International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 06 | June - 2021 ISSN: 2582-3930

MUNICIPAL SOLID WASTE MANAGEMENT IN ICHALKARANJI CITY, INDIA

R.S. Patil[1], V. S. Sherekar[2]

[1,2] *Assistant Professor, Department of Civil Engineering, DKTE Society's Textile & Engineering Institute (An Autonomous Institute), Ichalkaranji.*

Abstract - Municipal solid waste (MSW) is one among the main areas of concern everywhere the planet. In developing country like India, there's rapid increase in municipal solid waste due to urbanization and population increase. Composition of waste varies with various factors like living standard, climatic condition, socio-economic factor etc. This paper gives current scenario of Ichalkaranji city, India with reference to municipal solid waste quantity, quality and its management. We have presented overview of MSWM in Ichalkaranji city. We have also presented some results on MSWM of small-scale towns and their surrounding villages.

Keywords: Municipal solid waste, urbanization, Environment, Waste management

1.INTRODUCTION

Municipal solid waste (MSW) includes household garbage and rubbish, street sweeping, construction and demolition debris, sanitation residues, trade and non-hazardous industrial refuse and treated bio-medical solid waste. As per the World Bank estimates urban India produces approximately 100,000 metric tons of MSW daily or approximately 35 million metric tons of MSW annually by the year 2000. Quantity of MSW is increasing due to increase in population and rapid urbanization. Indian cities are generating eight times more MSW by 2006 than they did in 1947. Expected generation of municipal solid waste until 2025 in India is 700 grams per capita per day. The urban population of India is expected to grow to 45% of total from the prevailing 28%. Hence, the magnitude of MSWM problem is likely to grow to even larger proportions. The typical rate of increase of MSW generation in Indian cites is estimated around 1.3% annually. Rapidly developing cities is 0.5-1.5 Kg/Capita-day while for developed cites it is greater than 1 Kg/Capita-day in Asian countries like India.

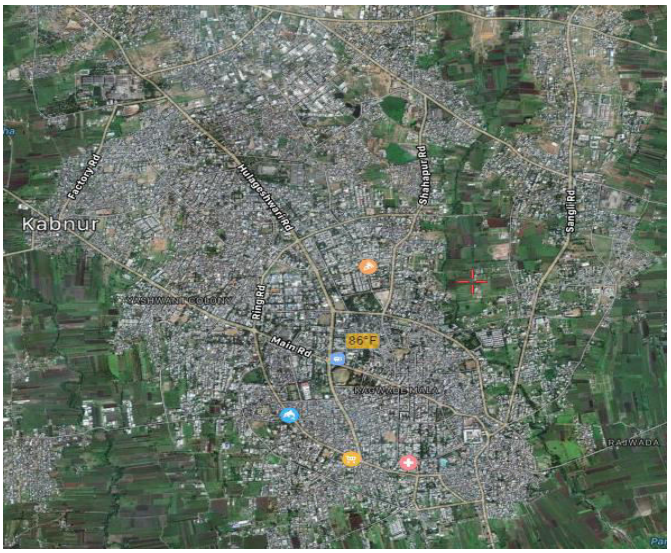

Fig -1: Ichalkaranji City

2. SOLID WASTE MANAGEMENT AT ICHALKARANJI

FEATURES OF PLANT :-

1. Collaboration with = Hydro air Tectonics Pvt. Ltd, Mumbai.
2. In Ichalkaranji city, 100ton/day solid waste is generated, out of which 80ton/day is processed.
3. The land required is 7.5 acres.
4. Moisture content solid waste = 60%
5. Volatile solid waste = 40%
6. Total Electricity = 150 HP/day
7. Total Water = 150 lit/day
8. Bacteria = 60-100 kg/day

Table -1: Physical Characteristics

SR. NO	CONSTITUENT	JANATA BANK (%)	KAGWADE MALA (%)	DUMPING SITE (%)
1.	Baggage	6.10	3.10	0.10
2.	Cloth Waste	24.30	7.20	3.15
3.	Glass	3.95	1.30	2.75
4.	Plastic Waste	23.59	12.81	12.62
5.	Paper Waste	7.20	5.23	2.15
6.	Rubber	3.10	0.0	4.15
7.	Veg & Non-veg	25.20	63.29	0.0
8.	Wood	0.10	0.0	0.60
9.	Mixed Garbage	0.0	0.0	57.30

10.	Leather	0.0	0.0	1.20
11.	Metal	0.30	0.0	0.10
12.	Inert Matter	0.0	0.0	8.30
13.	Others	2.26	5.37	3.33

Table -2: Chemical Characteristics

SR. NO.	PARAMETERS	JANATA BANK	KAGWADE MALA	DUMPING SITE
1.	pH	6.5	6.7	7.9
2.	Carbon (%)	18.09	18.22	17.20
3.	Nitrogen (%)	0.89	0.87	0.54
4.	Phosphorus (%)	0.79	0.95	0.73
5.	Potassium (%)	0.43	2.50	0.55
6.	Volatile Matter	39.70	33.43	37.27
7.	C/N Ratio	20.32	20.94	31.85

3. METHODOLOGY

I. PRE-PROCESSING AREA

Fig -2: PRE-SEGREGATION MACHINE

1. A preprocessing or staging area offers room to receive collected feedstock & to sort the materials as needed.
2. The size & design of the preprocessing area depends on the amount of incoming materials & the way the material is collected & sorted.
3. The preprocessing area is frequently used to share the degradable material or separate the bags in which the feedstock will be collected.
4. The use of staging area is to store separated materials & too wet & hold the materials briefly to prepare them for windrow formation.

II. PROCESSING AREA

Fig -3: SEGREGATION MACHINE

1. The processing area is composed of the manure formation pad & curing area must be carefully designed for efficient manure formation.
2. For protection against erosion, windrows will be arranged parallel to the grade to allow runoff to flow between the piles instead of through them.
3. Precipitation moving onto the manure formation pads can be diverted from manure piles through the use of the drains & conduits.
4. The required equipment also depends on the characteristics of the feedstock & the initial & final density of the composting material.
5. The size of manure forming depends primarily on the amount of material that facility receives for manuring & RDF & level of technology that will be used.
6. The processing conditions are changed according to climate.
7. Bio-filters can be used to absorb odor, producing by compounds.

III. MANURE FORMATION

Requirement: -

1. Formation of pad
2. Floor level should be parallel.
3. Structure of shed.

Conditions: -

1. Humid Atmosphere.
2. Spraying of bacteria & water within specific interval.

Procedure: -

1. Making layer of solid waste & sprinkling the water & bacteria within certain intervals.
2. Pad should be in slope way to avoid percolation of water.
3. Keeping it for 5-6 weeks for efficient manure formation.

Product Specification:- 1. pH – 7.85-8.6
2. Organic carbon – 5.17-11.5
3. NPK (%) – 0.9,0.4,0.5
4. Cost – Rs.1700/ton

TOTAL COST OF THE PROJECT :- Rs. 1150 lacks

IV. MANURE FORMATION

Fig -4: MANURE PROCESSING MACHINE

1. A post processing area at manure & RDF production facilities will be used to conduct quality control testing of manure to perform screening, size reduction & blending operations & to store manure & RDF.

2. A space about one fifth the area of the manuring pad is sufficient.

V. BUFFER ZONE

Fig -5: RDF (REFUSE DERIVED FUEL MACHINE)

1. This zone frequently needs to be several times the size of the manure RDF production pad particularly when the composting operation is adjacent to residential area.
2. Enclosed or higher technology facilities might require less of a buffer zone.
3. The buffer zone required by manure & RDF production depends largely on the type of feedstock to be converted into manure & RDF.

4. COST DETAIL OF THE PROJECT

Site Development	9.5 lacks
Construction & building	310 lacks
Plant & Machinery	690 lacks
Working capital	9.2 lacks
Pre Operative Expenses	18.3 lacks
Contingencies	84 lacks

5. CONCLUSIONS

Use R4 mechanism i.e., Reduction, Reuse, Recycle & Recovery of waste.

To avoid over/excess use of renewable & nonrenewable energy sources.

Operation will simple with emphasis on use of locally available resources.

The problem causing biodegradable component of waste is convertible to the extent of 80%.

The freshly received MSW will also have passed through sanitization, bio stabilization & process for minimizing the elements & to conserve the space.

At house level separate the wet & dry waste.

There is need for awareness & training to associated conservancy staff, waste generators & citizens forum including dumpsite neighborhoods

REFERENCES

1. Public Healthy Dept. IMC (ICKALKARANJI MUNICIPAL CORP.)
2. Environmental Status Report of IMC
3. Patrick Akata Nwofe (2015), "Management and Disposal of Municipal Solid Wastes in Abakaliki Metropolis, Ebonyi State, Nigeria" International Journal of Scientific Research in Environmental Sciences, 3(3), pp. 0107-0118, 2015. ISSN: 2322-4983
4. Amoo OM, Fangbale RL (2013). Renewable municipal solid waste pathways for energy generation and sustainable development in the Nigerian context. International Journal of Energy and Environmental Engineering, 4(1): 42.
5. Anikwe MAN, Nwobodo KCA (2002). Long term effect of municipal waste disposal on soil properties and productivity of sites used for urban agriculture in Abakaliki, Nigeria. Bioresource Technology, 83(3): 241- 250.
6. Akanmu IY, Shridha MKC (2002). Management of rice mill waste in Abakaliki, Ebonyi State, Nigeria (Doctoral dissertation, M. Sc. Dissertation).
7. Ohakwe J (2011). A statistical analysis of medical waste generation, management and the health implications: A case study of Enugu metropolis, Enugu State Nigeria. Continental Journal of Applied Sciences, 6: 25.
8. Olorutande AJ, Adeoye PA, Alao F (2013). Municipal solid wastes collection and management strategies in Akure, South-Western Nigeria. Capsian Journal of Environmental Sciences, 11(1): 1.
9. FICCI and Tata SMG. "Knowledge Paper on Plastic Industry for Infrastructure." 3 rd National Conference on Sustainable Infrastructure with Plastics (2017). Accessible at: ficci.in
10. International Solid Waste Alliance. "Waste and Climate Change." ISWA White Paper (2009). Accessible at: iswa.org
11. Arena, U., Mastellone, M. L., Camino, G. & Boccaleri, E. 2006. An innovative process for mass production of multi-wall carbon nanotubes by means of low-cost pyrolysis of polyolefins. Polymer Degradation and Stability, 91, 763-768.
12. Bhide, A. & Shekdar, A. 1998. Solid waste management in Indian urban centers. International Solid Waste Association Times (ISWA), 1, 26-28.
13. Boukis, I. P., Grammelis, P., Bezergianni, S. & Bridgwater, A. V. 2007. CFB air-blown flash pyrolysis. Part I: Engineering design and cold model performance. Fuel, 86, 1372- 1386.

14. Dawson, G. W. & Mercer, B. W. 1986. Hazardous waste management, John Wiley & Sons.