STUDY ON COST study and cost EVALUATION OF CITY ASSESMENT FOR FSM

FINAL REPORT

Municipal Association of Bangladesh-MAB
বাংলাদেশ পৌরসভা সমিতি

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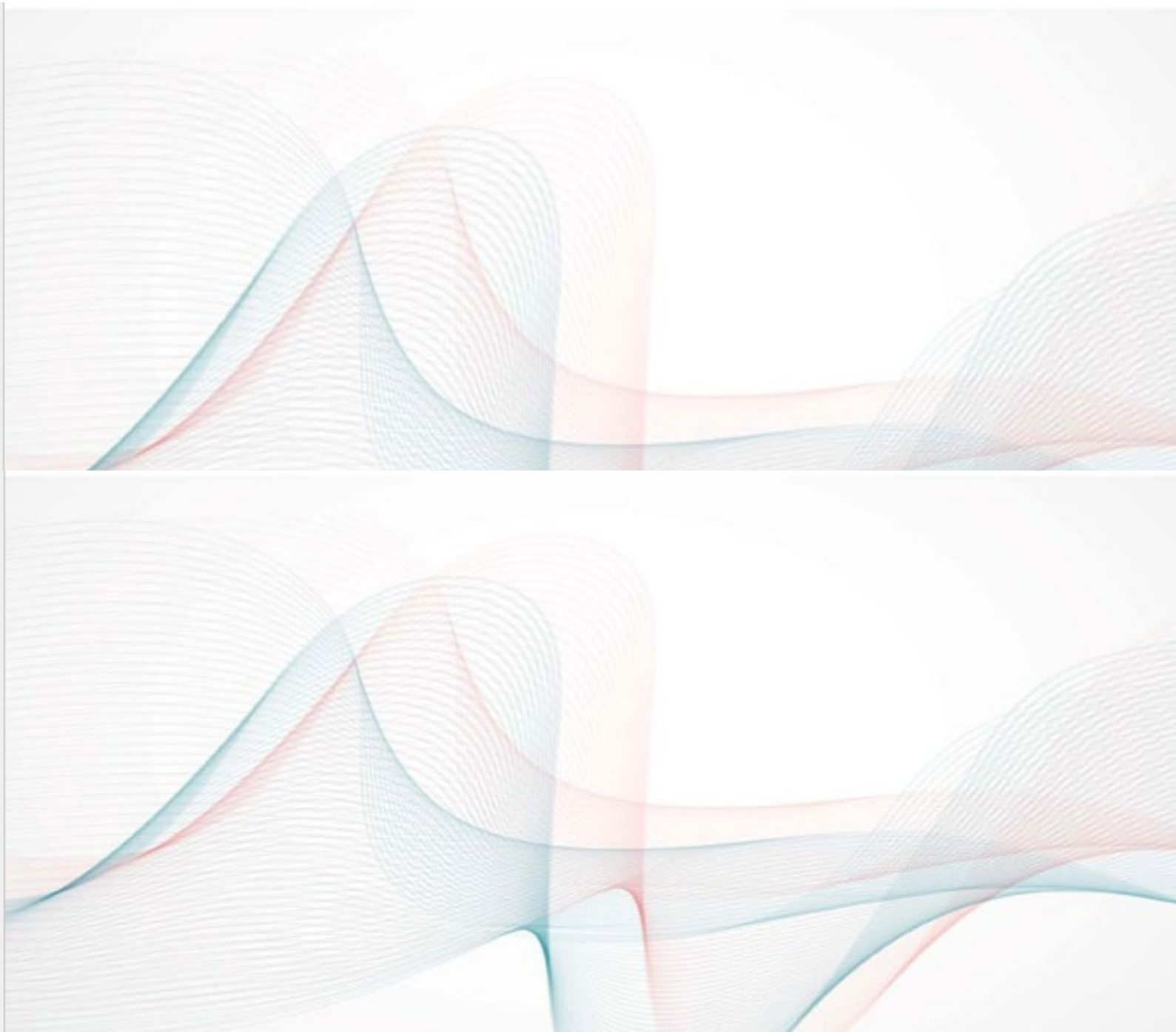

CHAPTER 1

1 INTRODUCTION

1.1 BACKGROUND

Bangladesh, with a population of more than 180 million has made significant progress towards providing water supply and sanitation in the last two decades. As of 2022, 59% of the population is using safely managed water services, a 4-percentage point increase since 2016. As for sanitation, the figure is much lower, with 39% of the population using safely managed sanitation services. Inequalities between the poorest and the richest are particularly high when looking only at basic sanitation, but also when looking at the estimated ratio for overall WASH services, which is 4:9 as of 2019. (JMP 2020). Access to WASH in schools and health-care institutions also require careful attention, and so does handwashing and menstrual health. 30% girl's student remain absent from school for 3 days in each month due to lack proper MHM facilities in school (BBS: national hygiene survey 2019).

Figure 1.1 Sustainable Development Goals launch in 2016

Bangladesh has made remarkable progress in advancing access to water and sanitation services by increasing access to drinking water to 98% and reducing open defecation practices to almost zero by 2019 which has made its way of achieving Sustainable Development Goals (SDGs). World Health Organization (WHO) and UNICEF has declared Bangladesh as an open defecation free country (Joint Monitoring Program Progress Report, 2021).

The population in urban areas is increasing due to natural growth rate of population and high rate of migration to cities and towns. Over the past century, rural-to-urban migration has increased due to

better economic opportunities provided in cities, access to better service provision and changing environmental and climatic conditions. According to the Joint Monitoring Program (JMP), 58% of urban residents benefited from improved sanitation facilities in 2015. Open defecation has reportedly been eradicated in urban areas. Most urban residents rely on onsite sanitation facilities. In Bangladesh, Dhaka is the only city with a sewer system, to which only 20% of its population is connected. However, 12% use unimproved facilities and 30% rely on facilities which are shared by different households, or on public (fee-paying) facilities. Except for only 20% area of Dhaka city, all urban areas of Bangladesh are served with onsite sanitation system. This onsite sanitation system has no consideration for faecal sludge management. Unsafe disposal of faecal sludge in open ground or on open drains or water bodies like lakes and canals is very common practice in most of the urban areas. This causes environmental degradation posing a threat to public health (Rahman et al., 2016). As a result, the urban municipal facilities are failing to provide adequate sanitation services for the community people thus creating a threat in attaining SDG 6 targets by 2030. To address the sanitation challenges and fulfil the Sustainable Development Goal (SDG) 6.2, the Government of Bangladesh has implemented various policies and strategies. Key among these are the National Strategy for Water Supply and Sanitation 2014 and the Institutional and Regulatory Framework for Faecal Sludge Management (FSM) for Paurashavas, along with the National Action Plan for the Implementation of IRF for FSM 2019.

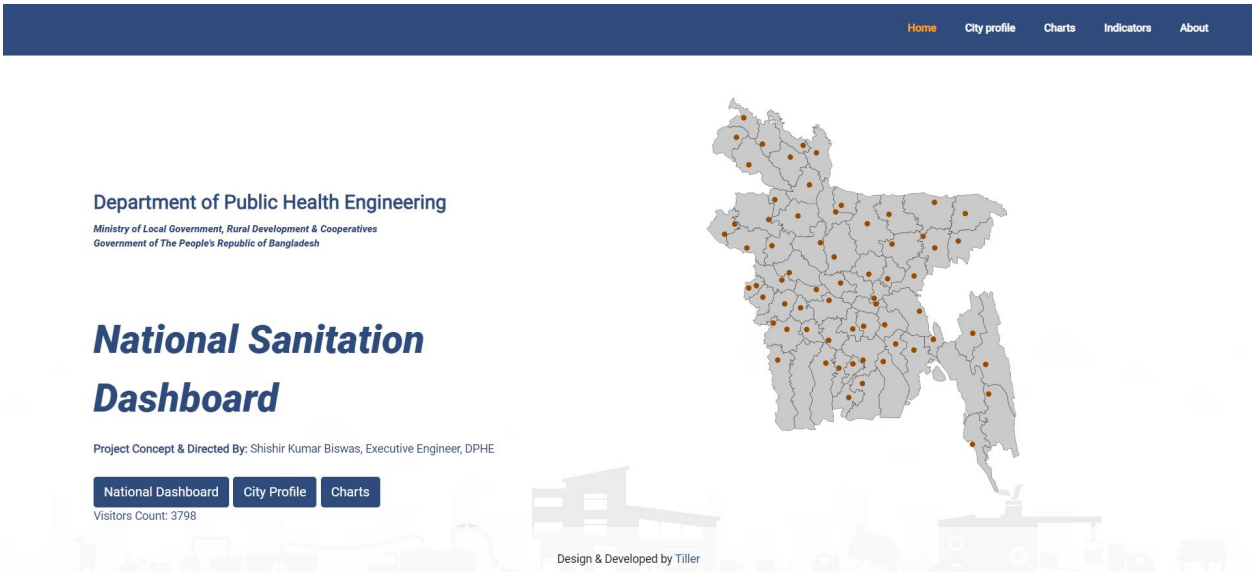

Figure 1.2: National sanitation dashboard developed by CFSC of DPHE

The CWIS-FSM Support Cell, established by the Local Government Division and hosted within the Department of Public Health Engineering (DPHE), plays a pivotal role in coordinating efforts related to faecal sludge management and waste management (FSWM). The cell oversees the planning, development, and execution of social mobilization, community engagement, and innovative initiatives to address sanitation challenges, both in urban and rural contexts. As part of these efforts, the DPHE has launched the Feasibility for Implementing Solid Waste and Faecal Sludge Management System project in 54 District Level Municipalities and 8 City Corporations, with funding from the Bill & Melinda Gates Foundation. This project aims to enhance the sanitation dashboard, hosted at www.sanboard.gov.bd, by incorporating data from all 329 Municipalities profiles for FSWM. However,

despite these initiatives, data and information remain scattered and unorganized, hindering effective decision-making and planning in the sanitation sector.

MAB's study on current urban sanitation data management practices for SDG 6.2 in Bangladesh highlights several key issues: reliance on manual processes that impair data accuracy, timeliness, and accessibility; poor integration between municipal data and the national dashboard, hindering effective monitoring; and a need for capacity-building among municipal personnel. The report recommends establishing standardized data collection systems, leveraging digital platforms, and enhancing collaboration between municipalities and the national dashboard. Implementing these strategies will improve data management, facilitate evidence-based decision-making, and help achieve SDG 6.2 targets, ensuring adequate and equitable sanitation for all in Bangladesh. The report provides valuable insights for policymakers, municipal authorities, development partners, and other stakeholders in sanitation and waste management, guiding efforts to strengthen data systems and promote sustainable sanitation practices.

Given the importance of reliable data for policy formulation and implementation, there is an urgent need to improve the data management system, particularly concerning SDG 6.2. A thorough analysis of the existing data management practices is essential to enhance the relevance and significance of data for informing policy interventions and addressing sanitation challenges effectively. In light of these considerations, the Municipal Association of Bangladesh (MAB) has embarked on a study to evaluate the cost of the City FSM Assessment. This study aims to provide insights into the financial implications of assessing faecal sludge management at the city level, thereby supporting the implementation of the National Action Plan for FSM and the Institutional and Regulatory Framework. By understanding the costs involved and exploring potential funding sources, this study seeks to promote the sustainability of City FSM assessments and contribute to the advancement of sanitation initiatives across Bangladesh.

1.2 Objectives

The study aims to provide insights into the cost implications of FSM assessments, justify assessment costs, identify funding sources, promote sustainability, and scope future assessments to support effective FSM interventions and policy implementation in Bangladesh's urban areas. The specific objectives are:

- Conduct a comprehensive analysis to identify and assess the various cost components involved in conducting FSM assessments at the city level. This includes costs associated with orientation, data collection, data compilation, reporting, quality control, overall supervision, and any other relevant activities.
- Evaluate and justify the costs associated with FSM assessments, taking into account the scope of work, methodological approach, and expected outcomes. This involves assessing the cost-effectiveness and operational robustness of the assessment process to ensure that resources are allocated efficiently and transparently.
- Explore and identify potential funding sources for FSM assessments at the municipal level, including opportunities for leveraging existing resources, engaging with development partners, mobilizing municipal budgets, and promoting cost-sharing mechanisms among stakeholders.
- Assess the sustainability of FSM assessments and propose strategies for ensuring their long-term viability and continuity. This includes identifying potential contribution areas by

municipalities, exploring opportunities for revenue generation, and developing mechanisms for integrating assessment costs into municipal budgets and planning processes.

- Evaluate the feasibility and scope of conducting horizontal assessments over time to track progress and measure the effectiveness of FSM interventions at the city level. This involves developing frameworks and methodologies for ongoing monitoring and evaluation to inform adaptive management and policy decision-making.

CHAPTER 2

APPROACH AND METHODOLOGY

2 APPROACH AND METHODOLOGY

2.1 Study Approach

The study will adopt a multi-faceted approach aimed at providing a comprehensive evaluation of the cost associated with City FSM Assessment in Bangladesh. A thorough review of existing literature, policies, reports, and relevant documentation will be conducted to gain insights into the current state of FSM assessments in Bangladesh. This desk research will help establish a foundational understanding of the context, challenges, and opportunities related to FSM assessments at the city level. Engaging with a diverse range of stakeholders, including government agencies, development partners, non-governmental organizations, and local communities, will be essential for gathering insights, perspectives, and feedback on FSM assessment practices and costs. Stakeholder consultations will involve interviews, focus group discussions, and workshops to ensure inclusivity and representation of various stakeholders.

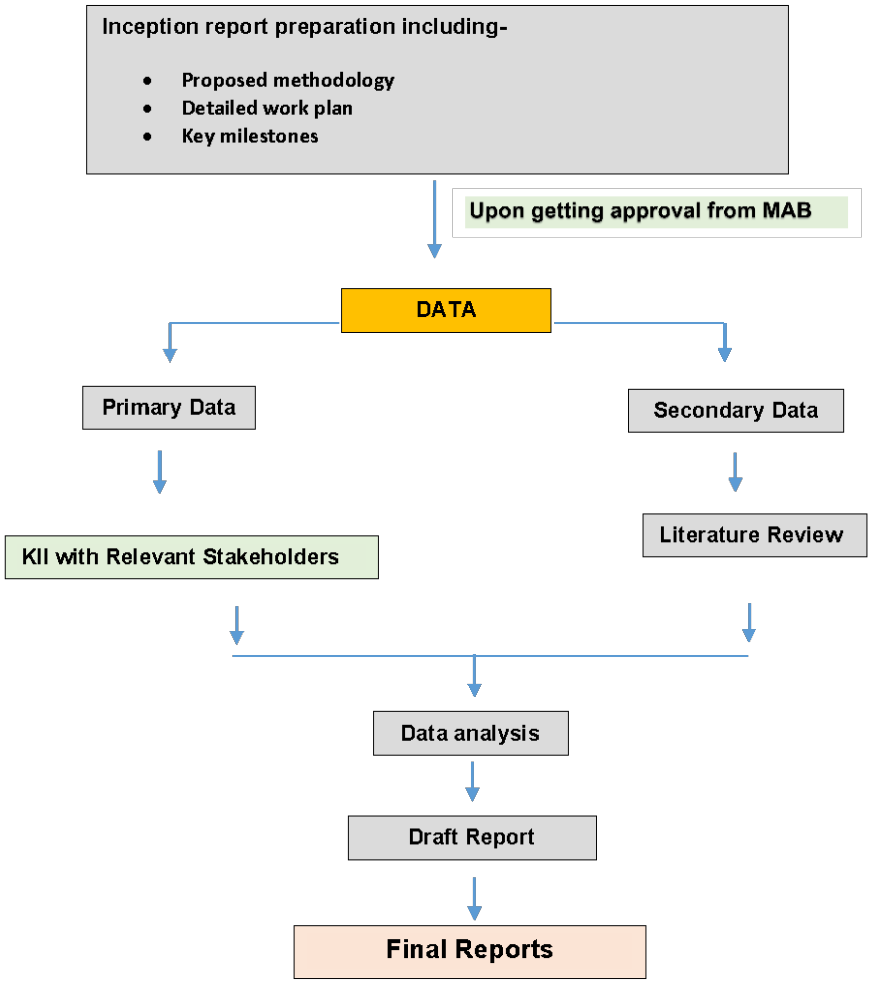

Figure 2.1: Methodological framework for this project.

Additionally, primary data collection will be carried out to gather detailed information on the cost components involved in FSM assessments. This will include conducting surveys, interviews, and site visits to municipalities across Bangladesh to collect data on expenses related to orientation, data collection, reporting, supervision, and other relevant activities. The collected data will be analyzed to identify and assess the various cost components associated with FSM assessments.

2.2 Sample Size

Aligned with the focus on the sanitation system of Bangladesh, meetings will be conducted with senior personnel from the Department of Public Health and Engineering (DPHE), relevant experts from international development agencies, and non-governmental stakeholders. A total of 10 interviews, including a combination of Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), will be executed to gather insights, perspectives, and expertise on faecal sludge management (FSM) assessments in Bangladesh. Information will also be collected through a household survey conducted by trained enumerators to complement the stakeholder insights, providing additional data points and perspectives on FSM assessment practices and challenges at the grassroots level.

2.3 Data Analysis

Emphasis will be placed on achieving and maintaining the highest level of quality throughout the evaluation research process. All collected, accepted, and analyzed data (both primary and secondary) will undergo specific quality control assessments to ensure accuracy and reliability. Critical assessment of the data will be conducted during and after collection to uphold data integrity. To analyze the sanitation status in Bangladesh for this study, a combination of quantitative and qualitative data analysis methods will be utilized. The following steps will be taken:

- Data Collection: Data on the sanitation status in Bangladesh will be gathered from various sources, including government reports, surveys, and academic studies. Both quantitative and qualitative data will be included to provide a comprehensive understanding of the situation.
- Data Cleaning and Organization: Upon collection, the data will undergo cleaning and organization to address missing or incorrect data, standardize variables, and create a coherent dataset suitable for analysis.
- Descriptive Analysis: Descriptive analysis will be conducted to summarize the data, identify patterns, and discern trends. Basic statistical measures such as means, medians, and percentages will be calculated, and graphs and charts will be utilized to visualize the data.
- Inferential Analysis: Inferential analysis will be employed to draw conclusions about the population based on the data sample. Statistical tests such as t-tests, ANOVA, or regression analysis will be utilized to test hypotheses and make predictions about the population.
- Thematic Analysis: Qualitative data will undergo thematic analysis to identify common themes and patterns. This process involves reviewing the data, identifying key themes, categorizing data into themes, and summarizing key findings.
- Synthesis of Findings: The findings from both quantitative and qualitative data analyses will be synthesized to develop a comprehensive understanding of the sanitation status in Bangladesh. Strengths, weaknesses, opportunities, and threats in the sanitation sector will be identified, and recommendations for future interventions will be made.

Overall, the data analysis process for assessing sanitation status in Bangladesh will involve collecting, cleaning, and analyzing both quantitative and qualitative data. The synthesis of findings will provide insights into the current situation and offer recommendations for improvement in the sanitation sector.

3 COST COMPONENTS OF FSM ASSESSMENTS

3.1 Costs for Orientation, Data Collection, Data Compilation

The successful implementation of faecal sludge management (FSM) assessments at the municipal level involves several key cost components. These include orientation, data collection, and data compilation. Each component plays a crucial role in ensuring that the assessments are thorough, accurate, and effective.

The following table summarizes the costs related to orientation, data collection, and data compilation for each FSM assessment:

Table 1: Cost of FSM Components

Cost Component	Cost (BDT)
A. Orientation Costs	**125,000**
- Training and Capacity Building Sessions	50,000
- Materials and Resources	50,000
- Organizing Orientation Workshops	150,000
B. Data Collection Costs	**100,000**
- Personnel Costs for Enumerators and Supervisors	40,000
- Transportation and Logistical Support	40,000
- Data Collection Tools and Equipment	20,000
C. Data Compilation and Reporting Costs	**25,000**
- Personnel Costs for Data Entry Operators and Analysts	10,000
- Costs Associated with Data Verification and Quality Checks	10,000
- Costs for Drafting, Reviewing, and Printing Reports	5,000
Total FSM Assessment Cost (A+B+C)	**250,000**

The comprehensive investment in these components ensures that FSM assessments are conducted effectively, leading to accurate and actionable insights for improving faecal sludge management at the municipal level.

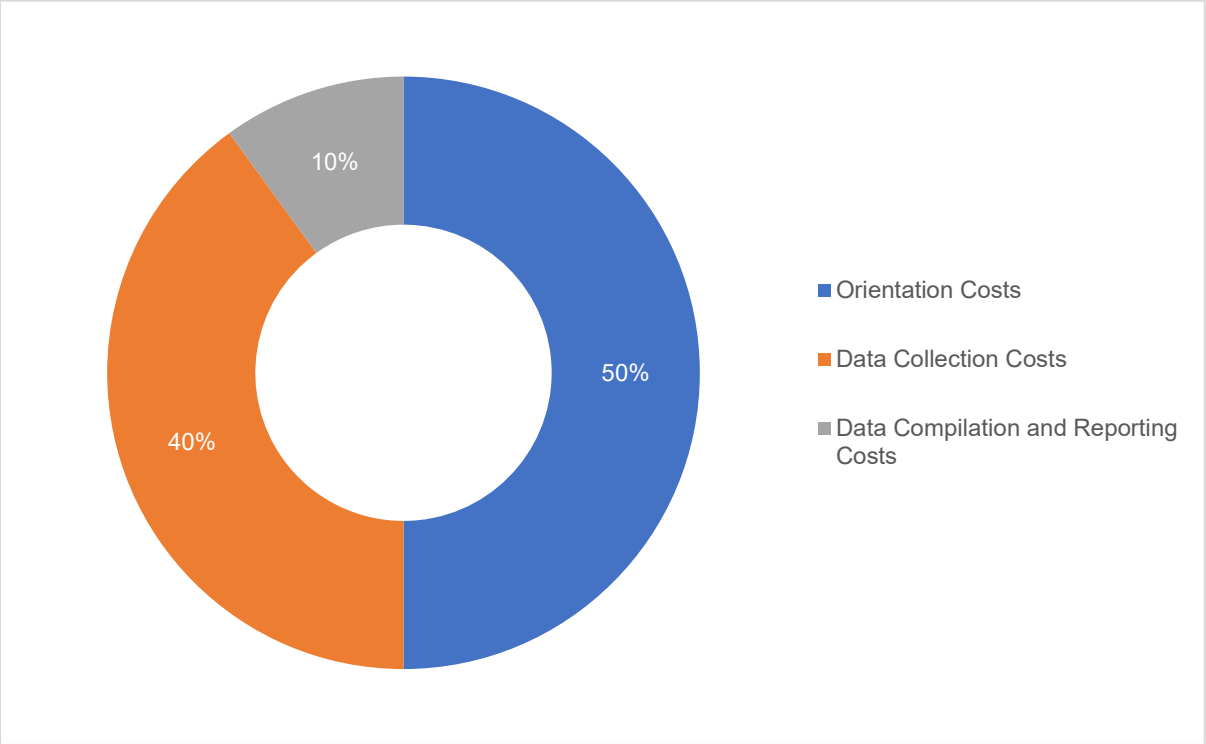

Figure 2: Associated cost distribution of FSM components

3.1.1 Costs Related to Orientation

Orientation is a critical phase in the faecal sludge management (FSM) assessment process, ensuring that all involved personnel are adequately prepared to conduct the assessment effectively. This phase encompasses several activities designed to build capacity, provide essential materials, and facilitate comprehensive training sessions.

Training and capacity building sessions are the cornerstone of the orientation process, with a cost of 50,000 BDT per assessment. These sessions aim to equip municipal staff and FSM service providers with the necessary knowledge and skills to perform their roles efficiently. Experienced trainers, specializing in FSM practices and assessment methodologies, are hired to conduct these sessions. The cost breakdown includes 20,000 BDT for trainer fees, ensuring that participants receive high-quality instruction. Additionally, 10,000 BDT is allocated for participant stipends, which cover their time and effort, promoting full engagement and attendance. The remaining 10,000 BDT is used for developing and printing training materials such as manuals and guides, as well as for venue and logistics, ensuring a conducive learning environment.

The provision of materials and resources is another significant component of the orientation phase, costing 50,000 BDT. This includes detailed manuals and guides (20,000 BDT), which cover all aspects of FSM assessments, from data collection techniques to safety protocols and reporting standards. Digital resources are also developed, providing accessible, online versions of training materials that participants can refer to during fieldwork. Additionally, essential stationery items such as notebooks, pens, and folders are provided (10,000 BDT), along with visual aids like posters and charts (5,000 BDT) to enhance the learning experience and facilitate better understanding.

Organizing orientation workshops amount to 40,000 BDT per assessment. These workshops are designed to bring together all participants in a collaborative environment. There will be no cost for venue renting as it will be arranged within the city. Logistics and transportation (10,000 BDT) are arranged to facilitate participants' travel to and from the venue, as well as to support any necessary logistical needs during the workshop. Facilitator fees (10,000 BDT) are also included, compensating experts who lead the workshops and provide in-depth knowledge on FSM and data collection methodologies. Catering and refreshments (20,000 BDT) are provided to keep participants energized and focused throughout the sessions.

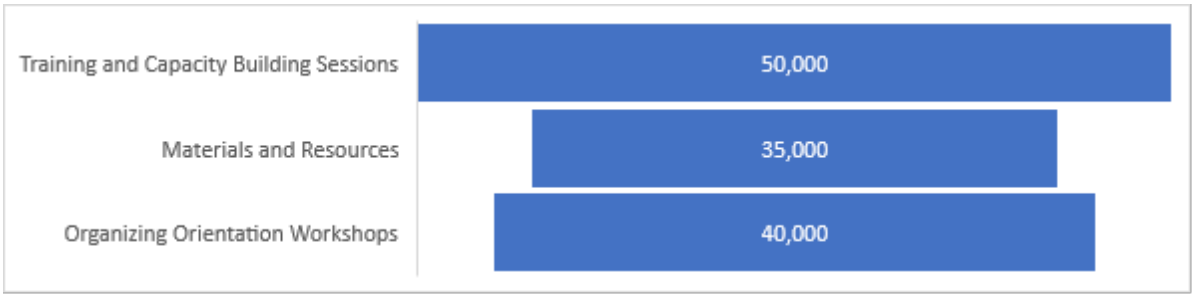

Figure 3: Summary of Orientation Costs

The total cost for orientation in each FSM assessment is 250,000 BDT. This investment ensures that municipal staff and FSM service providers are thoroughly prepared through comprehensive training sessions, access to high-quality materials and resources, and well-organized workshops. By providing detailed orientation, the assessment process is more likely to be efficient, accurate, and effective, laying a solid foundation for subsequent data collection and compilation activities.

Table 2: Detailed Breakdown of Orientation Costs

Orientation Cost Component	Cost (BDT)
A. Training and Capacity Building Sessions	**50,000**
- Trainer Fees	20,000
- Participant Stipends	10,000
- Training Materials	10,000
- Venue and Logistics	10,000
B. Materials and Resources	**35,000**
- Manuals and Guides	20,000
- Digital Resources	0
- Stationery and Supplies	10,000
- Visual Aids	5,000
C. Organizing Orientation Workshops	**40,000**
- Logistics and Transportation	10,000
- Facilitator Fees	10,000
- Catering and Refreshments	20,000
Total Orientation Costs per Assessment (A+B+C)	**125,000**

3.1.2 Costs Related to Data Collection

Data collection is a critical phase in the faecal sludge management (FSM) assessment process, requiring meticulous planning and execution to gather accurate and comprehensive data. This phase involves several key activities, each with associated costs, designed to ensure that data is collected efficiently and reliably from various sources within the municipality.

The personnel costs for enumerators and supervisors are a significant component of the data collection phase, amounting to 50,000 BDT per assessment. These funds cover the wages or stipends for individuals who are tasked with conducting surveys and gathering data in the field. Enumerators play a crucial role in interacting with households and other stakeholders to collect necessary information, while supervisors ensure that the data collection process is carried out according to the established protocols. This cost includes hiring qualified personnel, providing them with necessary training, and compensating them for their time and effort.

Transportation and logistical support are essential to facilitate the movement of data collection teams within the municipality, costing 50,000 BDT per assessment. This allocation ensures that teams can reach various locations to collect data efficiently. The costs cover vehicle rentals, fuel, and travel allowances for the data collection team. Additionally, logistical support includes arranging accommodations if necessary, and providing logistical coordination to ensure smooth operations in the field.

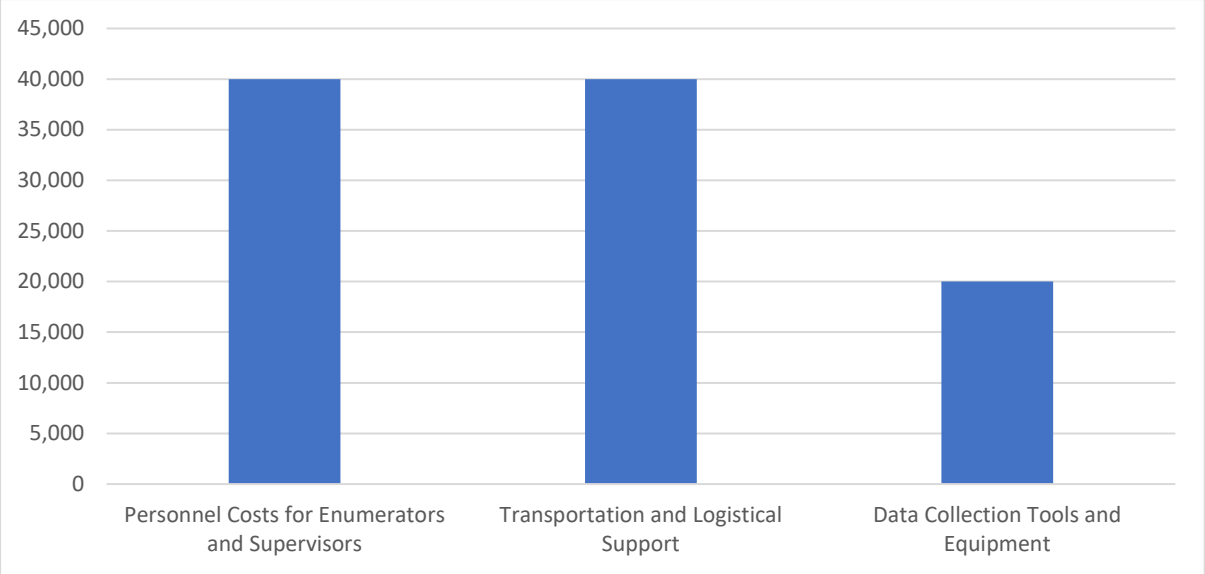

Figure 4: Summary of Data Collection Costs

The tools and equipment necessary for data collection are another critical expense, amounting to 50,000 BDT per assessment. This budget provides for the purchase or rental of digital tools such as tablets and GPS devices, which are essential for recording and geotagging data accurately. The use of digital tools helps streamline the data collection process, reduces errors, and facilitates real-time data entry and analysis. This category also includes costs for maintaining and supporting these tools, ensuring they are functional throughout the assessment period.

Table 3: Detailed Breakdown of Data Collection Costs

Data Collection Cost Component	Cost (BDT)

A. Personnel Costs for Enumerators and Supervisors	**40,000**
- Wages/Stipends	Included
- Training for Enumerators and Supervisors	Included
B. Transportation and Logistical Support	**40,000**
- Vehicle Rentals and Fuel	Included
- Travel Allowances	Included
- Accommodations (if necessary)	Included
C. Data Collection Tools and Equipment	**20,000**
- Tablets and GPS Devices	Included
- Maintenance and Technical Support	Included
Total Data Collection Costs per Assessment (A+B+C)	**100,000**

The total cost for data collection in each FSM assessment is 150,000 BDT. This investment ensures that data collection teams are well-compensated, adequately supported logistically, and equipped with the necessary tools and equipment to perform their tasks efficiently. By investing in personnel, transportation, and digital tools, the FSM assessments can gather accurate and reliable data, which is crucial for informed decision-making and effective management of faecal sludge at the municipal level.

3.1.3 Costs Related to Data Compilation and Reporting

The data compilation and reporting phase is a crucial step in the faecal sludge management (FSM) assessment process. It involves organizing the collected data, ensuring its accuracy, and preparing comprehensive reports that summarize the findings. This phase requires the use of various tools and personnel to manage data efficiently and produce high-quality reports. The costs associated with data compilation and reporting are as follows:

Personnel costs for data entry operators and analysts are a significant component of this phase, amounting to 10,000 BDT per assessment. Data entry operators are responsible for inputting the collected data into digital systems accurately, while data analysts process and interpret the data to generate meaningful insights. These personnel are essential for ensuring that the data is correctly entered and analysed, which is critical for the accuracy and reliability of the final reports. The costs include wages, benefits, and any necessary training for these staff members.

Ensuring the accuracy and reliability of the data involves data verification and quality checks, which cost 10,000 BDT per assessment. These processes include double-checking data entries, conducting spot checks, and implementing other quality assurance measures to identify and correct any errors or inconsistencies. Quality control is vital for maintaining the integrity of the data and ensuring that the findings of the assessment are credible and actionable. The city authority will contribute in this task.

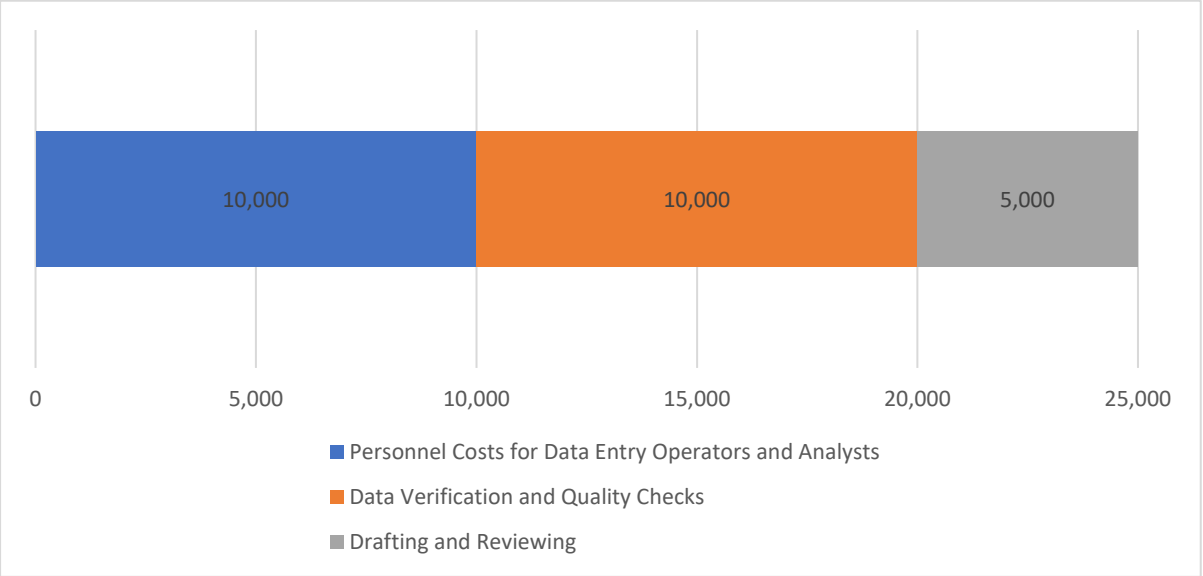

Figure 5: Summary of Data Compilation and Reporting Costs

The final step in this phase is the preparation of comprehensive reports, which summarize the findings of the FSM assessment. The costs for drafting, reviewing, and printing these reports amount to 5,000 BDT per assessment. This includes the work of report writers who compile the data and findings into a coherent document, editors who review and refine the content, and the costs associated with printing and distributing the final reports to relevant stakeholders. High-quality reports are essential for communicating the results of the assessment and providing recommendations for future actions.

Table 4: Detailed Breakdown of Data Compilation and Reporting Costs

Data Compilation and Reporting Cost Component	Cost (BDT)
A. Personnel Costs for Data Entry Operators and Analysts	10,000
- Wages/Benefits	Included
- Training for Data Entry and Analysis	Included
B. Data Verification and Quality Checks	10,000
- Double-checking Data Entries	Included
- Spot Checks	Included
- Quality Assurance Measures	Included
C. Drafting and Reviewing	5,000
- Editing and reviewing	Included
- Printing and Distribution	Included
Total Data Compilation and Reporting Costs per Assessment (A+B+C)	**25,000**

The total cost for data compilation and reporting in each FSM assessment is 110,000 BDT. This investment ensures that the collected data is accurately entered, verified, and analyzed, and that the findings are effectively communicated through high-quality reports. By allocating resources to software, skilled personnel, and thorough quality checks, the FSM assessments produce reliable and actionable insights that inform better decision-making and management practices at the municipal level.

3.2 Costs for Reporting, Quality Control, Overall Supervision

Ensuring the accuracy and reliability of faecal sludge management (FSM) assessments involves a comprehensive approach to reporting, quality control, and overall supervision. Each of these activities requires detailed planning and resources to maintain high standards throughout the assessment process. Here, we break down the costs associated with these critical components, with the city engineer responsible for these tasks at a salary of 50,000 BDT per month.

Table 5: Detailed Breakdown of Reporting, Quality Control, and Supervision Costs

Cost Component	Cost (BDT)
A. Reporting Costs	**5,000**
- Drafting Reports	Included
- Reviewing and Editing	Included
- Printing and Distribution	Included
B. Quality Control Costs	**5,000**
- Implementing Quality Control Measures	Included
- Tools and Software for Quality Assurance	Included
C. Overall Supervision Costs	**30,000**
- Personnel Costs for City Engineer	10,000
- Administrative and Overhead Costs	10,000
- Communication and Coordination Costs	10,000
Total Reporting, Quality Control, and Supervision Costs per Assessment (A+B+C)	**40,000**

The total cost for reporting, quality control, and overall supervision in each FSM assessment is 40,000 BDT per month which will be supervised by the city engineer. This investment ensures that the assessment process is thoroughly managed and monitored, producing high-quality, reliable data and reports.

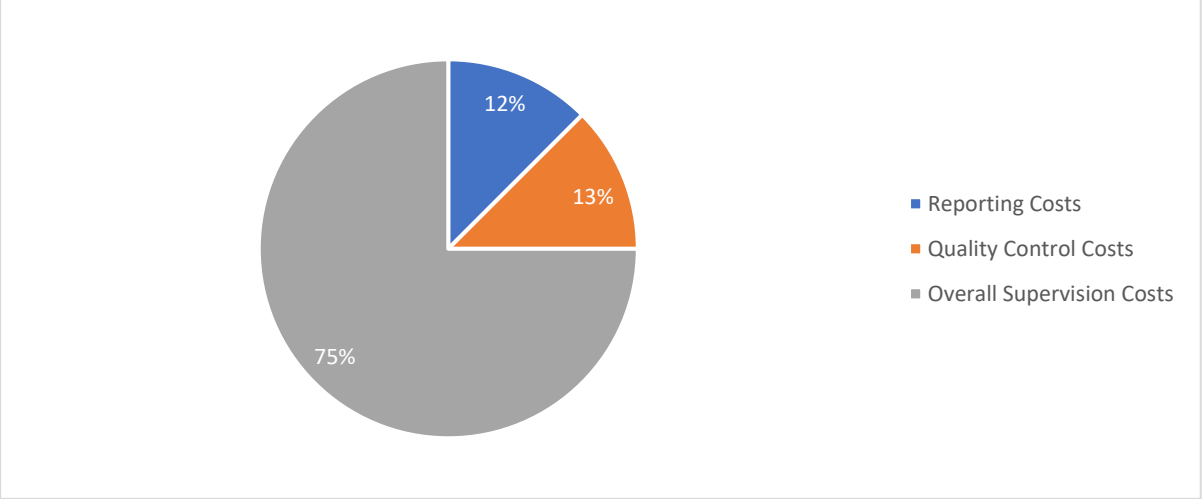

Figure 6: Cost Distribution among Reporting, Quality Control, and Supervision

By allocating resources to these critical components, FSM assessments can achieve greater accuracy, reliability, and effectiveness, ultimately supporting better decision-making and management practices at the municipal level.

3.2.1 Reporting Costs

The preparation of comprehensive reports is essential for summarizing the findings of the FSM assessments and providing actionable insights. The total cost for reporting per assessment is 5,000 BDT, which includes:

- **Drafting Reports:** The process of compiling data and writing detailed reports involves skilled report writers who can present the findings in a clear and coherent manner.
- **Reviewing and Editing:** Reports undergo multiple rounds of review and editing to ensure accuracy and clarity.
- **Printing and Distribution:** Once finalized, the reports are printed and distributed to relevant stakeholders, ensuring that the findings and recommendations are effectively communicated.

3.2.2 Quality Control Costs

Quality control is a vital aspect of FSM assessments, ensuring that the data collected and reported is accurate and reliable. The total cost for quality control measures per assessment is 5,000 BDT, which includes:

- **Implementing Quality Control Measures:** Quality control processes are integrated during data collection and compilation to identify and rectify any errors. This includes measures such as double-checking data entries, conducting spot checks, and using quality assurance protocols.
- **Tools and Software for Quality Assurance:** Utilizing specialized tools and software for quality assurance which will help in maintaining data integrity and facilitating the verification of collected data.

3.2.3 Overall Supervision Costs

Supervision ensures that all aspects of the FSM assessment process are coordinated and managed effectively. The total cost for overall supervision per assessment is 30,000 BDT, which includes:

- **Personnel Costs for City Engineer:** Project managers and supervisors play a critical role in overseeing the assessment process, ensuring that all activities are conducted according to plan. This involves 10,000 BDT per month for their compensation.
- **Administrative and Overhead Costs:** Administrative support and overhead costs associated with supervision activities amount to 10,000 BDT per month. These costs cover office supplies, utilities, and other administrative expenses necessary for smooth operations.
- **Communication and Coordination Costs:** Effective communication and coordination among different stakeholders are crucial for successful FSM assessments. Allocating 10,000 BDT per month for communication and coordination helps in organizing meetings, coordinating with field teams, and maintaining effective stakeholder engagement.

3.3 Scope of Horizontal Assessments Over Time

The sustainability and scalability costs at city level are critical investments that ensure the long-term effectiveness of FSM practices. By committing to the regular maintenance of FSTPs, vacutags, and digital monitoring tools, municipalities can maintain high standards of service, protect public health, and scale up FSM initiatives to meet growing demands. The total costs associated with these activities

highlight the importance of sustained financial support and proactive management in achieving successful and sustainable FSM outcomes.

Table 6: Detailed Breakdown of Horizontal Assessment Costs

Cost Component	Cost (BDT)
Periodic Evaluation Costs	**150,000/quarter**
- Conducting Periodic Assessments	140,000/quarter
- Tools and Methodologies for Longitudinal Studies	5,000/quarter
- Updating and Maintaining Data Over Time	5,000/quarter
Sustainability and Scalability Costs	**4,350,000/year**
- FSTP Maintenance (for 40,000 population)	4,000,000/year
- Vacutag Maintenance (per vacutag)	150,000/year
- Digital Dashboard Maintenance	200,000/year

The scope of horizontal assessments over time is essential for tracking the progress and effectiveness of faecal sludge management (FSM) initiatives. These assessments provide periodic evaluations of FSM practices, ensuring continuous improvement and sustainability.

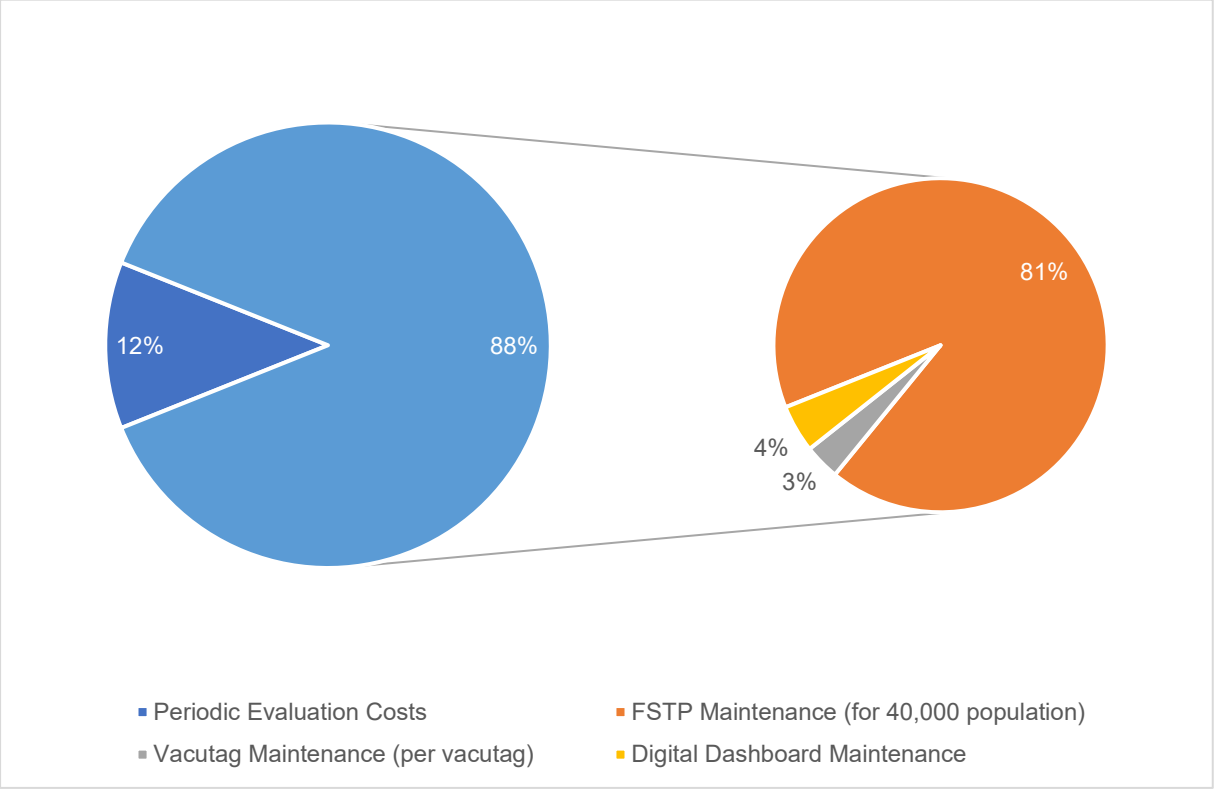

Figure 7: Cost Distribution of Horizontal Assessment

The costs associated with conducting these periodic assessments, maintaining FSM infrastructure, and ensuring scalability are detailed below.

3.3.1 Periodic Evaluation Costs

Periodic evaluations are crucial for assessing the ongoing effectiveness of FSM initiatives. These evaluations help identify areas for improvement, measure progress, and ensure that FSM practices remain efficient and effective over time. The total cost for periodic evaluations is 150,000 BDT per quarter. This includes several key components.

Conducting periodic assessments involves revisiting the sampled sites, conducting interviews, and gathering updated data on FSM practices. This ensures that the information remains current and reflects any changes or improvements made since the last assessment. The cost for this activity is 140,000 BDT per quarter, covering personnel expenses for enumerators and supervisors, transportation, and logistical support. Enumerators and supervisors play a vital role in collecting and verifying data, while logistical support ensures that they can reach all necessary locations efficiently.

Longitudinal studies, which track changes over time, require specialized tools and methodologies to ensure accuracy. The cost of developing and applying these tools is 5,000 BDT per quarter. These tasks will be accomplished through the engagement of city officials and local volunteers or local level experts for sustainability of the process. This cost includes training personnel on their use and procuring necessary software for data analysis. By leveraging local resources and expertise, this approach not only ensures cost-effectiveness but also promotes community involvement and ownership. These tools and methodologies are crucial for understanding trends and long-term impacts of FSM practices, providing a comprehensive view of their effectiveness.

Maintaining a comprehensive and up-to-date database is essential for effective monitoring and evaluation. Updating and maintaining data over time involves costs of 5,000 BDT per quarter. This ensures that the data remains accurate and accessible, facilitating informed decision-making. The costs cover data entry, database management, and ensuring data security. Regular updates allow for timely adjustments to FSM practices based on the latest information.

By committing to these periodic evaluations and maintaining detailed records, municipalities can ensure that FSM practices are continually improved and adapted to changing conditions. This proactive approach helps in identifying successful strategies and addressing any issues promptly, contributing to the long-term sustainability and scalability of FSM initiatives.

Table 7: Detailed Breakdown of Horizontal Assessment Costs

Cost Component	**Cost (BDT)**
Periodic Evaluation Costs	**150,000/quarter**
- Conducting Periodic Assessments	140,000/quarter
- Tools and Methodologies for Longitudinal Studies	5,000/quarter
- Updating and Maintaining Data Over Time	5,000/quarter

The periodic evaluation costs, totaling 300,000 BDT per quarter, ensure that FSM initiatives are continually assessed and improved. These evaluations are vital for maintaining the effectiveness and

efficiency of FSM practices over time. By investing in regular assessments, municipalities can ensure that their FSM strategies remain responsive to new challenges and opportunities, ultimately leading to better sanitation outcomes and enhanced public health.

3.3.2 Sustainability and Scalability Costs

Ensuring the sustainability and scalability of faecal sludge management (FSM) practices is crucial for long-term success. At the national level, the Department of Public Health Engineering (DPHE) will lead this effort. The maintenance of FSM infrastructure, such as faecal sludge treatment plants (FSTPs) and vacutags, as well as digital tools for monitoring, requires consistent investment. The costs associated with these activities ensure that FSM services remain reliable and can be scaled up as needed.

Maintenance of Faecal Sludge Treatment Plants (FSTPs) is a significant expense, with an annual cost of 4,000,000 BDT for a population of 40,000. This cost covers various aspects of plant operation, including personnel salaries, utility costs, equipment maintenance, and periodic upgrades. Regular maintenance ensures that the FSTPs function efficiently, providing safe and effective treatment of faecal sludge. The effective operation of FSTPs is crucial for minimizing environmental pollution and protecting public health.

The maintenance of vacutags, or vacuum tankers used for the collection and transportation of faecal sludge, is another critical component. Each vacutag requires 150,000 BDT annually for maintenance. This cost includes regular servicing, repairs, and ensuring that the vacutags meet health and safety standards. Well-maintained vacutags are essential for efficient and hygienic faecal sludge management, enabling timely and safe collection and transport of sludge to treatment facilities.

A digital dashboard for monitoring FSM activities also requires ongoing maintenance, costing 200,000 BDT per year. CFSC-DPHE has already a digital dashboard (sanboard.gov.bd). This dashboard plays a vital role in tracking FSM operations, providing real-time data and insights that aid in decision-making and transparency. The maintenance costs cover software updates, technical support, and ensuring data accuracy and accessibility. By maintaining a functional digital dashboard, municipalities can enhance their ability to manage FSM services effectively, responding quickly to any issues and making informed decisions based on up-to-date information.

4 JUSTIFICATION OF THE ASSESSMENT COST

4.1 Analysis and Justification of Cost Components

The comprehensive assessment of faecal sludge management (FSM) practices at the municipal level involves various cost components, each contributing to the overall effectiveness and sustainability of the FSM system. The cost components for orientation, data collection, data compilation, reporting, quality control, and overall supervision are justified through a detailed analysis of their necessity and impact on the FSM assessment process. Insights gathered from key informant interviews (KIIs) and focus group discussions (FGDs) highlight the critical role these components play in achieving reliable and actionable assessment outcomes.

By adopting standardized protocols, embracing automation and digitalization, enhancing capacity, promoting collaboration, ensuring data dissemination and accessibility, and establishing effective monitoring and evaluation mechanisms, municipalities can strengthen their data management practices, facilitate evidence-based decision-making, and drive sustainable progress in the sanitation sector. MAB's study on current urban sanitation data management practices for SDG 6.2 in Bangladesh recommended the use of Shit Flow Diagram (SFD) in horizontal scale to monitor the sanitation situation through the municipalities instead of traditional JMP Data flow or management.

4.1.1 Orientation

Orientation costs, amounting to 125,000 BDT per assessment, are essential for equipping municipal staff and FSM service providers with the necessary skills and knowledge to conduct effective assessments. Training sessions ensure that personnel are familiar with assessment methodologies, data collection techniques, and quality assurance measures. The provision of detailed manuals, guides, and digital resources further supports this training, enabling participants to reference these materials during fieldwork. Organized workshops facilitate a collaborative learning environment, fostering engagement and preparedness among participants. The justification for these costs lies in the necessity of thorough preparation to achieve accurate and efficient data collection, which is foundational for the entire assessment process.

4.1.2 Data Collection

The data collection phase, costing 100,000 BDT per assessment, is critical for gathering comprehensive and accurate information from various sources within the municipality. Personnel costs for enumerators and supervisors ensure that data is collected by trained individuals who can interact effectively with households and stakeholders. Transportation and logistical support are vital for reaching different locations, ensuring that data collection is not hindered by accessibility issues. The use of digital tools such as tablets and GPS devices enhances the efficiency and accuracy of data recording and geotagging. The justification for these costs is supported by the need for precise and reliable data, which forms the basis for subsequent analysis and decision-making.

4.1.3 Data Compilation and Reporting Costs

Data compilation and reporting, with a total cost of 25,000 BDT per assessment, involve organizing collected data, ensuring its accuracy, and preparing comprehensive reports. Specialized software tools facilitate efficient data entry and management, while trained personnel ensure that data is accurately inputted and analyzed. Quality checks and data verification processes are crucial for maintaining the

integrity of the data. The final reports, which summarize the findings of the assessment, are essential for communicating results to stakeholders and guiding future actions. The justification for these costs lies in the importance of reliable data management and clear reporting to support informed decision-making and effective FSM practices.

4.1.4 Quality Control and Supervision

Quality control and overall supervision costs, totaling 40,000 BDT per assessment, ensure that the assessment process is thoroughly managed and monitored. Quality control measures, including data verification and the use of specialized tools, maintain the accuracy and reliability of the collected data. The city engineer will oversee the assessment activities, ensuring adherence to protocols and addressing any issues that arise. Administrative support and communication costs facilitate coordination among various stakeholders, enhancing the overall efficiency of the assessment process. The justification for these costs is based on the need for rigorous oversight to achieve high standards of data quality and operational efficiency.

4.1.5 Sustainability and Scalability

Ensuring the long-term sustainability and scalability of FSM practices involves significant maintenance costs for FSM infrastructure. The maintenance of faecal sludge treatment plants (FSTPs), costing 4,000,000 BDT per year for a population of 40,000, is essential for efficient sludge treatment and environmental protection. Regular maintenance of vacutags, costing 150,000 BDT per year, ensures that these vehicles remain functional and safe for sludge collection and transport. The digital dashboard, costing 200,000 BDT per year, provides real-time monitoring and management of FSM activities, enhancing decision-making and transparency. The justification for these costs is supported by the need to maintain and scale up FSM infrastructure to meet growing demands and ensure sustainable sanitation solutions. Besides, this dashboard maintains the data at national level so it needs rigorous quality checking and data updating.

4.2 Financial Implications and Justification

The financial implications of the FSM assessment costs are significant but justified by the extensive benefits they bring to urban sanitation management. Investing in orientation, data collection, data compilation, and reporting ensures that municipal staff and FSM service providers are adequately prepared and equipped to conduct thorough assessments. The initial costs of 125,000 BDT for orientation, 100,000 BDT for data collection, and 25,000 BDT for data compilation and reporting may appear substantial, but these investments lay a solid foundation for accurate and reliable data collection. This foundation is critical for understanding the current state of FSM practices and identifying areas for improvement. The comprehensive training and resources provided during orientation sessions empower municipal personnel, leading to more efficient and effective assessments. Ultimately, this upfront investment translates into long-term savings and improved public health outcomes by facilitating well-informed decision-making and strategic planning.

The quality control and supervision costs, totalling 40,000 BDT per assessment, ensure the integrity and reliability of the data collected. Implementing rigorous quality control measures and maintaining strict oversight throughout the assessment process prevents errors and inconsistencies that could

undermine the entire effort. These costs cover the essential activities of data verification, employing specialized tools, and supporting the supervisory roles of project managers. By investing in these aspects, municipalities can ensure that the data used to guide FSM policies and practices is accurate and trustworthy. This reliability is crucial for attracting funding from international development partners and non-governmental organizations, who require robust data to justify their financial support. Additionally, the involvement of key stakeholders through KIIs and FGDs enriches the data with expert insights and community perspectives, further validating the investment in these comprehensive assessment processes.

The maintenance and scalability of FSM infrastructure have substantial financial implications, yet they are critical for ensuring the sustainability of FSM services. The annual costs of 4,000,000 BDT for maintaining faecal sludge treatment plants (FSTPs), 150,000 BDT for vacutag maintenance, and 200,000 BDT for digital dashboard upkeep represent ongoing investments that safeguard the long-term functionality and efficiency of FSM systems. These costs are justified by the critical role that well-maintained infrastructure plays in protecting public health and the environment. Properly functioning FSTPs and vacutags ensure that faecal sludge is treated and disposed of safely, preventing contamination and disease outbreaks. The digital dashboard provides real-time monitoring and management capabilities, enhancing operational efficiency and transparency. Additionally, we need to provide occupational health and safety training for plant and vacutag workers to ensure their safety and well-being. This training is essential to prevent workplace accidents and health issues, thereby maintaining a healthy and efficient workforce. The associated cost for this training will be 30,000 BDT annually. By ensuring the sustainability and scalability of FSM practices, these investments support the broader goals of urban development and public health, making them a prudent and necessary expenditure.

5 POTENTIAL FUNDING AND SUSTAINABILITY

5.1 Potential Sources of Costings at Municipal Budget

Ensuring the financial sustainability of faecal sludge management (FSM) systems in Bangladeshi municipalities requires identifying and securing various funding sources. Below are detailed potential sources of costings at the municipal budget level, tailored to the Bangladeshi context, supported by examples and innovative approaches.

1. **Municipal Revenue Allocations:** Municipalities can allocate a portion of their existing budgets to FSM activities. This involves prioritizing sanitation within the broader municipal budget, recognizing its critical role in public health and urban infrastructure. For instance, the Dhaka North City Corporation has allocated funds specifically for waste management and sanitation services in its annual budget.
2. **Local Fees and Levies:** Adjusting or introducing local fees and levies dedicated to FSM can provide a steady revenue stream. Potential options include:
    - **Property Fees:** Implementing a sanitation surcharge on property fees. This method has been effective in other developing countries, such as India, where cities like Pune levy a sanitation fee to fund waste management services.
    - **Service Charges:** Introducing or increasing service charges for water and sewer connections, with a portion earmarked for FSM. This approach ensures that those benefiting from improved sanitation services contribute to their sustainability.
3. **Government Grants and Subsidies:** Bangladesh's government, through the Local Government Division (LGD) and other relevant bodies, provides grants and subsidies for infrastructure projects, including sanitation. Municipalities can apply for these funds to support FSM initiatives, while prioritizing public health to mitigate health hazard and associated costs. For example, the LGD's Annual Development Program (ADP) includes allocations for sanitation and hygiene improvements, which municipalities can leverage for FSM projects.
4. **Public-Private Partnerships (PPPs):** PPPs can mobilize private sector expertise and funding for FSM projects. According to Clause 97 of the Local Government Act (Municipality), municipalities are empowered to engage the private sector in such initiatives. Municipalities can enter into agreements with private companies to design, build, operate, and maintain FSM facilities. In Bangladesh, the Dhaka Water Supply and Sewerage Authority (DWASA) has successfully implemented PPPs for water and sanitation projects, demonstrating the potential for similar arrangements in FSM. Furthermore, municipalities should develop their own sanitation by-laws, as stipulated in Clauses 121 and 122 of the Local Government Act, to create a regulatory framework that supports and facilitates effective FSM practices. The Paurashava Act 2009 (clauses 95 and 96) also allows municipalities to collaborate with the private sector for the collection, transportation, treatment, and disposal of faecal sludge, ensuring the sustainable management of sanitation services.
5. **International Development Aid:** Securing funds from international organizations and development partners is a viable option. Organizations such as the World Bank, Asian Development Bank (ADB), and various UN agencies have programs specifically aimed at improving urban sanitation. For example, the ADB has funded several water and sanitation projects in Bangladesh, providing grants and low-interest loans to support infrastructure development.

6. **User Fees and Tariffs:** Implementing or adjusting user fees for FSM services ensures that those who directly benefit from these services contribute to their costs. This could include:
    - **Emptying Fees:** Charging households for the emptying of septic tanks and pit latrines. To ensure affordability, a tiered pricing structure based on income levels can be introduced.
    - **Treatment Fees:** Levying fees for the treatment of faecal sludge at municipal treatment facilities. This can be integrated with existing utility bills to streamline collection.
7. **Innovative Financing Mechanisms:** Exploring innovative financing options can provide additional funds for FSM projects. These include:
    - **Municipal Bonds:** Issuing municipal bonds specifically for sanitation projects. While relatively new in Bangladesh, this approach has been used successfully in other countries to finance large infrastructure projects.
    - **Microfinance:** Partnering with microfinance institutions to provide loans for household-level sanitation improvements. This approach can empower low-income households to invest in better sanitation facilities, reducing the burden on municipal services.

Securing diverse and sustainable funding sources is crucial for the success of FSM initiatives in Bangladeshi municipalities. By leveraging municipal revenue allocations, local fees, government grants, PPPs, international aid, user fees, and innovative financing mechanisms, municipalities can ensure the long-term sustainability of their FSM systems. Each of these funding sources offers unique advantages and, when combined, can provide a robust financial foundation for improving urban sanitation and public health outcomes.

5.2 Potential Contribution Areas by the City Itself

Municipalities play a crucial role in the sustainability and effectiveness of faecal sludge management (FSM) practices. By leveraging their resources, capabilities, and community engagement, cities can contribute significantly to FSM initiatives. Here are some key areas where municipalities can make substantial contributions, distributed according to the sanitation value chain elements.

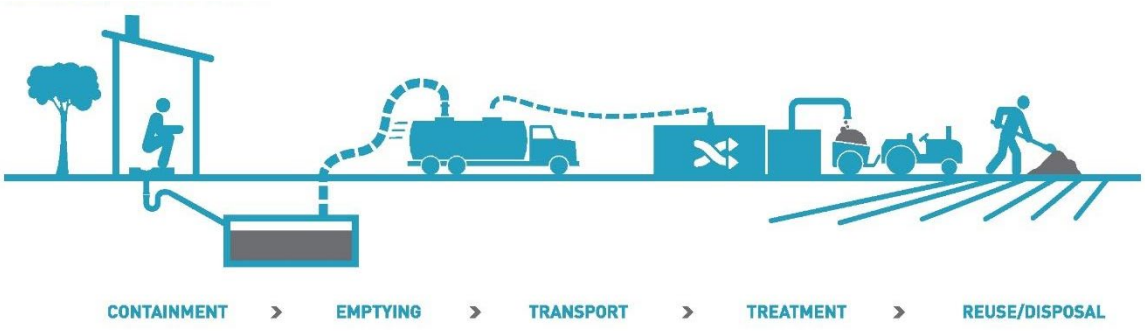

Figure 8: Sanitation Value Chain

5.2.1 Containment

Engaging the community and encouraging their participation in FSM initiatives can lead to greater sustainability. Municipalities can organize awareness campaigns to educate residents about the importance of proper sanitation and the role of FSM. By involving local communities in planning and decision-making processes, municipalities can ensure that FSM solutions are culturally appropriate

and widely accepted. Community-based monitoring and reporting systems can also be established, where residents report issues related to sanitation, helping municipalities respond promptly and efficiently. Municipalities will need to invest in campaign materials, event organization, and hiring community facilitators.

Municipalities can explore models for cost-sharing between the city and the beneficiaries of FSM services. For instance, implementing a sliding scale fee structure based on income levels can ensure that all residents have access to affordable sanitation services. Additionally, offering microfinance options to low-income households for sanitation improvements can empower them to invest in better facilities, thereby reducing the burden on municipal services. Municipalities will need to invest in managing fee structures and microfinance programs.

5.2.2 Emptying

Improving the operational efficiency of existing FSM services can significantly reduce costs and enhance service delivery. Municipalities can adopt process optimizations such as scheduling regular maintenance for faecal sludge treatment plants (FSTPs) and optimizing the routes for sludge collection to minimize fuel consumption and time. Implementing standard operating procedures and training staff on best practices can also lead to more efficient operations. For instance, the Dhaka North City Corporation has adopted a more systematic approach to waste management, which has resulted in cost savings and improved service delivery. Municipalities will need to invest in software for route optimization, regular maintenance schedules, and staff training.

Investing in capacity building and training for municipal staff can improve service delivery and reduce dependency on external consultants. Municipalities can organize regular training sessions for their staff on the latest FSM technologies, management practices, and safety protocols. This investment in human capital ensures that municipalities have the necessary skills and knowledge to manage FSM services effectively, leading to long-term cost benefits and improved service quality. Municipalities will need to invest in training materials, trainers' fees, and venue rentals.

5.2.3 Transportation

The use of technology can streamline FSM operations and reduce costs. Municipalities can implement digital monitoring systems that provide real-time data on FSM activities, helping to identify inefficiencies and areas for improvement. Automated processes, such as the use of drones for monitoring and mapping sanitation infrastructure, can enhance operational efficiency. For instance, the use of mobile applications for reporting and managing sanitation services has been successfully implemented in various cities worldwide, providing a model that can be adapted to the Bangladeshi context. Municipalities will need to invest in purchasing and maintaining digital monitoring systems, software licenses, and staff training.

5.2.4 Treatment

Improving the operational efficiency of existing FSM services can significantly reduce costs and enhance service delivery. Municipalities can adopt process optimizations such as scheduling regular maintenance for faecal sludge treatment plants (FSTPs) and optimizing the routes for sludge collection. Implementing standard operating procedures and training staff on best practices can also lead to more efficient operations. For instance, the Dhaka North City Corporation has adopted a

more systematic approach to waste management, which has resulted in cost savings and improved service delivery. Municipalities will need to invest in software for route optimization, regular maintenance schedules, and staff training.

5.2.5 Reuse

Municipalities can identify and develop revenue-generating activities related to FSM. One such opportunity is the production and sale of compost from treated faecal sludge. Treated sludge can be processed into nutrient-rich compost, which can then be sold to local farmers and gardeners. This not only generates revenue but also promotes sustainable agriculture. Additionally, biogas production from faecal sludge can be another revenue stream. Municipalities can invest in biogas plants that convert sludge into biogas, which can be used for cooking, heating, or electricity generation. Municipalities will need to invest in composting and biogas plants, marketing, and sales infrastructure.

There are significant opportunities for resource recovery and reuse within the FSM system, which can offset costs and contribute to sustainability. Treated sludge can be repurposed for agricultural use or as an input for building materials. For example, in some parts of Africa, treated sludge is used to make bricks, providing a cost-effective and sustainable building material. By exploring similar opportunities, municipalities can reduce waste and create valuable products that contribute to the local economy. Municipalities will need to invest in processing facilities, equipment for converting sludge to useful products, and distribution networks.

By focusing on these potential contribution areas, municipalities can play a pivotal role in the sustainability and effectiveness of FSM practices. Operational efficiency improvements, revenue-generating activities, community engagement, capacity building, cost-sharing, resource recovery, and leveraging technology are all strategies that can enhance FSM services. Through these efforts, municipalities can ensure better sanitation outcomes, improved public health, and long-term sustainability of FSM systems in urban areas.

5.3 Benefits

Implementing effective faecal sludge management (FSM) practices brings a multitude of benefits to municipalities and their residents. Here are some key advantages:

1. **Development of Local Expertise**: Through capacity building and training initiatives, a significant number of city personnel will become experts in FSM technologies and practices. This development of local expertise reduces dependency on external consultants and fosters a knowledgeable workforce capable of managing and improving FSM services autonomously.

2. **Enhanced Municipal Experience**: By engaging in FSM projects and collaborations with private sectors and community groups, municipalities will gain valuable experience in conducting assessments, implementing solutions, and managing FSM systems. This experience equips municipalities with the skills and confidence to handle future FSM challenges more effectively.

3. **Increased Community Awareness**: Community engagement and awareness campaigns will lead to a more informed and involved citizenry. Residents will better understand the importance of proper sanitation, the role of FSM, and how they can contribute to maintaining a clean and healthy environment. This heightened awareness promotes public cooperation and support for FSM initiatives.

4. **Improved Public Health**: Effective FSM practices significantly reduce the risks of waterborne diseases and environmental contamination. Proper containment, collection, transportation, treatment, and reuse of faecal sludge ensure that harmful pathogens are managed safely, leading to a healthier population and reducing the burden on healthcare systems.

5. **Economic Benefits**: Revenue-generating activities such as the production and sale of compost and biogas from treated faecal sludge create new economic opportunities. These activities not only provide municipalities with additional income streams but also stimulate local economies by promoting sustainable agriculture and energy production.

6. **Environmental Sustainability**: By optimizing FSM processes and implementing resource recovery and reuse practices, municipalities contribute to environmental sustainability. Treated sludge used in agriculture or as a building material reduces waste and promotes the efficient use of resources, aligning with sustainable development goals.

7. **Operational Efficiency**: Investments in technology, such as digital monitoring systems and automated processes, enhance the operational efficiency of FSM services. Real-time data and optimized workflows lead to cost savings, reduced resource consumption, and improved service delivery.

8. **Social Equity**: Implementing cost-sharing models and providing microfinance options for low-income households ensure that all residents have access to affordable sanitation services. This approach promotes social equity and supports vulnerable populations in improving their living conditions.

9. **Strengthened Public-Private Partnerships**: Engaging the private sector in FSM projects fosters collaboration and innovation. Public-private partnerships bring in expertise, funding, and innovative solutions, enhancing the overall effectiveness and sustainability of FSM practices.

10. **Resilience to Future Challenges**: A well-managed FSM system increases the resilience of cities to future sanitation challenges. Whether facing population growth, urbanization, or environmental changes, municipalities equipped with effective FSM practices are better prepared to adapt and maintain public health and sanitation standards.

By implementing these strategies and reaping these benefits, municipalities can ensure better sanitation outcomes, improved public health, and long-term sustainability of FSM systems in urban areas. These efforts not only address current sanitation challenges but also lay the groundwork for a healthier and more sustainable future for all residents.

6 RECOMMENDATIONS

Based on the detailed analysis of faecal sludge management (FSM) assessments, including the cost components, funding strategies, and potential contributions by municipalities, the following recommendations are made to enhance the sustainability and effectiveness of FSM systems in urban areas of Bangladesh.

6.1 Policy Recommendations

Municipalities should work with the central government to strengthen the regulatory framework for FSM. This includes enforcing existing regulations and introducing new policies that mandate regular faecal sludge emptying, safe treatment, and proper disposal. Clear guidelines and standards should be established to ensure uniformity across municipalities. PPP models should be promoted to leverage private sector expertise and resources in FSM. Municipalities can create conducive environments for PPPs by providing incentives such as tax breaks, subsidies, and streamlined approval processes. Successful examples from other sectors, such as the Dhaka Water Supply and Sewerage Authority's (DWASA) partnerships, can serve as models. Introduce innovative financial mechanisms such as municipal bonds and microfinance to fund FSM projects. Municipal bonds can be issued for large-scale infrastructure projects, while microfinance can support household-level sanitation improvements. These mechanisms provide alternative funding sources, reducing the reliance on traditional budget allocations.

6.2 Recommendations for Municipal Authorities

Municipalities should allocate a dedicated portion of their annual budget for FSM activities. This ensures sustained financial support for essential services such as sludge collection, transportation, and treatment. Budget allocations should be based on comprehensive cost assessments and projected service demands. Investing in the capacity building of municipal staff is crucial. Regular training programs should be conducted to keep staff updated on the latest FSM technologies, management practices, and safety protocols. Building in-house expertise reduces the need for external consultants and ensures continuity in service delivery. Active community engagement is vital for the success of FSM initiatives. Municipalities should organize awareness campaigns and educational programs to inform residents about the importance of proper sanitation and their role in maintaining FSM systems. Community involvement in planning and monitoring FSM activities can lead to more effective and sustainable outcomes.

6.3 Recommendations for Development Partners

Development partners can support municipalities by providing technical assistance in designing and implementing FSM systems. This includes offering expertise in infrastructure development, operational management, and capacity building. Technical assistance can help municipalities adopt best practices and innovative solutions tailored to their specific needs. International development agencies and financial institutions should facilitate access to funding for FSM projects. This can be done through grants, low-interest loans, and blended finance models. Ensuring that municipalities have access to sufficient financial resources is essential for scaling up FSM services and achieving long-term sustainability.

The financial resources required for FSM projects are a critical aspect of achieving effective and sustainable outcomes. Development partners can facilitate access to funding through grants, low-interest loans, and blended finance models. Ensuring that municipalities have sufficient financial resources is essential for scaling up FSM services and achieving long-term sustainability. Investments in FSM not only improve public health and environmental conditions but also generate economic benefits, making them a prudent and necessary expenditure. Development partners should advocate for the use of standardized tools such as the SFD to measure progress towards SDG 6.2.1. The SFD provides a clear and visual representation of faecal sludge management flows within municipalities, helping to identify gaps and areas for improvement. Utilizing this tool ensures accurate monitoring, better data management, and evidence-based decision-making.

Development partners should promote knowledge sharing and exchange of best practices among municipalities. Platforms for collaboration, such as workshops, conferences, and online forums, can be established to facilitate the sharing of experiences and lessons learned. This collaborative approach can drive innovation and improve the overall effectiveness of FSM systems.

Implementing these recommendations requires a coordinated effort among municipal authorities, government agencies, development partners, and communities. By strengthening regulatory frameworks, promoting public-private partnerships, allocating dedicated budgets, enhancing capacity building, engaging communities, providing technical assistance, facilitating access to funding, and promoting knowledge sharing, the sustainability and effectiveness of FSM systems in urban Bangladesh can be significantly improved. These efforts will lead to better sanitation outcomes, improved public health, and a more sustainable urban environment.

7 CONCLUSION

The comprehensive assessment of faecal sludge management (FSM) systems in Bangladeshi municipalities has highlighted the critical importance of structured and sustainable approaches to urban sanitation. By thoroughly examining cost components, funding sources, and potential municipal contributions, this study provides a robust framework for enhancing FSM practices. The findings underscore those substantial investments in orientation, data collection, data compilation, quality control, and supervision are not only necessary but also justifiable for achieving reliable and actionable insights into FSM practices.

A well-coordinated effort involving multiple stakeholders, including municipal authorities, government agencies, development partners, and local communities, is essential for the successful implementation of FSM initiatives. The recommendations put forth emphasize the need for strong regulatory frameworks, innovative financial mechanisms, and active community engagement. By leveraging public-private partnerships and accessing international development aid, municipalities can secure the necessary resources to sustain and scale FSM systems.

It is crucial to distinguish between the Joint Monitoring Programme (JMP) data flow and city-level assessments. While JMP provides a broad overview of national sanitation status, city assessments offer detailed, localized insights into urban sanitation challenges and opportunities. Furthermore, the study highlights the significant role of technology and operational efficiency in reducing costs and enhancing service delivery. Municipalities can benefit from capacity building and training programs that equip their staff with the latest skills and knowledge in FSM. Additionally, engaging communities and fostering a sense of ownership can lead to more effective and sustainable sanitation outcomes.

To effectively measure progress towards SDG 6.2.1, the study recommends the use of the Shit Flow Diagram (SFD) tool. SFD provides a clear and visual representation of faecal sludge management flows within municipalities, helping to identify gaps and areas for improvement. In conclusion, the successful implementation of FSM systems in urban Bangladesh requires a holistic approach that integrates financial planning, regulatory support, community engagement, and technical expertise. By following the detailed recommendations and leveraging the identified funding sources, municipalities can ensure that FSM systems are not only effective in the short term but also sustainable in the long run. This will lead to improved public health, environmental sustainability, and enhanced quality of life for urban residents.