



Full Length Research Paper

Solid Waste Generation and Characterization: A Case Study of Sector-IV, Sanjay Nagar, Jammu (J&K)

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Abstract

The objective of the study was to estimate and characterize the solid waste generated in sector-IV, Sanjay Nagar, Jammu. About 30% houses were randomly selected and the data regarding solid waste generation was collected in two phases. Phase-I involved the measurement of pre-exposure level of knowledge of the respondents with the help of structured questionnaire. During this phase knowledge regarding the nature of waste, waste minimization techniques etc. was imparted to the individuals. Phase-II involved the collection of data after post-exposure level of knowledge from the sample household. The study revealed considerable decrease in daily generation of biodegradable waste from 29.44 Kg to 27.23 Kg and non-biodegradable waste from 9.21 to 7.72 Kg during the study period, which can be attributed to awareness created among the sample house hold through the questionnaire.

Keywords: *Awareness, Environment, Management, Pollution, Solid waste*

Introduction

Land is our most valuable asset and now-a-days, it is becoming more susceptible to pollution by solid waste. Municipal Solid Waste (MSW) poses a difficult and complex problem for society. Many factors play significant role in municipal solid waste generation such as spiraling urban population, economic development, consumption pattern, climate, culture and institutional framework (Wang and Nie, 2001). Among these factors, urban population growth and economic development are considered vital as they not only accelerate consumption rates but also increase the generation of waste in developing countries (Alamgir *et al.*, 2007). Wang and Nie (2001) identified solid waste generation as an inevitable consequence of production and consumption activities related to the level of income and urbanization. Unscientific solid waste disposal can cause adverse impact on all components of the environment and human health (Sharholi *et al.*, 2005; Rathi, 2006). Consequently, the management of municipal solid waste needs to be revamped to ensure the longevity of environment.

In Jammu city at present, 450 tones of municipal solid waste is generated per day which contain 54% biodegradable waste, 14% recyclable and remaining 32% inert material (Daily Excelsior, 2006). The present investigation has been made to estimate the amount of solid waste generated in Sector- IV of Sanjay Nagar, Jammu, with a view to provide some of the much needed data as well as to aware the masses about the waste management techniques.

Materials and Methods

The study area (Sector-IV, Sanjay Nagar) was situated at a distance of 6 kms from Jammu University campus and came under the municipal limits of Jammu city. There were approximately 200 houses having about 1000 individuals in the study area. A minimum of 30% houses (i.e. 60 houses) were randomly selected for the purpose of study. The data regarding solid waste generation were collected in two phases viz., in the month of April and May, 2008. Phase-I involved the measurement of Pre-exposure level of knowledge of the respondents with the help of a structured questionnaire. During this phase knowledge regarding the nature of waste, waste minimization techniques etc. was imparted to the individuals. Phase-II involved the collection of data after the post exposure level of knowledge from the respective families. In each phase, solid waste generated per household during 24 hours was collected, segregated into biodegradable waste (kitchen, textile and paper), non-biodegradable waste (plastic, glass and metal waste) and inert material; and weighed with the help of digital balance. The appropriate statistical tools i.e., averages, percentages and mean scores were applied to draw meaningful inferences.

Results and Discussion

The physical composition of waste is changing over the years with the economic development of the country, increased habitation, density of population, changing food habits, social and cultural habits, education, effect of globalization etc. The overall composition of solid waste generated during the study period revealed high percentage of biodegradable material followed by non-biodegradable and inert material (Table 1).

The findings of the study revealed generation of 38.79 kg solid waste daily in the month of April (Table 2), out of which biodegradable waste was 29.44 kg, non-biodegradable was 9.21 kg and inert material was 0.136 kg. On contrary, Rampal and Sharma (2003) reported 114.67 kg daily solid waste generation at Bagh-e-Bahu, Jammu, the variation was due to religious and commercial importance of their area. Whereas, waste generated per household per day was reported to be 0.62 kg viz., biodegradable waste (0.48 kg), non-biodegradable waste (0.14 kg) and inert material (0.002 kg), (Table 2). The generation of biodegradable waste was less when compared with the daily generation of biodegradable waste in Hisar district of Haryana which was reported to be 0.62 kg (Karwasara, 1997). It was owed to rural households in which animal dung was major component of the waste generated.

In the month of May, the total daily solid waste came out to be 35.19 kg, out of which biodegradable waste was 27.23 kg, non-biodegradable waste was 7.72 kg and inert material was 0.25 kg (Table 3). There was considerable decrease in solid waste generation per household per day in the month of May which was due to awareness generated among the masses through the questionnaire. The daily per capita solid waste generation came out to be 0.13 kg, which was fairly low when compared with national average of 0.4 kg. It was also low when compared with other metropolitan cities where the corresponding figures ranged from 1.5 to 3.0 kg.

Table 1: Overall composition of solid waste generated during the study period (April-May, 2008)

Waste category	Waste generated/house/month (kg)		Waste generated/house/month (kg)		Mean
	April	% Composition	May	% Composition	
A. Bio-degradable					
Vegetable Waste	4.04	20.81	3.87	21.29	3.88
Food Waste	0.98	5.05	1.29	7.09	1.105
Fruit Waste	4.38	22.56	4.65	25.58	4.44
Paper Waste	5.07	26.12	3.96	21.78	4.44
Textile Waste	0.24	1.24	0.29	1.59	0.26
B. Non-biodegradable					
Plastic Waste	3.5	18.03	2.90	15.95	3.13
Metal Waste	0.85	4.38	0.68	3.74	0.75
Glass Waste	0.29	1.49	0.41	2.25	0.34
C. Inert Material	0.068	0.35	0.13	0.71	0.10

Table 2: Cumulative solid waste generation for different categories of solid waste in the month of April (2008)

Waste category	Total daily solid waste generation (Kg)	Waste generated per house per day (Kg)	Waste generated per person per day (Kg)	Total monthly solid waste generation (Kg)	Total waste generation per house per month (Kg)
A. Bio-degradable					
Vegetable Waste	8.08	0.13	0.026	242.40	4.04
Food waste	1.96	0.03	0.006	58.80	0.98
Fruit waste	8.76	0.14	0.029	262.80	4.38
Paper waste	10.15	0.17	0.033	304.50	5.07
Textile waste	0.49	0.008	0.0016	14.70	0.245
B. Non-biodegradable					
Plastic waste	6.94	0.11	0.023	208.20	3.47
Metal	1.70	0.02	0.0056	51.00	0.85
Glass	0.57	0.0095	0.0019	17.10	0.285
C. Inert material	0.136	0.002	0.00045	4.08	0.068

Table 3: Cumulative solid waste generation for different categories of solid waste in the month of May (2008)

Waste category	Total daily solid waste generation (Kg)	Waste generated per house per day (Kg)	Waste generated per person per day (Kg)	Total monthly solid waste generation (Kg)	Total waste generation per house per month (Kg)
A. Bio-degradable					
Vegetable Waste	7.49	0.124	0.025	232.19	3.87
Food waste	2.50	0.042	0.008	77.50	1.29
Fruit waste	9.01	0.150	0.030	279.31	4.65
Paper waste	7.66	0.127	0.025	237.46	3.96
Textile waste	0.570	0.009	0.0018	17.67	0.29
B. Non-biodegradable					
Plastic waste	5.61	0.093	0.019	173.91	2.90
Metal	1.32	0.022	0.0044	40.92	0.68
Glass	0.787	0.0131	0.0026	24.40	0.41
C. Inert material					
	0.25	0.0041	0.00082	7.72	0.13

Solid waste generation trend during the study period

There was overall decrease in the biodegradable and non-biodegradable waste generation during the study period but there was a considerable increase in the generation of inert material (Table 4). There was considerable decrease in the paper waste from 10.15 kg to 7.66 kg; plastic waste from 6.94 kg to 5.61 kg and slight decrease in metal waste from 1.70 kg to 1.32 kg during the study period (Table 2 and 3). The decreasing trend can be attributed to adoption of waste management techniques viz., reduction in the paper and plastic used in packaging, selling of paper to scrap dealer and recycling of metal waste.

Table 4: A detailed comparison of solid waste generation (kg) per house per month during the study period (April-May, 2008)

Waste category	April	May	Mean	% Decrease or Increase
A. Bio-Degradable	14.715	14.06	14.39	(-) 4.45%
B. Non-Biodegradable	4.605	3.99	4.30	(-) 13.35%
C. Inert Material	0.068	0.13	0.099	(+) 45.59%

Awareness level among the respondents of study area

About 100 individuals were interviewed with help of a questionnaire. Maximum number of respondents i.e. 58.0% belonged to age group 34-45 years. Maximum of the respondents i.e. 74.0% belonged to high family education status. Majority of the respondents had service as sole profession (85%) and only 15% had independent profession. Majority of the respondents (83%) belonged to nuclear family system consisting 3 to 4 family members. It was found that about 75% of the respondents preferred to throw waste in the dust bins than open spaces or drains. In order to reduce their daily solid waste generation, 20% respondents preferred to reuse the throw away items, 40% preferred to sell them to the waste purchaser while rest of the respondents simply throw away the waste items in the dust bins or in the open dumping sites.

Conclusion

The present study revealed that the most important aspect of the waste management would be the education of the people and the need for personal and environmental hygiene. The behavioral and attitudinal changes in people towards their environment can go a long run in environment management. It is suggested that efforts should be made to provide functional dumping sites with regular and frequent collections. However, due to variation in the consumption patterns and lifestyle changes, there is need of continuous monitoring of quantity and characteristics of municipal solid waste at different times.

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