



Draft

Institutional and Regulatory Framework for Fecal Sludge Management (FSM):

Mega City Dhaka

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Ministry of Local Government, Rural Development and Cooperatives**

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Abbreviations and Acronyms

AIT	Asian Institute of Technology
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BNBC	Bangladesh National Building Code
BUET	Bangladesh University of Engineering and Technology
CBO	Community Based Organization
CTO	Collection and Transportation Operator
DAE	Department of Agriculture Extension
DAP	Detailed Area Plan
DMDP	Dhaka Metropolitan Development Plan
DNCC	Dhaka North City Corporation
DoE	Department of Environment
DPHE	Department of Public Health Engineering
DSCC	Dhaka South City Corporation
DWASA	Dhaka Water Supply and Sewerage Authority
FSM	Fecal Sludge Management
GoB	Government of Bangladesh
ICDDR	International Centre for Diarrhoeal Disease and Research, Bangladesh
IEDCR	Institute of Epidemiology, Disease Control and Research
I/NGO	International and National NGO
ITN	International Training Network Center
IWMI	International Water Management Institute
JMP	Joint Monitoring Program
LGD	Local Government Division
LGED	Local Government Engineering Department
MoA	Ministry of Agriculture
MoEF	Ministry of Environment and Forest
MoHA	Ministry of Home Affairs
MoLGRDC	Ministry of Local Government Rural Development and Cooperatives
NFWSS	National Forum for Water Supply and Sanitation
NGO	Non-Government Organization
RAJUK	Rajdhani Unnayan Karttripakkha
TFO	Treatment Facilities Operator
WASA	Water Supply and Sewerage Authority
WEDC	Water, Engineering and Development Centre, Loughborough University

Terms and Definitions

Fecal sludge: Sludge removed from all kinds of on-site sanitation systems such as septic tanks, aqua privies, pit latrines, community multiple pit system, etc.

Septage: Fecal sludge (settled solids, scum and liquid) that accumulates in septic tanks.

Sewage Sludge: Sludge generated at the sewage treatment plants as a result of sewage digestion process is termed as sewage sludge. Sewage sludge is often more problematic than fecal sludge from household toilet facilities because it contains contaminants from industrial wastewaters.

Septic Tank: A watertight, multi-compartment, usually sub-surface receptacle that receives sewage from houses or other buildings and is designed to separate and store the solids and partially digest the organic matter in the sewage.

Onsite Sanitation System: Sanitation infrastructures that are designed to collect, store and dispose of human excreta at the household premises and include septic tank system and various types of pit latrines.

Desludging: This refers to the process of cleaning or removing the accumulated sludge/ septage from a septic tank, pit latrine or wastewater treatment facility.

Domestic Sewage: Wastewater composed of untreated human waste coming from residential and commercial sources. Domestic sewage does not include industrial and/or hazardous wastes.

Sewerage system: A system of sewers that collects and conveys wastewater to a treatment plant for treatment prior to disposal point. It includes all infrastructures for collecting, transporting, and pumping sewage.

Fecal Sludge Management: Also known as septage management, FSM includes the various technologies and mechanisms for collection, transportation, treatment and disposal of sludge produced by septic tanks, pit latrines, and wastewater treatment plants.

Biosolids: This usually refers to treated fecal sludge or byproduct of the treatment of domestic sewage in a sewage treatment plant. Biosolids consist primarily of digested organic matter and dead microbes and can be used as organic fertilizer or soil conditioner.

Institutional and Regulatory Framework for Fecal Sludge Management (FSM): Mega-City Dhaka

Chapter 1

Context

Dhaka City Sanitation Status

In Dhaka, only 20% of over 10 million population, mostly in the middle- and high-income areas, is within conventional sewerage network. However, the lone domestic sewage treatment plant based on stabilization ponds method at Pagla in Dhaka runs only at a third of its capacity, effectively serving only a small fraction of the city population. Apart from the 20 percent sewered area, the rest of the city is covered by on-site sanitation system, which include septic tank system, and different forms of pit latrines. The un-sewered middle- and high-income areas of the city are mostly covered by septic tank system (consisting of septic and soakage pit). However, with increasing population density in these areas brought about by vertical extension of dwellings, the septic tank system is barely functioning. Because of high population density and therefore high level of water use and wastewater generation, the septic tanks are unable to remove solids from wastewater effectively and getting filled quickly; the soakage pits are unable to drain the huge volumes of septic tank effluent into the subsurface, and thus overflowing.

Because a large section of these un-sewered areas are covered by storm sewer network, people are illegally discharging domestic sewage into the storm sewer in order to drain the generated sewage/wastewater away from their neighborhood. In many instances, domestic sewage/wastewater is directly discharged into storm sewers without carrying them through septic tanks. Therefore, raw sewage generated from these areas are now flowing through storm sewers; together with storm water these are being discharged into lakes/khals/low-lying areas within the city and eventually draining into surrounding rivers. Many buildings including high-rise ones are not connected to any kind of wastewater disposal system (e.g., septic tank), and discharge their sewage directly into lakes, canals and rivers. These practices are causing massive environmental pollution and creating serious health hazards, the effects of which are being felt within the city and beyond.

In slums and low-income communities, different forms of pit latrines are the most common form of on-site sanitation system; septic tank system is also present in some areas. Slums and low-income communities are primarily located in fringe areas and low-lying areas within the city. These areas are typically not covered by DWASA piped water supply system or storm sewer network. In slum areas, due to space and resource constraints, a single latrine is often shared by many families. As a result, the pits (or septic tanks) are filled up quickly with fecal matter. Therefore, without desludging, the toilets become unusable. This is seriously affecting the sustainability of sanitation services in slum areas. It is worth noting that while open defecation has been brought down to 1 percent (according to 2014 JMP report) on a national level, in many slums open defecation is practiced by as much as 20

percent of population (Oxfam and ITN-BUET, 2014); non-functional sanitation facilities is a major reason for such high prevalence of open defecation.

While septic tank system and different forms of pit latrines are predominant sanitation systems, they are often poorly designed, constructed and maintained. Often, septic tanks are designed/ constructed without considering the number of toilet users, and no desludging frequency is assigned with the design. Proper inlet and outlet devices are not provided in septic tanks. In many cases, soakage pits for disposal of septic tank effluent are absent. In absence of proper monitoring by approval agency (RAJUK), septic tanks in most households suffer from design and construction inadequacy.

Present Role of Dhaka City Corporations

Dhaka City Corporation, divided into Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC) in the year 2011, is mandated by the Local Government (City Corporations) Act 2009 to provide waste management services including sanitation and cleanliness in Dhaka City. DNCC and DSCC have a big workforce (cleaners) in the waste management section for street sweeping, solid waste collection, transportation and disposal. The City Corporations are also responsible for construction, operation and maintenance of public toilet facilities, which are operated through leasing to private operators. The City Corporations charge conservancy tax, which is mostly used for solid waste management service. Presently, the City Corporations do not provide any FSM service.

Present Role of DWASA

The Water Supply and Sewerage Act (1996) authorizes DWASA to provide sewerage service; however the sanitation service of the non-sewered areas is not explained. In the areas covered by sewerage system, DWASA imposes sewerage charge along with the water bill. In the other areas, where there is no sewerage provision, DWASA provides no fecal sludge/ septage management service. However, in the recently prepared sewerage master plan of DWASA (2013), provision for septic sludge management has been recommended.

Current Role of RAJUK

RAJUK'S (Capital Development Authority) present focus is only on housing areas, commercial and industrial zoning and lay out of roads. RAJUK, responsible for physical development of the city, do not play any role with regard to sanitation service. It provides building permission with the provision of sanitation system, but during the construction stage, this issue is not monitored.

Dhaka Metropolitan Development Plan (DMDP), associated with structure plan and Detailed Area Plan (DAP), has limited planning advice on sanitation. The Building Construction Rules (1996) includes key consideration on the sanitation planning at household level. In Bangladesh National Building Code (BNBC), detail provisions of toilets, urinals, and drainage are provided for 10 major categories of occupancies such as residential, institutional, healthcare, business, industrial etc. However, effluent treatment and sludge disposal issues are not elaborated.

Current State of Fecal Sludge Management (FSM) in Dhaka City

FSM system include the on-site sanitation facilities, and the FSM service chain (from emptying to treatment-disposal), as shown in Fig. 1. Fecal sludge management (FSM) is a growing concern in Dhaka City. In the policies, planning and budgeting, FSM is not specifically recognized as an element of urban sanitation system. Unhygienic manual emptying predominates against the mechanical emptying system because of its limited availability and lack of public awareness. A few I/NGOs with support from DWASA are providing limited FSM services (mostly limited to emptying of fecal sludge and disposal without treatment). However, the coverage of such services is limited, and it does not specifically address treatment and appropriate disposal of fecal sludge. As a result, unhygienic manual desludging of pits and discharge of pit contents in public sewers and adjacent low-lying areas is common.

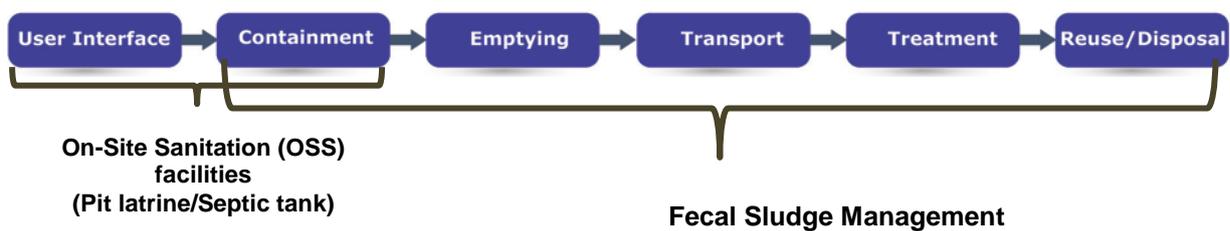


Figure 1: Components of fecal sludge management system

Lack of access to FSM services is also forcing many to intentionally discharge fecal matter directly into adjacent water bodies or low-lying areas. These practices are giving rise to significant environmental and public health concerns, primarily affecting the population of the low income communities. Because of need and apparent demand for such services, FSM services provided under a strong regulatory framework involving relevant stakeholders (e.g., DWASA, City Corporation) including the private sector are likely to be successful in these communities. In fact, with effective FSM services, the on-site sanitation technologies in the slums and low-income communities are likely to be sustainable over long-term.

Chapter 2

Objectives and Scope of FSM Framework

The primary objective of this FSM framework is to facilitate implementation of FSM services in DNCC and DSCC areas. Specifically, this framework would

- (a) identify ways and means of implementing FSM services in Dhaka City; and
- (b) define specific roles and responsibilities of various institutions and stakeholders, particularly of DNCC and DSCC, for effective implementation of FSM.

The institutional roles and responsibilities specified in this framework are based primarily on the provisions of the Local Government (City Corporation) Act 2009, which guides and regulates the roles and responsibilities of all City Corporations. LGD/DNCC and DSCC may formulate necessary rules, regulations or by-laws (within the framework of the City

Corporation Act 2009), if needed, for carrying out the specific roles and responsibilities outlined in this framework.

Only on-site sanitation facilities and areas served by such facilities would fall under the purview of the FSM framework. This framework would not apply to those parts of the cities where the network or conventional sewerage system (including treatment plants) for wastewater/sewage management are or will become operational. However, decentralized, “small bore sewerage (SBS)” system associated with septic tank effluent disposal may be introduced in the city corporation areas within the purview of this framework. Areas to be served by sewer networks and FSM services shall be delineated jointly by DWASA and DNCC/DSCC.

Chapter 3

Participating Institutions

An appropriate institutional arrangement is a prerequisite for effective fecal sludge management. It is important that institutions are identified for specific roles and responsibilities depending on existing local conditions, skill, strength and commitment of institutions for an effective, safe and sustainable FSM system. Since the entire FSM service chain is interlinked, it is important that the roles and responsibilities of institutions are clearly defined, integrated and are coordinated.

In view of the above, the following institutions have been identified for playing effective roles in the overall planning, development, implementation, practice, and monitoring and evaluation of fecal sludge management (FSM) in all city corporation areas.

(a) Ministries – to endorse this FSM framework; secure funding; technical support through respective line agencies (DPHE, LGED, DWASA); initiate inclusive planning and execution of FSM; ensure enforcement of laws, policies, strategies and guidelines; and **monitoring through the National Forum for Water Supply and Sanitation (NFWSS).**

- Local Government Division, Ministry of Local Government, Rural Development and Cooperatives (MoLGRDC): **Lead Ministry**
- Ministry of Environment and Forest (MoEF)
- Ministry of Health and Family Welfare (MHFW)
- Ministry of Agriculture (MoA)
- Ministry of Fisheries and Livestock
- Ministry of Housing and Works (MoHW)
- Ministry of Water Resources (MoWR)
- Ministry of Education
- Ministry of Information
- Ministry of Energy and Mineral Resources
- Ministry of Industries
- Ministry of Shipping
- Ministry of Railways
- Ministry of Land

- Ministry of Home Affairs
- Ministry of Law, Justice and Parliamentary Affairs

(b) Local Government Institutions and Line Agencies – to implement the entire FSM system.

- DNCC and DSCC – **primary responsibility of FSM**
- DWASA– supporting role
- DPHE – supporting role
- LGED – supporting role
- RAJUK – supporting role

(c) Institutions participating in capacity building – to provide research support to fill the knowledge gaps, technical assistance, training, quality assurance of process and products (e.g., compost) in the FSM service chain.

- Ministries and relevant line agencies
- ITN-BUET, relevant universities, research organizations
- BARI, BRRI, BARC, IEDCR, ICDDRDB
- International research/ training organizations (e.g., Sandec, EAWAG, WEDC, AIT, IHE, IWMI)
- Development partners
- I/NGOs
- Private Sector

(d) Institutions participating in awareness building – to support awareness campaign, promote private sector participation, demonstration of FSM business models, performance monitoring, technical assistance, R&D support and funding.

- Ministries and relevant line agencies
- Bangladesh Urban Forum
- Development partners
- I/NGOs
- Civil Society Organizations, CBOs
- Research organizations/universities
- Print, electronic and social media
- Private sector

Chapter 4

Distribution of Institutional Roles and Responsibilities

Section 4.1: Overview of Existing Laws, Rules and Regulations

Clause 41 of the Local Government (City Corporation) Act 2009, hereinafter referred to as City Corporation Act 2009, mentions the responsibilities and functions of a city corporation and refers to Schedule 3 for the details of its functions.

Schedule 3 of the City Corporation Act 2009, in its sub-clause 1.4 under clause 1, clearly mentions that *“The City Corporation shall make adequate arrangements for the collection and removal of refuse from all public streets, public latrines, urinals, drains, and all buildings and land within the jurisdiction of the city corporation”*.

Sub-clause 1.8 of the Act states that *“the City Corporation shall provide and maintain, in sufficient number and in proper condition, public latrines and urinals separately for both male and female users, and shall make arrangements for proper maintenance of these facilities and keep them clean”*.

Sub-clause 1.9 states that *“the individual owners of households having latrines and urinals shall keep them in proper condition and to the satisfaction of the city corporation”*.

Sub-clause 1.10 of the Act further states that *“the City Corporation shall serve notice to the owners of households having no latrine or urinal, or having inadequate arrangements, or having latrines and urinals at improper places, to (a) make necessary arrangements for latrines and urinals, (b) change/ improve latrines and urinals, (c) remove latrines and urinals where necessary, and (d) connect appropriately cleanable latrines and urinals to sub-surface sewer network where available”*.

Clause 8 of the Schedule 3 of the Local Government (City Corporation) Act 2009 describes in detail the responsibilities and functions of City Corporation in relation to supply of safe drinking water for use by all city dwellers, and also develop the city drainage system including construction, operation and maintenance of drains.

While the term “fecal sludge” is not specifically mentioned in the City Corporation Act 2009 (primarily because this term was not widely used at that time), it is clear that the primary responsibility of management of “fecal sludge” [referred to in the Act as “refuse” accumulated in “public toilets, urinals, drains and all buildings and land”] lies with the City Corporation.

It is also clear that the City Corporation shall perform these responsibilities in accordance with the provisions of the City Corporation Act 2009. However, for proper management of fecal sludge, if the City Corporation deems it necessary, it could formulate necessary “rules”, “regulations” and “bi-laws” according to the provisions (Clauses 120, 121 and 122 of this Act) described in Schedule 6, Schedule 7, and Schedule 8, respectively, of the Act.

For example, according to Schedule 7 of the City Corporation Act 2009, “regulations” could be formulated, among others, *“for the purpose of health system monitoring, inspection of lands and households; cleaning and disposal of waste by house owner; installation of private toilets and urinals, maintenance and inspection; responsibility of the public regarding health system, and providing license to the sweeper”*.

The Water Supply and Sewerage Authority Act 1996, hereinafter referred to as WASA Act 1996, in its sub-clause (2) of clause 17 clearly describes the major responsibilities vested on the Authority: *(a) construction, development and maintenance of water supply system for abstraction/collection, treatment, pumping, storage and distribution of potable drinking water;(b) construction, development and maintenance of sewerage system for collection, pumping, treatment and disposal of sanitary sewage and industrial liquid waste; (c) closing or abandoning of the drains that are, in the opinion of the Authority, not necessary or are dysfunctional;(d) construction and maintenance of storm water drainage system.*

The WASA Act 1996 does not specifically mention about responsibility of the Authority with regard to on-site sanitation system or any activity related to emptying of pits and septic tanks, collection, transportation, treatment and disposal and/ or reuse of fecal sludge from on-site facilities.

Section 4.2: Institutional Roles and Responsibilities

Sub-section 4.2.1: Overall responsibility of Fecal Sludge Management (FSM)

- (1) In accordance to the provisions of the City Corporation Act 2009, DNCC and DSCC (referred to hereinafter as “**City Corporations**”) shall be responsible for fecal sludge management (FSM) in areas within their jurisdiction, including planning for and implementation of FSM services (including financial/business model for service delivery). The MoLGRDC ministry will ensure that the relevant national laws, policies, strategies and guidelines are followed in providing FSM services and will arrange funding support for DNCC and DSCC.
- (2) The City Corporations shall collaborate with the Dhaka Water Supply and Sewerage Authority (DWASA), RAJUK, DPHE/LGED, development partners, the private sector, the I/NGOs in planning and implementation of FSM infrastructure and services in accordance with the provisions of the Act. The institutional set up for FSM in Dhaka city is outlined in Figure 2.
- (3) The City Corporations shall form a Standing Committee on “Fecal Sludge Management” in accordance to Sub-clause (2) of Clause 50 of the City Corporation Act 2009. This Standing Committee shall oversee the activities related to planning and implementation of FSM services. Depending on need and availability, the Committee would co-opt a sanitation/ FSM expert in the Committee [in accordance with Sub-clause (9) of Clause 50 of the City Corporation Act 2009].
- (4) The City Corporations shall initiate inclusive FSM planning and implementation modality among the government agencies, I/NGOs, community groups and the private sector.

Sub-section 4.2.2: Proper Design and Construction of Sanitation Facilities and Disposal of Sewage/wastewater/ “garbage”

Existing and New Construction:

- (1) While approving design of buildings, RAJUK shall check the design of the sanitation facilities (e.g., septic tank), as well as its location/layout (to make sure that it is accessible for mechanical desludging). The provisions of Bangladesh National Building Code shall be followed for checking design of septic tank system (i.e., septic tank and soakage pit).
- (2) For slums and low income communities, where conditions (e.g., availability of adequate land) permit, the City Corporations shall promote use of twin off-set pit pour-flush toilets or other innovative sanitation technologies that provide long-term solution to the fecal sludge management problem.

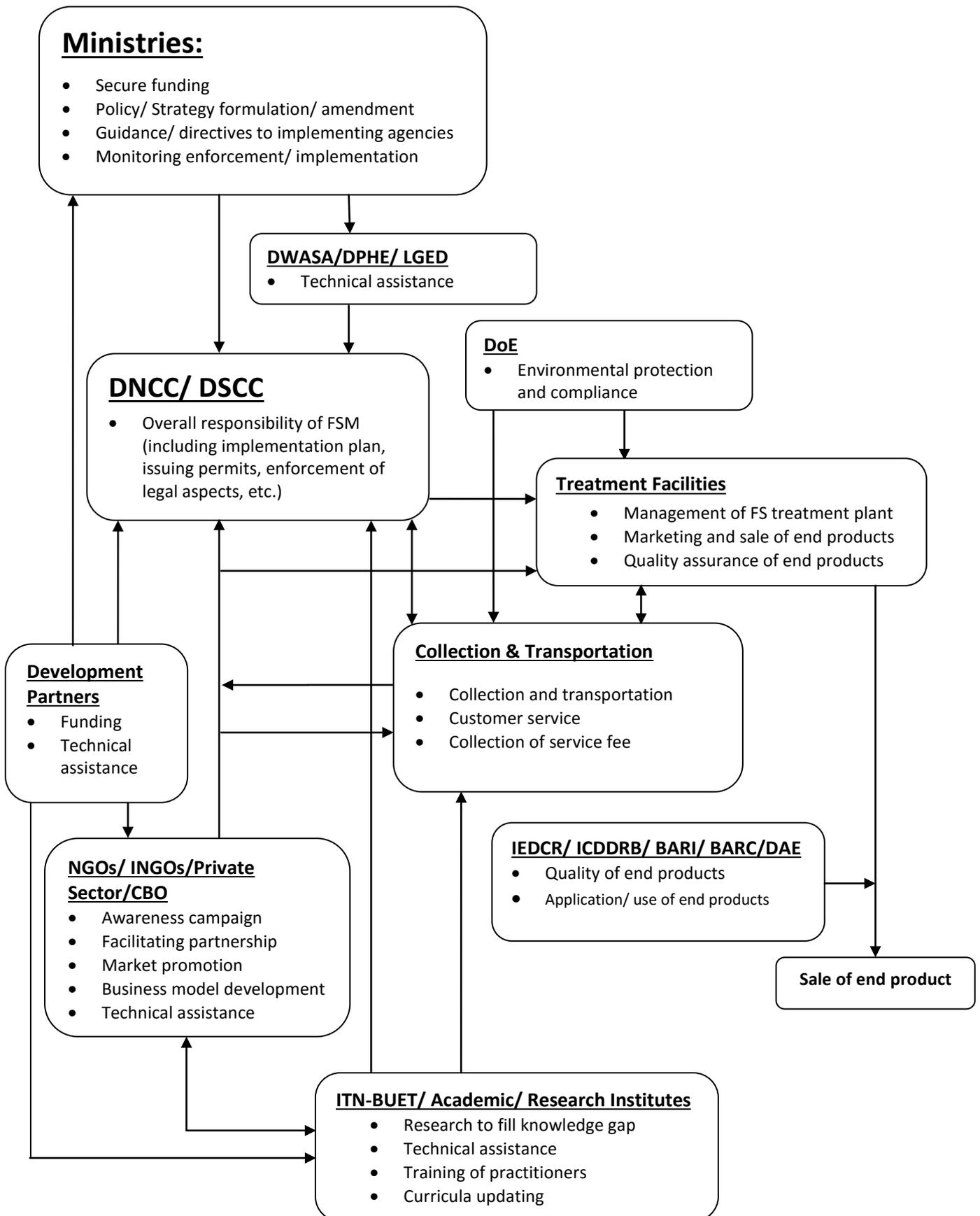


Figure 2: Institutional set up for fecal sludge management (FSM) in Dhaka city

- (3) RAJUK shall monitor that sanitation facilities of buildings have been sited and constructed according to the approved design during construction/reconstruction of buildings. In case of non-compliance, RAJUK shall instruct the owner to re-construct the sanitation facilities following the approved design.
- (4) The City Corporations shall serve notice to owners of premises where there is no sanitation facility, or inadequate sanitation facility, or sanitation facility in inappropriate locations to arrange proper sanitation facilities or remove inappropriate sanitation facilities.
- (5) The City Corporations may engage the private sector/non-government organizations in carrying out inspection of existing/ completed buildings for assessment of sanitation facilities.

Disposal of Sewage/ Wastewater/Garbage:

- (6) The City Corporations in collaboration with DWASA and RAJUK shall carry out inspection and make sure that domestic sewage/ wastewater, and discharge from house-drain are not connected to storm sewer/drain, and that “refuse” (which include fecal sludge) is not thrown/disposed or stored on street or open place (not designated for disposal of “refuse”); these activities are treated as punishable offence according to the provisions the City Corporation Act 2009.
- (7) In accordance to the provisions of the City Corporation Act 2009, the City Corporations shall ask owners of buildings/premises that are in such violation to discharge domestic sewage/ wastewater into a septic tank system (consisting of adequately designed septic tank and soakage pit); the effluent from adequately designed septic tank system (i.e., overflow, if any) may be discharged into storm drains/sewers. Until treatment facility for fecal sludge are built, fecal sludge (e.g., those desludged from onsite sanitation facilities) shall be disposed in a land/area designated by the City Corporations by digging pits/trenches in the ground, and covering the pits/trenches with soil after it is filled with sludge.
- (8) The City Corporations may engage the private sector/non-government sector (e.g., outsourcing) in carrying out inspection/survey for identifying illegal practices of sewage/ wastewater/ “garbage” disposal, as service procurement.
- (9) The LGD/City Corporations shall work with the Ministry of Railways and the Ministry of Shipping to device appropriate plans/programs to make sure that fecal matters/sludge from trains and water vessels are not discharged directly into the environment.

Sub-section 4.2.3: Fecal Sludge Collection and Transportation

- (1) The City Corporations shall be responsible for proper execution of the entire FSM service chain, including collection (emptying) and transportation in their respective unsewered areas. The City Corporations shall carry out and/or oversee the collection (emptying) and transportation, making sure that these operations are carried out in a hygienic manner without adversely affecting health and safety of emptiers, the public and the environment. The City Corporations may lease/ contract out all of the collection and transportation activities to Collection and Transportation Operator

(CTO) which could be either an individual or group of private contractors or to joint venture partnerships between NGOs, CBOs and private contractors as appropriate.

- (2) The pit emptying service shall include “transportation of the collected fecal sludge to the designated site for treatment and disposal”. The City Corporations shall make sure that the collected fecal sludge is transported to the designated site(s) for treatment and disposal, and that the collected fecal sludge is never disposed in open space or water bodies or storm drains or sewers (which is a punishable offence according to the City Corporation Act 2009).
- (3) The City Corporations shall ensure mechanical pit emptying (desludging) services for protection of public health and environment, and for ensuring health and safety of emptiers. The City Corporations shall make sure that the manual emptier (traditional pit emptier/cleaner) communities are integrated into the modern FSM services through proper training and support, without adversely affecting their income.
- (4) The process of pit emptying involves significant hazard, and the City Corporations shall follow/enforce appropriate health and safety guidelines for emptying services. Until such a health and safety guideline is prepared and approved (by the LGD), the City Corporations shall follow available similar guidelines being practiced/promoted elsewhere.
- (5) In accordance with Clause 82 and Schedule 4 of the City Corporation Act 2009, the City Corporations may fix fees/charges for collection and transportation of fecal sludge from sanitation facilities. If fecal sludge treatment facilities are operational in the City Corporation areas and the collected fecal sludge is transported to such facilities for treatment, the City Corporations may consider the entire service chain (i.e., from collection to treatment) while fixing such fees/charges.
- (6) In order to ensure proper and timely emptying of onsite sanitation facilities, the City Corporations shall gradually develop a database of all sanitation facilities within areas of their respective jurisdiction, along with probable emptying frequency of these facilities. Once the entire FSM service chain (i.e., from collection to treatment/disposal) is in place, this database would be used for efficient and timely emptying of all on-site sanitation facilities. The City Corporations shall also develop a database of households/ institutions availing the FSM (e.g., emptying) services.

Sub-section 4.2.4: Fecal Sludge Treatment, Disposal and/ or End-use

- (1) The City Corporations shall be responsible for proper execution of the entire FSM service chain, including fecal sludge treatment, disposal and end-use in their respective un-sewered areas. The City Corporation shall carry out and/or oversee these operations, making sure that these are carried out in compliance with existing rules and regulations (e.g., with regard to disposal of liquid effluent, and quality of end products such as compost), and without adversely affecting public health and the environment. The City Corporations may contract out treatment of fecal sludge to Treatment Facilities Operator (TFO), while giving due consideration to developing adequate technical skills of its own that is required for overseeing FS treatment and disposal.

- (2) The City Corporations shall collaborate with DWASA for possible treatment of fecal sludge at the sewage treatment plants operated by DWASA. DWASA shall be responsible for proper treatment of “sewage sludge” generated at its sewage treatment plants before discharge or enduse.
- (3) RAJUK and private developers shall facilitate availability of land for the City Corporations for fecal sludge treatment and related facilities.
- (4) Until treatment facility for fecal sludge are built, fecal sludge (e.g., those desludged from onsite sanitation facilities) shall be disposed in a land/area designated by the City Corporations by digging pits/trenches in a ground, and covering the pits/trenches with soil after it is filled with sludge.
- (5) The City Corporations/LGD may formulate regulations as per Clause 121 of the City Corporation Act 2009 for engaging private sector/ NGOs/ INGOs/CBOs for activities under Sub-section 4.2.4 of this Framework.
- (6) The City Corporations may fix fees/charges for treatment of fecal sludge separately, or together with the collection and transportation fees/charges as outlined in Article (5) of Section 4.2.3 of this Framework.
- (7) The City Corporations shall seek assistance of the Department of Environment (DoE), and the Institute of Epidemiology, Disease and Research (IEDCR) (or any competent/accredited national/international institution) in fulfilling compliance with the existing rules and regulations with regard to installation and operation of fecal sludge treatment facilities.
- (8) The City Corporations shall seek assistance of the Department of Agriculture Extension (DAE) under the Ministry of Agriculture with regard to simplifying the procedure for securing license for using/ marketing of compost/ organic fertilizer produced (if any) at fecal sludge treatment facilities.
- (9) The City Corporations shall work with the Ministry of Agriculture to ensure safe use of treated end products (compost/ organic fertilizer) in agriculture, landscaping and other purposes.

Section 4.3: “Environmental Police” for Field Compliance

- (1) The Ministry of Environment and Forest (MoEF) through the Department of Environment (DoE) shall ensure that all relevant environmental laws, regulations and principles are strictly followed by all concerned throughout the entire FSM service chain.
- (2) The MoLGRDC and MoEF, in consultation with all stakeholders shall initiate development of standards/ guidelines for enduse or disposal of treated sludge.
- (3) The MoLGRDC in consultation with MoEF, MoHA, Ministry of Law, Justice and Parliamentary Affairs, and other concerned stakeholders shall take initiative to make a legal provision to develop well-trained, skilled contingents of environmental force styled as “Environmental Police” for ensuring field compliance of laws, regulations, safety standards and policy guidelines with provisions of instant penalties to be decided by the ministries concerned.

Section 4.4: Capacity Building, Training and Research

- (1) The institutions identified in Chapter 3.0 (as participating institutions for capacity building) would provide support to fill the knowledge gaps, technical assistance, training, quality assurance of processes and products (e.g., compost) in the FSM service chain.
- (2) The MoLGRDC would take steps for setting up **Unit/ Division for FSM** in the City Corporation organogram, for effective delivery of FSM services.
- (3) The Ministries (listed in Chapter 3) and line organizations, research and training institutions, development partners, and I/NGOs would provide support to develop/enhance skills of personnel of City Corporations and other stakeholders, and to fill the knowledge gaps with regard to FSM.
- (4) National level research and training organizations (e.g., ITN-BUET, technical and agricultural universities/ institutes /centers) would collaborate with relevant international research/ training organizations/ institutions/ universities, I/NGOs and the private sector in capacity building, training and research on FSM. The Ministries of the GoB and the development partners shall support such initiatives.
- (5) The LGD of the MoLGRDC shall coordinate, and develop guidelines for capacity building, research and training initiatives on FSM, and facilitate sharing and dissemination of knowledge/ information on FSM among City Corporations.

Section 4.5: Awareness Building

- (1) The institutions identified in Chapter 3.0 (as participating institutions for awareness building) will support awareness campaign, promote private sector participation, and demonstration of FSM business. The relevant Ministries (listed in Chapter 3) and line organizations would support awareness building campaigns on FSM.
- (2) Local, national and international NGOs/ CBOs with support from the Government Ministries, research organizations and development partners shall play the key role in raising public awareness on FSM and facilitating partnership among key stakeholders including the private sector.
- (3) The civil society organizations would also work with I/NGOs and research organizations (for support on technical issues) in sensitizing the public on FSM through use of print, electronic and social & mass media.

Section 4.6: Technical Assistance and Funding Support

- (1) The GoB will increase funding support and provide other assistance (e.g., securing land for construction of treatment facility) for development of FSM infrastructure in the City Corporations.
- (2) Development partners, multilateral or bilateral, may provide technical assistance and funding support to the City Corporations for establishing FSM services through the MoLGRDC.

- (3) The MoLGRDC through its line organizations (DPHE, LGED, DWASA) would provide technical and other relevant support directly or on project-basis in planning and implementation of FSM service infrastructure (e.g., fecal sludge treatment plant).
- (4) The LGD shall take initiative to develop standards/guidelines for emptying, transportation, and treatment of fecal sludge; operation and maintenance (O&M) of fecal sludge treatment plant; disposal of effluent from fecal sludge treatment facilities, quality control/ standardization of treated products/by-products; and protocol for securing license for using/ marketing of compost/ organic fertilizer produced at fecal sludge treatment facilities.

Chapter 5

Financial Aspects of FSM Service Chain

Section 5.1: Cost of FSM Services

Fecal sludge management system involves different activities e.g. emptying, transport, treatment, and disposal and/or enduse and therefore there is cost involvement at each step of activities. Some FSM infrastructure, such as treatment plant and vacuum tankers (vacutugs) require considerable investment; therefore support from the Government would be required for these facilities. Other expenses, including emptying and transportation of fecal sludge, and regular operation and maintenance should be supported from fees/charges from service recipients. City Corporations shall collaborate with LGD for establishment of major FSM infrastructure (e.g., treatment plant, vacutugs), and develop appropriate “business models” for delivery of FSM services with contribution/ fees/ charges from service recipients in due course.

Section 5.2: A Proposition of Fund Flow for FSM Services

Flow of funds from one step to another has to be considered carefully so that the FSM services are sustained. Considering the existing situation of fecal sludge management in the city, and the level of awareness among different stakeholders of the importance of FSM, a financial flow approach for the FSM service chain can be considered as suggested below (Figure 3).

In the above approach the fund flow starts from HH/Community/Institution (both public and private), the collection points of fecal sludge. Payment by HH/Community/Institution is divided into two channels – to Collection and Transportation service provider as septic tank/pit emptying fee, and to the City Corporations as sanitation tax/charge along with holding tax to cover all other expenses including FS treatment. The emptying fee will be determined based on volumetric pumping rate, and other considerations as may be determined by the City Corporations; sanitation tax/charge can be determined based on water use or more conveniently on flat rate proportionate to holding tax and should be worked out through consultation by the City Corporations, MoLGRDC and concerned stakeholders. This two-channel payment mode will help support the low income people in slums, as in most cases sanitation tax/charge will be subsidized or fully waived and will be covered by government funds to city corporations to cover FS treatment and other expenses.

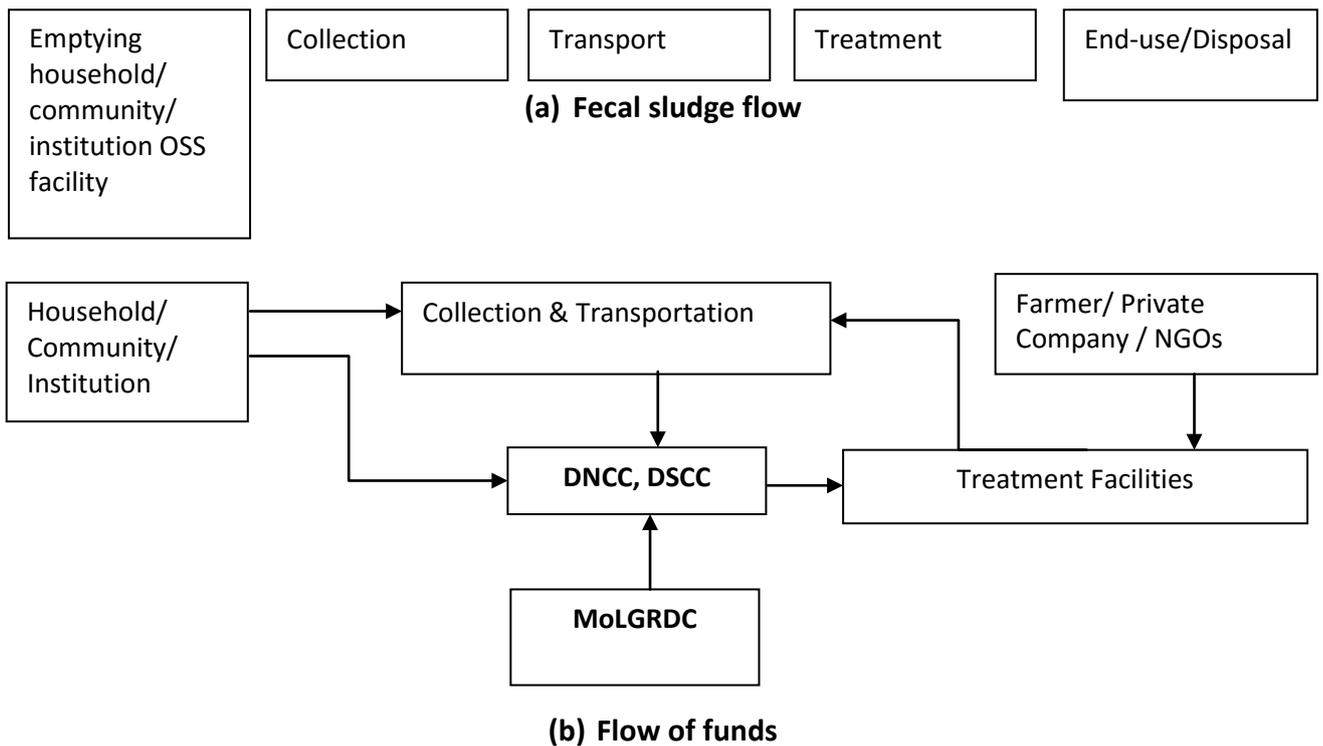


Figure 3: (a) Direction of sludge flow from HH to enduse/ disposal of treated sludge;
(b) Direction showing flow of money from different stakeholders for FSM service chain

An important feature of the above fund flow approach is the direction of the fund transfer to the treatment facilities. Treatment facilities will pay the collection and transportation service provider a discharge incentive to dump collected sludge at the FS treatment plant. The financial incentive here is used to encourage socially desirable behavior i.e., to encourage sludge collection and discharge at the treatment plant and reduce illegal discharge. With this approach the collection and transportation service provider would only have to recover a portion of the total operating costs from the emptying fee and the remaining portion would be made up by the discharge incentive from the treatment facility. As a result, the collection service would be more affordable for poorer households, more sludge would be collected, less sludge would be discharged to the environment and the community as a whole would benefit.

Treatment facilities will receive funds from the City Corporation, part of the sanitation taxes/charges collected, to cover treatment plant operation and management expenses. The City Corporation will charge fee for permits/ licenses for collection and transportation. Treatment facilities may also receive price of end products from private enterprises or NGOs engaged in marketing and selling of the end product.

However, substantial government support will be needed to fill the budget gaps of the City Corporations, particularly to cover some of the major capital expenditures. This financial flow approach is based on present FSM status and expected to have positive changes in the future with the gaps minimized and FSM services turned out as a viable business.