holes and covered with soil away from the house. (*Data source: Field Survey, 2021*)

Treatment/Disposal: There is no faecal sludge treatment plant or facilities in Ghatail municipality. (*Data Source: Ghatail Municipality Office*)

4.3 Open Defecation

From the Household visit, KIIs and field observation, 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.

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.

5 Data and assumptions

The baseline survey conducted in October 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 Ghatail municipality:

- The proportion of FS in septic tanks, fully line tanks and line, open bottom tanks are considered 79%, 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), the Municipality population was 35,245. The urban population growth in Ghatail is considered 3% per year. Considering the floating population, such as farmers and traders, comes to the city every day, the present (2021) population is estimated to be around 45,939.
- There are around 12% 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 with no outlet or overflow (system T1A4C10, 12%). Based on the household survey, variable F3 for system T1A4C10 is set to 53%.
- There are around 42% 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 (system T1A5C10, 42%). 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 98%.
- 21% 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 72% of HHs have emptied their septic tanks connected to soak pits with a desludging frequency of 2-5 years. Based on the household survey, variable F3 for system T1A2C5 is set to 72%.
- About 61% of septic tanks connected to the open drain and 'don't know where' got emptied within 4-5 years. Based on the household survey, variable F3 for systems T1A2C6, and T1A2C9 are set to 61%.
- Supernatant in T1A2C6 is 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%.

6 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 City Corporations”, 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)
- MANAGING MUNICIPAL WASTE: APPLICATION OF SPATIAL TOOLS AND TECHNIQUES Showmitra Kumar Sarkar* and Md. Esraz-UI-Zannat; Department of Urban and Regional Planning, Khulna University of Engineering & Technology, Bangladesh; Journal of Engineering Science 10(1), 2019, 113-122
- The revised ‘National Strategy for Water Supply and Sanitation, 2021’
- ‘At a Glance: Ghatail Municipality’, by municipal office
- <https://www.gps-latitude-longitude.com/gps-coordinateshttp://bmd.gov.bd/p/Rainfall-Situation-202>
- <https://www.floodmap.net/Elevation/ElevationMap/?qi=1185165>

Key Informant Interviews (KII) on 14-15 July 2021

- KII with Administrator Officer, Ghatail Municipality.
- KII with Sanitary Inspector, Ghatail Municipality.
- KII with Assistant Engineer, Department of Public Health and Engineering (DPHE), Ghatail.
- Facilitators: Md. Ashifur Rahaman, Jr. GIS Specialist, Onusandhani Creeds Limited.

Other sources of information

- The household survey, conducted by Md. Ashifur Rahaman, Junior GIS Specialist, Onushandhani Creeds (O.CREEDS) Limited, and Maria Abdullah Tarin, Assistant Research Officer, O.CREEDS Ltd. The survey was carried out on 14-15th of July 2021.
- Physical observation by O.CREEDS Ltd. Team on 14-15th of July 2021.



Figure 7: O.CREEDS Team at Ghatail Municipality, Tangail (Source: Field Survey, 14-15 July 2021)

Ghatail Municipality, Tangail,
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