

Studies on Municipal Solid Waste Management in Mysore City- A case study

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Abstract: Solid waste management is a worldwide phenomenon. It is a big challenge all over the world for human beings. The problem of municipal solid waste management (MSWM) is also prevailing in the urban environment of Mysore. Therefore the present study was taken to find out the problems and prospects of Municipal solid waste in Mysore city. A detailed investigation was made regarding the methods of practices associated with sources, quantity generated, collection, transportation, storage, treatment and disposal of Municipal solid waste in Mysore city. The data concerning to SWM in Mysore was obtained through questionnaire, individual field visit, interacting with people and authentic record of municipal corporation. Photographic evidences were also made about generation, storage, collection, transportation, treatment and disposal of MSW. This study reveals that the present system of MSWM in Mysore city is not satisfactory based on Municipal Solid Waste (Management & Handling) Rules 2000. [Report and Opinion. 2009;1(3):15-21]. (ISSN: 1553-9873).

Key words: Municipal solid waste, Mysore city cooperation (MCC), Composting, Municipal solid waste (Management and Handling) Rule 2000

INTRODUCTION

Mysore is the second largest city in Karnataka after Bangalore .Mysore was the capital of Mysore state until 1956, when the capital was shifted from Mysore to Bangalore. Mysore is spread over an area of about 128 sq. km with the growing population (0.65 millions in 1991 to 0.76 millions in 2001) at faster rate due to influx of many service industry activities, the generation of municipal waste both garbage and sewage has been on the rise .Anthropogenic activities in society generate large quantities of wastes posing a problem for their disposal. Improper disposal leads to spreading of diseases and unhygienic condition besides spoiling the aesthetics. The city has several major and small industries present in Nanjangud 20 Km away from the Mysore city together with many educational and commercial establishments. In India, every year 30.3 millions tons of Municipal solid waste is generated .This equate to about 350 gm of waste per person on average (Mazumdar ,1994)

Solid waste management is a integral part of urban and environmental management of each city with more than 65% of India's 250 million population living in class I town (population over 0.1 million) and 23 cities getting distinction of being metropolises (population over 1million)(Asnani et al; 1992, Bhide and Sudarshan, 1976) Municipal solid waste management, like most of other infrastructural services has come under great stress, consider low priority areas, solid waste management was never taken up seriously either by public or by concerned agency or authorities and now the piled up waste is threatening our heath, environment and well being (Chouhan and Reddy 1996, Mazumdar 1994). Mysore City Corporation (MCC) is responsible for community solid waste management in city .The present study has been carried out in the urban environment of Mysore in the year 2006 to understand the problems and perspective associated with solid waste management in the city.

MATERIALS AND METHODS

The solid waste from the different sector of society was collected, mixed and one Kg sample was prepared by using quartering method. The waste was then characterized and the percentage of each constituent was calculated. Secondary data regarding solid waste generation, collection system and disposal methods were collected from Mysore City Corporation.

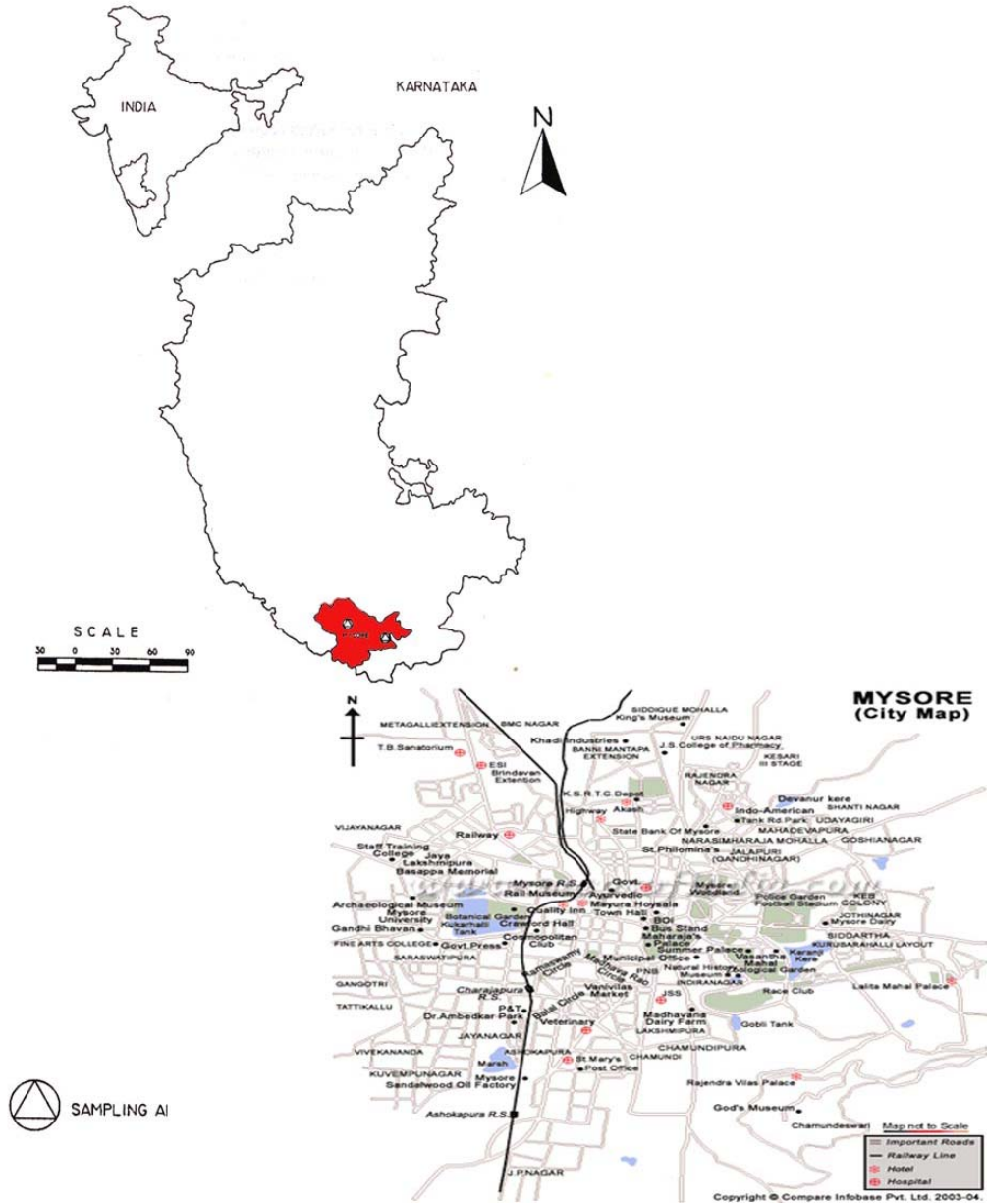


Fig. Study area

RESULTS AND DISCUSSION

Solid Waste Management

MCC is responsible for the management of sold waste generated in the city. The city administration has been decentralized in 8 zones. There are in all 65 wards in the city. The chief Health Officer is the overall incharge of solid waste management in the city. According to MCC, around 259.14 TPD solid waste is generated every day .Major sources of solid waste is given in table 1

Table 1: Major sources of solid waste generation.

SN	Sources of waste generation	Quantity(TPD)
1.	Non Slum Households	160.7
2.	Slum Households	10.3
3.	Shops and establishment, schools, temples etc	20.5
4.	Hotels ,Choultries etc	26.7
5.	Market ,Vegetable shops & meat shops	28.8
6.	Hospitals & Clinics	5.9
7.	Industries	1.4
8.	Others	5.1
	Total	259.4

Waste generation rates works out to be 0.35 Kg per capita per day. Approximately 170 TPD waste is generated from the residential sources. The hotels, Choultry and markets account for 55 TPD and the rest is from others sources. The various waste generating places in Mysore city are –

Shops	20067
Choultries	124
Hotels	410
Industries	133
Meats shops	387
Hospitals & Clinics	599
Temples	430

Collection System

The solid waste is collected from different sources/establishment by various methods. The solid waste management activity n Mysore consists of wastes generator throwing the waste into the round RCC bins and masonry bins. The pourakarmika sweeps the road and drains and transfer the waste into small heaps on the road or into the bins .Mysore being a tourist city, there are many location within the city and occasion especially during Dasara where special effort for cleaningness are required .Special contingents of staff are dedicated for these operation.

There are 2879 dust bins are placed in Mysore city. Two types of dust bins are used. These are cylindrical bottomless cement concrete of 0.45-0.8 m³ capacity and rectangular bins with bottom made of masonry of 2-10 m³ capacity. The collection of waste from these dust bins is planned in accordance with frequency of container becoming full. The present location of dust bins and the waste collection point have been classified into daily collection (A type), weekly twice collection (B type) and weekly once collection (C type) as part of Nirmal Nagara Programme. In addition, there are 20 dumper placer containers used as primary collection containers in commercial areas and bulk generator. Around 30 wards are managed on contract by private contractor authorized by MCC. The contracts involves sweeping of the wards , transfer of waste to the bins and others collection point ,collection of waste from these point and transporting them to the Waste Processing Facility (WPF) or any other designated disposal point. The number of staff engaged in solid waste management in the city corporation is shown in table 2

Table: 2 Distribution of staff for SWM

SN	Category Staff	Numbers
1.	Health Officer	1
2.	Deputy Health Officer	1
3.	Senior Health Inspector	4
4.	Junior Health Inspector	18
5.	Conservancy Dafedar	42
6.	Pourakarmika (Sweepers)	787
7.	Porakarmika on time scale & Gram Panchayat	16
8.	Drivers	23

The city has various government hospitals, private hospitals, nursing homes and clinics .MCC has contracted private agency that has set up a Biomedical Waste Processing Facility (BWPF) on T.Narsipura road .The infectious waste from 599 hospitals are collected by agency at cost and being treated .The industrials waste from small unit get mixed in the municipal stream while the larger industries manage their own waste.

Transportation

Transportation of solid waste is carried out partially by MCC and partially by private contractor. Out of 65 wards, MCC is responsible for transportation of about 50-55 % of solid waste generated, while private contractor are responsible for the rest 40-45 % of the waste in the city. The solid waste is stored temporarily in the dust bins and then transported to the disposal site. Types of vehicles used for transportation of solid waste are as follows:

Tractor tipper 5
Tractor trailer 17
Dumper 2

One tipper and four tractors are more than 15 years old. Another 2 tippers and 6 tractors are over 10 years old. Lifting of garbage is done manually. The waste collected from the roads and bins is directly transported to the final dumping site .The refuse vehicles have to travel about 6 Km distance through the city to carry waste up to the dumping site. The tractors and dumpers carrying waste are not covered or partially covered during the journey and waste tends to spill on the roads. Most often workers are not provided with protective hand gloves and shoes so they are directly expose to the waste. Protective measures are necessary to avoid contracting skin allergies and respiratory diseases .The loading and unloading of waste is done through mechanical system reducing direct contact of worker with the wastes.

Disposal of Wastes

Considering quantity and composition of Municipal solid waste generation in Mysore city, a composting plant was set up under the ADB assisted Karnataka Urban Infrastructure Development Project at Vidayranya Puram to generate compost from the city refuse. The plant is located about 6 Km from the Mysore city within an areas of 12.5 acres The plant was set up by the Excel Industries and was being operated by M/S Vennar Organics till June 2005. The plant has been operational at sub optimal levels and as of then the agency stopped operation. Now MCC is operating the Excel plant itself. The plant has the capacity to handle 200 tons of waste per day. The remaining waste is being dumped besides the Excel plant. The city doesn't have disposal sites. Management of biomedical waste (BMW) is taken care by a private agency that has set up a biomedical waste processing facility on T.Narsipura road. There is also a small vermin-composting is operational in Mysore Zoo.

Characteristics of Solid Waste

The quantity and characteristics of solid waste vary from place to place .factors that influence the quantity and composition are the average income level, the sources, the population, social behavior, climate, industrial production and the market for waste materials. The waste generation and economics level of the society have been related by studying the quantity of domestic solid waste generated from three socioeconomic groups' i.e. Low income group (LIG), middle income group (MIG) and high income group (HIG) and a positive correlation between the high income and waste generation has been noted. The HIG people throw away more plastic, metallic and glass waste and also hazardous waste. Plastics, metals and glass account for 11 % in the Mysore city solid waste.

The study reveals that the composition of solid waste in Mysore city has 40 % organic matter followed by 45 % earthen materials and 1.5 % as wooden materials. This shows that municipal solid waste of Mysore city has a fair amount of biodegradable materials. The percentage of non biodegradable waste like metals and plastics is not very high but substantial percentage of concrete /pebbles/silts/sands etc was observed, which is indicative of large scale building construction and other development activities. The typical composition of municipal solid waste of Mysore city is given in table 3

Table 3:Composition of municipal solid waste of Mysore city.

SN	Components	Approx.value (%)
1.	Organic components	40
2.	Straw ,bagasses ,& banana leaves	
3.	Wooden materials	1.5
4.	Plastics	10
5.	Stones /pebbles/silts/sands	45
6.	Cloths /rags	1.5
7.	Metals	0.2
8.	Rubber/leather	1
9.	Glass /ceramics	0.8

IEC Activities in Mysore City

IEC activities in Mysore are entrusted to People Science Forum (PSF) , a part of Karnataka Rajay Vigyan Parishat(KRVP) since Jan 2005.Before Nirmal Nagara was implemented ,there were Jatha's workshops, signature campaign on solid waste management were held. After the implementation of Nirmal Nagara project, house to house campaign on SWM is being held since Oct 2001till date, consecutively for 196 weeks. School children Eco club has been formed; training for MCC staff and two workshops have been organized for Residence Welfare Association (RWA) formation. At Dasara exhibition 2004, public dialogue, street plays were held. As of now about 40 RWAs is active in the city.

CONCLUSION

The solid waste management in Mysore city appears to be inadequate and needs up gradation. The solid waste has to be disposed off scientifically through sanitary landfill and recyclable portion of the waste should be salvaged. Segregation of recyclable material would also leads to reduction in quantity of solid waste for final disposal. Higher priority needs to be assigned to the management of municipal solid waste by the local authority and a system approach needs to be adopted for optimizing the entire operation of SWM encompassing segregation at source, timely and proper collection, transportation routes and types of vehicles and development and proper operation of sanitary landfill site .Mysore city might need to look for better solution of waste disposal considering unavailability of landfill and disposal site.

The present system of MSWM in Mysore city is not satisfactory based on MSW(M & H) Rule 2000. There is need to implement MSW (M & H) Rule 2000 in an integrated manner. More emphasis needs to be laid on segregation and collection of waste at door step. Segregation of recyclable material from mixed waste not only is tedious but also wasteful, therefore the residents should be sensitized towards the importance of segregation of wastes at source. Rather than considering the municipal solid waste simply as residue to be thrown away, it should be recognized as resource materials for the production of energy, compost and fuel depending upon the techno-economical viability, local condition and sustainability of the project on long term basis.

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Submission date: 30th March 2009

REFERENCES

1. Asnani, P.U , SR Shukla and PS Rajvanshi (1992) Solid waste management all India.
2. Bhide A.D and Sudarshan (1976) Solid waste management in developing countries.
3. Chouhan B.M and B.K Reddy (1996) Bio-energy scenario in India. IREDA News. 7(1):20-27
4. Dhande A.D. Ingle sopan T, Attarde Sanjay B and Wagh Nilesh D : (2005) ,Ecofriendly approach of urban solid waste management - A Case Study of Jalgaon city, Maharashtra, J. Environ. Biols 26 (4): 747-752.
5. G.P. Shivashankara, H.B Rekha (2005) Solid waste management in suburban areas of Bangalore. Nature Environment and Pollution Technology 4(4): 495-500.
6. Indian standards Institution IS – 10158 (1992).Method of Analysis of solid waste.
7. Jha MK, Sondhi OAK and Pansare M (2003) Solid waste Management - A case study IJEP, 23 (11): 1153 – 1160
8. Macwan J.E.M, Jay Shukla, Perita patel and Bhumika Shah (2003) Metropolitan Domestic Solid waste Generation Analysis in Indian context” Journal of Indian Association Env.al Management Vol. 30:158-161.
9. Malvia R, Choudhary R and Budhia Dharam (2002) Study on solid waste assessment and management. Indore city. IJEP 22(8): 841-846.
10. Mazumdar, N.B (1994) Municipal solid waste management the Indian perspectives.

Environment Monitor, 12(2): 257-269.

11. Renjini RL and Prakasam V.R, (2005) An evaluation of Municipal solid waste management in Tripunithura Municipality of Kerala ,IJEP; 25 (7) :652-656.
12. Shannigrahi A.S. Chatterjee N and Olamiya M.S (1997) Physicochemical characteristics of Municipal solid waste in to mega city, Indian journal of Environmental Portection Vol. 17: 527 – 529.
13. Shekdar, A.V. (1999) Municipal solid waste management. The Italian Perspective Journal of MEM, 27: 100-108.
14. Tambekar D.H. and Kale S.A (2005) A study on physicochemical characteristics of Municipal solid waste of Amravati city, Maharashtra, Nature Env. And Pollution Tech. Vol. 4, No. 3:459 - 462
15. Tehabanoglous G et al, Theisen H and Eliassen R, (1993) Solid waste Engineering principle and management , MG-Graw Hill, New York.
16. Yishu Chiu, Joan Eryrter and George W. Gipe, (1976) Solid Waste Generation. Rates of a University Community. Journal of Env.al Engg Divison ASCE vol 102 –, PP: 340 – 345

4/1/2009