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Solid waste as an environmental hazard; A Case study of Bahawalpur City, Pakistan

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Abstract

Solid waste is becoming threat to urban environment especially in developing countries like Pakistan. The situation is worst particularly in the Capital cities where the population is on higherside. In such cities of developing countries the public sector is unable to deliver services more effectively to protect the environment from illegal dumping of domestic and industrial waste. Moreover limited funds are provided by the Government to the Solid Waste Management sector as result of this the levels of services required for protection of urban environment is not attained. The current study is focuses on the Generation of solid waste in Bahawalpur City and its impact on the urban environment. Primary Data was collected through questionnaire on the basis of random sampling. Results reveals that the most of the solid waste was dumped in land or thrown away in streets which causing serious damages to the health of the inhabitants and urban environment of the City.

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Introduction

The anything which cannot be used in the future is generally known as waste. The waste can also be called as any such material which must be disposed of and have no immediate economic demand after its usage. Generally it is classified into three groups i.e. Liquid Waste, Gaseous Waste and Solid Waste. The solid waste consists of the material disposed of or thrown away as trash, garbage and rubbish from the homes or from any institution (Omofonmwan & Eseigbe, 2009).

Most of the South Asian Cities are facing the problems like urbanization, rural urban migration and the trends of industrialization. As a result of all this population of cities is rapidly increasing. The constant increase in population has resulted in the generation of solid waste which is serious threat not only to the inhabitants of the area but it is also a cause of environmental degradation.

Due to poor managmnet of solid waste these cities are facing problems relating to public health and environmental pollution. Poor waste management is the result of poor Government Policies, lack of political will, lack of appropriate use of economic and human resources, and weak local institutions result in poor waste management especially in larger cities of developing countries. The local municipalities are playing their role to manage the solid waste but their efforts results into nothing due to the lack of resources, institutional and infrastructure facilities (Visvanathan & Glawe, 2006).

High percentage of municipal solid waste is formed by the solid waste emanates from the Hospitals. Such kind of solid waste contains many pathogenic agents and hazardous materials that can affect the health of patients, staff and the relatives of the patients (Amouei *et al.*, 2012).

Due to urbanization and industrial revolution the production of solid and gaseous waste has significantly increased. Now a days even a common man is well aware about the adverse effect of waste material of liquid and gases but still there is dire need to identify the damaging effect of solid waste not only on the human health but on the surrounding environment as well.

Currently, most of urban areas of the world are under the cloud owing to plenty of solid waste material. In developing countries most of the land pollution is caused by the inhabitants and second major source of the land pollution is the industrial solid waste. A comprehensive research should be made to find out the impact of solid waste on the human health and on the environment as well (Ahmed *et al.*, 2011).

Solid waste management (SWM) is one of the major reasons of environmental degradation in Pakistan. Inappropriate management of solid waste in all over the country has caused serious health issues to the inhabitants of the area and as well as the environmental problems on other hand. Recent literature has been reviewed to identify the current Solid Waste Management practices in five major cities of Pakistan, and an effort has been made to provide a comprehensive review on the total amount of municipal solid waste, storage of solid waste, collection of solid waste, physical composition of solid waste, transfer of solid waste, processing and disposal of Solid Waste (Mahar *et al.*, 2007).

Human beings have been generating waste since of their origin on the face of earth. Sometimes the waste may be in the form of bones and other parts of animals they slaughter for their food or the wood they cut to make their carts. The nature of the waste generated by the activities of human being is becoming more and more complex. Due to a boom in industrial revolution the world has seen the rise in consumers at the end of 19th century. Currently not only the Air Pollution is an issue for the environment but the face of the earth is also getting polluted by the generation of solid waste. Generation of garbage households can be recycled and reused to prevent creation of waste at source and reducing amount of waste thrown into the community dustbins. There is a need to develop such strategies and proper planning which can provide a better, safe and healthy environment. Improper solid waste management results into environmental degradation like causing soil, water and air Pollution. On the other hand the solid waste produced by the anthropogenic activities and discharge of greenhouse gases from landfills and by the usage of home appliances is serious threat to human health.

The heaps of garbage are home of rodents. These animals are also the cause several diseases transmitted by them to the human beings. In order to manage the solid waste special challenges has been posted by the modernism in term of change in the lifestyles of people. Over the period of time the solid waste has been recognized as an important factor of environmental degradation as a result of urbanization. Poor solid waste management could be a disastrous activity for any urban area in all over the world (Ballados, 2010). Throwing garbage or solid waste in open areas characterized by the dry and hot climate not only has no serious threat to human beings but on surrounding environment as well. It is because in hot and dry areas the amount of heat generated by the immediately turned into the harmless waste (Ladu *et al.*, 2011). Anthropogenic activities are producing about 54,888 tons/day solid waste in Pakistan. According to an estimation annually about 2.4% soil waste is generated in Pakistan while the rate of solid waste generation varies from 0.283 Kg/capita/day to 0.613 Kg/capita/day." Major cities of Pakistan are densely populated and almost each individual household is producing about 1.89-4.29 kg/house solid waste on daily basis. The variation in the generation of solid waste mainly depend upon the household size (Ahmed, *et al.*, 2011).

The rate of generation of solid waste in Bahawalpur City is about 325 tons/day. The available site is not sufficient to dispose the solid waste as just 200 tons/day of solid waste is dumped in this site while remaining portion of solid waste is dumped openly in the nearby plots and along the roadside (BWMC, 2015).

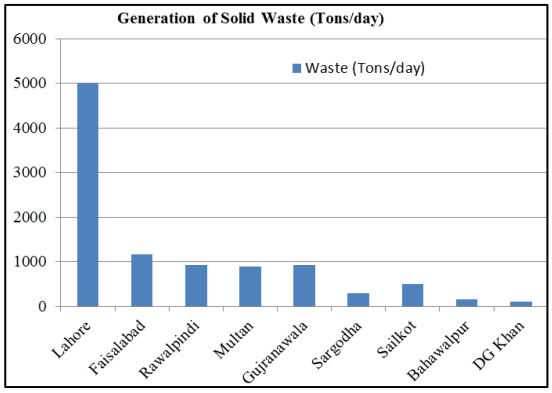

Fig. 1. Generation of Solid Waste in major Cities of Pakistan Source: (Joeng & Kim, 2007).

Material and methods

Current study was focused on the primary data sources. Primary data was collected through structured questionnaire on the basis of random sampling from the inhabitants of the study area. After collecting the primary data form the field, the data was statistically analyzed by appling chi-square and correlation and the results are depicted graphically. Finally, field observation which is the most important part of the research, involving people's attitude in producing and controlling solid waste was observed.

Study Area

Bahawalpur is the Southern part of Punjab province and it is located to the South of Sutlej River. It is the part of Cholistan desert lies near the Thar Desert. Bahawalpur is the twelfth largest city of Pakistan. According to the population cernsus of 2017 the total population of Bahawalpur City is 681,696.

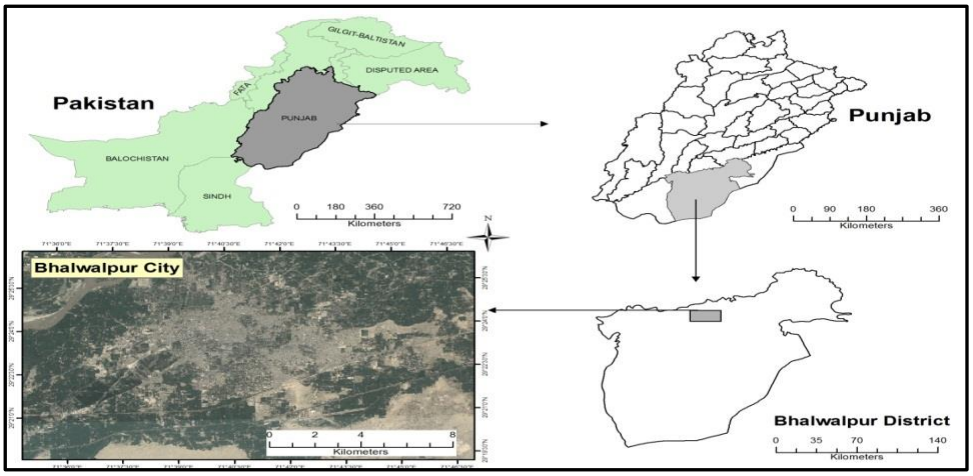

Fig. 2. Study Area.

Results and discussion

The results of the research show that the environment of the area has been affected by the poor management of solid waste. The findings also show that the people are not satisfied with the work of Tehsil Municipal Administration of Bahawalpur City in managing the solid waste.

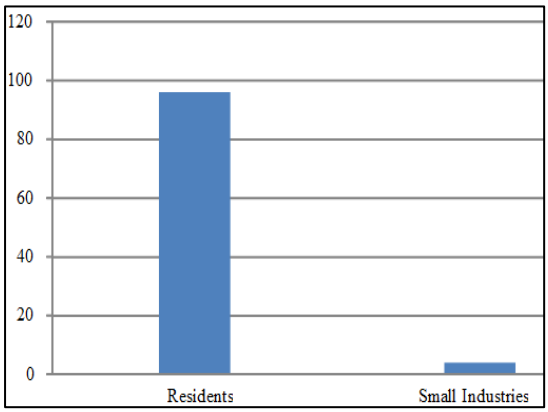

Fig. 3. Source of solid waste.

Fig. 3 shows that major cause of solid waste production was the inhabitants of the area. About 96% of the solid waste was produced by the household garbage and 4% of the solid waste was produced by small industries.

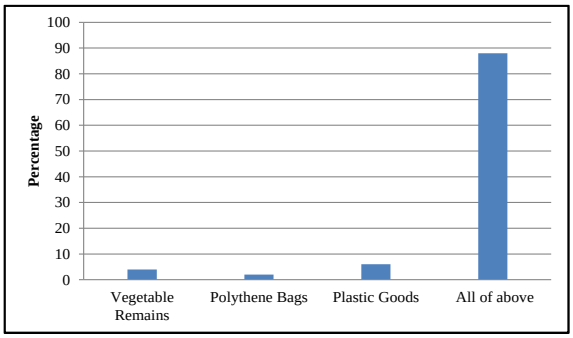

Fig. 4. Types of Solid Waste.

The results shows that the major composition of solid waste in the city is of mixed type. About 88% of the inhabitants think that mainly solid waste is composed vegetable remains, polythene bags and plastic items as a result of household waste. About 08% of the inhabitants think that the polythene bags and plastic goods are the source of solid waste generation in the city while only 04% inhabitants argue that the remains of vegetables are also the source of solid waste generation in the city.

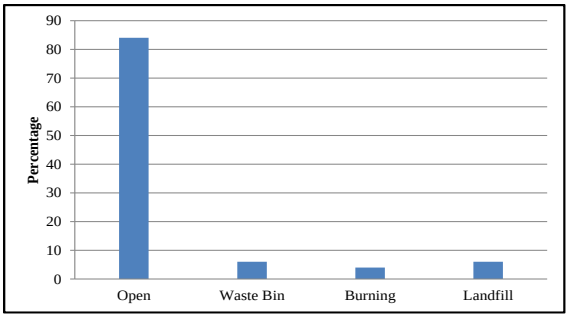

Fig. 5. Disposal of Solid Waste.

Fig. 5 depicts that majority of the inhabitants throw their solid waste in streets. They don't use waste bins or any other method to dispose the solid waste properly. The proper disposing methods of solid waste like the use of waste bins, burning of solid waste or landfill method is rarely practiced in the area.

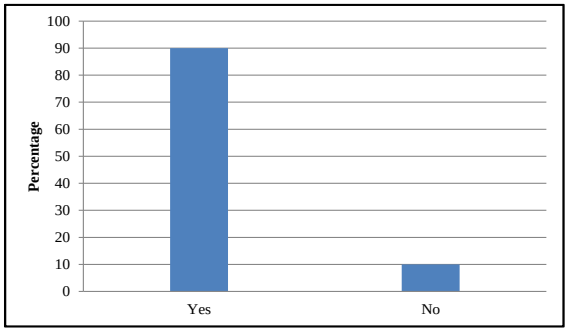

Fig. 6. Impacts of solid waste on the Environment.

Fig. 6 reveals that majority of the people think that poor solid waste management has a significant impact on the surrounding environment. Almost 90% of the inhabitants think that poor practices of solid waste management are effecting the environment while 10% of the inhabitants were not aware about environmental degradation.

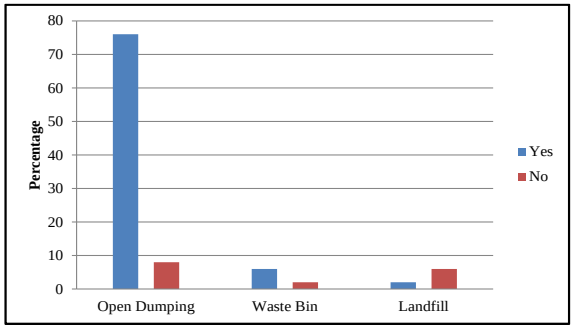

Fig. 7. Dumping Methods vs. Environmental Problems.

Fig. 7 shows that there is significant relationship between the waste dumping methods and the environmental problems. Environmental degradation is directly related to the proper solid waste management.

If the solid waste is dumped properly there will be no adverse impact on the environment. In the study area proper dumping methods like the use of waste bins and landfill method is not used, majority of the inhabitants throw their solid waste openly in the streets which causes many diseases and environmental degradation.

Table 1. Summary of chi square result for frequency of Dumping Methods vs. Environmental Problems.

Cross Tabulation	χ^2	A
Dumping Methods vs. Environmental Problems	14.404	.002

(χ^2)= chi square value

(α) = level of significance, statistically significant at 5%

Table 2. Summary of chi square result for frequency of Dumping Methods vs. Health Problems.

Cross Tabulation	χ^2	A
Dumping Methods vs. Health Problems	7.736	.025

(χ^2)= chi square value

(α) = level of significance, statistically significant at 5%

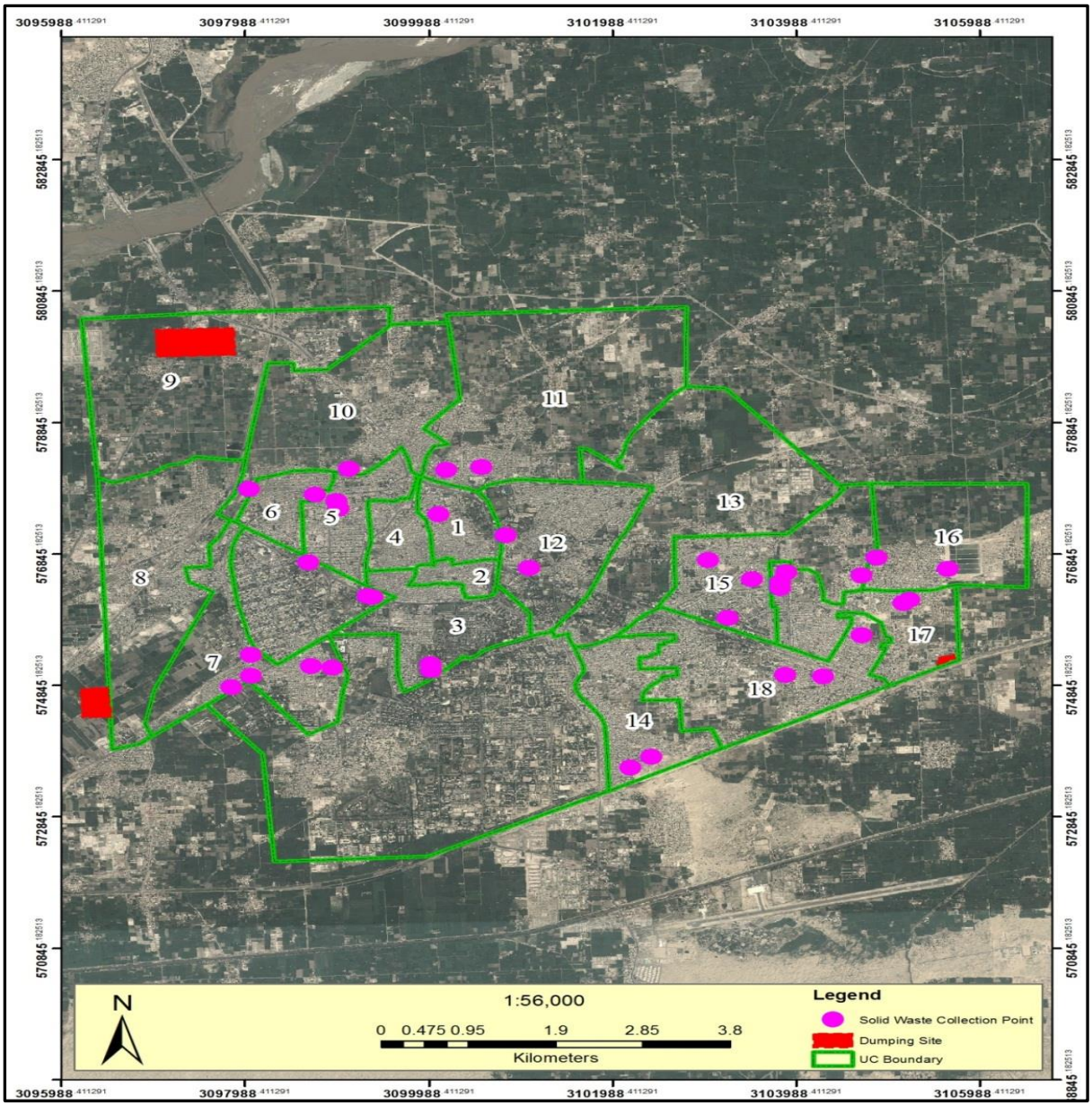

Fig. 8. Dumping Site and Collection Points of Solid Waste in Bahawalpur City.

Conclusion

Municipal solid waste management system was not working properly. Residents of the area were not satisfied with the work of Tehsil Municipal Administration. Municipal solid waste management system involves collection, transportation, storage, treatment and disposal etc. These activities even if properly controlled and with proper precautionary measures adopted, may have less adverse impact on urban environment, aestheticism and quality of life of the inhabitants. Urban exapansion, growing populations and increasing industrialization have increased and correspondingly generating higher volumes of solid waste. Poor solid-waste management is threats to human health and natural environment. Unfortunately, the public and the private sectors, in developing countries including Pakistan, are giving insufficient attention and fund to the disposal of solid waste which is causing severe environmental and health problems. It is dire need of time to resolve the environmental issues on priority basis in order to keep the environment safe and healthy for future generation.

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