

Municipal Solid Waste Management in Raichur City

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ABSTRACT

The problem of solid waste management (SWM) is acquiring an alarming dimension in India. The swift industrialization and urbanization has resulted change in the life style, because of which the quantity of solid waste generated has increased significantly and its characteristics have changed. Lack of financial resources, institutional weakness, improper choice of technology and public apathy towards SWM has made this service far from satisfactory. In this context an investigation has been undertaken to study the present scenario of SWM in Raichur city of Karnataka. The entire city is divided into three sanitary zones for effective management of MSW covering all 35 wards. The samples were collected from all the three zones for characterization. The Raichur urban local body (ULB) operates to collect waste by door-to-door collection and containerized storage system. The dumper placers are used to transport the waste to the dumping site. Auto tippers are used for primary collection in slum zones and tricycles are used in other parts. The disposal site is near Ekklaspur village which is 6 km away from the city. At present solid waste is not segregated at the source and open dumping is practiced. However, both these practices are not complying with the guidelines laid by MSW (Handling and Management) Rules 2000. The average per capita per day generation of solid waste was found to be 278 gms. A thorough study of all the components of municipal solid waste management was carried out and scientific management of MSW is suggested. In this paper the attempt have been made to proper management of municipal solid waste in Raichur city.

Keywords: *Urban local body (ULB), Municipal solid waste (MSW), Solid waste management (SWM)*

1.0 INTRODUCTION

Municipal solid waste management (MSWM) is one of the major environmental problems of Indian cities. Improper management of municipal solid waste (MSW) causes hazards to inhabitants. Various studies reveal that about 90% of MSW is disposed of unscientifically in open dumps and landfills, creating problems to public health and the environment.

Development of sprawling urban area and rapid industrialization has increased the quantity as well as diverse nature of wastes, which need proper handling and treatment. India has a mixed demographic

profile with about 307 million (about 30%) of the total population living in urban area and by 2011 it will be 395 million (RMC, 2004). The present system of SWM in most of the urban areas are highly unsatisfactory due to limited finances, inadequate services and coupled with public apathy towards the same. The solid waste management is one of the essential service and it is an obligatory duty of municipal bodies to arrange for daily street cleaning, collection, transportation, processing and disposal of waste. Improper handling and disposal practices of solid wastes continue to be a serious problem. Indian cities generate on an average of 300-400 gms/capita/day solid waste and of which only 60-80% of the waste is collected on daily basis and rest of the waste is left to decay on the streets, roads, drains etc, which attracts vector transmitting diseases (Geetha Karthi, 2007).

Technological development, globalization and population growth have accelerated the dynamics of the urbanization process in developing countries. In India alone, the urban population has increased from 11% in 1901 to 26% in 2001. The rapid growth rates of many cities, combined with their huge population base, has left many Indian cities deficient in infrastructure services like water supply, sewerage and solid waste management. The poor management of SW in urban area is putting public to serious health risks. Hence it is therefore to initiate concerned effort for proper scientific management of MSW.

2.0 STUDY AREA

Raichur is a district headquarters in Karnataka, India and is situated between two rivers Krishna and Tungabhadra at 15° 12' N latitude and 76° 21' E longitude which is popularly known as "DO-AABA". It receives annual rainfall of 638mm. The population of the town is about 2,62,500 and floating population of about 20,000. It is having good connectivity by road and rail. It is also an important educational, administrative and trade center in the Hyderabad-Karnataka, region. It is housing a very few industries within municipal limit. The city municipal council extends over an area of 60.0 sq kms. The entire area is divided into three sanitary zones for effective management of MSW covering 35 wards (CMC, 2006).

3.0 SOLID WASTE MANAGEMENT PRACTICE IN RAICHUR- PRESENT SCENARIO

Like Indian typical cities in the Raichur municipality the majority of the waste generated is from domestic sector followed by commercial establishments, markets, other public places and from open areas. At present about 73 tonnes of waste is generated per day. The per capita solid waste generation rate between 250 to 300 gms per day is observed during normal day. The solid waste management of all 35 wards is handled through public participation by including self help groups and private contractors. However the segregation of waste at the source is not practiced. Unsegregated waste is collected by tricycles from the sources and carried to the secondary storage containers of 3 and 4cum capacity. Depending upon the waste generated and command area, containers are placed in different wards. At present there are 60 containers and 5 dumper placers supported by 15 push carts, 80 tricycles and 7 auto tippers for primary collection. However there are still some areas where public throw their waste at their will on streets, roads etc. To facilitate the collection of these waste 3 tractors are used. Finally collected waste in containers is transported by the dumper placers to the open disposal site near Ekhaspur village which is 6 kms away from the city. Table 1 shows the solid waste generation of the Raichur municipality.

4.0 RESULTS

The physical components of MSW were analyzed from various zones of Raichur city including the biodegradable and recyclables. Physical characteristics of the representative samples were studied in

Municipal Solid Waste Management in Raichur City-Present Scenario

terms of their weight density, moisture content and are represented in Table 2.

Table 1. Source Wise Solid Waste Generation of the Raichur Municipality

<i>Sl No</i>	<i>Sources</i>	<i>Total No</i>	<i>Unit quantity of waste per source in kg.</i>	<i>Total quantity of waste generated kg per day</i>
1	Non slum house holds	26023	1.5	39034.5
2	Slum house holds	21126	1.0	21126
3	Commercial shops	3434	1.5	5151
4	Major Hotels and Resorts	12	15	180
5	Small Hotels	33	20	330
6	Markets	01	200	200
7	Choutries	23	10	230
8	Hostels & Institutions	99	5	495
9	Boarding and Lodging	15	15	225
10	Vegetable Shops	20	5	100
11	Meat Shops	136	5	680
12	Municipal Waste from industries	149	10	1490
13	Theaters	12	5	60
14	Wastes from floating population			1000
15	Waste from street sweeping			2000
	Total:			72301

The average moisture content and density was found to be 28.902% and 166.72 kg/m³ respectively. The Raichur MSW comprised of about 74% biodegradable waste, about 1.5% recyclables and 24.5% other waste which is shown in Figure 1.

Table 2. Constituents and Properties of Raichur MSW

<i>Sl No</i>	<i>Components</i>	<i>Percentage by mass</i>	<i>Average Moisture content</i>	<i>Dry mass in kg</i>	<i>Volume M³</i>	<i>Typical Density Kg/m³</i>
1	Food & vegetable waste	33.21	72	10.170	1.145	290
2	Paper	13.39	8	13.540	1.575	85
3	Plastic	7.10	4	6.350	1.109	65
4	Textile	2.65	9	2.410	0.407	65
5	Rubber	1.85	3	1.750	0.142	130
6	Leather	1.35	12	1.180	0.0845	160
7	Wood	1.98	18	1.200	0.0825	240
8	Dust, ash, brick	7.86	10	6.810	0.163	480
9	Glass	1.6	4	1.568	0.082	195
10	Rags & mix waste	29.01	6	26.100	1.208	240
	Total	100.00		71.098	5.998	

5.0 DESIGN OF BIO-COMPOST PLANT

A land area 24.18 acres is available for disposal. As about 74% of the waste generated is organic it is

viable to have the biocompost plant as eco-friendly and sustainable method of disposal. The proposed biocompost plant is designed for the estimated population of 5,51,693 with 20 years of design life period. The estimated quantity of waste to be handled is 264.70 tonnes per day. The windrows are designed on the basis of 50 tonnes per day in the starting year. The windrow platforms are sized to accommodate the dumping area 4m wide, windrow width of 6m and 4m for I,II,III week and IV,V,VI week respectively. Clearance width of 3m for turning of windrows and passage of 4m wide for shifting the garbage from one windrow to next windrow for the transport of digested garbage. Platform is provided with 2% slope to ensure collection of leachate or surface run off through the lined drains provided all around the platform leading to leachate collection sump. The overall size of the platform is 73m x 53m.

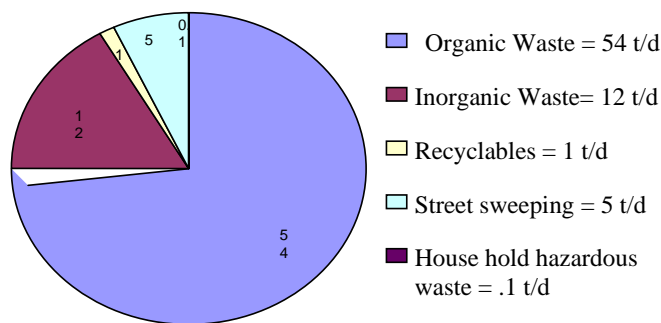


Figure 1 Composition of Raichur Municipal Solid Waste

6.0 CONCLUSIONS

In this work a detailed study of collection, storage, transport and disposal practices was conducted for Raichur city. An improvement to existing system has been proposed to meet the MSW (H&M) rules 2000. The site has been planned as an integrated facility for compost plant and sanitary landfill for a design period of 20 years. In order to build up institutional capabilities it is necessary to harness and integrate the role of other emerging actors in the field of SWM. Private sector, NGOs and rag pickers are to be brought in to the institutional framework for effective management of MSW. (Shaleen Singhal and Sunil Pande, 2001).

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