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BILL & MELINDA GATES foundation

Faecal Sludge Management

Jalampur Municipality

In urban areas of Bangladesh, safe management of faecal sludge is often overlooked despite the country's extensive coverage of on–site sanitation systems. Managing sanitation, in the prevailing situation, is viewed as a household responsibility and is therefore largely ungoverned and unfunded. As a result, families often delay emptying as long as possible and often continue to use the pits beyond its capacity for safe containment. Households commonly use manual or automated systems to empty their pits or discharge their pit contents directly to low lying areas, storm water drains or water bodies. In all cases, faecal matter is released straight into the environment before being safely managed. Moreover, leachate from pits causes contamination of groundwater with bacterial pathogens and nitrates in addition to foul smell, mosquito breeding and vector transmission, a threat that is severe in dense habitats. Discussion with public authorities revealed that many latrines and even public toilets lose usability when pits remain full and are deemed obsolete after a period.

A substantial gap exists between the demand for excreta management services and the ability of the local government institutions to routinely provide it. The municipalities who are responsible for providing FSM services have limited capacity, both in terms of resources and trained manpower, for delivery of FSM services. Municipalities also lack proper solid waste collection facilities thus communities often resort to dumping household waste on the streets or nearby wetlands.

In 2017, BRAC WASH implemented a pilot project on operating a faecal sludge management plant in Jamalpur pourashava to collect learnings and subsequently develop an understanding of the feasibility of establishing a value chain model for safe collection, transportation, treatment and reuse of faecal sludge in the municipality. Jamalpur is one of the largest municipalities of the country which houses nearly 148,219 inhabitants and 35,039 households. Each year the municipality produces nearly 37.05 tons of faecal sludge and 18.2 tons of solid wastes, most of which are inappropriately managed. Jamalpur municipality was also one of the 38 municipalities in which BRAC WASH operated in since 2016, and had a municipality owned faecal sludge (FS) treatment plant which made it an ideal candidate to initiate BRAC's waste management pilot project.

The pilot project was aimed to improve the capacity of the municipal authorities by renovating and operating a faecal sludge treatment plant, developing a sanitation value chain and ultimately handing over the operations of treatment plants

BRAC followed a multidimensional approach to develop the sanitation value chain in partnership with the Jamalpur municipality, from creating demand through advocacy and promotional activities to ensuring supply by developing human and solid waste collectors, operating the treatment plant, and marketing the organic fertilizer produced through co-composting. This project brief explains the details of the activities that the programme implemented:

Partnership with the municipality:

BRAC partnered with the Jamalpur municipal authority to instigate the safe management of faecal sludge in 2017. Under this partnership, it was agreed that BRAC WASH would provide technical support to develop the sanitation value chain, while the municipality would provide a its non–functional treatment plant, a large vacutug for mechanical collection and transport of faecal sludge, and administrative support for the recruitment of workforce, community mobilization and awareness raising activities.

Activities in Jamalpur's Sanitation Value Chain

ACCESS TO TOILETS

BRAC's Urban WASH project provides sanitation loans so households can install new or upgrade existing latrines. On site twin-pit latrines are promoted as the ideal technology

EMPTYING

Pit emptiers are trained on safe emptying of pits or septic tanks using the mechanical vacutug Households receive this service in exchange of a fee

TRANSPORT

The faecal sludge collected from household pits are safely transported to the FS treatment plant where it is undergoes multiple stages of treatment

TREATMENT

The faecal sludge is disposed and stored at the mixing chamber, followed by transfer to the drying chamber to remove moisture. Next, it is co-composted with organic household waste

REUSE

Faecal slugde and organic waste is co-composted, dried, weighed and packaged into organic fertiliser-The fertilizer is sold to farmers

Creating demand and developing service providers:

As the first step to develop the sanitation value change, BRAC WASH, with support from the municipal authorities, reactivated ward level WatSan committees to create demand for faecal sludge management services. Mobilizing WatSan committees facilitated community engagement, and enabled municipal authorities and BRAC WASH staff to communicate to communities that connecting their pit latrines to storm water drains were illegal and harmful for the environment. Households were also informed and motivated to construct septic tanks and refrain from using manual labour to clean their latrine pits/septic tanks, because through such practices, pit contents were almost always disposed openly to the environment. Additionally, through community mobilization and mass communication the municipal authorities also disseminated messages to households to avail mechanical pit emptying services.

Secondly, to create a network of service providers to meet the rising demand for pit emptying services, the programme recruited pit emptiers and trained them on mechanical emptying, occupational safety, and operating a vacutug. Besides safe management of human waste, the programme also actively worked towards ensuring that household wastes were effectively managed. BRAC WASH conducted a baseline survey to identify household data on solid waste collection, and based on the information and consultation with the municipal authorities, developed Solid Waste Entrepreneurs (SWE) to provide waste collection services where municipal services were unavailable. SWEs were developed through provision of financial services, technical support and connecting them to households in communities. Each SWE provided waste collection services to 200–250 households in exchange of a service fee.

Renovation and operation of the treatment plant

The programme renovated the municipal treatment plant to increase its capacity and effectiveness to manage larger volumes of waste, and treat the effluent to meet the national standard parameters. In an effort to make the plant more efficient, its capacity was increased from 30 cubic meters to 60 cubic meters, newer and smaller drying beds were constructed to dry the sludge faster and more effectively. An anaerobic baffled reactor was constructed to treat the effluent leaching out of the sludge before releasing into the environment. Furthermore an auto–compost mixer machine was added for ensuring improved quality of the organic fertilizer. A smaller vacutug (of 800L capacity) was also custom built to access narrow alleys of the municipal areas which could not be accessed by the larger vacutug.

The pit emptier and waste collectors provided services to communities in exchange for a service fee, and disposed of the human and household wastes in the faecal sludge treatment plant to be co–composted. In the treatment plant, faecal sludge is primarily treated to remove moisture and then co–composted with organic solid waste at the ratio of 1:2 to produce organic fertilizer which is safe for reuse.

CO-COMPOSTING PROCESS

Organic Household Waste

Solid waste entrepreneurs dispose the household waste at the treatment plants

Sorting and Cutting

The household wastes are sorted to remove the inorganic material. The organic matter is then cut into smaller pieces

Aeration Turning

Quality Control

Packaging of Organic Fertilizer

Mixed blending

The organic household waste and dried faecal sludge are transferred to the compostion chamber and mixed in the ratio of 2:1 to produce organic fertilizer

Faecal Sludge

The faecal sludge is disposed at the treatment plant from the vacutug

Drying

The faecal sludge is stored at the mixing chamber followed by transfering to the drying chamber to separate the waste water and remove moisture

Promotion of waste collection services and use of organic fertilizers

In the early stages of the project, the programme held advocacy sessions with the local government in an effort to create a sense of awareness and accountability amongst the authority. In later parts of the project, the municipal authority and the programme collectively raised awareness against illegal pit connections to municipal drains, and promoted mechanical pit emptying services. The programme distributed promotional materials to households and institutions which illustrated phone numbers to avail the service. Moreover, desludging services were also promoted using the network of waste collectors.

However, to nudge households and institutions to adopt FSM services instead of utilizing manual labor and hazardous waste disposal practices, a rigorous awareness raising campaign needs to be put in place. ITN BUET with support from the Department of Public Health Engineering (DPHE) have developed an awareness raising campaign strategy for FSM for municipalities to commence the campaigns.