



Journal of Applied Sciences

ISSN 1812-5654

science
alert

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Domestic Waste Disposal Practice of Sylhet City

Md. Tauhid-Ur-Rahman

Department of Land and Water Resources, 32, Brinnefvägen,
Royal Institute of Technology, KTH, Stockholm, SE-100 44, Sweden

Abstract: This study focuses the analysis of current practices of household waste disposal, problems faced by the residents during waste disposal and their views for improvement of the waste management system. However, it has been found that traditional concepts and technologies usually adopted in waste collection is becoming insufficient and ineffective causing more than half of the generated wastes (44%) remain uncollected and disposed of locally, which results in adverse impacts like water pollution, drainage congestion and finally, the degradation of the overall urban environment.

Key words: Solid Waste Management (SWM), open dumping, sanitary landfill, Sylhet City Corporation (SCC)

INTRODUCTION

The continuing growth in generation of solid waste and disposal of solid waste is a serious issue challenging the urban planners in fast growing city like Sylhet. Mainly, unplanned growth of urban population causes reckless generation of solid wastes and exert tremendous pressure on existing service (Ahmed and Rahman, 2000). Sylhet City Corporation (SCC) is the only responsible organization for Solid Waste Management (SWM). Since Sylhet is not an industrial city; most of the generated solid wastes are normally domestic, commercial and clinical waste type. The solid waste generation rate of this city is near about $0.48 \text{ kg}^{-1}\text{cap}^{-1}\text{day}^{-1}$ (Choudhury and Mamun, 2002). Considering this generation rate around 0.6 million (Eneytullah, 1994) inhabitants of this city are generating more or less 280 tons of different categories of solid waste in each day. Besides, around 100 health care establishments including government and private hospitals, diagnostic centers, out door clinics produce 6000-kg (Haque and Hasan, 2002) daily. Approximately 44% (Rahman *et al.*, 2003) of the solid waste generated within SCC area is never collected. Some are disposed in vacant lots, low-lying areas, pond or rivers but a large percentage is deposited into road-side drainage ditches, storm sewers and charra. In the prevailing system-of collection house holds are supposed to deposit their solid wastes in the communal bin. When the communal bins are placed at far distance households usually throw their garbage at any convenient point like nearby road, ditches, ponds, lakes, or surface drains (Rahman *et al.*, 2003). The final disposal of solid waste is being done by uncontrolled dumping of collected garbage in low-lying land and Hawor (an open boundary water

body), which is located at Lalmatia in Mogla Bazar uncontrolled disposal of solid waste has contributed localized flooding through clogging of drains. Around 10 to 15 (Rahman *et al.*, 2003) percent volume of the storm sewer contains solid waste. Nonetheless, the old technologies of waste collection fails to manage the wastes properly and it collects only around half of the total generated wastes. Moreover, uncollected solid waste is a public nuisance. It encroaches on roadways, diminishes aesthetic and causes unpleasant odour and irritating dust. Organic portion of solid waste ferments and favors fly breeding. As a result of this uncontrolled disposal of solid wastes, degradation of the quality of urban environment (Rahman and Islam, 2000) has become a major concern to planners and the importance of efficient urban solid waste management is being increasingly recognized. Moreover, according to Agenda 21, the blue print for action plan towards sustainable global development, adopted by participating nations, including Bangladesh, during United Nations Conference of Environment and Development (UNCED), held in Rio-De-Janerio (Brazil) in June 1992, requires all countries to establish waste treatment and disposal criteria so that by 2025 they are all to dispose of all kinds of waste, including solid waste, according to international guide-line. Unsustainable patterns of production and consumption are increasing the quantities and variety of environmentally persistent wastes at unprecedented rates. The trend could significantly increase the quantities of wastes produced by the end of the century and increase quantities four to fivefold by the year 2025 (Anonymous, 2005). A preventive waste management approach focused on changes in lifestyles and in production and consumption patterns offers the best chance for reversing

current trends (Wadood, 1994). Realizing the gravity of the present solid waste management situation, an intensive six months' research work was undertaken starting from early May up to end of November'2002 to analyze the present condition and to search for suitable solutions for achieving sound environmental management system for the remote city like, Sylhet.

MATERIALS AND METHODS

The study is based on primary information (interviews, observations, questionnaire survey and informal talks) and secondary information collected from various agencies. Detailed discussions on existing solid waste management and current practices of waste disposal of households have been provided along with identification of problems, efficiency and drawbacks of the present system. To analyze the current practices of waste disposal of household, problems faced by the households during waste disposal and their views for improvement of the waste management system, several household surveys were conducted in three randomly selected areas such as one from planned (Housing Estate), one from unplanned (Munshipara) and another from congested residential area (Sheikghat) of Sylhet city. About 10% of the total households from each area were covered by the survey.

STUDY AREA

The study area consists of three localities such as housing estate, Munshipara and Sheikghat.

Housing estate residential area: Housing Estate Residential area is located in ward No. 8 of Sylhet City Corporation with total registered household of 261 and a population of 1205. The streets of Housing Estate are wide and planned. The density of Housing Estate area is less compared to Munshi Para.

Munshi para: Munshi Para is a congested area with narrow lanes and by lanes. This area is also located in ward No. 1 of SCC with total registered household of 212 and a population of 672. The density of this area is higher than Housing Estate. Access of SP conservancy truck is difficult due to narrowness of lanes and bylanes.

Sheikghat: Sheikghat is an unplanned area with narrow lanes and with lacking of municipal facilities. This area is located in ward No. 2 of SP with total registered household of 106 and a population of 576. The density of this area is higher than Housing Estate. There are some slums in this area.

RESULTS AND DISCUSSION

Socio-economic condition of the respondents: Majority of respondents are engaged in Business (32.65%) followed by Govt./Non govt. Employee (30.6%). About 16% of them are from low income group. Ten percent of the participants are students from different institutes. Housewives (4%) also take part in the interview. Educational attainment is quite good in the areas. At least 48 percent of the total respondents can read and write and have an educational degree of primary level. It is also found that people of mixed income reside in the study areas. Again, 22% participants have at least higher secondary level educational degree. Only 2% of the community people are illiterate. On the other hand, 6% people have tertiary level educational qualification.

Comments of residences on SWM: When asked about their views on present solid waste management system more than 90% of respondents stated that present solid waste management system is polluting their environment (Table 1) and the majority rated the present SCC waste disposal services as unsatisfactory. The main reasons for the present SWM polluting environment are offensive odor from the wastes disposed on the road, wastes being not properly removed (Table 2). Twenty four percent residents rated the SWM system as poorly managed.

Current waste disposal practices and places

General characteristics of waste disposed: Table 4 represents the characteristics of wastes being disposed by households. Table 4 indicates that kitchen and vegetable wastes constitute the major portion of waste being disposed by households. The amount of paper, tin, plastic items are comparatively greater in upper income areas.

Place of disposal: Buyers of separated items are presented in Table 3 mainly hawkers (93%) are collecting the recyclable and resalable materials roaming from door to

Table 1: Response regarding pollution due to present SWM system

Name of the area	Munshipara		Shekghat		Housing estate		Total	
	No.	%	No.	%	No.	%	No.	%
Yes	140	94	70	70	240	100	45	92
No	10	6	30	30	Nil	Nil	4	8

Table 2: Response regarding reasons for pollution due to present SWM system

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Reasons	No.	%	No.	%	No.	%
Offensive odour from scattered solid waste all over the area due to lack of dustbin	50	33.33	50	50	100	41.66
Waste is not properly removed from the area	70	46.66	70	70	80	33.33
Waste is disposed on drains	40	26.67	20	20	50	20.33
Waste is scattered outside the bin	80	53.33	40	40	80	33.33
Waste is disposed on the road	40	26.67	30	30	70	29.66

Table 3: Buyers of separated items

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Buyers	No.	%	No.	%	No.	%
Hawkers	140	93.33	80	80	220	91.66
Shops	Nil	Nil	Nil	Nil	Nil	Nil
Not applicable	10	6.67	20	20	20	8.33

Table 4: Solid waste disposal

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Responsible person	No.	%	No.	%	No.	%
Servants	20	13.33	70	70	20	8
Family members	10	6.67	30	30	Nil	Nil
Collected by SCC employees	Nil	Nil	Nil	Nil	Nil	Nil
Collected by CBO's workers	120	80	Nil	Nil	220	92

Table 5: Money spent for waste disposal by respondents

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Amount of money	No.	%	No.	%	No.	%
No money	Nil	Nil	100	100	Nil	Nil
Tk. 1-10	150	100	Nil	Nil	Nil	Nil
Tk. 11-20	Nil	Nil	Nil	Nil	240	100

Table 6: Problems faced by respondents regarding waste disposal

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Problems	No.	%	No.	%	No.	%
No dustbin in the area	10	6.67	16	16	Nil	Nil
Dustbin is not easily accessible	37	24.67	40	40	50	20.8
Dustbin is not in appropriate location	23	15	20	20	30	12.5
Dustbin is not in the way of walking	36	24	15	15	Nil	Nil
Offensive odour near the bin	44	30	9	9	160	66.7

door. It is evident from the analysis that about 30% of respondents in Shekhghat are disposing their waste on road side or drain side rather than community bin. While 100% of respondents in Housing Estate area are disposing their waste in community bins. It indicates that in unplanned area only 44% are using community bin for disposal of wastes.

Persons disposing wastes and frequency of disposal: Table 4 shows that in majority of cases Community Based Organizations' workers do the disposal in planned areas.

Money spent for disposal of wastes: When respondents were asked specifically about their expenditure exclusively for disposal of wastes 100% in Shekhghat responded that they do not spend any money for (Table 5) disposal of waste. About 100% respondents in Housing Estate and Munshipara are expending some money upto Tk. 20 per month for this purpose.

Problems faced by respondents during waste disposal: Households were asked to identify two main problems they face during waste disposal. Table 6 indicates that the main problem faced by respondents in Shekhghat is

Table 7: Problems due to improper disposal of waste in respondents area

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Problems	No.	%	No.	%	No.	%
Blockage of open drains with wastes	30	20	40	40	100	70.8
Encroachment of roadways by disposal of wastes on roads	50	33.3	20	20	190	79.2
Offensive odour from wastes	120	80	90	90	200	83.3
Presence of flies, mosquitoes/due to indiscriminate disposal of waste in the area	130	86.7	80	80	240	100

Table 8: Type of collection system preferred

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	15		10		24	
	-----		-----		-----	
Types of systems preferred	No.	%	No.	%	No.	%
House to house/curb collection	13	86.67	8	80	20	83.33
Communal collection	2	13.33	2	20	4	16.67

Table 9: Respondents ability to contribute financially

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	15		10		24	
	-----		-----		-----	
Amount of contribution	No.	%	No.	%	No.	%
Tk. 10-20	13	86.67	5	50	19	79.16
Tk. 20-50	2	13.33	1	10	3	12.5
Tk. 50+	Nil	Nil	Nil	Nil	2	8.33
No contribution	Nil	Nil	4	40	Nil	Nil

Table 10: Instant responses of respondents regarding mode of participation

Name of the area	Munshipara		Shekhghat		Housing estate	
Total household	150		100		240	
	-----		-----		-----	
Community participation	No. 147	% 98	No. 98	% 98	No. 238	% 99
Community based organizations	126	84	83	83	273	88
Proper waste disposal practices	122	81	79	79	204	85
Present design of bin	99	66	67	67	149	62
Use of media for Environmental Newspaper	45	30	40	40	98	45
Radio/TV	103	69	57	57	120	50
Others	2	1	3	3	12	5

absence of dustbin in the area, while the dustbin provided by SCC is at distant location Perhaps due to these reasons people throw their wastes on roads at Shekhghat.

Problems due to improper disposal of wastes: Several problems were unfolded due to improper disposal of wastes by the respondents in their areas. Table 7 shows that most of respondents identified encroachment of road way by waste, presence of flies and mosquitoes, offensive odour and overall degradation of environment as the major problems due to improper disposal of waste in their respective area.

Type of collection system preferred: When the respondents were asked about the type of system they preferred for waste disposal, majority of them liked that waste be collected from their houses. It is interesting to note that only 16.32% of the total respondents preferred to dispose their waste in community dustbins (Table 8).

Financial contribution for improvement of the waste disposal system of the area: Table 9 indicates the respondents willingness to contribute for improvement of present waste disposal system. It was found from the survey that more than 90% of respondent are willing to pay for improvement of the garbage disposal situation.

Response regarding community participation: About 99% of the respondents in the study area felt that community participation was essential for improvement of waste management and overall environment of the neighbourhood.

Response regarding participation In Community Based Organizations (CBOs): About 85% of the respondents expressed their willingness to participate in community based organizations and programs in order to improve the waste management as well as for environmental improvement their areas.

Response regarding awareness of proper waste disposal practice: When the respondents were asked as to how disposal of waste by the household at proper places can be attained, 82% suggested people's participation followed by creating awareness among people about disposal at proper places by the relevant authority (37.9%); while 40.1% replied that it can be attained by enforcement of law (Table 10).

Response regarding present design of bin: When the respondents were asked about their opinion about present design of community bin provided by SCC, 65% of them answered that the design is not perfect. They suggested that it should have cover or lid (Table 10).

Preference of respondents regarding use of media for environmental awareness: Table 10 indicates the preference for use of media suggested by respondents in order to educate the people about proper waste disposal and for building environmental awareness among them.

It is evident that majority of the respondent preferred electronic and print media to be used for educating the people for proper waste disposal and for building environmental awareness. A good number of respondents suggested that teaching in school can help to educate good environmental habits in the long run.

IMPACTS OF SOLID WASTE ON ENVIRONMENT

Environment is the sum of all social, biological, physical and chemical factors which compose the surrounding of human beings (Rahman *et al.*, 2003). Today, urban SWM is considered to be one of the most immediate and serious environmental problems confronting urban governments in developing countries. This is mainly due to rapid urbanization taking place on an enormous scale in developing countries. Inadequate management of solid waste is an obvious cause for degradation of the environment in most cities of the third world. It is the task of society to ensure that disposal is carried out in such a way that it does not seriously damage the environment. The environmental impacts of inadequate management of solid wastes are described below:

Public nuisance impact: Uncollected solid waste is a public nuisance. It clogs sewers and open drains, encroaches on roadways, diminishes aesthetic and causes unpleasant odour and irritating dust.

Public health impact: Public health can be affected when solid waste is not adequately contained at and collected from living and working environments, because:

- The organic portion of solid waste ferments and favors fly breeding.
- The garbage in refuse attracts rats.
- The pathogens may be conveyed to man through flies and dusts.

Within a matter of hours in a warm temperature, sterile organic matter can be a potentially lethal source of toxic or disease producing organisms. The organisms do not have to be originally present in waste material as the environment is normally well provided with spores, bacteria, viruses, insects, vermin and other vectors awaiting a favorable site on which to multiply (Eneytullah, 1994). The mere presence of these cultures of potentially disease producing organism in solid wastes has been not enough to cause a major health hazard. The blame for disease transmittal must be placed especially on the flies, mosquitoes and rodents. Inadequate collection and disposal of solid waste is a major factor in the spread of gastrointestinal and parasitic disease, primarily caused by the proliferation of insects and rodents. Public health also can be affected with solid waste if disposed within an open dump (Fig. 1). In open dumps there is ready access to the waste to domestic animals and subsequently, potential spread of disease and chemical contaminants through food chain.



Fig. 1: Unhygienic practice by the workers at disposal sites



Fig. 2: People throwing the waste out side the bin



Fig. 3: Landfill site near Hawor

Water pollution: The infiltration of rainfall or surface water in solid waste dumps or landfill can produce leachate. If this leachate enters surface or ground water, it will cause severe water pollution.

Land contamination: The most obvious contamination of land is caused by windblown litter and clandestine dumping in open area along road-ways (Fig. 2 and 3). This contamination causes an aesthetic impact, which can result in diminished civic pride and loss of property value.

Air pollution: The most obvious air quality problems associated with waste collection and disposal are dust, odours and smoke. The air quality problem, most associated with solid waste collection, is dust created during loading operation. Dust is a nuisance and an eye irritant. However, it may also carry pathogenic microorganisms which could be inhaled when airborne. There is typically a putrid smell from hydrogen sulphide gas and other gases created by anaerobic biodegradation of wastes within dumps or land fill which can also pollute the air.

GUIDELINES FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT OF SYLHET CITY

It is recommended that there should be suitable legislation in which guidelines are provided to cope with solid waste disposal, which should also provide as a basis for legal action to be taken against polluters.

1. The new solid waste management law should include the following provisions:
 - Standards for collection and disposal of wastes;
 - Types of wastes that should be land-filled and collected by municipal workers;
 - Time frame work for the conservancy work.

- Penal action for illegal disposal of garbage on roads, drains unauthorized places;
 - Penal action for negligence and unsatisfactory performance by the staff.
2. For a clean environment and prevention of transfer of infectious disease it is required that there should be adequate finance or allocation for SWM. Adequate finance could be attained by:
 - De-linking conservancy tax from general property tax based on rental value. It is recommended that market value of property should be used.
 - Separate charge rate should be developed for domestic, clinical, commercial and industrial solid waste.
 - Charges should be made for removal of construction or demolition waste. This tax could be levied while granting building permission.
 3. For efficient management of solid waste activities vehicles maintenance and cleaners (sweepers) should be under one division for better co-ordination and control.
 4. In order to reduce the health hazard among the garbage crew it is recommended that they should be provided with proper protective clothing, gloves, boots etc. when loading and unloading wastes which are generally partially decomposed.
 5. The present design of community bins is not satisfactory as it open and without cover or lid. It is recommended that all bins should have covered lid and have concrete bottom to prevent leachate leakage. Another type of portable community bin or container, which can be lifted directly on the vehicle, could be used.
 6. It has been found that most of the staff in the conservancy, division of Sylhet City Corporation don't have proper training regarding waste management. It is recommended that adequate in house training should be made for conservancy staffs. Senior level conservancy staffs should be trained in neighboring countries where waste management is satisfactory.
 7. It has been found that at present low level awareness among public about health and environmental problems due to improper disposal of wastes prevail. It is recommended that public education campaign should be lunched carefully co-oriented with improvements in solid management system (Wunsch, 1991). The campaign should educate the public about relation between health clean environment and proper waste disposal. The campaign should also help to develop good public habits of garbage disposal. To

educate the people electronic and print media should be used. For long term benefit course should be introduced in school level about environmental education specially sanitary habits. Clean ward competition can also be introduced by Sylhet City Corporation to involve by motivation.

Active participation of community is essential for waste management. Active participation can be ensured with the involvement of Community Based Organizations (CBOs) in waste management. It has been observed that majority of the problems of littering illegal disposal of wastes on roads, drain or vacant plots is associated with the present community bin system of waste disposal. The problem of this system can be avoided by using house to house waste collection system as it is done in Housing Estate.

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