

# A Review Article of Solid Waste Management and Sampling Methods in Jabalpur City

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**Abstract-** It is known that the waste which is thrown away can be used in many different ways. This paper deals with the solid waste management methods and practices in India. The solid waste management consists of various types of wastes like industrial, agricultural, transport, municipal etc. Although all types of wastes are harmful but municipal solid waste 'now known as Solid Waste' is the type of waste which can be managed properly without causing any pollution and harm to other species. In this paper the main focus is on municipal solid waste. Various methods have been described to manage the solid waste from organic compost making to energy generation.

**Keywords-** Municipal Solid Waste, Pollution, Organic Compost.

## I. INTRODUCTION

India is the second fastest growing economy and the second most populated country in the world. The population of India is expected to increase from 1029 million to 1400 million during the period 2001–2028, an increase of 42% in 26 at the rate of 5.2% annually About 852 million people live in rural areas and 325 million live in urban areas.

The level of urbanization of the country has increased from 26.5% to 38% in the last 50-60 years and is expected to rise to 44% by the year 2026. An important feature of India's urbanization is the phenomenal concentration of the population in Class I cities<sup>1</sup> (metropolitan cities), urban agglomerations/cities having a population of more than 1 million, as depicted by the increase in the number of metropolitans from 23 to 35 in the last decade.[2] Rapid industrialization and population explosion in India has led to the migration of people from villages to cities, which generate thousands of tons of MSW daily.

The MSW amount is expected to increase significantly in the near future as the country strives to attain an industrialized nation status by the year 2020[1] Poor collection and inadequate transportation are responsible for the accumulation of MSW at every nook and corner. The management of MSW is going through a critical phase, due to the unavailability of suitable facilities to treat and dispose of the larger amount of MSW generated daily in metropolitan cities. Unscientific disposal causes an adverse impact on all components of the environment and human health Generally, MSW is disposed of in low-lying areas without taking any precautions or operational controls. Therefore, MSWM is one of the major environmental problems of Indian megacities. It involves

activities associated with generation, storage, collection, transfer and transport, processing and disposal of solid wastes. But, in most cities, the MSWM system comprises only four activities, i.e., waste generation, collection, transportation, and disposal. The management of MSW requires proper infrastructure, maintenance and upgrade for all activities. This becomes increasingly expensive and complex due to the continuous and unplanned growth of urban centers. The difficulties in providing the desired level of public service in the urban centers are often attributed to the poor financial status of the managing municipal corporations.

## II. DISPOSAL OF SOLID WASTE

It has been reported that improper bin collection practices, collection, transfer and/or transport systems have great effect on the characteristics of the solid wastes. Besides, the poor route of planning, lack of information concerning the collection schedule [1], number of vehicles for solid waste collection and poor roads [2] and insufficient infrastructure [3] can also effect of the characteristics' of the solid wastes. The effective ways and affordable waste collection services were studied and reported by Sharholi et al. To organize the informal sector and promoting micro-enterprises. Knowledge of treatment by authorities is one of the important factors affecting the handling of solid waste [4,5, 6].

Factors influence household waste disposal were analyzed by Tadesse et al. Their results indicated that the supply of waste facilities significantly affects the choice of waste disposal. They reported that the inadequate supply of waste containers as well as the longer distance of transporting these containers increases the possibility of dumping such wastes in open areas and roadsides along the trip. Pokhrel and Viraraghavan mentioned that

insufficient financial resources, absence of legislation, well equipped, and engineered landfills all contribute to the limitation of solid waste safe disposal [7,8,9].

### III. LITERATURE REVIEW

**Sunil J. Kulkarni:** The solid waste disposal is generally done by using sanitary land fill method. In developing countries open dumping is done. Open dumping is dangerous option due to odour and dispersion of waste in the form of particles in the air. Sanitary landfill is relatively safer option. The solid waste buried in the land contaminates groundwater. The bio composting of the waste provides additional benefits like manure for agriculture and reduction in the volume of waste. The other option of treating solid waste is incineration. Incineration has disadvantage of exhaust gases. The hazardous waste poses an inherent danger to personnel or the environment when exposed. Many investigators have carried out research for treatment of hazardous waste treatment. The current review summarizes research and studies on solid wastes with emphasis on hazardous waste.

**Hussein I. Abdel-Shafy:** Disposal of solid wastes is a stinging and widespread problem in both urban and rural areas in many developed and developing countries. Municipal solid waste (MSW) collection and disposal is one of the major problems of urban environment in most countries worldwide today. MSW management solutions must be financially sustainable, technically feasible, socially, legally acceptable and environmentally friendly. Solid waste management issue is the biggest challenge to the authorities of both small and large cities'.

Valorization of food organic waste is one of the important current research areas. The conventional landfill, incineration, composting, and ways of handling solid wastes are common as mature technologies for waste disposal. Traditionally, the most commonly used technologies for the treatment and valorization of the organic fraction of MSW are composting and anaerobic digestion (AD). The generation of organic solid waste (OSW); worldwide; is dramatically increasing each year. Most of the OSW's are composed of agricultural waste, household food waste, human and animal wastes, etc. They are normally handled as animal feed, incinerated or disposed to landfill sites. OAW's are comprised of materials rich in proteins, minerals, and sugars that could be used in other processes as substrates or raw materials.

**Lilliana Abarca Guerrero:** Solid waste management is a challenge for the cities' authorities in developing countries mainly due to the increasing generation of waste, the burden posed on the municipal budget as a result of the high costs associated to its management, the lack of understanding over a diversity of factors that affect the different stages of waste management and

linkages necessary to enable the entire handling system functioning. An analysis of literature on the work done and reported mainly in publications from 2005 to 2011, related to waste management in developing countries, showed that few articles give quantitative information. The analysis was conducted in two of the major scientific journals, Waste Management Journal and Waste Management and Research. The objective of this research was to determine the stakeholders' action/behavior that have a role in the waste management process and to analyze influential factors on the system, in more than thirty urban areas in 22 developing countries in 4 continents.

A combination of methods was used in this study in order to assess the stakeholders and the factors influencing the performance of waste management in the cities. Data was collected from scientific literature, existing data bases, observations made during visits to urban areas, structured interviews with relevant professionals, exercises provided to participants in workshops and a questionnaire applied to stakeholders. Descriptive and inferential statistic methods were used to draw conclusions. The outcomes of the research are a comprehensive list of stakeholders that are relevant in the waste management systems and a set of factors that reveal the most important causes for the systems' failure. The information provided is very useful when planning, changing or implementing waste management systems in cities.

**Z. Minghua, F. Xiumin, A. Rovetta, H. Qichang, F. Vicentini, L. Bingkai, A. Giusti, L. Yi:** The increase in population, the rapid economic growth and the rise in community living standards accelerate municipal solid waste (MSW) generation in developing cities. This problem is especially serious in Pudong New Area, Shanghai, China. The daily amount of MSW generated in Pudong was about 1.11 kg per person in 2006. According to the current population growth trend, the solid waste quantity generated will continue to increase with the city's development. In this paper, we describe a waste generation and composition analysis and provide a comprehensive review of municipal solid waste management (MSWM) in Pudong. Some of the important aspects of waste management, such as the current status of waste collection, transport and disposal in Pudong, will be illustrated. Also, the current situation will be evaluated, and its problems will be identified.

**M. Sujauddin, M.S. Huda, A.T.M. Rafiqul:** Solid waste management (SWM) is a multidimensional challenge faced by urban authorities, especially in developing countries like Bangladesh. We investigated per capita waste generation by residents, its composition, and the households' attitudes towards waste management at Rahman Nagar Residential Area, Chittagong, Bangladesh. The study involved a structured questionnaire and encompassed 75 households from five different

socioeconomic groups (SEGs): low (LSEG), lower middle (LMSEG), middle (MSEG), upper middle (UMSEG) and high (HSEG). Wastes, collected from all of the groups of households, were segregated and weighed. Waste generation was 1.3 kg/household/day and 0.25 kg/person/day. Household solid waste (HSW) was comprised of nine categories of wastes with vegetable/food waste being the largest component (62%). Vegetable/food waste generation increased from the HSEG (47%) to the LSEG (88%). By weight, 66% of the waste was compostable in nature. The generation of HSW was positively correlated with family size ( $r_{xy} = 0.236$ ,  $p < 0.05$ ), education level ( $r_{xy} = 0.244$ ,  $p < 0.05$ ) and monthly income ( $r_{xy} = 0.671$ ,  $p < 0.01$ ) of the households. Municipal authorities are usually the responsible agencies for solid waste collection and disposal, but the magnitude of the problem is well beyond the ability of any municipal government to tackle. Hence dwellers were found to take the service from the local waste management initiative. Of the respondents, an impressive 44% were willing to pay US\$0.3 to US\$0.4 per month to waste collectors and it is recommended that service charge be based on the volume of waste generated by households.

Almost a quarter (22.7%) of the respondents preferred 12–1 pm as the time period for their waste to be collected. This study adequately shows that household solid waste can be converted from burden to resource through segregation at the source, since people are aware of their role in this direction provided a mechanism to assist them in this pursuit exists and the burden is distributed according to the amount of waste generated.

**J. Okot-Okumu, R. Nyenje:** This paper examines municipal solid waste management in Uganda under the decentralisation policy. The aim is to analyse devolved solid waste management and the constraints on achieving sustainable waste management. To achieve the objectives, waste characteristics, generation rate, collection, disposal and stakeholder roles and waste management responsibilities were analysed. Results indicate the waste is predominantly biodegradable (78%) with generation rate of 0.55 (0.3–0.66) kg/capita/day and collection coverage of 43.7%. Urban Councils are under capacity to handle waste management demands and where services are poor or nonexistent the community have developed onsite waste management methods. Waste recovery, recycling, re-use, and composting are being practiced by the urban community. The national strategy for solid waste management is failing because environmental management is not mainstreamed into local development plans and weak resource mobilisation, due to the lack of fiscal decentralisation and lack of participatory approach to the decentralisation process.

Waste management receives less than 10% of urban council budgets compared to other policy areas. In

conclusion, for effective waste management there is need for genuine decentralisation where urban councils are empowered, have capacity for resource mobilisation and apply participatory planning.

#### IV. CONCLUSION

The solid waste from the domestic activities is biodegradable. It is normally classified as putrescible and non putrescible. The solid waste disposal is generally done by using sanitary land fill method. In developing countries open dumping is done. Open dumping is dangerous option due to odour and dispersion of waste in the form of particles in the air. Sanitary landfill is relatively safer option. The solid waste buried in the land contaminates groundwater. The bio composting of the waste provides additional benefits like manure for agriculture and reduction in the volume of waste. The other option of treating solid waste is incineration. Incineration has disadvantage of exhaust gases. The other methods like vermicomposting and anaerobic treatment can be used for the solid waste treatment. The investigations by many investigators reveal that co-processing is more preferred option in the waste management system. In incineration the waste is reduced by 95–96%. Also the concept of generation of wealth from waste can reduce economical burden on the society. Recycling and incineration are two of the most sustainable waste management techniques available.

#### REFERENCES

- [1] Shekdar, A.V. Municipal solid waste management – the Indian perspective. *Journal of Indian Association for Environmental Management* 26 (2), 100–108., 1999
- [2] Sharma, S., Shah, K.W. “Generation and disposal of solid waste in Hoshangabad”. In: *Book of Proceedings of the Second International Congress of Chemistry and Environment*, Indore, India, pp. 749–751, 2005.
- [3] Mufeed Sharholy, Kafeel Ahmad, Gauhar Mahmood, R.C. Trivedi, “Municipal solid waste management in Indian cities – A review” *Waste Management* 28 (2007) 459–467
- [4] Vikash Talyan, R.P. Dahiya a, T.R. Sreekrishnan, “State of municipal solid waste management in Delhi, the capital of India”, *Waste Management* 28 (2008) 1276–1287
- [5] Tumpa Hazra, Sudha Goel, “Country Report-Solid waste management in Kolkata, India: Practices and challenges”, *Waste Management* 29 (2009) 470–478
- [6] K. Naresh Kumar, Sudha Goel, “Characterization of Municipal Solid Waste (MSW) and a proposed management plan for Kharagpur, West Bengal, India”, *Resources, Conservation and Recycling* 53 (2009) 166–174

- [7] Tapan Narayana, “Municipal solid waste management in India: From waste disposal to recovery of resources?”, *Waste Management* 29 (2009) 1163–1166
- [8] Seema Unnikrishnan, Anju Singh, “Energy recovery in solid waste management through CDM in India and other countries”, *Resources, Conservation and Recycling* 54 (2010) 630–640
- [9] Dimpal Vij, “Urbanization and solid waste management in India: Present practices and future challenges”, *International Conference on Emerging Economies – Prospects and Challenges (ICEE-2012), Procedia - Social and Behavioral Sciences* 37 (2012) 437 – 447