

Assessing the Scenario of Solid Waste Management System: A Case Study in Gopalganj Municipality of Bangladesh

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Abstract

Improper waste management system causes pollution, and it is regarded as one of the main problems in Bangladesh. The proper waste management system is considered as the vital element for the prospect in any country. The paper is an attempt to analyze the waste management systems in Gopalganj municipality. To this end, data were collected from service providers and civil society. A simple random sampling technique with structural questioners was used to collect data. The data were collected from 100 respondents, where 20 were service providers and 80 from civil society. Results from the study indicate that 100% of service providers agreed to work with solid waste management activities, but 57.5% of respondents from civil society opposed their information. Both groups of people are decided about the barriers to the waste management system. It is also found that 45% of respondents from service providers and 48.75% from civil society respondents agree. The proper waste management barriers found from the analysis were awareness, lack of workforce, and waste vehicles in Gopalganj municipality. Both groups of people express the same opinion on them. From a policy perspective, GO-NGO collaboration will develop the waste management system, which will also be the prospect of the economy in Gopalganj municipality.

Keywords: Solid Waste, Management System, Gopalganj Municipality, Bangladesh

Introduction

Solid wastes are all from human and animal activities that are usually solid and disposed of as unnecessary or undesirable. Municipal waste is generated in residential areas and commercial institutions, such as food waste, garbage, ash and residues, demolition and construction waste, street sweeping, etc [1]. In developing countries like Bangladesh, the increasing amount of organic waste is one of the most critical environmental problems. Environmental and health problems such as disease transmission, fire risks, odor nuisance, aesthetic nuisance, water pollution, air pollution, soil pollution, economic losses, etc., occur due to poor solid waste management [2]. Management of municipal solid waste (MSW) is one of the most pressing issues facing emerging and underdeveloped nations. Developed nations generate more garbage than developing ones. They do, however, have excellent management systems since they spend a significant amount of money in this area. MSW management is an essential issue in developing nations like Bangladesh since it requires a lot of money.

Furthermore, individuals pay little attention to waste management. With population expansion and urbanization, MSW production rises. It's getting increasingly difficult as more land is required to dispose of waste [3]. A fast rise in MSW may result in significant environmental pollution and various health risks for residents. MSW management is more than a technical issue; it is influenced by various political, legal, environmental, and economic issues [4]. Environmental dilapidation and ecological inequity happen continuously due to poor planning and management of solid waste [5]. MSW is dumped in open fields in most Bangladeshi cities, including Gopalganj City Corporation (GCC), which is not an acceptable method to dispose of solid waste since it pollutes the environment and creates an ecological imbalance. Bangladesh's urban population is rapidly growing at a pace of 6% each year [6]. The government is attempting to develop a safe and sustainable solution for the effective management of solid wastes in order to ensure eco-friendly towns.

However, the current Gopalganj study area is one of Bangladesh's developing cities. Rapid population growth, unplanned industrialization, lack of money, insufficient labor, inappropriate technology, and lack of awareness are the main constraints on solid waste management. This study aims to investigate the existing solid waste management system of Gopalganj municipality, identify the specific problems associated with waste collection and disposal, and provide some recommendations for the proper disposal of solid wastes.

Materials and Methods

The current research focuses on the Gopalganj municipality's solid waste management system. The data was gathered via interviews with residents, trash employees, and Gopalganj municipality officials and then evaluated to understand the current solid waste management system better. The data gathering and analysis process is detailed below.

Gopalganj Sadar municipality was selected as the study area for this research. Gopalganj is a district in the Dhaka Division of Bangladesh. The community has about 1,172,415 civilians, and its surface area is 1,490 km². It stood on the bank of the Madhumati River and was located at 23°00'47.67" N 89°49'21.41". Gopalganj is subdivided into five sub-districts [7]. Gopalganj Sadar Upazila is divided into Gopalganj Municipality. Gopalganj Municipality is subdivided into 09 wards and 47 mahallas [8].

The current solid waste management system of the Gopalganj municipality was examined in this research. Primary and secondary data were gathered from residents, employees, and Gopalganj municipality authorities and then analyzed. The data was collected from 100 respondents, where 20 respondents were service providers in different levels of Gopalganj municipality, and 80 respondents were civil society in a different level. The primary random collected data from respondents are analyzing below.

Results

The information was collected from the service provider by selected 20 respondents randomly in different levels from Gopalganj municipality.

S/N	Questions	Strongly Disagree	Disagree	Strongly Agree	Agree	Neutral
1.	Does Paurashava perform any function related to managing the solid waste of the Upazila?	0	0	0	20 (100%)	0
2.	Have you seen any barriers in the waste management process in Gopalganj municipality?	2 (10%)	8 (40%)	0	9 (45%)	1 (5%)
3.	What are the reasons behind the barrier of the waste management system in Gopalganj municipality?					
	Lack of Awareness among people	0	0	8 (40%)	12 (60%)	0
	Manpower shortage in the Paurashava	0	0	11 (55%)	9 (45%)	0
	Lack of waste transportation vehicles	0	0	5 (25%)	15 (75%)	0
4.	How can we solve the problems of an effective waste management system?					
	Awareness campaign and training	0	0	13 (65%)	07 (35%)	0
	Recruits available manpower	0	0	6 (30%)	14 (70%)	0
	Arranging training for waste disposal related manpower	0	0	4 (20%)	16 (80%)	0
	Arranging available vehicles	0	0	7 (35%)	13 (65%)	0
5.	Have any Go-NGO collaboration here?	7 (35%)	11 (55%)	0	0	2 (10%)
6.	Would you think GO-NGO Collaboration develop a waste management system?	0	1 (5%)	5 (25%)	13 (65%)	1 (5%)

Table 1: Data from the service provider

The above information from the service provider represents that the Gopalganj municipality actively works with solid waste management. But they face barriers like awareness of local people, Manpower shortage, Lack of Manpower training, and Waste vehicles. But they informed that these barriers would be minimizable. The Go-NGO collaboration is not present here. But they think GO-NGO collaboration would develop the waste management system. The information was collected from civil society by selected 80 respondents randomly in different levels from Gopalganj municipality.

S/N	Questions	Strongly Disagree	Disagree	Strongly Agree	Agree	Neutral
1.	Does Paurashava perform any function related to managing solid waste of the Upazila?	5 (6.25%)	46 (57.5%)	0	26 (32.5%)	3 (3.75%)
2.	Have you seen any barriers in the waste management process in Gopalganj municipality?	5 (6.25%)	25 (31.25%)	8 (10%)	39 (48.75%)	3 (3.75%)
3.	What are the reasons behind the barrier of the waste management system in Gopalganj municipality?					
	Lack of Awareness among people	4 (5%)	18 (22.5%)	13 (16.25%)	38 (47.5%)	7 (8.75%)
	Manpower shortage in the Paurashava	17 (21.25%)	32 (40%)	9 (11.25%)	13 (16.25%)	9 (11.25%)
	Lack of waste transportation vehicles	14 (17.5%)	35 (43.75%)	7 (8.75%)	11 (13.75%)	13 (16.25%)
4.	How can we solve the problems of an effective waste management system?					
	Awareness campaign and training	6 (7.5%)	18 (22.5%)	13 (16.25%)	32 (40%)	11 (13.75%)
	Recruits available manpower	8 (10%)	13 (16.25%)	17 (21.25%)	32 (40%)	10 (12.50%)
	Arranging training for waste disposal related manpower	0	3 (3.75%)	27 (33.75%)	47 (58.75%)	3 (3.75%)
	Arranging available vehicles	8 (10%)	14 (17.50%)	20 (25%)	33 (41.25%)	5 (6.25%)
5.	Would you think GO-NGO Collaboration develop a waste management system?	0	3 (3.75%)	28 (35%)	44 (55%)	5 (6.25%)

Table 2: Data from civil society

The information from the civil society presents that the service providers are not actively worked with the waste management system. They agreed with service providers regarding the barriers like awareness of local people, Manpower shortage in municipality and waste vehicles shortage, etc. They also suggest that overcoming these barriers would solve the waste management problem in Gopalganj municipality. They are also hopeful that the collaboration of GO-NGO would develop the waste management system.

Discussion

Individual houses, multi-storied apartment complexes, commercial and industrial establishments, streets, parks, and marketplaces produce waste. Households either carry their waste to the closest dustbins, roadsides, or collection sites and give it over to waste collection personnel or collect their waste and hand it over to waste collection staff. Waste collection personnel also collect waste from homes and other sources of waste. Waste workers transport waste to greater collection locations using small collection vehicles such as vans. Approximately 45 % of the waste produced is taken at collection facilities, with the remaining dumped indiscriminately on roadsides, in dustbins, and into open drains. These wastes and waste from uncollected dustbins or other collection locations are spread by scavenging birds and animals, clogging wastewater drains, creating public health issues, and pollution, among other things.

Waste workers gather the waste from homes, dustbins, and local collection sites and transport it to more significant collection sites using vans. Waste is collected and transferred to a disposal location using a bigger collecting vehicle such as a truck. Approximately 45 % of the waste produced is collected and delivered to the disposal site due to a lack of personnel and collection and transport vehicles. The waste is immediately disposed of at the dumpsite. The waste collected hasn't been adequately processed, and the disposal method is a landfill. Environmental pollution, such as water, air, and soil pollution, occurs due to open dumping. The municipality of Gopalganj does not have a solid waste recycling program. Recovered or salvaged wastes with market value are reclaimed or salvaged for recycling. Papers, bottles, containers, metals, clothing, shoes, and other household waste are separated and sold to street hawkers by housewives. Tokai, or poor people or children of slum residents, gather various low-value things from waste collection bins and disposal sites, such as broken glass, cans, cardboard, waste papers, rags, plastics, metals, and other business wastes. When municipal vehicles load and unload new garbage, scavengers or waste workers gather various things at the collecting and disposal sites. Waste and old materials businesses get the recovered materials. The waste dealers separate the materials incorrectly after intermediate processing, such as washing, drying, and sorting, and sell them to customers and provide them to relevant processing companies for reuse as raw materials.

The Gopalganj Municipality Authority collects around 45 % of the waste produced at collection locations and disposes it at a disposal facility. The majority of the waste is dumped indiscriminately on roadsides, in dustbins, and into open sewers. Waste dumped on roadsides and in dumpsters causes odor, irritation, visual annoyance, and fire risks, among other things. Uncollected trash accumulates indiscriminately on roadways and in sewage drains. These pollutants block open drains, resulting in wastewater flow clogging and waterlogging, especially during the rainy season. Wastes are also transported away by runoff and end up in ponds, lakes, and rivers, posing a threat to those ecosystems. The study area's low-income residents typically dump their trash on nearby empty plots, lowlands, public spaces, and so on, or burn it in their backyards.

Collected wastes are dumped in open dumps that are managed without appropriate soil cover and compaction the waste disposal site's open dumping. The open disposal of waste poses several public health and environmental risks. Decomposition of organic materials in waste results in gases such as methane, which is highly explosive and combustible and contributes to global warming. Open dump wastes produce strong leachate, which pollutes groundwater and surface water resources via biological and chemical processes. Waste workers purposefully light fires at dumps regularly to decrease waste, allowing more waste to be disposed of and therefore extending the dump's life. Scavengers set fires on purpose to readily detect and collect metals from the ashes. Dump fires produce smoke, which contributes to air pollution. Noise pollution develops at the dumping site as a result of trash spreading activities and vehicle movement. Birds, mice, flies, mosquitoes, and other creatures are drawn to the dumps by food leftovers and kitchen trash. Humans and other animals in the area get illnesses from animals eating at landfills. Because of a lack of appropriate training and knowledge, workers at dumping sites are more susceptible to infectious diseases.

This research found that the awareness of people, lack of manpower and waste vehicles, etc., obstacles the efficient waste management system. This research also found that the collaboration with GO-NGO would develop the waste management system. The civil society informed that the effectiveness and the cordial interest of service providers would minimize the problem of the waste management systems. [2] Found the similar result as lack of awareness of people, manpower and waste vehicles shortage, and lack of GO-NGO collaboration was the main hinders of the proper MSW management system and suggested that the cordial interest of service providers minimize the problem of the MSW management.

Conclusion and Policy Recommendation

Now the waste management system is one of the burdens in Bangladesh in regards the pollutions. But the proper waste management would be the prospect of Bangladesh's economy. Some action taken would be the solution of the waste management system barriers and potential of Gopalganj municipality.

Arranging the awareness program of civil society would minimize the waste management problem

The availability of municipality human resources and waste vehicles would minimize the waste management problem

GO-NGO collaboration work will be developing the effective waste management process

The proper scientific waste management process would be the solution by utilizing the wastes as the raw materials of energy conversion, which support the energy sector and the agriculture sector by its byproduct compost.

The above suggestions would be the solution of efficient waste management process which will be the new door prospect of the economy of the Gopalganj municipality.

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