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Baseline Study

# A Baseline Study to Assess Faecal Sludge Management of Residential Premises in Selected Southern Cities of Bangladesh

SNV SMART DEVELOPMENT WORKS

# A Baseline Study to Assess Faecal Sludge Management of Residential Premises in Selected Southern Cities of Bangladesh

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# Executive Summary

The main objective of this baseline study was to understand the current situation of faecal sludge management (FSM) and practices of residential premises in three cities in southern Bangladesh: Khulna, Kushtia and Jhenaidah.

A second objective was to establish a benchmark for the FSM programme.

The baseline consists of two parts:

1) A quantitative part measuring access to sanitation, hygiene and FSM services at residential premises.

2) A qualitative part assessing the capacities and enabling environment factors affecting safe sanitation and FSM services.

This report covers the first part.

We collected information through a questionnaire survey of sampled households. We employed a stratified random sampling method designed to detect relatively small changes in the survey indicators with a satisfying degree of precision. To conduct the study, we gathered information on five impact indicators:

- Access to sanitary facilities
- Hygienic use and maintenance of sanitation facilities
- Access to hand washing with soap
- Safety of pit emptying and collection, and
- Safe treatment and disposal

We used the Qualitative Information System (QIS) to quantify factual statements describing the situation for a particular score using progressive scales. Each scale ranges from the absence of the particular indicator at the lowest level (score 0) to the optimal mini-scenario at the highest level (score 4). Levels 1, 2 and 3 describe the scenarios in-between levels 0 and 4 for each specific indicator. To disaggregate the data by wealth groups we used asset-based wealth ranking.

The sampled households' sanitation facilities were grouped into various levels as per the type of toilets they are using. High levels indicate an environmentally safe toilet while low levels indicate no toilet.

Level 1 indicates that no toilet is used within the premises. Level 2 indicates the presence of unimproved toilets, i.e., there is direct contact of faeces by humans or faeces are conveyed directly to the environment; shared toilets also fall into level 2. Toilets where faeces are inaccessible to humans but still accessible to flies are categorised as level 3, while toilets that are inaccessible to flies fall into level 4. Toilets that don't contaminate surface or groundwater and are inaccessible to flies are categorised as environmentally safe toilets.

Most respondents have access to an improved toilet inaccessible to flies (Khulna 66.09%, Kushtia 63.51% and Jhenaidah 43%). We also observed from the same variable that open defecation has been very low in all three cities (Khulna 1.33%, Kushtia 1.10% and Jhenaidah 1.9%).

Toilets with a septic tank are predominant in all three cities, but in the majority of households in Khulna and Kushtia, the septic tanks are only providing containment, as there is no soak well. Jhenaidah has a comparatively higher number of environmentally safe toilets because of functional soak pits. Ninety-four per cent of households whose septic tanks are not connected to a soak well/pit in Khulna mentioned that septic tank outlets were connected to surface or grey water drains. Another 4% said that the liquid from the septic tank was released onto open ground.

In all three cities, a strong correlation was found between access to a sanitary toilet and wealth. This is most pronounced in Jhenaidah. Open defecation is relatively low and only seen in the poorest wealth quintiles, except in Kushtia where 1% of those that do not have a toilet are from the wealthy and wealthiest groups (WQ4 and WQ5).

To assess the hygienic use and maintenance of sanitation facilities, we used a scale based on functionality, availability of water and privacy. High levels indicate a hygienically used and maintained sanitation facility, while low levels indicate poor hygiene. Residents of the three cities have used and maintained toilets in a hygienic way (Khulna 36.47%, Kushtia 42.08% and Jhenaidah 28.70%). At the same time, they are keeping the toilet clean and privacy is ensured (Khulna 34.82%, Kushtia 40.43% and Jhenaidah 29.40%). On the other hand, a tiny percentage of respondents have no toilet or their toilet is not in use (Khulna 2.93%, Kushtia 3.78% and Jhenaidah 3.5%). Thirty-six per cent of respondents in Khulna, 42% in Kushtia and 29% in Jhenaidah have functional toilets without blockages in the water seal but there is no water within the toilet cubicle. Eighteen per cent of households in Khulna, 6% in Kushtia and 19% in Jhenaidah are using a toilet with functionality problems; common issues are no water seal, blockage in the water seal or unimproved toilets in use. Even if most of the toilets are functional, there is no access to running water within the toilet cubicles

and the majority of households use pour-flushing after defecation.

Out of 182 cases in all three towns, only 47 households met the toilet use needs of members with mobility difficulties. There are 50 cases with members with vision impairment, of these only 13 households have met their needs. Frequency of toilet cleaning is satisfactory but there are still a good number of households, especially in Jhenaidah, who do not clean their toilet every day, or even every week.

Access to hand washing with soap after defecation was classified based on the availability of a dedicated handwashing station, availability of cleansing material, susceptibility to water contamination and availability of running water. Higher levels tend to indicate a contamination-free handwashing station while lower levels indicate a partial or total lack of water and cleansing materials. About half of the households in Kushtia, 43% of households in Khulna and 29% of households in Jhenaidah fall into the highest level with a dedicated handwashing station with running water and cleansing materials; but around one-third of the households have no handwashing station within accessible distance with water available (level 0). The situation in Khulna is worse (45%) compared to the other two towns. In most households, the decision to install handwashing devices is taken together by both the men and women. Access to handwashing facilities is highly related to wealth; the wealthier households have better access to sanitation facilities. In Khulna, the practice of storing water is very minimal in all of the wealth quintiles. The majority of the poor (72%) and poorest households (88%) in Khulna do not have a handwashing station within accessible distance to the toilet. The situation is similar in Jhenaidah, where 86% of the poorest households and 45% of non-poor households have no handwashing device. But in Kushtia, the majority of the poor and poorest households have a handwashing device, but they were still susceptible to contamination. On the other hand, more than three-quarters of the households among the wealthy and wealthier groups have handwashing facilities with running water and cleansing materials.

The safety of the emptying and collection of sludge was classified according to where the sludge was conveyed after emptying and the type of containment being used. The lowest level of unsafe emptying or conveyance was recorded when the sludge is directly discharged into the environment; pits have not been emptied within the last three years; or emptying is done with someone entering the containment without protective gear. The next level, mostly safe, indicates that sludge is not discharged directly into the environment; the containment has been emptied within the last three years; someone enters the containment wearing protective gear; or an anaerobic digester was in use. The highest level, environmentally safe emptying, indicates that no one enters the containment; no leakage exists in the sewerage pipe; or anaerobically digested slurry is disposed of after six months' storage. In all programme locations, more than 85% of households practice unsafe faecal sludge (FS) emptying and conveyance. There are no safe emptying options available in the towns. Sweepers are largely used to empty septic tanks/pits, sweepers in all of the project areas. However, a combination of sweepers and mechanical cleaning is predominant in Kushtia. Kushtia Paurashava has been operating Vacutug services for slightly longer than the other two towns. In all three towns, development partners and the Government of Bangladesh have provided logistical support to the local authorities for emptying, but this collected sludge is directly or indirectly disposed into waterbodies. As a result, most households are classified as level 1, i.e. unsafe emptying.

To assess the safe treatment and disposal of sludge, the levels were based on the final disposal of the sludge. If details are unknown by the household, it's categorised as practising unsafe treatment. If anaerobically digested sludge is disposed directly into the environment, disposal is considered partially safe. But if sludge from a single containment is disposed directly to a designated site or composted using twin pit latrines and the compost is stored for less than six months, then the practice is classified as using mostly safe treatment and disposal. Environmentally safe treatment and disposal is where sludge is anaerobically digested using two-compartment septic tanks or biogas, and the sludge is knowingly disposed to a designated site or composted in twin pit latrines, and the compost is stored for more than six months. Two-thirds or more households in all three locations practice environmentally unsafe treatment and disposal. Most people, irrespective of wealth and social status, deploy unsafe or partially safe treatment techniques while some households practice safe treatment methods; the trend is positively correlated with household wealth. Even though Kushtia and Jhenaidah have treatment plants, the services have not been established as envisioned. This clearly shows that having an infrastructure without any demand-side activities will not guarantee proper FSM services.

More than half of the pit latrines in Kushtia are two pit latrines without a Y-junction. This indicates a lack of understanding of the principles and benefits of proper twin pit latrines with a Y-junction. Households could not utilise the benefits of resource recovery from the technology. The variance in knowledge and practice for resource recovery and use is very high.

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# Abbreviations

| | |
|---|---|
| ADB | Asian Development Bank |
| BNBC | Bangladesh National Building Code |
| CBO | Community Based Organisation |
| CDC | Community Development Committee |
| DEWATS | Decentralised Wastewater Treatment System |
| DHS | Demographic Health Survey |
| DPHE | Department of Public Health Engineering |
| FS | Faecal Sludge |
| FSM | Faecal Sludge Management |
| GIS | Geographic Information System |
| HWSS | Handwashing Stations with Soap |
| HWWS | Handwashing With Soap |
| IRC | International Reference Centre for Community Water Supply |
| ITN-BUET | International Training Network-Bangladesh University of Engineering and Technology |
| JMP | Joint Monitoring Programme – WHO/Unicef |
| KCC | Khulna City Corporation |
| KUET | Khulna University of Engineering and Technology |
| KWASA | Khulna Water Supply and Sewerage Authority |
| LGI | Local Government Institution |
| NGO | Non-Government Organisation |
| PCA | Principal Component Analysis |
| Paurashava | Municipality |
| UPPR | Urban Partnerships for Poverty Reduction |
| URP | Urban and Rural Planning |
| Vacutug | Vacuum and Truck |
| WSP | Water and Sanitation Programme |
| WSS | Water Supply and Sanitation |

## Operational definitions

**Household:** A group of related people living under the same roof or close buildings, preparing and sharing food together. Members accept one member of their group as the head of the household. A household can consist of one or more families but with a common kitchen.

**Performance monitoring:** A means to support the supervision of programme activities in progress to ensure that they are on-course and on-schedule in meeting the programme objectives and performance targets.

**Shared and community toilet:** A toilet with one cubicle used by a maximum of seven households is considered a shared toilet. A community toilet is one used by more than seven households. Its cleaning is done either on a rotation basis (shared toilet) or by an appointed caretaker (community toilet).

**Vacutug:** A vacuum tank that extracts sludge from a septic tank and/or pit.

**Paurashava:** A municipality or administrative unit of local government in charge of offering public utility services, licences, permits and other services. Public utility services include water, electricity, sewerage and sanitation.

**Kucha:** A housing structure among poor households in Bangladesh that resembles a hut or cottage with a mud-dried earthen floor with a bamboo, straw or grass based roof.

**Semi-pucca:** A housing structure among middle-income households in Bangladesh with a concrete floor, cor rugated tin partition and corrugated tin roof.

**Pucca:** A housing structure common among middle-income/upper-middle-income households in Bang ladesh with a concrete floor, walls and roof.

**Ward:** The lowest administrative unit of local government institutions for both urban and rural areas. The number of wards is based primarily on population and varies by city.

# 1. Introduction

## 1.1 Country and Khulna Division Context

Bangladesh is one of the world's most densely populated countries. Approximately 150 million people live in an area of 147,570 square km, resulting in a population density of 964 inhabitants per square km. Khulna Division is one of seven divisions of Bangladesh and is located in the southwest of the country.

Bangladesh's population growth rate has declined from 2.9% per annum in 1974 to 1.37% in 2011. The urbanisation rate of Bangladesh in 2011 in terms of area coverage is 23.30% and in Khulna Division it is 17.99%. Among the total population of Bangladesh in 2011, 23% are urban dwellers and 77% are rural.

The area of Khulna Division is 22,272 square km. Among Khulna Division's total population of 15,687,759 in 2011, 18% are urban dwellers and 82% are rural. The urban cities and towns in Khulna Division include one city corporation (Khulna City Corporation), nine district-level municipality towns (Bagerhat, Chuadanga, Jessore, Jhenaidah, Kushtia, Magura, Meherpur, Narail and Satkhira) and 58 upazila-level municipalities/towns (36 municipalities, 22 towns).

**Figure 1: Map of Bangladesh**
**Map of Bangladesh**


**Figure 2:**
**Map of Khulna Division**


Khulna is the third largest industrial city of Bangladesh. It is a divisional city and regional hub of administrative, institutional, commercial and academic affairs. Khulna city is located on the banks of the Rupsha and Bhairab rivers (another river, the Mayur, is almost dead due to siltation and waste disposal). Khulna is 4m above mean sea level (MSL) and its area is 45.65 square km. The population of Khulna City Corporation is about 1.5 million with a density of 32,859 persons per square km. There are 31 wards with 66,257 holdings. Khulna Water Supply and Sewerage Authority were established in 2008 to provide water and sanitation facilities within the city, but so far they have only focused on increasing residents' access to water. Khulna city's importance has increased significantly with the beginning of construction of the Padma Bridge over its namesake river at Mawa. The bridge will reduce travel time with the capital drastically and also promote activities of the Mongla seaport.

Kushtia Municipality is a Class 'A' Municipality with 12 wards, but its jurisdiction has been extended to cover part of an additional two unions. Therefore, the extended area will encompass 27.8 square km. The population of Kushtia (extended) is 238,065 and there are 13,093 holdings. The Gorai and Kaliganga rivers form the northern and eastern peripheries of the municipality.

Jhenaidah Municipality is a Class 'A' Municipality with nine wards and an area of 32.4 square km. The population of Jhenaidah is 157,822 with a density of 3,987 per square km. There are 13,390 holdings. There is only one river in Jhenaidah, the Nabaganga.

In the last few years, Bangladesh's urban population growth has increased to around 3% per annum while rural population growth continues steadily at around 0.5%. This is consistent with the country's increasing urbanisation, as more people move to the cities. The Bangladesh Bureau of Statistics (BBS) estimates that the population will have increased to 183 million by 2025. About 41% (75 million) of the population will live in urban areas, compared to 28% at present.

## 1.2 Country Sanitation Situation

Bangladesh has made significant progress in sanitation during the last decade mainly because of the Community-Led Total Sanitation Approach (CLTS), a coordinated effort led by the government and supported by NGOs and other development partners. The 2014 WHO-Unicef Joint Monitoring Program for Water Supply and Sanitation (JMP)[1] report shows that 57% of the population has access to improved sanitation facilities.

Open defecation practice has decreased to only 3% in 2012 compared to 19% in 2000. The report also reveals that in addition to the 57% (55% in urban areas) of people using improved sanitation, 28% (30% in urban areas) use shared latrines and 12% use unimproved latrines. This means that about 97% of the population has access to some form of latrine, irrespective of its quality.

In Bangladesh, waterborne sewerage systems cover only 20% of the city of Dhaka's population (about 2% of the country's population). The vast majority (about 94% of the country's population) are served by on-site sanitation (OSS) systems such as septic tanks, improved pit latrines and unimproved pit latrines.

## 1.3 Faecal Sludge Management in Bangladesh

Although the WSS sector has an impressive array of legal instruments, policies, strategies and plans in place (the National Policy for Safe Water Supply and Sanitation became effective in 1998), faecal sludge management has long been neglected and it is not yet institutionalised. Generally, faecal sludge management is unsystematic, unplanned, poorly regulated and mostly provided by individuals or informal private service providers.

However, in recent years there has been increasing interest in FSM in Bangladesh. The recently approved National Water Supply and Sanitation Strategy, 2014, provides specific strategic directions to address faecal sludge related issues and design, and to implement a comprehensive faecal sludge management programme. There are also a number of ongoing initiatives to carry out faecal sludge management programmes at a small scale or on a pilot basis at local levels.

For example, the Department of Public Health Engineering (DPHE), with Asian Development Bank (ADB) assistance, is executing a project for water and sanitation services in secondary towns. Under this project, FSM facilities will be introduced in 11 towns. The municipalities will be provided with tractor-towed tanks with suction pumps for emptying and transporting faecal sludge from septic tanks and pit latrines. Sludge treatment plants will be constructed on the outskirts of towns, into which the sludge will be disposed.

In Dhaka city, two NGOs – Dustha Shystha Kendra (DSK) and Population Services and Training Centre (PSTC) – with financial and technical support from WaterAid have been providing mechanical faecal sludge emptying services. Different fees are charged for different economic groups; low-income groups in slums get a subsidised rate.

In Khulna city, under an ADB-funded project, the Khulna City Corporation uses two tank lorries towed by tractors and equipped with suction pumps for mechanical emptying purposes. While the corporation charges a fee from households for providing services, the collected sludge is usually deposited into open water.

In Faridpur town, the municipality provides a mechanical emptying service using a Vacutug purchased through funds provided by the municipality and the INGO Practical Action. However, there is a need to assess the performance of the initiatives and standardisation of the FSM processes.

Besides the above initiatives, Bangladesh is participating in an ongoing World Bank (Water and Sanitation Program)-funded study on faecal sludge management issues. The Local Government Engineering Department (LGED) has taken up an urban sanitation strategy preparation task with ADB financing. The National Forum for Water Supply and Sanitation has recently assigned ITN-BUET with the task of coordinating the ongoing initiatives.

SNV Netherlands Development Organisation, with funding from the Bill & Melinda Gates Foundation, took the initiative to reform FSM practices in southern Bangladesh in partnership with Khulna University of Engineering & Technology, Khulna University, Khulna Water Supply and Sewerage Authority and WaterAid. This baseline survey was conducted with the intention of creating a foundation stone for this FSM modernisation scheme, which will offer city-wide, pro-poor, safe and sustainable faecal sludge management services.

1. Unicef and World Health Organization, Progress on Drinking Water and Sanitation: 2014 Update

## 1.4 FSM Programme

The overall goal of the programme is to demonstrate financially viable and sustainable faecal sludge management solutions for cities and towns in Bangladesh. In turn, this will improve the health and well-being of the urban population, in particular low-income groups working in sludge management as well as slum residents who will benefit from the new services.

As a direct result of the project, 1 million people will gain an improved living environment and access to safe faecal sludge management services. Considering the current prevalence of unsafe sanitary facilities, the project will support 250,000 people to gain access to improved sanitation facilities. This project aims to make hygienic faecal sludge emptying services accessible and affordable to the urban poor through interventions that will make the sanitation sector more sustainable, competitive and dynamic.

The project has five components in line with its objectives:

1. Consumer behaviour change and demand creation for services
2. Development of market-based solutions for improved sanitation and sludge emptying services
3. Strengthening of sanitation governance and enabling environment for services
4. Improved treatment, disposal and reuse of sludge
5. Sector learning around faecal sludge management and citywide service delivery

Each component will involve four types of activities:

- research
- capacity building
- implementation, and
- monitoring for progress against outcomes and outputs

## 1.5 Objectives of the Baseline

The objectives of the baseline survey are as follows:

- To collect primary data on some indicators related to hygienic and sustainable faecal sludge management in the selected urban areas of Khulna, Kushtia and Jhenaidah
- To determine the relative sanitation and hygiene situation in these three urban areas so that future activities can be designed in an effective and efficient way

The information collected through this baseline survey will help the programme to adapt its approaches to faecal collection, hygiene, education and demand creation (in particular to access to adequate sanitation) in the target cities.

## 1.6 Report Structure:

This report contains an executive summary that describes the entire process of the baseline study and its key findings.

The main body of this report includes an introductory section (1); methodology of the study (2); results and findings about respondents' and households' characteristics (3); results and findings about impact indicators including access to sanitary facilities, hygienic use and maintenance of sanitation facilities, access to handwashing with soap (HWWS), safety of pit emptying and collection and safe treatment and disposal (4.1 to 4.5); and lessons drawn from these results and findings to form conclusions (5).

# 2. Methodology of the Baseline

The baseline survey employed a mix of quantitative and qualitative data collection methods including the use of questionnaires. Questionnaires were developed so that more than 60% of answers could be gathered through observation by enumerators. The Urban and Rural Planning discipline of Khulna University and SNV worked closely together to develop these instruments, which are presented in this report.

The survey employed a stratified random sampling method, designed to be able to detect relatively small changes in the survey indicators with a satisfying degree of precision. The statistical aspects of sampling were discussed further. All parties agreed on the aspects of the statistical survey design.

## 2.1 Indicators Measured in the Baseline

Impact indicators measured in the baseline study are:

i. Access to sanitation facilities

ii. Hygienic use and maintenance of sanitation facilities

iii. Access to handwashing with soap (HWWS)

iv. Safe pit emptying and conveyance

v. Safe treatment and disposal

The details of each indicator are described in later chapters.

## 2.2 Use of QIS Scales (Qualitative Information System)

The performance monitoring framework uses so-called ladders, very similar to those used in the JMP programme. The method is called Qualitative Information System (QIS) and was developed by IRC and WSP at the end of the 1990s as a means to quantify qualitative data used in process indicators and outcome indicators.

Qualitative information is quantified with the help of progressive scales called 'ladders'. Each step on the ladder has a short description, called a 'mini-scenario', which are factual statements that describe the situation for a particular score. Each scale ranges from the absence of the particular indicator at the lowest level (score 0) to the optimal mini-scenario at the highest level (score 4). Levels 1, 2 and 3 describe the scenarios in-between levels 0 and 4 for each specific indicator. Where there is a benchmark it is usually indicated at level 2. A typical scale looks like this:

| Description | Level |
|---|---|
| None of the characteristics are present (Condition or practice is not present) | 0 |
| One characteristic is present | 1 |
| BENCHMARK: Two characteristics are present | 2 |
| Three characteristics are present | 3 |
| IDEAL: All four (key) characteristics are present | 4 |

## 2.3 DATA COLLECTION TOOLS USED IN THE BASELINE

### 2.3.1 HOUSEHOLD QUESTIONNAIRE

The household questionnaire included 148 questions mostly coded and segregated under the following five modules:

i. Household Information

ii. Sanitation (technology, operation and maintenance)

iii. Handwashing with Soap

iv. Faecal Sludge Management

v. Wealth Index

To assess the household wealth index, we used the Bangladesh 2011 Wealth Index Questionnaire developed by a DHS programme. It has earned a worldwide reputation for collecting and disseminating accurate, nationally representative data. The wealth index is a composite measure of a household's cumulative living standard and is calculated using easy-to-collect data on a household's ownership of selected assets such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities.

#### 2.3.1 Pre-Testing Of Questionnaire

Based on the Performance Monitoring Indicator (PMI) guidelines developed for the programme, a set of variables was identified for data collection. Appropriate questions were formulated to capture those variables either by directly asking the respondents or by visual observations.

The draft questionnaire was shared with colleagues working on urban sanitation and also with councillors of the local authority. Comments and suggestions from the city council were also incorporated. The Bangla version of the questionnaire was pretested in Khulna by the enumerators before actually doing the survey.

## 2.4 Sampling

### 2.4.1 Sampling Consideration

While selecting samples to conduct the baseline assessment, attention was given to the following:

i. Samples should be spread across all types of settlements within the municipality's jurisdiction

ii. Representative samples should be taken from all categories of housing (kucha, semi-pucca and pucca)

iii. Samples should be taken from all access roads in all wards in Khulna, Kushtia and Jhenaidah city

iv. Samples should be taken from all types of housing tenure (owned, rented/leased, government/ institutional, slum, squatters, etc.) proportionate to its number

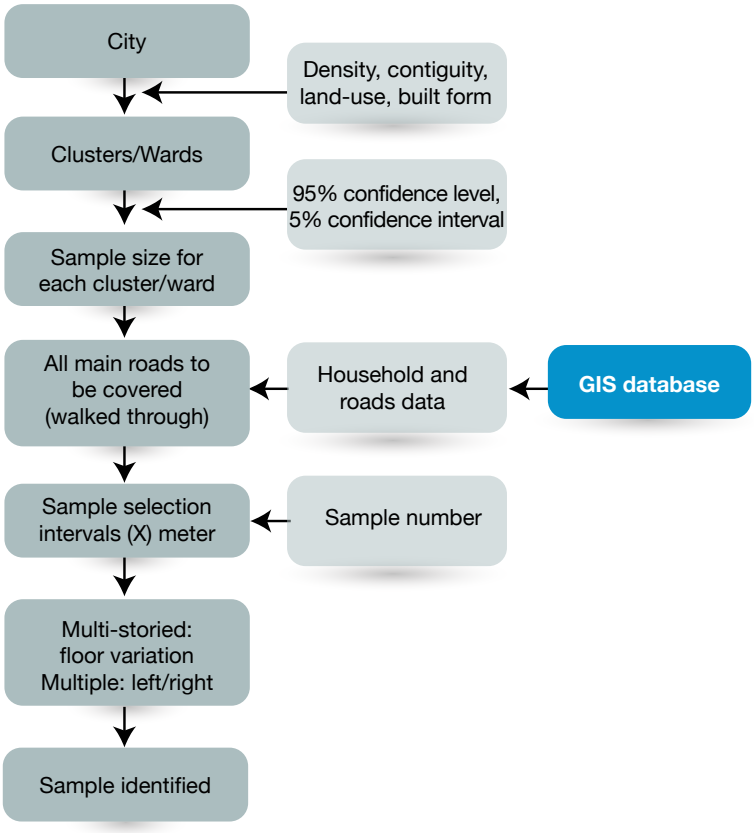
v. Samples should be spread across the entire study area uniformly

### 2.4.2 Sample Size and Method

A stratified random sampling method was adopted for this baseline study. For each of the cities, sample size was determined based on a 95% confidence level. A multistage stratified random sampling method ensures social equity, spatial randomness and takes into consideration density, housing types and geographical randomness. Major steps in sample selection are (Figure 3):

i. Cluster identification

**Figure 3: General workflow of sample selection**



ii. Sample size determination

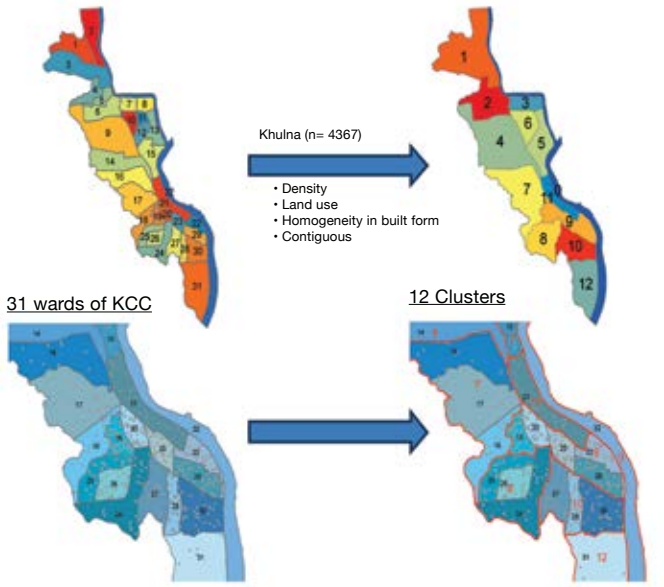
iii. Density matters

iv. Access

### 2.4.3 Cluster Identification:

The ward boundaries of Khulna City Corporation and the paurashavas were the unit of consideration as most of the available demographic statistics are based on these boundaries. In cases where adjacent wards were found to be similar in terms of population density, land-use composition and built-form, they were merged to generate a cluster. There were exceptions in Khulna, as Ward 21 and Ward 31 could not be merged with the surroundings. Ward 21 is mostly railway land and Ward 31 shows distinct characteristics compared to its surroundings. Therefore, 12 clusters were identified for Khulna (Figure 4).

**Figure 4: Cluster identification process**




### 2.4.4 Sample Size Determination:

Applying a 95% confidence level and a 5% confidence interval, sample sizes were determined for each cluster (Table 1):

**Table 1: Distribution of sample by towns and their wards**

| Khulna | | | | Kushtia | | | Jhenaidah | | |
|---|---|---|---|---|---|---|---|---|---|
| Cluster No | Ward No. | Sample Size | Responce Rate | ward No | Sample Size | Responce Rate (%) | Ward No. | Sample Size | Responce Rate (%) |
| 1 | 1,2,3 | 384 | 99% | 1 | 84 | 100% | 1 | 111 | 100% |
| 2 | 4,5,6 | 384 | 99% | 2 | 84 | 100% | 2 | 111 | 100% |
| 3 | 7,8 | 384 | 100% | 3 | 84 | 100% | 3 | 111 | 100% |
| 4 | 9,14 | 384 | 100% | 4 | 84 | 101% | 4 | 111 | 100% |
| 5 | 13,15 | 384 | 84% | 5 | 84 | 101% | 5 | 111 | 100% |
| 6 | 10,11,12 | 384 | 113% | 6 | 84 | 100% | 6 | 111 | 100% |
| 7 | 16,17,18 | 384 | 96% | 7 | 84 | 101% | 7 | 111 | 100% |
| 8 | 24,25,26 | 384 | 101% | 8 | 84 | 119% | 8 | 111 | 100% |
| 9 | 19,20,22, 23,29 | 384 | 101% | 9 | 84 | 101% | 9 | 111 | 100% |
| 10 | 27,28,30 | 384 | 100% | 10 | 84 | 100% | Total | 1000 | 100% |
| 11 | 21 | 272 | 100% | 11 | 84 | 100% | | | |
| 12 | 31 | 292 | 96% | 12 | 84 | 101% | | | |
| Total | | 4404 | 99% | 13 Extended area | 242 | 99% | | | |
| | | | | Total | 1250 | 102% | | | |

For Kushtia and Jhenaidah, clusters were not considered. Rather, municipal ward boundaries were the units of consideration, the same confidence interval for sample size applied.

The density of each cluster was estimated using demographic and GIS data, which helped to determine the spacing between samples within a cluster. Samples were taken from all roads within a cluster, following a minimum spacing between samples. This way spatial randomness was ensured. A 20% sample was kept on hold and distributed later to ensure proportionate sampling from all building types, all tenures and all streets/areas.

## 2.5 Training And Supervision Of Enumerators

### 2.5.1 Training:

Officials (primarily conservancy supervisors) from each city's conservancy department conducted the survey. This ensured the departments' involvement in the process and enhanced their understanding of the programme and the situation in the cities. To build officials' knowledge in urban sanitation and skills on data collection, we organised two 2-day training courses from May 17–21, 2014. Isolated from their day-to-day work activities, 65 conservancy officials from three cities attended training courses held in Shushilon's Residential Training Centre in Munshiganj, Shyamnagar, Satkhira, which is three hours' drive from Khulna.

Many of the officials had never received any formal training on sanitation or data collection tools, but a few had been previously engaged in data collection. In addition to the staff from LGIs, the Chairman of Conservancy Standing Committee of KCC participated. The SNV programme team, with input from the URP discipline of Khulna University, facilitated the training programme.

The training course included the following topics:

- Settlement patterns including household premises, non-household premises and public places
- The F-diagram
- Urban sanitation technologies (unimproved and improved)
- Use and maintenance of toilet facilities
- Handwashing with soap after defecation
- Current and improved system of pit/septic tank emptying and transportation
- Health and safety issues while emptying
- Treatment and reuse of faecal sludge

Besides these technical topics, there was a comprehensive orientation with the questionnaire. This orientation made officials confident about all of the variables and some of the processes such as rapport building and data collection planning. A range of methods was followed, including lectures and discussions, small group work, demonstrations, role play, exercises and field visits. As part of the process all participants, in pairs, went to different neighbouring households and conducted mock interviews using the actual questionnaire.

### 2.5.2 Supervision

The conservancy supervisors who are responsible for maintaining the cleanliness of particular wards were given priority to undertake the survey in their locality because:

1) They are aware of the nooks and crannies of their working area

2) They would have easy access to respondents during daytime hours (potential respondents won't open the door even during the day if they don't know the person)

Hence a team of conservancy supervisors were used as enumerators. To cross-check the data, conservancy officers examined all of the questionnaires to verify consistency, and postgraduates from URP/Khulna University performed a 10% sampling check in the field.

## 2.6 Methodology Of Data Processing And Analysis

### 2.6.1 Data Processing and Analysis

Data processing and analysis was done centrally by the URP discipline of Khulna University in close coordination with SNV. To manage the questionnaire database, we designed a Microsoft Access database. The forms were designed to mimic the questionnaire in order to ease data entry. Appropriate restrictions were applied to minimise typos and data entry mistakes. For further data cleaning several queries were run to check data consistency. Mistakes and inconsistencies were corrected by revisiting the original questionnaire and with assistance from the relevant SNV advisor, as needed. Common mistakes found include:

- Typos
- Bengali/English mix in questionnaire and hence mistakes in data entry
- Instructions for skipping non-applicable questions were not followed

Data processing and analysis entailed the following steps:

- Entering data and checking the accuracy, completeness, relevance and consistency of critical data elements
- Converting data from Access to the SPSS program with a view to computing indicators and other critical data elements required for reporting
- Performing data cleaning using a set of manipulation commands to ensure that data are aligned to the data analysis plan and the agreed reporting template

Descriptive statistics entailed:

- Computing frequency distributions
- Means and cross tabulations with chi square statistics

Graphs were used for visual presentation of summary data.

Ward level analysis was also done to provide further details that could otherwise be masked with city level analysis. The analysed results were shared with city authorities and some of the stakeholders for their feedback. The programme team was continuously engaged for technical support in analysis and interpretation of the results.

### 2.6.2 Wealth Quintile

The wealth index used for the baseline report has been used in many DHS and other country level surveys to measure inequalities in household characteristics. It serves as an indicator of household level wealth that is consistent with expenditure and income measures. The index is constructed using household asset data via principal components analysis.

The wealth index is created in three steps.

**Step one:** A subset of indicators common to slum and non-slum areas is used to create wealth scores for households in both areas. Categorical variables are transformed into separate dichotomous (0-1) indicators. These indicators and those that are continuous are then examined using a principal components analysis to produce a common factor score for each household.

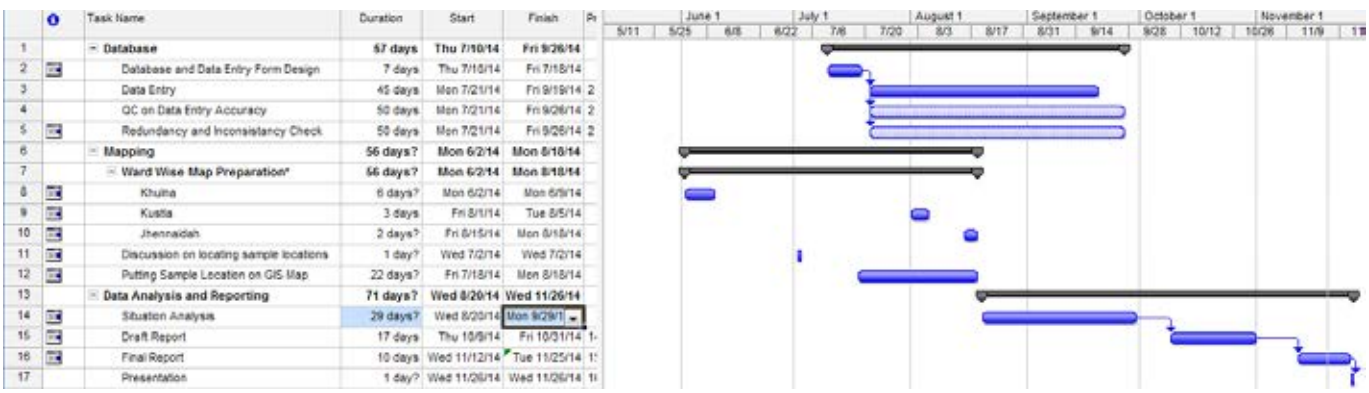
**Step two:** Separate factor scores are produced for households in slum and non-slum areas using area-specific indicators.

**Step three:** The third step combines the separate area-specific factor scores to produce a combined (slum and non-slum) wealth index by area-specific scores, through a regression of the common factor scores.

This three-step procedure permits greater adaptability of the separate wealth index in both slum and non-slum areas of each city. For each city, the resulting separate combined wealth index has a mean of zero and a standard deviation of one. Once the index is computed, each city level wealth quintile (from lowest to highest) is obtained by assigning the household a score by dividing the ranking into five equal categories, each comprising 20% of the households.

## 2.7 Work Plan of the Baseline

Planning, liaison and primary decision making for the baseline report started in February 2014. By April, it was determined that municipalities' conservancy staff would be on board to collect data. It took three months (June-September) to collect data and 10% of the samples were further checked for quality control. This was done by postgraduate students who have survey-checking experience. Data cleaning took some time and was completed in October.



# 3. Results and Findings on Respondents and Household Characteristics

## 3.1 Characteristics of Respondents

More than one-third of respondents in Khulna and Jhenaidah are female. Participation of female respondents in Kushtia is slightly higher (by 3%) compared to Khulna and 6% compared to Jhenaidah (Table 2). The figure also suggests that the engagement of male respondents in all three cities is higher than that of females.
The survey got the highest responses from household heads. In Khulna, 55% of responses came from household

**Table 2: Gender distribution of respondents**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Male | 2,730 | 62% | 744 | 59% | 651 | 65% |
| Female | 1,697 | 38% | 525 | 41% | 349 | 35% |
| Total | 4,367 | 100% | 1,269 | 100% | 1,000 | 100% |

heads whereas 48% and 59% of household heads responded in Kushtia and Jhenaidah, respectively. The second highest response group is husband and wife, sharing more than one quarter of the total in Khulna and Kushtia. The difference in share among the second and third highest response group in Jhenaidah is minimal compared to Khulna and Kushtia (Table 3).

**Table 3: Respondent types**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Household heads | 2,408 | 55% | 606 | 48% | 591 | 59% |
| Sponse | 1,172 | 27% | 352 | 28% | 349 | 19% |
| Son /daughter | 592 | 14% | 525 | 20% | 152 | 15% |
| Others | 195 | 5% | 59 | 5% | 68 | 7% |
| Total | 4,367 | 100% | 1,269 | 100% | 1,000 | 100% |

## 3.2 Household Characteristics

### 3.2.1 Household Characteristics

#### 3.2.1.1 Percentage of Female-Headed Households

A male-headed household is dominant in all of the programme areas. In Khulna and Kushtia, 8% of households are female-headed, while in Jhenaidah 7% are female-headed. (Table 4).

**Table 4: Percentage of female-headed household**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Male head of household | 2,730 | 62% | 744 | 59% | 651 | 65% |
| Female head of household | 1,697 | 38% | 525 | 41% | 349 | 35% |
| Total | 4,367 | 100% | 1,269 | 100% | 1,000 | 100% |

### 3.2.1.2 Household Size

Khulna has the largest household sizes, with nearly five and one-third persons per household, followed by Jhenaidah with slightly less than that. The average household size in all of the programme areas is higher than the average national household size for urban areas, which is 4.29.

**Table 5: Average household size**

| | Khulna | Kushtia | Jhenaidah |
|---|---|---|---|
| Mean | 5.32 | 4.86 | 5.29 |
| Median | 5 | 4 | 5 |
| Mode | 4 | 4 | 4 |

### 3.2.1.3 Ownership of Land and House

Most of the households in all three cities own their houses and/or the land. The highest percentage is in Jhenaidah, followed by Kushtia and Khulna.

One reason for this could be that surveyors relied on the landowner/building owner for information about sanitation, the septic tank, etc. However, there is also a significant percentage of rented households in Khulna, more than one-fifth of the total. Kushtia and Jhenaidah have a relatively smaller number of rented households.

Interestingly, all of the cities show a type of ownership where the land is rented but the house is owned by the family that rents the land. In Khulna, about two-thirds of these households are located on government-owned land (Table 6). There are also households who either do not own land, a house or pay any rent. In Khulna, almost 8% fall into this category and more than half of these are from the slums located on government-owned land.

**Figure 5: Households' ownership types (in percent)**

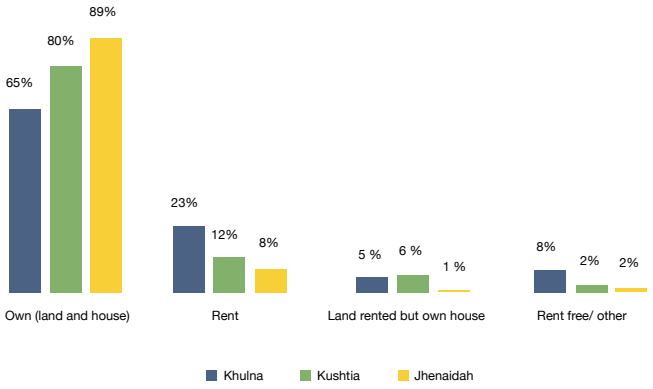



**Table 6: Land/house ownership and location of households in Khulna**

| | Planned residential area | Unplanned residential area | Slum located on private land | Slum located on government land | Total |
|---|---|---|---|---|---|
| Own | 13.8% | 81.8% | 3.5% | 0.9% | 100.0% |
| Rent | 20.7% | 66.8% | 6.9% | 5.6% | 100.0% |
| Land rented but own house | 0.5% | 25.7% | 6.7% | 67.1% | 100.0% |
| Rent-free/other | 10.0% | 25.7% | 7.9% | 56.5% | 100.0% |
| Total | 14.4% | 71.4% | 4.7% | 9.4% | 100.0% |

#### 3.2.1.4 Percentage of Households with Children Under Two

The proportion of children younger than two years old is 2%, 3% and 3% in Jhenaidah, Khulna and Kushtia, respectively. However, 10–15% of households have infants under two years old in all of the cities. This is a very significant number in terms of providing sanitation and faecal sludge management services.

**Table 7: Percentage of HH with children under two years old**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Household without U2 children | 3,716 | 85% | 1,119 | 88% | 898 | 90% |
| Household with U2 children | 651 | 15% | 150 | 12% | 102 | 10% |
| Total | 4,367 | 100% | 1,269 | 100% | 1,000 | 100% |

#### 3.2.1.5 Percentage of Households with Children Under Six

Children younger than six make up 5–6% of the total population on average, which also needs to be taken into consideration. The percentage of households in Khulna with children under six is 33%, while in Kushtia and Jhenaidah the number is 28% and 27%, respectively.

**Table 8: Percentage of HH with children under six years old**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Household without U6 children | 2,927 | 67% | 918 | 72% | 731 | 73% |
| Household with U6 children | 1,440 | 33% | 351 | 28% | 269 | 27% |
| Total | 4,367 | 100% | 1,269 | 100% | 1,000 | 100% |

#### 3.2.1.6 Households with a Member with a Disability

A small portion of households has at least one member experiencing mobility difficulties (Khulna 2.5%, Kushtia 4.6% and Jhenaidah 1.4%), and vision impairment (Khulna 0.1%, Kushtia 1.7% and Jhenaidah 0.5%).
Table 9: Households with a member with a disability.

**Table 9: Households with a member with a disability**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Household with memebers having difficulties in walking | 110 | 2.5% | 58 | 4.6% | 14 | 1.4% |
| Household with memebers having difficulties in seeing | 6 | 0.1% | 21 | 1.7% | 5 | 0.5% |

### 3.2.2 Household Characteristics for Wealth Index

#### 3.2.2.1 Wealth Quintiles by Programme Areas

Table 10 presents the wealth quintiles of slum and non-slum households in the programme areas. More than 85% of households residing in slum areas of Khulna and Kushtia are in the bottom two quintiles, compared with about one-third in non-slum areas. Among the three cities, Jhenaidah has the highest number of the poorest population in slum areas. The data also reveals that about 10-12% of slum dwellers have better wealth conditions in Khulna and Kushtia.

**Table 10: Population by wealth quintiles (in per cent)**

| Wealth Quintile | Non-slum | | | Slum | | |
|---|---|---|---|---|---|---|
| | Khulna | Kushtia | Jhenaidah | Khulna | Kushtia | Jhenaidah |
| Poorest | 14.53% | 13.58% | 16.49% | 52.92% | 60.47% | 100% |
| Poor | 17.17% | 19.14% | 20.88% | 37.34% | 26.16% | 0% |
| Medium wealth | 22.66% | 21.88% | 20.88% | 3.73% | 7.56% | 0% |
| Wealthy | 22.53% | 22.97% | 20.88% | 4.71% | 1.74% | 0% |
| Wealthiest | 23.06% | 22.42% | 20.88% | 1.3% | 4.07% | 0% |

The baseline survey uses an asset-based wealth index. This is based on the physical assets of the household such as:

- access to safe water, types of latrine and domestic possessions (mobile phone, radio, television, bed, chair, clock, table, etc.);
- energy sources (charcoal, electricity, kerosene, wood);
- housing condition and materials of construction;
- ownership of domestic animals;
- house ownership including number of rooms;
- means of transport (animal-drawn carts, bicycle, motorcycle); and
- personal bank account.

As a result of the method used (PCA), the survey population is divided into five equal wealth quintiles. This means that the wealth (or poverty) is expressed relative to the programme population only, not to the population of the entire country. As can be seen from the table above, the population in the two poorest wealth quintiles (WQ1 and WQ2) is relatively larger in the slum areas of all three cities.

# 4. Results and Findings on Impact Indicators

## 4.1 Impact Indicator 1: Access to Sanitary Facilities

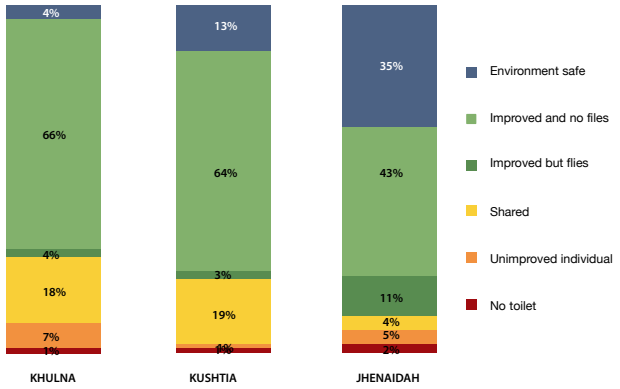
The sampled households' sanitation facilities were grouped into various levels by the type of toilets they are using. High levels indicate an environmentally safe toilet while low levels indicate no toilet.

| Indicator 1 | | Description |
|---|---|---|
| 4 | Environmentally safe toilet | Improved toilet preventing access to faeces by any animals or insects (flies/rodents)<br>and Human faeces are contained for storage/collection in such a way that they cannot contaminate surface or groundwater (i.e. septic tank is connected to a soak well) |
| 3 | Improved individual toilet without access by flies | Human faeces are contained in a toilet pit/tank in such a way that they are inaccessible to human contact or flies or other animals (rodents, insects) (Septic tank without soak well containment and water seal exists) |
| 2 | Improved individual toilet but accessible to flies | Human faeces are contained in a toilet pit/tank in such a way that they are inaccessible to human contact or contact by other animals (i.e. there is containment)<br>but are still accessible to flies (no water seal exists with the pan) |
| 1b | Shared toilet | Toilet is shared by more than one household due to not having designated toilets for the sole use of its family |
| 1a | Unimproved toilet | Human faeces are contained in a toilet pit/tank but are accessible to human contact or contact by animals (insects, rodents) or Toilet has no containment and human faeces are conveyed directly to the environment |
| 0 | No toilet | There is no toilet used within the premises. The residence says they practice open defecation and/or use neighbour's toilet. |

**Table 11: Access to sanitation facilities**

| QSI Level | Khulna | Kushtia | Jhenaidah |
|---|---|---|---|
| Level 4 | 158 | 160 | 345 |
| Level 3 | 2,886 | 806 | 430 |
| Level 2 | 170 | 32 | 114 |
| Level 1b | 777 | 246 | 41 |
| Level 1a | 318 | 11 | 51 |
| Level 0 | 58 | 14 | 19 |
| Total | 4,367 | 1,269 | 1,000 |

**Figure 6: Access to sanitation facilities**




### 4.1.1 Overall Access to Sanitary Facilities

Most individual households have their own toilet. However, very few of them are environmentally safe.

About 35% of households in Jhenaidah use an environmentally safe toilet, as there are many households with a functional soak well. The situation is worse in Khulna (only 4%) and Kushtia (13%).

It appears that open defecation has become a rare phenomenon, but still a significant share of the population falls into level 1, which is primarily because of shared toilets (Khulna 18%, Kushtia 19% and Jhenaidah 4%) and unimproved toilets (Khulna 7%, Kushtia 1% and Jhenaidah 5%). A small number of people do not have their own or shared toilet and thus use their neighbour's.

The majority of toilets are improved and inaccessible to flies. But as the containment is not working properly, human faeces are disposed directly to open drains or waterbodies, which thereby contaminates surface or ground water. Therefore, these toilets fall into level 3. These level 3 toilets can be graduated to environmentally safe toilets through the removal of illegal drain connections and the proper collection and transport of faecal sludge.

In Khulna, 66% of toilets are placed in level 3, as most of them do not have a soak well or, due to the high water table, the soak well does not work. Hence the households connect the toilet to a drain. In comparison, Jhenaidah is in a better position in terms of access to sanitation facilities than Khulna and Kushtia, but 11% of households in Jhenaidah still use unimproved toilets without a water seal.

ACCESS TO SANITARY FACILITIES PER CITY AND WARD

About one-fifth of the population in Khulna and Kushtia are sharing their toilets among households. More than 25% of households in wards 4, 8, 10, 11, 19 and 26 in Khulna have shared toilets. Most of the toilets in all of the wards fall into level 3, indicating that the toilets are environmentally unsafe. Upon analysis based on the cluster, the scenario remains the same. Ward numbers 10, 11 and 12 have a greater concentration of unimproved toilets (35-69%), while the city average is 18% in Khulna. These wards are located in Khalishpur, and include planned residential areas established by the National Housing Authority and Jute Mills before the country's independence. These households have a toilet at the individual level, but are connected to surface drains. One of these areas has a sewerage network constructed during the 1960s that never functioned properly. Also, there was never a treatment plant connected to the sewerage pipelines; hence all faecal sludge ends up in the nearby river.

**Table 12: Access to sanitation facilities in Khulna per ward**

| | QSI for Impact Indicator 1A | | | | | | |
|---|---|---|---|---|---|---|---|
| Ward Number | 0 | 1a | 1b | 2 | 3 | 4 | Total |
| 1 | 7% | | 9% | | 83% | 1% | 100% |
| 2 | 2% | | 22% | 1% | 75% | | 100% |
| 3 | | 3% | 14% | | 83% | | 100% |
| 4 | 2% | | 38% | 4% | 54% | 2% | 100% |
| 5 | 4% | | 21% | | 75% | | 100% |
| 6 | 2% | | 11% | 2% | 85% | 1% | 100% |
| 7 | 1% | 1% | 22% | | 77% | | 100% |
| 8 | 8% | 12% | 29% | 2% | 31% | 19% | 100% |
| 9 | 1% | 3% | 21% | 2% | 72% | 2% | 100% |
| 10 | 2% | 35% | 34% | 15% | 4% | 10% | 100% |
| 11 | 3% | 35% | 41% | 17% | 3% | | 100% |
| 12 | | 59% | 18% | | 12% | 11% | 100% |
| 13 | | | | 70% | 30% | | 100% |
| 14 | 1% | 2% | 10% | 2% | 79% | 7% | 100% |
| 15 | 2% | 11% | 13% | | 75% | | 100% |
| 16 | | 2% | 10% | | 81% | 7% | 100% |
| 17 | | 1% | 11% | | 49% | 39% | 100% |
| 18 | | | 8% | | 92% | | 100% |
| 19 | | 3% | 26% | | 72% | | 100% |
| 20 | 4% | 9% | 20% | 11% | 53% | 3% | 100% |
| 21 | | 2% | 13% | | 86% | | 100% |
| 22 | | 10% | 21% | 1% | 82% | | 100% |
| 23 | | 3% | 14% | 1% | 82% | | 100% |
| 24 | | 1% | 24% | 4% | 71% | | 100% |
| 25 | | 4% | 12% | 2% | 81% | 2% | 100% |
| 26 | 1% | 5% | 26% | 1% | 68% | | 100% |
| 27 | | | | | 100% | | 100% |
| 28 | | 10% | 17% | | 70% | 2% | 100% |
| 29 | | | 19% | 1% | 80% | | 100% |
| 30 | | | 13% | | 88% | | 100% |
| 31 | 2% | 7% | 18% | 4% | 66% | 4% | 100% |
| Total | 1% | 7% | 18% | 4% | 66% | 4% | 100% |

Kushtia has a relatively higher percentage of households with their own latrine than do the other cities. About one-fifth of the population in Kushtia shares a toilet among households. The percentage of households with a shared toilet is comparatively higher in wards 2, 3, 4, 10, 11 and extended area (13). Wards 1, 4 and 5 have more than 25% environmentally safe toilets – primarily because each has a functional soak well.

**Table 13: Access to sanitation facilities in Kushtia per ward**

| | QSI for Impact Indicator 1A | | | | | | |
|---|---|---|---|---|---|---|---|
| Ward Number | 0 | 1a | 1b | 2 | 3 | 4 | Total |
| 1 | 5% | | 8% | | 51% | 36% | 100% |
| 2 | 4% | | 26% | 1% | 70% | | 100% |
| 3 | | | 33% | 10% | 52% | 5% | 100% |
| 4 | 2% | | 22% | | 49% | 26% | 100% |
| 5 | | | 15% | | 29% | 55% | 100% |
| 6 | 1% | 11% | 7% | 1% | 67% | 13% | 100% |
| 7 | 1% | | 18% | | 67% | 14% | 100% |
| 8 | | | 12% | 3% | 78% | 7% | 100% |
| 9 | | | 9% | | 84% | 7% | 100% |
| 10 | | | 26% | | 73% | 1% | 100% |
| 11 | 1% | | 35% | | 63% | 1% | 100% |
| 12 | | | 17% | 4% | 78% | 2% | 100% |
| 13 | 1% | 1% | 21% | 7% | 63% | 7% | 100% |
| Total | 1% | 1% | 19% | 3% | 64% | 13% | 100% |

Among the three towns, Jhenaidah has a comparatively higher number of environmentally safe toilets because of the functional soak well. Ward 7 has the largest number of households without toilets and unimproved toilets.

**Table 14: Access to sanitation facilities in Jhenaidah per ward**

| | QSI for Impact Indicator 1A | | | | | | |
|---|---|---|---|---|---|---|---|
| Ward Number | 0 | 1a | 1b | 2 | 3 | 4 | Total |
| 1 | 1% | 13% | | 29% | 38% | 20% | 100% |
| 2 | | | | | 54% | 46% | 100% |
| 3 | 2% | 2% | | 39% | 28% | 30% | 100% |
| 4 | | 4% | | 14% | 40% | 42% | 100% |
| 5 | | | 5% | 7% | 35% | 54% | 100% |
| 6 | 3% | | 17% | 2% | 34% | 44% | 100% |
| 7 | 11% | 23% | 9% | | 45% | 13% | 100% |
| 8 | | 1% | 5% | | 60% | 35% | 100% |
| 9 | 1% | 5% | 2% | 12% | 54% | 27% | 100% |
| Total | 2% | 5% | 4% | 11% | 43% | 35% | 100% |

### 4.1.2 Access To Sanitary Facilities Against Wealth Quintiles

In all three cities, there was a strong correlation between access to a sanitary toilet and wealth. This is most pronounced in Jhenaidah. Open defecation is relatively low and only seen in the poorest wealth quintiles. In Kushtia, 1% of those in the wealthy and wealthiest groups (WQ4 and WQ5) do not have a toilet. Of the households with toilets, most have good fly management because of 1) the massive 'sanitation for all' awareness campaign; and 2) easy availability of improved sanitary products with a water seal. As discussed earlier, due to technical limitations for the construction of soak wells and the lack of a proper emptying, transport and treatment mechanism, sludge is being disposed of in waterbodies; hence most toilets are not environmentally safe.

**Khulna:** Though people in Khulna do not defecate in open spaces on a large scale, environmentally improved toilets are also uncommon. The bottom three groups of the wealth quintile, ranging from 18-32%, frequently use shared, unimproved toilets. In Khulna, wealthy groups enjoy better toilet facilities than do the poor. While about 45% of the poorest households use an improved individual toilet that is inaccessible to flies, 84% of the wealthier group do.

**Kushtia:** Open defecation is comparatively low in Kushtia. Most people use a shared toilet or an individual toilet inaccessible to flies. The number of households using a shared toilet decreases as household wealth increases, and the number of environmentally safe toilets increases with the increase in wealth. But improved toilets inaccessible to flies remain the dominant toilet type, irrespective of wealth quintile.

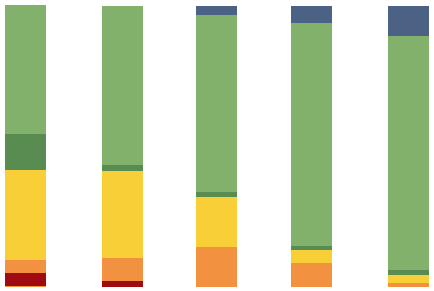
**Jhenaidah:** Poor people in Jhenaidah have relatively greater access to their neighbour's toilet. Though a significant number of households from the poorest group defecate in open spaces, use of unimproved individual toilets, both accessible and inaccessible to flies, is dominant. Use of these types of toilets decreases with a household's increasing wealth. Similarly, the percentage of households having environmentally safe toilets increases as household wealth increases. Almost all of the wealthier households have access to improved sanitation facilities.

### 4.1.3 Types of Toilets Found in the Programme Area

Toilets with a septic tank are predominant in all three cities, but in most households in Khulna and Kushtia the tanks act as containment only, because soak wells are non-existent.

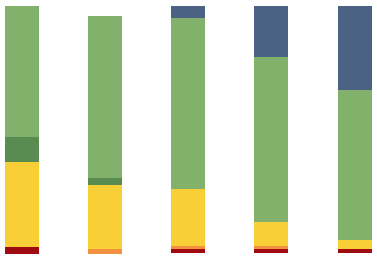
Only Kushtia has a sewerage network (wards 6 & 7), which covers 4% of the population, but this network is not connected to any treatment plant. Instead, faecal sludge is being disposed of directly into waterbodies.

**Figure 7: Access to toilet by wealth quintiles in Khulna**



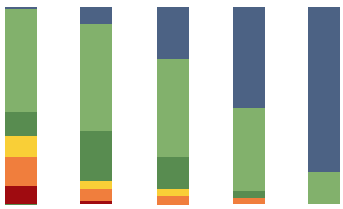
| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| environmental safe | | 0% | 2% | 5% | 10% |
| improved and no files | 45% | 57% | 64% | 80% | 84% |
| improved but files | 14% | 2% | 2% | 1% | 1% |
| shared | 32% | 31% | 18% | 5% | 3% |
| unimproved | 4% | 9% | 14% | 8% | 1% |
| no toilet | 5% | 2% | | 0% | |

**Figure 8: Access to toilet by wealth quintiles in Kushtia**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| environmental safe | | 4% | 4% | 21% | 34% |
| improved and no files | 53% | 67% | 70% | 67% | 61% |
| improved but files | 10% | 2% | 0% | | |
| shared | 35% | 26% | 23% | 9% | 4% |
| unimproved | 0% | 1% | 2% | 2% | |
| no toilet | 2% | 0% | 1% | 1% | 1% |

**Figure 9: Access to sanitation facilities against wealth quintiles in Jhenaidah**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| environmental safe | 1% | 9% | 27% | 52% | 85% |
| improved and no files | 53% | 55% | 50% | 42% | 16% |
| improved but files | 13% | 25% | 17% | 3% | |
| shared | 12% | 5% | 3% | 2% | |
| unimproved | 15% | 6% | 4% | 2% | |
| no toilet | 8% | 1% | 1% | | |

The types of toilets in Khulna households range from the most unhygienic (a hanging toilet) to toilets connected to a Decentralised Wastewater Treatment System (DEWATS). In addition to hanging latrines (present in less than 1% of households), unimproved toilets also include direct open pit without cover (1.4%) and latrines connected directly to drains or open space, i.e. no containment (8.1%). About 1% of respondents did not know where the excreta went after flushing.

There are more types of toilets used in Khulna than in Kushtia and Jhenaidah.

**Table 15: Types of toilets in the cities**

| Types of toilet | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Count | Per cent | Count | Per cent | Count | Per cent |
| Hanging latrine | 4 | 0.1% | | | | |
| Direct open pit/pit without cover | 59 | 1.4% | 2 | 0.2% | 21 | 2.1% |
| Latrine connected to open space or drain | 351 | 8.1% | 11 | 0.9% | 19 | 1.9% |
| Don't know where it goes after flush | 34 | 0.8% | | | 6 | .6% |
| Bucket latrine | 2 | 0% | | | 6 | .6% |
| Covered pit latrine | 227 | 5.3% | 9 | 0.7% | 22 | 2.2% |
| Pit latrine with covered slab and pan | 930 | 21.6% | 509 | 40.6% | 460 | 46.9% |
| Ventilated improved pit latrine | 42 | 1.0% | 46 | 3.7% | 1 | .1% |
| Septic tank | 2,660 | 61.7% | 629 | 50.1% | 446 | 45.5% |
| Sewerage system | | | 49 | 3.9% | | |
| Total | 4,309 | 100.0% | 1,255 | 100.0% | 981 | 100.0% |

**Table 16: Types of pit latrines**

| Types of pit latrines | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Count | Percent | Count | Percent | Count | Percent |
| Direct single pit | 266 | 22% | 46 | 8% | 280 | 58% |
| Offset single pit | 192 | 16% | 73 | 13% | 140 | 29% |
| Double pit (without Y junction) | 459 | 38% | 309 | 55% | - | 0% |
| More than two pit | 122 | 10% | 31 | 5% | 54 | 11% |
| Twin pit (with Y junction) | 160 | 13% | 105 | 19% | 9 | 2% |
| Total pit latrines | 1,199 | 100% | 564 | 100% | 483 | 100% |

There are five types of improved pit latrines (Table 17) being used in the cities. The twin-pit latrines without a 'Y-junction' are found in 38% and 55% of households in Khulna and Kushtia, respectively. There are a considerable number of toilets connected to one or more than two pits that are merely containments and do not comply with the principles of twin-pit latrines. In Jhenaidah more than 50% of pit latrines are direct single pit and about one-quarter are offset single pit. It is clear from the data that Jhenaidah households still do not have access to information about improved twin-pit latrines. This may be because fewer numbers of development organisations promoting sanitation are working in Jhenaidah.

A few years ago, Nabolok, with support from WaterAid, built two pilot DEWATS for around 200 households living in two five-story buildings at Peoples' Jute Mills Colony in Khalishpur. Similarly, last year the Japanese organisation JADE constructed two biogas plants and community toilet blocks on an experimental basis in the 'Khyama' refugee camps. There are no ecosan toilets in the programme cities.

**Table 17: Comparison of Indicator 1 between female-headed households and male-headed households**

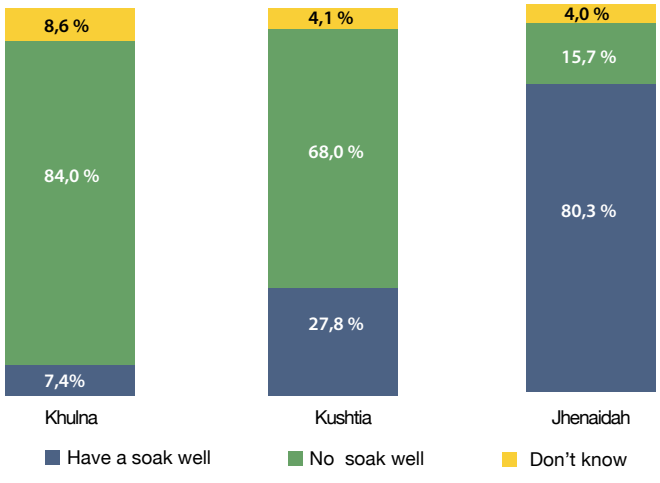
| QIS Level | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| 4 | 4% | 2% | 13% | 11% | 34% | 44% |
| 3 | 67% | 58% | 63% | 68% | 44% | 29% |
| 2 | 4% | 5% | 3% | 1% | 11% | 17% |
| 1b | 17% | 22% | 19% | 18% | 4% | 5% |
| 1a | 7% | 10% | 1% | 0% | 5% | 2% |
| 0 | 1% | 3% | 1% | 2% | 2% | 5% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |
| N | 4,039 | 328 | 1,165 | 104 | 934 | 66 |

There is no significant variance on the types of toilets being used in different wealth quintiles based on who heads the household, except in Khulna where 35% of female-headed households fall into the bottom three levels; in the case of male-headed households the number is 25%.

### 4.1.4 Connection of Septic Tanks to Drains or Surface Water

According to the Bangladesh National Building Code (BNBC), effluent from septic tanks shall not discharge into an open water course. The BNBC also mentions that septic tanks discharging into either a subsurface disposal field or one or more seepage pits (soak wells) require approval of drainage and sanitation plans for places where public sewers are not available. However, 84% and 68% of households that have a septic tank are connected to a drain or surface water; these households comprise 52% and 34% of the total households that have a toilet in Khulna and Kushtia, respectively. Ninety-four per cent of households whose septic tanks are not connected to a soak well/pit in Khulna mentioned that septic tank outlets were connected to surface or grey water drains. Another 4% mentioned that liquid from the septic tank is released onto open ground. In Jhenaidah, 80% of households with a septic tank also have a soak well. (The main reason for not having a soak well in Khulna and Kushtia is because both cities have high water tables and a soak well does not work.)

**Figure 10: Septic tank connected to a soak well/pit**



### 4.1.5 Percentage of Households Who Built their Septic Tank/Pit with the Building

It is alarming that more than 75% of households in Kushtia and 72% of households in Jhenaidah did not build their septic tanks along with the building. The percentage is much lower in Khulna. The reason for this difference may lie in the varying degree of compliance to building construction regulations, as well as the age of the city. At the city corporation level, incorporating a septic tank into the building design is a prerequisite for the approval of any new construction plan. People in Kushtia and Jhenaidah might not be aware of the system, or strict regulations imposed by paurashavas may not be enforceable.

**Table 18: Percentage of HHs who built their septic tank/pit with the building**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| Septic tank / pit built together with building | 1,039 | 26.9% | 193 | 15.5% | 197 | 21.2% |
| Septic tank / pit not built together with building | 2,262 | 58.6% | 955 | 76.9% | 668 | 71.8% |
| Don't konw | 558 | 14.5% | 94 | 7.6% | 65 | 7% |
| Total | 3,859 | 100% | 1,242 | 100% | 930 | 100% |

### 4.1.6 Inspection of Household by the Authority

The authority very rarely physically inspects households to monitor a septic tank/pit. About 83% of respondents in Jhenaidah answered that the authority never paid a visit. Only one out of 100 households in Jhenaidah confirmed a visit by officials. For Khulna and Kushtia, the scenario of regular inspection is better. Importantly, a significant number of respondents didn't know about the process or simply didn't notice this kind of checking activity in their locality.

**Table 19: Inspection of household by the authority**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequncy | Percent | Frequency | Percent |
| HH was visited by any authority | 438 | 11.4% | 131 | 11.0% | 6 | 0.6% |
| No authority visited HH | 2,451 | 65.8% | 869 | 72.9% | 768 | 82.6% |
| Don't know | 880 | 22.8% | 129 | 16.1% | 156 | 16.8% |
| Total | 3,859 | 100% | 1,192 | 100% | 930 | 100% |

### 4.1.7 Shared Toilets

Shared toilets are categorised as unimproved as defined by the Joint Monitoring Programme (JMP) of WHO/Unicef.

In Khulna, 45% of households living in slums located on private land are using a shared toilet, while in Kushtia and Jhenaidah the proportion is 30% and 12% respectively. More than one-third of the households living in slums located on government land are using a shared toilet. The use of a shared toilet is low in unplanned residential areas, though in Khulna and Kushtia it ranges from 17–19%.

**Table 20: Shared toilets**

| Type of household location | Khulna | | | Kushtia | | | Jhenaidah | | |
|---|---|---|---|---|---|---|---|---|---|
| | Non-shared | Shared | Total | Non-shared | Shared | Total | Non-shared | Shared | Total |
| Planned residential area | 91% | 9% | 100% | 95% | 5% | 100% | 94% | 6% | 100% |
| Unplanned residential area | 83% | 17% | 100% | 81% | 19% | 100% | 97% | 3% | 100% |
| Slum located on private land | 55% | 45% | 100% | 70% | 30% | 100% | 88% | 12% | 100% |
| Slum located on goverment land | 74% | 26% | 100% | 66% | 34% | 100% | 75% | 25% | 100% |
| Total | 82% | 18% | 100% | 81% | 19% | 100% | 96% | 4% | 100% |

#### 4.1.8 Separate Toilet for Women:

Thirty-seven per cent of households have more than one chamber, either within their household premises or in the community/shared toilet they use. Among these, a very insignificant number of toilet cubicles (7%) are segregated by gender. This ratio is higher in the community toilets (36%) and in government-owned slums (65%).

#### 4.1.9 Discussion of the Findings

Open defecation has become a rare phenomenon, which indicates that most households have access to toilets, irrespective of their quality.

The majority of toilets have either a septic tank or pit as containment, but due to a lack of proper design and installation of these technologies – and no collection and treatment facilities – almost all faecal sludge is being disposed of in waterbodies.

As per the BNBC, it is mandatory to have a septic tank with a soak well, but in Khulna and Kushtia, due to high water tables, a soak well does not function. Eighty-four per cent (Khulna) and 64% (Kushtia) of households that have a septic tank are connected to a drain or surface water. These households comprise 52% and 34% of the total households that have a toilet in Khulna and Kushtia, respectively.

The majority of the toilets are improved and inaccessible to flies. But, as containment is not working properly, human faeces are disposed directly to open drains or waterbodies, contaminating surface or ground water. Therefore, these toilets are categorised as level 3. For many households, the main issue is that their septic tank is not functioning well; hence households have been innovative in making a direct connection to nearby drains. Even if the illegal connection from the toilets to the water bodies is severed, unless and until a proper emptying and treatment service is established, the toilets in these cities will never be categorised at the highest level. Additionally, options to upgrade existing containment or adopt new technologies should be developed to achieve sustainable sanitation in these three cities.

In Khulna, Kushtia and Jhenaidah a strong correlation was found between access to a sanitary toilet and wealth. This is most pronounced in Jhenaidah, where the percentage of households having environmentally safe toilets increases as household wealth increases.

Among the three cities, Jhenaidah's pit latrines are in the worst condition. This may be due to the limited promotion and involvement of development organisations relative to the other two cities.

One of the major twin pit latrine promoters is the UPPR project of UNDP, which has a programme in Khulna and Kushtia, but not in Jhenaidah.

## 4.2 Impact Indicator 2: Hygienic use and Maintenance of Sanitation Facilities

The sampled households' sanitation facilities were grouped into various levels as per their hygienic use and maintenance. High levels indicate a hygienically used and maintained sanitation facility while low levels indicate poor hygiene.

| Level | Criteria | Description |
|---|---|---|
| 4 | Used, functional, clean toilet with privacy | Toilet in use as a toilet<br>and is covered or has a water seal<br>and is not blocked<br>and is free from any faecal smears in/on pan & floor<br>and all walls and door are in place and intact<br>and cleansing materials/sanitary materials are not left in the open after use<br>and water is available within the toilet<br>and provides adequate privacy |
| 3 | Used, functional and clean toilet | Toilet in use as a toilet<br>and is covered or has a water seal<br>and is not blocked<br>and is free from any faecal smears in/on pan & floor<br>and all walls and door are in place and intact<br>and cleansing materials/sanitary materials are not left in the open after use<br>and water is available within the toilet |
| 2 | In use as toilet, and functional | Toilet in use as a toilet<br>and<br>is covered or has a water seal so no flies/rodents have access in & out of the toilet pit/tank<br>and<br>is not blocked |
| 1 | In use as a toilet | Toilet in use as a toilet |
| 0 | No toilet or not in use | No toilet, or toilet exists but is not in use as a toilet |

### 4.2.1 Overall Hygienic use and Maintenance of Sanitation Facilities

**Figure 11: Hygienic use and maintenance of sanitation facilities**

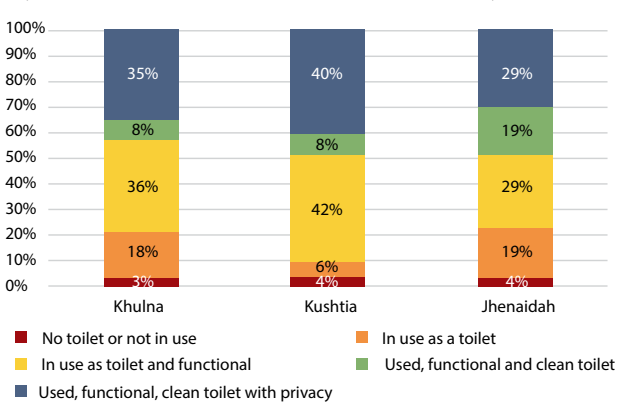



**Table 21: Hygienic use and maintenance of sanitation facilities**

| | Khulna | Kushtia | Jhenaidah |
|---|---|---|---|
| Level 4 | 1,520 | 513 | 294 |
| Level 3 | 353 | 104 | 193 |
| Level 2 | 1,592 | 534 | 287 |
| Level 1 | 772 | 70 | 191 |
| Level 0 | 128 | 48 | 35 |
| Total | 4,365 | 1,269 | 1,000 |

Findings indicate that the majority of toilets are in use in all three cities. When combining information from Indicator 1, we see that 3% of households in Khulna and 4% of households in both Kushtia and Jhenaidah have a toilet but do not use it.

In Bangladesh, all except some indigenous groups use water for anal cleansing. In all three cities, nearly one-third of the toilets are functional, clean and private. In Khulna and Kushtia, 8% of toilets are clean and functional; in Jhenaidah this number is higher at 19%, however, there is a lack of privacy and running water inside the toilet in all cases. Thirty-six per cent of households in Khulna, 42% in Kushtia and 29% in Jhenaidah have functional toilets free of blockages in the water seal, but there is no water available within the toilet cubicle. In Khulna, 18% of households use a toilet with functionality problems while in Kushtia the number is 6% and in Jhenaidah 19%.

Common issues are no water seal, blockage in the water seal or that unimproved toilets are in use. Even if most toilets are functional, households don't have access to running water within the cubicles.

### 4.2.2 Type of Toilet Flush:

The majority (around 95%) of households in all three cities clean their toilet by pour flushing after defecation. Only 1% of households in Kushtia use cistern flush but in Khulna the number is 5%. Cistern flush is used in households having a septic tank.

### 4.2.3 Toilet Cleaning:

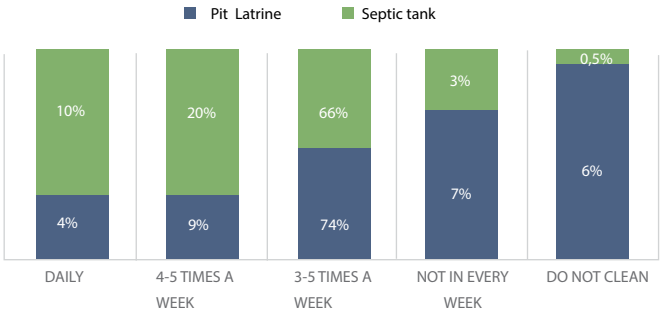
Toilet cleaning occurs very frequently in Khulna and Kushtia. About 90% of households in Khulna and Kushtia clean their toilet at least once a week. In contrast, in Jhenaidah the number is 77%. More than 18% of households in Jhenaidah do not clean their toilet every week. The frequency of toilet cleaning is higher for toilets with a septic tank than for pit latrines. Figure 13 shows that 30% of households with a septic tank clean their toilets at least four times a week.

### 4.2.4 Responsibility Of Cleaning:

**Table 22: Toilet cleaning frequency in the three cities**

| Cleaning frequency | Khulna | Kushtia | Jhenaidah |
|---|---|---|---|
| Daily | 22% | 7% | 29% |
| 4-6 times a week | 19% | 15% | 8% |
| 1-3 times a week | 49% | 70% | 40% |
| Not in every week | 4% | 5% | 18% |
| Do not clean | 5% | 3% | 5% |
| Don't Know | 1% | 0% | 0% |
| Total | 100% | 100% | 100% |

**Figure 12: Cleaning frequency against toilet type in Kushtia**




Men and women largely share the responsibility for toilet cleaning in Khulna, but women clean most of the time in Jhenaidah and Kushtia. Caretakers/servants also clean the toilets in Khulna, but their contribution is very insignificant in the other two cities.

In the poor group (one of the bottom two wealth quintiles), a quarter of the households in Jhenaidah responded

**Table 23: Cross-tabulation between wealth quintile and household members involved in toilet cleaning**

| | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Poor | Non-poor | Poor | Non-poor | Poor | Non-poor |
| HH Male Member | 4% | 5% | 3% | 4% | 26% | 27% |
| No Female Member | 27% | 28% | 64% | 47% | 55% | 32% |
| HH Male and Female Together | 63% | 58% | 32% | 46% | 17% | 39% |
| Caretaker / Servant | 4% | 9% | 1% | 4% | 1% | 1% |
| Don't Know | 2% | 0% | 1% | 0% | 1% | 0% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

that male members clean their toilet; this number is much lower in Khulna and Kushtia. In contrast, among the poor, the percentage of female members who clean the toilet is highest in Kushtia – more than two times higher than in Khulna. However, 63% of poor households in Khulna clean the toilet jointly. In the poor group, the pattern of cleaning responsibility in the three cities is very much distinct. Apart from this, a small number of households employ caretakers/servants to clean their toilet though this is largely seen in wealthier quintiles.

### 4.2.5 Hygienic use and Maintenance of Sanitation Facilities Against Accessibility of Water

Nearly half of the households in Khulna and Kushtia have running water inside the toilet cubicles, but Jhenaidah's

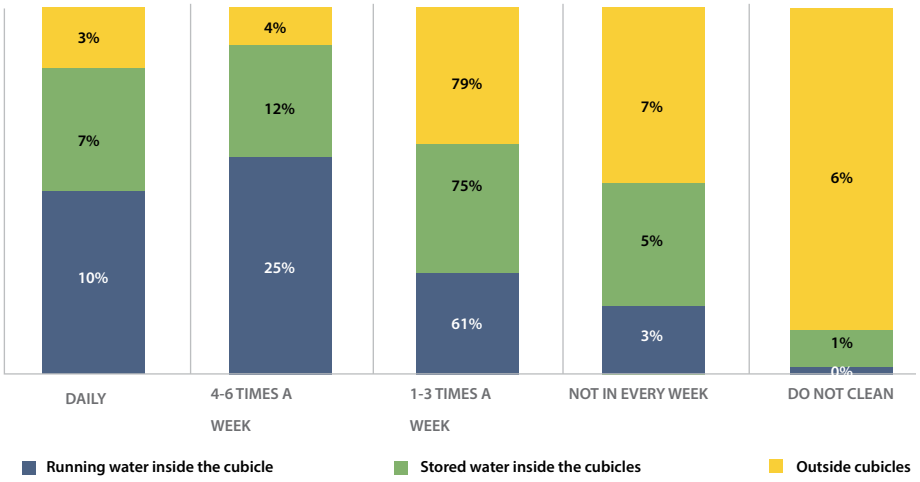
**Table 24: Location of water source or storage for toilet use**

| Location of water for toilet use | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| Running water inside the cubicles | 1,711 | 44% | 585 | 47% | 317 | 34% |
| Stored water inside the cubicles | 431 | 11% | 130 | 10% | 253 | 27% |
| Outside the cubicles | 1,717 | 44% | 527 | 42% | 359 | 39% |
| Total | 3,859 | 100% | 1,242 | 100% | 929 | 100% |

proportion is one-third. Another 27% of households store water inside cubicles in Jhenaidah, while in Khulna and Kushtia the ratio is around 11%. In all three cities, nearly one-third of the households have water located outside the toilet cubicles but inside the household premises.

Figure 13 shows the direct relationship between frequency of toilet cleaning and the availability of water inside

**Figure 13: Toilet cleaning frequency and water availability in Kushtia**




the toilet. In Kushtia, 35% of households with running water inside their toilet cubicles clean the toilet at least four times a week. But the ratio is 19% among households who store water inside the toilet and 7% among those who do not have water inside their toilet.

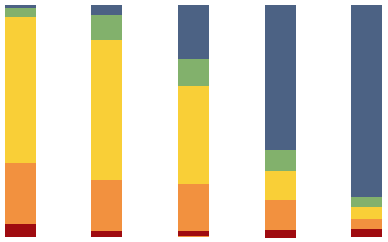
### 4.2.6 User Maintenance Against Quintile

In Khulna, the majority of wealthy and wealthier households use a clean and functional toilet that also offers privacy. On the other hand, nearly two-thirds of the poorest households use only a functional toilet without adequate privacy and running water inside the toilet.

In Kushtia, the wealthier quintile households properly use and maintain toilets. But in poorer quintiles, running water is unavailable within the toilet cubicle – even though the toilet is functional.

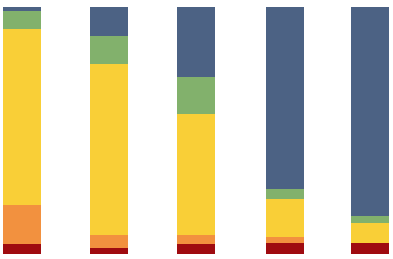
In Jhenaidah, we can observe a clear distinction from the responses regarding the types of toilet used. Most of the poorest, poor and medium quintile households use toilets that are functional but lack adequate privacy, running water inside the cubicles and cleanliness. The use of more environmentally friendly toilets increases with the increase in wealth. The functionality of the toilet also follows the same trend. The lowest three categories in the wealth quintile use a place or structure for toilet purposes. These kinds of toilets are not cleaned regularly and privacy is not assured. The percentage of people having this kind of toilet decreases as households' wealth increases. However, functional and clean toilets offering privacy are largely enjoyed by well-off families.

**Figure 14: Use and maintenance of toilets against wealth quintiles in Khulna**



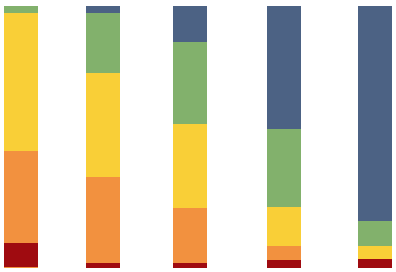
| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Used, functional and clean toilet with privacy | 1% | 4% | 23% | 63% | 83% |
| Used, functional & clean toilet | 4% | 11% | 12% | 9% | 4% |
| Toilet in use and functional | 62% | 61% | 42% | 12% | 5% |
| Toilet in use, but nonfunctional | 27% | 22% | 22% | 13% | 5% |
| Toilet not in use | 6% | 3% | 2% | 3% | 2% |

**Figure 15: Use and maintenance of toilet against wealth quintiles in Kushtia**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Used, functional and clean toilet with privacy | 2% | 12% | 29% | 74% | 85% |
| Used, functional & clean toilet | 7% | 11% | 15% | 5% | 2% |
| toilet in use and functional | 71% | 68% | 49% | 15% | 8% |
| Toilet in use, but nonfunctional | 17% | 6% | 4% | 2% | |
| Toilet not in use | 3% | 3% | 4% | 5% | 5% |

**Figure 16: Use and maintenance of toilet against wealth quintiles in Jhenaidah**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Used, functional and clean toilet with privacy | | 3% | 14% | 47% | 83% |
| Used, functional & clean toilet | 3% | 23% | 31% | 30% | 10% |
| Toilet in use and functional | 53% | 40% | 33% | 15% | 4% |
| Toilet in use, but nonfunctional | 36% | 33% | 21% | 6% | |
| Toilet not in use | 9% | 2% | 2% | 3% | 4% |

### 4.2.7 Hygienic use and Maintenance of Sanitation Facilities Among Households of People with Disabilities

Out of 182 cases in all three cities, only 47 households met the toilet-use needs of members who experience mobility difficulties. There are 50 households with members with vision impairment, and of these, only 13 have met their needs. Kushtia has the highest number of people with disabilities who have either visual or any other physical disabilities (6% of households). This number might seem insignificant, but people with disabilities have unique requirements for everyday activities.

**Table 25: Toilet meeting the needs of household members with disabilities**

| | Khulna | | | Kushtia | | | Jhenaidah | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | Total in this group | Yes | No | Total in this group | Yes | No | Total in this group | Yes | No | Total in this group |
| Toilet met the needs of the persons who have difficulties in walking | 14 | 96 | 110 | 22 | 36 | 58 | 11 | 3 | 14 | 47 | 135 | 182 |
| Toilet met the needs of the persons who have difficulties in seeing | 7 | 17 | 24 | 6 | 15 | 21 | 0 | 5 | 5 | 13 | 37 | 50 |

### 4.2.8 Discussion on the Findings for Hygienic use and Maintenance of Sanitation Facilities

In all three cities, about one-third of the toilets are functional, clean (no faecal smears, walls and doors are in place, no cleansing materials are on the floor and water is available) and offer proper privacy.

Even though the toilets are functional, there are still issues related to privacy (intact walls and locks on the door), and the availability of running water within the toilet cubicle in the lower two wealth quintiles.

In Bangladesh, all except some indigenous groups use water for anal cleansing.

In Khulna, 18% of households are using a toilet with functionality problems; in Kushtia this number is 6% and in Jhenaidah 19%. Common issues are no water seal, blockage in the water seal or the usage of unimproved toilets. The majority (around 95%) of households in all three cities clean their toilet by pour flushing after defecation.

The frequency of toilet cleaning is satisfactory but there are still many households, especially in Jhenaidah, who do not clean their toilet every day – or even once a week. In the smaller cities of Kushtia and Jhenaidah, women clean the toilet most of the time; this could negatively impact the overall health situation of households, as women are also responsible for preparing food and minding children.

About one-quarter of the total households in the three project areas lack a handwashing station, which may discourage members from washing their hands regularly.

## 4.3 Impact Indicator 3: Access to Handwashing with Soap (HWWS)

The sampled households' availability of handwashing stations with soap (HWWS) for use after defecation was classified at various levels of importance, as outlined below:

| Level | Criteria | Description |
|---|---|---|
| 4 | HWWS with running water | Handwashing station (within an accessible distance) with running water from tap with a provision of cleansing material (i.e. water and soap) facility |
| 3 | HWWS without contamination | Handwashing station (within an accessible distance) with a provision of cleansing material (i.e. water and soap) facility and preventing water contamination (e.g. water container with tap, tippy tap, ladle, etc.) |
| 2 | HWWS with potential contamination | Household has a specific place with a provision for washing hands within accessible distance (10 feet) of toilet facility<br>and<br>Water is available but susceptible to contamination (i.e. hand touching the water - with a facility of water in an open container)<br>and<br>With soap or substitute available for handwashing |
| 1 | HWWS without soap | Household has a specific place with a provision for washing hands within accessible distance (10 feet) to toilet facility<br>and<br>Water is available but susceptible to contamination (i.e. hand touching the water - with a facility of water in an open container)<br>and<br>Without availability of soap or substitute |
| 0 | No HWWS | Water is not present at the hand washing station |

### 4.3.1 Overall Situation of Handwashing with Soap After Defecation

Upper levels tend to show a contamination-free handwashing facility, while low levels indicate partial or total deficiencies. One-third or more households in the programme locations have no handwashing station within accessible distance and with water available. The situation in Khulna is worse (45%) compared to the other two cities. Many households in the programme areas fulfilled all criteria, including the availability of running water at the handwashing station. About half of the households in Kushtia, 43% of households in Khulna and 29% of households in Jhenaidah fall at QIS level 4. In Jhenaidah, a large number of households have a handwashing station with the potential for water contamination (21%) and are without soap (15%). The situation is comparatively better in the other two cities.

While investigating handwashing procedures, we discovered that the majority of households use soap or detergent to wash their hands after defecation. On the contrary, around 13% in Khulna and 7% in Jhenaidah use nothing. Kushtia also has the same phenomenon, but the percentage of households that use nothing for handwashing is much lower than in the former two cities. Many people in all cities use a traditional sanitiser such as ash, mud or sand). The ratio varies from 1% to 7% among the cities.

**Figure 17: Overall situation of HWWS in the three cities**

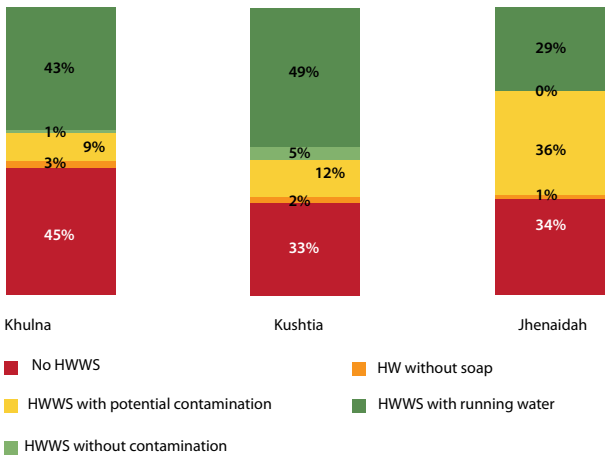
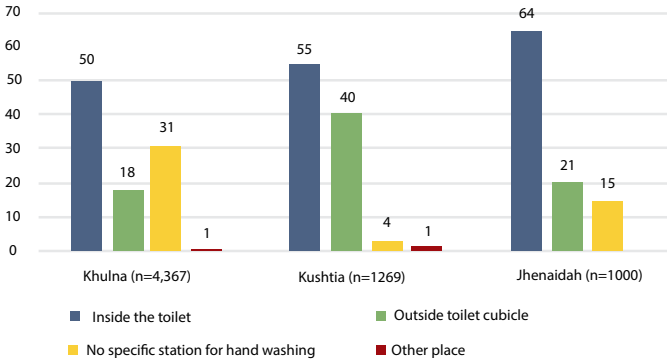



**Table 26: Hand washing agent**

| | Khulna (n=3030) | Kushtia (n=1224) | Jhenaidah (n=850) |
|---|---|---|---|
| Have soap/ detergent | 85.6% | 93% | 90.8% |
| Have ash/mud/sand | 1.6% | 2% | 2.4% |
| Nothing for hand washing | 12.9% | 5.1% | 6.8% |

More than half of the households in all three cities have a handwashing station inside the toilet. The tap used for anal cleansing has not been considered as a handwashing station; only a wash basin within or outside the toilet cubicle has been considered. In Khulna, 18% of households have a handwashing station outside the toilet cubicle; in Kushtia the number is 40% and in Jhenaidah 21%. Kushtia has better arrangements for a handwashing station than do the other two cities. Unlike Kushtia, Khulna and Jhenaidah have a large group of households without any specific place for handwashing.

**Figure 18: Location of handwashing station**




### 4.3.2 Gender Role for Decision Making to Install a Household Handwashing Station

Most households' decisions to install a handwashing station are made together by both the men and women. Decisions made solely by women are, however, very infrequent in all three project areas.

**Table 27: Gender role for decision making to install a household handwashing station**

| Handwashing agent | Khulna (n=3,030) | Kushtia (n=1,224) | Jhenaidah (n=850) |
|---|---|---|---|
| Women made the decision | 4.9% | 11.4% | 2.70% |
| Men made the decision | 22.7% | 31.2% | 26.60% |
| Decision made jointly | 72.4% | 57.4% | 70.70% |

**Table 28: Gender role for decision making on establishing a handwashing station by wealth quintile**

| Gender role for decesion making | Poorest | | | Poor | | | Medium Wealth | | | Wealthy | | | Wealthiest | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Khulna | Kushtia | Jhenaidah | Khulna | Kushtia | Jhenaidah | Khulna | Kushtia | Jhenaidah | Khulna | Kushtia | Jhenaidah | Khulna | Kushtia | Jhenaidah |
| Women | 6% | 15% | 8% | 8% | 3% | 3% | 5% | 13% | 1% | 5% | 9% | 3% | 3% | 10% | 2% |
| Man | 13% | 38% | 48% | 17% | 35% | 19% | 26% | 29% | 29% | 24% | 29% | 24% | 25% | 26% | 22% |
| Both | 81% | 47% | 44% | 74% | 54% | 78% | 69% | 58% | 71% | 71% | 63% | 74% | 72% | 64% | 76% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| n | 276 | 222 | 102 | 436 | 249 | 160 | 647 | 252 | 192 | 812 | 251 | 197 | 859 | 250 | 199 |

The table above shows that women's role in deciding to establish a handwashing station decreases with the increase in wealth quintiles in all three cities.

### 4.3.3 Source of Information on Handwashing

Television is the major source of information for more than 80% of households in all of the cities, but the impact of other media varies by city. Other media includes radio, newspapers, billboards and training/orientation. Family members also exchange information among themselves that is used as both a second and third source of information.

In Khulna, 92% of households get information from TV, but 35% get information from health centres. Training/ orientation does not seem to be an information source, but academic institutions also provide valuable information to the people of Khulna.

For Kushtia households, television dominates as the primary source of information. Household members, in particular, act as a learning source for most families in Kushtia. Academic institutions and health clinics also provide information to households.

In Jhenaidah, television factors highly as an information source compared to print media such as newspapers and billboards. However, in contrast to Khulna and Kushtia, household members in Jhenaidah also get information from other family members.

**Table 29: Sources of information on handwashing**

| Sources of information on hand washing | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Responses | Percent of Cases | Responses | Percent of Cases | Responses | Percent of Cases |
| Radio | 315 | 10% | 5 | 0% | 8 | 1% |
| Television | 2,782 | 92% | 1,080 | 88% | 809 | 81% |
| Newspaper | 437 | 14% | 19 | 2% | 187 | 19% |
| Billboard | 517 | 17% | 8 | 1% | 270 | 27% |
| Training / orientation | 92 | 3% | 8 | 1% | 1 | 0% |
| Family members | 446 | 15% | 256 | 21% | 288 | 29% |
| Education institute | 645 | 21% | 192 | 16% | 111 | 11% |
| Health centre | 1,062 | 35% | 33 | 3% | 160 | 16% |
| Others | 31 | 1% | 22 | 2% | 8 | 1% |

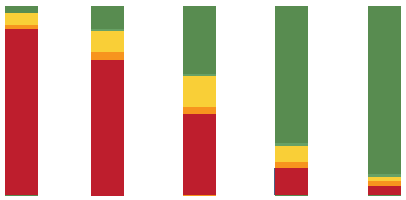
### 4.3.4 Access to Handwashing with Soap as Per Wealth Quintile

The figures below (19, 20 and 21) show the relationship between wealth quintiles and the availability of a handwashing station after defecation in the three programme cities.

As can be seen, in all the cities access to handwashing facilities is very much related to wealth. Wealthier households have better access to sanitation facilities. In Khulna, the practice of storing water is negligible in all the wealth quintiles. Even at the lowest quintile, about 15% of households are using soap for handwashing, irrespective of water storage facilities.

The majority of the poor (72%) and poorest households (88%) in Khulna do not have a handwashing station within accessible distance to the toilet. The situation is similar in Jhenaidah, where 86% of the poorest households and 45% of poor households do not have

**Figure 19: Access to handwashing with soap against wealth quintiles in Khulna**

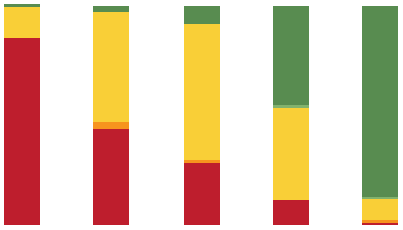


| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| HWWS with Running Water | 4% | 12% | 36% | 74% | 89% |
| HWWS without water contamination | | 1% | 1% | 1% | 1% |
| HWWS with potential water contamination | 6% | 12% | 17% | 9% | 3% |
| HW Station without soap | 2% | 3% | 4% | 2% | 3% |
| No HW Station | 88% | 72% | 43% | 15% | 5% |

**Figure 20: Access to handwashing with soap against wealth quintiles in Kushtia**

| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| HWWS with Running Water | 12% | 28% | 45% | 77% | 84% |
| HWWS without water contamination | 0% | 2% | 5% | 8% | 8% |
| HWWS with potential water contamination | 15% | 20% | 20% | 4% | 2% |
| HW Station without soap | 4% | 1% | 2% | 2% | |
| No HW Station | 69% | 50% | 28% | 10% | 6% |

**Figure 21: Access to handwashing with soap against wealth quintiles in Jhenaidah**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| HWWS with running water | 1% | 3% | 8% | 46% | 88% |
| HWWS without water contamination | | | | 1% | 1% |
| HWWS with potential water contamination | 13% | 50% | 63% | 42% | 10% |
| HW Station without soap | | 3% | 1% | | 2% |
| No HW Station | 86% | 45% | 29% | 12% | 1% |

a handwashing station. But in Kushtia, the majority of poor and poorest households have a handwashing station that is susceptible to contamination. In contrast, more than three-quarters of the households among the wealthy and wealthier groups have handwashing facilities with running water and cleansing material.

### 4.3.5 Discussion on the Findings for Access to Handwashing with Soap (Hwws)

The survey findings show that handwashing stations are available in most households, but there are still a considerable number of households using traditional techniques to sanitise hands after defecation. There might be a chance that children are also using the same techniques and are habituated to it.

Data was collected by observing whether a handwashing station with water is available or not; from this we can't discern whether household members are using proper handwashing techniques and the time of handwashing.

About a quarter of the households do not have a specific location for the handwashing facility, which could discourage children from washing their hands if left unattended. As women do not have a strong voice when households decide about handwashing facilities, children might be in a more vulnerable position.

To create a greater awareness among the people about safe handwashing, TV is playing a key role. The print media also contributes considerably. As well, households are getting advice and suggestions from their family members on safe handwashing, but the rate could be even higher with the adoption of more family-based sanitation programs. Commercial advertising from companies and organisations are contributing to improving hand washing practices, too.

Since the local government division initiated the National Health Baseline in 2014, handwashing with soap has been one of the prime interventions. Similarly, there are many development organisations working on this practice; hence the programme will not focus more on this indicator, but basic information will be disseminated where applicable.

## 4.4 Impact Indicator 4 (7): Safety of Pit Emptying and Conveyance

### 4.4.1 Overall Findings on Safety of Pit Emptying and Conveyance

This indicator measures safety during emptying and conveyance of faecal sludge from a pit or septic tank. We measured this indicator based on toilet types, to understand the condition of containment, knowledge of the premise owner/user about the needs and standards of pit emptying, and use of safety equipment by the emptiers during their work.

The sampled households were grouped into various levels, according to the following criteria. High levels indicate an environmentally safe emptying and conveyance while, low levels indicate no practice of FS emptying and conveyance.

| Level | Criteria | Description |
|---|---|---|
| 4 | Environmentally safe FS emptying and conveyance | Faecal sludge (FS) is not discharged directly to the environment, open drains or open ground<br>and<br>Pit/tanks: Toilet pits/tanks older than three years have been emptied within the last three years<br>and<br>No one entered the pit at any time during toilet pit/septic tank emptying<br>and<br>Emptiers wore protective gear during toilet pit/tank emptying<br>and<br>Emptiers used safe pit emptying devices<br><br>Sewerage systems: Pipes forming the sewerage system from the premises do not leak<br>Or Compost/biogas/anaerobic digestion systems<br>Compost/sludge is only disposed of after at least six months' storage |
| 3 | Mostly safe FS emptying and conveyance | Faecal sludge (FS) is not discharged directly to the environment, open drains or open ground<br>and<br>Pit/tanks: Toilet pits/tanks older than three years have been emptied within the last three years<br>and<br>No one entered the pit at any time during toilet pit/septic tank emptying<br>and<br>Emptiers wore protective gear during toilet pit/tank emptying<br>but<br>Emptiers used unsafe pit emptying devices<br>Or Compost/biogas/anaerobic digestion systems<br>Compost/sludge is disposed of before at least six months' storage |
| 2 | Partially safe FSM emptying and conveyance | Households are aware of the need and frequency (standard) of periodic emptying of faecal sludge from the septic tank/pit<br>and<br>Faecal sludge is not discharged directly to the environment<br>and<br>Pit/tanks: Toilet pits/tanks older than three years have been emptied within the last three years<br>but<br>Toilet pit/tank emptying requires someone to enter the pit and/or no protective gear is worn |
| 1 | Unsafe FSM emptying or conveyance | Households are not aware of the need and frequency (standard) of periodic emptying of faecal sludge from the septic tank/pit<br>or<br>Toilet pits/tanks older than three years have not been emptied within the last three years |
| 0 | No practice of FSM emptying or conveyance | a. No toilet on the premises<br>or<br>b. Toilet pan discharges directly into the environment (unimproved toilet) |

In all programme locations, about 50% or more of households practise unsafe FS emptying and conveyance. There are virtually no environmentally safe emptying options available in the cities, as seen in Figure 22 and table 30 below.

In Kushtia, about 50% of households fall under QIS level 2 and above, while the number is 20% in Khulna and 7% in Jhenaidah. Kushtia Paurashava has been operating Vacutug services for slightly longer than the other two cities. In all three cities, development partners and the Government of Bangladesh have provided logistical support for emptying, but as the entire value chain has not been properly managed, even collected sludge is directly or indirectly disposed into waterbodies. Therefore, most households fall into level 1, i.e. unsafe emptying.

**Figure 22: Overall emptying and conveyance in the three cities**

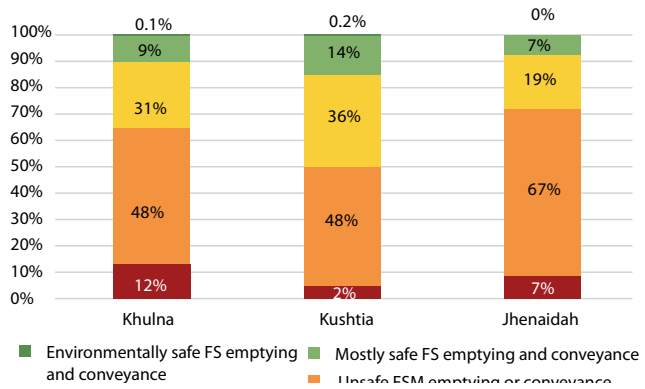



**Table 30: Overall emptying and conveyance in the three cities**

| QSI Level | Khulna | Kushtia | Jhenaidah |
|---|---|---|---|
| Level 4 | 5 | 2 | - |
| Level 3 | 393 | 177 | 73 |
| Level 2 | 1,363 | 451 | 187 |
| Level 1 | 2,094 | 603 | 669 |
| Level 0 | 508 | 27 | 71 |
| Total | 4,367 | 1,268 | 1,000 |

### 4.4.2 Knowledge on the Necessity of Pit/Tank Emptying

Most respondents answered positively when they were asked about their knowledge of the necessity of emptying the pit/septic tank on a regular basis. Less than 10% of the households don't feel that the pit or septic tank requires regular emptying; in Jhenaidah, this ratio is more than double that of Khulna and Kushtia. Those who do not feel that pit/tank emptying is important gave three main reasons:

- Sludge soaks into the ground.
- The size of the pit/tank is too big.
- The pit/tank is connected to a drain/open place.

The majority of respondents noted the large sizes of the septic tank or pit.

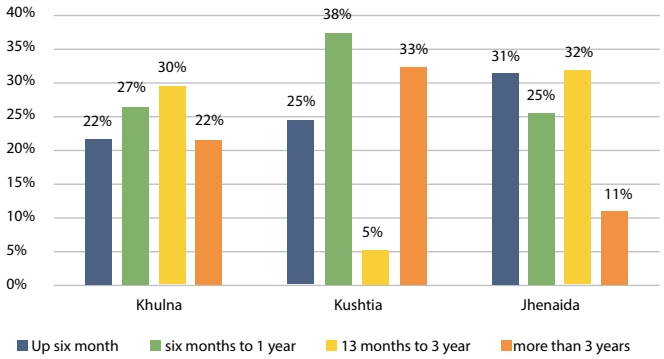
**Table 31: Knowledge of the importance of pit/tank emptying**

| | | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|---|
| | | Count | Percent | Count | Percent | Count | Percent |
| Feelings about the importance of emptying the pit / septic tank | Yes | 3,638 | 92% | 1,165 | 93% | 735 | 79% |
| | No | 336 | 9% | 90 | 7% | 194 | 21% |
| | Total | 3,974 | 100% | 1,255 | 100% | 929 | 100% |

### 4.4.3 Safety of Pit Emptying and Collection Against Wealth Quintiles

In Kushtia, 25% of households emptied their septic tank less than six months ago; this is a much higher percentage than is found in Khulna (22%), but lower than in Jhenaidah (31%). The survey also found that about 22% of households in Khulna, 33% in Kushtia and 11% in Jhenaidah had not emptied their pit/tank within the last three years.

**Figure 23: When the pit/septic tank was last emptied**



### Khulna

The practice of safe septic tank emptying and conveyance is almost absent in Khulna city. More than half of the total households, irrespective of wealth quintile, either use unsafe emptying or do not practise faecal sludge emptying at all. The number is even higher for the top two groups of the quintile. The number of people in the wealthy groups who do not have a sludge emptying option is half that of the former group who are comparatively poor.

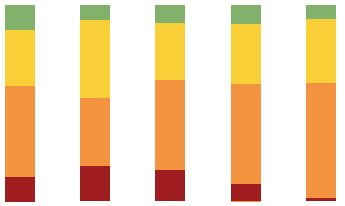
### Kushtia

Despite having a functional toilet and occasional privacy, households are emptying their tank in an unsafe way, irrespective of wealth category. Faecal sludge is also disposed unsafely to the environment. However, less than one-fifth of the total households practise partially safe sludge treatment and disposal.

### Jhenaidah

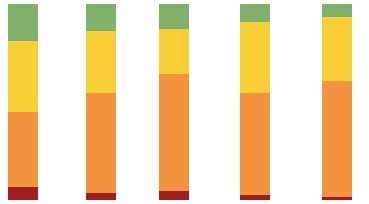
On average, 7% of households do not practise any faecal sludge treatment or disposal. The majority in this category belong in the poorest quintile, and the number falls sharply in the next four wealth quintiles. Basically, no households in Jhenaidah are practising fully safe cleaning procedures. About 46% of households in the poorest wealth quintile deploy unsafe emptying and conveyance; this is the lowest number in this category and alarmingly, the percentage of households practising unsafe emptying and conveyance increases as we move upwards in the quintile. The number of containments that were emptied within the last three years is very minimal; hence most households fall into level 1. Poor households use pit latrines some of the time, with a functional Y-junction whereas in the wealthier quintile – even if households have improved toilets – their containment is mostly directly or indirectly connected to a drain or waterbody.

**Figure 24: Practice of emptying septic tank/pit against wealth quintile in Khulna**



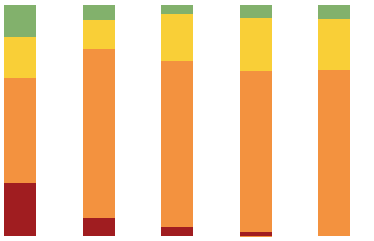
| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Environmentally safe FS emptying and conveyance | | 1% | | 0% | |
| Mostly safe FS emptying and conveyance | 12% | 7% | 10% | 9% | 7% |
| Partially safe FSM emptying and conveyance | 28% | 39% | 27% | 30% | 32% |
| Unsafe FSM emptying or conveyance | 47% | 35% | 46% | 53% | 59% |
| No practice of FSM emptying or conveyance | 13% | 18% | 17% | 9% | 1% |

**Figure 25: Practice of emptying septic tank/pit against wealth quintile in Kushtia**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Environmentally safe FS emptying and conveyance | | | 0% | 0% | |
| Mostly safe FS emptying and conveyance | 19% | 12% | 14% | 13% | 13% |
| Partially safe FSM emptying and conveyance | 40% | 38% | 39% | 29% | 34% |
| Unsafe FSM emptying or conveyance | 39% | 49% | 44% | 56% | 52% |
| No practice of FSM emptying or conveyance | 3% | 1% | 3% | 3% | 1% |

**Figure 26: Practice of emptying septic tank/pit against wealth quintile in Jhenaidah**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Mostly safe FS emptying and conveyance | 14% | 7% | 4% | 6% | 6% |
| Partially safe FSM emptying and conveyance | 18% | 12% | 20% | 23% | 22% |
| Unsafe FSM emptying or conveyance | 46% | 75% | 72% | 71% | 72% |
| No practice of FSM emptying or conveyance | 23% | 7% | 4% | 2% | |

### 4.4.4 Other Data on Safe Emptying

#### 4.4.4.1 Manual vs Mechanical Emptying

To empty the septic tanks/pits, sweepers (manual cleaners) are used frequently in all of the project areas. However, a combination of sweepers and mechanical cleaning is predominant in Kushtia. The mechanical emptying process can pump the liquid portion, but manual intervention is required to clean the harder substance at the bottom of the tank/pit. Even the house owner compels the sweeper to clean the tank/pit entirely; to do this the sweeper has to climb down into the containment. A very insignificant percentage of households in Khulna and Kushtia deploy mechanical cleaning. Vacutug services have been operating in Khulna and Jhenaidah for some time, but they haven't been used at scale in Khulna; in Jhenaidah the service is almost non-existent.

**Table 32: Manual vs mechanical emptying**

| Types of emptying | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Count | Column N % | Count | Column N % | Count | Column N % |
| Manual sweepers | 1521 | 81% | 181 | 34% | 259 | 98% |
| Combination of manual & mechanical | 320 | 17% | 330 | 61% | 1 | 0% |
| 100% Mechanical | 24 | 1% | 3 | 1% | 1 | 0% |
| Self | 22 | 1% | 24 | 5% | 4 | 2% |
| Others | 3 | 0% | 0 | 0% | 0 | 0% |
| Total | 1890 | 100% | 538 | 100% | 265 | 100% |

#### 4.4.4.2 Service Provision: City Authority vs CDC vs Sweepers

Jhenaidah has virtually no services for safe sludge management, not even from the paurashava. But with support from DPHE, a treatment plant is under construction. Kushtia, however, has a faecal sludge co-composting treatment plant; hence the city authority has launched some services. Households in Khulna show a similar response to those in Kushtia when asked about the responsibility of a concerned authority for sludge management. Khulna, unlike Kushtia and Jhenaidah, receives services from NGOs and CBOs. A significant number of households in Kushtia do the cleaning themselves.

**Table 33: Service providers for pit/septic tank emptying**

| Types of emptying | Khulna | | Kushtia | | Jhenaidah | |
|---|---|---|---|---|---|---|
| | Count | Percent | Count | Percent | Count | Percent |
| KCC / Kushtia / Jhenaidah Paurashava | 309 | 16.3% | 333 | 61.9 | 2 | .08% |
| CBOs / NGOs | 27 | 1.4% | 1 | .02% | | |
| Individual Sweeper | 1,526 | 80.7% | 180 | 33.5% | 259 | 97.7% |
| Self | 22 | 1.2% | 24 | 4.5% | 4 | 1.5% |
| Don't Know | 4 | 0.2% | | 0% | | |
| Others | 2 | 0.1% | | 0% | | |
| Total | 1,890 | 100% | 538 | 100% | 265 | 100% |

In Kushtia, the paurashava bears the major responsibility for sludge management. Individual sweepers play an important role along with the municipality, especially in the suburbs where municipal services do not reach. In some cases, people also took it upon themselves to clean.

Khulna is largely dependent on the services of individual sweepers, even though KCC provides this service. One of the major reasons for not using KCC's services is that the Vacutug is large and the application procedure is cumbersome. One has to apply and then pay a bank fee and deposit to KCC, so people prefer to call either an NGO-supplied Vacutug or manual emptier – just make a call and negotiate a fee. The NGOs/CBO services are focused on specific wards and serve a small group of people.

The situation in Jhenaidah is somewhat alarming as the paurashava has very little capacity to deal with sludge. Individual sweepers do almost all of the activities related to cleaning and transporting.

### 4.4.5 Time Required to Provide Emptying Services

**Table 34: Time required to provide pit/septic tank cleaning in Khulna and Kushtia**

| | Khulna | | | Kushtia | | |
|---|---|---|---|---|---|---|
| | Service provided within 24 hours | Service provided after 24 hours | Total | Service provided within 24 hours | Service provided after 24 hours | Total |
| City corporation/ paurashava | 33% | 67% | 100% | 47% | 53% | 100% |
| CBO/CDC | 85% | 15% | 100% | Not applicable | | 100% |
| Sweeper (manual cleaning) | 84% | 16% | 100% | 92% | 8% | 100% |

Table 34 shows that the Vacutug service from the Community Development Committee (CDC) and manual cleaning in Khulna required less time compared to the city corporation. Two-thirds of Khulna respondents who had their pit/septic tank emptied waited more than a day to get KCC services, while 85% of respondents in Khulna mentioned that they received the service within 24 hours from CDC.

### 4.4.6 Discussion on the Findings for Safety of Pit Emptying and Collection

Almost all households in the three cities practise unsafe emptying and conveyance, irrespective of wealth quintile.

Although the Vacutug service was introduced a few years ago, it is not yet functioning properly. Since there are no proper disposal sites, most of the sludge is dumped in undesignated areas.

People are convinced of the necessity to empty on a regular basis, but due to lack of service or information, the demand hasn't increased.

There is no consistency in emptying frequency among households as most containments are connected to waterbodies or are substandard.

In most cases, households in Khulna and Jhenaidah use manual emptying while in Kushtia the majority of people use a combination of manual and mechanical emptying. Also, service provided by the CBO/NGO is faster than of the local authority.

## 4.5 Impact Indicator 5 (8): Safe Treatment and Disposal

This is last the part of the sanitation value chain, and focuses on safe treatment and disposal arrangements.

It is very difficult to measure treatment and disposal at the household level. However we measured this indicator based on toilet types, to understand the on-site pre-treatment facilities, pit emptying practices and the knowledge of the premise owner/user about the disposal practice of the emptiers.

Sampled households were grouped into various levels according to the following criteria. High levels indicate environmentally safe treatment and disposal, while low levels indicate no practice of FS treatment or disposal.

| Level | Criteria | Description |
|---|---|---|
| 4 | Environmentally safe FS treatment & disposal | a. FS is anaerobically digested using either a two-compartment septic tank or biogas<br>- and<br>the premise owners/users know that FS is disposed into a designated site<br>or<br>b. FS is composted using either a twin pit latrine, ecosan or urine-diverting dry toilet and manure is used as compost<br>- but composted materials are stored for more than six months before disposal |
| 3 | Mostly safe FS treatment & disposal | a. FS is contained in a pit (other than twin pit) or one-chamber septic tank and emptied<br>- and<br>the premise owners/users know that FS is disposed into a designated site<br>or<br>b. FS is composted using either twin pit latrine, ecosan or urine-diverting dry toilet and manure is used as compost<br>but composted materials are stored for less than six months before disposal<br>or<br>c Toilet, less than three years old, not emptied;<br>but the premise owners/users know that FS is disposed into a designated site |
| 2 | Partially safe FS treatment & disposal | a. Toilet pit/tank emptied<br>and<br>the premise owners/users know that FS is disposed directly into a non-designated site<br>or<br>b. Toilet, less than three years old, not emptied;<br>but the premise owners/users know that FS is disposed directly into a non-designated site |
| 1 | Unsafe FS treatment or disposal | a. Toilet pit/tank (other than compost toilets), older than three years, not emptied<br>or<br>b. Toilet pit/tank (other than compost toilets), less than three years old, not emptied; and the designated sites are unknown known<br>or<br>c. FS is collected by a third party, the details of which are not known (e.g. dumping site) |
| 0 | No practice of FS treatment or disposal | a. No toilet on the premises<br>or<br>b. Toilet pan discharges directly into the environment (unimproved toilet) |

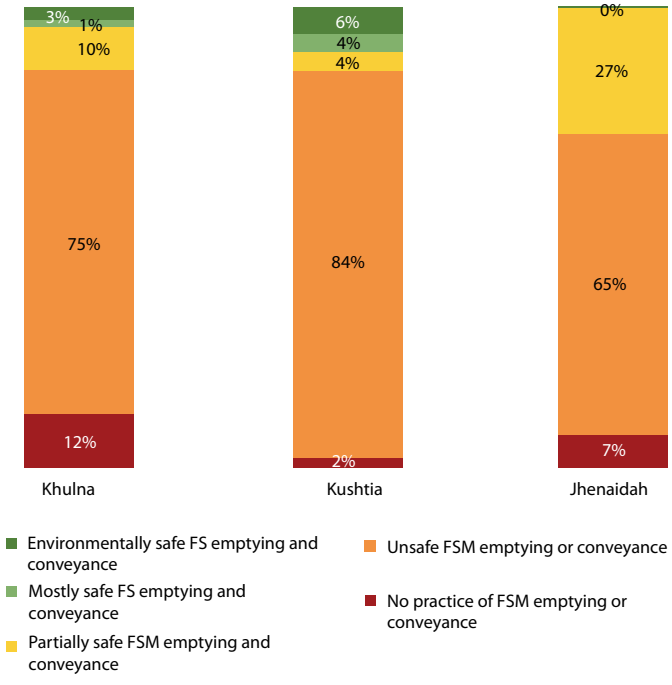
Two-thirds or more of the households in the programme locations practise environmentally unsafe treatment and disposal, as per the above mentioned criteria.

The major reasons for this are that 1) most households do not know where the sludge is disposed; and 2) septic tanks were not emptied for more than three years. Nine percent of households in Kushtia paurashava fall into QIS level 3 and above, where treatment facilities are required. None of the households in Jhenaidah score higher than QIS level 2, though the paurashava has an FS treatment plant. More than one-fourth of Jhenaidah households fall into QIS level 2, which indicates that most of the emptied FS is being dumped into the environment.

**Table 35: Provision of faecal sludge treatment and disposal or reuse in the three cities**

| QIS Level | Khulna | Kushtia | Jhenaidah |
|---|---|---|---|
| Level 4 | 131 | 76 | 2 |
| Level 3 | 40 | 49 | 1 |
| Level 2 | 423 | 47 | 272 |
| Level 1 | 3,265 | 1,069 | 653 |
| Level 0 | 508 | 27 | 71 |
| Total | 4,367 | 1,268 | 999 |

**Figure 27: Provision of faecal sludge treatment and disposal or reuse in the three cities**



### 4.5.1 Existing Usage of the Sludge

About 79% of households in Kushtia consider faecal sludge to be a resource and reusable. This knowledge must have come from the establishment of a co-composting plant by the local authority. The ratio is far lower in Khulna (52%) and Jhenaidah (28%). A very insignificant number of households used resources recovered from faecal sludge, primarily for agriculture. There are also some cases where households are using recovered faecal sludge as fish feed and as an input to biogas plants. Only 114 cases in Khulna and Kushtia reported that they used faecal sludge as a resource. In Jhenaidah, there are no such cases. Households that used FS mentioned that it was used for fish feed, poultry feed, the kitchen garden, agriculture and producing biogas. Among those uses, agriculture was the most common answer given by the respondents.

**Figure 28:Households' knowledge about resource recovery from FS**

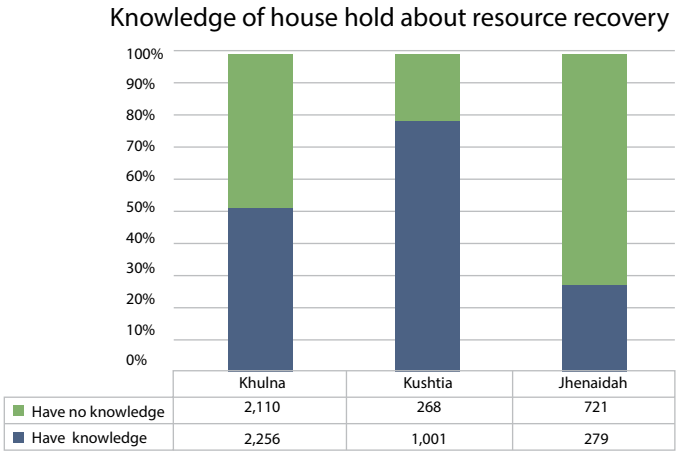



**Table 36: Frequency and purpose of sludge being used as a resource**

Number of cases

| | Fish feed | Poultry feed | Kitchen garden | Agriculture | Producing biogas | Total |
|---|---|---|---|---|---|---|
| Khulna | 4 | 1 | 4 | 64 | 26 | 99 |
| Kushtia | 1 | | 3 | 11 | | 15 |
| Total | 5 | 1 | 7 | 75 | 26 | 114 |

### 4.5.2 Safe Treatment and Disposal Against Wealth Quintiles

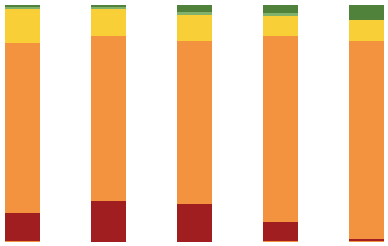
#### Khulna

The number of households practicing faecal sludge treatment and disposal is almost evenly distributed among groups of the wealth quintile. Most people, irrespective of wealth and social status, deploy unsafe or partially safe treatment techniques while some households practise safe treatment methods; the trend is positively correlated with the wealth of the household.

#### Kushtia

Despite having a functional toilet and occasional privacy, households are emptying their tank in a mostly unsafe way, irrespective of wealth category and, in most cases, directly into the environment. A quarter of the total households, however, practise partially safe sludge treatment and disposal.

**Figure 29: Treatment and disposal against wealth quintile in Khulna**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Environmentally safe FS emptying and conveyance | 1% | 1% | 3% | 4% | 6% |
| Mostly safe FS emptying and conveyance | 1% | 1% | 1% | 1% | 0% |
| Partially safe FSM emptying and conveyance | 13% | 10% | 9% | 8% | 9% |
| Unsafe FSM emptying or conveyance | 72% | 70% | 69% | 79% | 84% |
| No practice of FSM emptying or conveyance | 13% | 18% | 17% | 9% | 1% |

### Jhenaidah

Almost a quarter of the households from the poorest group do not practise any disposal techniques. However, 52% from the same group are practicing environmentally unsafe disposal while the remainder of households use somewhat better techniques than the former. More than three-quarters of the households from every wealth quintile use either environmentally unsafe or partially safe disposal procedures. Safe treatment and disposal among all wealth quintiles is almost nil in Jhenaidah.

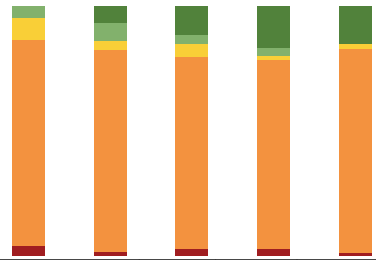
#### 4.5.3 Discussion on the Findings for Safe Treatment and Disposal of Faecal Sludge

Two-thirds or more of the households in all three locations practise environmentally unsafe treatment and disposal. Most people, irrespective of wealth and social status, deploy unsafe or partially safe treatment techniques while some households practise safe treatment methods; the trend is positively correlated with household wealth.

Even though Kushtia and Jhenaidah have treatment plants, the services have not been established as envisioned; having the infrastructure without any demand-side activities does not ensure proper FSM services.

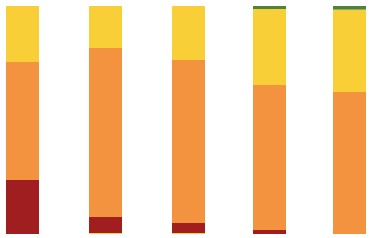
More than half of the pit latrines in Kushtia are twin-pit latrines without a Y-junction; this indicates a lack of understanding of the concepts and benefits of proper twin-pit latrines with a Y-junction. Households could not utilise the benefits of resource recovery from the technology. There is a very high variance in knowledge and practice of resource recovery and use.

**Figure 30: Treatment and disposal against wealth quintile in Kushtia**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Environmentally safe FS emptying and conveyance | | 6% | 11% | 17% | 15% |
| Mostly safe FS emptying and conveyance | 5% | 8% | 4% | 3% | 0% |
| Partially safe FSM emptying and conveyance | 8% | 4% | 5% | 1% | 1% |
| Unsafe FSM emptying or conveyance | 84% | 81% | 7% | 77% | 83% |
| No practice of FSM emptying or conveyance | 3% | 1% | 3% | 3% | 1% |

**Figure 31: Treatment and disposal against wealth quintile in Jhenaidah**



| | Poorest | Poor | Medium Wealth | Wealthy | Wealthiest |
|---|---|---|---|---|---|
| Environmentally safe FS emptying and conveyance | | | | 1% | 1% |
| Mostly safe FS emptying and conveyance | | | | | 1% |
| Partially safe FSM emptying and conveyance | 24% | 18% | 24% | 34% | 36% |
| Unsafe FSM emptying or conveyance | 53% | 75% | 72% | 64% | 63% |
| No practice of FSM emptying or conveyance | 23% | 7% | 4% | 2% | |

# 5. CONCLUSION

We engaged conservancy supervisors from the respective city authorities to collect data from sample households; this built supervisors' awareness of FSM issues and ensured that households could be accessed easily. Residents believed that this was a step in the right direction from the city authorities towards achieving improved sanitation coverage.

Compared to other countries in the region, Bangladesh has drastically reduced open defecation, which is also visible in our programme areas. But not enough attention has been given to the quality and post-construction servicing of toilets.

Most of the households in the three cities of Khulna, Kushtia and Jhenaidah have access to a toilet irrespective of its quality. The majority of toilets have either a safety tank or pit as containment, but due to a lack of proper design and installation of these technologies – and no collection and treatment facilities – almost all faecal sludge is being disposed into the environment. To ensure proper public health, policies and standards are in place but enforcement is very weak. The relatively smaller cities of Kushtia and Jhenaidah have better sanitation coverage. Khulna is lagging behind Kushtia and Jhenaidah in service coverage and safe sanitation.

Even if illegal connections from toilets to waterbodies are cut off, unless and until a proper emptying and treatment procedure is established the toilets in these cities will never be environmentally safe. Among the three cities, Jhenaidah's pit latrines are in the worst condition, but the number of functional septic tanks is higher. In all three cities a strong correlation was found between access to a sanitary toilet and wealth.

Even if most households have access to toilets, only about one-third are functional, clean (no faecal smears, walls and doors are in place, no cleansing materials are on the floor and running water is available) and have proper privacy in all three cities. In the lower two quintiles the availability of running water within the toilet cubicles is low and therefore impacts the facilities' overall hygienic maintenance. Common issues for non-functional toilets are no water seal, blockage in the water seal or that unimproved toilets are in use.

Most (around 95%) households in all three cities clean their toilet by pour flushing after defecation. The frequency of toilet cleaning is satisfactory but there are still many households, especially in Jhenaidah, who do not clean their toilet every day – not even once in a week. In Kushtia and Jhenaidah, women clean the toilet most of the time, which could negatively impact the overall health situation of households as women are also responsible for preparing food and minding children.

About one-quarter of the total households in the three project areas lack a handwashing station, so members may be discouraged from washing their hands regularly. Women don't have a strong voice when households decide about handwashing facilities; hence children might be in a more vulnerable position. Most households get messages about handwashing through visual media as opposed to print media or word of mouth.

Even though a Vacutug service was introduced a few years ago, it is not yet functioning properly; hence households are compelled to practise manual emptying. Most households, irrespective of wealth quintile, practise unsafe emptying and conveyance; this directly impacts public health and the environment. Vacutug operation is most prominent in Kushtia, where the service is provided directly by the paurashava; therefore we can conclude that the local authority is interested in promoting safe emptying and conveyance. This may be because of previous interventions and the installation of a treatment plant (though the plant is not operating at full scale).

Even with designated disposal sites available in the cities, most of the sludge is not going to these; instead it is disposed into nearby open waterbodies or buried. People are convinced of the necessity to empty their pit/tank on a regular basis, but the supply side needs to be strengthened to cater to service demand.

Most households, irrespective of wealth and social status, deploy unsafe or partially safe treatment techniques while a few wealthier households practise safe treatment methods. As we discovered in Kushtia and Jhenaidah, treatment infrastructure without demand-side activities does not ensure proper FSM services.

Finally, there is a very high variance in households' knowledge and practice of resource recovery and use. The many twin-pit latrines without a Y-junction in Khulna and Kushtia indicate that the concepts and benefits of these latrines are not promoted; households are missing the benefits of resource recovery from proper twin-pit latrines.

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## Demonstration of Pro-poor Market-based Solutions for Faecal Sludge Management in Urban Centres of Southern Bangladesh

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