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Water Supply and Sanitation Facilities in Urban Slums: A Case Study of Rajshahi City Corporation Slums

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Abstract Slum population has been increasing in Bangladesh over the last three decades along with the growth and expansion of cities and towns. But slum facilities are very much unsatisfactory for them due to the lack of proper water supply and sanitation system. Therefore, the major portion of the households use unsafe latrine and deposit their children's excreta into road side drain and open places, which pollutes water sources, groundwater and the general environment. As a result, majority of the population in Bangladesh suffer from different kinds of water and excreta-borne diseases that aggravate their poverty situations. So, the main objective and essential goal of the study is to investigate the water supply system and sanitation facilities in urban slums of Bangladesh. During the study period, data has been collected by questionnaire survey from each slum households (15 slums and 5324 households in RCC). However, the hygienic practice has been found to be significantly low among the all households in slums although they have enough knowledge about it. The study has showed that majority slum households use tube well water for drinking but significant numbers of them are found to use open latrine for defecation. Normally, pit and water seal latrines are found which are partially hygienic. These may cause ground water contamination depending on the soil characteristics and distance between the water sources and latrines. The open disposal of excreta pollutes the nearby water bodies, canals and drains causing severe environmental pollution. Many motivational work and idea marketing from government and NGO sides help to improve their awareness level.

Keywords: *slum, sanitation, hygienic, water supply, contamination*

1. Introduction

Slum population has been largely increased in Bangladesh over the last three decades along with the growth and expansion of cities and towns. Urban poverty is largely due to the transfer of the rural poor people to urban areas [4]. The facilities are quit unsatisfactory for urban slum dwellers in Rajshahi City Corporation which is one of the city corporations of Bangladesh. There are about 15 slums (5324 households) in Rajshahi City Corporation area of varying sizes where the cities poor people lived in. the number of slum dwellers has been increasing in Rajshahi, but the services are not [2]. About 160 million people live in Bangladesh. Everyday these 13 corer people discharge average 30-50 thousand tons excreta [5]. The major portion of these excreta is deposited into water bodies and open places which pollute water sources, groundwater and the general environment. As a result, majority of the population in Bangladesh suffer from different kinds of water and excreta-borne diseases that aggravate their poverty situations. The global health burden associated with these conditions is staggering, with an estimated 4000–6000 children dying each day from diseases associated with lack of access to safe drinking water, inadequate sanitation and poor hygiene [3]. An adequate supply of safe drinking water is universally recognized as a basic human need. Yet millions of people in the developing world do not have ready access to an adequate and safe water supply [1].

Currently, UNICEF and WHO estimate that 1.1 billion people lack access to improved water supplies and 2.6 billion people lack adequate sanitation [6]. Water supply and sanitation facilities in terms of quality and quantity are utmost necessary for assessing the living environment of the slum. In many areas the sanitation coverage is much below than that of the national coverage figure, only 13.5% in metropolitan slums [7]. Moreover, the presence of slums and their unhealthy environment within Rajshahi City Corporation is an ever-present threat of public health. They have no proper arrangement of water supply and sanitation system which has created an adverse effect on city's environment. A few numbers (13%) of the households use apparently good latrines, which are not fully hygienic. Among the rest households 15% use open latrines and 72% use ring slab latrine without water seal. Some organizations are trying to improve the condition of water supply and sanitation facilities for urban poor in Rajshahi City with different approaches. But the crisis of water supply and sanitation facilities is a common feature in daily life of urban slum poor. So, it is an immediate concern to study the approaches of different organizations related to water and sanitation facilities for urban poor in this city. That's why, essential goal of the study is to investigate the water supply and sanitation facilities of Rajshahi City Corporation slums.

2. Methodology

At first, the topic of the study has been conceptualized and then the objectives followed by the study area have been selected. After that the data collection procedure follows which involves questionnaire preparation with the help of literature review and consultation with the supervisor, sample number selection with the same procedure; and then the primary data has been collected through household survey and the secondary data has been collected through some secondary sources (Internet, Rajshahi City Corporation office, Bangladesh Bureau of Statistics, published and unpublished sources). The collected data has been analyzed through some statistical software (SPSS, MS Excel, etc.).

3. Field Survey Design

The study was undertaken with a view to identify the environmental conditions e.g. water supply and sanitation facilities of the slum in RCC area of existing situation. In order to achieve the objectives household surveys, field visits and a questionnaire survey were conducted. 'Household head' means the person who plays the main role in the decision-making process of a family. In absence of the household head, the second important adult member of the family was interviewed. Information was also collected through 'non-participatory observation'.

4. Project Location

The total numbers of slums in the Rajshahi City Corporation area are 15 which have 5324 households. For the study all slum were surveyed. Most of these (about 9 slums, 3713 households) are situated on the bank of the Padma river. Details of Rajshahi City Corporation slum area is as follows in Table 1:

Table 1. Details of Rajshahi City Corporation slum area

Sl. No	Name of slums	No. of CDCs in the slums	No. of HHs	No. of Beneficiaries	Location (Ward No.)
01	Badurtola	01	400	1740	25
02	Sawtalpara	01	312	1357	17
03	Sweeper Colony	01	180	783	11
04	Sreerampur	01	289	1257	7
05	Jelepara	01	168	731	13
06	Bara Banagram Baganpara	01	299	1301	17
07	Bara banagram Roypara	01	400	2079	17
08	Ramchandrapur Baze Kazla East	01	567	2858	24
09	Ramchandrapur Baze Kazla West	01	520	2262	24
10	Ramchandrapur Samprasarito	01	520	2262	24
11	Sekherchalk Panchoboti	01	474	2062	23
12	Panchoboti Masuapara	01	400	1740	23
13	Ghospara & Camp	01	252	1096	12
14	Barakotiapara	01	254	1105	12
15	Power House Para	01	289	1823	25
	Total	15	5324	24456	

* CDCs= Community Development Centres, * HHs= Households

5. Results

5.1 Water Supply and Use

5.1.1. Perception of Safe Drinking Water

For a maximum household of about 87% of the Ramchandrapur Baze Kazla slum described tube-well water is safe for drinking. On the other hand tube well water is described safe for only 14% of household of Jelepara slum which is the minimum. Pipe water is mentioned safe for drinking for a maximum household of about 86% of the Jelepara slum. In contrast only 11% households of Barakotiapara slum mentioned that it is safe for drinking. 16% households of the Bara Banagram Baganpara slum mentioned boiled water is safe for drinking. Boiled water is not safe described by the slums of Jelepara, Ramchandrapur Baze Kazla West and Sekherchalk Panchoboti. Average of the percentages of these slums are 64% (Tube-well water), 31% (Piped water), 9% (Boiled water) respectively.

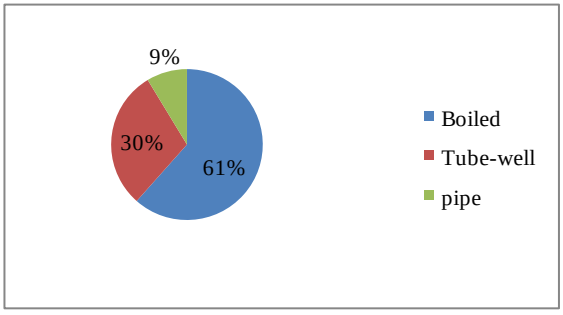

Figure 1. Average percentages of perception of safe drinking water

5.1.2. Water Sources for Drinking Purpose

Maximum households (92%) of the Badurtola slum use tube-well water for drinking purpose. On the other hand only 14% households of Jelepara slum drink tube-well water. Maximum households (86%) of Jelepara slum use tap water for drinking and only 5% households of Badurtola slum drink tap water. Some other sources such as river, pond and well are used for drinking sources in

few slums. The average percentages are 73% (tube-well) and 16% (tap).

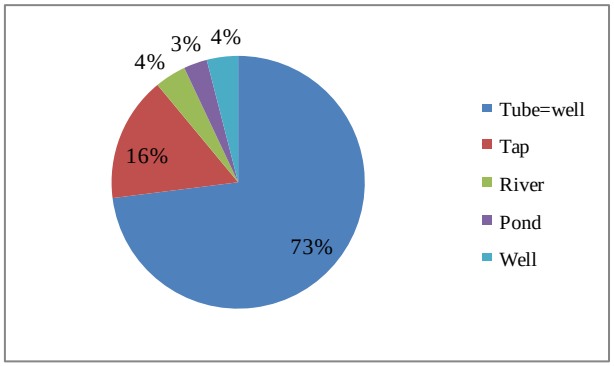

Figure 2. Average percentage of use of water sources for drinking purposes.

5.1.3. Water Sources for Washing Clothes

Nine slums are situated on the bank of Padma river in Rajshahi City Corporation area. Maximum households in these slum use river water for washing clothes. It was found that maximum (70%) households of Badurtola slum and minimum (2%) households of Ghospara and Camp slum use river water for this purpose. Maximum (38%) tube-well water uses by the households of Bara Banagram Roypara slum and minimum (5%) by the Jelepara slum. Similarly maximum household (81%) of the Sweeper Colony slum use tap water for washing clothes and it is minimum (8%) in Badurtola slum. People in this slum also use pond and well water for this purpose. For washing clothes average percentage of this sources are 21% (tube-well), 40% (tap), 31% (river), 6% (pond) and 2% (well).

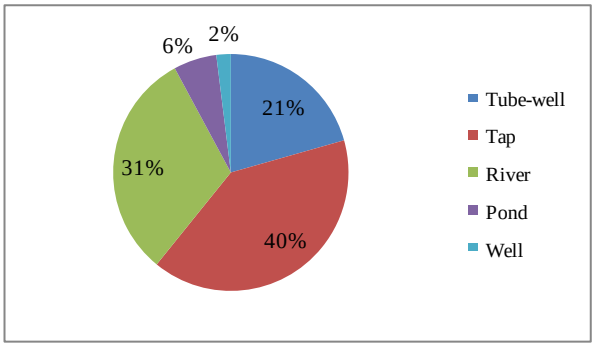

Figure 3. Average percentage of use of water sources for washing clothes

5.1.4. Water Sources for Bathing Purpose

It was found that maximum (73%) households of Badurtola slum and minimum (4%) households of Ghospara and Camp slum use river water for bathing purposes. Tube-well water is used by the maximum (37%) households of Bara Banagram Roypara slum and minimum (6%) by the Jelepara slum. Similarly maximum household (83%) of the Sweeper colony slum use tap water for Bathing purpose and it is minimum (8%) in Badurtola slum. People in these slums also use pond and well water for same purposes. For bathing, average percentages of water sources are 18% (tube-well), 42% (tap), 33% (river), 5% (pond) and 2% (well).

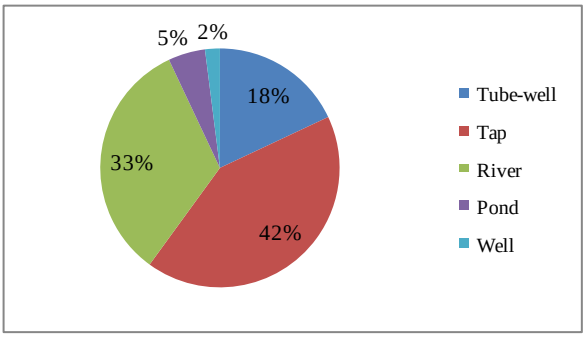

Figure 4. Average use of water sources for bathing purpose

5.1.5. Ownership of water sources

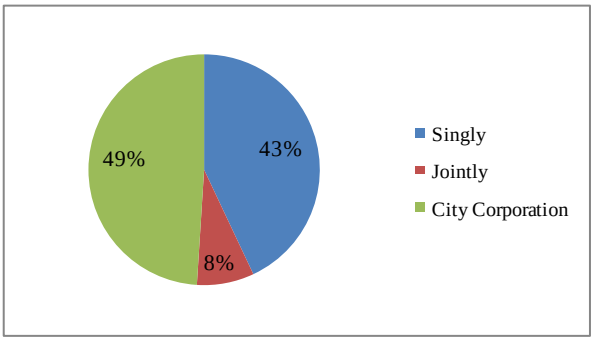

Figure 5. Average percentages of ownership of water sources

Maximum households (83%) of Jelepara slum have their own water sources (tap) and this percentage is minimum (8%) in Badurtola slum. 92% of the water sources (tube-well) in Badurtola slum is given by Rajshahi City Corporation and it is minimum (22%) in Sweeper Colony and Power House Para. A few number of households (8%) in all slums jointly owned their water sources. Average percentage of water sources are 43% (singly) and 49% (City Corporation).

5.1.6. Storage of Drinking Water

Among different type of containers are used by the households for storing drinking water, cooking pot is the most widely used (31%) followed by pitcher (28%), jug/bottle (27%), and pot (14%). These percentages are nearly same among all the slums.

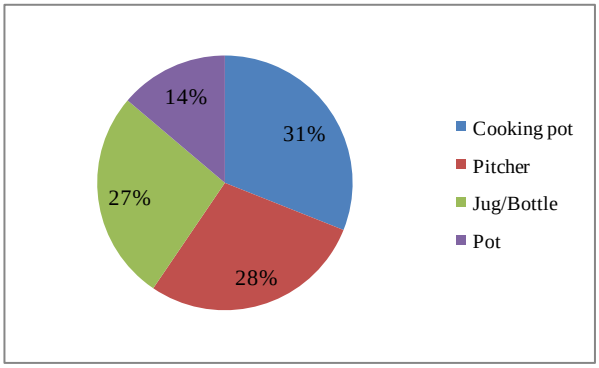

Figure 6. Average percentages of storage of drinking water

5.1.7. Problems Faced in Getting Drinking Water

"Water found in particular time in a day and particular months of a year" is the main problem for getting safe

drinking water in Jelepara slum (91%). This problem is minimum (15%) in power house para slum. 'Takes more time' (for queue, distance or less flow/discharge) is reported by more than 61% of the households in both Ramchandrapur Baze Kazla West and Power house para slums. This problem is minimum (11%) in Barakotipara slum. "Carrying water" from far distance is a problem for getting drinking water reported by 51% (maximum) households in Badurtola slum. This problem is minimum (3%) in Barakotipara slum. Averages of these percentages are 51%, 23%, 26%.

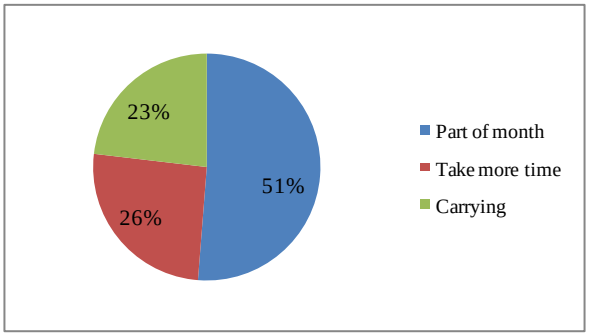

Figure 7. Average percentages of problem faced in getting safe drinking water

5.1.8. Distance of Household from Water Sources

Most of the households (83%) in Sweeper colony have their own source of drinking water available within 20m and this percentage is minimum (20%) in Ramchandrapur Baze Kazla West slum. On the other hand most people (68%) of Ramchandrapur Samprosarito slum have to cross above 100m (300 ft) distance to get water. Average of this percentages are 36% (20-50 m), 29% (50-100m), 35% (>100m).

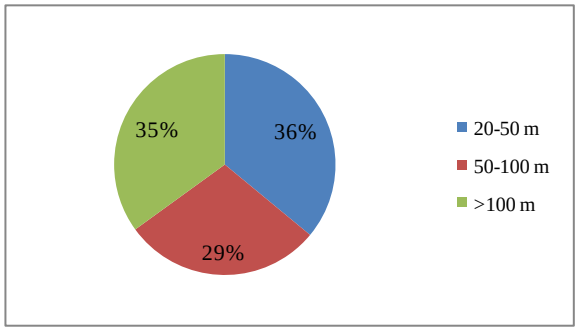

Figure 8. Average percentages of distance of households from water sources

5.1.9. Condition of Platform of Water Sources

Maximum (54%) platforms of water sources in Power House Para slum and minimum (20%) platforms in Jelepara are seem to be good. Corresponding unhealthy platform also found in these slums. Average percentages of these are 37% (good) and 63% (unhealthy).

5.2. Households and Environmental Sanitation

5.2.1. Type of Latrine

It was found that about 58% latrine in sweeper colony are good which are not fully hygienic and its minimum value found in sreerampur, Jelepara and Bara Banagram Baganpara slums. Maximum households (36%) in Panchaboti Masuapara slum used open latrines and it is minimum in Sweeper Colony. About 97% households in Badurtola slum use ring slab latrine which has no water seal and this type of latrine is minimum (42%) in Sweeper Colony. Average uses of these latrines are 15% (good), 13% (open) and 72% (ring slab).

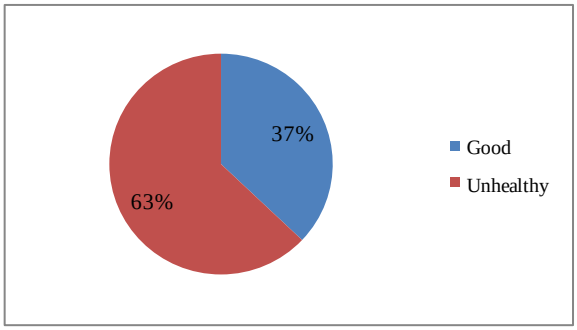

Figure 9. Average percentage of condition of platform of water sources

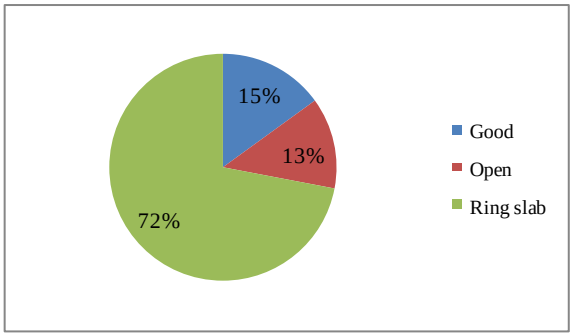

Figure 10. Average percentages of types of latrine among all slums

5.2.2. Ownership of Latrine

94% of the households reportedly owned the latrines which they used either singly (82%) or jointly (12%). However, a few numbers (6%) of the latrines are owned by the City Corporations. Maximum (97%) of the households in Badurtola slum use singly latrines and minimum (44%) households in Sweeper colony use it. Most of the latrines (56%) in Sweeper Colony are given by City Corporation.

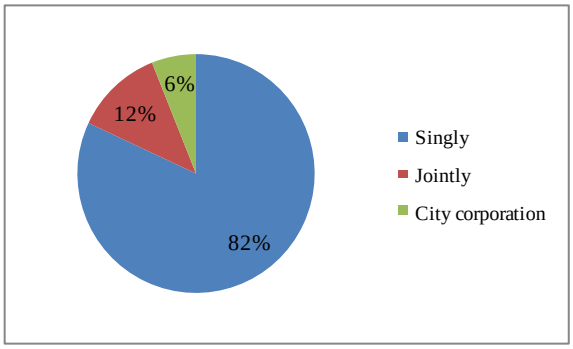

Figure 11. Average percentage of ownership of latrine

5.2.3. Distance between Latrine and Tube-well

It is observed that the distance between the drinking water source and the latrine is within 10m and the

situation of these types is 13% and the situation is 85% where the distance between the drinking water source and the latrine is greater than 10m. Rests 2% are situated at 10 m distance. These variations among all slums are quite less. Almost similar variations are found in all the slums.

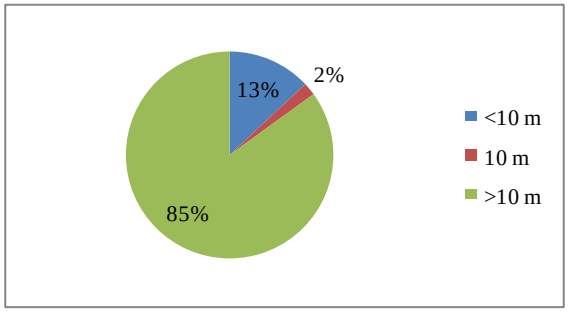

Figure 12. Average percentages of distance between latrine and tube-well

5.2.4. Use of latrine by children less than 5 year

Data shows that maximum (79%) used latrine in Badurtola slum. Maximum (77%) households in Sreerampur slum disposed it into latrine and maximum (61%) households in sweeper colony disposed it into road side drain. The corresponding minimum value of this uses are 22%, 11% and 0% in Barakotipara, Sweeper Colony and Jelepara respectively.

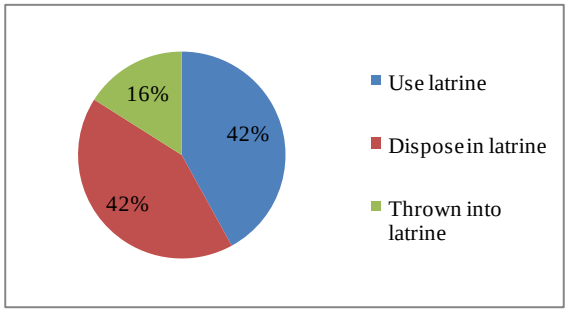

Figure 13. Average percentage of use latrine children less than 5 years old

5.2.5. Hygienic Knowledge for Wearing Sandal while Going to Latrine

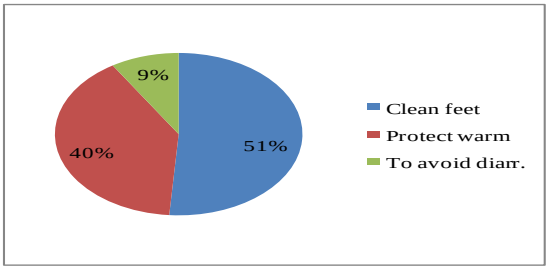

Figure 14. Average percentages of hygienic knowledge for wearing sandal while going to latrine

Majority (63%) of the households mentioned that wearing sandal while going to latrine is suggested to keep the feet clean. A significant proportion (49%) of the member of households could rightly mention the suggested reason for wearing sandal that is 'To protect from worms'. 'To avoid diarrhea' were frequently mentioned by 11% of the households. The variations of this percentage are nearly same among all the slums.

5.2.6. Knowledge of the Kind of Disease Caused by Contaminated Water

Majority (58%) of the households mentioned that jaundice is the prime diseases caused by contaminated water. The second most frequently mentioned diseases were diarrhea (48%) and dysentery (33%) and typhoid (24%). The variations of these percentages are nearly same among all the slums.

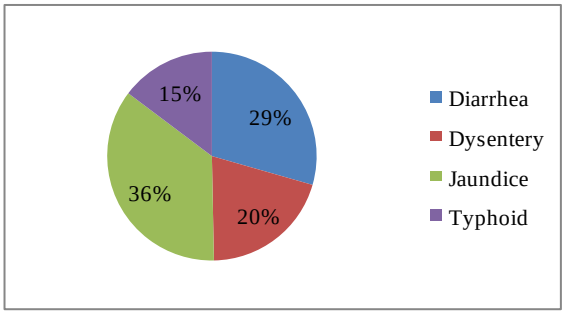

Figure 15. Average percentages of knowledge of the kind of disease caused by contaminated water

5.2.7. Features of hygienic latrine

'Faces cannot visible' came out as the most frequently mentioned feature of a hygienic latrine mentioned by 42% of the households. This response also varied little across the contexts. 'No foul smell' was also mentioned by nearly same number of about 40% of the households. The other relatively more frequently mentioned response was "Water sealed" about 24% of the households. The variations of this percentage are nearly same among all the slums.

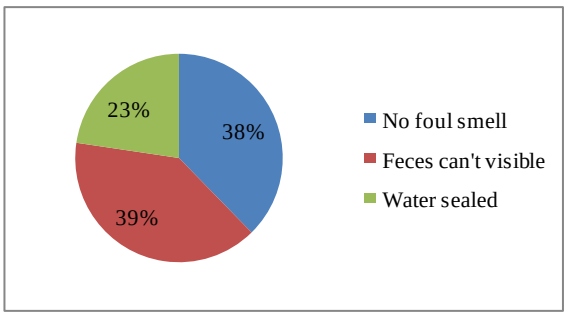

Figure 16. Average percentages of features of hygienic latrines in all slums

6. Conclusion

In spite of good hygienic knowledge, the practice has been found to be significantly low among the slum dwellers. The study in Rajshahi City Corporation slum area of Rajshahi City showed that the water supply and sanitation condition are improving very slowly. Majority slum people use tube well water for drinking. Significant numbers of people are found to be habituated to open defecation. Normally RCC slum has pit latrines which are not fully hygienic. These may cause ground water contamination depending on the soil characteristics and

distance between the water sources and latrines. For lack of sufficient water sources, most people resort to unsafe water sources like ponds, rivers and even ditches which cause sufferings from diseases and phenomenon is common in Sweeper Colony, Jelepara and Panchoboti Masuapara slums. Type of hygienic latrine and other facilities were found to be generally poor from observation and from responses from the households of Jelepara slum. However, Government and in some cases, NGOs should come forward to take necessary steps and effective measures to offer the best facilities for taking more programs in slum areas on water supply and sanitation. Moreover, specific rules and regulations need to be established to force the owners of household to provide the adequate water supply, sanitary facilities in their slums. In near future, some other parameters such as, practices of washing hand returning from latrine, sickness from water borne diseases, loss of working days due to sickness etc can be analyzed to measure the complete scenario of the slums that will be helpful to facilitate water supply and sanitation by the policy maker, Government and NGO etc.

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