MUNICIPAL SOLID WASTE MANAGEMENT

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Introduction:

Over the last two decades rapid urbanization, changes in life style and rise in population has resulted in generation of huge quantities of Municipal Solid Waste (MSW). The quantity of MSW generated is much higher than the quantity collected, transported and disposed, leading to pilling up of uncollected waste in streets, public places and drains. With rapid urbanization and economic growth and an increase in per capita waste generation, annual municipal solid waste generation is estimated to grow more than five-fold from the current level of 70 million tons to reach 370 million tons by 2030 (source; McKinsey Global Institute). Even the collected waste is mostly dumped on the outskirts of towns/cities and has created serious environmental and public health problems. Studies have shown that a high percentage of individuals who live near or on disposal sites are infected by gastrointestinal parasites, worms, and other pathogenic organisms. The insanitary methods adopted for disposal of municipal solid wastes are, therefore, a serious health concern. The poorly maintained landfill sites are causes of surface and groundwater contamination, and air pollution.

Figure 1: Major Consequences of Improper IMSWM

Integrated Municipal Solid Waste Management in GHMC:

Municipal Solid Waste (MSW) generated by Greater Hyderabad Municipal Corporation (GHMC) is estimated to be 3800 tons/day (TPD). The MSW generated is a mixed waste type MSW.

Sources of waste generators in the city are:

- Domestic Households
- Commercial Establishments
- Street Sweeping & Drain Cleaning
- Medical Waste
- Vegetable and Other Markets

(Source: "Solid Waste Management Practices in Hyderabad City" Presented at XI Metropolis World Congress, Hyderabad, 6-10 October 2014)

Unscientific dumping of daily garbage was earlier practice. In order to comply with the Municipal Solid Waste (M&H) Rules, 2000 and provide good living conditions to the citizens of Hyderabad, GHMC approved the Integrated Municipal Solid Waste Management (IMSWM) project in a Public Private Partnership (PPP) model. The objective of GHMC is to develop and implement a viable and environmentally sustainable Integrated Municipal Solid Waste Management (IMSWM) system in Hyderabad.

The municipal waste generated from the community has to be source-segregated into dry and wet. The recyclables like plastics, PET bottles, caps, tyres and re-usables like clothes, metals etc need to be segregated as best as possible to minimize burden on waste processing and disposal units. Later, techniques and technologies available and upcoming need to applied to recover resources i.e. Materials, products and energy from waste. The popular saying “Waste is Wealth” has to come true in practical way. State of art collection bins and waste compactors have to be utilized in waste collection to ensure safe and hygienic transport of MSW to transfer stations. The waste transporting vehicles shall be monitored using vehicle tracking system to plan and

implement an efficient waste collection system. At transfer stations, the waste shall further be reduced in volume by sorting for recyclables, reusables and bulk material. In addition, the leachate is also collected at the transfer stations. The MSW from

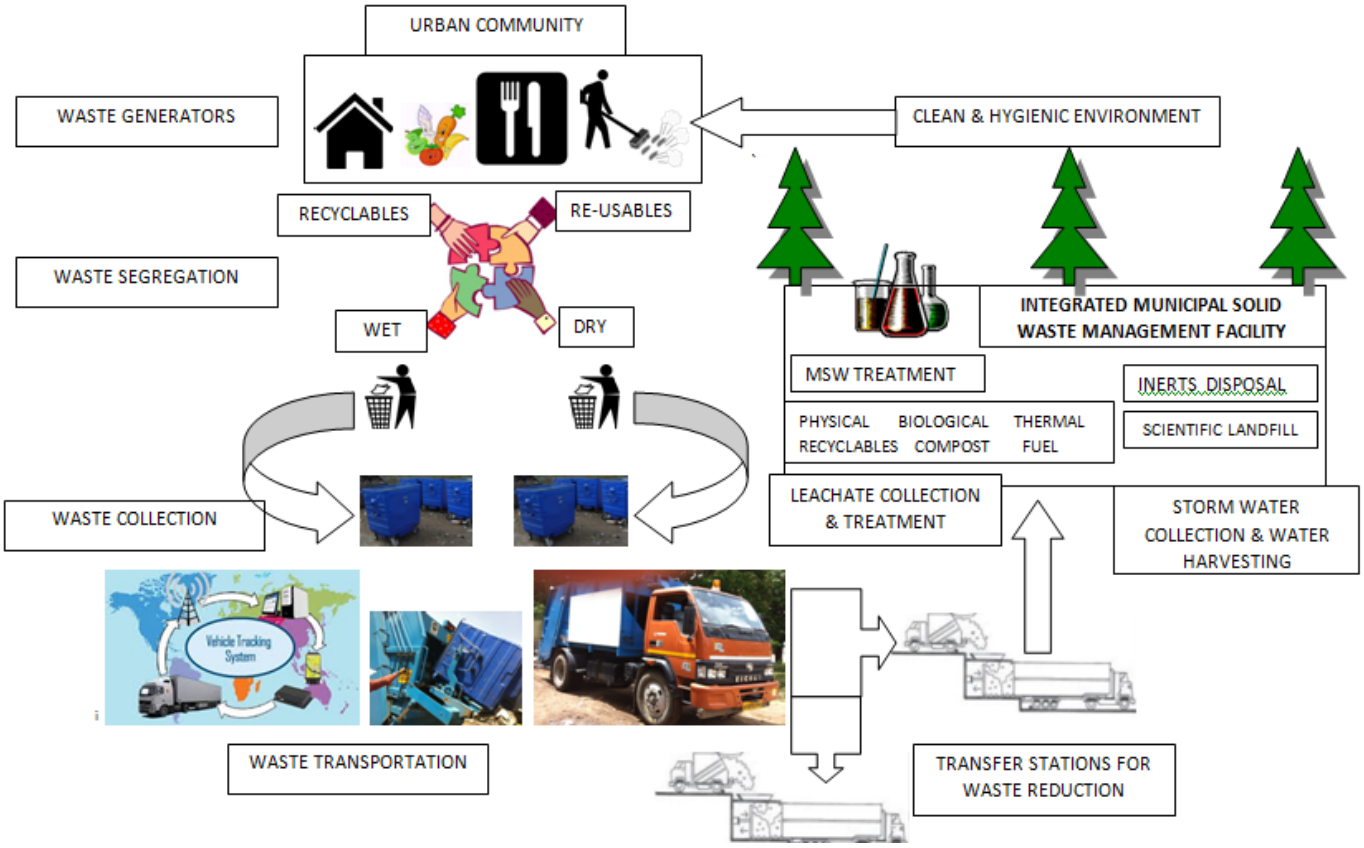
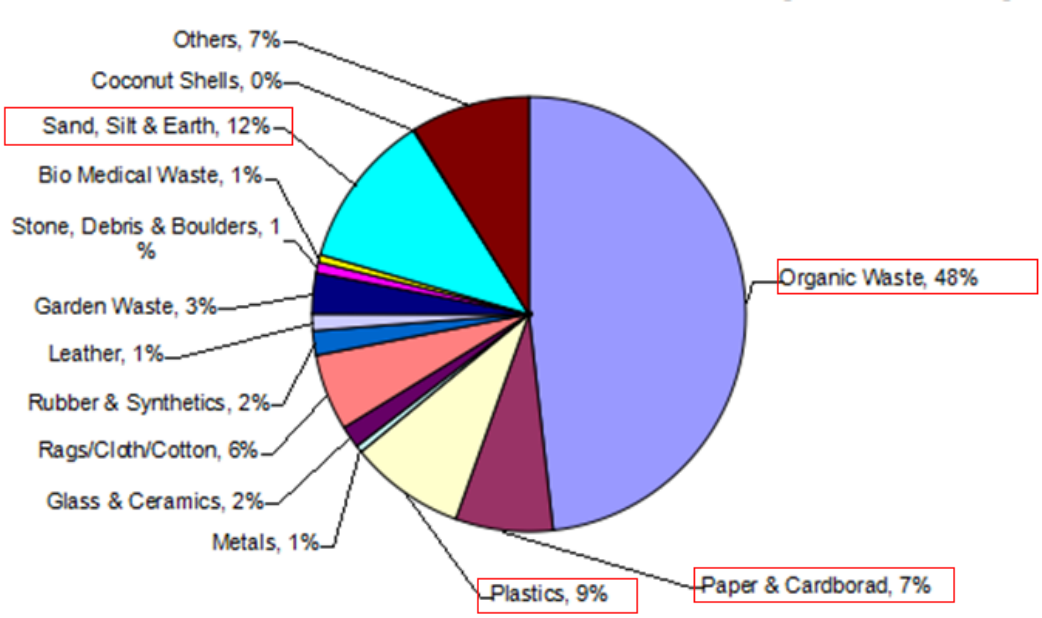


Figure 2: Concept of Integrated Municipal Solid Waste Management

transfer stations has to be transported to the Integrated Municipal Solid Waste Treatment and Disposal (T&D) Facility. At this facility, the MSW is treated using physical, biological and thermal means to produce recyclables, compost, fuel or electricity. The inerts of MSW that cannot be further treated shall be disposed off at scientific landfill. The T&D facility needs to be equipped with weigh bridges, administrative building, storm water drainage system, leachate collection system, and a laboratory. Last but not least, the facility has to be covered with adequate green belt to arrest the air pollution. The collected leachate has to be treated and discharged safely into the environment. The gases generated after landfill closure have to be scientifically collected and utilized if possible for fuel or electricity production.

Sources and Characteristics of MSW for Hyderabad City

The sources of MSW in Hyderabad are Households, Commercial Establishments, Street Sweeping, Parks & Gardens, Markets, Drain cleaning, Hotels, Temples, Meat Stalls, Institutions, Hospitals, Cinema & Function Halls.



Source: Detailed Project Report for IMSWM Facility, GHMC (Based on Waste sampling done across various Circles in Hyderabad)

Figure 3: Characteristics of MSW of Hyderabad City

Door to Door Collection and Segregation of MSW

The door to door collection activity in the city is accomplished with the help of collection crew using tricycles. The waste is handed over to the collection crew or is picked up from residences on a regular basis and is then placed in the nearby bins or secondary open collection pits. GHMC provides the tricycle to the economically weaker section people at free of cost for collection of waste from door to door. The tricycle operator shall collect the waste daily from the area assigned by the GHMC and also responsible for operation & maintenance of the tricycle. The tricycle operator has to meet his monthly expenses along with operation & maintenance of tricycle from the user fee and revenue obtained by selling the recyclable.

The segregation of waste at source point is mostly achieved by tricycle operator or rag pickers. In addition, segregation is taking place at various levels however in an unorganized way. The newspapers, plastics and cardboards in household are sold to local waste merchant (raddiwala). Clothes are mostly recycled or bartered for steel items.

It is proposed to establish a system based on '2 Bin system of Solid Waste Storage at source. Every household is encouraged to keep separate Bins/containers for Food/Green waste and Recyclables/Non-bio degradable waste.

As per the '2 Bin system of Solid Waste Storage at source, each of the household is encouraged to keep separate Bins/containers for Food/Green waste and Recyclables/Non-bio degradable.

Category 1. Food & Green waste (wet waste) 
Cooked/uncooked food, vegetable, fruit, meat, borne, fish waste, leaves, grass
Category 2. Recyclable & Non-bio-degradable (dry waste) 
Paper, Plastics, glass, metal, ceramic, rubber, leather, rags, used cloths, wood, stone, sand, ash, thermo coal, straw & packing materials

Scientific Landfill

Scientific Landfill is designed by adopting CPHEEO Manual on Municipal Solid Waste Management, United States Environmental Protection Agency's Manual on Solid Waste Management (Subpart – D, Design Criteria) and Municipal Solid Waste (Management & Handling) Rules. The landfill has been designed for a period of 10 years. Approximately 800 tons/day of inert matter comprising of silt, sand, rejects from each process line shall be disposed in the landfill.

Figure: 4 Scientific Landfill

Review of MSW Rules:

MSW Rules 2000

The Municipal solid waste (Management & Handling) Rules,2000 has been enacted under the Environment(Protection) Act,1986 vide notification No.S.O.908(E) of MoEF, New Delhi, dtd.25/09/2000. (Ref: MSW Rules 2000). (These Rules are included in Annexure-I)

These rules are applicable to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes in the country. The responsibility under the MSW Rules, 2000 lies with the ULBs and the concerned Departments of Municipal affairs/urban development and collectors are overall responsible to enforce the provisions of these rules.

The Rules contains four Schedules and contents as described below:

Schedule-I describes the responsibilities of the respective authorities for implementation and enforcement of the MSW rules and implementation schedule.

Schedule-II describes the compliance criteria for management of MSW for the following MSW operations

- Collection of MSW
- Segregation of MSW
- Storing of MSW
- Transportation of MSW
- Processing of MSW
- Disposal of MSW

Schedule-III describes the specifications of landfill sites that include the following:

- Site selection
- Facilities at the site
- Specifications for land filling,
- Pollution prevention
- Water quality monitoring
- Ambient air quality monitoring
- Plantation at landfill site
- Closure of landfill site and post care
- Special provisions for hilly area

Schedule-IV describes the waste processing options including standards and standard forms as follows:

- Standards for composting, treated leachates and incinerations
- Forms of application

  - Form I – Application for obtaining authorization
  - Form II – Format for Annual Report to be submitted by Municipal Authority
  - Form III – Format for Issue of Authorization
  - Form IV – Format of Annual Review Report to be submitted by the State Pollution Control Board/Committees to the Central Pollution Control Board
  - Form V – Accident Reporting

Draft Rules of MSW, 2013

The Ministry of Environment and Forest (MOEF) has put forth a notification of draft Municipal Solid Waste (Management and Handling) Rules 2013 in the Gazette of India vide Notification No. 1978 (E) dated 02.07.2013. These draft rules are made available to public via Public Notice and are currently under review. Once implemented, it will become mandatory for the municipalities in the state to develop landfills and submit annual reports to state government and pollution control board.