

**Sample Baseline Survey of Household Sanitation
Facilities in
Gazipur City Corporation**

**2030 Water Resources Group
World Bank**

Abstract

Despite outstanding success in rural sanitation coverage, Bangladesh is still facing tremendous challenges regarding urban wastewater management. The objective of this baseline survey of the household sanitation facilities in Zones 1 and 3 of Gazipur city corporation (GCC) is to understand existing practices and facilities for sanitation and water supply at household / premise level, broadly assess areas and types of premises lacking facilities for safe sanitation and make an informed, ball-park estimation of type, number and capacity of existing septic tanks / holding tanks. Peoples' willingness to pay for safe sanitation services through both network and non-network systems was also assessed.

The survey covered 1000 respondents. Data were collected from households, slums, apartment units and commercial/public establishments located in zone 1 and zone 3 of the GCC, and then segmented based on density and income of the survey areas. Our findings show that although most of the respondents (88%) have access to toilets connected to septic tanks or pits; majority of these tanks (79%) do not have a soak pit. GCC does not provide any tank or pit emptying services.. However, users generally empty their pits during incidents of overflow, when pit cleaning becomes absolutely necessary. Usually sweepers (manual pit/tank emptier) are hired for such job and the sludge is thrown into drains, rivers or in open spaces polluting the water bodies and environment.

Other key findings relate to respondents' perception of their immediate environment: Over 95% of respondents affirmed that a clean environment is very important for them. Also, more than 75% of respondents expressed a willingness to pay equal to or higher than water charges for network wastewater services. However, less than 40% respondents indicated a willingness to bear even current (or marginally lower than current) charges for safe faecal sludge management (FSM) or non-network services. This points to the high level of dissatisfaction associated with FSM services as currently experienced; and the urgent need to provide safe alternate practices for non-network services.

Overall, the survey findings reiterate the necessity for safe wastewater and faecal sludge management services in the area.

1. BACKGROUND

The 2030 Water Resources Group (2030 WRG) is a **public-private-civil society partnership** that supports governments accelerate reforms in sustainable water resources management for long-term development and economic growth. It does so by helping change the ‘political economy’ for water reform in the country by convening stakeholders and by providing water resources analysis in ways applicable to politicians, administrators and business leaders outside the traditional water sector.

2030 WRG deploys an **Analyze-Convene-Transform** approach with a focus on accelerating particularly demand-side solutions across agriculture, industry and urban development.

2030 WRG was formed at the World Economic Forum’s annual meeting in 2008, where representatives of the United Nations, individual governments and companies, as well non-governmental organizations resolved to address global water security and its economic and geopolitical implications. It is currently **hosted by the World Bank**.

2030 WRG works in several countries. In Asia, 2030 WRG has ongoing programs in Bangladesh, Vietnam, and Mongolia.

With outstanding success in household sanitation coverage in rural areas, Bangladesh is embarking on addressing the issue of urban wastewater management. However, due to factors like high population density, rapid and unplanned growth, inadequate service provision and so on in urban areas, the challenges are acute. Moreover, in absence of an effective wastewater management system most of the sludge goes back to surface water bodies, offsetting the gains achieved through increased sanitation coverage (Bashar & Ahmed 2012).

A significant initiative in this regard has been the preparation of the Dhaka Sewerage Master Plan (DSMP), developed by Dhaka Water Supply and Sanitation Authority (DWASA), under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MoLGRD&C) of Govt. of Bangladesh (GoB). The plan provides strategic direction, through a robust technical approach, to urban wastewater management. Keeping in view constraints in financing large public infrastructure, the plan prioritizes provision in Dhaka city, recommending that other urban areas under the Plan - including four in the Greater Dhaka Region (being Gazipur, Tongi, Savar and Narsingdi) - be taken up only after 2025, or later.

In 2013, two of the municipalities under the DSMP – Gazipur and Tongi – were amalgamated, along with large rural areas, to form Gazipur City Corporation (GCC). They currently constitute Zone 1 and Zone 3 respectively of GCC, accounting for approx. 900,000 population (42% of total GCC population) and 80.54 sq.km area (24.5% of total GCC jurisdiction). In 2017, a rapid assessment of wastewater management options for these two urbanized zones of GCC was undertaken, to investigate the potential for bringing forward implementation of wastewater

infrastructure and services outside Dhaka city jurisdiction, with minimum burden on the public exchequer. The rapid assessment (RA) recommended an integrated approach, combining both network and non-network systems; and identified estimated capital investment requirements of 429 Cr. Tk. for the two zones. To reduce the demand on public finances (GoB grants), the rapid assessment explored alternate sources of finance, including private sector investment and concessional loans.

It also proposed implementation of select components through private sector, with the objective to ensure that the assets constructed are operated efficiently to safely collect, convey and treat wastewater (and/or faecal sludge) – and deliver a positive impact on the environment. LGD and GCC have, in principle, agreed to initiate next steps for implementation of wastewater infrastructure in Zone 1 and Zone 3 of GCC through preparation of a Detailed Feasibility Study report.

Before starting detailed project preparation, a sample baseline survey of household sanitation facilities in Zones 1 and 3 of Gazipur City was felt necessary, to validate some of the assumptions of the Rapid Assessment.

2. OBJECTIVES

The objective of the sample baseline survey of household sanitation facilities in Zones 1 and 3 of GCC is (a): to understand existing practices and facilities for sanitation at household / premise level (b): to broadly assess areas and types of premises lacking facilities for safe sanitation (c): make an informed, ball-park estimation of type, number and capacity of existing septic tanks / holding tanks.

The specific objectives of the survey are:

- Collect baseline data of households water consumption patterns; including HHs getting water supply from the GCC as well as off-system households fulfilling their water supply needs from other sources;
- Collect baseline data of household sanitation practices;
- Data on customer perception and demand regarding level of sanitation services from the GCC;
- Baseline data regarding willingness to pay and tariff structures;
- Views and status on water supply services and sanitation situation corresponding to the segregate classes (a) high income areas; (b): middle and low-income areas / workers' housing; (c): slums; (d): commercial and institutional (incl. offices) areas (e): public and shared facilities (bus stand / railway station / slums) of citizen.

3. METHOD

In order to understand the water and sanitation situation in GCC, the survey covered a stratified random sampling of households in selected wards in Zones 1 and 3 of GCC. The sample included different localities, viz., (a): high income areas; (b): middle and low-income areas / workers' housing; (c): slums; (d): commercial and institutional (incl. offices) areas (e): public and shared facilities (bus stand / railway station / slums). The sampling followed is presented below. In total 1000 establishments were surveyed through a simple questionnaire as well as documented through photographs.

Zone 1 (Tongi)						
Number of samples	High Income Area			Low Income area		
	Individual house	Flat	Slum	Individual house	Flat	Slum
High Density Ward	40	40	40	40	40	40
Low Density Ward	40	40	40	40	40	40

+ 20 samples from institutional buildings, shops, hotels, public places...etc. Total 500 questionnaires

Note: The same sampling was repeated in Zone 3 (Gazipur)

Survey instrument: A short structured questionnaire was prepared for collecting relevant data by interviewing the primary income earners (in case of HHs) or decision-makers of each of the establishments/premises by a trained enumerator. The questions were asked in Bangla and were formulated in a simple way so that the interviewer and the respondent can easily understand. The survey covered the existing practices and facilities for waters and sanitation at household / premise level, areas and types of premises lacking facilities for safe sanitation, number and capacity of existing septic tanks / holding tanks, residents' perception of a clean environment, willingness to pay for better services etc. Prior to the actual survey the questionnaire was pre-tested and modified based on the output gathered from the field test.

Data management and analysis: The collected data was rechecked and edited for inconsistency, wrong recordings, and coding in the field. Before the data entry, the filled in questionnaires were further checked by enumerators. After recording all data, distributions and ranges were examined for consistency, and extreme values and necessary corrections were made in the case of entry errors. Then the cleaned data were analysed using STATA.

4. FINDINGS

The survey covered total 1000 units which includes 320 individual households, 320 slum, 320 apartments units and 40 public and shared facilities. 50.80 percentage of the sample sites were located in high density wards and rest in the low-density wards. The sample size was equally distributed between two zones. The findings section is divided into 3 parts: General and Water supply, understanding the sanitation facilities of the area and consumers' willingness to pay for safe pit emptying system.

General and Water Supply

About 43.8 percent of households surveyed were found to have piped water connection. According to the data GCC covers the highest number of households with their services. Apart from GCC other providers include Center for Disease Control and Prevention (CDC), Urban Poverty Reduction in Bangladesh (UPPR) and Care Bangladesh. Zone wise distribution of the number of households covered by each provider are presented in below table 1:

Table 1: Access to piped water supply disaggregated by the service provider institution:

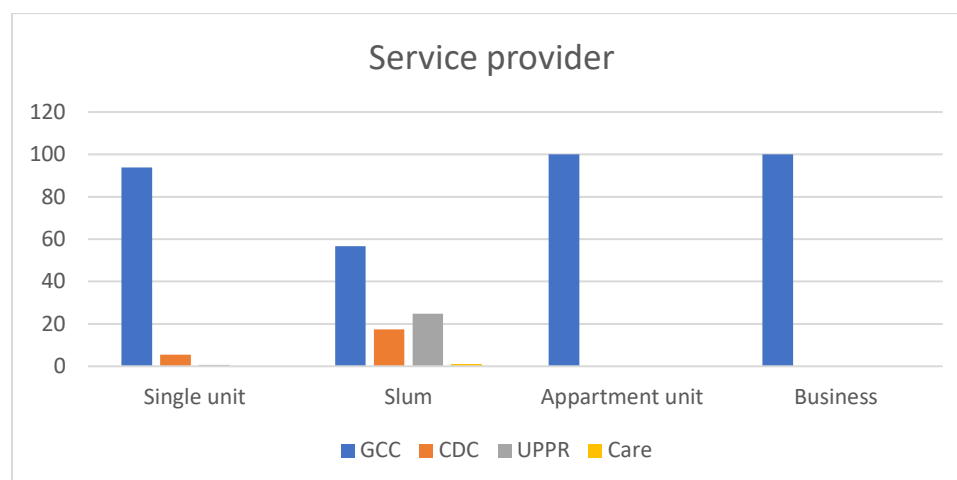
Water and Sanitation provider	Zone-1 (%)	Zone-3 (%)	Total
GCC	38.4	32.4	35.4
CDC	7.6	0	3.8
UPPR	8.8	0	4.4
Care Bangladesh	0.4	0	0.2
None	44.8	67.6	56.2

Table 1.1 shows ward wise distribution of the percentage of hhs that has no access to piped water supply in two zones. Further analysis depicts that 93.14 percent of these hhs manage water through tube wells fitted with submersible pumps.

Table 1.1: Ward wise distribution of HHs in each zone that do not have access to piped water supply

Zone 1		Zone3	
Ward	Percentage HH without access to piped water supply	Ward	Percentage HH without access to piped water supply
43	11	24	60
44	1	25	54
45	4	26	38
46	6	27	21
47	12	28	46
48	5	29	59
49	13	30	39
50	9	31	21
51	31		
52	47		
53	39		
54	10		
55	9		
56	10		
57	17		

Diagram 1: Water and sanitation provider by type of establishments



As per the bar diagram (diagram 1) above, 100 percent of the apartment units and public and shared facilities gets their water supply from GCC while about 93.79 percent of the single household units and 56.65 percent of the slums use GCC for their water supply while rest of the establishments fulfil their water supply need through other private providers.

Average width of access road to the property, disaggregated based on income class and density of the areas: To understand whether it will be possible for a vaccu-tug truck (for non-network system) to enter the premises of the establishments to provide their services, the width of the access road to each of the property was measured. The result show that overall average width is 3.72 m. While high income and high-density areas on average have slightly wider access road to each property than low income and low density areas; however, the difference is negligible.

Table 2: Average width of access road to the property:

Type of Area	Average Width of the road (in meter)
Average width access to the property (overall)	3.72
For high density areas	3.95
For low density areas	3.48
For high income areas	3.86
For Low income areas	3.18

Average household size: The number of persons per household is estimated in average 5.23 for single unit, 4.96 for slums and 5.52 for apartment units. As per data in slums average size of the household is comparatively lower than single units and apartments units however the difference is not significant.

Table 3: Average household size disaggregated based on accommodation type

Type of Accommodation	Average Size
Single unit	5.23
Slum	4.96
Apartment	5.52

Percentage of HHs augmenting piped supply with supplementary sources: Table 4 shows the percentage of HH having access to piped water supply from any of the provider as well as the percentage of these HHs that gets their piped water supply from GCC. Data shows that about 17.7 percent of the establishments that has access to piped water supply from any provider also requires to augment it with supplementary sources of water. Further analysis shows that about 42.69 percent of establishments that receives piped water supply from GCC augments it with supplementary sources. Which implies that GCC is unable to meet the water need of more than 40 percent of its clients.

Table 4: Percentage of HHs surveyed augment piped supply with supplementary sources:

	Percentage
Percentage of household having access to piped water supply	46.1
Percentage of household receiving piped water supply from GCC	80.82
Percentage of HHs and Businesses that receives piped water supply (from any provider) augmented with supplementary sources	17.7
Percentage of HHs that receives piped water from GCC augment with supplementary sources	42.69

Average HHs water consumption

Table 5 shows per month average water consumption of each type of residential establishment. According to the data on average water consumption per month of a single unit HHs, slum and apartment unit is about 9828.16, 7567.19 and 11106.84 liter respectively. Since a slum household has fewer members, and more difficult access to water, the water consumption rate of slums is found comparatively lower than other establishments.

Table 5: Per month average water consumption rate disaggregated by establishments

Water Consumption	Liters (per month)	Litres /capita / day
Single unit house	9828.16	62.64
Slum	7567.19	50.85
Apartment unit	11106.84	67.07

Sanitation Facilities

Access to sanitation facilities:

We have found no cases of open defecation. As per our data all establishments had access to toilet facilities. Table 6 shows the disaggregated survey results for HHs which includes: single unit, apartment unit and slums and public and shared facilities that includes shops, hotels, institutional buildings and other public places. Data shows that 0.42 percent of HHs are still using pit toilets. 86.98 percent HHs and 90 percent of public and shared facilities were found having access to proper sanitary toilet with water seal. Type of toilets used by HHs and public and shared facilities of GCC are as follow:

Table 6: Type of toilet used by HHs and Public and shared facilities in GCC

Access to Sanitation	HHs (%)	Public and shared facilities (%)
Pit toilet (Kacha toilet)	0.42	0.00
Toilet without water seal	12.60	10.00
Toilet with Water seal	86.98	90.00
Total	100	100

Shared/communal toilet facilities:

29.4 percent (in table 7) of the sample was found to be using shared toilet facilities. When disaggregated (in table 7.1) by HHs and commercial establishment, the data shows that of the total HHs and commercial establishments surveyed, about 30.21 and 10 percent respectively uses shared facilities.

Table 7: Shared toilet facilities

Type	Freq.	Percent
Shared toilet	294	29.4
Not shared	706	70.6
Total	1,000	100

Table 7.1: Percentage of shared toilet facilities segregated by HHs and Public and shared facilities

Shared toilet facilities	HHs	Public and shared facilities	Total
Shared toilet	30.21	10	29.4
Not shared	69.79	90	70.6
Total	100	100	100

Discharging situation:

The below section provides information on number of toilets having access to (i): septic tanks / holding tanks / pit latrines discharging directly to drain outside. Data shows that 64.7 percent of the establishments have access to septic tank while rest rely on either pit or direct discharging system to outside drain for waste water management.

Below mentioned table 8 & 8.1 show the types of discharging facilities and how many of them have access to proper septic tank.

Table 8: Waste water management system disaggregated by HHs and commercial establishment

Type	Individual house (%)	Slum area (%)	Apartment (%)	Businesses (%)	Total (%)
Septic tank	41.25	44.38	55.63	70	48
Pit	30.63	40.94	2.5	2.5	23.8
Latrine discharging directly to drain outside	28.13	14.69	41.88	27.5	28.2
Total	100	100	100	100	100

Table 8.1: Waste water management system disaggregated by zone

Type	Zone-1	Zone-3	Total
Septic tank	71.4	58	64.7
Pit	17	30.6	23.8
Latrine discharging directly to drain outside	11.6	11.4	11.5
Total	100	100	100

In general, toilet waste travels from the toilet to septic tank, to a soak well or drainage pit which helps to soak up septic tank effluent into the surrounding soil. Even though majority of the toilets surveyed have access to septic tank most of these tanks lack a soak-well; as a result the tank overflows in the surrounding drains and waterbodies polluting the surface water. Our data shows that (in table 8.1) Only 20 percent of the toilet with septic tanks have 2 chambers and a soak-well.

Table 8.2: septic tank with soak pit / latrine with soak pit arrangement by establishments; and zones

Type of Tank	Individual house (%)	Slum area (%)	Apartment (%)	Businesses (%)	Total (%)
tank with one chamber	48.44	45.05	14.71	23.68	30.45
two chambers	36.98	27.03	62.42	60.53	48.69
2 chambers and soak-well	14.58	27.93	22.88	15.79	20.87
Total	100	100	100	100	100

Type	Zone-1 (%)	Zone-3 (%)	Total (%)
tank with one chamber	33.05	27.24	30.45
two chambers	37.82	62.07	48.69
2 chambers and soak-well	29.13	10.69	20.87
Total	100	100	100

The average estimated size of a septic tank is as follows:

Width	9.13 feet
Length	11.24 feet
Depth	8.84 feet

Pit cleaning:

As per our findings almost all HHs of GCC do not practice regular pit emptying; instead pits are emptied only when they overflow and cleaning becomes absolute necessity. Mainly pits/tanks are clean on a self-initiative basis, employing a manual emptier.

Table 9: pit cleaning situation

Emptying septic tank	HHs (%)	Public and shared facilities (%)
NGOs/pvt org	0.61	0
Self-initiative	99.39	100

Satisfaction with current emptying services: Almost all household practice an emergency pit cleaning where they only clean their pit when it overflows. Cleaning is undertaken by a sweeper (manual emptier) and sludge is generally thrown into drains, rivers or in open spaces. Over 90% of households surveyed claimed that they are dissatisfied, or only somewhat satisfied, with the services of the manual pit cleaners (table 9.1). The main reason for dissatisfaction for majority is the high cost and poor quality of the service.

Table 9.1: Satisfaction with current emptying services

Satisfaction with Emptying services	HHs (%)	Public and shared facilities (%)	Total (%)
Dissatisfied	30.09	16.67	29.62
Somewhat satisfied	61.70	50.00	61.29
Satisfied	8.21	33.33	9.09
Total	100	100	100

Willingness to Pay

Importance of clean environment outside: The survey tried to understand the importance attached to having a clean environment in public spaces around residents' houses; and the

responses reflected from the survey are extremely positive - there seems to be a high demand for improving environmental conditions through wastewater services. As per the data, 95.3 percent of respondents conveyed that a clean environment is very important for them.

Table 10: Importance of clean environment outside

How important is it for a house owner to have a clean environment outside	Frequency	Percent
Not at all important	10	1.0
Somewhat important	37	3.7
Very important	953	95.3
Total	1,000	100

Willingness to Pay for Improved Wastewater Services: In order to understand what consumers, find acceptable as fee for safe wastewater services – both network and non-network services – we asked them about their willingness to pay for each of these services separately.

As there was no prior set price for these services, respondents' willingness to pay was assessed relative to their current water bill; and whether they are willing to pay equivalent, more or less than their current water bill. As per the findings, for network wastewater services, 53.2 percent agreed to pay equal amount of the current water charges, 22.8 percent agreed to pay higher than their current charges – i.e., more than 75% of respondents agreed to pay equivalent or higher charges as compared to water supply charges for services based on network sewerage. The rest stated that they prefer to pay a lower rate than the current water charges (Table 11)

Table 11: Number of HHs surveyed willing to pay for sewerage (network) services

Willingness to pay for network services	Zone1	Zone2	Total
Ok to pay equal to current water charge	63.6	42.8	53.2
Higher than the current water charge	25.4	20.2	22.8
Lower than the current water charge	11	37	24

Note: The current estimated water charge is approx. BTK_520/connection

Willingness to pay for improved emptying (non-network) services: For a non-network services, we asked respondents to compare charges with their current emptying cost and inform us whether they want to pay more or less than what they are paying to the manual pit emptier. Majority of the respondents said they would want to pay lower than the current cost. About 13.5 percent agreed to pay same rate as the current cost and 8.5 percent are unwilling to pay any amount for this service. It may thus be inferred that non-network services – or pit emptying – are

not a preferred option, and payment for such services is a low priority expenditure for the residents. This may likely be due to the current experience of pit emptying as a practice that is not delivering a clean environment.

Table 12: Number of HHs surveyed willing to pay for improved emptying (non-network) services:

Willingness to pay for improved emptying system	Zone-1	Zone-3	Total
Lot lower than the current rate	58.2	49.4	53.8
Bit lower than the current rate	22.8	25.6	24.2
Same rate	11.8	15.2	13.5
Not willing to pay any money for the services	7.2	9.8	8.5

Note: The current rate paid for tank emptying services is 1200 for HHs and 2000 for businesses on average

Conclusion

The objective of this survey was to understand existing practices and facilities for water and sanitation at household / premise level, broadly assess areas and types of premises lacking facilities for safe sanitation and make an informed, ball-park estimation of type, number and capacity of existing septic tanks / holding tanks.

The findings show that even though most of the people in GCC use latrine connected to septic tank or pit (88%); majority of them don't have access to a soak pit (79%). Mainly tanks are cleaned on a self-initiative basis. However, users generally do not empty their pits/tanks on time unless it overflows, and cleaning becomes absolutely necessary. Usually HHs hire sweepers (manual pit emptier) who clean the pit and throws the sludge in drains, rivers or in open spaces polluting the water bodies. Thus, study makes very clear that there is a need for safe wastewater and Faecal Sludge Management (FSM) in the area.

The study also measured people willingness to pay for safe emptying services or for access to a network system. The findings show that a majority of the respondents were willing to pay an adequate amount for network- based services. However, for non-networks systems, the responses were bit mixed, although consumers expressed concern about the health and safety of manual emptying. Access to improved pit emptying services seems to be a less preferred option.

As a result, it may be concluded that there is a significant need for increasing awareness of good and alternate sanitation practices among the residents which could eventually promote better behavior and deliver a safe and healthy environment.