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Solid Waste Management in Karnataka with Special Reference to Hubli-Dharwad and Bangalore Municipal Corporations

Shilpa P. Chowti[1*] and G. N. Kulkarni[2]

[1]Ph.D Scholar, [2]Professor

Department of Agricultural Economics, UAS, Dharwad-580005

*Corresponding Author E-mail: agrichoutishilpa@gmail.com

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ABSTRACT

Solid waste is the most visible form of environmental problem and is of great concern in many regions of world. The municipal solid waste management continues to remain as one of the most neglected areas of urban development in India. The tremendous increase in population accelerates the amount of municipal solid waste (MSW) generation. In this context the a study is carried out in two major municipalities of the state, one from north (Hubli-Dharwad Municipal Corporation, HDMC) and one from south (Bangalore Bruhat Mahanagara Palike, BBMP). The present population of Hubli-Dharwad and Bangalore is 10.29 lakhs and 1.15 crore, respectively. The study reveals that the HDMC generates about 400 tons of solid waste every day with per capita waste generation of 0.4 kg/day. Out of the total waste generated, about 360 tons of solid waste is being collected (88.37%). While, in BBMP, the generation of solid waste is about 4500 tons per day with per capita waste generation of 0.50 kg/day and collection efficiency of waste is 82.77 per cent (4000 TPD). Studying the sources of solid waste generation conveys the way for better waste management practices. Among the different sources of solid waste generation, the share of households is highest and accounted for 55 per cent (220 TPD) of waste generated in Hubli-Dharwad municipal corporation area and the same is about 56 per cent (2520) in Bangalore municipal corporation area. The share of waste generation by hotels is 9 per cent and 13 per cent respectively in Hubli-Dharwad and Bangalore Municipal Corporations.

Key word: *Solid waste, Hubli-Dharwad, Municipal corporations.*

INTRODUCTION

The municipal solid waste management continues to remain as one of the most neglected areas of urban development in India. In most of the cities in India, more than half of the solid waste generation remains unattended. The problem is likely to aggravate further with the rise in population, changing food habits and people life style due to changes in socio-economic status etc. this gives rise to insanitary conditions particularly in densely populated areas, which in turn may have serious health and environmental consequences putting high pressure on resources.

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Solid waste management comprises a whole range of actors involving public, private sector, non-governmental organizations and community based organizations. In India, the responsibility of collection and disposal of waste has vested traditionally with the municipalities which have neither adequate financial resources nor the trained personnel for dealing with increasing complexities of garbage collection and disposal. This is further complicated by weak administration and managerial capacities of urban bodies resulting in mismanagement and inefficiency.

Poor municipal solid waste management (MSWM) is one of the causes for major environmental problems in many cities in Karnataka. The improper management of municipal solid waste (MSW) causes hazards to inhabitants. Various studies revealed that about 90 per cent of MSW is disposed of unscientifically in open area or in the landfills without segregation which is creating public health hazards and damaging the environment around. In the present study, an attempt has been made to provide a comprehensive review of the characteristics, generation, collection, storage, transportation, disposal and treatment technologies of MSW practiced in Karnataka**.**

MATERIAL AND METHODS

The present study was taken up in Karnataka state. In order to analyze the study objectives, Bruhat Bengaluru Mahanagara Palike (BBMP) and Hubli-Dharwad municipal corporations (HDMC) have been selected. The study was based on both primary and secondary data. The secondary data on solid waste generation, collection, and segregation of solid waste was collected from each of the selected Municipal Corporation (HDMC and BBMP) for the period from 2001-2002 to 2016-17 to analyze the growth in population and solid waste generation. The descriptive statistics like averages, percentages *etc* were used to draw the meaningfull solid waste generation, collection and segregation of waste and also to know the sources of solid waste generation.

RESULTS AND DISCUSSION

In the present study an attempt has been made to study the generation, collection and segregation of solid waste in the selected municipalities (HDMA and BBMP) and the results are presented in Table 1. The twin cities (Hubli-Dharwad) are currently divided into 67 wards divided in to12 zones. According to the figures available with HDMC, current solid waste generation is about 400 tones per day with a collection efficiency of 88.37 per cent (360 TPD) and the per capita generation of waste is estimated at 0.40 kg/capita/day. The segregation of the solid waste at the households' level is 20 per cent. Most of the solid waste is being dumped in an open dump yard with an area of about (22 acres in Hubli) and (16 acres in Dharwad). Currently, HDMC is responsible for the street sweeping and collection from 19 wards and the remaining 48 wards are contracted out for the task. The SWM works are carried out by 612 sanitary workers (26.12%) or Pourakarmikas (Permanent workers) on the role of HDMC and about 1731(73.88%) workers from the private contractors.

Bengaluru generates about 4500 tons of solid waste per day, of which 4000 tons of waste is being collected with the per capita waste generation of 0.50 kg/day. The BBMP is carrying out collection, street sweeping, transportation, processing and disposal in 198 wards. BBMP is divided in to10 zones and 198 wards, of which 93 wards are under responsibility, and 105 wards are contracted out. Currently 3197 pourakarmikas (14.69%) and 18562 contract workers (85.31%)were employed in solid waste management. The segregation of waste at households level is 40 per cent and this segregated waste is recycled while, the remaining waste is land filled at two land filling sites. To encourage segregation at source BBMP has established 189 dry collection centers in most of the wards. These centers are designated for collection dry wastes generated in their respective wards. To have a system for bulk generators like hotels, restaurants, marriage halls and apartments etc, BBMP has issued public notification asking them to have their own insitu facilities to process their waste or to make use of service providers of BBMP.

Study also made an attempt to know the different sources of solid waste generation and the results are presented in Table 2. Among the different sources of solid waste generation in Hubli- Dharwad, the generation of the waste at households is highest at 55 per cent (220 TPD) fallowed by commercial areas 17 per cent (65TPD), hotels (9%), markets (8%) and debris (5%). In Bangalore city, the generation of solid waste at households is 56 per cent (2520 TPD) and hotels are generating about 13 per cent of the waste (585 TPD). The remaining areas market places, commercial areas, institutions, industries and debris from construction sites are generating about 8 per cent (360 TPD), 9 per cent (405 TPD), 3 per cent (135 TPD), 5 per cent (225 TPD) and 5 per cent (225 TPD) respectively. The results are in line with the study conducted by Mane and Hemalata[1].

Table 1: Characterization of HDMC and BBMP

Sl.No	Indicator	Unit	Details	
			Hubli-Dharwad	**Bengaluru**
1	Area under municipal corporation	Sq. Km	202.3	741
2	Number of Zones	Number	12	10
3	Municipal wards	Number	67	198
4	No. of Pourakarmikas wards	Number	19	93
5	No. of Contract wards	Number	48	105
6	No. of Dumping yard	Number	2	2
7	Present strength ofsanitary workers	Number	2343	21759
	a.Pourakarmikas (Permanent)	Number	612 (26.12%)	3197 (14.69%)
	b. Contract workers	Number	1731 (73.88%)	18562 (85.31%)
8	Quantity of waste generated 2011-12 2016-17	tons/day	347 400 (86.75%)	3200 4500(71.11%)
9	Quantity of solid waste collected 2016-17	tons/day	360	4000
10	Collection efficiency of solid waste	percentage	90.00	88.89
11	Daily per capita waste generated	Kg/day	0.40	0.50
12	Waste generation per household	Kg/day	1.35	1.51
13	Extent of segregation of solid waste at households level	Percentage	20.00	40.00

Note: HDMC- Hubli-Dharwad Municipal Corporation BBMP-Bruhat Bangaluru Mahanagara Palike

Table 2: Source wise generation of solid waste in study area

Sl. No.	Source of waste	HDMC		BBMP	
		Quantity (TPD)	**Percentage**	**Quantity (TPD)**	**Percentage**
1	Household	220	55.0	2520	56.0
2	Hotels	36	9.0	585	13.0
3	Market (area/No.)	34	8.0	360	8.0
4	Commercial area	65	17.0	405	9.0
5	Institutional area	3	1.0	135	3.0
6	MSW from Industries	12	3.0	225	5.0
7	Debris	20	5.0	225	5.0
8	Miscellaneous	10	3.0	45	1.0
	Total	400	100.0	**4500**	**100.0**

CONCLUSION

It could be inferred from the results that, households contributed substantially to the solid waste generation across the two municipals. The other prominent sources of its generation remained commercial areas, hotels and market areas. There has been a substantial increase in the solid waste over a period of time but the collection efficiency is much below the generated solid waste. Thus, there is a need for scientific management of solid waste at both households' level and municipal levels for safe environment.

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