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COVER STORY

Life finds a way!

The picture depicts a *Cana Indica* plant sprouting in one of the maturation ponds of the faecal sludge treatment plant in Faridpur. These ponds ensure high efficiencies of pathogen removal from the treated waste water before discharging to the environment.

photo: plaban ganguly | 2017 | faridpur

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Editorial Panel
Abdullah Al Fahad
B M Al-Emran
Makfie Farah
Md. Firoz A A Chowdhury
Plaban Ganguly
Qurratul Ayen Shudha
Rakib Uddin Ahmed

Contributor
Abdullah Al-Muyeed, PhD
Ashish Barua
Azizur Rahman
Digbijoy Dey
Habibur Rahman
Rajeev Munankami
Md Golam Muktadir
Moktadir Kabir
Shahidul Islam
Shishir Kumar Biswas
Uttam Kumar Saha
Valerie Meilhaud

Copy & Creatives
Plaban Ganguly

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Advisory Panel

Abdus Shaheen
Country Programme Manager
Water & Sanitation for the Urban Poor (WSUP)

Dr Muhammad Ashraf Ali
Director, ITN-BUET

Dr Khairul Islam
Country Director, WaterAid Bangladesh

Hasin Jahan
Country Director, Practical Action

Jason Belanger
Country Director
SNV Netherlands Development Organisation

25-year-old Nupur has been working at the co-compost plant for the past year; her daily routine involves separating organic and inorganic waste from the all waste that comes into the plant each day. She shares how going through almost half a ton of waste each day is not a job she is ashamed of or feels less-dignified in carrying out. She is doing her part for the community and feeling proud for her contribution!

Acknowledgement

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BENAPOLE MUNICIPALITY

Benapole municipality was established in 2006. It is situated in Jashore and houses the largest land-port station in the southern border of Bangladesh for export import with the neighbouring country India and generates voluminous revenue for the government. This economicall significant municipality has an area of 17.40 km² and population of around 90,000. This municipality has 6410 households. Besides, a large number of people travel between Bangladesh and India through Benapole Customs.

During the early days of FSM in Benapole, Manual emptying services were provided by peer-to-peer arrangements. People used to clean their septic tanks up only when that overflew and dump the sludge in nearby waterbodies or in open environment. Challenges municipality faced including undesirable environmental situation, no existence of mechanical instruments for emptying and public awareness were not up to the mark. Moreover, public awareness was not up to the mark. The situation intensified as the conservancy department of the municipality only followed up on the solid waste management of the locality.

To overcome these challenges, the municipal authority has started providing FSM services to people in Benapole since April 2018 with the support from SNV Netherlands Development Organisation. In this implementation process, the municipality and SNV are playing the following key roles:

- Increase demand and willingness-to-pay among the population for safe sanitation facilities and safe desludging services
- Viable business models for sanitation services targeting different consumer segments develop, teste and establish
- City-wide service delivery framework and enabling conditions develop and adopt by local authorities
- Financially viable, socially acceptable and environmentally safe treatment and re-use technologies introduce, teste and integrate in investment plans
- Progress and lessons learned from the program will be systematically documented, shared and promoted with key sector stakeholders at local and national level

There are 40 pit-emptiers in the municipality. As the faecal sludge treatment plant is yet to become operational, the emptiers dump the sludge by digging holes or in nearby drainage systems to reduce the environmental hazards. Currently, they empty the pits manually. The municipality is planning to ensure their occupational health and safety by introducing safe desludging technologies.

As the service is at its infancy, a lot of challenges are yet to overcome. The municipality has allocated 3.62 million BDT for safe sanitation in the current fiscal year which shows a great determination by the municipal authority towards making FSM fully functional in Benapole.

There is access to both water and sanitation but still a long way to go to meet SDG target. A challenge for WASH sector actors

Safe water is a crisis when it comes to low lands of Bangladesh. People try for different sources to meet their demand. Some of the residents in Benapole as well depend on public toilet

It is not sufficient just to have an infrastructure if there is no proper operation and maintenance.

No one misses this public toilet if you are crossing Benapole border!

Lack of awareness on possible water contamination. Is only knowledge sufficient? How can we change the behavior?

Adapting and replicating a proven partnership model for urban sanitation: SWEEP in Chittagong

CHATTOGRAM CITY CORPORATION

Chattogram is the second largest city in Bangladesh, with a population of three million living in only 155 square kilometres. There is no sewerage in Chattogram: most of the population use septic tanks and a minority rely on wet pit latrines; an estimated 200,000 m^3 of faecal sludge accumulates in Chattogram's tanks and pits every year. The city's surface drainage system is treated as de facto sewerage: a survey found that almost half of Chattogram's residents connect their septic tanks and pit latrines directly to street drains to discharge faecal waste. Those who cannot connect their toilets in such a manner employ informal manual emptiers who dump the sludge in the nearest surface drain or water body. Others open their tanks and pits during the rainy season so the sludge drains away.

To respond to this challenges, building on the model in Dhaka, SWEEP was launched in Chittagong in March 2017 under a tripartite agreement between CCC, Chittagong Sheba Sangstha (a local medical waste collection company), and Water and Sanitation for the Urban Poor (WSUP) Bangladesh. The nature of the contractual arrangement is innovative and unique, responding to opportunities offered by institutional arrangements by Chattogram City Corporation. SWEEP has some distinctive features relative to other PPP arrangements: it is licensed by the government, and the facility (the vacuum tanker) is procured rather than built. The vacuum tanker is then transferred to government but operated by the private sector under a lease/license agreement. Under this agreement, WSUP provided a new vacuum tanker to CCC, which is leased to Sheba. CCC provides access to dumping and treatment sites, refers business to Sheba, and performs infrequent maintenance activities. Sheba operates the business according to quality and service standards set up by WSUP and CCC, invests in marketing, and assumes all operating costs. WSUP serves as the facilitator between the two parties, helping to identify and select the company, arranging lease negotiations, investing in demand creation, and building the operational and managerial capacity of both CCC and Sheba.

Thus, in response to FSM services, a vacuum tanker-based service began work in Chattogram in April 2017. The product of a public-private partnership between CCC, WSUP and Chattogram Sheba Sangstha, resulting 'SWEEP' as a brand for dedicated, effective and efficient emptying and transport service in the city and successfully promoted to customers along the principles of reliability, safety and affordability, over the period. The original vacuum tanker was procured by WSUP for CCC to lease at a reduced price to a vetted private operator (later determined to be CSS following a vetting process). Now operating two tankers, CSS has served nearly 71,491 customers, emptied more than 2128m^3 of sludge and made more than USD 5,148 in profit.

The approach is demonstrating the good marketing for FSM and people of all incomes are willing to pay for improved services. In combination with a socially-minded pricing strategy and a supportive public sector, SWEEP is profitable and is expected to achieve further scale if the capacity of the public sector to work with private actors.

WSUP handed over a vacuum tanker to Chattogram City Corporation on March 2017. After that, the tanker has been leased to Chittagong Sheba Songstha, a private entrepreneur, through PPP agreement initiated by WSUP. Chittagong Sheba Songstha is providing the Septic tank/Pit latrine emptying services by this vacuum tanker and operating the SWEEP-FSM business in Chattogram City

Under SWEEP service, Chittagong Sheba Songstha empties the septic tanks and releases the collected sludge in the Treatment Plant beside Halishahar, Ananda Bazar

Representatives from ITN-BUET visiting the treatment plant in Cahttogram

Embedding and scaling an innovative Public Private Partnership (PPP) model for citywide services in Dhaka, Bangladesh

ওয়াসা

DHAKA WATER SUPPLY AND SEWERAGE AUTHORITY (WASA)

Dhaka Water Supply & Sewerage Authority (DWASA), established in 1963, is as an independent organisation with the mandate of water supply and Sewage disposal to the 16 million city dwellers of Dhaka, the capital of Bangladesh. In Dhaka city, due to the absence of modern FSM services for more than 80-85 percent households, causing prevalence of different types of intestinal and water borne diseases. The situation is even worse in the outskirts and outside of the capital.

There is little sewerage in Dhaka; only 20-25% of its residents are connected to the centralised network provided by Dhaka Water Supply and Sewerage Authority (DWASA). The remainder use on-site sanitation – most of whom are connected to septic tanks, with a minority (mostly in lower income areas) using pit latrines. However, there is a lack of functional treatment for sludge collected from either off-site and on-site facilities.

In response to the situation, a Public Private Partnership (PPP) was established between Dhaka WASA and a commercial enterprise (Gulshan Clean & Care, GCC, a cleaning company), based on a lease agreement for two DWASA-owned vacuum tankers. The partnership aimed at bridging the service gap through the operation of a new faecal sludge emptying service, marketed under the brand name SWEEP. Dhaka Wasa now can bring 20 percent of households under the FSM service. This PPP initiative is supported by Unicef Bangladesh in collaboration with Water and Sanitation for the Urban Poor (WSUP) Bangladesh.

SWEEP, a mechanical emptying service, has worked in Dhaka for three years, serving over 234860 people to date. Operating under a public-private agreement between a commercial enterprise and the city's utility, SWEEP provides safe emptying and transport to institutions and households of all income levels. SWEEP is one of Bangladesh's few formalised and profitable private FSM enterprises. A carefully designed differential pricing strategy and a contractual requirement to serve low-income residents has helped SWEEP achieve commercial viability and equitability. However, poor enforcement of sanitation regulations means that households bypass safe containment or emptying, preventing the FSM market from developing further.

SWEEP is delivered by GCC under a lease-based contract with DWASA. Responsibilities are shared between DWASA and GCC; for example, DWASA is responsible for major vacuum tanker maintenance, while GCC deals with day-to-day maintenance. SWEEP became profitable on an O&M basis within its first five months. Over three years, SWEEP has served around 220,000 people, emptied more than 8,000m^3 of sludge, generated USD 86,000 in revenue and more than USD 15,000 in profit, demonstrating the business potential of professionalised mechanical emptying services in Dhaka. SWEEP is contractually obliged to supply services to customers of different incomes, and to ensure that 30% of customers are low-income.

WSUP has handed over the second vacuum tanker to Dhaka WASA on November 2017. Gulshan Clean and Care (GCC), a private entrepreneur uses this vehicle under a lease agreement. In addition, GCC is also operating the first vacuum tanker through PPP agreement

SWEEP services clean septic tanks from road side business areas at night. The task is risky due to the heavy traffic in the capital. But SWEEP provides the emptying services at a reasonable price in a safe way

In hard to reach areas and in the Low Income Communities (LICs), small scale entrepreneurs provide pit emptying services

As a part of providing the FSM services and operating the SWEEP business, Gulshan Clean and Care (GCC) empties septic tanks in the Low Income Communities (LICs) of Dhaka by vacuum tanker

The efforts to establish a cost effective fecal sludge treatment and kitchen waste co-compost facilities are very impressive. Kushtia municipality has developed a business model to have operate these facilities at zero or minimal net cost. FSTP operation is outsourced to a commercial organic fertiliser company.

SNV/Kushtia/Aidan Dockery/2017

A Practical Solution to Faecal Sludge Management

FARIDPUR MUNICIPALITY

Faridpur Municipality, one of the oldest municipalities in Bangladesh with an area of 39km², has established a full-sanitation value chain of FSM from containment, collection, transportation, disposal to treatment and reuse. Since August 2016, the municipal authority is providing full-fledged FSM service to 0.15 million city dwellers. Practical Action, with the financial support from Bill & Melinda Gates Foundation, has supported the municipality to establish a comprehensive city-wide Faecal Sludge Management (FSM) service for Faridpur city.

Responsible Leadership

Success of a functioning FSM system critically depends on synchronisation and resonance between responsible city authority and responsive citizens at large. Faridpur municipality remains in the forefront for making FSM system functioning and sustainable through ensuring a strong regulatory and enforcement mechanism. The municipality has formed a Multi Stakeholder Steering Committee (MSSC) which acts as a monitoring and guiding entity for FSM services in general. This committee, involving representatives from different stakeholders, oversees the service level agreements, performance of the parties involved, and incentive management.

Responsive Citizens

The municipal authority is rolling out a city-wide social mobilisation campaign, **গুপ্তধনের সন্ধানে - The Treasure Hunt**, targeting all segments of population to make everyone aware and responsive regarding FSM. The campaign developed a sense of responsibility among the city-dwellers around their role as a law-abiding citizen and also among the functionaries of municipality. This mutual role clarity is allowing the municipality to apply legal measures to stop illegal connections and at the same time the citizens are getting space to raise their voices in case proper services are not offered on demand. As a result, after a year of campaigning, the service demand has increased from 8% to 45% and unsafe containment has reduced from 66% to 48%.

eServices for FSM

Faridpur Municipality has introduced online service management facilities through which citizens can place their request for emptying septic tank using mobile app, phone call, SMS, or at the service desk. Received requests are forwarded to the sweepers' cooperatives by the service desk staff in an even and odd number basis. The information of the volume collected and disposed remain recorded into the system. This is further reviewed periodically by MSSC to monitor the proper disposal of the collected sludge into the plant. Besides, this online system retains and updates all relevant information and data, including locations of septic tanks, date, frequency, and volume of sludge etc. to analyse the scenario of FSM in the city.

Compost Research and Training Centre (CRTC)

There is a research & training centre at the plant site with a capacity of 30 persons to provide hands-on training for municipal authorities, engineers, professionals and practitioners for designing, managing and developing business model for FSM.

Public Private Partnership: A Viable Business Model

A business model has been developed for FSM in Faridpur, adopting a Public Private Partnership (PPP) approach. The model envisions city-wide customer services at an affordable price offered by the municipality, the sweepers' cooperatives, and the Treatment Plant Operator (TPO).

Two traditional sweeper communities, both Hindu and Muslim by religion, have been transformed into business entities through formal registration with the Department of Cooperatives having thir own constitution, bank account and operational management structure in place. Municipality has signed a service level agreement with both the sweepers' cooperatives for providing emptying and transportation services to the citizens. There are two vacutags owned by the municipality, one is imported and the other one is made locally, which have been leased out to both these cooperatives. They are now capable of business planning, market expansion, demand assessment and client-friendly service delivery.

The pit-emptying business has become profitable from year one turning the groups into successful entrepreneurs. The tariff has been carefully set considering several factors with a window of safety net for the low income population.

Society Development Committee (SDC), the Treatment Plant Operator (TPO), has signed a contract with the Municipality to manage the treatment plant. The TPO is responsible to produce, demonstrate, and market compost. It also sets mechanism for testing compost to maintain quality set by the government.

Bangladesh Government has adopted this private sector led green business model in the Institutional and Regulatory Framework (IRF) for FSM for all the secondary towns. This appraoch will be scaled up in different towns to turn the informal pit-emptying service into profitable business ventures and dignified livelihood options.

Way Forward

As the size of the municipality extends, the municipal authority will have to put focus on incorporating new and emerging issues and cover the extended and peripheral areas. At the same time, the municipality is planning to adress the gender inclusivity, dignifying the lives of the sanitation workers and retaining the existing clients.

appropriate technology

Modified Gulper

Investment: $140
Capacity: 4,000 litres of sludge per hour

Submersible Pump

Investment: $700
Capacity: 65-80 litres of sludge per minute (1.5hp)

Transport

Investment: $10000
Capacity: 1,850 litres in a single trip (25hp)
Fuel Consumption: 10KM/L

magnitude of the treatment plant

area
1.5 Acres

treatment capacity
24-42m³/Day

compost production capacity
100 tons per year

- **aerobic digestion followed by sun drying**
- **leachet management**

coverage
city-wide 0.15M People

A child observes and points with enthusiasm at the ongoing mechanised desludging operations. A full-sanitation value chain of FSM has been established in Faridpur for making the cities safe for many, like this child, to enjoy.

Happiness of enjoying a dignified life shines out of Abdullah's (25) face who is also a member of the formal sweepers' cooperative.

Locally manufactured sludge transporter having capacity of 1850 litres per trip.

Faecal sludge treatment plant, covering 1.5 acres of land, has the treatment capacity of 42m³ and compost production capacity of 100 tons per year. There is a Compost Research and Training Centre (CRTC) with a capacity of 30 persons where Practical Action provides orientation and hands-on training on designing, developing and managing business model for FSM

All the municipal leaders are taking oaths publicly at the launching ceremony of the social mobilisation campaign, The Treasure Hunt, targeting all segments of population to make them aware and responsive towards safe management of faecal sludge and individual's law abiding role

Abdullah (25), an employee is working at the maturation pond of the treatment plant

ITN-BUET
for mainstreaming FSM in Bangladesh

ITN-BUET
Centre for Water Supply and Waste Management

With the approval of the Institutional and Regulatory Framework (IRF) for Faecal Sludge Management in Bangladesh in November 2017 by the Ministry of Local Government, Rural Development & Co-operatives, a milestone has been achieved for the sanitation sector in Bangladesh. It is a guiding document for policy makers and practitioners for ensuring safely managed sanitation through fecal sludge management (FSM) in both rural and urban areas.

ITN-BUET, one of the pioneers in FSM sector in the country, supported Policy Support Branch, Local Government Division (LGD), Ministry of LGRD&C in developing the IRF-FSM in collaboration with other sector actors. In order to ensure sustainable FSM system in the country, ITN-BUET is currently working with the government and stakeholders to develop the National Action Plan (NAP) for implementing the IRF-FSM, build capacity of the of professionals & practitioners through orientation, training, generate new ideas, conduct action research through identifying existing gaps for appropriate technology and business models, and disseminate knowledge among peers. It is expected NAP will be available for practice at different levels by 2019.

International Training Network (ITN), a centre of Bangladesh University of Engineering and Technology (BUET), started its journey with a vision to achieve a strong, capable human resource base for sustainable development of water supply and sanitation sector in 1997. It has successfully actuated bridging role between academic & research institution and management & implementing organizations. It also strives to create a common platform for the academicians and implementers. The ITN-BUET has a special niche for capacity building in the WASH sector in the country. It takes care of curricula and syllabi, produces master trainers, develops teaching and training materials, develop R&D skills, undertakes research and brings out publication to fill up knowledge gaps. The centre is motivated to identify the gaps in the sector and develop training packages including courses, modules and materials according to the sector need. ITN renders its services on a multiplier effect including gender and social inclusion.

ITN-BUET has coordinated with a number of development partners and banks for ensuring safe environmental sanitation in the country. In early 2000 it started working with the MoLGRD&C to develop the arsenic policy for the country. In 2003-4, ITN-BUET led the process of formulating the Arsenic Mitigation Policy of the country with support from the GoB and other stakeholder. ITN-BUET was the Convener of the committee which formed the National Sanitation Strategy 2005 in collaboration with LGD, DPHE, Sanitation Secretariat and with active participation from relevant sector actor. ITN-BUET was one of members of to prepare the Sector Plan Development 2011-2025 committee and led the R&D sector for water supply and sanitation.

In 2014, ITN-BUET started working with the Asian Development Bank to establish a Knowledge-Hub for onsite sanitation system where fecal sludge management was an important component. This project worked in the background to push the policy makers to develop IRF-FSM in 2017 in Bangladesh. IRF-FSM is new for the local government institutes (LGIs e.g., Paurashava, City Corporation), as well as for DPHE, LGED, WASA, City Development Authority and I/NGOs and many other stakeholders. Hence, for mainstreaming the implementation of IRF-FSM, the dissemination of IRF-FSM among all stakeholders was extremely important. ITN-BUET in collaboration with PSB, LGD and UNICEF disseminated IRF-FSM among the leaders and top level officials of Paurashavas (municipality), City Corporations, DPHE, LGED, WASA, City Development Authority, LGD of ministry, NILG and I/NGOs. Apart from engaging in the policy aspect of the FSM sector, ITN-BUET has developed reference books on water supply and solid waste management which also address FSM both in English and Bangla. These books are currently used at the technical universities in Bangladesh and other countries for undergraduate and graduate students. ITN-BUET has also developed course materials on FSM for faculties like architecture and planning and for technical institutes.

The sector actors felt the need to have a common platform for sectoral collaboration and policy influencing to achieve safe sanitation for all. In 2016, ITN-BUET, WaterAid Bangladesh, Practical Action, SNV Netherlands Development Organization and Water & Sanitation for the Urban Poor (WSUP) created a networking platform, the Bangladesh Fecal Sludge Management (FSM) Network as core group members. More than 40 organizations are working for FSM in Bangladesh and most of them are the members of FSM Network. The FSM Network has successfully integrated and working together with the sectors actors and beyond for a comprehensive fecal sludge management system in the country.

There still remains a number of policy and practice level challenges to ensure safe FSM in Bangladesh. The entire FSM value chain needs to be regularized to address the practice of unsafe containment, unsafe and non-mechanical collection & transportation and illegal dumping/disposal in open places or water bodies. The local government institutions need to build capacity in terms of human resource development, budget allocation, equipment modernization and safe treatment of sludge. Imposing penalty for illegal disposal or inappropriate containment is another crucial challenge. The non-availability of land for fecal sludge treatment is one of the biggest challenges to implement FSM services in cities and towns. On this background, ITN-BUET is currently implementing a national level capacity building program for FSM & City Wide Inclusive Sanitation (CWIS) under a grant from Bill & Melinda Gates Foundation (BMGF) to address many of the above challenges in coordination with GoB and other stakeholders. Under this project, a number of training/orientation programs for decision makers, professional, and master level training for the officials of municipality, DPHE, LGED, I/NGOs, academia and others, would be organized. Also, training for fecal sludge treatment plant operators and pit-emptiers would be delivered engaging municipality and NGOs. Sensitization programs and awareness raising for the community will be organized utilizing print, electronic and social media. ITN-BUET plans to develop and disseminate knowledge products in collaboration with renowned national and international organizations for the capacity building programs at various level.

It is expected that by the time Bangladesh achieves the Middle-Income Country status, it would be able to ensure safely managed fecal sludge system for both rural and urban population. ITN-BUET would be working along with the government and other stakeholders to achieve the target.

Launching ceremony of The Institutional and Regulatory Framework for Faecal Sludge Management (IRF-FSM) in Bangladesh. This regulatory framework is a great guideline to all the stakeholders, especially to the local government institutions, to ensure proper treatment and disposal of human excreta.

Myaor, Satkhira Municipality is sharing the experience of FSM to other mayors

Dissemination workshop on IRF-FSM for the Municipal mayors in Bangladesh

The Vice Chancellor of BUET is delivering his speech in the certificate giving ceremony of the first ever Long Course on FSM in Bangladesh

Stakeholders consultation on National Action Plan for implementing the IRF-FSM

Field inspection of unsafe containment in urban area

I am Mintu. I have been working as a pit-emptier since I was 10. I couldn't go to school as we were not allowed. Even few years back, I was not allowed to enter into the restaurants and departmental stores. But now, I am happily observing that the perception has started changing. We work with gloves and machines and we don't get dirty anymore. People treat us better. We get more work assignments and living a dignified life now. .

PRACTICAL ACTION/Faridpur/Plaban Ganguly/2018

JAMALPUR MUNICIPALITY

Jamalpur Municipality was established in 1869. The area of the Jamalpur Pourashava at present is about 53.28 sq.km and which is the second largest Pourashava in Bangladesh is according to area. It is a "A" class pourashava.

The municipality started their FSM activities in 2017. BRAC WASH Programme supported the municipality for initiating FSM in Jamalpur and working as the implementation organisation of FSM. BRAC trained the local pit emptiers. They also ran a social awareness raising campaign. BRAC provides help for pit and tank emptying. Safe transporting is also a part of BRACs association with the municipality. They have also piloted an organic fertiliser marketing plan.

The operation is being carried out in a cost-effective manner with high value for money. The pit emptiers are getting paid in a result-based incentive model. They are getting the basic salary from BRAC. They are also receiving half of the emptying fee as incentive which ensures their engagement in the whole process. This model is smoothly running since gradual increase in the call for emptying is visible.

In this process, the emptiers received HSE training provided by BRAC. They also started using safety equipment while emptying the septic tanks. Eventually, they are now providing mechanical pit emptying service for the house owners and ensuring their occupational health and safety.

A household owner has to pay 500 BDT per emptying trip. For emptying trip, municipality charges 500-1000 BDT depending on the sludge volume. For tanks, the fee is 1,000-5,000 BDT depending on the size. The pit emptiers receive payment on a result based incentive model. They receive half of the emptying fees. It ensures their involvement with the whole process. The implementing agency also provides the emptiers with a basic income. They do it from the revenue generated from the composting pilot initiative.

Presently, a locally manufactured vacutag is transporting the sludge. Jamalpur Municipality owns and operates the sludge treatment plant. The plant is a 10 km round trip from the city centre. The treatment plant has an area of 336 m2. It can treat 2m3 sludge a day. It uses sand bed drying method. After treatment, the sludge is used to produce fertiliser using the co-composting method.

People have welcomed the initiatives well. After the FSM services were underway, the people are becoming aware of the importance of FSM and it is a part of conversation. Households opting for the services are gradually increasing. The mayor and other officials are very enthusiastic and cooperative during the whole process.

Dumping faecal sludge in open water bodies is still common in Jamalpur. If legal actions are taken against such activities, FSM will become more important and relevant. The basic salary of the emptiers and the emptying fee can be added into

municipality taxes. Besides, the municipality is facing few more challenges like:

- Locations of the pit/tank are difficult to access (in most cases, the pits/tanks are positioned behind the house)
- Households contant with the emptiers on emergency basis when pit/tank overflows. Immediately addressing the call is a challenge
- Emptying fee is not fixed and negotiation is a burden for the emptiers
- Locally manufactured vacutugs often face mechanical problems

Happiness is, the mayor and the municipality were very enthusiastic and helpful during the implantation of the whole process. This initiative is significantly contributing to the environment by:

- Preventing the discharge of wastewater to the water bodies
- Reducing the health risk of the emptiers through training and safety equipment
- Recharging the groundwater with the treated wastewater
- Revitalising the organic content of soil with the promotion of organic fertiliser

The FS liquid is being discharged to the mixing chamber from the customized vacu-tug. The mixing chamber is used as intermediate chamber to properly mix the sludge with the water. Uniformly mixed sludge is then subjected to sand bed drying for dewatering. Separated water is discharged to the ground following the environmental standard.

Front view of the Faecal Sludge and Municipality Solid Waste Co-composting Plant. The place is getting clean since the dumped solid waste is being used for co-composting. External beautification has been done to increase the social acceptance of such initiatives.

Trained pit emptiers provide emptying service using safety equipments. Inclusion of pump made the process safe and fast, which can empty a ordinary pit latrine in 3-5 minutes.

Compost derived from the process which is grinded after co-composting to remove external particles.

JHENAIDAH MUNICIPALITY

Jhenaidah municipality is at the southern parts of Bangladesh. This municipality was established in 1958 with an area of 32.42 km². There are around 2,53,000 people living in the municipality. It houses 18,345 households.

In Jhenaidah Municipality, SNV Netherlands Development Organisation with the financial assistance of BMGF and DFID and in association with Aid Foundation, has been implementing a project namely 'Demonstration of Pro-poor Market-based Solutions for Faecal Sludge Management in Urban Centres of Southern Bangladesh' since 2014.

While implanting this project, major roles played by the Jhenaidah Municipality covered developing safe sanitation system, managing faecal sludge through FSTP, collecting and dumping solid waste, enhancing capacity to develop and implement waste management services and policy, taking initiatives maintaining city wide environmental hygiene, licensing FSM business including emptying and reuse of sludge, infrastructure development for emptying transportation (VaccuTag service) and taking initiatives to improve the emptiers residence, education etc. In this process, key roles played by SNV Netherlands Development Organisation include Providing technical support to develop safe sanitation system, enhancing institutional capacity, policy and advocacy, taking initiatives to maintain city wide environmental hygiene, providing technical support to municipality for making a business plan, introducing faecal sludge management and treatment related improved technologies, and improving infrastructure development for emptying transportation (VaccuTag service).

During the early days of sanitation services, the citizens contacted the pit emptiers personally. The municipality faced various challenges during that time. Most citizens were comfortable employing traditional methods of pit emptying. They were uninterested to improve the methods or pay for them. Many household owners thought it was their duty to clean up the septic tanks or the pits. People were also unaware of the negative effects traditional methods were having on the environment. The pits and septic tanks had direct connections with nearby drains. People who knew about improved FSM services, considered the services too expensive. Often, the septic tanks had flawed designs. This made providing FSM services even difficult.

Jhenaidah Municipality owns 2 vacutags: one with a capacity of 1000 litre, another of 2000 litre. There are different tariffs for the vacutags. For septic tank emptying, the 1000 litre vacutag charges 1150 BDT for the first trip, the second trip costs 500 BDT. Form the 3rd to 5th trip citizens must pay 400 BDT. Onwards, the static fee is 300 BDT. For pit emptying, tariff for the first trip is 575 BDT. Second trip costs 400 BDT and additional trips are charge 300 BDT.

The 2000 litre vacutag will charge 1725 BDT for the first septic tank emptying. Second trip will be 700 BDT; third to fifth will be 600 BDT and additional trips will be 500 BDT. First pit emptying will cost 805 BDT, second one would be for 500 BDT and additional trips will be 400 BDT. The entire tariff include a 15% VAT.

Aid Foundation, a local NGO. with the assistance of municipal authority has been emptying the containment and transporting the collected sludge using these two VaccuTags and dump in the FSTP. The plant has an area of 2.4 acre. The main plant occupies 744 m2 area. It can treat 36m3 sludge a day.

The emptiers and relevant personnel ensure the PPTE during the emptying, transportation and disposal the collected sludge in the treatment plant. There are 40 emptiers working in the municipality among them 25 received OHS and PPTE training, mechanical emptying system and entrepreneurship development. These emptiers now use protective gears during the work. Before engaging in FSM services, the emptiers emptied the pit/ septic tank manually. They faced different health risks for manual working. But after the introduction of improved modern FSM services, the emptiers who have been working with FSM services consider the Vaccutags a blessing for them.

At the beginning, the citizens thought that this service will be expensive. They also perceived that municipality will not be able to provide the services city-wide. Now, people have realised the necessity and importance of FSM service. Ninety percent users were satisfied with the services while 74% of them were happy with tariff. The municipality introduced FSM tax for pit/septic tank services and Public Private Partnership (PPP) for emptying services. They have planned to introduce Market System Approach for end use/ reuse the treated sludge (like co-compost, bricade etc.).

The municipality has been working to establish a city-wide service, but they can cover around 3% of the total holdings only. The municipality is face the following major challenges:

- *Interest in traditional emptying and dumping system:* Most of the city dwellers emptying the pits/septic tank by emptiers who followed traditional practices and dump into digging a whole near the pit/septic tank
- *Lack of interest of the city dwellers in improve emptying system:* Though the municipality had taken initiatives to increase the interest to use improve technology like VaccuTag emptying the filled pit/ septic tank. Most of the city dwellers didn't show their interest using the VaccuTag services.
- *Perception about emptying the pit/septic tank:* Many holdings owner think that they should empty the pit/ septic tank after filling these or overflow the sludge.
- *Lack of awareness on regular and improve emptying:* Most of the city dwellers know about the VacuTag services but they didn't show their interest on using the services.
- *Pit/septic tank connection with the near drain:* Most of the holdings' pit/septic tank had illegal connection with the existing drainage system. These factors cause overflow/discharge of FS in the drains, water bodies or open dump site.
- *Perception about the VaccuTag and improve emptying system:* The city dwellers who know about the VaccuTag services assume that the service cost is higher than the traditional system.
- *Inappropriate design of pit/ septic tank:*vInappropriate design of pit/septic tank also makes the system non-functional

As a way forward, awareness raising regarding safe sanitation is the first in line for Jhenaidah Municipality and SNV. Improving the vacutags is another priority. New technologies must also be introduced for providing FSM services. SNV will also focus on strengthening the PPP model in the municipality. In addition, the municipality and the Department of Environment (DoE) must implement relevant laws.

People enter into FSTP site thinking a new park has been constructed and enjoys the environment but ones they know the reality then then cover their nose as a gesture.

A milestone moment for FSM sector in Bangladesh: Jhenaidah Paurashava has outsourced entire FSM services to AID Foundation after comprehensive selection process. The service has efficiency has increased by 50% wherein Paurashava is monitoring the services.

The earlier version of mechanical emptying device mounted on Nasiman, local van, was good but had many technical limitations. The emptiers were proud to ride on this across the city.

Discussing the upgradation plan for the existing FSTP, which was idle after handing over to Paurashava. Till date 2,000 m3 sludge has been treated safely.

The challenge in managing the public toilet is not the fee for usages. Paurashava is reviewing their leasing modality and with the learning from exposure visit to different cities they are dedicated to ensure proper operation of public toilets across the city.

Demonstration of pro-poor market- based solutions for faecal sludge management in urban centres

KHULNA
CITY CORPORATION

Khulna was declared as municipality on September 8, 1884. In 1972, Khulna Municipality was re-named as Khulna Pourashabha. It was declared Khulna City Corporation on December 12, 1984. The city corporation has an area of 45.65 km² and has 66257 households. This city has 1500689 people living in it.

During the early days, sweepers were largely employed for emptying septic tanks/pits. The sweepers emptied manually and they did their job on a call basis. While emptying, they used to dig a ditch nearby the containment where land is available, otherwise they disposed it to the drains or water bodies. The sweepers used drum carrying with van for the emptying purpose. There is no proper emptying mechanism for pits or septic tanks. In most cases, it was done manually by sweepers only when the tanks overflew. Practically, they dilute the substances with water mixed with kerosene and dump it manually to the nearby open drain.

To meet this challenge, since 2000, KCC started traditional empting service but that was not complete value chain of FSM. In 2014, new strategies for citywide safe sanitation was piloted in Khulna city under the Pro-poor Market-based Solutions for Faecal Sludge Management in Urban Centres of Southern Bangladesh project with the financial support from the Bill & Melinda Gates Foundation and United Kingdom Department for International Development (DFID). The city corporation authority took this initiative with the following major objectives:

- Improve the living environment of people in Khulna city
- Develop safe sanitation system
- Reform human waste management
- Building government capacity to develop and implement waste management services and policy
- Increase the productivity and protect the health and dignity of people working in this vital sector

To ensure improved sanitation access for 250,000 city dwellers of Khulna, conservancy department of KCC have designated staff to deal the service with city dwellers. Three (03) hotline numbers, customer database and GPS tracking system has been introduced to provide and monitor the service. Emptier's are provided with Personal Protective Equipment (PPE). FSM equipment include vacutag, de-sludge tanker vacutag (submersible pump, gumboot, gloves, musk, apron etc.).

KCC owns one 7000 litre, one 5000 litre, 2000 litre capacity while CDC own three 1000 litre capacity vacutags. 260 Of emptiers have been trained on Occupational Health & Safety (OHS) under KCC emptier pool. KCC has promoted and enforced mechanical service. However, manual service also exists to some extent, where mechanical service cannot reach. KCC owned 2000, 5000 & 7000 litre systems charge 1500, 2500 & 3500 BDT per trip per trip, excluding VAT, Income Tax and other fees.

Now the major challenge is to collect sludge and dump to FSTP. Still the disposal of faecal sludge is unusual as most are directly connected to surface water drains or water bodies consequently accumulated sludge overflows into nearby drains and low-lying lands.

In absence of any centralised sewerage network in Khulna city, the majority of population is dependent on onsite sanitation systems. The faecal sludge generated by the city was dumped anywhere and everywhere in the city. Moreover, a lot of these systems were desludged manually. Hence with the financial assistance of SNV Netherlands, Khulna city corporation (KCC) decided to establish a fecal sludge treatment plant (FSTP) at Rajbandh with the help of AIT Bangkok. Since the plant is recently established, SNV and city authority are looking out for ways and means to get truckloads of faecal sludge to the treatment plant.

Khulna FSTP has an area of 1.3 Acres for the site and 700 m2 for the plant, it started its operation in February, 2017. This plant can treat 180 m3 of sludge. The plant has 6 units of planted drying beds, 6 units of unplanted drying beds, 1 constructed wetland with 2 chamber and 1 polishing tank.

Here treated water from the polishing pond after a retention of 10-15 days is transferred to the final collection tank which is finally discharged to a canal behind FSTP. In FSTP treated effluent, the BOD values were found to be varied from 16 mg/L to 25 mg/L while the allowable disposal limit is 40 mg/L for inland surface water bodies (ECR'97, Bangladesh). Total suspended solids (TSS) concentrations were observed in the range of 30~80 mg/L which is within the allowable limit of 100 mg/L. The nitrate and phosphate concentrations in treated effluent were always found to be far less than the acceptable limit. Escherichia coli (E.coli) in final effluent never exceeded 100N/100ml while the acceptable limit is 1000N/100ml.

Presently, KCC and CDC are providing mechanical emptying services for the citizens. For the O&M of the FSTP, city corporation bears responsibility. Considering the experience so far, Khulna is now considering to be a model FSM city and inspiration for FSM in the country, and thereby contributing to the development of national guidance on FSM. KCC-FSM service is now supporting the accessibility to improved sanitation facilities for 250,000 people.

In Khulna City Corporation, a community-based organisation (CBO) named Community Development Committee (CDC), evolved from UNDP funded UPPR project to providing mechanical emptying services with their three 1000 litre vacutags. This is a first ever women led CBO of such kind in Bangladesh let alone in the city. This CBO is considered the only private operator in KCC.

As a result of working together with SNV, the local authorities in Khulna (Khulna City Corporation, Khulna Development Authority, Khulna Water Supply and Sewerage Authority, along with line departments) each have made a commitment that no wastewater should be disposed without treatment. They recently formed a technical team to come up with recommendations for further improvements to localised technical solutions and the workflow for the approval of buildings. With regard to the national building code, they have successfully advocated already for the inclusion of an improved sanitary plan with septic tank and additional approval rounds for construction.

As a way forward, the municipality plans to engage private operators to provide the emptying, transportation and treatment services for faecal sludge. The municipality believes this to be key to create a sustainable FSM service model.

A pit-emptier is emptying a septic tank mechanically in Khulna City Corporation

50% of households in Ward 10 of Khulna City Corporation don't have containment and the sludge is directly disposed in the local environment creating public health risk. A simple DEWAT can be a game changer.

Emptiers are habituated to work with barehand and feet but now with regular persuasion changes are visible. Ensuring Occupational Safety and Health of sanitation workers still remains a challenge.

If the leaders are committed and ready to mainstream any issue, the change can happen very fast. KCC has one of the largest FSTP in the country with a maximum capacity of treating 180m3 sludge per day.

JASHORE MUNICIPALITY

Beginning of a new era in country's one of the oldest municipalities

Jashore municipality started in 1864. It is situated at Southern Bangladesh, in Khulna Division. The municipality has a population of around 286,000. Its area is 14.72 square kilometre. In total, there are 22397 households in the municipality.

The municipality has been providing rudimentary FSM service from 2012. During early days, manual emptying service was the norm. The service was provided through individual arrangement. The environmental effects were largely overlooked. The emptiers were not familiar with mechanical emptying process and public awareness of the whole situation was almost non-existent.

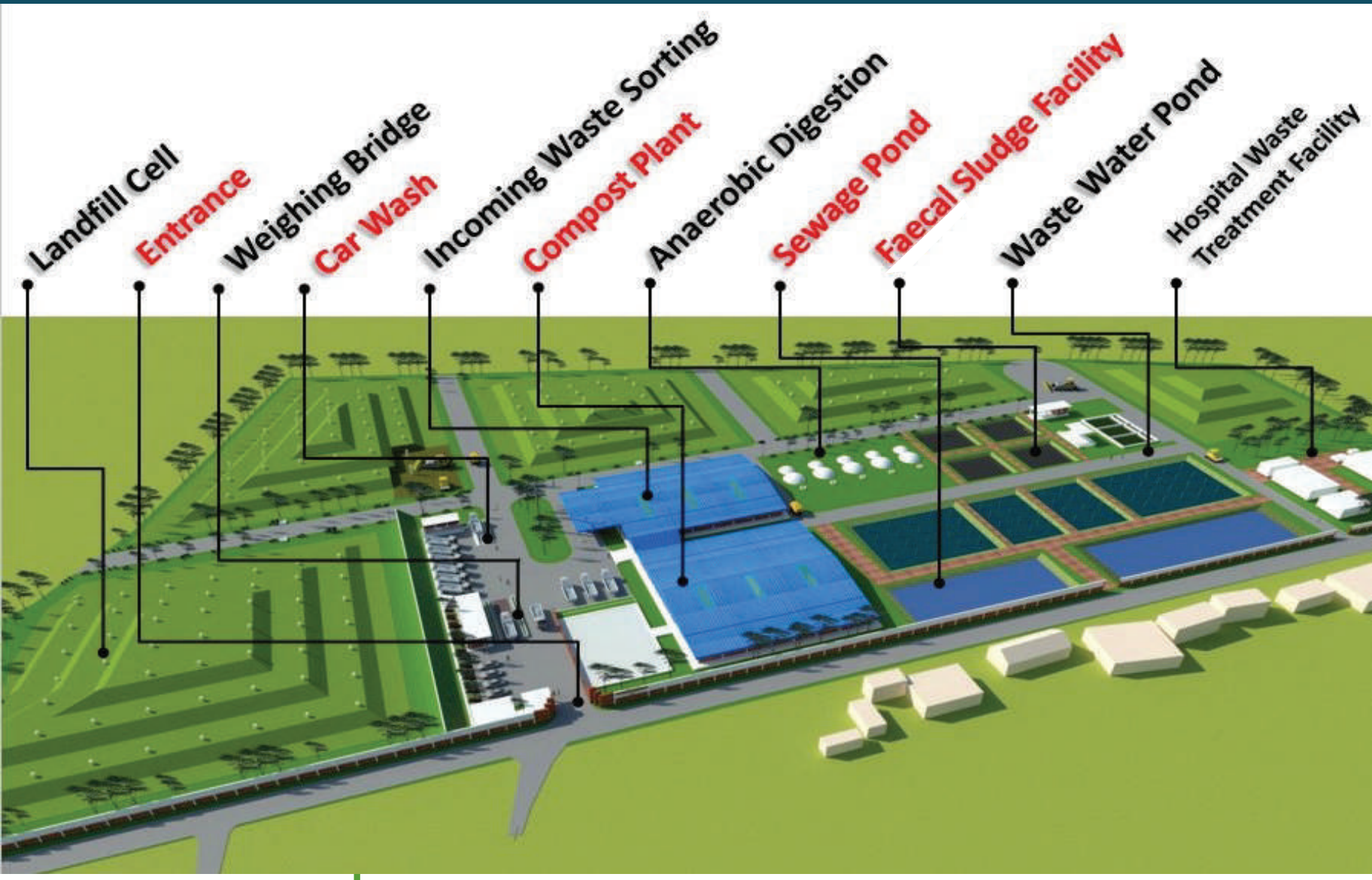
Later on, The Jashore Municipality, started providing improved FSM services since April 2018. SNV Netherlands Development Organisation is supporting the municipality to provide the services successfully. The municipality is playing the key role for:

- Increasing demand and willingness-to-pay among the population for safe sanitation facilities and safe desludging services
- Developing, testing and establishing a viable business models for sanitation services targeting different consumer segments
- Developing and adopting a city-wide service delivery framework and enabling conditions by local authorities
- Introducing, testing and integrating financially viable, socially acceptable and environmentally safe treatment and re-use technologies in investment plans

Now, the municipality owns a 2000 litre vacutag. They use the vacutag to provide FSM services as per the demand. The municipality has constructed the FSTP but it is yet to be operational. The emmptiers dump the sludge in dump-sites and nearby water bodies. Although, the single vacutag is not enough to meet the rising demands of the city. For the firstt emptying trip, the charge is 2300 BDT. From onwards, each trip cost 1500 BDT. Municipal conservancy department operates the emptying services through their relevant emptiers.

The municipality is planning to document the progress and lessons learned from the program systematically, and share that with the key sector stakeholders at local and national level.

INTEGRATED LANDFILL AND RESOURCE RECOVERY FACILITY

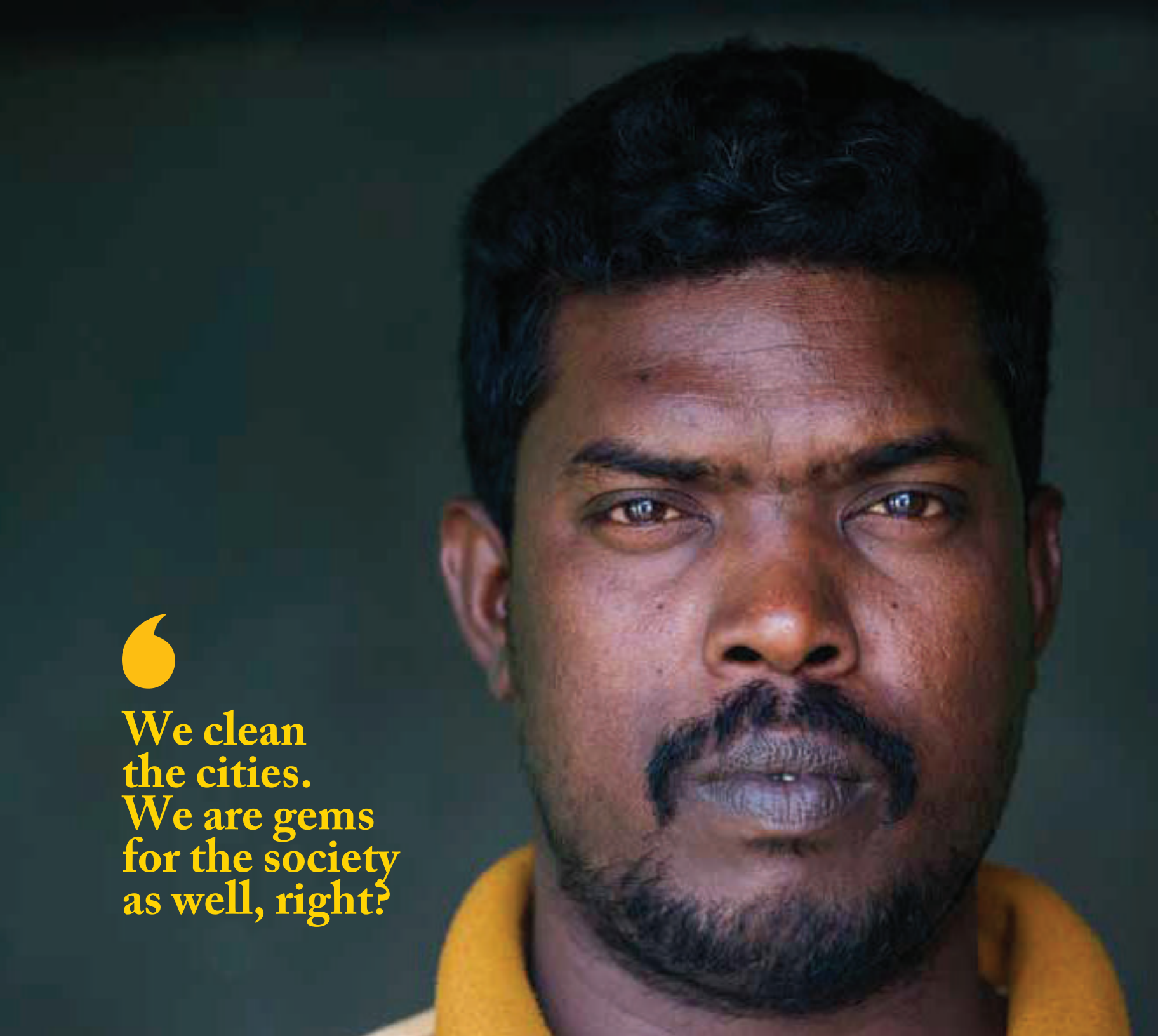


Schematic diagram of Regional Integrated Landfill & Resource Recovery Facility at Jashore being constructed with the support of CRDP (City Region Development) Project

A child observes and points with enthusiasm at the ongoing mechanised desludging operations. A full-sanitation value chain of FSM has been established in Faridpur for making the cities safe for many, like this child, to enjoy.

Did you know the sewage from a leaky or damage pipe can contaminate safe water sources and create massive health hazard?

Safety in using public toilets still remain one of un-discussed topic in the school of FSM. Users often feels reluctance to use the service for the lack of hygiene, proper maintainace and other related issues. Thus, the place often becomes a hub for drug users and criminals.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We clean
the cities.
We are gems
for the society
as well, right?

KUSHTIA MUNICIPALITY

Kushtia Municipality was established in 1869 with an area of 42.79 sq/km. It has a total population of 375,000. Kushtia Municipality is providing septic tank and pit latrine emptying services through vacutug since 2004. Municipality started managing this faecal sludge through co-composting technology since 2012 with the help from UN-ESCAP and waste Concern. SNV Netherlands Development Organization is helping the municipality in FSM since 2014.

The Municipality has the sole responsibility of providing sanitation services within the city. Usually the Municipality provides these services to the citizen with its own source revenue.

To provide sustainable FSM service, municipality is the following key roles:

- Vacutug operation, maintenance and management
- Provide demand base FS emptying services
- Collect sludge and dumping at FSTP site
- Collect kitchen waste and ensure availability at FSTP site
- Monitoring of sludge collection and dumping
- Monitoring the progress of compost production and marketing
- Keeping the customer records (online data entry and hard copy preservation)
- Maintain coordination with development partners (SNV & ERAS)
- Ensure FSM value chain

Environmental Resource Advancement Services (ERAS) working with Municipality since July 2016. As a private sector-ERAS is engaged with FSM services alongside the municipality for promotion of reuse segment. Their main responsibilities are:

- FSTP operation and management
- Semi dry sludge collection from drying bed
- Co-compost production and marketing (shorting of kitchen waste, dumping, drying, netting, packaging)
- Record keeping (desludging, production, marketing)
- Quality control of co-compost (LAB test, moisture control, temperature records)
- Demonstration of co-compost in agriculture farming/field
- Maintain coordination with govt: line department, LGIs, SNV and fertilizer companies as well as pocket farmers
- Progress report produce and share with respective officials

Municipality use vacutugs for providing faecal sludge emptying services to city dwellers. Municipality have 3 vacutugs which have the capacity of 1000 Lt., 2000 Lt., and 4000 Lt. respectively. During the first year, municipality provided free service to the households just to popularise the service and raising awareness. At that time, vity people were not habituated to paid mechanical emptying and were not aware of the environmental hazards due to unsafe desludging.

They preferred low cost manual emptying by hiring sweepers. In second year, they took the fuel cost of vacutag only. The municipality revised the vacutug service charge in August 2016. Since then, a 1000 litre capacity vacutag charges 800 BDT for the first trip. Onwards, it costs 200 BDT. The fee for the first trips for 2000 litre and 4000 litre vacutags are 1000 and 1200 BDT respectively. For further trips, they charge 300 and 500 BDT respectively. In case of pit latrines, complete emptying will cost 500 BDT. A 15% VAT is applicable for all the fees. Conservancy department of Kushtia Municipality have designated staff to deal with the demand and delivery of the services. A total of 10 persons are involved in emptying services (2 drivers and 8 emptiers).

Emptiers use Occupational Health and Safety (OHS) measures (gloves, gumboot, helmet, mask) during service delivery but it's so difficult to ensure all materials for every emptying service at field level. However, these OHS measures have dignified the lives of the sanitation workers, who were socially excluded, and reduced the rate of alcohol dependency & drug abuse while providing emptying service. They suffer from less illness due to the service has become mechanised. The service has created a permanent income source for the workers. Now the pit-emptiers feel proud when they use the vacutug and OHS equipment's for emptying purpose.

In Kushtia, municipality provides the emptying and transportation services and private operator is responsible for O&M of FSTP and production and marketing of co-compost. The treatment plant was designed and implemented with the support from Department of Public Health Engineering (DPHE) which covers 0.5 acres of land with the treatment capacity of 9m3 per day per bed. The municipality has also a coco-pit filter in the Faecal Sludge Treatment Plant (FSTP) for the treatment of the liquid waste water comes from the vacutag.

The municipality has outsourced it's FSTP and Co-compost plant to la icensed organic fertiliser company, Approkashi Ltd., ERAS since June 2016 who is responsible for O&M of FSTP and managing of faecal sludge for production of co-compost. SNV is providing technical support to the Municipality and the private operator for strengthening their services for providing city-wide safe sanitation management. Aprokashi Ltd. is using 40% Faecal Sludge, 40% Organic waste, 15% Cow Dung, and 5% of Sawdust for co-composting. In the last 4 months, Aprokashi Ltd. has produced 12 Tons of co-compost, i.e. 3 tons per month on an average. They sold 4 tons among them.

City authority provides nonstop (30 days) faecal sludge emptying service to the city people based on their demand. This has made the service very unique and popular amongst the citizens of Kushtia municipality. People are more mobilised now a days for receiving mechanical emptying service by municipality with a fixed rate payment scheme. Eventually, the municipal authority has become successful to decrease manual emptying. Moreover, they have engaged private sector for ensuring reuse of faecal sludge in farming system.

As a way forward, Kushtia municipality is planning to introduce different size vacutags for easy access to different roads in the city, market promotion of co-compost and increase the capacity of faecal sludge treatment facilities. They are also planning to assign separate sections to ensure service availability across the city, imposing sanitation tax to buy more equipment and hire people is another branch of FSM service. The Municipality also has started rolling out the Institutional Regulatory Format (IRF) for FSM.

Kushtia Paurashava have been providing emptying services for almost 10 years and Paurashava have waiting list for service for 2 days. After CWISE interventions City Council are motivated and committed to take the service to next level.

Learning by doing: Laying of bricks on drying bed above the filter media has not only made the collection effective and efficient but also reduce the sand content in dried sludge.

Black Gold: which has a potential to support in increasing agricultural productivity and hence ensuring food safety.

LAKSHAM MUNICIPALITY

Laksham Municipality, established in 1984, is a 'Class A' category municipality of Cumilla in Bangladesh. Laksham Municipality spans 19.42 Km² area and has a population around 106,000. Like all other municipalities in Bangladesh, people of Laksham have mainly on-site sanitation system. Around 43 tonnes of faecal sludge are produced each day there and the municipality is the only responsible authority for managing these.

Building on the PPP led city-wide sustainable FSM service model in Faridpur, Laksham municipality has launched a project with the support from Practical Action and Bill & Melinda Gates Foundation and integrated with the Third Urban Governance & Infrastructures Improvement Project (UGIIP-III) to ensure the safe management of these large amount of faecal sludge.

The municipal authority has completed the plan for the Faecal Sludge Treatment Plant (FSTP). The land development and the construction work have started already. Moreover, they have developed a business calendar for the FSTP and are building capacity of the sanitation workers, city dwellers and municipal representatives through training, sensitisation workshops, etc. The municipality have already formed the Multi Stakeholder Steering Committee (MSSC) which will act as a monitoring and guiding entity for FSM services in general and will implement the city sanitation plan. Besides, one business cooperative of the pit-emptiers has been formed there and the formal registration process is underway.

Mayor of the Laksham municipality launched the project on FSM

Meeting of multi-stakeholder steering committee in Laksham municipality

A Good Beginning that needs to be built on

LAXMIPUR MUNICIPALITY

Among the towns in Bangladesh, where faecal sludge treatment plants have been constructed, Lakshmipur municipality has been among the earliest to start operation. The initiative included i) the construction of the sludge treatment system (at the outskirts of the town) and ii) the procurement of tractor towed tanks with suction pumps (vaccutugs) of capacity 2m³ and 0.7m³. The plant has been operational since May 2013.

Treatment and disposal of faecal sludge

Lakshmipur municipality has established a faecal sludge treatment plant with support from the Secondary Town Water Supply and Sanitation Sector project (funded by the GoB and ADB) run by Department of Public Health Engineering (DPHE). DPHE designed and implemented the treatment plant.

The implemented Faecal sludge treatment plants are the conventional sludge drying beds with simple impermeable beds filled with different layers of gravel and sand including planted vegetation for evapotranspiration which enhance the drying phenomenon. Planted drying beds do not need desludging before each new application / loading of sludge as root system of the plants maintains the permeability of the beds. The constructed treatment plant at required around 0.30-acre land area which consists of two beds for alternative use. Each bed consists of 144 m2 area and has been designed to run around 5-7 years i.e. waste water and septage sludge can be disposed in a bed continuously 5-7 years with septic tank emptying interval 2-3 days per week. Currently, the plant receives about 42 m3 of sludge per week. The liquid effluent generated from the plant is reported to satisfy the national discharge standards and are discharged into open environment. End-use of treated sludge has not yet been considered and there is no data on the quality of compost or dried sludge produced at the treatment plant.

Emptying and transportation of faecal sludge

In Lakshmipur municipality, people usually desludge their septic tanks/pits when they overflow; some also reported desludging at fixed regular interval. The municipality introduced mechanical desludging service in 2013, and many people are availing this service. The municipality has received three mechanical desludging equipment (Vacutug) from the Secondary Town Water Supply and Sanitation Sector project (funded by the GoB and ADB) run by DPHE. When a customer places his/her demand of emptying Septic tank.

The present service offered by the Pourashava charges BDT 500 to 1000 (excluding cost of salt, kerosene, bamboo, rope, etc.) per trip. It involves applying and paying the fee, after which the service would be offered in 1-3 days. However, the extent of service at this stage is limited; more resources would be required to expand the service. People also avail manual desludging services, especially in areas inaccessible by Vacutug; manual desludging is slightly cheaper than the mechanical service.

Although Lakshmipur municipality now has the critical public infrastructure in place for an effective faecal sludge management system, it is important that the city now focuses on ensuring improved performance along the sanitation chain -- where the onsite systems work well, faecal sludge is mechanically collected and treated at the treatment site. Here, it is important to stress that the on-site systems should function effectively for the effectiveness of the entire system.

- Improving access to septic tanks and pit latrines for easy mechanical desludging. Presently, it is difficult for the vaccutug to access septic tanks that are in dense settlements or located in relatively inaccessible spaces like beneath stairways.
- Ensuring that the on-site systems like the septic tanks and pit latrines are not directly connected to storm water drains. This practice not only results in environmental pollution, but also poses challenges in estimating the demand and load of the emptying and treatment service respectively

Going forward the Pourashava leadership are to taking efforts to address the above-mentioned areas and also make improvements in the emptying and collection of faecal sludge.

FSM treatment plant in Laxmipur has been operationalised for more than six years and this is currently the benchmark for new FSM plants in other municipalities. The Laxmipur FSM model has become a source of inspiration for many city authorities and they have taken initiatives to replicate the model.

People in Khulna City Corporation think it's a park. After commissioning of FSTP new birds are seen in thelocality. It has also helped to change people's perception towards faecle sludge

SNV/Khulna/Sayed Asif/2018

Upscaling the best practices of FSM Magura embraces the second generation sanitation challenge

MAGURA MUNICIPALITY

Building on the PPP led city-wide sustainable sludge management service model in Faridpur, Magura municipality has started their initiatives towards managing the huge amount of human excreta produced daily. Integrated with the Third Urban Governance & Infrastructures Improvement Project (UGIIP-III) of the Government of Bangladesh, Practical Action and Bill & Melinda Gates Foundation are supporting the municipal authority to overcome their second-generation sanitation challenge.

Magura Municipality, one of the largest municipalities in Bangladesh, was established in 1972 with an area of 44.36 km². It is a part of Khulna Division and an "A" category municipality. Magura municipality has a population of around 114,000. 83 percent of the households, having access to sanitary latrines, depends on onsite sanitation system. The major portion is released into open drains, water bodies and agricultural land. Open drain connection from septic tank or pit latrine is one of the general scenarios in Magura. Being the only responsible authority, Magura municipality has to manage around 46 tonnes of faecal sludge produced daily. Currently, the municipality, is establishing the basis of the FSM services and focusing on the opportunities of an environment friendly, financially sustainable green business model for FSM.

The municipal authority has completed the plan for the Faecal Sludge Treatment Plant (FSTP). The municipality has already acquired land for the plant. Moreover, they have developed a business calendar for the FSTP and are building capacity of the sanitation workers, city dwellers, municipal representatives and other relevant government officials through training, sensitisation workshops, etc.

The municipality have already formed the Multi Stakeholder Steering Committee (MSSC) which will act as a monitoring and guiding entity for FSM services in general and will implement the city sanitation plan. They have already gathered all the key stakeholders, district commission, elected ward councillors, local government institutions, educational institutions, local media and members of the civil society, on a common platform to institutionalise the demand the sustainability of a functioning FSM system. Besides, two business cooperatives of the pit-emptiers have been formed there the formal registration process is underway.

They are trying to synchronise between responsible city authority and responsive citizens. Currently, The municipal authority is designing a city-wide social mobilisation campaign, **গুপ্তধনের সন্ধানে - The Treasure Hunt**, targeting all segments of population to make everyone aware and responsive regarding FSM. The campaign aims to develop a sense of responsibility among the city-dwellers around their role as a law-abiding citizen and also among the functionaries of municipality.

A dialogue on the necessity and the opportunities of sustainable FSM was organised by the municipality and the district commission of Magura. District Commissioner, Mayor and all the ward councillors, representatives from all the government institutions, educational institutions, media and members of the civil society participated the dialogue and discussed the way forward towards establishing a city-wide FSM service in Magura.

Mayor of the Magura and Meherpur municipality have signed an MoU with Practical Action in presence of the project director of UGIIP-III for ensuring greater collaboration

Sharing and discussion meeting with the Town Level Coordination Committee (TLCC) to up scale the FSM in Magura

MEHERPUR MUNICIPALITY

Meherpur Municipality, a historical municipality of Bangladesh, was established in 1869. It is a part of Khulna Division and an "A" category municipality with an area of 17.60 km². Around 70,000 people live here and more than 10,200 tonnes of faecal sludge are produced every year and the municipality is the only responsible authority for managing these huge amounts of human excreta.

Building on the PPP led city-wide sustainable sludge management service model in Faridpur, Meherpur municipality has launched a project with the support from Practical Action and Bill & Melinda Gates Foundation and integrating with the Third Urban Governance & Infrastructures Improvement Project (UGIIP-III) to establish a sustainable FSM service for all the city dwellers in Meherpur.

The municipal authority has completed the plan for the Faecal Sludge Treatment Plant (FSTP). The land development and the construction work have started already. Moreover, they have developed a business calendar for the FSTP and are building capacity of the sanitation workers, city dwellers and municipal representatives through training, sensitisation workshops, etc. The municipality have already formed the Multi Stakeholder Steering Committee (MSSC) which will act as a monitoring and guiding entity for FSM services in general and will implement the city sanitation plan. Besides, two business cooperatives of the pit-emptiers have been formed there the formal registration process is underway.

Meeting of the members from cooperatives of the pit-emptiers. There are two business cooperatives in Magura municipality

Mayor of the municipality is sharing his experiences and vision towards making Meherpur a model town in terms of FSM during the MoU signing ceremony with Practical Action

MYMENSINGH CITY CORPORATION

On going construction work of Polishing Pond for FSTP at Aqua, Mymensingh, jointly by municipality & NGO Forum

Launching workshop. The key stakeholders consulted on the baseline study and FSM framework for conducting the FSM service in coming days

Mr Ekramul Haque, the honorable Mayor of Mymensingh municipality is inaugurating the construction work of Faecal Sludge Treatment Plant (FSTP) at Aqua, Mymensingh

The FSTP is getting ready. The construction work of FSTP is almost at the end. The finishing work is going on full swing with the anticipation to be commissioned by early 2019

NARSINGDI MUNICIPALITY

Narsingdi Municipality provides FSM service to its XXX number of citizens. This initiative was supported by Department of Public Health Engineering (DPHE) under "Secondary Towns Water Supply and Sanitation Sector (GoB-ADB) Project" from 2006 to 2014. The municipality owns a vacutag for emptying, collection and transportation of faecal sludge. They operate a treatment plant having drying beds technology with their own organisational setup. They also provide training and safety equipment to the pit-emptiers.

Faecal Sludge Treatment Plant at Narsingdi Municipality

গুপ্তধনের সন্ধানে

RESPONSIVE CITIZENS

Success of a functioning FSM system critically depends on synchronization and resonance between responsible city authority and responsive citizens at large. Faridpur municipality has rolled out a city-wide social mobilisation campaign, গুপ্তধনের সন্ধানে - The Treasure Hunt, targeting all segments of population to make everyone aware and responsive regarding FSM. The campaign developed a sense of responsibility among the city-dwellers around their role as a law-abiding citizen and also among the functionaries of municipality. This mutual role clarity is allowing the municipality to apply legal measures to stop illegal connections and at the same time the citizens are getting space to raise their voices in case proper services are not offered on demand. As a result, after a year of campaigning, the service demand has increased from 8% to 45% and unsafe containment has reduced from 66% to 48%.

RAJBARI MUNICIPALITY

Rajbari Municipality was established in 1913 with an area of 11.66 m2. It is a part of Dhaka Division and an "A" category municipality. Rajbari has a population of around 56,000, among them 27964 are men and 27818 are female. This municipality houses 8854 holdings mainly dependant on-site sanitation system. Around 23 tonnes of faecal sludge are produced each day there and the municipality is the only responsible authority for managing these.

Building on the PPP led city-wide sustainable sludge management service model in Faridpur, Rajbari municipality has launched a project with the support from Practical Action and Bill & Melinda Gates Foundation and integrated with the Third Urban Governance & Infrastructures Improvement Project (UGIIP-III) to ensure the safe management of these large amount of faecal sludge.

The municipal authority has completed the plan for the Faecal Sludge Treatment Plant (FSTP). The municipality has already acquired land for the plant. Moreover, they have developed a business calendar for the FSTP and are building capacity of the sanitation workers, city dwellers and municipal representatives through training, sensitisation workshops, etc. The municipality have already formed the Multi Stakeholder Steering Committee (MSSC) which will act as a monitoring and guiding entity for FSM services in general and will implement the city sanitation plan. Besides, two business cooperatives of the pit-emptiers have been formed there the formal registration process is underway.

Sharing and discussion meeting with all the elected ward councillors in Rajbari

Workshop on forming cooperatives of the pit-emptiers from the *Harijan* Community

Co-Composting of Faecal Sludge and Municipal Organic Waste in Sakhipur Municipality, Bangladesh

SAKHIPUR MUNICIPALITY

Sakhipur municipality is about 96 km from Dhaka, the capital of Bangladesh. Covering an area of around 18 km², Sakhipur became a municipality in October 2000 and has a population of 32,000 people living in a residential area of around 8km², which translates as a population density of 2,611 people/km² (2011).

In recent years, Sakhipur has been experiencing rapid increase in population, and this, coupled with insufficient waste management strategies, has led to the accumulation of considerable amount of waste in and around the city. Each year, 6,500 metric tons of faecal sludge and 3,500 metric ton of household solid waste is generated. Almost 80 percent of the faecal sludge from the pits or tanks is discharged directly to the environment, either following manual emptying or from overflowing pipes. The Shit Flow Diagram describes the existing situation, where only 21 percent of faecal sludge is disposed safely. It is clear that the absence of a treatment plant has created a gap in the faecal sludge management system. The sweepers manually evacuate the pits and tanks and take the wastes to the disposal points. Due to lack of proper maintenance, emptying and collection services, accumulated sludge from the on-site sanitation units overflows and discharges in nearby open drains, water bodies and forest. This causes a considerable negative impact on public health and harm to the environment. Solid waste management in the town is also inadequate. There are no dustbins nor any designated waste disposal sites. As a result, city dwellers generally dispose of their household waste in ditches, at the roadside or into drains.

Triggered by the significant amount of the solid waste and faecal sludge generated in the municipality, the possibility of combined composting of faecal sludge and organic solid waste was considered by municipal authority, WaterAid Bangladesh and Bangladesh Association of Social Advancement (BASA) during design of the co-composting plant in Sakhipur. Co-composting means composting of two inputs: organic solid waste and faecal sludge.

The municipal authority took the lead in meeting the need for faecal sludge management, working closely with WaterAid Bangladesh and its partner, BASA. The municipality leased a 0.3-acre plot of land outside the city centre for the co-composting plant. WaterAid provided technical and financial support and BASA worked as the implementation partner. Construction work started in 2015, and the plant became fully operational in January 2016. The technology chosen for the co-composting plant is a three-step process: 1) Faecal sludge drying on unplanted drying beds; 2) Wastewater treatment through a constructed wetland, and 3)Aerobic decomposition (composting) of dried faecal sludge and organic solid waste. The treatment plant can treat 5000 litre of sludge per day.

Transportation is a crucial part of a the system in order to reduce the risk of contamination and ensure proper recycling of sludge. Liquid faecal sludge is collected from septic tanks and pit latrines using a 1,000-litre capacity Vacutug owned by the municipality. The Vacutug is currently operating four days a week, and an estimated 16,000l–20,000l of faecal sludge is

collected weekly. It takes three to five trips to fill one bed, where faecal sludge is kept for 14 days and refilled in cycles. The plant has ten 9m²-beds, with a loading capacity of 3,000–5,000 litres each at a loading depth of about 20cm depending on the concentration of the liquid sludge. The base of the bed is lined with three layers of a gravel-sand filter material of different thicknesses and particle sizes.

The solid waste fed into the plant is collected by the municipality from households for a monthly fee of BDT 50 (USD 0.60) a month. The co-composting plant handles 125 metric tons of solid waste a year, and organic components are screened during the separation process, and the inorganic part is recycled and used by industry. Every week, one composting process is initiated in the plant. The organic solid waste, dried faecal sludge and sawdust are mixed at a volume ratio of 3:1:1. Sawdust, purchased cheaply from nearby sawmills, is added to increase the solids content and balance the carbon to nitrogen (C:N) ratio.

Approximately 24 metric tonnes of compost is produced per year. The municipal authority sells the compost directly to local farmers for BDT 16.00 (USD 0.20)/kg, and the farmers use the compost to produce a variety of vegetables. The compost is available in five package sizes: 1kg, 3kg, 5kg and 50kg. The farmers use the compost as soil conditioner locally and the feedback from the farmers is encouraging, and demand for the compost is high in and around the town. Shit flow diagrams (SFD) developed to quantify the pre and post condition of FSM in the municipality revealed that the introduction of the co-composting plant is expected to increase the volume of sludge treated from 21 percent to 58 percent over two years in the city.

Financial and Economic Aspects

The fee for faecal sludge collection and transportation is BDT 800 (USD 10) per trip. An estimated USD 7,000 is collected annually in fees for these services. An additional USD 6,000 per year has been raised from sales of compost. Sakhipur municipality allocates 150,000 BDT for sanitation services.

Operation of the co-composting plant is labour intensive, with a plant supervisor, two solid waste segregators and two personnel working with the Vacutug. Earlier, solid waste sorting was the costliest activity. Since December 2018, the service of collecting solid waste from 1000 households and separating the organic and inorganic wastes has been leased out to a private entrepreneur.

Challenges, Next Steps and Plans for Scaling Up

As a new approach for Bangladesh, the challenge is to change the perception of people about the compost. The stigma around faeces and its reuse needs to be addressed. Human waste can be turned into new resources, and Sakhipur provides the evidence in the context of Bangladesh. The compost produced at Sakhipur improves soil fertility, which leads to more satisfactory yields for farmers. The co-composting plant exemplifies how to effectively deal with solid waste and faecal sludge induced environmental pollution through FSM practice.

The municipality is planning to tackle the rising demand of FSM services. the authority wants to safely manage all the sludge by 2021. The narrow roads leading up to the households are challenging for the vacutags. Moreover, the demand for the pit emptying service is increasing steadily. Only one vacutag is not enough to meet the rising demand.

Workers are disposing sludges in the co-compost plant which has collected from different location in the Sakhipur Municipality

Nupur Akter separating organic and inorganic material from solid waste in the co-compost plant

Afternoons are spent smilingly like this at the Sakhipur Co-compost plant – where workers can be seen taking rest in the middle of their daily sludge collection schedule!

The plant is operating for the last two and half year and treated approximately 2400 MT faecal sludge and 250 MT solid waste.

Two works of Sakhipur co-compost plant preparing the drying bed

Shahabuddin, a worker of co-compost plant, proudly holding the end product "Sakhi compost" in the plant

Last year, Abdul Gofor had used 'Sakhi compost' for the first time on his field to harvest cauliflowers

Co-Composting of Faecal Sludge and Municipal Organic Waste in Sakhipur Municipality, Bangladesh

SAIDPUR MUNICIPALITY

Saidpur Municipality of Nilphamari district is an 'A' category municipality covering an area of 34.42 square kilometers. The total number of households is 28,309 and population size is 136,696. Saidpur is one of the populous cities under Nilphamari District, came into existence on 30 April, 1958 as a municipality. Among the households of the municipality total numbers of septic tanks are 13,702, pit latrines are 11,833.

Among the households of the municipality, it is estimated in a preliminary survey that there are about 15800 septic tanks and more than 3500 pit latrines. From a recent baseline survey, it is found that on an average 76,686 liter of sludge are generated daily. The major portion is released into open drains, water bodies and agricultural land. Open drain connection from septic tank or pit latrine is one of the general scenerio in Saidpur. Thirteen percent (13%) of the excreta flow is classified as safely managed, and the remaining eighty-seven (87%) percent is classified as unsafely managed.

The base line survey reveals that on an average 56.05 ton of household solid waste are generated daily. Very small portion of solid wastes are disposed in designated dumping station by municipality. The rest of the wastes are disposed by road side, disposal in drain, land filling, and open throwing.

Considering the volume of faecal sludge generated in the area and the enormous potential for a comprehensive faecal sludge management scheme, Saidpur Municipality has started providing Faecal Sludge Management (FSM) service since XXX.

Currently, the municipality owns two vacutags. One has a capacity of 3500 litres the other has a 1000 litres. Since the introduction of vacu-tugs, a significat amount of sludge is now transported by trucks. Currently, only a small percentage of the population use this service. The municipal authority collects the applications from the household owners. After the owners have deposited the fees for the services, authorities send the emptiers to provide necessary services. the 3500-litre capacity vacutag charges 1500 BDT per trip, the fee is 500 for the other vacutag. Currently, only a small percentage of the population use this service. As the demand is increasing day by day, the municipal authority is planning how they can provide mechanical pit-emptying service to more population of the city. As the demand is increasing day by day, the municipal authority is planning how they can provide mechanical pit-emptying service to more population of the city. Earlier, almost all the pits and septic tanks were emptied manually using a bucket and rope. Unfortunately, health and safety were not a consideration when they are on the job, which is typically done in the dead of night. But the scenario has started changing. Saidpur Municipality has 100-trained pit-emptiers. Now, the emptiers have the mechanical emptier, gloves, masks and boots for ensuring safety and efficiency.

People of two distinct culture live in Saidpur. Forty five percent of them are non-bengali. This might prove challenging in the long run. Convincing the people to shift from employing manual emptying to mechanical was the largest challenge during the early days. One major challenge remains; the absence of a Faecal Sludge Treatment Plant (FSTP). Presently all the sludge is dumped in a pond and other water bodies. Citizens were doubtful about the process, end product and were unwilling to receive mechanical pit emptying service. At the same time there is an increasing trend of waste generation in the municipality. A significant percentage of the population has no access to proper waste disposal services. As a result, most of the people, illegally dispose their waste and faecal sludge in an open environment or in nearby waterbodies which is posing serious environmental and health hazards to the citizens.

To address the above environmental hazards, Saidpur Municipality, in assistance with SKS Foundation and the financial support from WaterAid Bangladesh has started establishing a human sludge and solid waste treatment plant. Municipality authority has provided a land of 160 decimal to ensure sustainable solid waste and faecal sludge management.

Participants at the Town Level Sanitation Planning workshop – discussions were held on a wide variety of topics surrounding the key roles and responsibilities of municipalities and other stakeholders present on the day.

Engineers and workers all at work – skeletons of the drying beds can be seen surfacing here.

The Mayor speaks at the inaugural ceremony of the construction work.

160 decimals of land have been allotted for the Co-compost plant – this is a landscape view!

The drying beds are almost complete!

SIRAJGANJ MUNICIPALITY

Sirajganj municipality is situated in north-central region in Bangladesh, lying on the Jamuna River and just west of the Brahmaputra River. The municipality has a population of about 156,000.

Major types of sanitation facilities in Sirajganj municipality include: (a) pour flash toilets with a single direct or off-set pit, (b) pour-flush toilet with twin off-set pit, (c) pour flash latrine with septic tank, with or without soak pit. Sanitation coverage in the municipality is reported to be about 96.2%.

Sirajganj municipality has established a faecal sludge treatment plant with technical support from DPHE in 2013-14 on a one-acre land under GoB-ADB funded Secondary Town Water Supply and Sanitation Project. After construction of treatment plant, DPHE has handed it over to the municipality for operation and maintenance.

Before the introduction of mechanical pit emptying service by the municipality in 2012, manual pit emptying was the common and only form of service available. The process was unhygienic, generates odour nuisance, and hazardous to the manual emptier who do not use any safety gear. The cost of emptying varies from Tk. 500 to 1000 per pit. The municipality started mechanical emptying service from December 2012 after obtaining a 2000L capacity vacutug from UNICEF; the collected sludge is transported to a treatment plant. The emptying charge is Tk. 2500 for the first trip, and Tk. 1500 for the next trip, if needed. Vacutug transports the collected sludge in a closed container and disposes the sludge to the filter bed of the treatment plant. Currently, the municipality is taking initiative to popularise FSM to increase the demand of the service.

Contruction work of the faecal sludge treatment plant in Sirajganj municipality

Sustainable sludge management services: Engaging traditional pit-emptier groups by ensuring their occupational health and safety and promoting the protection of environment

SATKHIRA MUNICIPALITY

In 1869, Satkhira municipality was established with an area of 31.10 km². Satkhira Municipality with a population of about 140,000 people and about 24,000 households; is entirely covered by on-site sanitation system (i.e., septic tank system and pit latrines). People usually desludge septic tanks and pits when they become full or overflow; draining of pit contents to drain/low-lying area is also common.

Traditional pit emptier groups (often referred to as "sweepers") carry out the manual pit/tank emptying operations without any protective gear, exposing themselves to serious health hazards; this has serious adverse impact on their lives and livelihood. The emptied faecal sludge used to be discharged into a water body causing serious environmental pollution and threatening public health.

To overcome this challenge, Satkhira Municipality with support from Practical Action initiated FSM services covering entire service chain from collection to treatment through construction of a 2000 l/day capacity treatment plant in 2014. However, ensuring proper collection and transportation of faecal sludge employing the traditional pit emptier groups was a major challenge. After a series of awareness raising, motivational programs and training, the traditional pit emptier groups are now using locally available/fabricated modern equipment and safety gears for collection and transportation of faecal sludge to the treatment plant. This has significantly improved the lives of the traditional pit emptier groups. However, the FSM service is able to cover only a small fraction of the population and major challenges remain.

The municipality does not consider the service as a business venture. They invested in buying the equipment e.g. treatment plant and transporter for the faecal sludge. The municipality then leased out those tools to the sweeper groups so that they can provide the service. The sweeper group provided the services, took the fees, did regular maintenance of the transporter and other small equipment from that money and the remaining was their profit.

To provide the FSM services, Satkhira municipality has five 3-ton capacity trucks among which 3 are operational. There are two tractor-trailers (Locally known as Nasiman) with which only 12 to 15 tons of waste are collected. The transporter can transport 1 cubic-meter per trip and can serve up-to 10 trips/night. But the transporter never met such demands as the serving area was very small. The treatment plant is small too. It can treat 2 cubic metre sludge a day. The municipality officially provide the service by Vacutag.

People in Satkhira were unaware about the adverse effects of unmanaged faecal sludge on the environment and public health. And the service demand of FSM is quite low because of this. People often consider the service expensive and contact sweepers directly. Then the sweepers visit them to manually empty the pit or septic tanks.

Households of Satkhira Municipality were positive to the FSM activities. However, the practice is still not quite popoular as it should be. The treatment plant is small. In future, when the demand increases for such services, this treatment plant will not be able to provide all the necessary support.

Despite all the limitations, there are ways forward for Satkhira. An efficient social mobilisation campaign can change the attitude of the citizens. As it already happened in Faridpur, Satkhira Municipality is also looking forward to make their citizens responsive towards FSM. The municipality also requires improved technology along with proper fund. Above all, the great sign of hope is, Satkhira Municipality is getting an increase in the demand for FSM service gradually.

The Pilot Feacal Sludge Treatment Plant at Satkhira Municipality

Demonstration of the "Citywide Faecal Sludge Treatment Facility" developed based on experience and learning from Satkhira.

Pit Emptiers using adapted submersible pump to increase operational efficiency

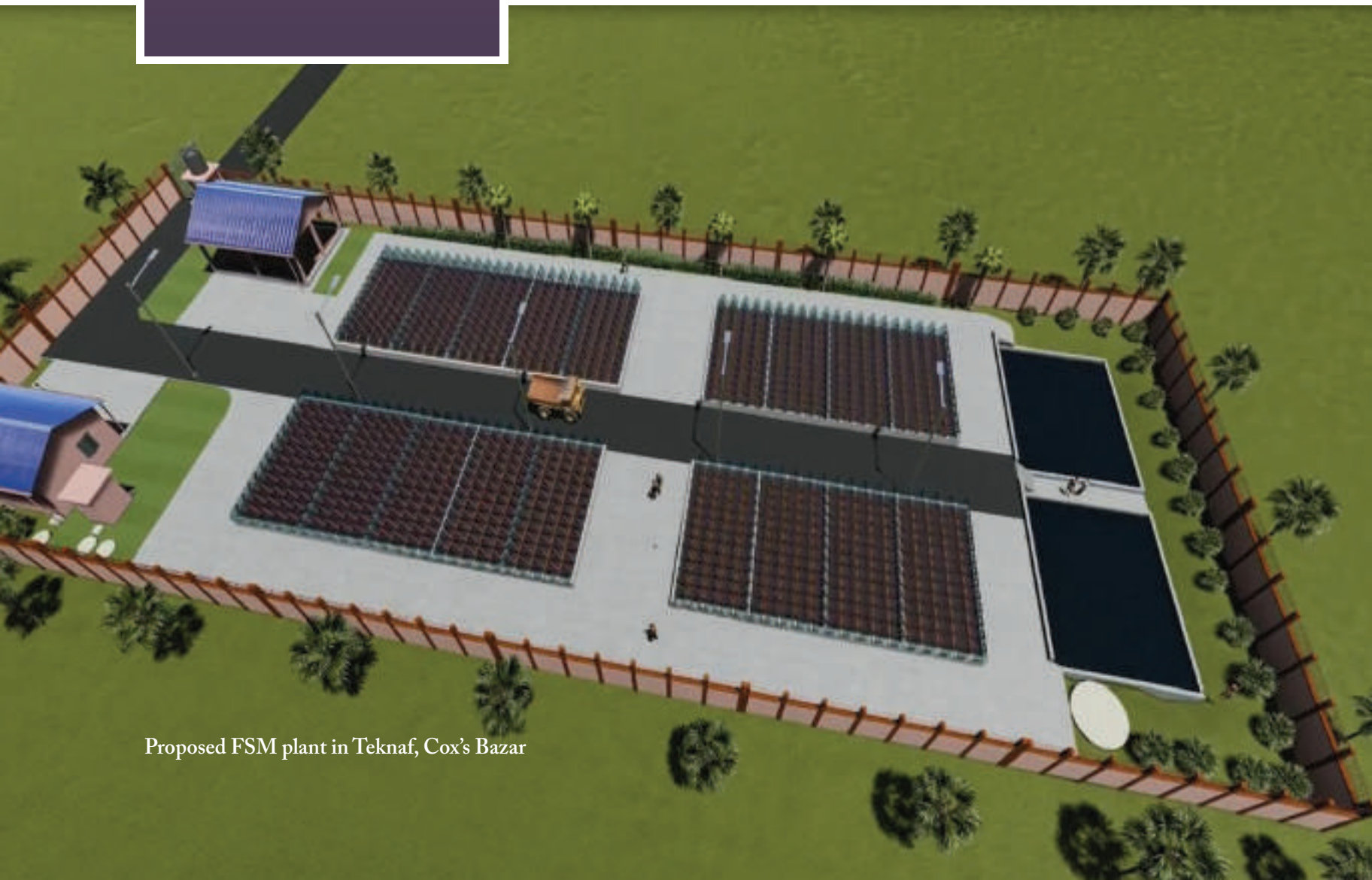
Drying semi-solid sludge. It is safe for multipurpose application

Use of health safety gears while delivering pit-emptying service at Satkhira Municipality. The municipality also uses a locally manufactured and low-cost sludge transporter

TEKNAF MUNICIPALITY

Teknaf Municipality is the southernmost of Bangladesh. It was established in 2000 with an area of 4.05 km². It has a population of arounf 25,000.

The Teknaf municipality has started working on eshtablishing a full FSM value chain addressing local needs and contextual challenges. The municipal authority will work to improve the whole sanitation chain including the desludging and faecal sludge treatment in order to ensure the quality of all interlinked FSM activities.



Proposed FSM plant in Teknaf, Cox's Bazar

INSTITUTIONAL AND REGULATORY FRAMEWORK for FAECAL SLUDGE MANAGEMENT (FSM)

IRF-FSM, launched in November 2017, was a timely step of the Local Government Division of the Ministry of LGRD&C to guide Department of Public Health Engineering (DPHE), Water and Sewerage Authorities, City and Municipal Authorities, NGOs, and especially Local Government Institutions (LGIs) who are playing the central role for ensuring proper treatment and disposal of faecal sludge.

FSM is gradually gaining a great momentum in Bangladesh. I am very happy that DPHE is successfully playing the central role in it

Engr. Md. Saifur Rahman
Chief Engineer, DPHE

Dhaka WASA put emphasis on developing a Public Private Partnership for a sustainable FSM system in the capital of the coutry

Uttam Kumar Roy
Deputy Managing Director-Finance
Dhaka WASA

The Government considers FSM is a key component of achieving SDG 6 by 2031. I hope DPHE and Bangladesh FSM Network will play a major role in achieving this goal

Robin Raihan Ahmed
Chairman, FSM Support Cell, DPHE

I pledge to make Faridpur an illegal sewage connection free city. We together will turn all the faecal sludge into wealth. I will make Faridpur an ideal city in Bangladesh in terms of FSM

Sheikh Mahtab Ali Methu
Mayor, Faridpur Municipality

I am trying to make my city inclusive, green and safer for the city dwellers and dignify the lives of the pit-emptiers and cleaners by implementing FSM successfully

Md Saidul Karim Mintu
Mayor, Jhenaidah Municipality

I took the challenge of recycling faecal sludge and turning it into compost. I am determined to manage all the waste to make my municipality green and clean for the citizens.

Abu Hanif Azad
Mayor, Sakhipur Municipality

I am
Sonia, 25 years old
daughter of a pit-emptier, sister of a
pit-emptier, daughter in-law of a pit
emptier and wife of a pit-emptier, from Rajbari,
Bangladesh. My whole family has been working in
emptying the faecal sludge. I have been witnessing their
sufferings and struggles very closely from a very young age.
While cleaning the septic tanks manually, my father broke his
leg, my father in-law fell in and injured his chest and damaged
lungs severely from the gas inside. My husband injured his hand
when a slab fell on him. I had to face financial crisis then as they
were the only earning members of both of my families, paternal
and in-law's. During those struggling periods, we somehow
made it through the day. Besides, People called me out as
sweeper's daughter and sweeper's wife earlier. I was not
allowed in schools, restaurants and general stores. But, I am
very happy to say things are changing now a days. Being a
home maker, I can observe these changes towards our
social inclusion and occupational security. My
father, father in-law and my husband
receive more dignity and my children
have started going to
school.

BANGLADESH
FSM NETWORK

Bangladesh FSM Network is a common and collective platform for the sector actors to generate ideas, share views, influence policy and practice, and raise a collective voice to meet the challenges of sanitation sector

GET IN TOUCH | please write to:
mehrab.goni@practicalaction.org.bd

SECRETARIAT | House- 28/A, Road- 05, Dhanmondi, Dhaka - 1205
T: +880 2 9672683, 9675236 | F: +880 2 9674340