

Study on Existing Faecal Sludge Management Situation in Dinajpur Municipality

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Abstract

Faecal sludge comprise the human excreta both in liquid and semi-solid states which stored in pits and septic tanks. The absence of adequate excreta management system in many cities of developing countries continuously leads to serious health and environmental problem. The aim of this study is to identify the current scenario of faecal sludge management in Dinajpur municipality. With the use of questioner survey, this study has been carried out a total of 1650 householders. It shows that all the householders are used on site sanitation system where 67% is sanitary latrines. About 87% toilet and 63% septic tanks are within house. However 74% households do not have any sock pit and 11% pits are connected with open drain which is alarming for spreading diseases. It is also found that 79% of septic tank are emptied over time, over which 64% of tanks emptied manually by sweeper and rest of them by municipal services provided by Dinajpur municipality. In recent years cost per emptying is above 800 taka. Most of the manual emptied sludge are deposited on pits and drains. The encouraging matter is that 85% of septic tanks are easily accessible which is helpful for emptying sludge.

Keywords: Faecal sludge; Survey; Septic tank; Empty; Disposal.

1 Introduction

Worldwide 1.7 billion people is still behind the basic sanitation services, such as private toilets or latrines. Of these, 494 million still defecate in the open place, such as in street gutters, behind bushes or into open bodies of water facilities (WHO, 2020). Globally full sanitation facilities are not the same. In Bangladesh 40% of all latrines are classified as unimproved (World Bank, 2016). In urban areas, on-site sanitation system particularly pit latrines are becoming more familiar as it is the most economical solution to sanitation provision (Still, 2002; Thye et. al., 2011). However, the main challenge is that pits have a limited capacity and when fill, it can be no longer being useful. (Still et.al. 2005). In order to remain it useful under working conditions, pits need to be emptied when it fill up (Thye et.al. 2009). Thus the technologically advanced means of emptying pits is the use of cesspool trucks because it has high a level of efficiency and the extent to which it reduces the contact with faecal sludge (Eales, 2005). However the cost of emptying of this technique is so high that most people are using manual emptier (Kone & Chowdhry, 2012) who often dump sludge indiscriminately into the environment (Klingel et. al. 2002) or by simply disposing off into the closest stream (Schaub-Jones et.al. 2006). The main cost determining factors are: the capacity of the truck, fuel, distance, labor, dumping costs and profit margins of the cesspool truck operator and or the owner of the truck (Murungi & Dijk, 2014). This resulting in pollution of the water and other environmental resources, which affects the health of the community.

Faecal sludge (FS) is the sludge found in onsite sanitation (OSS) technologies. Strande described it as a fresh or partly digested slurry or semisolid substance with a high concentration of pathogen, resulting from the storage, collection or treatment of mixture of excreta and black water, with or without grey water. A well-constructed and maintained OSS facility is momentous to the separation of human contact from human faces, and promotion of safe public health and environment (Nakagiri et.al. 2016). Indubitably said that an effective and efficient FS management system should be considered for handling of FS until safe disposal stage because when FS is not well managed, it threatens human health and dignity. (Harada et.al. 2015). So it requires to be treated the sludge before disposal. But in practice, due to lack of law enforcement from the Public Health and Environmental Office and sludge disposal options, faecal sludge from on-site facilities rarely reaches a treatment or disposal facilities. However Manual emptier and private vacuum trucks often tend to dispose the sludge where most convenient, such as nearby streams, rivers or lakes and bushes, thus creating environmental and public health

hazards. Thus Faecal sludge management (FSM) refers to the storage, collection, conveyance, treatment and safe disposal or productive reuse of faecal sludge (Okoye, 2016). Effective FS management systems entails transactions and interactions among a variety of people and organizations from the public, private and civil society at every step in the service chain, from the household level user, to collection and transport companies, operators of treatment plants, and the final end user of treated sludge (Islam, 2016).

Nowadays Dinajpur municipality is developing rapidly. It has a population of about 186727 and 12 wards (Dinajpur Municipality, 2023). The municipality is an unsewered old city where on site sanitation technologies are used by the community. The faecal sludge management scenario is becoming critical day by day with increasing populations and households. Moreover, there is no designated place for treatment and disposal of faecal sludge in this municipality. Even, most of the house owner have not enough space for dumping their faecal sludge within their premises. As a consequence, for the design and development of proper faecal sludge management system, the current scenario of the FSM service are essential to know of Dinajpur municipality. Therefore the aim of the study is to collect the field level information to see the existing FSM situation.

2 Methodology

Within the area of Dinajpur municipality this study has been carrying out. With the use of well-structured questionnaire, observation and analysis of collected data, this study aims at to see the existing situation of faecal sludge management system of this municipality. Twelve teams with five persons of each team were conducting the survey with a total 1650 households of the municipality. Each team were collecting data from each wards. In this investigation, householders were asked to know about how long they are living there, how many persons living in their houses, the types of toilet facilities they used, location of toilets, location & position of septic tank and accessibility of septic tank. They also asked in case when the pits full what they do, what methods they apply for disposing sludge and where they disposed their sludge. The information regarding number of emptying during their living period and cost per emptying were questioned. . In addition, it was also surveyed that whether the septic tank is connected with sock pit or open drain. Then the house owners were asked for their opinion regarding the willingness to pay more for providing better service by authority. Finally the data of the questionnaire were analyzed with Microsoft Excel.

3 Results and Discussions

A total of 1650 households have surveyed during the process of data collection of this research where the household head is the main target. The respondents are mostly women compared than the male during the survey time. In most of the cases, the respondents are free-flowing to give the answers but some of the respondents are unwilling to give information. All the information collected from the survey were analyzed in percentage and represents in graphical form. It is shown that 43% of people living there for more than 20 years (Figure 1). The numbers is increasing day by day.

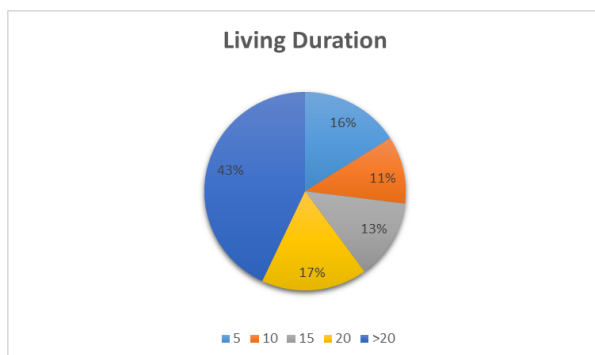


Figure 1. Duration of Living Year

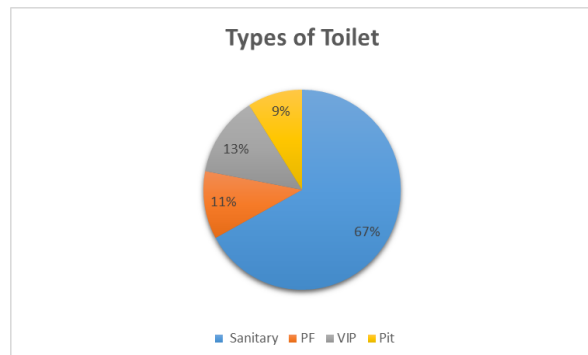


Figure 2. Types of Toilet Used by the households

All the households in Dinajpur Municipality are using on site sanitation system. Among the 1650 households 67% are using sanitary latrines Where 9%, 13% & 11% are using pit, Ventilated Improved pit & Pour Flash latrine respectively (Figure 2).

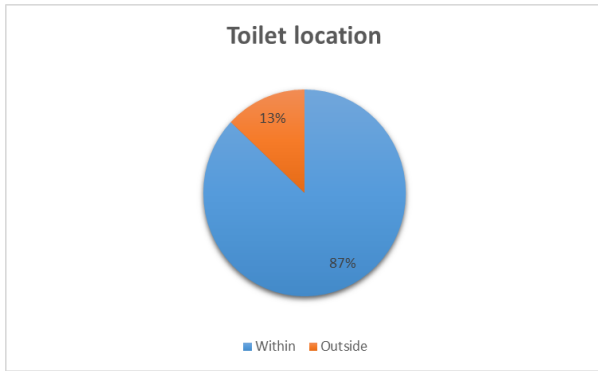


Figure 3. Location of Toilet

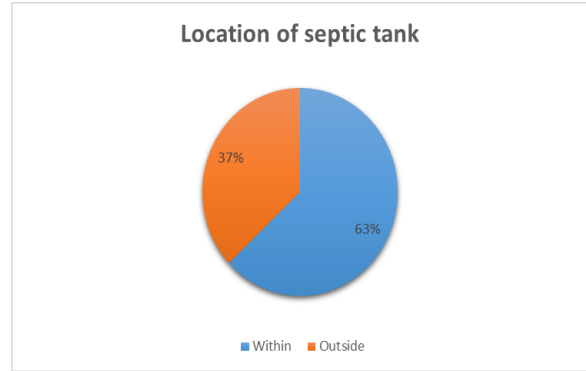


Figure 4. Location of Septic tank

About 87% of the toilet are inside the house which is good for safety and convenience and rest of them are outside the house (Figure 3). In some old houses, low income householders and slum areas latrine are outside of the house. It was found from the survey that 63% of septic tank is within the house because of lack of space and 37% are outside the house (Figure 4). Where 49% septic tank are at front of house, 28% at side & 23% at rear side of the house (Figure 5).

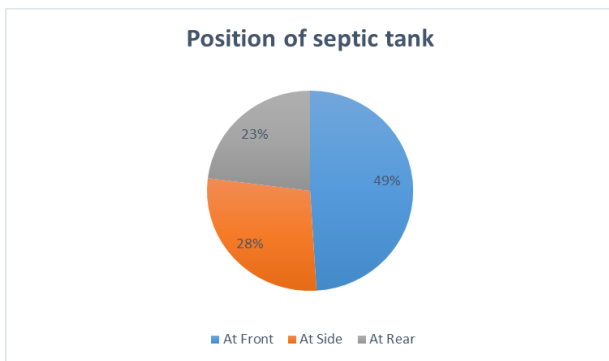


Figure 5. Position of septic tank with respect to house

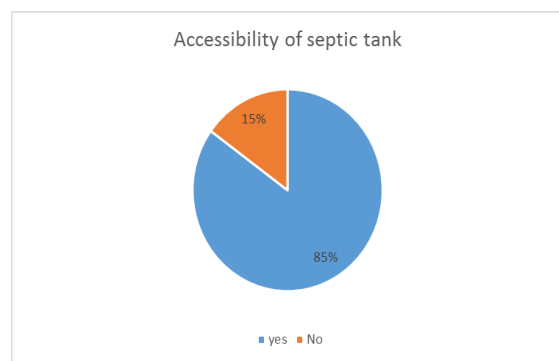


Figure 6. Accessibility of septic tank

Among the septic tank, 85% of the septic tank are easily accessible (Figure 6) though 51% of the tank are at sides of the house which is a very good news for present & future cleaning. Here some pictures (Figure 7) of accessible septic tank.



Figure 7. Picture of some accessible septic tank

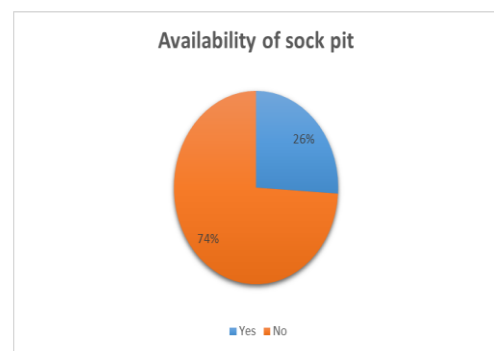


Figure 8. Availability of sock pit

An alarming new is that 74% of households do not have any sock pit with septic tanks (Figure 8). It means that these septic tanks are connected with surface drains and polluting the nearby surface water bodies (Figure 9). Therefore, the situation of Dinajpur municipality is very much dangerous in considering the environmental pollution by discharging the effluent of the septic tanks (Bari, 2017). The house owners mentioned that scarcity of land and not functioning of sock pit due to the shallow groundwater table are major reasons for not constructing sock pit.



Figure 9. Septic tank effluents discharge nearby depression

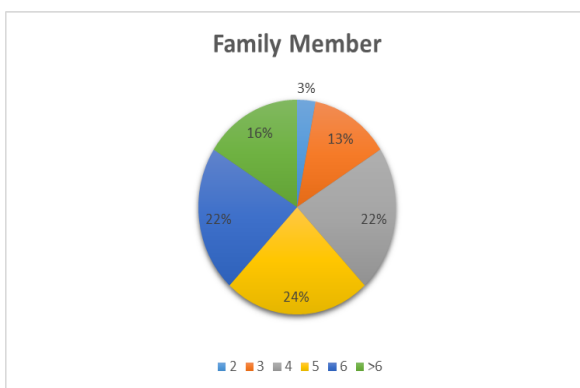


Figure 10. Family members of these household

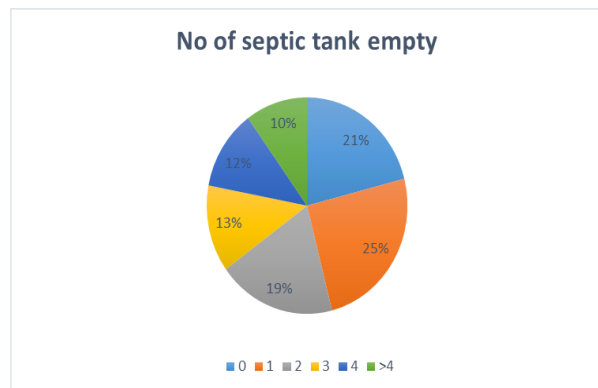


Figure 11. Number of Septic tank empty

People living in Dinajpur municipality from long time though new houses form with old houses. The 2,3,4,5,6 & >6 members of each houses are 3%, 13%, 22%, 24%, 22% & 16% respectively (Figure 10). Though 80% of houses were more than four members, 21% household do not have any experience about emptying septic tank. During the survey it was found that Many of them do not remember how many times they empty the tank. About 25%, 19%, 13%, 12% & 10% householders empty their tank 1,2,3,4 & >4 times respectively (Figure 11).

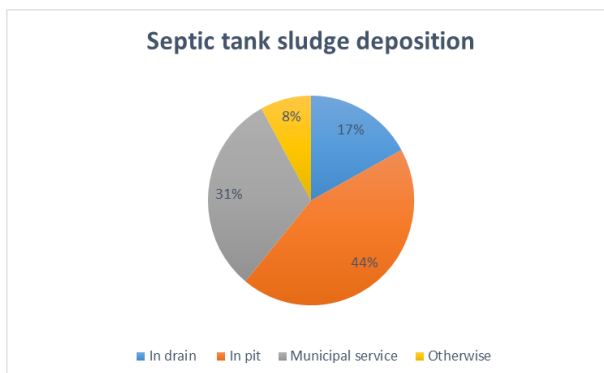


Figure 12. Deposition of septic tank sludge

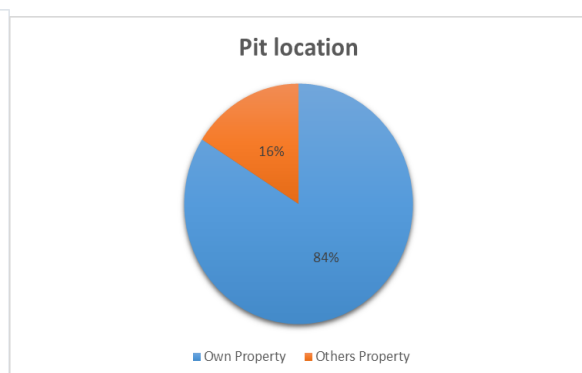


Figure 13. Location of disposal pit

It was found from the investigation that most of the emptying cases people call sweeper for emptying the septic tank. Usually they dig a pit at nearby place to bury the sludge from septic tank. Recently some people (31%) are taking service from municipal Corporation conservancy department. Municipal truck (Figure 14) collect the sludge from septic tank and discharge it in Mata sagor 2.9 km. away from the municipality (Figure15). About 44% of households dispose their septic tank sludge in pit followed by 31% in drain and 8% in nearby depressed areas (Figure 12). Among the pits 88% are making pits of their own property, rest of them are making others property because of lack of space availability (Figure 13).



Figure 14. Municipal truck



Figure 15. Mata sagor where municipal truck disposed sludge

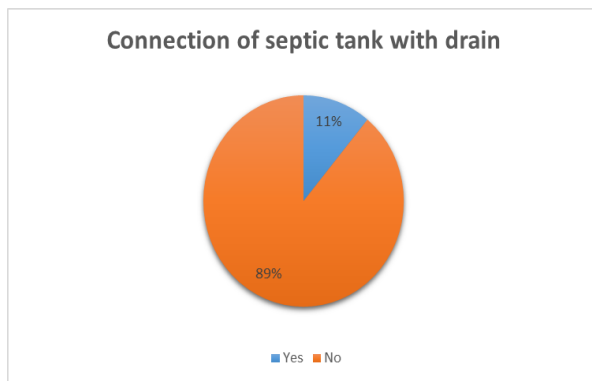


Figure 16. Connection of septic tank with open drain

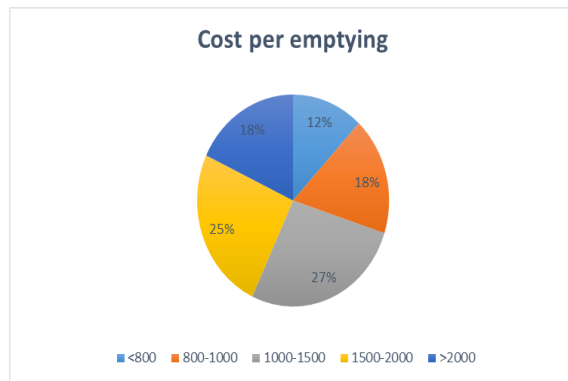


Figure 17. Cost per emptying

In some areas septic tank connected with open drains is about 11% of the total septic tanks (Figure 16) which is very much alarming for diseases transmission and pollution of the environment as well as aesthetically not satisfactory. However the expenditure of per emptying is minimum 800 taka & maximum >2000 taka. Most of the cases emptying cost is greater than 1500 taka (Figure 17). It depends on the size of the septic tank, location of disposal of sludge and methods of emptying. At present many people are willing to pay more if service is provided properly by Municipal Corporation authority or any other. All surveyed house owners agreed that Municipal Corporation authority or other concern institutions should take initiative to improve the situation.

4 Conclusions

The people living in Dinajpur municipality are using on-site sanitation technologies where there is unsewered sanitary system. Most of the latrines are sanitary latrines and inside the house. Most of the septic tanks are at the sides of the house but greater percentage is easily accessible. An alarming news is that some septic tank is connected with open drain and some of them have no soak pit. Also many of the cases the sludge disposal option is open places like nearby depressions, drains, pits etc. Majority of the house owners have the experience to empty their septic tank sludge and most of the cases they call sweeper to empty because of low cost. In recently some are called municipal services to empty. However many people are willing to pay if they get better services. Finally, it could be found that existing situation of faecal sludge management is very poor and it needs to be improved by providing the facilities for more collection of faecal sludge and treatment facilities for ultimate disposal or reuse.

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