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Estimation of the Total Generation of Municipal Solid Waste in Quetta city and its Sustainable Management

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Abstract

The densely populated provincial capital of Baluchistan, Quetta, is home to permanent residents, a large number of Afghan refuges and visitors. Waste belongs to Food, Recycling, Landfill and Hazardous categories generated in Quetta city, have been thoroughly studied via a comprehensive survey. It has been concluded that the best way to manage the Municipal Solid Waste is to design a separate autonomous Governmental department, empowered enough to access each and every house of the district and convinced people to cooperate in addressing the important issue right from blocks to district level.

Key words: Municipal Solid Waste (MSW), Municipal Solid Waste Management (MSWM), Metropolitan Corporation Quetta (MCQ), Metric Tons (MT).

INTRODUCTION

Quetta, the provincial capital of Baluchistan is densely populated. It is located southwest of Baluchistan province near Pak-Afghan border. The population of Quetta not only comprises the permeant residents of the city, but also includes afghan refuges and the visitors to Quetta who come to satisfy their basic needs of life such as education, health, trade etc.[1] According to the Election Commission of Pakistan, the Quetta city is divided into two types administrative units: Urban Union Councils (UCs) and Urban Wards (UWs). There are total nine UCs and 58 UWs and the population is 1.1 million according to census 2017[2, 3].

Municipal Solid Waste (MSW) includes all types of waste produced at commercial, institutional and domestic levels. It is broadly categorized into: Food Waste (such as fruit peels, vegetables, rotted food etc.), Recycling Waste (paper, cardboard, textile, metals, glass, plastic, rubber), Landfill Waste (wood, dust, bricks, ash) and Hazardous Waste (paints, heavy metals, batteries, industrial chemicals) are collectively known as MSW.[4]. According to a recent report of MCQ (Metropolitan Corporation Quetta) , total MSW

produced in Quetta is 1200 MT to 1450 MT, and increased at a rate of about 100 MT per year. The situation of the city is deteriorating, as more than 53% of the total waste remains uncollected and dumped openly in empty places, due to limited resources of concerned authorities [5].

In Pakistan, due to insufficient budget, poor management and unhygienic disposal practices, it has been observed that the large volume of solid waste is dumped openly, everywhere around the cities (Fig. 1.1 & 1.2). Huge volume of solid waste at numerous places upkeep the growth of the pathogens and affects human health. The aim of this paper is to estimate the total waste generation in Quetta city at ward levels, and give suggestions for its effective management.

Fig. 1.1: Household waste thrown by people at the corner of street, near Gool Masjid Satellite town Quetta.

Fig. 1.2: Openly dumped solid waste in front of Barech Market Sirki road, Quetta.

METHODOLOGY

A total of ten houses were selected for the study. Waste sample was collected from the from the houses for a whole week, on daily basis. Different colored bags were given to the under study households, and they were convinced to place different types of waste in different bags. The samples collected were weighed and analyzed, and the data was recorded carefully. The data was later processed by using Microsoft Excel to generate visual graph.

RESULTS AND DISCUSSION

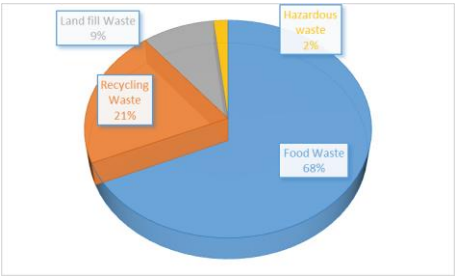
Total 10 houses were visited for a whole week (06 days). The detail of average production of MSW, categorized into Food, Recycling, Land Fill and Hazardous waste are shown in table 1 and presenting the data in pie chart as well.

The result of this study shows that 4.68 kg MSW is produced by a family of 8.2 people in a week (06 days) and the daily generation of MSW produced by a single person is 0.46 kg. Hence 1047 MT solid waste is produced in district Quetta, and the Quetta city contributes more than 50% in the total waste generation. Previously MCQ has reported that the total waste generation in Quetta district is 1250MT.

Table 1: Composition of MSW Produced in Selected Houses generated in kg per 06 days

S. No	Respondent / Houses	Family Size	Food Waste (Kg)	Recyclable Waste (Kg)	Hazardous Waste (Kg)	Landfill Waste (Kg)	Total Volume of MSW (Kg)
1	House 1	6	11.58	3.11	1.59	1.32	17.6
2	House 2	10	18.2	4.24	0.96	0.003	23.403
3	House 3	5	7.9	1.8	0.97	0.003	10.673
4	House 4	7	10.64	2.37	0.88	0.06	13.95
5	House 5	3	5.03	1.48	1.52	0.19	8.22
6	House 6	19	32.09	9.69	5.88	0.39	48.05
7	House 7	13	37.33	5.84	4.11	0.153	47.433
8	House 8	9	20.48	2.11	1.18	1.7	25.47
9	House 9	6	6.91	9.03	1.75	0.25	17.94
10	House 10	4	6.53	8.4	1.6	0.61	17.14
Total		82	156.69	48.07	20.44	4.679	229.879
Average		8.2	15.669	4.807	2.044	0.4679	22.9879

Fig. 1: Composition of MSW Produced in Quetta city



Noor., A et al. (2018) [6] have investigated that, 74% recyclable, 23% Food Waste and 3% hazardous waste but the present study shows totally different results about the recyclable waste which is only 21 % of the total waste. This variation may depends upon the methodology of data collection or different life style of the targeted population of the Quetta city.

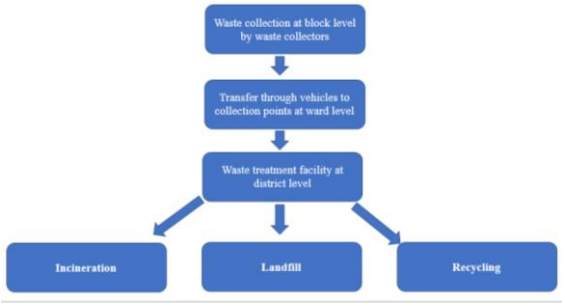
In this study, it has been observed that the uncollected waste not only affects the environment of the city but also a major problem of unaware public of the Quetta city, that do not even treaat the waste as waste [Fig 4].

Fig. 4: Openly dumped solid wastes; affecting the poor people of the Quetta city.

CONCLUSION

It is recommended to establish an MSWM department at district level, empowered enough to set up and run a central waste processing

site with incineration, landfill and recycling facilities. The highest rank in the department shall be named HoD (Head of Department), responsible for the major decisions and general management of the proposed body. The central department will govern its sub-departments at ward level, each headed by a ward manager, whose duty will be supervise staff and machinery working in his area. There shall be one waste collection point per ward. It is also possible to set up more than one waste collection points in a single ward, or one waste collection point for multiple wards; based on the population of the area. The last level in the waste management hierarchy will be a 'block'. The resources required for waste management at this level will be waste collecting vehicles, each with a fleet consist of a driver and two waste collectors. The sorting of waste at generation source or households, by putting it in different colored waste-category-specific bags, is desirable. For this purpose, the district level department may higher coordinators, with a duty to spread awareness regarding at source waste sorting. It is expected that money that come from the houses service fee will suffice, running expenditures of the department. In the under discussion system, path followed by the waste will be:



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