



Figure 2- MSW Management Method

3.2.4 Processing-

We survey the biomedical treatment, recycle of waste. Biomedical Waste treatment facility in should be Incineration ash (Hazardous facility Maharashtra Enviro Power Ltd., Ranjangaon), Treated solid waste (Municipal landfill), Plastic waste after disinfection and shredding (recycling or municipal landfill), Treated wastewater (Sewer/drain or recycling), Oil & grease (incineration).

PCMC should produce hydrocarbon fuel from plastic, collected from MSW at Moshi Kachara Depot as maximum as possible. The city based Bharat Vikas Group Waste Management Ltd. (BVG) has developed a technological process for producing fuel from all types of plastic wastes. The plant is capable of producing 600-700 litre of hydrocarbon fuel from 1 MT of waste plastic. This particular waste to fuel plant is of extreme importance towards finding the solution to the ever-worsening problem of plastic waste.

3.3.5 Disposal:

We visited disposal site Moshi and surveyed the recover potential of ground, calorific value and bulk density of waste sample. Characteristics of processed lechate are presently higher than MSW Standards. However, PCMC should have to undertake a project to further treat the lechate chemically and biologically. At the Moshi landfill site, a mechanical composting unit is operational in the area of 6.48 ha. The mechanical compost unit, having the capacity to treat 500 MTD of waste, presently treats 250-330 MTD of solid waste. Vermicomposting plant having the capacity of 30 MTD is operational at the Moshi site in an area of 2.02 ha. Presently, the plant treats 12-15 MTD of collected waste as well as the STP sludge.

Table 4: Characteristics of leachates generated from Moshi landfill site as well as Mechanical composting

Parameters	MSW Standard MSW (M&H) 2000 Standard	Concentration	
		Untreated leachate	Treated leachate
pH	5.5	8.9	9.3
COD(mg/l)	-	23200	3840
BOD(mg/l)	100	6960	1100
TSS (mg/l)	200	2584	1272
Total dissolved solids (mg/l)	2100	2926	1854
Chloride (mg/l)	600	4448	2524

Different ionic concentrations including heavy metals were substantially increased (5.7 – 109%) in compost sample over biodegradable MSW. Surface soil, below the compost at dumping site acquired higher concentrations (15 – 800 %) of different pollutants from those of control soil. Leachability rates of certain pollutants viz. Na, K, Zn, Cu, Mn, Mg were remarkably high (7 – 83%) from surface soil to a level up to 1.2 m downward. However a reverse trend was observed exhibiting poor leachability rate of the metals Co, Cr, Pb & Ni was observed, where the concentration were more (11 – 75%) at surface soils then those at soils below 1.2 m deep. Now Environmental Minister announced that the land at Punavale is allotted for landfilling. Hence it has greater importance in future landfilling and disposal.

3.3 Primary Data Collection-

Primary data collection was done by conducting structured and semi-structured interviews, informal interviews; email communications etc. with key stakeholders which includes NGOs, citizens, waste pickers, scrap-dealers (Kabadiwalas) and formal recyclers at whole methodology. The purpose of this activity was to understand the existing recycling practices, access to waste and the economics involved in it. Waste management (WM) is very crucial as it involves several stages starting from the source of generation till the final disposal (MoUD, 2000). We also collected information related to health hazard from the public living nearby areas around the disposal site. City development report, Environment report and transportation report has provided data input for the study. The solid waste management system of the metro cities such as Mumbai, Delhi, Kolkata and Chennai is also studied as zero waste initiatives.

Table 5-Zero Waste goals and Objectives

Goals	Objectives
Improve efficiency of current waste handling practices	<ul style="list-style-type: none"> • Comply with regulatory requirements of MSW rules • Improve the collection, segregation practice in the area • Impart transparency, accountability, efficiency in operations
Strengthen infrastructure to promote resource recovery	<ul style="list-style-type: none"> • Build internal capacity of Corporation in terms of human & capital resources • Strengthen association with various stakeholders to implement the tasks and achieve above goals • Impart sense of ownership and involvement in community
Reduce burden on the ecosystem	<ul style="list-style-type: none"> • Minimize quantity of waste generated, transported and landfilled • Incentivize hygienic waste handling practices • Avoid exposure of waste to natural resources as soil, water, air

3.4 Action Plan

Issues in MSWM are no system of door to door collection of waste, no segregation of waste at source, Inadequate community bin facilities, Burning of waste on roads/ bins, People throwing waste on streets, open space, drains, nalas etc., No separate system for collecting of disposal of construction waste and /or Industrial waste, Problem of hotel

& restaurant waste, No system of collection of garden waste, Issue of plastic bags / plastic with less than 20 microns, Crude dumping of waste, Use of Plastic bags / plastic thinner than 20 micron, Lacking of public awareness, High level of subsidy and low level of recovery for SW service.

Municipal Corporation should have to strengthen its capacity and institutional arrangement to handle all solid waste in City. To handle all the solid waste in city, Municipal Corporation must take help of NGO's, researchers, universities and colleges. People's participation is essential to ensure a well-managed system. There is also need to conduct an education campaign on waste management and health related issues. Also NGO's (Janwani) and environmental sustainable companies (Teri) should have to arrange seminars, street plays. Also Municipal Corporation must spread messages through radio, television, newspapers and hoarding about the advantages of clean city. Such efforts will reduce the open waste and waste at storage sites. There is need of scientific planning of the solid waste collection at each household, collection points and easiest way of transportation up to land fill sites. An increase in population has put tremendous pressure on budgetary resources. The unbundling of services and technological innovations have opened up these areas to private sector participation (MoF 2009, Clairair O. S. 2006). Training & Public Awareness, Scientific approach for Sweeping, Waste Segregation and Reuse, Provision of Adequate Collection Facilities, Developing Strong Transportation Facilities, Setting up Transfer Stations, Augmentation of Waste Processing, 100% daily sweeping to entire city population, 100% Waste Collection system before end of year, 75% waste segregation at collection, 95% SW processed before land filling, Development of Sanitary landfill site, Quick & Prompt complaint attendance for the utility, Dust Free Major roads.

Table 6: Action Plan for Zero Waste PCMC

Infrastructure Development	<ul style="list-style-type: none"> • Establish 'Performance Evaluation cell' with members from stakeholders as NGOs ALMs, CBOs, volunteers • Establish supporting cell for labour as part of co-operative of rag pickers
Capacity Building & Partnerships	<ul style="list-style-type: none"> • Policy amendment for strict enforcement of segregation practice • Redefine slum adoption scheme for waste collection from slums • Policy amendment to promote processing, Build common platform for knowledge sharing
Assessment & Development	<ul style="list-style-type: none"> • Redesign system with advanced technology usage and set up common resource pool • Optimization or Rationalization of collection Routes and Study • Promote and establish various financial models as PPP.
Awareness & Promotion-	<ul style="list-style-type: none"> • Promote segregation Launch Awareness campaign for Zero Waste • Launch Environment Action program for education Centre's • Arrange Environment Mela (Eco Mela) • Set up Green Cell3R Build common platform for sharing knowledge and ideas • Establish sorting Centre's Promote decentralized processing of wet waste

4. Conclusion

The waste has several components which have potential to be reduced-reused-recycled. This potential is underutilized on account of lack of awareness among generators, lack of sense of ownership and responsibility, lack of sufficient infrastructure. 75 percent of total waste can be reduced from going to landfill by practicing 3R's This will not only reduce pollution caused by dumping but also make today's waste as tomorrow's resource.

The action plan follows situation analyses followed by a thematic approach of building up infrastructure, capacity, awareness and assessment. Accordingly detailed Action sheets have been developed. The study presents a methodology and action planning process. The field application coupled with this guidance is expected to serve as a tool kit for applications elsewhere to develop a zero waste management plan for a ward in an urban area.

Also maximum collection efficiency, route cost optimization, Processing, composting, recovery with minimum landfilling, Health hazard, open dumping, burning of waste.

Bungalow Societies, Housing Societies, Slums, Gavthan, Commercial Establishments, SHGs (Self Help Group), schools, Senior citizens and other groups plays vital role in solid waste management of PCMC.

5. Future Scope

As population, living standard increases the generation of waste is continuous. Hence we should have to plan according to Population Forecasting, Use of GPS Tracking System, advanced processing and recycle technologies (Biological and thermal treatment) , diversity principle (More diverse most efficient planning), minimum waste to landfilling.

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Authors



Niraj Ashok Burge pursuing Bachelor’s Degree in Civil Engineering from Rajarshi Shahu College of Engineering in 2015, University of Pune, Maharashtra. He is currently working on “Solid Waste Management in PCMC” as a research project.



Sunil Kartar Gangurde pursuing Bachelor’s Degree in Civil Engineering from Rajarshi Shahu College of Engineering in 2015, University of Pune, Maharashtra. He is currently working on “Solid Waste Management in PCMC” as a research project.

