# Government Perspective on Municipal Solid Wastes Management

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DO NOT BURN WASTE
DO NOT LITTER WASTE

# Introduction

- Municipal solid wastes are the residue or rubbish generated from household and commercial activities from municipalities.
- It excludes wastes generated from hospitals, industries and other electrical and electronic wastes.
- Fast urbanization, over population, change in life style and unscientific disposal of wastes caused problem to health and environment.

# Introduction

Problems of Municipal Solid Wastes:

- Health problem by providing shelter to rodents and insects which are vectors of disease organism. Mosquitoes growth is responsible for dengue, malaria fevers and other communicable diseases such as typhoid, cholera etc.,
- Mixing with soil and water and generation of leachate from illegal dumping causes environmental problem by polluting air, soil and water.
- Piles in the streets makes nuisance by unpleasant odour. Co-disposal with hazardous materials cause LF site problem.

# Municipal Solid Waste Management (MSWM)

- To protect health of the public, to provide sanitation, the solid waste management have been the subject of local bodies as per Municipal Corporation Act.

- MSWM encompasses planning, engineering, organization, administration, financial and legal aspects of activities associated with generation, storage, collection, transportation, processing and disposal of wastes in an environmentally compatible manner adopting principles of economy, aesthetics and energy conservation.

# MSW generation status in India

- India, the second largest populated and one of the fastest urbanising countries is a land of climatic, social and cultural diversity.
- Wastes generation varies from villages to cities 0.1 to 0.6 kg per head.
- 23 metro cities generate 30, 000 ton per day and class I cities generate 50, 000 per day.
- Twenty eight percent of urban population produce approximately 1,76,530 T.
- Piles of garbage with all kinds of litter is a common site in urban India.

# Characteristics of MSW

- Compostable organics, inert debris, paper, plastics, leather, textile, glass, household hazardous and metals are constituents of MSW.
- Generally MSW in India consists of 40-55% of compostable organics, 6% of paper.
- Typical composition of municipal solid waste is like wet waste (53.7%), dry waste (10%) and inert waste (37.25).

# Legal Responsibilities

- The civic bodies are responsible for keeping the town clean and providing sanitary condition as per the municipalities act all over the World.
- The MSW rules made under the provision of EPA, 1986 also entrust the responsibility to the municipalities.
- Also so it is responsibility of each citizen to avoid littering the street and segregation of wastes at their house.

# MSW GENERATION - NATIONAL SCENARIO

## MAJOR DEFICIENCIES

- Littering of garbage due to unorganized primary collection
- Provision and operation of interim storage facilities unsatisfactory
- Irregular garbage lifting
- Transportation system not synchronize with storage facilities
- Processing/ treatment of MSW not practiced
- Final disposal through dumping and not SLF

# DEFINITIONS

**MUNICIPAL SOLID WASTE** includes commercial and residential wastes generated in a industrial hazardous wastes but including municipal or notified areas in either solid or semi-solid form excluding bio-medical wastes.

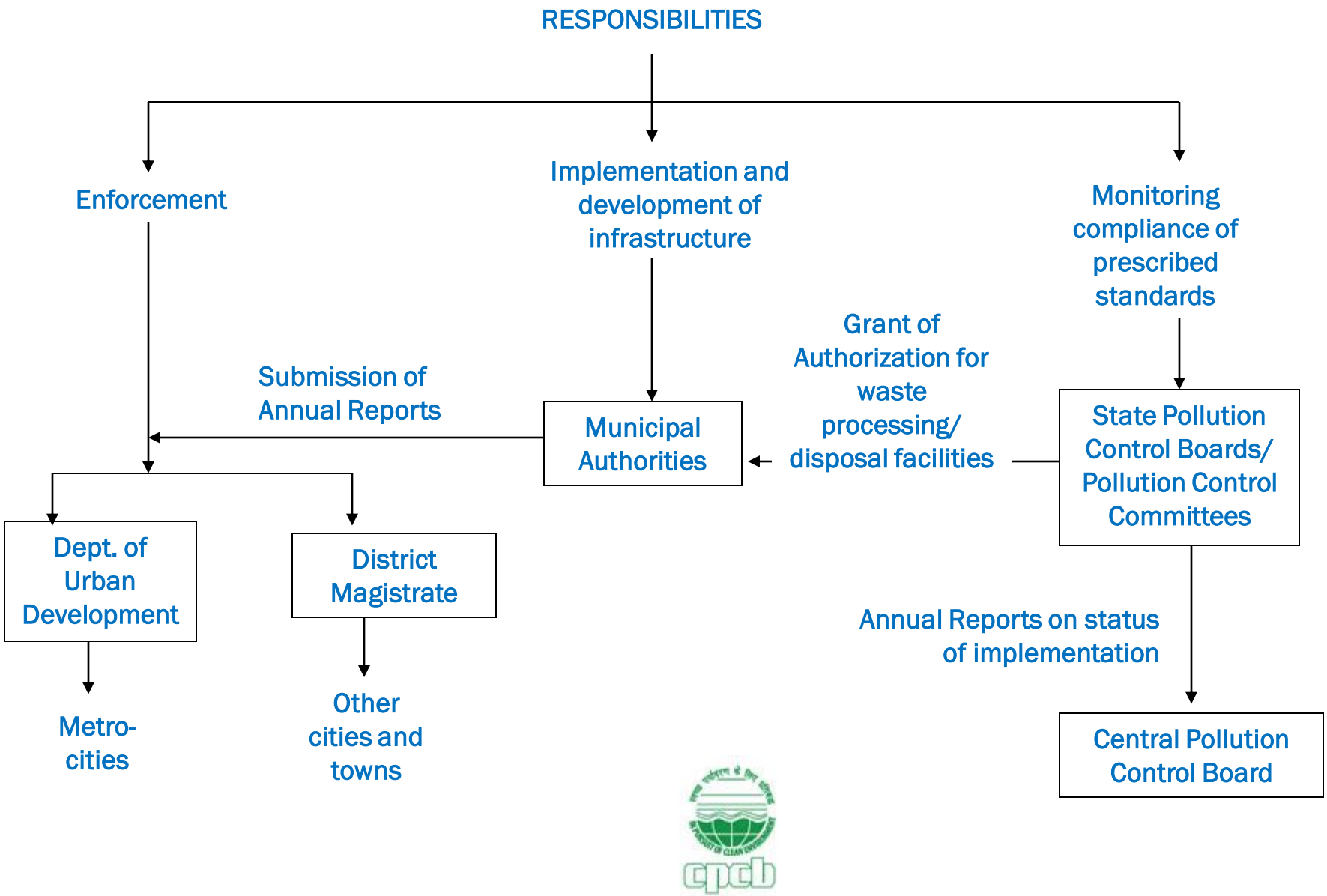
**GENERATOR OF WASTES** means persons or establishments generating municipal solid wastes.

**AUTHORIZATION** means the consent given by the Board or Committee to the "operator of a facility."

**MUNICIPAL AUTHORITY** means Municipal Corporation, Municipality, Nagar Palika, Nagar Nigam, Nagar Panchayat, Municipal Council including notified area committee (NAC) or any other local body constituted under the relevant statutes and, where the management and handling of municipal solid waste is entrusted to such agency.

**OPERATOR OF A FACILITY** means a person who owns or operates a facility for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes and also includes any other agency appointed as such by the municipal authority for the management and handling of municipal solid wastes in the respective areas.

# LEGISLATIVE FRAMEWORK



# Regulatory frame work

- Enacted “Municipal Solid Wastes (Management and Handling) Rules, 2000
- Rules lay emphasis on seeking participation of citizens in waste segregation, prohibiting littering of garbage, proper storage of waste and efficient transportation of waste for its processing and final disposal.
- Specifications to be followed for land filling to protect environmental pollution and adoption of appropriate waste processing technologies has been emphasized.
- The Rules are applicable to each town irrespective of its population.

# RESPONSIBILTIES OF MUNICIPAL AUTHORITIES

- Implementation of Schedule I and other provisions of the Rules
- Infrastructure development for collection, storage, segregation, transportation and disposal of MSW as per Schedule II
- Obtaining authorization for setting up waste processing and disposal facilities from SPCBs/ PCCs
- Furnishing annual report and accident reporting to Secretary (UD)/ District Magistrate

# RESPONSIBILITIES OF SPCBs/ PCCs

- Monitoring compliance of standards regarding groundwater, ambient air, incineration, leachate and compost quality (Schedule II, III and IV)
- Grant of authorization to municipal authorities for setting up waste processing/ disposal facilities (within 45 days of application)
- Furnishing annual report on status of implementation to CPCB

# RESPONSIBILITIES OF STATE/ UT GOVERNMENTS

- Overall enforcement in metro-cities in the State/ UT – Secretary-in-charge, Dept. of Urban Development.
- Overall enforcement in other large cities and towns – District Magistrate/ Deputy Commissioner of the concerned districts.

# Key issues in managing Municipal Solid Waste

- Phenomenal growth in urban population is creating solid waste disposal problems;
- Alternative service delivery is required?
- Community based initiatives;
- What is needed to nurture community based initiatives;
- The need for research;
- Is service delivery by NGOs/Public sector/CBOs-All good?
- Need for Networking;
- Innovations: e.g. Preventing spillage of garbage, Vermiculture, drain cleaning street sweeping etc.

# Technologies for MSW processing

## Composting

- It is a versatile technology to get resource from organic wastes

- Segregated and pulverised wastes are made to windrow and allowed for composting. Air, water and microbial cultures are supplied for efficient composting

- Vermi-composting is followed for decentralised and odour free compost yard.

# Technology for waste processing

## Biomethanization

- Biochemical process for conversion of large molecule to methane with low cost operation.
- Decomposition is performed by several facultative and anaerobic bacteria such as Clostridium, Bifidacterium, desulphovibrio, Actinomyces, Staphylococcus etc.,
- Methonogenesis is carried out by methanobacillus, methanococus etc.,

# Technology for waste processing

**Pelletisation (RDF production)**

- The bulky and organic rich wastes are compacted alone or with binder and other auxiliary fuel to get refuse derived fuel.

- RDF making follows screening, shuddering, drying and densification.

- RDF used along with other fuel like coal, biomass and in co-incineration.

# Disposal of wastes

- As per schedule-III of the rule, specifications are provided to Landfill Sites
- Landfilling restricted to non-recyclable, non-biodegradable inert wastes.
- Landfill site identified Development Authority and hand over to municipality.
- Large enough to last for 20-25 years.
- Away from habitation cluster, forest, water bodies, monuments, national park, wet land etc.
- Develop Buffer zone

# Criteria for landfill site

- Away from air port in case with in 20 km permission from air port authority
- Fenced with gate to stop entry of animals, monitoring facility
- Compaction, soil layer before end of each working day and monsoon
- Final cover with soil layer of 60 cm
- Ground water quality and ambient air monitoring shall be followed
- Lined layer with leachate collection facility.

# Case Studies of MSW Management

- Mysore with population of 9 lakhs generates 420 T of wastes.
- 50% of the wastes arrive at a processing site are made windrow and composted. Turning and presence of plastics favours supply of oxygen.
- After 45 days sieved and shredded and allowed of 15 days composting by spreading inoculum. Plastics sold to the recyclers.
- Crushed and sieved compost are packed and sold.

# Case Studies of MSW Management

- **Coimbatore** city with population of 16 lakhs generates 750 T of wastes. The wastes has 45% of compostable organics.
- Composting (350 T) and RDF (220 T) are followed and 20% of the wastes are land filled.
- Composting consists of screening, windrow, shredding , screening
- Sanitary landfill sites are used for disposal of inert/rejects.

# Case Studies of MSW Management

- Namakkal with population 1,70, 000 generates 46 T of wastes and only 30 T of waste is collected. The segregated 25 T waste is processed by vermicomposting and windrow composting . It contains 45% bio-degradable.
- The machineries used in the plants are depicted as below:

# View of waste segregating units

# Waste processing units

# Quality of compost derived from Municipal wastes in Namakkal

| *S.N* | *Parameters* | *Bio Compost* | *Vermi compost* | *Standard* |
|---|---|---|---|---|
| 1 | pH | 8.38 | 6.98 | **5.5-8.5** |
| 2 | Copper, mg/kg | 256 | 54 | **300** |
| 3 | Cadmium, mg/kg | BDL | BDL | **5** |
| 4 | Chromium, mg/kg | 46.80 | 32.10 | **50** |
| 5 | Iron, mg/kg | 2891 | 5445 | **-** |
| 6 | Manganese, mg/kg | 279 | 393 | **-** |
| 7 | Nickel, mg/kg | 29.5 | 30.1 | **50** |
| 8 | Lead, mg/kg | **140** | BDL | **100** |
| 9 | Cobalt, mg/kg | 4.75 | 8.85 | - |

# Ambient Air quality in waste processing unit at Namakkal

| Sampling Locations | Parameters ($\mu g/m^3$) | | |
|---|---|---|---|
| | $PM_{10}$ | $SO_2$ | $NH_3$ |
| Near Bio-composting yard | 92 | BDL | 21 |
| Near security gate | 116 | BDL | 44 |
| Standard | 100 | 80 | 400 |

# Ground water quality near waste processing unit in Namakkal

* All values are in mg/l except pH & EC (µS/cm)

| S.No | Parameters | Open well | Bore Well | Drinking Water Standard (ISO 10500:1991) |
|---|---|---|---|---|
| 1 | pH | 7.5 | 7.8 | **6.5 – 8.5** |
| 2 | Elec. Conductivity | 4900 | 2670 | - |
| 3 | Total Dissolved Solids | **3278** | **1748** | **500** |
| 4 | T.Hardness as $CaCO_3$ | **1480** | **1133** | **300** |
| 5 | Calcium (as $Ca^{++}$) | **209** | **137** | **75** |
| 6 | Magnesium (as $Mg^{++}$) | **233** | **192** | **30** |
| 7 | Chloride | **663** | **382** | **250** |
| 8 | Sulphates | **649** | 25 | **200** |
| 9 | Sodium | 425 | 264 | - |
| 10 | Potassium | 134 | 30 | - |
| 11 | Nitrate | 22 | 24 | **45** |
| 12 | Copper | **0.07** | **0.08** | **0.05** |
| 13 | Cadmium | **0.05** | **0.05** | **0.01** |
| 14 | Chromium | BDL | BDL | **0.05** |
| 15 | Iron | **0.32** | BDL | **0.3** |
| 16 | Manganese | BDL | BDL | **0.1** |
| 17 | Nickel | BDL | BDL | - |
| 18 | Lead | BDL | BDL | **0.05** |
| 19 | Cobalt | BDL | BDL | - |

# Status of MSW (H&M)Rules,2000 implementation and Enforcement

- Out of 3625 ULB, only 2806 have submitted report to SPCB/ Committees.
- Number of ULB identified Landfill is 1305
- Number of ULBs already made Landfill is 55 (Schedule- III)
- Number of ULBs set up waste processing unit is 179 (Schedule-IV)
- Number of ULBs obtained authorization 322

# Hurdle in implementation of the MSW (M&H) Rule, 2000

- Negligence/ignorance of the municipality/concerned government bodies.
- Lack of stringent punishment for non-compliance of the rule.
- Finance problem and rerouting allocated funds.
- Non-cooperation of citizens in segregating the wastes and identification sites for processing and disposal.

# Actions Needed

- Amendment in MSW (M&H)rule, 2000
- Private/NGOs involvement in collection and processing of wastes
- Attempt for 100% utilization of wastes rather than land fill.
- Encouragement of the bio- compost produced from MSW and co-composting with other wastes like cow dung, spent wash etc.,
- Work towards waste to energy policy.

# THANK YOU