

THE AMOUNT OF WASTE GENERATED FROM ROAD SIDE SHOP WITH IT CONSEQUENCES: CASE STUDY ON KUET POCKET GATE FULBARIGATE KHULNA, BANGLADESH

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ABSTRACT

The aim of the study is to recognize the amount of wastes generating from road side food shops and its consequences in KUET pocket gate, Fulbarigate, Khulna, Bangladesh. Every day food shops like tea stall, small restaurants, and hotels are generating a large amount of waste products in this area. But there is no proper waste management and dumping system here. A questionnaire survey was conducted to determine the amount of waste generates per shop per day, which types of waste is generating and also about their waste management and dumping system. Sorting the waste, their amount is determined and type is identified. From tea stall 229.95 kg/year waste generated . 142.35 kg/year wats are generated from Grocery shops and 186.15 kg/ year waste are generated from restaurants which are found from this research. The analysis shows that the waste has a bad impact on the adjacent environment where the satisfaction index shows the less value as it creates air, water pollution and that's why it has negative impact on KUET students as well as the local people. Road side waste dumping causes road blockage, in rainy season it also blocks the water drainage system and causes water logging in the area.

Key words: Food shops, Waste production, Environment, Water logging.

1. RESEARCH BACKGROUND

1.1 Introduction

The objective of the research is to assess the impact of waste, generating from road side food shops in KUET pocket gate, Fulbarigate, Khulna. Khulna University of Engineering & Technology (KUET) is a public engineering university of Bangladesh emphasizing education and research on engineering and technology. This is a renowned university for the study of engineering in Khulna, Bangladesh. Pocket gate is an entrance in south side with the Fulbarigate and Khulna bypass link road of its campus. Waste is known as the amount of something which is remaining after the useable and beneficial components have been removed and that has no longer satisfactory or useful. It may damage the healthy environment, spreading odor, make the site unpleasing to see and seriously, it is very harmful if the initiatives are not started. Growth of population, increasing urbanization, rising standards of living due to technological innovations have contributed to an increase both in the quantity and variety of solid wastes. It is increasing as the population is increasing day by day and the use of different materials is also increasing so that the unused portions is now at the top (UN Data, 2012).

It is very important to know how and where the waste is being managed. The importance of solid waste management is increasing day by day as it is an asset for producing energy, clearing environment, maintaining balance ecosystem which is already adopted in developed countries Globally, the estimated quantity of solid wastes expected to be generated annually by the year 2025 is about 19 billion tons (Elagroudy & Zayat, 2018). Management of solid waste reduces or eliminates adverse impacts on the environment and human health and supports economic development and improved quality of life. So it is necessary to find the impact of socio, economic and environmental for it. A part of management can be done by reusing the reusable portion from the waste which is collected in a healthy and safe

environment. Bangladesh is generally faced with the rapid corrosion of environmental and sanitation conditions due to the conventional system of collection, transportation and the unconscious dumping of municipal solid wastes (Rahman, Haque and Morshed, 2017).

Every day food shops like tea stall, small restaurants, and hotels are generating a large amount of waste products in this area. But there is no proper waste management and dumping system here. So the waste creates pollutions, road side blockage which have a bad impact on KUET students and also on the local people. A questionnaire survey is conducted to determine the amount of waste generates per shop per day, which types of waste is generating and also about their waste management and dumping system.

The findings of this study suggest that the waste has a very bad impact on the adjacent environment as it creates air, water pollution and that's why it has a negative impact on KUET students as well as the local people. Road side waste dumping causes road blockage, in rainy season it also blocks the water drainage system and causes water logging in the area.

1.2 Literature Review

The term waste is any solid, liquid or gaseous substances or materials which being a scrap or being super flows, refuse or reject, is disposed of or required to be disposed as unwanted (Adewole, April 2009). According to The United Kingdom's Environmental Protection Act 1990, waste includes any substance or article, which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled. Waste can be divided into different categories like recyclable general waste, non-recyclable general waste, household waste, hazardous waste etc. Waste can be segregated as bio degradable waste and non-bio degradable waste. Bio degradable waste includes organic waste like kitchen waste, vegetable waste, paper etc. Non-bio degradable wastes are segregated into recyclable (plastics, glass, metal etc.), toxic waste (paints, chemicals, blubs etc.) and C-soiled (hospital waste such as cloth with blood and other body fluids) (S S H Alequzzaman M., 2006).

Waste management involves the collection, transportation, processing, recycling or disposal and monitoring of waste materials. It relates to refused materials produced by human activity, and is generally undertaken to reduce their effect on health, environment or aesthetics. Waste management is also carried out to recover resources from it. This has brought awareness to people that the solution lies in using waste as a resource rather than to be destroyed (Colon, 2006). Waste management involves the use of solid, liquid, gaseous or radioactive substances with different methods and fields of expertise for each of these. It concerned with the generation, on-site storage, collection, transfer, transportation, processing and recovery, and ultimate disposal of solid wastes (Vasisth, 2011).

In March 2005 JICA developed a case study on solid waste management of Dhaka city. The objective of that study were to formulate master plan concerning solid waste management in Dhaka City with the target year of 2015 and to develop capabilities and management skills of the DCC personnel through the technology transfer during the course of the Study.

2. STUDY AREA AND METHODOLOGY

2.1 Study Area

Khulna is the 3rd largest city of Bangladesh. Khulna University of Engineering & Technology (KUET) is a public engineering university of Bangladesh emphasizing education and research on engineering and technology in Khulna city. Pocket gate is an entrance in south side with the Fulbarigate and Khulna bypass link road of its campus. Which is located in Teligati, Khan Jahan Ali thana, Khulna district and between 22.9005° N, 89.5024° E.

Study area at a glance

Table 1: Study Area at a Glance

Tea stall	2
Restaurant	2
Grocery Shop	3
Distance from Fulbarigate	0.85 Kilometers
Distance from ZeroPoint	14.4 Kilometers

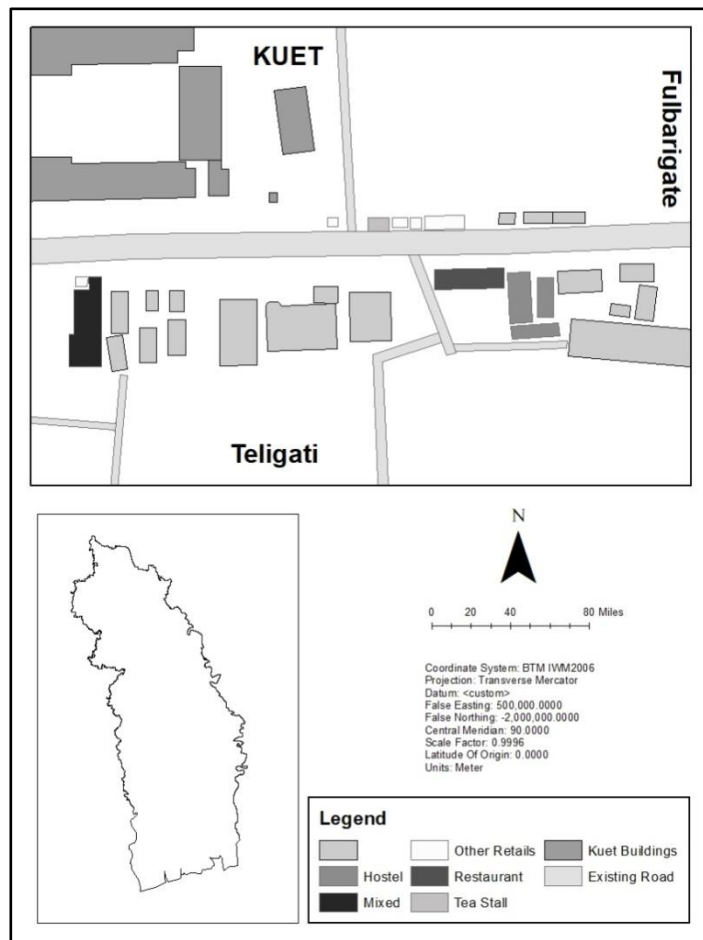


Figure 1: Map of Study Area, Source: Author 2017

2.2 Methods

Some report and other sources were reviewed for gathering knowledge. The practical field observation and field based data collection of solid waste generation, collection, transportation of solid waste management situation through questionnaire and interviews. During the survey some factors were also considered such as income level, education which can affect waste generation.

The primary data has been collected though the field survey and owner, manger, workers of 6 road side shop were interviewed with the help of questionnaires. Questionnaire measured shop existing solid waste practices as well as individual knowledge, concerns, willingness to participate on solid waste. The secondary data has been very useful for this research. The secondary data was collected from the various sources. Firstly, studies which involved the

consultation of reports, articles, documents and Case studies. Some map was collected from various sources (KCC, LGED, and KDA).

For calculating the satisfactory index, a questionnaire survey was conducted among 50 people to know about the satisfactory condition about waste disposal system, water logging problem, air pollution, water blockage, water logging diseases. The satisfactory value is between 0-5. Where 0 indicate excellent, 1 indicate better, 2 indicate good, 3 indicate bad, 4 indicate worse and 5 indicate worst. Satisfactory index of each attributes is calculated by at first multiply each value by the number of respondents for the value then adding all the value. At last this value is divided by the total number of respondent.

3. ANALYSIS & INTERPRETATION

In the pocket gate there were no waste collection facilities. Waste is generally dumped in the road side when the waste buckets become full. In the all shop the storage of waste is done in one way or the other. Storage containers like plastic buckets are kept in the shop in order to store waste.

3.1 Solid Waste Generation

In study area shops are categorized into three different types on the basis of types of shops. These shops are tea stall, restaurant and grocery shop. There are two tea stalls, two restaurants and three grocery shops.

Among these three tea stall produces higher amounts of waste (0.63kg) per day where the grocery shop produces low amount of waste (.39kg) per day among the three type shops. And restaurant produces 0.51 kg waste per day. Figure 2 represent the yearly waste generation from the Shops.



Figure 2: Yearly Waste Generation from Shops, Source: Field Survey 2017

3.1.1 Tea Stall

In this area there are two tea stall. They are named as Babu Tea Stall & Liton Tea Stall. Among this two tea stall Babu Tea Stall produce more amount of waste per day than Liton Tea Stall. The figure 3 shows the amount of waste generation per day from the tea stalls.

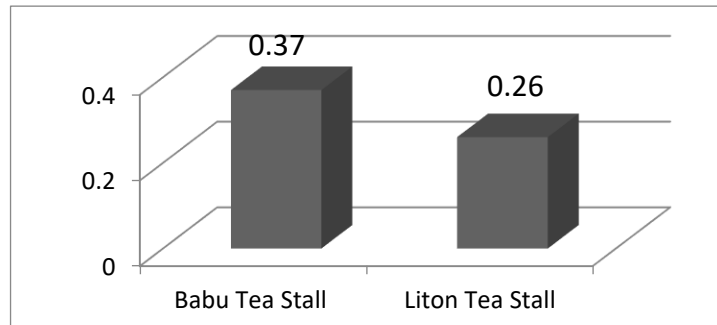


Figure 3: Waste Generation from Tea Stall, Source: Field Survey 2017

3.1.2 Restaurant

Food Club and Sadia Hotel is the two main restaurants in the study area. Among this two restaurants, Food Club produces higher amount of waste than the Sadia Hotel. Figure 4 shows the waste generation per day from the restaurants.

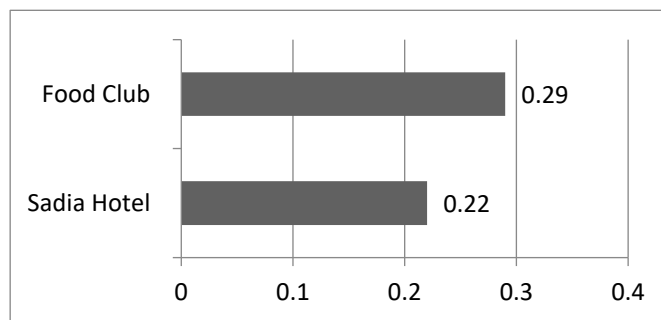


Figure 4: Waste Generation from Restaurant, Source: Field Survey 2017

3.1.3 Grocery Shop

In the study area there are three grocery shops. These are Sakib Shop, Student Corner and Rafiq Store. Among the three shops Student Corner produces higher amount of waste per day. The amount of waste generation from the grocery shops is shown in figure 5.

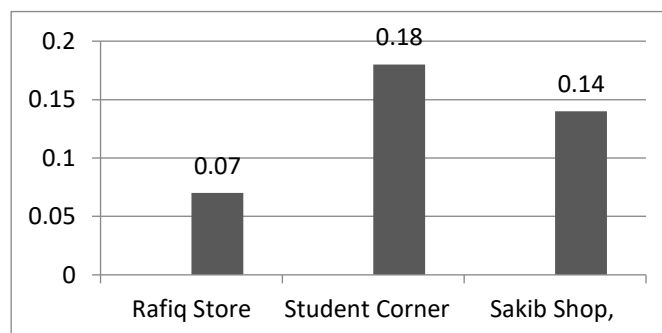


Figure 5: Waste Generation from Grocery Shop, Source: Field Survey 2017

3.2 Segregation of Waste

The segregation condition in the study area is very poor. No shop has their own segregation system. All waste is dumped into a bucket. Then the wastes are dumped beside the road side area. The figure 6 represents the presence of segregation system in the shops.

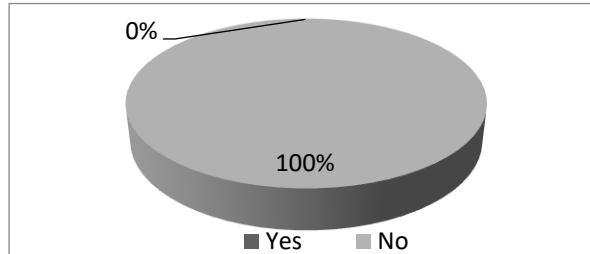


Figure 6: Segregation System, Source: Field Survey 2017

3.3 Satisfaction Index

In the user opinion survey respondents are asked to give their opinion on different attributes of waste management system in pocket gate on a scale of 0 to 5. Where 5 indicates the best excellent and 0 indicate the worst performance.

User opinions are taken about waste disposal system, water logging problem, air pollution, road side blockage, Water logging Diseases.

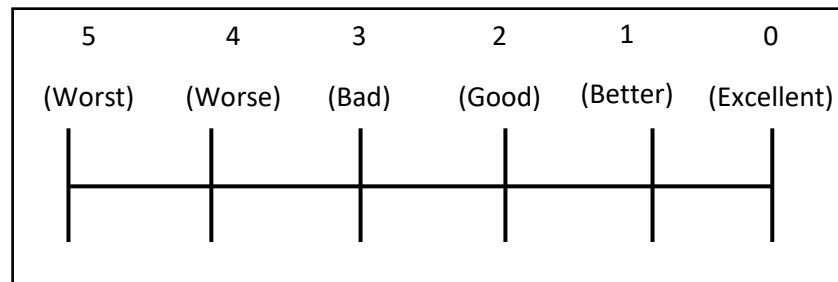


Figure 7: Scale of Satisfaction Level, Source: Author, 2017

Table 2: Value of Different Attributes

Attributes	Scale					
	5	4	3	2	1	0
Waste disposal system	9	22	16	3	0	0
Water logging problem	18	11	13	5	2	1
Air pollution	20	17	12	1	0	0
Road side blockage	31	14	5	0	0	0
Water logging Diseases	12	6	8	14	7	3

Source: Field Survey, 2017

$$\text{Satisfaction Index on Waste disposal} = \frac{5 \times 9 + 4 \times 22 + 3 \times 16 + 2 \times 3 + 1 \times 0 + 0 \times 0}{50}$$

$$= 3.74$$

Satisfaction Index of other attributes of waste management system in pocket gate

Table 3: Satisfaction Index of Different Attributes

Attributes	Satisfaction Index
Waste disposal system	3.74
Water logging problem	3.7
Air pollution	4.12
Road side blockage	4.52
Water logging Diseases	2.98

Source: Field Survey, 2017

From the above table 3, it is seen that the condition of air pollution and road side blockage is worst in the study area for lack of proper waste management system. The waste disposal system is not satisfactory and water logging problems are occurred due to it. On the other hand it is seen that water logging diseases are not spread at a high rate but it also affect the KUET students as well as the local people.

4. CONCLUSION

Population in Khulna city as well in Bangladesh is increasing rapidly and waste generation is also increasing. Depending on the education level, income level, house type, waste generation varies. Waste generation types are changing due to the adaption and availability of various packaging product (e.g. food etc.). It is found that none of the food shop has segregation practice at the early level of waste management in road side and also waste pickers do not have any different selected place to dump different waste in separate space. Source-segregated waste is essential for better management, so food shops should be motivated accordingly. Segregation practice at initial level in houses can increase the effectiveness of waste management and can make it easy to waste picker to manage the wastes and waste collection for recycling can be easier. Environmental significance of the wastes beside the road is negatively increasing. So, a better waste dumping place should be proposed to accumulate the wastes.

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