

# Challenges in municipal solid waste management in Indian cities: A case study of Bilaspur (Chhattisgarh)

<sup>1</sup>Shristi Sinha, <sup>2</sup> Mr. R K Bhatia

<sup>1</sup>M.E. Environmental Engineering, JEC, Jabalpur, MP, India

<sup>2</sup>Associate Professor, Dept. Of Civil Engineering, JEC, Jabalpur, MP, India

**Abstract** Municipal solid waste generation is the result of day to day activities of people. The management of waste in smaller cities lacks the required funds, proper designed waste master plan, and public awareness etc. is some of the underlying reasons for the absence of an adequate waste management system. Bilaspur city also faces the same consequences which lead to its poor management of municipal solid waste. Ever growing population with the continuous migration of rural population to urban areas also adds to the increase in an amount of waste. Lack of proper servicing of the municipal waste solid collection system, poor infrastructure, lack of disposal methods limits the adequate implementation of MSW management in a city. The city also requires an active recycling sector. The environmental degradation caused by such unplanned waste disposal leads to soil contamination. Wastes are handled by informal recycling in the city. Urban local bodies (ULB's) can play the vital role for proper waste management. However, plan for a waste disposal service has been proposed still many of the municipalities are struggling till now to provide even the most basic waste management services. The study gives an overview of various aspects of MSWM limitations regarding data and waste collection and its disposal. Identifying the problems would be helpful in drafting the solutions.

**Keywords:** MSWM, challenges, informal recycling, disposal

## 1. INTRODUCTION

One of the fundamental problems in smaller cities like Bilaspur is the lack of the formal system for solid waste management. Presently the landfills are posing serious drawbacks and health implications which limit the use of landfills. A significant proportion of the urban population does not have access to municipal waste collection services. As a result, residents opt to dump their waste on available spaces throughout the suburbs even in the societies and communities- resulting unsightly piles of waste and wind-blown litter. Another drawback is the unavailability of certain required data which are needed to study waste management in the city. At present, limited studies are focusing on municipal solid waste management practices in Bilaspur with the focus on environmental impact and its detrimental effects on human health. Also, there is the lack of basic epidemiologic and waste generation data on the health impact of prevailing waste management services. Therefore, there is also need to mention the municipal solid waste management issues and associated problems which may pose health and economic risks to the Bilaspur communities. Bilaspur lacks the necessary requirements for the MSWM such as better policies, waste management system, inadequate waste collection services, and lack of awareness. Thus, the aim of this paper is to assess the current MSWM challenges and limitations in the Bilaspur city as a case study. The study focuses on different aspects of MSWM such as identifying the main problems and constraints that hinder improvement in the current municipal solid waste management practices.

### 1.1 Present scenario of MSWM in Bilaspur

Presently in Bilaspur, there are no such waste management systems under implementation. The wastes are collected once in a week by the municipally employed collectors from the temporary bins and dumped in the dump yards. To study the municipal solid waste management in Bilaspur, a small survey was conducted to estimate the amount of waste generated per day in the city. The wastes produced by the different income levels are different in nature and amount. So the wastes samples were collected from various income groups in the society. The collected wastes were sorted and weighed. Total wastes produced per day in the city

were also estimated in Bilaspur City. The population in the wards Are distributed under four administrative zones in the city. Each region consists of 12 wards. These administrative areas are self-monitored by the local governments. The waste samples were collected randomly from the wards from different income groups with the average of a constant four members families. The percentage of green waste are highest which are ultimately dumped into the dumpsites regardless of their high reuse potential Population distribution in wards under administrative zones (Source: Census 2011)

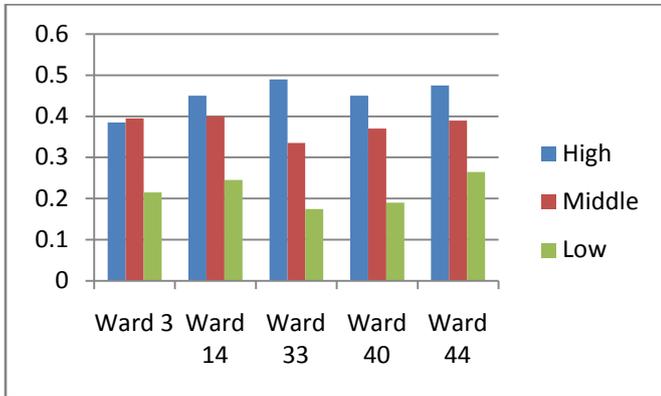


Chart 1. Waste in wards

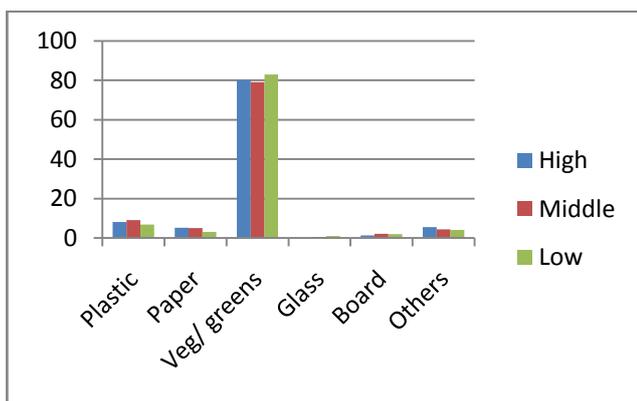
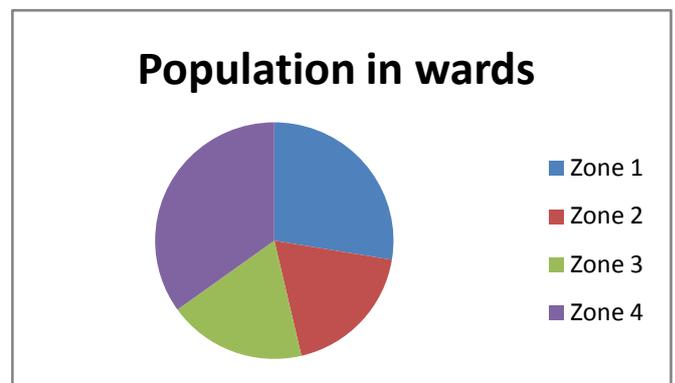


Chart 2. Waste constituents in percentage

Per capita per day waste generation by income groups Percentage of waste components in sample

Typical waste management in Bilaspur:

- Household waste generation and storage
- Dumping the wastes in the community bins
- Transport to the waste disposal site
- Waste disposal in dump yards.

Recovering and recycling of the wastes usually does not take place in the city itself. Informal recycling takes place in the city and is widely practiced by the scavengers or waste pickers or by the solid waste management members themselves for extra earnings (Christian Zurbrügg, 2003). Recovered and recyclable materials then sold to different level dealers. Then they are finally sold out to the recycled product manufacturers. From Bilaspur, the wastes are selling and buying chain by the dealers in another city, Raipur (C.G.). Hence no such recycling practices are found in Bilaspur.

Despite increasing population and their basic needs the waste management in Bilaspur faces many technical and behavioral limitations. The drawbacks encountered during the study are at the ground level which forms the base of any management system. Lack of communication, data, education, and awareness, are the fundamental challenges faced in the city. For the study of waste management system, various data are essential. Lack of data restrains the further studies. No such records were found regarding

waste generation/management. According to SWM 2015, there are certain regulations which are to be followed by a management system. Presently the city fails to follow the necessary rules. There are vast differences in views and opinions to the waste related problems and about the informal sector regarding waste management. Since there is no relevant and authentic information available on how much waste is collected in the city by both the formal and informal sector, it becomes difficult to estimate the actual economic benefits. Poor, inaccessible, and marginal urban areas suffer most from the illservice thus worsening poverty, health issues, and social marginalization. In low-income or inhabited settlements, waste collection is often nonexistent. The informal sector plays a vital role in recovering huge quantum of solid waste at a subtle capital. Likewise, many other limitations or challenges exists which restrains the study of MSWM in the city.

## 2. Challenges in MSWM in Bilaspur

**2.1 Poor implementation by authorities/municipalities:** The existing services of the municipal waste collection system lack the regular and systematic collection of waste. There is no daily basis collection of scraps. Residents dump their wastes in the bins which are collected only once a week. Even in some of the wards, there are no bins present. The collecting vehicles transport the waste openly creating unsightly views, vehicles overfilled with wastes falls on the roads. Some of the essential services under failure are--

- **No Door to door collection:** the D2D service is becoming very necessary and standard service which leads to a manageable collection of wastes. This service enables the access to most remote areas to for garbage collection.

Ones employed in D2D service also earn income under municipalities. But due to poor management, the significant portion of the residents is deprived of a D2D waste collection.

- **No source segregation:** No provision for source separation is there in the management. Waste (biodegradable and nonbiodegradable wastes) is dumped in the storage bins which are collected as a whole and transported to the dump yards.
- **Open storage:** Most of the community bins does not have any covering or lid. This unhygienic condition can cause serious health issues.

According to the SWM rules 2015, there are certain duties assigned to the authorities such as Urban Local Bodies, State Pollution Control Board which includes:

- To frame bye-laws, incorporations of rules and ensure their timely implementation
- direct waste producers not to litter, to segregate the waste according to the prescribed in the rules and give away the segregated waste to the waste collector.
- To provide direction to waste producers to store their domestic hazardous wastes at the waste deposition center created by ULB's for its safe disposal.
- To develop a systematic program for source segregation, collection, storage, transportation, processing of wastes.
- Involve communities in the municipal waste management and promotion of decentralized processing of waste
- provide easy access to waste pickers and recyclers for the collection of segregated recyclable waste

There is no such implementation in the city where the above-prescribed management rules are in order; even residents are unaware of the rules.

Table-1 Status of waste management in Bilaspur according to the SWM rules 2015:-

| Parameters  | Specifications   | Status in city  |
|---|--|---|
| Storage of segregated solid waste at source       | Littering, open burning prohibited, creating awareness for lowering waste generation, reuse, source separation   | Wastes littered on roads, no provision for recycling/reuse, absence of source separation, lack of awareness in the waste generators.    |
| Collection of solid wastes                        | Organise D2D collection, collecting biodegradable wastes separately, user fees or charges shall be levied from the waste generators for sustainable management                           | Large section of residents are deprived of D2D collection, no separate collection of biodegradable waste                                |
| Sweeping of street and cleaning of surface drains | Cleaning of roads, streets, lanes, surface drains and public places at regular intervals, waste shall not be mixed at any stage with the solid waste collected from the door step.       | Cleaning is done but not in regular interval  |
| Secondary Storage                                 | waste depots shall have covered containers ,minimise manual handling of waste  | Manual handling is employed in collection   |
| Material recovery facilities                      | setup material recovery facility , store recyclable materials  | No segregation of recyclable materials, only small portion is collected by scavengers   |
| Transportation of solid wastes                    | Waste collected to processing facility, vehicles shall be covered, waste shall be collected from secondary storage before overflowing  | No provision for processing of waste, open collecting vehicles  |
| Processing of solid wastes                        | emphasis on decentralised processing, biodegradables shall be treated by biomethanation, composting, AD, recyclable material to the recycling industry                                   | Sanitary landfill with composting and RDF processing facility is proposed, some portion of recyclables collected and sold by scavengers |
| Disposal of solid wastes                          | landfill only permitted for non-recyclable, non-biodegradable, non-combustible and non-reactive inert waste, in absence of landfill dumpsite shall be capped according to landfill norms | No designed landfill, available dumpsites are used without standards or specifications  |

Source: Solid Waste Management Rule 2015



Waste littered on roadsides

**2.2 The expansion of slums accompanied with unplanned growth with no waste management system** Urbanization. Migrants from rural/poorer areas add to the slum population in the city. This section of the population is unable to avail the decent housing/living in the City, which leads to the development of slums. Around 35% percent of the population in the city lives in slums which have increased in last few years. This pressure of ever-growing population on urban infrastructure in many cities overburdens the services designed for urban areas. Urban municipal bodies are under pressure to meet the primary demand for services such as water, sanitation, and solid waste management. Most of the slums are growing in an unplanned manner, and the local authority's ill prepared enough to provide basic facilities (like providing waste bins or collecting their wastes) to the growing population. These causes garbage to be littered in open areas, leading ill effect on the socioeconomic and environmental health of the area.

**2.3 Unavailability of required data for study:** There are the lack of previous data related to migrating population, an amount of wastes generated, an amount of wastes if recycled, etc. For the record, when asked to the waste dealers they did not provide us any data regarding their waste collection, the amount of waste incoming or how much volume of waste they sell each day. Few of them only gave us a rough idea of the rates at which they buy scraps from scavengers. This unavailability of relevant data limits the further study for the waste collection and management in the city.

**2.4 Lack of communication between authorities and stakeholders:** Stakeholders are part of a waste management program. The municipal bodies need to have a direct contact and communication with the stakeholders for a sustainable waste management. The stakeholders and their role are as follows: There is a lack of the direct communication between the municipalities and the stakeholders which are a loophole in the sustainable waste management system. It becomes impossible for the people to take part in the management system without knowing their role and duties.

It is the responsibility of the every sector of stakeholders to frame a communication network within the members for a smooth working of the waste management system.

Table-2 Role of stakeholders

| Stakeholders | Categorisation   | Role  |
|--------------|--|---|
| Authorities  | Planning bodies, health authorities, local Governments       | Establishment of emission standards, manage biomedical wastes, planning infrastructure for waste management, maintain waste data, training of staff |
| Communities  | Community groups, Environmental NGO's, scavengers, activists | Form participating committees, creating awareness and education   |
| Waste sector | Waste generators, Recycling firms                            | Should minimise the waste generation, developing recycling facility   |

**2.5 Non- integration of informal sector with mainstream recycling:** Informal recycling sector is a significantly essential from the recycling perspective. Recycling activities are an integral part of the informal sector, but the municipal bodies are not involved which is a major setback for the establishment of the large-scale recycling industry. The practices of waste collection by the informal sector include multi-layer collection and recycling through residential and landfill locations. Integrating their services with the formal waste management system is a potential tool to empower these people to increase their skills in resource recovery and improve their working and living conditions. There is a lot of scope for improvement in the management of solid waste and the status of the informal waste recycling sector.

**3. Conclusion** In a city like Bilaspur, which is still in its developing phase appropriately designed waste management system, is the need of the hour. The population and the necessary requirements will only keep on increasing. Municipal waste management is one of the vital grounds on which all round development of a city depends. Municipalities are facing numerous underlying municipal solid waste management issues. However successful, innovative and technical ideas and approaches implemented on different levels of the solid waste management system. In Bilaspur, there are various technical and behavioral challenges. To overcome the drawbacks, one should know the know-how, communicate and distribute the responsibilities. Stakeholders such as research institutions, NGOs, public committees, planning commissions are an integral part of the waste management system as they play a vital role in enhancing and supporting the dissemination of best practices. Solid waste management is not only a technical challenge. The integrating informal sector with the mainstream can improve the recycling industry. Understanding and taking into account the environmental impact, financial and economic calculations, social and cultural problems, and the institutional, political and legal structure, is most necessary for planning and implementation of a sustainable solid waste management scheme.

### Reference

- Christian Zurbrügg, Urban Solid Waste Management in Low-Income Countries of Asia How to Cope with the Garbage Crisis, Presented for Scientific Committee on Problems of the Environment (SCOPE) Urban Solid Waste Management Review Session, Durban, South Africa, November 2002
- ISWA (International Solid Waste Association) guidelines for waste to energy in low and middle-income countries.
- GOI, National program on “Energy recovery from Urban, Municipal and Industrial Wastes by MNES.
- Rahul Singh, K R Chari, Socio-economic issues in waste management by informal sector in India.
- Solid Waste Management Rules 2015, Ministry of Environment, Forest and Climate Change, New Delhi.
- H. N. Chanakya & T. V. Ramachandra & M. Vijayachamundeeswari, Resource recovery potential from secondary components of segregated municipal solid wastes, Environ Monit Assess DOI 10.1007/s10661-007-9712-4