

Multi-Criteria Analysis for Optimal Selection of Waste Management Technologies for Mumbai,

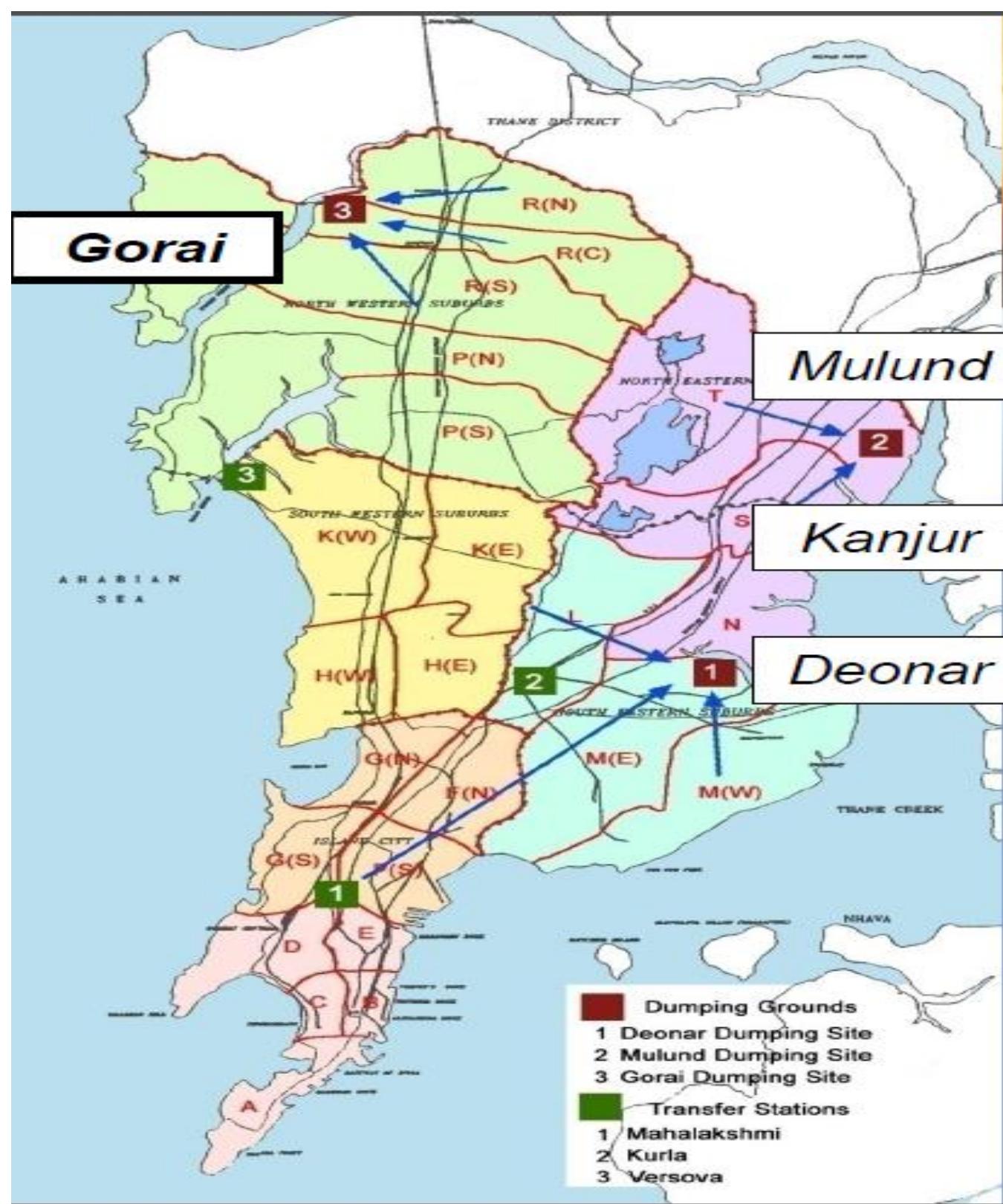
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AIM

- Multi-Criteria Analysis to identify waste management techniques that offer the most benefits in terms of environmental, health, technical, economics and social aspects for Mumbai, India.

WHAT AND WHERE IS THE PROBLEM ?



	Deonar	Mulund	Gorai
Total Area (hectares)	132	25	19.6
Date of Establishment	1927	1968	1972
MSW received (TPD)	4,100	600	1,200
Debris received (TPD)	1,000	200	1,200
Wards Supplying Waste	A, B, C, D, E, F/N, F/S, G/N, G/S, H/E, H/W, K/E, L, M/W, M/E, N, Market	A, C, D, E, F/N, G/N, G/S, H/W, H/E, K/W, K/L, M/W, M/E, N, S, and T	R/S, R/N, R/C, K/W, P/N, P/S

- Inadequate waste collection and uncontrolled disposal represent a hazard to human health and to the environment.
- The proportion of wet biodegradable organic matter in MSW is high thereby reducing the calorific value of MSW to 800-1000 kcal/ kg as compared to 1500-2700 kcal/kg in high-income countries.
- Considering that the volume of waste is expected to increase at the rate of 5% per year on account of increasing population and changing lifestyles, it is assumed that urban India will generate 276,342 TPD by 2021, 450,132 TPD by 2031 and 1,195,000 TPD by 2050.

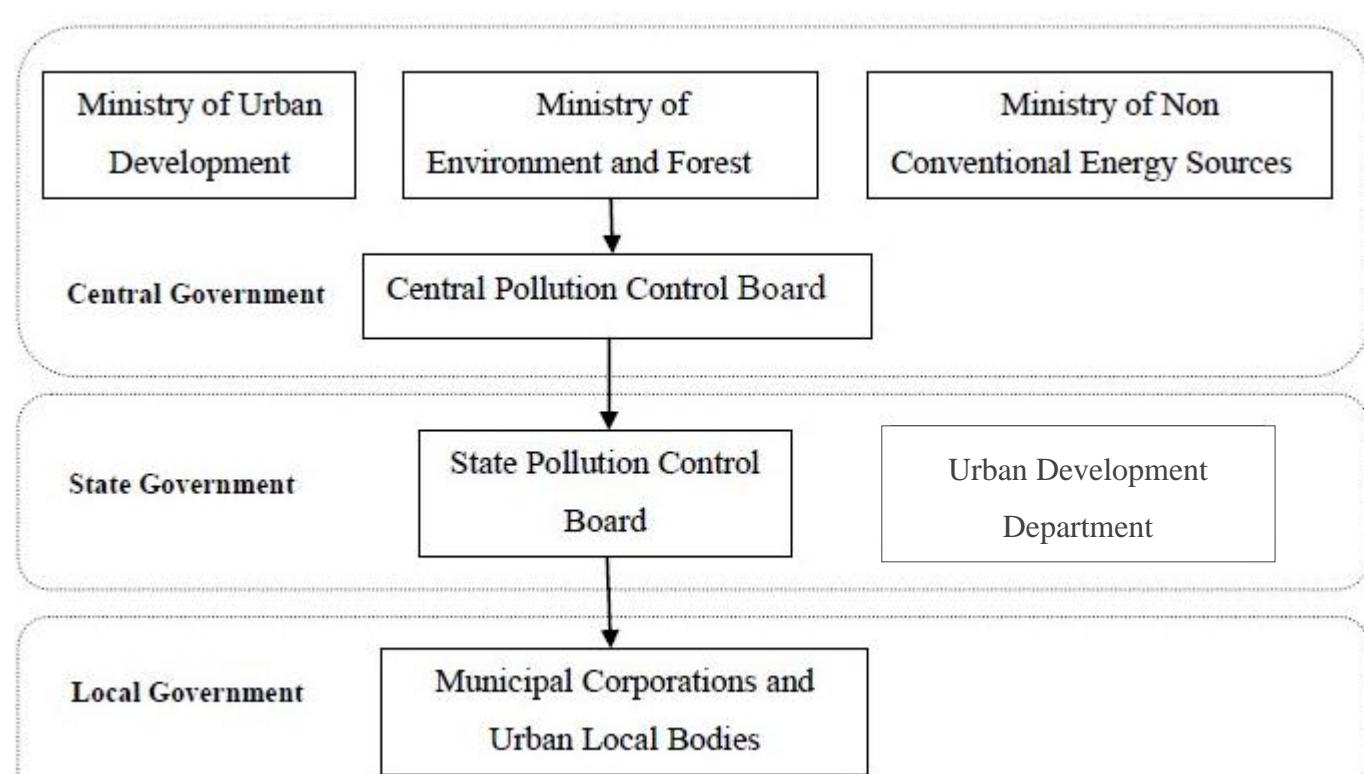
BREAKDOWN OF MSW COMPOSITION

Component	Percentage on wet weight basis
Organics/Compostable matter	37%
Paper/ Cardboard	15%
Sand and Fine Earth	35%
Plastics	0.75%
Metals	0.8%
Glass	0.4%
Others	13%

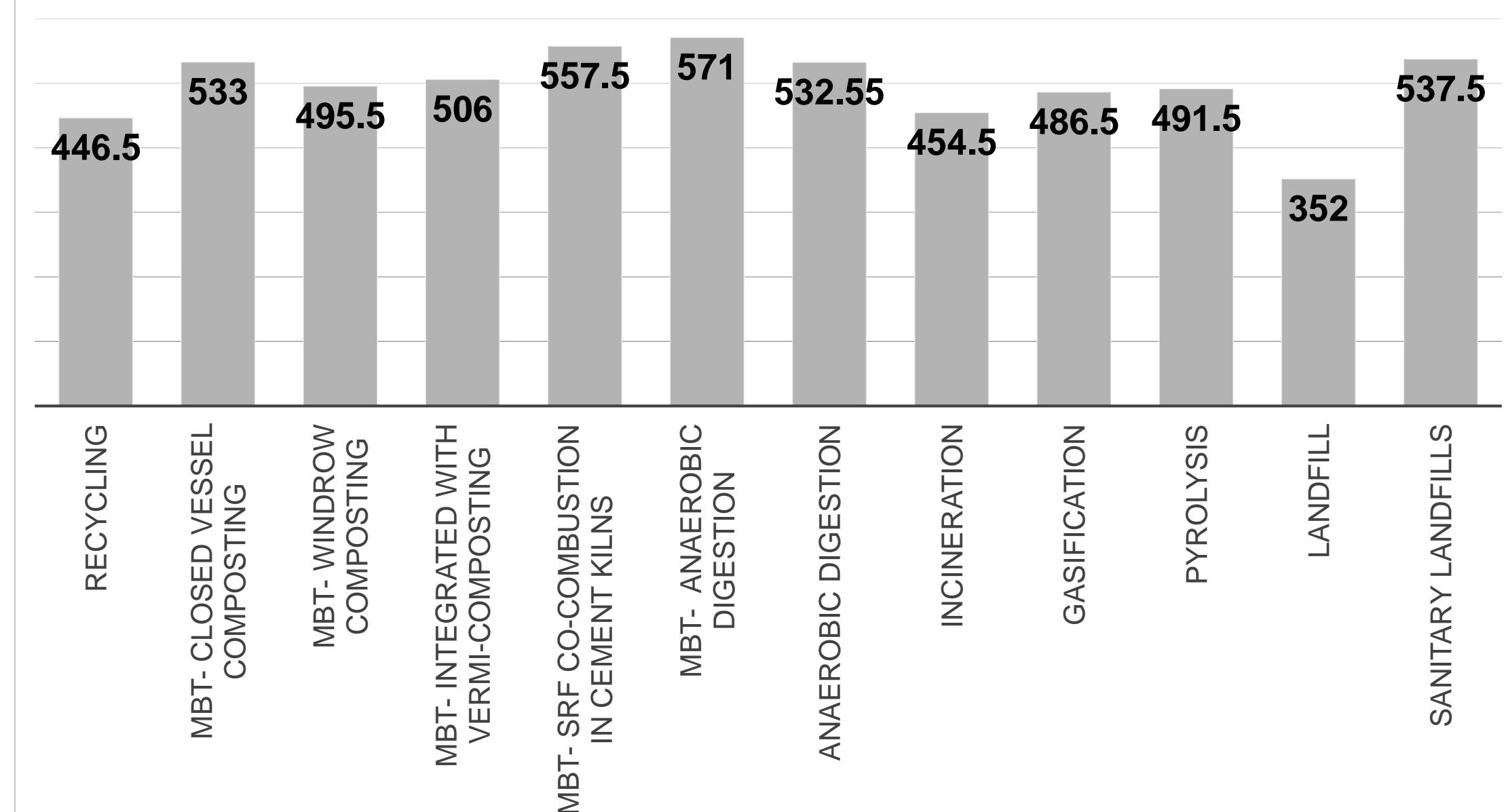
INNOVATIVE SCHEMES

- Slum Adoption Schemes** - wherein local community based organisations (CBOs) are registered and incentivised for waste collection and maintenance of general hygiene, have been launched by the MCGM for slum areas. The MCGM has already registered 249 such CBOs covering about 4.8 million of slum population.
- Clean Development Mission**, an offshoot of the Kyoto Protocol, provides financial support from carbon credit to support environmentally sustainable and financially viable waste management practices. The CDM has emerged as a comprehensive scientific system for managing unprocessed municipal waste that has accumulated at dump sites in the city for several years.

HIERARCHY OF INSTITUTIONAL FRAMEWORK



PERFORMANCE ASSESSMENT



SENSITIVITY ANALYSIS

Weighting Criteria - 1		Weighting Criteria - 2	
Environmental	25	Environmental	15
Social	25	Social	15
Health	20	Health	20
Economic	15	Economic	35
Technical	15	Technical	15
Ranking		Ranking	
1. MBT followed by Anaerobic Digestion		1. MBT followed by Anaerobic Digestion	
2. MBT followed by SRF in cement kilns		2. MBT followed by SRF in cement kilns	
3. Sanitary Landfill		3. Sanitary Landfill	
Weighting Criteria - 3		Weighting Criteria - 4	
Environmental	35	Environmental	10
Social	10	Social	35
Health	10	Health	35
Economic	35	Economic	10
Technical	10	Technical	10
Ranking		Ranking	
1. MBT followed by Anaerobic Digestion		1. MBT followed by Anaerobic Digestion	
2. MBT followed by SRF in cement kilns		2. MBT followed by SRF in cement kilns	
3. Closed vessel composting		3. Closed vessel composting	

SUCCESS STORY: GORAI LANDFILL SITE



CONCLUSION: A holistic study of the current MSW management sector in Mumbai, India revealed many shortcomings in the existing practices. High scoring management options ensured high resource recovery without disrupting the informal sector that is very actively functioning in Mumbai. The analysis identified MBT followed by anaerobic digestion as the most favourable management option for MSW treatment in Mumbai. Conventional landfilling, as is currently practised on a wide scale in Mumbai, emerged as the least favourable treatment option.

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