M. Alamgir, S.M.T. Islam and J. A. Saju (Eds.)
ISBN: 978-984-35-4034-8

Proceedings of the Waste Safe 2023 – 8th International Conference on
Integrated Solid Waste and Faecal Sludge Management
25-26 February 2023, Khulna, Bangladesh

PLASTIC WASTE MANAGEMENT IN ADABOR THANA

Washilatun Nahar*, Md. Mahin Alam Jihad* and Rubaiyet Hafiza*

*European University of Bangladesh

ABSTRACT

Plastic waste management is one of the most pressing and significant environmental issues in developing Asian countries. In most cities, such as Dhaka, inefficient waste management and disposal are the causes of environmental damage. The main objectives of this study are to learn about the current plastic waste management situation and find out the kind of plastic garbage managed in Shyamoli, Adabor. A survey has been conducted to determine the current situation of plastic waste management at Kallyanpur, Shyamoli, Adabor, Baytul Aman, Juhurimoholla, Bijlimoholla, Tikkapara, Rajia Sultana Road, Nurjahan Road, and Krishimarket. This survey was conducted among plastic waste collectors and at the plastic waste recycling shops. It was discovered that the ratio of different types of plastic garbage handled is 25% for hard plastic and 75% for soft plastic. A total of approximately 800 kg of plastic wastes were handled daily in that area.

Key words: *plastic waste, plastic waste management, plastic waste recycle process.*

INTRODUCTION

Nowadays, different fields such as engineering, automotive, construction, medical, aerospace, electrical, robotics, and so on are using plastics. Plastics have become an essential part of our daily necessities. As these are used in huge quantities, the waste generated is also vast. That's why plastic waste management is garnering much attention. Many countries are revising their policies regarding plastic waste management. But only changing policies will not solve the growing environmental threat. It should be implemented, and people should be aware of the threatening situation. So they do not throw away waste without realizing its impact. Adabor thana is a densely populated area in Dhaka city. So, the waste generation, especially plastic waste, is more and creating several problems.

According to ASTM, a plastic is defined as a material composed mainly of an organic substrate of high molecular weight maintaining solidity in its final state, and, in certain stage in the manufacturing processing prior to being turned into finished product, can undergo shaping by flow. (Abdelhafidia et al., 2015) However, this definition did not mention numerous additives, coatings, or treatments included in plastic blends and composites encountered during plastics recovery prior to re-utilization. Plastics play a vital function in our everyday living due to its lightweight, versatility, low cost of production, safety and hygiene, durability, chemicals resistance, electrical and thermal insulation in comparison with its competing materials. These properties have positioned plastics to become relatively indispensible in every aspect of life. According to UNEP, about eight million tonnes of plastic is globally dumped into the oceans annually, killing marine life while also penetrating the human food chain. (Adrados et al., 2012) These pose challenges during collection, separation, and recycling of PSW. The durability of plastics causes their accumulation and persistency in the environment with estimated rate of over 25 MT per year. (Idumah & Nwuzor, 2019) Moreover, the conversion of plastics to their constituent chemicals is often technologically difficult and not profitable. The management of plastics recovered from MSW is a most sensitive industry due to the continual increase in the quantity of plastics recovered from MSW, biodegradability difficulty, and its hazardous effect on the society. The escalating quest for plastics has

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resulted in accumulation of pyramids of waste plastics in landfills which has occupied vast spaces, thereby contributing to environmental challenges. Due to the versatile application of plastics in numerous areas, there has been global increment in plastics production globally. This escalating quest for plastics has resulted in petroleum depletion as component of non-renewable fossil fuel because plastics are derived from petroleum.

(Rigamonti et al., 2014) worked on the environmental evaluation of plastic waste management scenarios. Their study aimed to contribute to the debate on waste management based on the analysis of different plastic waste recovery routes. They defined five possibilities and modeled using the EASEWASTE model with a life cycle assessment approach. They found it hard to identify an optimal strategy for plastic waste management.

(Siddiqui & Pandey, 2013) reviewed the strategies for plastic waste management. The growth of environmental awareness and less available landfill capacity has initiated plastic waste recycling programs in most developed countries. However, only 5 to 25% of plastic waste is recycled. Their study discussed the prospects of plastic waste management schemes. It was concluded that the present situation of environmental worsening is likely to continue unless long-term remedial measures are adopted.

The generated research will aid in decision making about country-level trash collection and management, with the goal of increasing the efficiency and effectiveness of the waste collection and management system. The following are the study's key goals:

- To learn about the current plastic waste management situation in Shyamoli, Adabor.
- To find out what kind of plastic garbage is being managed in Shyamoli, Adabor.

METHODOLOGY

General

Adabor is a thana of Dhaka city. Adabor thana is located at 23'46'N 90'22'E, on the bank of the Buriganga river. It covers a total area of 2.07 km^2. It lies south of Mohammadpur thana, East of Sher-e-Bangla Nagar and Mohammadpur thana, West o Savar upazilla, Mohammadpur and Darus Salam thanas and North of Darus Salam thana. The population of the thana is around 86,540.

Study Area

The study was conducted at different places in Adabor Thana. A survey has been conducted to determine the current situation of plastic waste management at Kallyanpur, Shyamoli, Adabor, Baytul Aman, Juhurimoholla, Bijlimoholla, Tikkapara, Rajia Sultana Road, Nurjahan Road, and Krishimarket. The map of the study area is shown in Figure 1.

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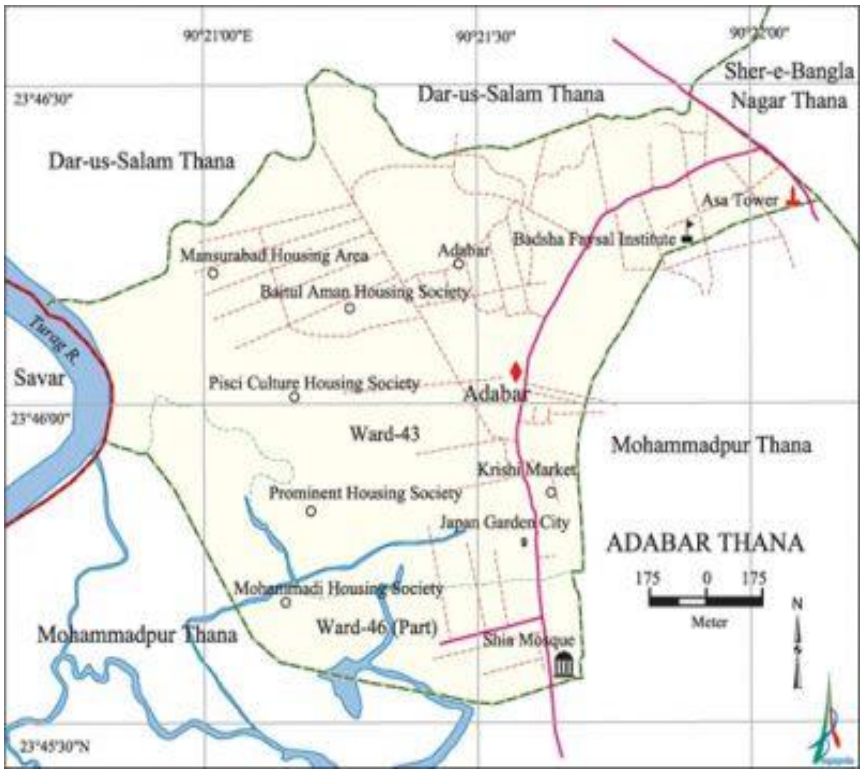

Figure 1 Adabor Thana

Procedure of Data Collection

To find out the present plastic waste management condition reconnaissance survey was done in Adabor thana. This survey was conducted among people who are related to the recycling process of plastic waste. A survey among primary plastic waste collectors such as feriwala, waste pickers and at the plastic waste recycling shops had been done. The total survey consisted of two stages

- A survey among primary plastic waste collectors
- Survey at the plastic waste recycling shops

Primary plastic waste collectors are the one who collect waste from houses or dustbins, or other dumping places and sell it to the recycle shops. They collect it from door to door. Waste collectors can be divided into two categories: feriwala collect waste from houses, and waste pickers collecting waste from dustbins or other dumping places. The locations of primary waste collectors while they are at work are unpredictable, so data are collected from their living places, having conversation with them and from the waste shop owners.

The information about the plastic waste recycle shops are collected in three stages

a) Finding the location of the plastic waste recycling shops: The shops that recycle plastic waste are grouped together in various locations across Adabor. These stores were found by exploring the thana's roads. It is challenging to determine the precise number of stores because some dispersed stores might not be counted. There are around 64 shops detected throughout the study.

b) Categorize the shops: The stores are divided into groups based on how much plastic waste they generate daily. Small stores handle between 5 and 10 kg of plastic waste per day, medium shops handle between 11 and 20 kg of plastic waste per day, and large shops handle more than 21 kg of plastic waste per day. Due to time constraints and the fact that all stores open at similar time, it is impossible to collect information on every store.

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c) Conversation with the shop owners and the workers: After categorizing the shops' detailed information about some shops is collected using a questionnaire form. This information includes the quantity of plastic waste, the type of plastic waste, and the collection process of plastic waste, recycle process, etc.

RESULTS & DISCUSSION

In this study, it was observed that the plastic waste handling and processing in Adabor were done by waste collectors and waste recycling shops. The types of plastic waste, present management system, amount of involved recycling shops, and amount of plastic waste collected are discussed below.

According to the field survey done in different places of Adabor thana, the amount of different types of plastic waste that are handled by primary plastic waste collectors are shown in Table 1.

Table 1 Amount of different types of plastic waste handled by primary waste collectors

Types	Average amount collected (kg/day)	
	Waste Pickers	Feriwala
Soft Plastic	87	56
Hard Plastic	92	61
Total	179	117

From Table 1, it can be seen that waste pickers and feriwala handle about 179 kg and 117 kg plastic waste per day respectively.

The amount of different types of plastic waste that are handled in different recycle shops in Adabor thana are shown in Table 2.

Table 2 Amount of different types of plastic waste handled by plastic waste recycling shops

Types of Plastic	Amount Collected (Kg/day)	Percentage (%)
Soft Plastic	600	75
Hard Plastic	200	25
Total	800	100

From Table 2, it can be observed that about 800 kg plastic wastes are handled at plastic waste recycling shops.

The following Figure 2 shows the approximate percentage of hard and soft plastic waste handled in Adabor thana.

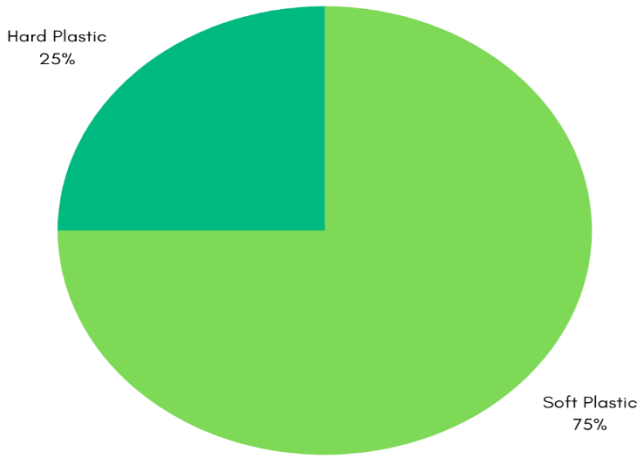

Figure 2 Approximate percentage of different types of plastic waste

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The number of plastic shops in Adabor thana based on location and type is given in Table 3.

Table 3 Amount of plastic waste recycling shops in Adabor thana

Location	Number of Shops with Type			Total
	Large	Medium	Small	
Shyamoli (Haque Shaheber Garage)	1	2	3	6
Juhuri Moholla	1	2	4	7
Kallyanpur (Overbridge)	0	1	3	4
Adabor	1	3	5	9
Baytul Aman	0	3	3	6
Bijlimoholla	0	3	4	7
Tikkapara	1	1	2	4
Rajia Sultana Road	1	1	5	7
Nurjahan Road	0	2	3	5
Krishimarket	2	3	4	9
Total	7	21	36	64

From Table 3, it can be seen that there are about 7 large, 21 medium and 36 small waste recycling shops in the study area.

The amount of plastic waste managed in Adabor thana according to location is shown in Table 4.

Table 4 Amount of plastic waste handled in Adabor thana based on location

Location	Total Amount of Plastic Waste (kg/day)
Kallyanpur	84
Shyamoli	70
Adabor	93
Baytul Aman	88
Juhurimoholla	60
Bijlimoholla	72
Tikkapara	67
Rajia Sultana Road	94
Nurjahan Road	55
Krishimarket	117
Total	800

From Table 4, it can be seen that around 800 kg plastic wastes were handled in Adabor daily. The highest amount of plastic waste was handled at Krishi market and the lowest at Nurjahan road. In Figure 3, the amount plastic waste based on location is shown.

ISBN: 978-984-35-4034-8

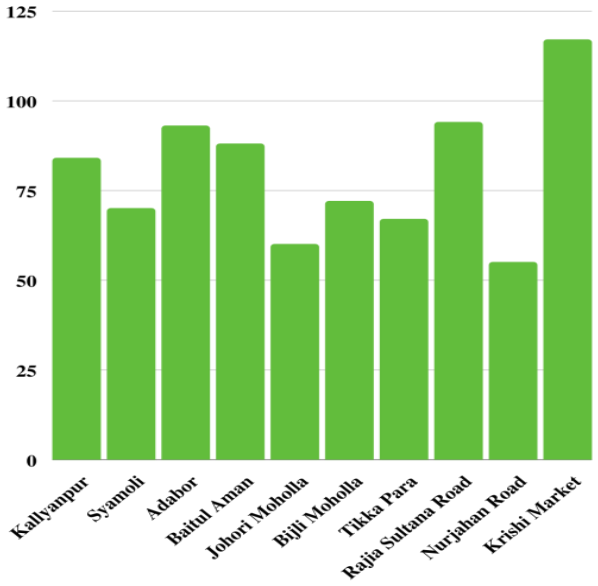

Figure 3 Total amount of plastic waste based on location

Figure 4 Some plastic waste recycling shops in Adabor

ISBN: 978-984-35-4034-8

Figure 5 Primary waste collection zones in Adabor

Existing Plastic Waste Management System

From the field survey, the present plastic waste management system in Adabor thana can be identified. It is observed that primary plastic waste collectors collect plastic waste from houses, dustbins, and dumping zones. After that, they sell the plastic waste to different waste recycling shops. At the recycling shops, they sort the plastic waste and start further process to recycle it.

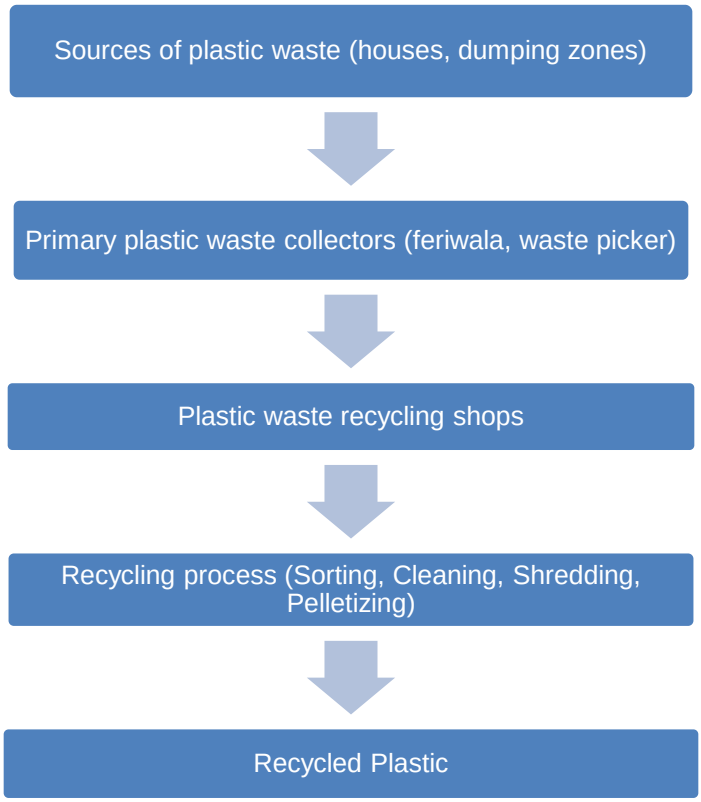

Figure 6 Present Plastic Waste Management System

CONCLUSION AND RECOMMENDATION

Solid waste management is one of the most important issues nowadays. With the increase in population, waste generation also increases. Among all the solid wastes, plastic waste poses an immense threat to the environment. From the above study, it can be seen that a vast amount of plastic waste is collected daily in Adabor thana. But the existing plastic waste recycling process is insufficient to decrease the enormous amount of plastic waste. Proper methods should be taken to manage plastic waste.

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