

Surveying Of Urban Solid Waste Generated In MAZAR CITY

Masoud Gholami

Deepak Kumar Soni

School Of Civil Engineering, Galgotias University, Greater Noida

Abstract: Mazar city has excessive challenges regarding to Solid Waste Management which effected in various areas such as: environmental, human health and social activities. For this research both methods quantities and qualitative was used in order to identify the waste generated sources and characterize the waste. The research area has selected from random method 1 and 6 districts have been selected as representatives Mazar's 10 districts. In order to determination of sample size, 242 residential household in these two districts. According to this research 48% of waste which are generating contain of food wastes and 11% are plastics. More than 49% responded claimed that the municipal authorities are not able to manage the wastes. There are many reasons like lack of experts, lack of equipment, lack of budges and lack awareness.

Keywords: collection, characterize, landfill, waste sources, solid waste management

I. INTRODUCTION

Life standards, urbanization, population growth and economic development have caused in raising the waste consumption, volumes and types of wastes. MSW generation rates were affected by many factors like migration of people to urban areas rapidly, life standard increased, utilization of different types of goods and finally, developing of economic. Solid waste management is one of the most massive problems which all over the world are facing now a days and need for globally corporation. (1).

In many developing countries the reason of solid waste management is lack of knowledges, rapid urbanization and poor management of municipal authorities and governmental office. However, the big amount of budges are spending in this area the condition of solid waste management are getting worse and out of control day by day.

The first direct impact of poor solid waste management is on environmental and human health. If not taking action.

Generation, collection, transportation, recovery and disposal are the main process of Municipal solid waste management in order to conserve the environmental, human health and save lives. (2). The next definition is solid waste management and systems is an accurate technologies and

mechanisms included in the generation, collection, storage, processing, transfer or transport and disposal and solid waste set up to decrease waste at the lowest possible (3). In addition, reducing risk which are influencing human health and environment.

In urban habitats of developing and least develop nations generated MSW is at best collected dumped in arbitrary dump sites that probably is non standards. Such disposal needs collecting, transport and dumping into the nearest land. Which in other develop countries MSW is dumped in water bodies and wetland and part of the wastes is burning to minimize its volumes. Such practices have their adverse environmental impacts ranging from polluting the natural resources and the ecosystems to the building of health problems which might turn into long-term public health problems(4).

Mazar city is located in north zone of Afghanistan which is one of the historical province of Afghanistan. The capital of this city is Mazar Sharif which one of the largest city in Afghanistan. It is a developing city which the construction is in progressing. Geographical location: this city with the high of 357 from the ocean, 36. 7 latitude and 67. 3 longitudes is located in the country. From north has border with Uzbekistan and Turkmenistan, from east with Samangan province. This city is divided to ten districts and 36.7 km planning zone and

20 km unplanned zone. In addition majority of the population has been located in east and south of the city

Raising the efficiency of solid waste management system in Mazar city needs decreasing waste generation at its sources. Promoting public awareness. Private sector participation and NGOs in urban waste management, and using new technologies in this management system. Furthermore, it is essential to demonstrate the recent management of solid waste by monitoring the effectiveness of the solid waste by doing the questioners and provide the best methods in order to solid waste management in Mazar city from the majority sense and propose to the responsible organizations in order to replace to accurate method or continue the current methods. The scope of the research is to review the current condition of Mazar solid waste management in order to set up a sustainable waste management. In addition the main purpose of this study is to identify the sources of wastes and characterize the types of waste in order to suggest an appropriate methods for managing wastes in this city.

II. MATERIAL AND METHODS

A. STUDY AREA

Mazar is the third largest city in Afghanistan which is located in north of the country and one of the most popular city on order to immigrate people in this city. There are ten districts with divers land such as planed and non-planned areas

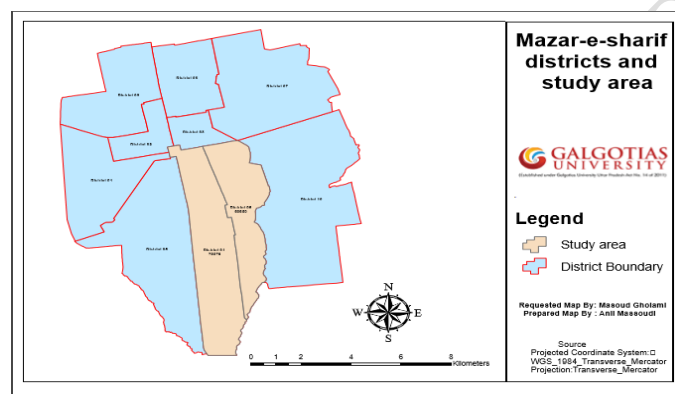


Figure 1: Mazar map, representative districts known and study area

B. SOURCES OF INFORMATION

The all data have collected included both secondary and empirical data. Secondary data has taken from critical literature review of scholarly articles on solid waste management. Therefore, the primary data was generated through site visit, and field work by surveying and face to face interviews, and on site visits of households, communal container collection sites, dumpsites.

C. SAMPLING TECHNIQUES AND DATA ANALYSIS

In order to being more effective of solid waste management this research from both methods quantitative and

qualitative were applied in Mazar city. District 1 and 6 have selected as representative areas which households were selected in order to taken sample. Therefore, each individual house selected. The scope of this research is household areas and the other areas like hospital, commercial were not considered in this research.

Residential areas were selected based on socio-economic of in habitants planned and unplanned parameters of the regions. In district 1 the number of families were 4562, and 6 district were 2195 which from systematic methods was used. From each districts 16 families were selected in order to taking sample. Therefore, from every family the sample has been taken for 8 days continuously, which the whole sample which has been taken is 256.

House No	Family	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Total(kg)
1	4	1.38	1.66	1.41	2	1.79	1.41	1.38	11.03
2	5	1.84	1.58	1.97	1.67	1.45	2	2.01	12.52
3	2	0.9	0.88	0.8	0.91	0.01	0.68	0.7	4.88
4	6	2.06	2.5	0	2.46	3	2.14	2.78	14.94
5	3	1.22	0.98	1.15	1	1.1	1.18	1.09	7.72
Total waste		7.4	7.6	5.33	8.04	7.35	7.41	7.96	51.09
Total people		20	20	14	20	20	20	20	
Per cap. Generation rate		0.37	0.38	0.38	0.4	0.36	0.37	0.4	0.38

Figure 2: sample size taken from study areas

Average per capita generation rate:

- ✓ 0.38 kg/cap/day
- ✓ $0.38 \text{ kg/cap.day} * 700000 \text{ cap} = 266000 = 266 \text{ ton /day}$

III. RESULTS AND DISCUSSIONS

A. MAIN ROADS AND TRASH POINT AREAS

In the below figure which has suggested trash point for MSWM of Mazar city in case of collected data and analyzed in order to identified the accurate trash point in this city.

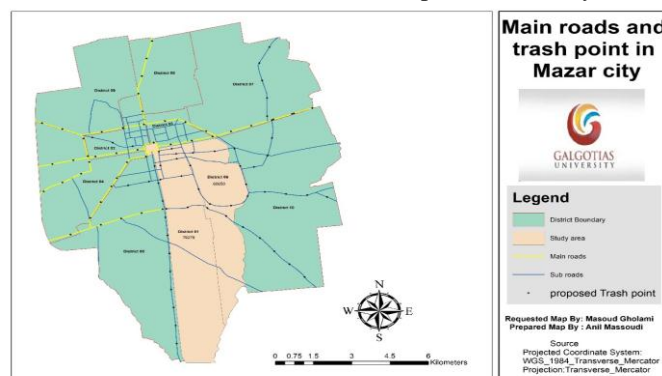


Figure 3: trash point areas modified

A. CHARACTERISTICS AND SOURCES OF SOLID WASTE IN URBAN AREAS

Waste production is directly depends on consumption. While the population were not growth wastes was not a big deal. Population growth, traveled to cities, life standard development and increasing the utilization of goods by urban people were the cause of wastes issue in Afghanistan

especially big cities. Various sources generated wastes in Mazar city.

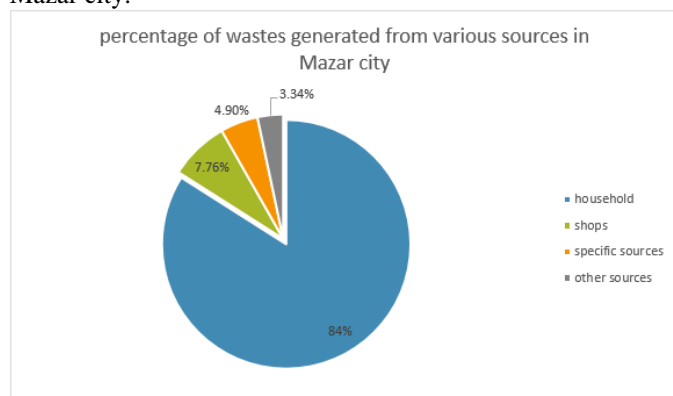


Figure 4: percentage of wastes generated in diverse sources in Mazar city

Sources	Types of wastes
Residential area	Food, Tin, Plastic, paper, dust, rubber, metal, glass, textile, leather, garden trimming. Cardboard.
Commercial area	chemical waste, electronic waste, demolition waste
Agriculture wastes	corn stalks, sugarcane bagasse, drops and culls from fruits and vegetables, pruning
Mess and hostel	Food, Tin, Plastic, paper, dust, textile, leather, metal, garden trimming

Figure 5: sources and types of wastes generated in Mazar city

SOURCES, VENUES AND TYPES OF WASTES IN THE CITY

Source of wastes	Venue of wastes generated	Types of solid wastes
House hold	different types of houses like flats, apartments	rubbish, organic, food wastes, plastics and etc.
commercial	stores, malls and shops	chemical waste, electronic waste, demolition waste
urban	commercial high places	commercial high place
Industrial	factories different types	toxic materials
Opened place	parks, streets etc.	plastic bottles, food wastes
Treatment plan	waste waters	waste water wastes
Agriculture	gardens	corn stalks, sugarcane bagasse, drops

Figure 6: sources, venues and types of wastes in the city

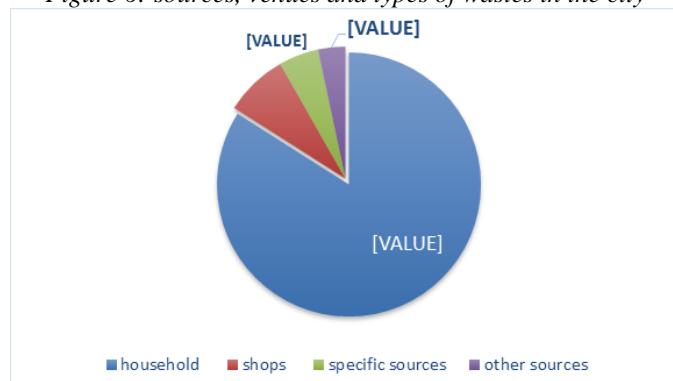


Figure 7: percentages of waste generated in different source

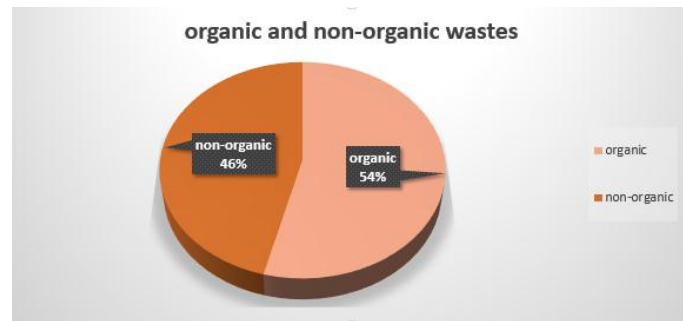


Figure 8: percentages of organic and non-organic waste in the city

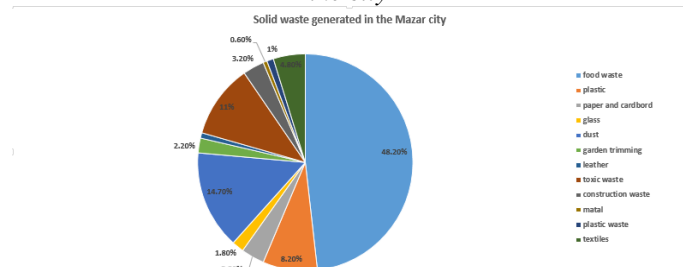


Figure 9: characterize of waste in the city generated

The total composition of solid waste generated in Mazar city which contribute is food waste 48.20% (figure 6). The big amount of solid waste composition is food waste following with plastic, paper and cardboard, glass, dust, garden trimming, leather, toxic waste, construction waste, metal, plastic waste bottles and textiles. The research will help the municipal authorities to set up an accurate and appropriate plan in order to manage the solid waste. Therefore, this might help the authorities to convert the solid waste into energy especially into biological process because the majority of waste contain food waste or organic waste that could be useful for agriculture purposes. In addition, this paper will provide awareness to the government to taking action about recycling and give chance to other private and NGOs to fund on this project.

IV. CONCLUSION

The most important issue for solid waste management in Mazar city should be upgraded soon. One the significant stage is collection process which has problems and not accurate and affordable for this city. Segregating solid waste at the source of generation could be the best option at the moment. Providing awareness for the communities to minimize the generation of waste and segregate dry and wet wastes. The disposing of solid waste might be done in a scientific sanitary landfill and the recyclable materials can be divided and transfer to recycle units. The segregation system should be applied at the sources of generation of waste. Accurate biodegradable waste could be decreased the waste disposal 55-75% at the moment. Finally, requested from the municipal authorities of Mazar city to follow these significant solutions which provided appropriately.

V. RECOMMENDATION

According to this survey which was founded that the big amount of waste is generating in Mazar city contain of organic matter which is nearby 54%. Hence I would like to suggest an accurate, appropriate models in order to reduce the volume of waste and generating renewable energy. Generation of methane gas is one of the most affordable method of this city because the big amount of waste contain organic matter as well as suitable temperature for converting methane gas.

Methane generation occurs as a result of anaerobic digestion of organic matter by methane forming bacteria. The gas formed inside an on-site methane digester typically consists of around 65% methane, with the balance consisting of carbon dioxide together with trace amounts of other organic gases.

For methane generation to occur, there needs to be two key types of anaerobic bacteria present: 1) The 'acid formers' that convert the organic waste into organic acids; and 2) the 'methane formers' that subsequently convert the organic acids produced by the acid formers into methane and carbon dioxide. Temperature is critical for optimizing methane production by the bacteria. Conventional methane digesters operate at temperatures of between 90-110F for optimal results.

- ✓ Continuous minimization of municipal solid waste production and prevention of its generation at source
- ✓ Separation of hazardous waste from household's wastes
- ✓ Apply comprehensive waste management system in compliance with the management hierarchy
- ✓ Education campaign on solid waste management and public awareness in reducing generation, separation and recycling of waste
- ✓ Privatizations of part or whole waste and monitoring their functioning by the municipality
- ✓ Wastes separation of recyclable materials and composting of organic waste should be encourage and also the economic market for this purpose should be supported
- ✓ Increasing the number of rubbish and container on streets, highways, parks and other public and private places in the city
- ✓ Coverage of solid waste management services at the household level and the easy access of people to such service
- ✓ Increased the efficiency municipal solid waste collection, waste collection site, containers and raising the

- ✓ Suitable dumped sites and sanitary landfills
- ✓ Existing waste management regulations and their enforcement should be reviewed and amended urgently
- ✓ Economic instruments such polluter pay principles and services users are also essential in waste management process should be considered

REFERENCES

- [1] Pfammatter R and Schertenleib R. (1996). Nongovernmental refuse collection in low-income urban areas. Lessons learned from selected in Asia, Africa and Latin America. SANDEC Report No.1/96. Water and sanitation in developing countries EAWAG/SANDEC, Duebendr, Switzerland.
- [2] Tacoli, C. (2012) Urbanization, Gender and Urban Poverty: Paid Work and Unpaid Care Work in the City. International Institute for Environment and Development, United Nations Population Fund, London, UK.
- [3] Yousif, D.F. and Scott, S. (2007) Governing Solid Waste Management in Mazate-nango, Guatemala: Problems and Prospects. International Development Planning Review, 29, 433-450. <https://doi.org/10.3828/idpr.29.4.2>.
- [4] Hoornweg, D., & Bhada-Tata, P. (2012). What a waste: a global review of solid waste management.
- [5] Daskalopoulos E., Badr O., Probert S.D., (1999). Economic and Environmental Evaluations of Waste Treatment and Disposal Technologies for Municipal Solid Waste. Applied Ecology 58, pp.209-255.
- [6] Moqsud, A.; Hayashi, S. and Rahman, H. (2005). Assessment of the modified composting barrel for sustainable organic waste management in tropical regions. Environmental Informatics archives, vol. 3, pp. 130-136.
- [7] Imad A. Khatib (2011). Municipal Solid Waste Management in Developing Countries: Future Challenges and Possible Opportunities, Integrated Waste Management - Volume II, Mr. Sunil Kumar (Ed.), ISBN: 978-953-307-447-4, InTech, Available from: <http://www.intechopen.com/books/integrated-waste-management-volumeii/municipal-solid-waste-management-in-developing-countriesfuture-challenges-and-possible-opportunities>, p 40.
- [8] MUDA "Ministry of Urban Development Affairs", IDLG "Independent Directorate of Local Governance", & KM "Kabul Municipality". (2015).