

Management of Municipal Solid Waste Produced in Quetta City

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Abstract

Quetta, the capital city of Baluchistan province lack most of the facilities to tackle the Municipal Solid Waste. The Metropolitan Corporation Quetta does not have enough capacity to manage the MSW as it only lifts and dispose 45% to 50% of the total waste. Due to overall backwardness of the Baluchistan province, people come to Quetta city for their basic necessities of life particularly health and education and generate considerable amount of MSW. Most of the household waste is collected by the scavengers and due to the absence of MSW recycling facilities, local waste dealers and stockist are left with the only option to export the recyclable waste to other large cities, mainly Lahore for waste recovery. The most common practice for reducing the dumped waste volume is open burning which potentially causes serious health and environmental problems. There is no existing systematic method in Quetta city for Municipal Solid Waste Management. Therefore, it is now necessary for the Government of Baluchistan to pay special attention to the waste management.

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

INTRODUCTION

Baluchistan is the largest administrative unit comprising of 347,190 Km². It is approximately half of the total area of Pakistan i.e. 43.1%. Despite having such a large area, its population according to the census of year 2017 is just above than that of Lahore district, Punjab. It goes without saying that Baluchistan is the least populated province of Pakistan, and the population density is 35.42 persons per square kilometer. [1]

The most populated city of Baluchistan is Quetta. Its area is approximately 2380km², located north-west of the province, about 1680m above from the sea level. The provincial capital, Quetta is located 30.11'60" Latitude and 67.01' Longitude. Owing to the huge variety of fruits, it is known as the fruit garden of Pakistan.

Additionally, it also produces sufficient amounts of dry fruits as well. The population of Quetta city was 760000 as per 1998 census, but in the year 2017, it rises to 1172000. A significant part of the population i.e. the 25.5% is consisting of afghan refugees [2]. It is worth mentioning that the general backwardness of the Baluchistan province badly impacts Quetta. Throughout the province, Quetta is the only city able to cater most of the basic necessities of life, particularly health and education. Due to lack of the basic facilities, people from the rest of Baluchistan are compelled to come to Quetta to satisfy their needs of health and education. This results in unplanned urbanization that negatively impacts the resources and capacity of the city. Moreover, the population of the city is increasing day by day, and there develops different environmental, residential and Solid Waste Management (SWM) complications.

At present, Metropolitan Corporation Quetta (MCQ) is lifting 550MT to 650MT MSW daily, whereas the daily generation of MSW is 1200MT to 1400MT, leaving behind 650MT to 800MT due to limited capacity of MCQ [3] which reflects the miserable condition of the city. Addressing the current situation of Municipal Solid Waste Management (MSWM) in the capital city of Baluchistan requires immediate attention. The aim of this paper is to provide a sustainable management solution of MSW generation in Quetta city.

RESEARCH METHODOLOGY

The data has been collected through surveying, interviews of the local people, especially those who are concerned with collection, disposal, or buy and sell of the household waste produced in the city. For a better understanding of the current situation of MSWM, data has been collected from the MCQ. The limited literature on the topic, available online and in the University of Baluchistan, was also consulted.

RESULTS AND DISCUSSION

By surveying urban areas of the city and visiting all the concerned stake holders, it has been observed that there is no proper way of handling, collection, sorting, processing, transportation and disposal

of MSW produced in Quetta city. The MCQ only lift 55% to 60% (approx.) of the total waste dumped by the citizens and private waste collectors, and transport it to the eastern bypass of the city near Tameer e Nau Public High School. The transported waste is dumped openly without any processing, composting or other necessary actions. The remaining 45% to 50% of the waste remains unaddressed, threatening the public health. The most common practice for reducing the dumped waste volume is open burning which potentially causes serious health and environmental problems.

Based on the present research, there are certain recommendations that may provide sustainable management of the issue. To start with, more than half of the total waste generated in Quetta city is managed by the private or informal sector. If it is replaced by an exclusive government department with the only task of MSWM, the situation is likely to improve. The proposed department should hire and then train its workers for proper waste collection and disposal. As the private waste collectors are usually untrained and unequipped, they are unable to manage the waste properly, hence threatens the ecosystem.

Unfortunately, there is not even a single waste recycling plant in the whole Baluchistan province, thus making the waste recovery impossible. Instead of carrying out the possible recycling, waste is burnt to add to the already existing problem of environmental pollution. It is also found that the required setup for recycling MSW is not so expensive that government cannot afford it.

During survey, it is observed that due to the absence of MSW recycling facilities, local waste dealers and stockiest are left with the only option to export the recyclable waste to other large cities, mainly Lahore for waste recovery. It has a many negative socio-economic impacts on Quetta. Sufficient number of recycling facilities will not only create job opportunities; but also prevent the outflow of money, in the form of valuable waste and transportation cost, from the city. Additionally, it will also lowers the prices of products made from the recyclable waste.

It is found during the research that Quetta based waste dealers and stockist buy the recyclable waste from scavengers at the rate of Rs. 60 per kg. Afterwards, the dealers transport it to the

recycling facilities in larger cities where they sell it for R.s 120 per kg. Every month, more than 300 metric ton of recyclable waste that worth R.s 370 million is exported from Quetta to other cities. This huge amount of money, if saved and spent wisely, may suffice to upgrade the existing MSWM system, and run the previously proposed government department. Thus, it becomes clear that having local waste recycling facilities will greatly improve the socio-economic conditions of the Quetta citizenry.

The solution of the issues in MSWM requires a close cooperation between the people and the concerned authorities. This is not possible without public awareness of the serious consequences of mismanaging the MSW. Awareness campaigns at large scales may serve the purpose. People need to be convinced to throw garbage at government approved sites only. Similarly, training regarding at source waste handling and sorting should also be made a part of these campaigns. A common practice in the developed countries is putting different kinds of waste in different colored containers. The same practice should be promoted in Quetta. Further, proper and ecofriendly waste management should be included in the national curriculum. It will help greatly in developing cooperation and coordination between the general public and the concerned authorities.

Once all the requirements discussed so far are fulfilled, there may establish a sustainable MSWM system. In such a system MSW will be sorted into three main categories, namely; i) recyclable waste ii) Landfill waste and iii) Incinerable waste. The recyclable waste will be sent to recycling facilities to convert it to finished consumer products. The landfill waste will be transported to proper landfill sites, the structure of which is discussed later. The incinerable waste will be transferred to incineration plants to generate energy. Details of the incineration process is not relevant to the present discussion. For further information, work of Lam et al., 2010, titled “Use of the incineration Municipal Solid Waste Ash: a Review” may be consulted. A modern landfill structure is consisting of six major components as discussed;

- i) **Bottom Line:** The innermost boundary of a modern landfill structure is the bottom liner. Its purpose is to prevent contact

between the waste, and the underlying soil and water. In MSW landfill, the bottom line is usually made up of HDPE (High Density Polyethylene). It is considered one of the best options for constructing bottom liner for its durability and puncture resistance.

- ii) **Cells:** A cell is the area of a landfill structure approved to use for dumping. Its size depends upon the waste volume and can be as large as 20+ acres. A cell of a landfill can be aptly called its mouth. Shredding and compaction machinery is also installed in cells for the proper processing of waste.
- iii) **Leachate Collection System:** The bottom of a modern landfill structure is sloped to a lower point called slump where water released from waste or leachate is collected. This water, after collection, is treated and decontaminated before being used for other purposes.
- iv) **Methane Collection System:** There are a number of decomposing bacteria inside an MSW landfill which decomposes the organic food waste. This process of breaking down of organic waste produces methane that may be harmful because of its potential to burn or explode. It is removed with the help of embedded pipes and utilized for energy production.
- v) **Cover:** Waste that is dumped into the cells should be covered daily with 4 to 6 inches of compact soil to avoid exposure to air, rodents, insects and animals. It also serve the purpose of controlling unpleasant odors. This process is called covering or capping.
- vi) **Ground Water Monitoring Stations:** They make use of pipe networks that are embedded in the underground water. Samples are collected from the underlying water sources and tested for the presence of leachate and other contaminants. In case of contamination, necessary repair is done to prevent water pollution.

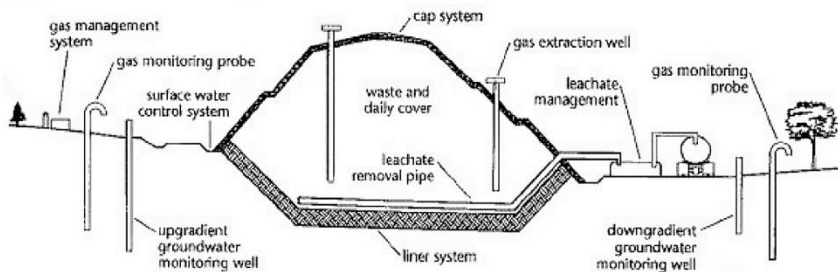


Fig1: Modern Landfill Model (UNEP, 2002)

CONCLUSIONS

- i) It is observed that more than 45% of MSW produced in Quetta city left behind in the streets, open plots and empty places or even in drains that results in their blockage.
- ii) The existing human capital of MCQ is insufficient for MSWM.
- iii) The valuable waste such as plastic bottles, cardboards, metals etc. are collected by the private waste collector and sell it to the local dealers who export them to larger cities of Pakistan and make high earnings.
- iv) There is not even a single waste recycling plant throughout the province where waste could be recovered.
- v) The common practice to reduce the volume of waste in Quetta is open burning instead of incineration or composting.
- vi) There is no landfill system throughout the capital city of Baluchistan and all waste that is generated in Quetta city is dumped in eastern bypass near Tameer Nau Public High School.
- vii) MSWM is possible only if government pays significant attention, otherwise, the problem will worsen further.
- viii) The solid waste generation also depends upon the visitors to Quetta from all over the province. Reason behind this enormous inflow of people is the lack of basic facilities in other districts of Baluchistan.

- ix) A considerable waste is also produced by afghan refugees.
- x) It was also observed that the newly built housing schemes in Quetta city too, lack the proper management of MSW.
- xi) A single waste handling plant has been constructed in 2015 by Baluchistan Government but remains closed since 2017 due to insufficient budget and mismanagement.

REFERENCES

1. Geological Survey of Pakistan.
2. Bureau of Statistic Pakistan, 2017
3. Metropolitan Quetta Report, 2019
4. Lam, C. H., Ip, A. W., Barford, J. P., & McKay, G. (2010). Use of incineration MSW ash: a review. *Sustainability*, 2(7), 1943-1968.
5. A typical schematic design of an engineered landfill with a full leachate and gas management. Source: UNEP (2002)