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IMPORTANCE OF SOLID WASTE MANAGEMENT TO COMBAT CHALLENGE OF CLIMATE CHANGE

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Abstract:

The process of Industrialization and urbanization has geared up the migration of rural population to the urban centers in the search up employment, education, health facilities This flow flourished the size of urban areas and contributed the increase in urban population. The growth in urban population may directly leads to increase in generation of solid waste and issues associated with its management and disposal.

Beside the lack of availability of space to store and dispose out the generated waste; use of obsolete methods for solid waste treatment, the contribution of solid waste disposal methods in climate change become a major concern.

The recent changes in global climate are believed to be the result of growing anthropogenic greenhouse gas (GHG) emissions; mainly carbon dioxide and methane, resulting from the increased industrial activities over the years. One of the main emission sources that add to the anthropogenic greenhouse gases concentrations in the

atmosphere are derived from the processes of solid waste disposal. It is estimated that about 3.4 % of Green House Gases (GHGs) emitted from waste disposal sites due to obsolete waste processing techniques.

This paper focusses the relevance of solid waste disposal in context with emission of GHG's. It covers the waste management process and highlights the urge of proper and effective municipal solid waste management to cope with the issue of climate change.

Key Words: Solid waste, ULBs, GHG's, Climate Change, SDG, Management

Introduction:

The municipal solid waste management is an obligatory function of Municipal Corporations, Municipalities and other local village administrative bodies in India. It involves activities associated with generation, storage, collection, transfer and transport, processing and disposal of solid waste. In the 21st century of modern development with the progress of civilization and rapid industrialization the problem of generation of large quantity of solid waste is become a concern in urban centers for Urban Local Bodies (ULB).

Rapid industrial growth in urban developments may responsible for increase in living standards of residential population which is ultimately responsible for generation of huge quantity of solid waste.

The quantity of MSW generated depends on a number of factors, such as food habits, standard of living, degree of commercial activities and seasons. Data on quantity variation and generation are useful in planning for collection and disposal systems for waste management. With increasing urbanization and changing life styles, Indian cities now generate eight times more municipal solid waste than they generated in 1947.

Presently, about 90 million tons of solid waste are generated annually as byproducts of industrial, mining, municipal, agricultural and other processes. As per the 2001 census the population of urban India was 285 million which produces approximately 1,20,000 tons of solid waste every day. The most exhibited consequence of the population explosion is seen in the form of increase in solid waste quantity and the problems associated with disposal (Singhal and Pandey, 2001).

In India, the per capita waste generation in urban areas ranges from 0.2 to 0.6 kg, leading to a generation of 38 million ton of municipal solid waste (MSW) per year The Ministry of Urban Development (MoUD) in India estimates that, the rate of collection is about 75 % (ton of MSW collected by municipal corporation/ton of MSW generated by city) for urban areas. While, The Energy and Research Institute (TERI) estimates the rate of collection is about 72.5% (CPCB, 2000a).

Per capita MSW generation in various towns of the state ranges between 100 and 600 gm per day. In total, over 16000 tons per day (TPD) of MSW is generated of which around 50 % is generated in three cities, namely Mumbai, Thane and Pune only (as in 2001-02). Compared to other metropolitan cities in India as well as in Maharashtra, amount of MSW generation is the highest in Mumbai and the city alone generates about 7500 TPD followed by Pune at 1000 TPD and Thane at 724 TPD (TMC, 2001; TOI, 2003).

Management of solid waste is become a major challenge for the administrators, engineers and planners. Huge volume of generated solid wastes is need to be collected, transported and finally disposed off scientifically. Unfortunately, in many developing countries, the system for managing wastes is primitive and cannot cope with huge volumes of waste being generated. In developing countries, it is common to find large heaps of garbage festering all over the city. The problem gets further complicated due to the obsolete techniques employed for waste management.

Municipal solid waste management is an obligatory function of Municipal Corporations, Municipalities and other local village administrative bodies in India. It involves activities associated with generation, storage, collection, transfer and transport, processing and disposal of solid waste. But, in most cities, the MSWM system comprises only four activities, i.e., waste generation, collection, transportation, and disposal (Tyagi, 2008).

Solid waste disposal and Greenhouse Gas emission:

To dispose of the collected waste from centers generally the disposal methods viz. open dumping, incineration, landfilling, biological treatment, thermal treatment being used. Scientific disposal of waste is the most neglected area of SWM services.

Almost all municipal authorities deposit solid waste at a dump-yard situated within or outside the city haphazardly and do not bother to spread and cover the waste with inert material. These sites emanate foul smell and become breeding grounds for flies, rodent, and pests. Liquid seeping through the rotting organic waste called leachate, which may pollute underground water and poses a serious threat to health and environment.

Landfill sites also release landfill gas with 50 to 60 % methane by volume. Methane is 21 times more potent than carbon dioxide aggravating problems related to global warming. It is estimated by TERI that in 1997 India released about 7 million tons of methane into the atmosphere. This could increase to 39 million tons by 2047, if no efforts are made to reduce the emission through composting or recycling of solid waste.

Among these methods, from landfills mainly methane (CH_4) and carbon dioxide (CO_2) gases are produced. These gases have significant greenhouse effect. CH_4 emission from landfill is about 13% of global CH_4 emission and is about 818 million metric tons per annum in terms of CO_2 equivalent (Rachel, Damodaran, Panesar, Leatherwood & Asnani, 2007).

In India, estimated methane emission is about 16 million metric CO_2 equivalents per annum through landfills (International Energy Agency, 2008). It is estimated that about 3.4 % of Green House Gases (GHGs) emit out from waste disposal sites due to obsolete waste processing techniques. It is estimated by TERI that in 1997 India released about 7 million tons of methane into the atmosphere. This could increase to 39 million tons by 2047, if no efforts are made to reduce the emission through composting or recycling of solid waste.

The waste sector is accountable for approximately 5% of the global green house budget with total emissions of approximately 1300 $MTCO_2$ –eq. in 2005 is reported by IPCC. This 5 % consist of methane (CH_4) emission from anaerobic decomposition of solid waste.

The phenomenon of climate change is an outcome of certain environmental changes due to human activities which may leads to alterations in weather conditions and further an emergence of global warming. Adoption of obsolete and unscientific waste disposal methods are responsible for emission of GHG's. Landfilling, composting and incineration are considered as the most common treatment technologies or municipal solid waste worldwide.

The mitigation of GHG's emission from waste must be addressed in the context of Integrated Solid Waste Management. The major ISWM activities are waste prevention recycling and composting and combustion and disposal in properly designed, constructed and managed landfills.

Conclusion:

With considering the contribution of solid waste disposal methods in emission of GHG's resulting the Climate change; there is an urge to adopt scientific waste treatment methods for effective solid waste disposal. In addition to achieve the goals of sustainable development set by United Nations General Assembly to combat the

challenge of climate change the importance of effective solid waste management play a significant role.

References:

CPCB (Central Pollution Control Board) (2000a): *Manual on Municipal Solid Waste Management*, 1st ed.; Prepared by The Expert Committee constituted by the Ministry of Urban Development, The Government of India.

Jha, M.K; O.A. K. Sondhi & M. Pansare, (2003): "Solid waste management – a case study", *Indian Journal of Environmental Protection*; 23 (10): pp 1153–1160.

Kansal, A. (2002): "Solid waste management strategies for India", *Indian Journal of Environmental Protection;* 22 (4): pp 444 – 448.

Kansal, A; R.K. Prasad & S. Gupta (1998): "Delhi municipal solid waste and environment – an appraisal", *Indian Journal of Environmental Protection;* 18 (2): pp 123–128.

MoEF (2000): Ministry of Environment & Forest: Notification on Municipal Solid Waste (Management and Handling) Rules, India. pp. 3.

Palnitkar S. (2002): Manual of Solid Waste Management, AIILSG, Mumbai. pp 9.

Rachel G, Damodaran N, Panesar B, Leatherwood C, Asnani PU (2007): Methane to markets and landfill gas energy