

Municipal Solid Waste Management Crises in the Developing Countries: A Case Study of Peshawar City

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ABSTRACT

Due to the speedy increase in population, the solid waste management issues are becoming a challenge for the developing countries. Unhealthy collection, improper transportation and open dumping of the Municipal Solid Waste (MSW) is causing a serious threat to the environment and the people residing in the surroundings. In Pakistan, unsustainable way of solid waste management, lack of the authorities to deal with effectively with the MSW and least vision of the society towards the emerging issues of the solid waste is depicting the worst situation in the country. To highlight the significant Municipal Solid Waste Management (MSWM) issues in the developing countries of the world, Peshawar city has been selected as a case study. Peshawar city is experiencing serious environmental issues due to speedy urbanization pace, rapid industrialization, deficiency of the authorities to manage the solid waste issues properly and lack of public awareness towards the challenging issue. Open dumping of the MSW on the open lands, utilized as dumping sites are responsible for the environmental problems increasing day by day. The research findings clearly reveal the MSWM crises in the city. Improper MSWM practices are not only creating air, land and water pollution but it also causes the blockage of open drains, smaller canals and ruining the aesthetics of the city.

Keywords

Solid Waste Management problems in Peshawar, Environmental Problems in Peshawar, Dumping Sites Peshawar.

1. Introduction

MSW catastrophes are directly related to the environment, human health and economy. The MSWM authorities in the developing countries are facing serious problems in the collection, transportation and disposal of the MSW. In Pakistan, the MSWM is getting worst day by day due to improper practices of handling the municipal solid waste [1]. The open dumps of the MSW are responsible for a number of diseases in Pakistan [2]. The increase in waste generation per capita per day is another threat for the

municipal authorities in the country. The solid waste generation in Pakistan is 0.283 to 0.612 per capita per day (pcpd) with an annual solid waste generation growth rate of 2.4% [3].

As there is a diversity in the living practices of the people of the country, therefore the authorities are not able to provide uniform MSWM system across the country [4]. According to the Ministry of Environment (Pakistan), around 55,000 tons of the MSW is generated on a daily basis but unfortunately, the collection efficiency is as low as 50% of the total MSW generation [5] & [6].

A number of studies have been done on finding out the MSWM crises in the developing countries and cities. Some of these studies are mentioned below.

Foday Pinka Sankoh (2013) studied the environmental and health impact of improper disposal of MSW in the Granville Brook dumpsite, Sierra Leone. Data was collected from different sources which included dump visual inspections of the dump site, questionnaire distribution, asset inventory from the municipalities, interviews from the local scavengers and farmers of agricultural activities near the disposal site and other data from sources like journals, books, newspapers,. The study divulged a number of fruitful results. The people residing near the dumpsite and the surrounding areas suffered from different diseases like malaria, diarrhoea, skin allergy and chest pain. Another important issue regarding the improper MSW disposal was that the hygienic conditions during the raining season gets worst due to increase in the moisture content of the MSW resulting in disease carrying odour [7].

N. Ijaz (2012) studied the MSWM issues in Taxila, Pakistan. The methodology follows data collection from the TMA (Taxila). The data collection included the asset inventory of the municipalities and other information like collection, transportation, disposal and handling system of the MSW. Personal field visits to the dumping sites were also conducted in order to investigate the real conditions of the sites and the areas in the surroundings. The study reveals a number of important findings. The MSWM system in the Taxila city is not up to the mark. Open dumping is a normal practice being done in the city and heaps of MSW can be seen commonly in the streets and on the road banks [8].

Iftekhar Enayatullah (2005) studied the urban MSW problems and prospects in Bangladesh. The data collection included field visits, physical composition of the MSW from the collected samples and asset inventories from concerned authorities, Asian Development Bank (ADB) and World Bank. The study reveals that food waste was in a highest percentage of 68% whereas the least percentage was that of chemicals (0.64%). Moreover, the waste generation rate was around 13000 tons/day but only 55% of the total MSW is collected. The left over MSW are lying on open roads and streets causing air pollution and foul smell in the localities. Around 75% of the total MSW is compostable but it is not composted,

resulting in reduction of the capacity of the landfill by the same amount of percentage. The ultimate disposal of the MSW is done in open lands without any fear of environmental deterioration. Another matter of concern in the study was that around 141 acres of land is being used for dumping of the MSW which is not only an improper utilization of the land but also degradation of the valuable property of the cities [9].

To study the environmental issues due to wrong MSWM practices, Peshawar city was selected as a case study. Peshawar city is known as the “City of Flowers”. Peshawar is the capital of Khyber Pakhtunkhwa, Pakistan [10]. It is the biggest city of Khyber Pakhtunkhwa and is the ninth largest city of the country according to the census of 1998 [11]. It is situated in a valley near the Khyber Pass, eastern end. It is at a distance of around 170 Kms from the capital of Pakistan. The climate of Peshawar city is semi-arid, with hot summers and slight winters. The overall efficiency of MSWM system in the study area is not up to the mark and the aesthetics of the “City of Flowers” is ruined due to the improper MSWM system. The Tehsil Municipal Administration (TMA), Peshawar is responsible for the management of the MSW generated in the city. The plan of the city is shown in figure 1.

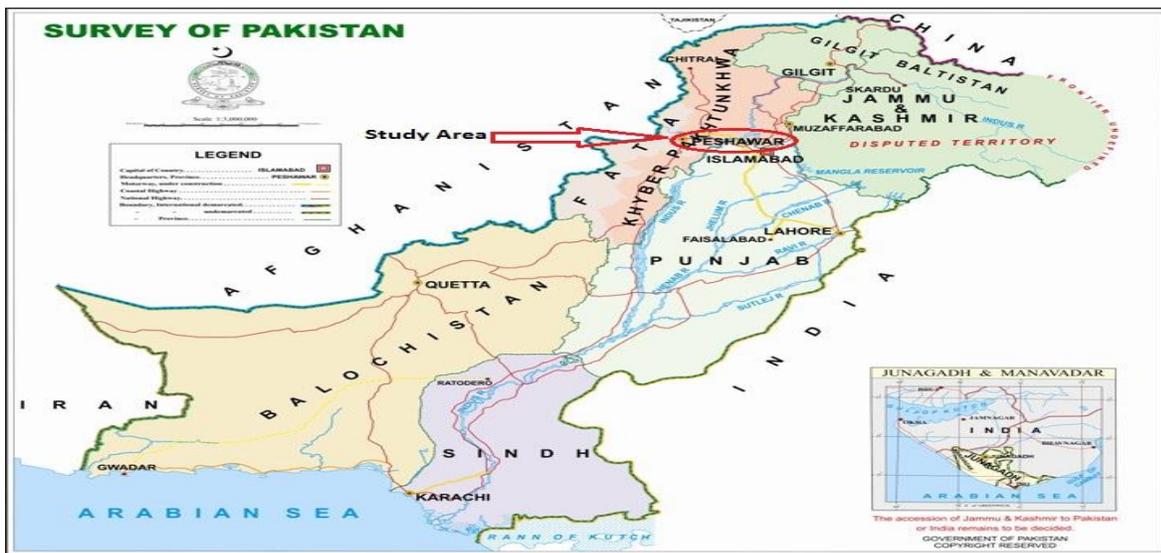


Figure 1 Study Area shown in a Red Target Circle (Courtesy: <https://www.google.com.pk/imgres?>)

2. Research Objectives

The main objective of the study was to highlight the improper disposal practices of the MSW and the arising environmental concerns in the surroundings.

3. Methodology

The methodology follows a sequence of data collection from the Tehsil Municipal Administration (TMA), Water & Sanitation Services Peshawar (WSSP), Peshawar Development Authority (PDA) and Municipal Corporation Peshawar (MCP) and investigation of the situation through the field visits to the landfill sites.

WSSP is responsible for the collection, transportation and disposal the MSW, except the cantonment area which is handled by Cantonment Board Peshawar (CBP). The city district government is divided in to 4 towns and these towns have been included in the 4 zones demarcated by WSSP. There are total 92 number of councils out of which 49 belongs to the rural areas whereas 43 belongs to the urban areas.

I. Field Visits:

To inspect the current MSWM system in Peshawar, field visits were conducted. MCP, TMA, PDA, CBP, and WSSP were visited to know the MSWM system right from the collection point to the disposal point. It was noticed that only three Dumping Sites, which were in a miserable condition existed for dumping of the total MSW generated in the Peshawar metropolitan area. The description of these dumping sites is given below.

a) HazarKhwani Dumping Site:

Hazar Khwani dumping site is owned by the government of KPK and is spread over an area of 25 Acres of land near Hazar Khwani chowk, Ring Road, Peshawar. The site serves zone-B of Peshawar that makes almost two-third area of the city. The site is located at a distance of 6 kms from main ring road, near Pushtakhara chowk. The waste is collected from the urban areas and commercial hubs including restaurants, educational institutes, etc. There are total 12 pits, almost all of the pits have been filled till now. Each pit is around 10 kanals of radius and the depth varies from 100 to 300 ft. The area is surrounded by commercial and residential hubs. Approximately 100-150 Tons of the MSW is dumped in the site on a daily basis. According to the Zone B official, this facility is on utilized for the last 15 years. Anti-Malaria spray is done on a daily basis in the surrounding areas to mitigate health risks but the health and environmental conditions at this site were unbearable. There were heaps of MSW lying on the ground with the least facilities available for managing the MSW. The multi-loaders were mostly in rotten and a miserable state. Malaria, jaundice and tuberculosis were common diseases people of the locality were suffering from. Figures 2-4 shows the conditions of the dumping site and its surroundings.



Figure 2 Bins in Rotten State



Figure 3 Houses Located in the nearest surroundings of the Dumping Site



Figure 4 Agricultural Activities on its peak in the locality of the Dumping Site

b) LandiAkhoon Ahmad Dumping Site:

LandiAkhoon Ahmad dumping site serves zone-C of Peshawar that makes almost one-third area of the city. The site is located at a distance of 1.5 kilometers from main ring road, near Pushtakhara chowk. The

waste is collected from urban areas and commercial hubs including restaurants, educational institutes, etc. There are total seven pits, six of which has already been filled and only one pit is left which is being used till now. Each pit is 4 to 12 kanals and the depth varies from 250 to 400 ft. The area surrounding the Dumpsite is mostly agricultural with a few houses where the people earn living by sorting out the valuable items from the same MSW being dumped. The current situation at the site is highly unsafe and substandard. Municipal trucks and Lorries are emptied on the site and after that no treatment, overlay or any sort of engineered practice is followed. Approximately 60-80 Tons of waste is dumped in the site on a daily basis. This site is a rented facility and is in operation for the last 10 years. There were almost no facilities for the MSWM staff; even a Chair was not available for the staff. A lot of scavengers mainly children of age ranging from 6-15 years were earning bread for them in those sites. They usually sort out the readily saleable items from the MSW bulks and then sell it out in the market. Anti-malaria spray was carried out on a daily basis in the dumping site. But unfortunately, the environmental conditions at these sites were deteriorated to the highest level with a nuisance smell and it is very difficult for a common person to breathe in the area. The most common diseases that were noticed in the people of the locality were diarrhea, malaria, skin diseases, jaundice and HIV aids (rarely). Figures 5 to 7 shows the miserable condition of Landi Akhoon Ahmad dumping site.



Figure 5 MSW Lying on Road despite the provided Facility



Figure 6 Scavengers earning their miserable living from the MSW



Figure 7 The Valuable Land turned into a Dumping Site

c) Hayatabad Dumping Site:

This site is located in phase 7, Hayatabad, Peshawar. This dumping site serves the MSW of Hayatabad Township only. In this facility the MSW is dumped in the dumping pits in layers followed by a layer of soil on the day end in order to mitigate the foul smell. This site is operational since the development of the town (1988), but as this site is reserved for the MSW of Hayatabad Township only therefore, it is not yet reached up to its saturation level. Moreover, Peshawar Development Authority (PDA) has plans for converting this dumping site into a recreational park once it gets filled in order to utilize it in a better way rather than leaving heaps of MSW openly. Around 90 tons of MSW is dumped in this facility on a daily basis. The MSWM system at this site was relatively in a better condition but still, it do not reach up to the benchmark of an ideal MSWM system. Figures 8 to 10 shows the conditions of phase 7 dumping site.



Figure 8 MSW collected in Piles to be thrown in the pit



Figure 9 Soil Stock for spreading over the thrown batch of the MSW



Figure 10 Covered Dumping Pits already reached to a ground level

II. Results and Discussion

The data collected consist of the inventory of the assets being utilized by the concerned departments for MSWM. The data has been collected from the Municipal Corporation Peshawar (MCP), Peshawar Development Authority (PDA) and Water & Sanitation Services Peshawar (WSSP). Table 1 shows the asset inventory of the equipments and other details for the three dumping sites.

Table 1 Asset Inventory (MCP/PDA/WSSP, 2015)

<i>Description</i>	HazarKh wani	LandiAkhoon Ahmed	Iayatabad
<i>Area</i>	25 acres	Not Specified	Not specified
<i>Ownership</i>	Government Asset	On rent	Government Asset
<i>No. of Compactors</i>	17	8	8
<i>Small compactors (Suzuki vehicles)</i>	24	N/A	1
<i>Blades Tractor</i>	1	1	1
<i>No. of Multi Loaders</i>	13	5	3
<i>Shovel</i>	2	1	1
<i>Modern Dumpers</i>	1	N/A	N/A
<i>Sweeper Trucks</i>	N/A	N/A	1

Table 2 shows the role of different organizations regarding the MSWM.

Table 2 Role of Organizations in MSWM

<i>Type of Services</i>	Service Provider					
	Govt.*	Constt.**	Pvt. Sector	NGO's	Others	
A. <i>MSWM Services</i>						
1. <i>Collection</i>	✓	N/A	✗	✓	✗	
2. <i>Transportation</i>	✓	N/A	✗	✗	✗	
3. <i>Pre-Treatment</i>	N/A	N/A	N/A	N/A	N/A	
4. <i>Recycling</i>	✗	N/A	✓	✓	✗	
5. <i>Disposal</i>	✓	N/A	✗	✗	✗	

	Govt.	Constt.**	Pvt. Sector	NGO's	Academia	Financial Institutions
<i>B. Support Services</i>						
<i>1. Awareness</i>	✓	✓	N/A	✓	✓	✗
<i>2. Information</i>	✓	✓	N/A	✓	✓	✗
<i>3. Technical Expertise</i>	✗	✓	N/A	✗	✓	✗
<i>4. Financing</i>	✓	✗	N/A	✓	✓	✓

*Government

**Consultant

Table 3 shows an analysis of the status of institutions, its weaknesses or gaps and suggestions for the improvement.

Table 3 Deficiencies and Bridging Measures

<i>Type of Services</i>	Status	Gaps	Suggestions
<i>A. MSWM Services</i>			
<i>1. Collection</i>	40%-60% Collection	Lack of Responsibility	Public Private Partnership
<i>2. Transportation</i>	Transportation to dumping site	Lack of transfer station	Provision of Transfer station
<i>3. Pre-Treatment</i>	No Pre-treatment	Lack of vision towards SWM hierarchy	Execution of SWM hierarchy
<i>4. Recycling</i>	No formal recycling	Lack of facilities	Government facilitation
<i>5. Disposal</i>	Open lands	Lack of sanitary landfills	Engineered Sanitary Landfill
<i>B. Support Services</i>			
<i>1. Awareness</i>	Insufficient	Gap b/w organizations & citizens	Media awareness programs
<i>2. Information</i>	Insufficient	Lack of vision towards MSW crises	Media awareness programs
<i>3. Technical Expertise</i>	Minimal	Gap between industry and academia	Linkage of industry & academia
<i>4. Financing</i>	Insufficient	Unsustainable MSWM	Sustainable MSWM

Conclusion

Following conclusions are drawn on the basis of the study:

- The MSWM authorities are facing serious problems to cope with the increasing amount of MSW being generated in the city.
- The improper collection, transportation and disposal impart critical environmental issues to the city.
- The MSW is dumped on the valuable lands of the city which not only degrade the worth of the land but it also reduces the worth of the properties in the nearby localities.
- Due to wrong MSWM practices, the aesthetics of the city is in miserable state.
- Different diseases were observed in the people residing near the dumping areas.

Recommendations

As a result of the study, the following recommendations are put forward:

- Educating the community.
- Color coded dustbins for source segregation of the MSW.
- Promotion of 3R (Reduce, Reuse, Recycle) hierarchy.
- A proper treatment plant may be built for the solid waste being utilized for productive purposes.
- Sufficient vehicles and machinery should be provided to SWM authorities for the collection and disposal of waste.
- The leftover MSW should be incinerated and sanitary land filled via proper, environmental friendly system.

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