Generation and Management of Domestic Solid Waste at Rural Area of Jammu District, J&K, India

KEYWORDS: Solid Waste Management(SWM), Biodegradable, Non-Biodegradable, Animal Farm Waste, Jammu Municipal Corporation(JMC).

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ABSTRACT *Solid waste management has become a challenge for both the urban as well as the rural areas in the world. The present study deals with the analysis of domestic solid waste generation composition and management within the residential area of Sunjwan village which is a rural area of Jammu district of Jammu and Kashmir State. Total 83 houses were studied for solid waste composition and generation for a period of three months. Characterization and management of solid waste along with methods of disposal of Domestic Solid Waste (DSW) were studied to analyze its impact on the environment and people inhabiting the area. Proper disposal methods have also been suggested so that the environment in general and the population inhabiting the area in particular are saved from the hazardous effects of fast increasing menace of the domestic solid waste.*

1. INTRODUCTION

The problem of solid waste has increased alarmingly with population growth, increasing urbanisation and industrialisation and rising standards of living have all contributed to an increase in both the amount and variety of waste generated in most countries. Furthermore, many countries are now faced with dealing not only with greater volumes of waste, but also more dangerous waste materials (Santra, 2001).

The Environmental Protection Act (1986) defines waste as “Any substance or object which the holder discards or intends to discard”. Many of the wastes generated at present are used or reused in uneconomic manner or left completely unutilized, causing a great damage to the human health and environment. Solid waste can be classified into different types depending on their sources viz- Municipal waste, Agricultural waste, Sewage waste, Industrial and mining waste, Hazardous waste, Radioactive waste and Bio-medical waste.

The term “solid waste” is applied to unwanted or discarded waste material from houses, street sweeping, commercial, industrial, mining, energy production, sewage sludge, agricultural operations etc., arising from man’s activities (Park and Park, 1991). Solid wastes are wastes that are neither liquid nor gaseous like durable goods, non-durable goods, containers and packing, food scraps, yard trimmings and miscellaneous inorganic wastes. Solid waste is more or less synonymous with the term refuse but solid waste is the preferred term.

The waste generally contains discarded material like paper, plastic bags, glass, metal, fine earth particles, ash, sewage sludge, dead animals etc. Even the generation of solid waste is not constant and varies from 2.75 to 4.00 Kg per capita per day in the high income countries but it is as low as 0.5 Kg per capita per day in low-income countries. However waste generation increases continuously in proportion with population and increasing land requirements (Indris et al., 2004). The organic matter in solid waste in developing countries is much higher than that in the waste in the developed countries and organic matter can be converted into useful products to reduce the burden on existing landfills (Richard, 1992). There is need for evolving a clear cut policy for the management of solid waste, particularly in Asian countries (Deshpande, 1984).

Though a lot of work has been done on solid waste generation and its composition in various parts of India by various workers like Dutta et al. (1999), Garg and Parsad (2003), Bhide (2004), Yousaf and Rehman (2007) etc. Some contribution have been made by Rampal et al., (2002), Rampal and Kour (2005), Gupta and Manhas, (2008), Sharma and Gupta (2011) and Kumar and Singh (2013) etc. from different parts of Jammu but the present study area remained neglected in this respect.

The present study is carried out to estimate the amount of solid waste generated in a rural area of district Jammu, its characterisation and to devise a plan of measures to be adopted for proper waste management in the area, thereby protecting the population of the area from its possible hazards.

2. STUDY AREA AND METHODOLGY

2.1 STUDY AREA

Sunjwan, the area of present study is a modern village situated at a distance of 8 km from Jammu City in the “Shivalik Range”. The majority of the population is dependant on agriculture and animal farming. Some people are in the government service. Increasing human and livestock population has resulted in increased domestic solid waste generation, both quantitatively and qualitatively and has become a major problem of concern in the area. In absence of proper methods of solid waste collection, storage, transportation and disposal, people throw their domestic waste along streets, into the fields or in drains which lead to soil pollution and choking of drains. In order to cope up with this problem, there is an urgent need to have a basic knowledge about the various aspects of solid waste in the study area, so that an appropriate plan shall be devised for proper solid waste management.

2.2 METHODOLGY

Present study was carried out to analyse the qualitative as well as quantitative domestic solid waste. Random sampling was carried out in 83 houses in the study area. Domestic solid waste generated per house was collected in plastic bags and weight was recorded in the digital weighing machine. Number of persons residing in each house was also calculated for estimation of per capita generation of solid waste. The sampling also includes farmyard waste including dung waste from domesticated animals.

Composition and generation analysis was done by categorising solid waste into biodegradable and non bio-degradable waste. For quantitative analysis, different items were sepa-

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rated and weighed in digital weighing balance. Some of the formulas used for calculations are as under:

Solid waste generation per capita per day = Total solid waste generated from 'n' houses per day
Total number of individuals in 'n' houses

(Where 'n' is the number of houses selected for sampling)

Total Solid Waste (kg/day) = Per Capita Solid Waste/Day x Total number of Individuals (Population) in the area.

3. RESULTS AND DISCUSSION

Qualitative analysis of solid waste from the study area revealed the presence of both biodegradable and non biodegradable waste. Biodegradable waste included paper, wooden materials, kitchen waste, animal farm waste, textile waste etc. whereas non bio-degradable solid waste included ploythene and plastics, metals, glass etc. Quantitative analysis has revealed generation of 1.84 kg per capita solid waste per day. Thus, for the study area, with 350 houses and a population of 2100 , total solid waste generation was calculated as 3864 kg per day. Per month and per year generation of solid waste was calculated as 115920 kg and 1110360 kg, respectively. Biodegradable solid waste accounted for 99.613% whereas non-biodegradable waste constitutes 0.371 % of the total waste.

Persent study shows that biodegradable waste (99.613%) has major share in the total solid waste and has major contribution of animal farm waste (98.78%), followed by kitchen waste (.67%), wooden waste (.012%), textile waste (.065%) and paper waste (.086%). Maximum and minimum value among paper waste constituents was shared by newspaper (.047%) and packing paper (.039) respectively. Whereas, non-biodegradable portion include glass (.178%), plastic (.119%) and metal (.075%) waste. Polythenes (.0081%) and packing materials (.0038%) were the constituents of plastic waste. Among metals, metal containers (.073%) and shaving blades (.002%) were major constituents(Table 1 and 2).

Observations show a greater contribution of biodegradable waste over the non-biodegradable waste. The biodegradable waste contributes the maximum percentage to the waste and it might be because of the rural nature of the study area and presence of animal farm waste in the the total waste generated. The study has exposed that there is no proper solid waste management (SWM) in the locality. House to house solid waste collection as observed in Jammu city, is not practised in this rural area of Jammu. As the study area falls beyond the jurisdiction of Municipal Corporation of Jammu (JMC), there is no appropriate storage, transportation and disposal of solid waste. Solid waste generated in the residential area is thrown in the streets, on the roadside, in the fields, in drains or in open places. This open dumping is a health hazard and attracts rats and stray animals. Solid waste causes odour pollution during decomposition and is also home to vectors of various diseases and can cause epidemics.

4. CONCLUSION AND RECOMMENDATIONS

Unmanaged solid waste poses a threat to the public health and the quality of life, especially, for the socially and economically weaker sections of the society. Open dumping in the study area has lead to foul smell, insect and rodents menace and poor water quality. Therefore, from the above study, it is concluded that the present system of solid waste handling is not suitable because of health hazards involved in it. The solid waste of the area is highly heterogeneous with substantial percentage of decomposable organic matter.

On the basis of the present analysis of solid waste composition, generation and management, it is recommended that: (1) There should be proper disposal of the domestic waste generated in the study area to maintain proper sanitation in the area. (2) Open dumping of the solid waste in the area should be replaced by sanitary landfills, vermicomposting and energy recovery, which will be eco friendly and substantially reduce soil and water pollution problems. (3) Segregation of solid waste at source should be made compulsory and should be followed strictly. (4) Community participation and motivation to reduce, reuse and recycle solid waste as far as possible. (5) Landfill sites should be selected through scientific scrutiny. (6) Civic authorities/Panchayats should be given sufficient power for prosecution of the offenders. (7) Residents should be made aware about the safe disposal of domestic waste. (8) Public awareness programmes about the harmful effects of solid waste should be conducted. (9) National waste management policies have to be made coherent. (10) Municipal authorities should take the area in their jurisdiction as the area is at the periphery of the Jammu Municipal limits and maintain the storage facilities to avoid unhygienic and unsanitary conditions. (11) Jammu Municipal Corporation (JMC) should provide adequate dustbins/metal bins in the streets so that people have not to carry waste for long distances within the street or in any other street. (12) Awareness to local inhabitants by conducting meetings, workshops, training programmes regularly on cleanliness and ill effects of improper waste management.

Table 1: Composition and percentage of various types of wastes generated from the study area.

Composition	Av. composition of waste (% by weight)
(A) BIODEGRADABLE	99.613%
I) Farmyard and Kitchen Waste	99.462%
a) Animal Farm Waste	98.78%
b) Wooden Waste	.012%
c) Kitchen Waste	.67%
II) Textile Waste	.065%
a) Rags	.052%
b) Fibre Waste	.013%
III) Paper waste	.086%
a) Packing Waste Paper	.039%
b) Newspaper Waste	.047%
(B) NON-BIODEGRADABLE	.371%
I) Plastic Waste	.119%
a) Plastic Bottles	.038%
b) Packing Polythene Materials	.081%
II) Metal	.075%
a) Metal Tins and Containers	.073%
b) Shaving Blades	.002%
III) Glass	.178%
a) Glass Bottles	.15%
b) Broken Glass Pieces	.028%

Table 2: Qualitative and quantitative account (detailed) of solid waste (g) in study area.

Composition of Solid Waste	Total Wt. (in gms)	Percentage
(A) Biodegradable		
1. *Animal Farm Waste	847.5	98.78
2. Wooden Waste	107	012
3. Vegetable Waste	2338	.271
4. Fruit Waste	2657	.309
5. Egg Shell Waste	748	.087
6. Rags / Cloth Pieces	454	.052
7. Fibre Waste	116	.013
8. Milk Packs	132	.015
9. Butter Packs	104	.012

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10. Cigarette Packs	83	.009
11. Soap Wrappers	48	.005
12. Paper Waste	341	.039
13. Juice Packs	52	.005
(B) Non-Biodegradable		
1. Polythene	378	.044
2. Plastic Bottles	330	.038
3. Shampoo Packs	53	.006
4. Toffee Wrappers	26	.003
5. Chocolate Wrappers	38	.004
6. Bhujia / Namkeen Wrap-pers	44	.005
7. Medicine Wrappers	52.5	.006
8. Bread Wrappers	31	.003
9. Biscuit wrappers	76	.008
10.Tobbaco Wrappers	18	.002
11. Cold Drink Cans	623	.072
12. Shaving Blades	21	.002
13. Broken Glasses	248	.028
14. Glass Bottles	1287	.15
No. Of Individuals 464	857.9 Kg	100

***Wt in Kg**

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