

Solid Waste Management Strategy in Mahendergarh District (Haryana)

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Abstract: Rural communities are generally resource conscious and the amount of waste generated in villages is, therefore, much less than in urban centres. Also the nature and composition of waste is different in villages from that of cities. Most of the waste generated in villages is from individual households, whereas in urban areas, commercial establishments and institutions are also an important source of waste. At the same time, the organic proportion of waste in village households is much higher than that in the cities. This is mainly because of different life styles, consumption patterns, food habits, etc. Traditionally, the village communities never considered anything as waste and had well-managed waste management systems which allowed for maximum recycling and reuse of waste. However, with increase in population, the quantities of waste have increased several fold, whereas the resources available for its management (such as land availability for composting of organic waste) have diminished over time. These wastes are, therefore, now dumped in the open and are managed unscientifically, leading to problems of environmental sanitation. The objective of this paper is to highlight the current status of waste management practices in the Mahendergarh District, environmental problems associated with the current practices, and their solutions.

Key Words: Solid waste, reuse of waste, population, organic proportion etc.

1. INTRODUCTION:-

Wastes are threat to the environment and human health if not handled or disposed off properly. Surface water contamination takes place when wastes reach water bodies while ground water gets contaminated when residues from waste percolate into the ground water. Soil contamination as a result of waste can harm plants on taking up contaminants from their roots. Emissions from incinerators or other waste burning devices and landfills can also cause air contamination. For the protection and improvement of environment and to prevent hazards to human beings, other living creatures, plants and property, the Parliament enacted the Environment (Protection) Act in 1986 (the Act). Relevant rules were framed under the Act to manage and handle different kinds of wastes viz. hazardous waste, bio-medical waste and solid waste, in the years 1989, 1998 and 2015 respectively. The various streams of waste generation in the village ecosystem of Mahendergarh District can be grouped as follows:

- Domestic waste broadly grouped into (1) Solid waste, and (2) Liquid waste
- Livestock waste
- Agricultural waste
- Other waste

Solid Waste management is the collection, transportation, processing and disposal, managing and monitoring of solid waste materials. The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. Solid Wastes are categorized into municipal wastes, hazardous wastes, medical wastes and radioactive wastes. Managing solid waste generally involves planning, financing, construction and operation of facilities for the collection, transportation, recycling and final disposition of the waste.

2. REVIEW OF LITERATURE:

The Haryana Sub-Region has a highly productive agricultural economy as well as a robust Industrial base which implies that there are three distinct typologies of waste generation - Urban Areas, Industrial Estates, Bio-Medical Wastes producing sites & Rural Areas and each typology would require a different approach.

Urban areas usually generate household waste with a larger biodegradable and relatively smaller non-biodegradable content while commercial establishments generate large volumes of non-bio-degradable waste and e-waste. Industries producing hazardous waste need specialized treatment before any method of disposal may be adopted. Thus, the different typologies of waste depending on their generation source require different management systems to deliver the most efficient results. The varying nature of solid waste generated by different areas may form the base for classification and identification of zones. As per Environment Report of Haryana State, the Environment

Department had assessed the following quantity and type of waste generated in Mahendergarh district during the year 2004-05:

- i) Municipal Solid Waste 3,578.30 tonnes per day
- ii) Industrial Hazardous Waste 63,707 tonnes per year
- iii) Bio-Medical Waste 311 tonnes per year

The Environment Department and the Board had not assessed correctly the quantity and type of waste generated during the year 2005-06 and 2006-07. No system to assess the quantity of waste being generated during these years was in place. Further segregation of waste, for example segregation of municipal waste into biodegradable, plastic, etc. was not being done which was essential to determine the method of treatment/disposal of such waste. No projections about the growth of waste based on growth of population, consumption patterns and industrial growth had been made. Besides no assessment had been made to determine the current capacity to handle waste or the capacity that needed to be created for handling the increasing quantity of the waste.

Further, risks to surface and ground water, ambient air and soil as a result of improper management of waste had also not been assessed. More importantly, no strategy had been made to reduce the generation of waste so that waste disposal is manageable according to provisions of the 'Act'.

3. MATERIAL AND METHOD:

The quantity and nature of household waste generated depends upon number of factors such as foodhabits, standard of living, income levels, levels of urbanization and climate. It is estimated that solid waste generated in small, medium and large cities and towns in India is about 0.1 kg, 0.3 - 0.4 kg and 0.5 kg per capita per day respectively. Our Research indicates that the per capita generation rate increases with the size of the city and varies between 0.3 to 0.6 kg/d. In the metropolitan areas, values up to 0.5 kg / capita / day have been recorded. The estimated annual increase in per capita waste quantity is about 1.33% per year.

Population range (in millions)	No. of cities surveyed	Paper	Rubber, Leather and synthetics	Glass	Metal	Compostable matter	Inert material
0.1-.05	12	2.91	0.78	0.56	0.33	44.57	43.59
0.5-1.0	15	2.95	0.73	0.56	0.32	10.04	48.38
1.0-2.0	9	4.71	0.71	0.46	0.49	38.95	44.73
2.0-5.0	3	3.18	0.48	0.48	0.59	56.57	49.07
5.0 and above	4	6.43	0.28	0.94	0.08	30.84	53.9

Table 1: Solid Waste Composition for different sizes of Cities

Population range (in millions)	Nitrogen as total Nitrogen	Phosphorus as P2 Os	Postassium as K ₂ O	C/N Ratio	Calorific Value kcal/kg
0.1-0.5	0.71	0.63	0.83	30.94	1009.89
0.5-1.0	0.66	.56	0.69	21.13	900.61
1.0-2.0	0.64	0.82	0.07	23.68	980.05
2.0-5.0	0.56	0.69	0.78	22.45	907.18
5.0 and above	0.56	0.52	0.52	30.11	800.70

Table 2: Energy Potential of Solid Waste for different sizes of Cities

The nature of waste generated may therefore be classified in three distinct categories:

a. Category 1 & 2 - Large Cities

Category 1 includes large urban complexes of Gurgaon and Faridabad which are projected to have more than 1500 MT of solid waste daily. Category 2 includes larger urban areas with a projected generation in the range of 100 MT solid waste daily.

Category 3 & 4 - Small Towns(Cities Of Mahendergarh district)

Category 3 areas would generate solid waste in the range of 30 to 50 MT daily while Category 4 is small towns which would generate not more than 20 MT daily. The smaller towns generate comparatively lesser volumes of waste and it would be viable to adopt vermin-composting and other intermediate and low cost biotechnologies to effectively dispose waste. Narnaul, Ateli, Satnali etc. are the towns expected to fall in category 3.

b. Category 5 - Rural Areas (Villages of Mahendergarh district)

Rural households generate mostly compostable wastes which may be converted to green manure for each village. Design of such plants is available with the Ministry of New and Renewable Energy (MNRE) and made available to all panchayats for implementation. O&M and other details may be worked out through community participation. Technologies for rural areas could focus on manure generation and biomethanation plants. The manure generated may be used in the same village or marketed through a centralized system. The gas may be used for the purposes of street lighting and cooking. All villages will be included in this zone and the location of treatment facilities may be located as approved by the village panchayats and Block Development Officers.

4. CONCLUSION:

Waste management in the Mahendergarh district is efficient and effective. But The Department/Board failed in assessing the updated quantity of waste being generated in the Mahendergarh district projecting the growth of waste based on growth of population, consumption pattern and industrial growth and to formulate the strategy to prevent or to reduce generation of waste. Only 24 *per cent* of the hazardous waste generation units, 40 *per cent* of bio-medical waste facilities and none of the municipal solid waste operators had obtained authorisation from the State Pollution Control Board. Large quantities of hazardous waste was being piled up in pits while the bio-medical waste was not being segregated, stored and disposed of by health institutions as per prescribed Rules. Municipal solid waste, sewage and treated effluent were being unauthorized disposed of on the banks of a Nallah, in drains and in the open, causing pollution. The Board failed to take action against the defaulting individuals/organizations to make the implementation of the provisions of Environment Protection Act 1986 and Rules framed thereunder effective. The Department and the Board should assess the amount of different kinds of wastes being generated and formulate strategy for reduction in generation of waste and management considering environmental hazard of different types of waste;

- Hazardous waste common treatment, storage and disposal facilities needs to be set up by involving industrial units;
- A proper system should be put in place to ensure proper disposal of biomedical waste by health institutions;
- A comprehensive plan should be prepared for disposal of municipal solid waste as per Rules in consultation with Urban Development Department; and
- The Board should take appropriate action against the persons/ organisations contravening the provisions of the Act, Rules, Orders, Directions, etc.

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