

Periodic Research

Waste Generation in Punjab (2010-2011)



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Abstract

According to World Health Organization, waste is defined as any substance or object arising from human or animal activities that has to be discarded as 'unwanted' (Economopoulos, 1993). It is very important to dispose that waste properly to ensure the community a healthy and safe environment particularly before the onset or at the time of any crisis. **Aim:** The aim of present research work is to find out the status of solid waste generation in the all the districts of Punjab and to give measures to dispose of this solid waste. **Study Area.** The study area chosen for this research work is the state of Punjab. **Methods:** The data on the waste generation for the urban areas of all the districts of Punjab was taken from Economic Adviser, Government of Punjab for the year 2010-2011. Spatial patters of solid waste generation in all the districts of Punjab are shown with the help of ArcGIS. **Findings:** The district which generated maximum amount of municipal waste in 2010-2011 was Ludhiana but the maximum per person municipal waste was generated by district Faridkot, while maximum amount of hazardous and bio medical waste was generated by district Jalandhar. The government must adopt structural and non-structural measures for the safe disposal of waste.

Keyword Solid Waste, Municipal Waste, Hazardous Waste, Biomedical Waste

Introduction

According to World Health Organization, waste is defined as any substance or object arising from human or animal activities that has to be discarded as 'unwanted' (Economopoulos, 1993). Generally solid waste includes all the non-liquid waste generated by human activities like domestic garbage, human feces not properly dumped, remains of dead animals, plastic, papers, medical waste from hospitals and laboratories, hazardous waste generated from big industries etc. It is very important to dispose that waste properly to ensure the community a healthy and safe environment. According to the Environment Information System (Punjab), established under the Ministry of Environment and Forests, Government of India has categorized solid waste into the following:

1. Municipal Solid Waste
2. Hazardous Solid Waste
3. Biomedical Solid Waste

In Punjab, all these three types of wastes are generated. Municipal waste is the waste collected in the boundary of municipal agency which comprises of solid and semi-solid waste like household waste, construction and demolition debris, sanitation residue, and waste from streets. This municipal waste is generally found in residential and commercial complexes (Rules, 2000). High Powered Committee (2001) defines hazardous waste as the waste in the form of solid, liquid or gas which is dangerous to community health and environment due to its physical, chemical, reactive, toxic, flammable, explosive, corrosive, radioactive or infectious characteristics. Therefore it must be handled, transported, treated and disposed off carefully. Government of India's Biomedical (Management and Handling) Rules 1998 define biomedical waste as the waste generated during diagnosis, treatment or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biological.

The ever-increasing migration of population in Punjab from rural to urban areas is creating the problem of proper solid waste disposal for the municipal authorities. Mostly the slum population of urban areas is facing this problem, which makes them more vulnerable and exposed to any kind of disaster. Improper disposal of solid waste causes various negative

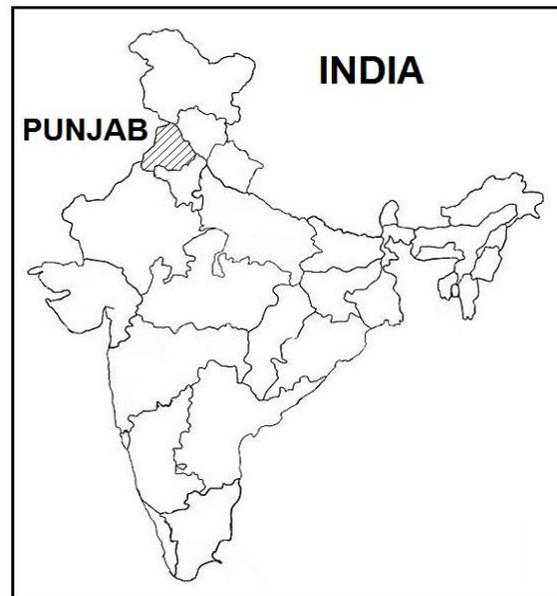
impacts on environment like soil erosion, contamination of groundwater, generation of harmful gases like Methane, green house gases, epidemics etc. The municipal authorities have to upgrade themselves according to the changing scenario. No doubt, now the government of Punjab is taking positive steps in waste collection but this waste can be managed by two methods. First the generation of waste must be reduced and secondly the collected waste must be efficiently managed and utilized for gainful purposes. These two steps must be taken keeping in mind sustainable development of various parts of the state.

Aim and Methodology

The aim of present research work is to find out the status of solid waste generation in the all the districts of Punjab and to give measures to dispose of this solid waste. The data on the waste generation for all the districts of Punjab was taken from Economic Adviser, Government of Punjab for the year 2010-2011. Spatial patterns of solid waste generation in all the districts of Punjab are shown with the help of ArcGIS.

The Study Area

The study area selected for the present research is the state of Punjab (India). Punjab is located in the north-western parts of India. It shares its international boundary with Pakistan in the west and state boundaries with Jammu & Kashmir in north, Himachal Pradesh in the east and Rajasthan and Haryana in the south. It covers a total area of 50362 sq km. Around 5000 years ago, the famous Indus civilization flourished in and around this state. There is a narrow tract of hills in the north-eastern parts of the state which are known as the Shiwalik hills. The rest of the state is a vast fertile alluvial plain. The three major rivers flowing through the state are Satluj, Beas and Ravi. The climate of the state is of continental monsoon type. Agriculture is the mainstay of economy. Nearly 86% of total geographical area is under cultivation. The main crops produced are wheat, rice, maize, gram and pulses. According to the Census of 2011, the population of the state is 24,358,999 persons out of which the rural population is 16,096,488 persons and the urban population is 8,262,511 persons. The population density is 551 persons per sq. km and the literacy rate is 76.68%. The state comprises of 22 districts and state capital is Chandigarh.



Map 1: India: Location of Punjab State

Results & Discussion

In Punjab, the amount of waste generated varies from place to place. Table 1 shows the variation in the generation of waste (municipal, hazardous & biomedical) of urban areas in all the districts of Punjab for the year 2010-2011. The unit of measurement of waste generation is metric tonnes (MT). In this table, municipal waste generated per person is calculated by dividing the amount of municipal waste generated by a district to the total urban population of that district.

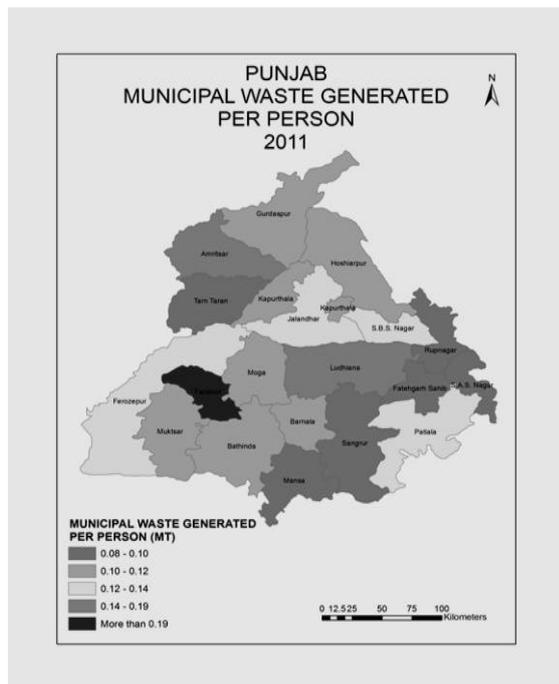
The red colour of district Faridkot in Map 2 shows the highest amount of municipal waste generated per person in the urban areas of the district. This district generated more than 1.25 MT of municipal waste per person in 2010-2011. After Faridkot district comes the districts of Ludhiana and Amritsar in orange colour. These two districts of Ludhiana and Amritsar generated 0.19 MT and 0.17 MT of municipal waste per person in 2010-2011. This is because of their high percentage of urban population in the district. The districts of S.B.S Nagar, Patiala, Ferozpur and Jalandhar in yellow show their moderate amount of municipal waste generated per person. These districts fall in the category of 0.13 to 0.14 MT of municipal waste generated per person. Then comes the districts of Gurdaspur, Moga, Muktsar, Bathinda, Barnala, Kapurthala and Hoshiarpur which produced municipal waste range between 0.12 MTs to 0.11 MTs per person for the year 2010-2011. The lowest municipal waste per person in Punjab was generated in the districts of Sangrur, Mansa, Fatehgarh Sahib, Taran Tarn, Roopnagar and S.A.S. Nagar for 2010-2011. These districts generate municipal waste varying between 0.10 MTs to 0.08 MTs per person.

Table 1: Amount of Solid Waste Generated In All the Districts of Punjab (2010-2011)(Metric Tonnes)

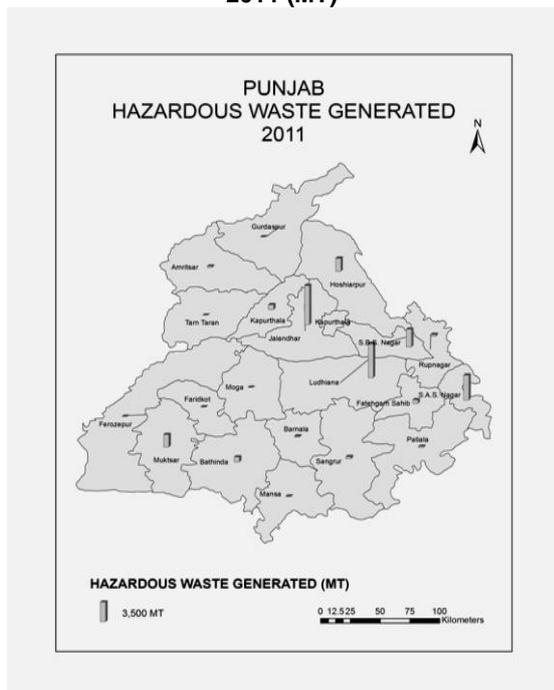
Sr. No.	District	Municipal Waste	Hazardous Waste	Biomedical Waste	Total Urban Population	Municipal waste produced per person
1	Gurdaspur	72425.08	19.67	193.09	655144	0.11
2	Amritsar	228981.5	199.92	142.5	1336060	0.17
3	Tarn Taran	11902.8	2.19	125	141459	0.08
4	Kapurthala	33360.6	868.58	399.6	285372	0.12
5	Jalandhar	155573.6	6948.11	502.8	1160365	0.13
6	S.B.S. Nagar	17165.88	3117.42	113.7	125505	0.14
7	Hoshiarpur	38711.4	2316.94	121.65	334824	0.12
8	Rupnagar	14560	298.37	27.29	177820	0.08
9	S.A.S. Nagar	45500	4410.74	101.5	544035	0.08
10	Ludhiana	396315.9	6040.64	399.8	2062681	0.19
11	Ferozepur	72599.8	42.66	224.3	552239	0.13
12	Faridkot	27154.4	26.07	113.7	21794	1.25
13	Muktsar	27165.32	2205.54	127.06	252698	0.11
14	Moga	26098.8	3.33	121.65	223790	0.12
15	Bathinda	57442.82	871.32	397.52	499916	0.11
16	Mansa	16740.36	104.88	175.45	163452	0.10
17	Sangrur	53216.8	392.9	119	516775	0.10
18	Barnala	21188.44	150.9	41.4	190619	0.11
19	Patiala	95331.6	201.88	249.3	762003	0.13
20	Fatehgarh Sahib	18709.6	660	41.3	185165	0.10

Source: Economic Adviser, Government of Punjab, 2010-2011

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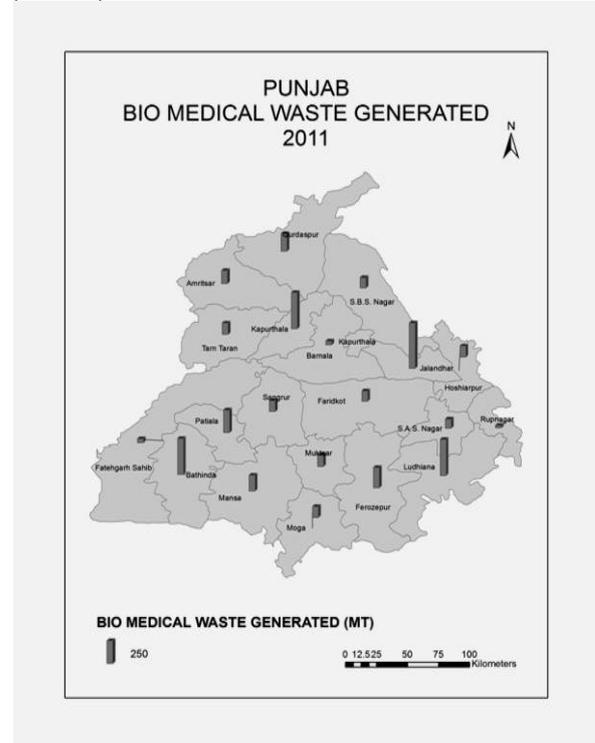
Map 2.
Punjab: Municipal Waste Generated Per Person 2011 (MT)



Map 3.
Punjab: Hazardous Waste Generated, 2011 (MT)
The spatial patterns of generation of hazardous waste and biomedical waste are shown in Map 3 & 4.

The district generating the highest amount of hazardous waste is Jalandhar, which produced 6948.11 MTs of hazardous waste in the year 2010-2011, and the lowest is generated by district Taran Tarn which is 2.19 MTs in 2010-2011 as shown in Map 3. The main reason behind the generation of

hazardous waste is the polluted waste of industries dumped in open spaces. This practice is highly rampant in district Jalandhar and lowest in district Taran Tarn. Map 4 shows the variation of biomedical waste generation in Punjab, which shows the highest generator of biomedical waste was again district Jalandhar (502.8 MTs) and the lowest amount of biomedical waste was generated in district Roopnagar (27 MTs).



Map 4
Punjab: Biomedical Waste Generated, 2011 (MT)
Conclusion

The district that generated highest quantity of municipal waste in 2010-2011 was Ludhiana, but the maximum per person municipal waste was generated by district Faridkot, while maximum amount of hazardous and bio-medical waste was generated by district Jalandhar. It has been found that all the hazardous waste and biomedical waste collected in the year 2010-2011 was collected and treated properly. However, every year the amount of solid waste generated in the urban areas of the state is increasing. To solve this problem there are many structural and non structural measures like Incineration, Gasification Technology, Compositing, Refuse Derived Fuel (RFD) Plants, Landfilling, Bioreactor Landfilling etc., which must be adopted by the government for the safe disposal of waste generated in the state.

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