



SOLID WASTE MANAGEMENT IN INDIA'S
NORTHEAST

DUMPSITE REMEDIATION AND SUSTAINABLE LANDFILL CONSTRUCTION & OPERATIONS

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Dumpsites in India – current status



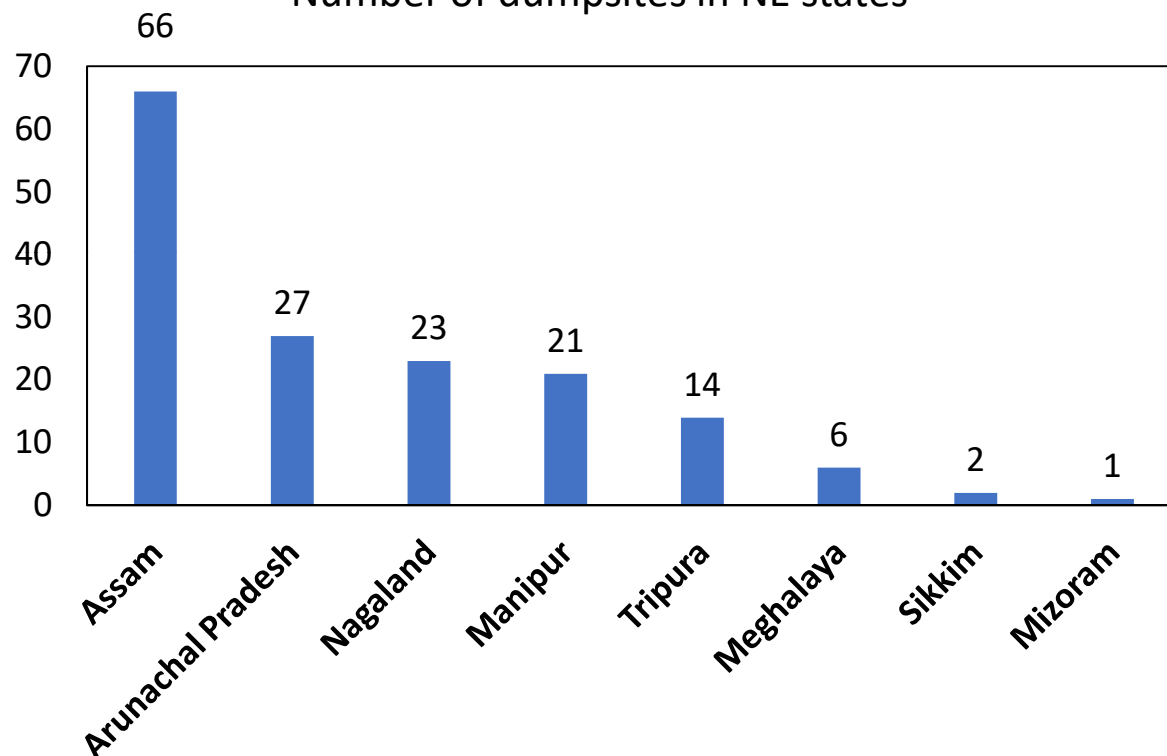
- 3159 dumpsites (according to CPCB) – an offshoot of waste mismanagement for decades
- 1300 million tonnes of legacy waste to be remediated
- 10,000 Hectares of land
- Estimated cost of remediation **INR 1,04,000 Crore**
- SBM 2.0 (2021-2026) has a total budget outlay of INR 1,40,000 Crore
- About 74% of the amount equivalent to entire SBM allocation is going to be spent on remediation of our dumpsites



Dumpsites in NE states – current status



Number of dumpsites in NE states



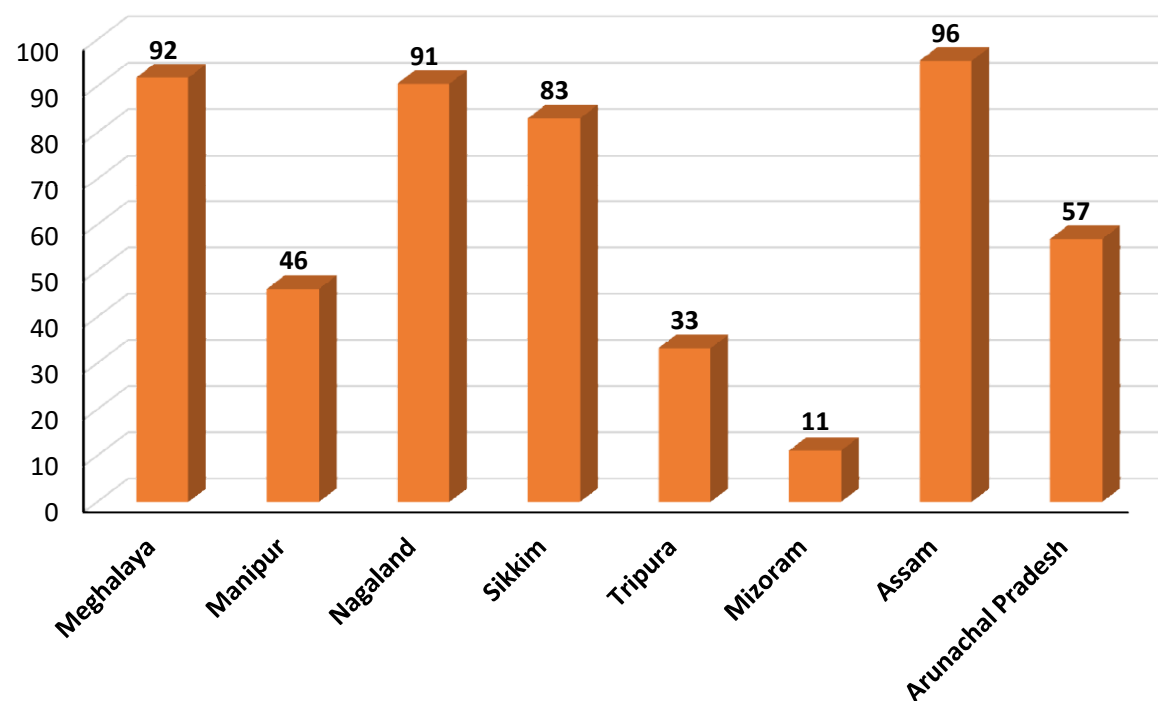
The Boragaon Dumpsite in Guwahati is adjacent to the Deepor Beel, an area for endangered species

Source: CPCB Annual Report 2019-2020

Percentage of Waste dumped in NE states



Percentage of MSW dumped/landfilled/un-treated in NE states



- A major fraction of waste remains un-attended.
- In Meghalaya, Nagaland and Assam – 90 per cent of waste is dumped

Source: CPCB Annual Report 2019-2020

Major dumpsites in North Eastern States



Gangtok: the only landfill site in Gangtok has been set up on the banks of the Ranikhola river

Nagaland: A view of the DMC garbage dumping site at Sunrise Colony, Dimapur

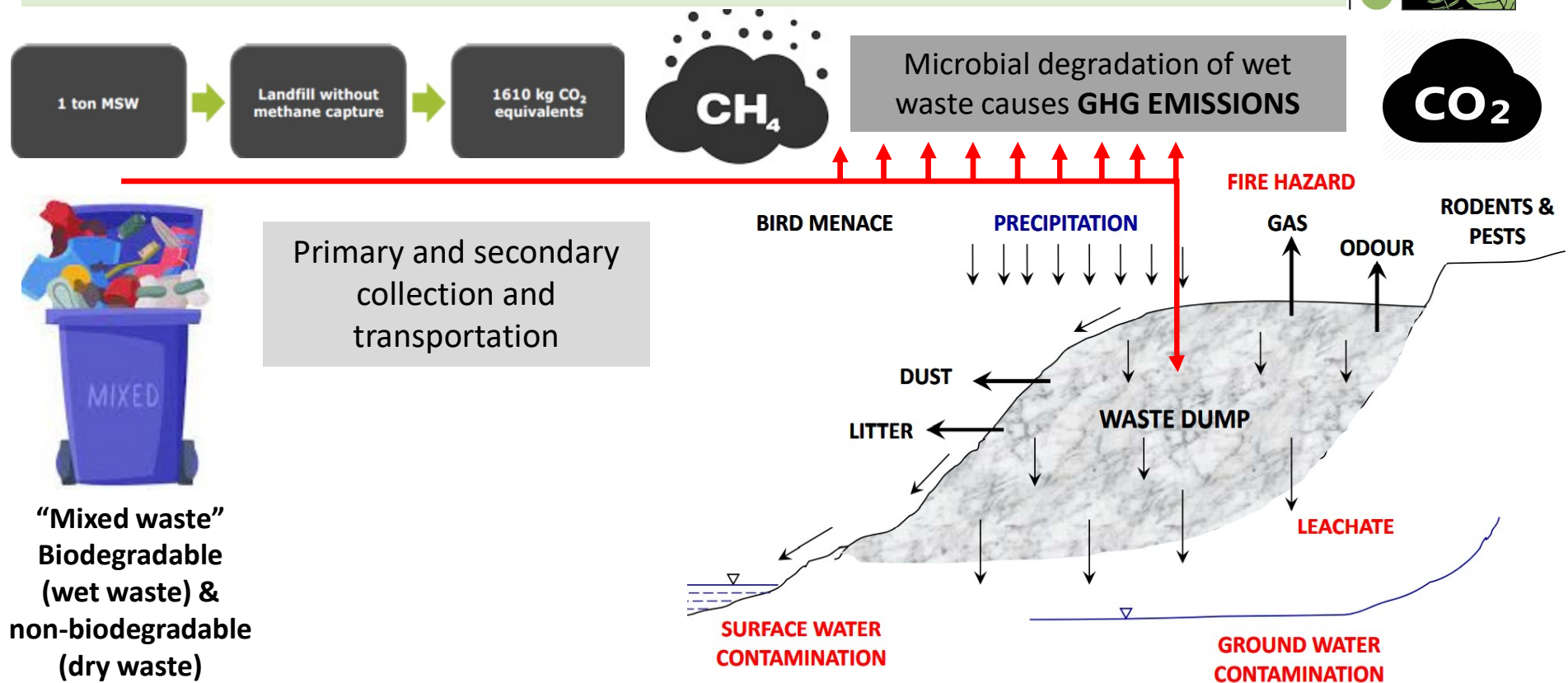


Meghalaya: The dumping ground at Marten in East Khasi Hills district is the biggest such dumpsites in state capital Shilong

Tripura: People collect recyclable items at a garbage dump site in Agartala, Tripura



Environmental & health hazards due to waste dumping



Available options for remediation



Biomining of dumpsite:

- entire waste is treated
- entire land is reclaimed
- entire waste fractions are used for gainful applications

Bio-capping of dumpsite:

- Leachate collection and treatment
- Land is not recovered., no waste fractions utilized

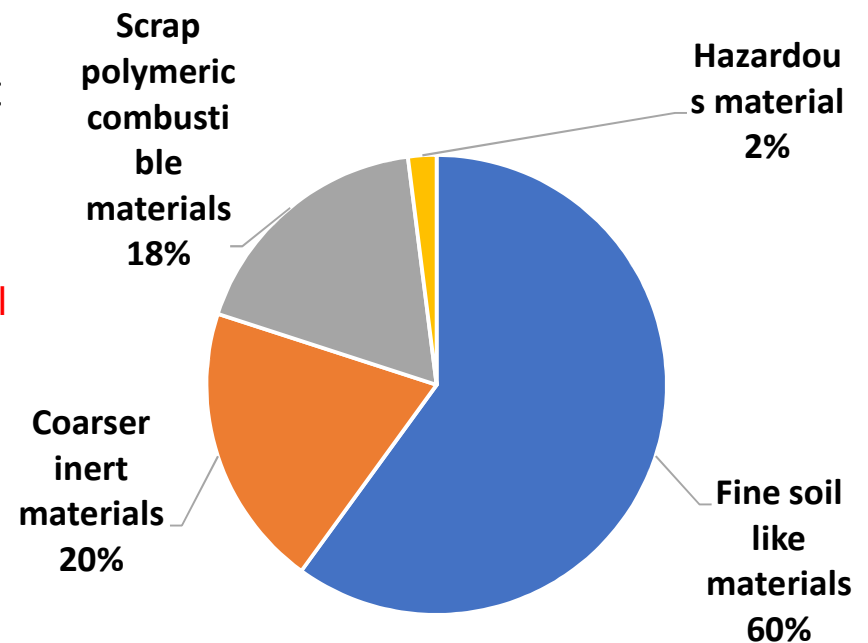
Hybrid model (biomining and bio-capping)

- A fraction of waste is treated
- A fraction of land is reclaimed
- A fraction of waste are used for gainful applications
- Rest of the unused waste is bio-capped

Composition of legacy waste



- Indian dumpsite contains a mix of legacy waste (aged waste) and fresh MSW.
- Characteristics and composition are different – which affects the choice of treatment technology and end use of recovered material.
 - Significant proportion of fine soil like material (50 to 60 per cent);
 - Coarser particles such as broken bricks, masonry, stones *etc* – 20 to 25 per cent
 - The combustible material ranges between 15 to 18 per cent on weight basis.
 - Other miscellaneous fractions comprising broken glass, metallic fractions such as razors, needles, sanitary waste, batteries and diapers might constitute almost 1-2 per cent in the total waste quantum.



Gainful Application of bio-mined fractions – Easier said than done?



Components of legacy waste	Potential applications	Environmental and health hazards
Fine soil like materials	Can be used as a earth-filling material, road making, substitute of clay in construction industry	Presence of leachable heavy metals, organics
Coarser inert materials	filling of low-lying areas, aggregates in C&D waste processing industry	Presence of leachable heavy metals, organics
Scrap polymeric combustible materials	RDF, road making	Contamination with inert, ash content, sulphur content
Hazardous material	Disposed of in secured landfills	Can lead to many environmental hazards if not disposed of in a sustainable manner

Challenges in Dumpsite remediation by biomining



Operational

- Sale of RDFs, tie-ups with nearest cement plants
- High transportation cost, difficulty in sale of inert fraction

Infrastructural

- Availability of space,
- Availability of customised equipment and skilled manpower

Financial

- Most of the biomining projects are under-budgeted
- The cost burden for transporting the soil and inerts maybe Rs 4000-5000/MT for 10-50 KM, transportation cost may become exponentially higher than the cost for remediation itself.

Environmental challenges particularly for hilly regions



Roadmap to a zero landfill city

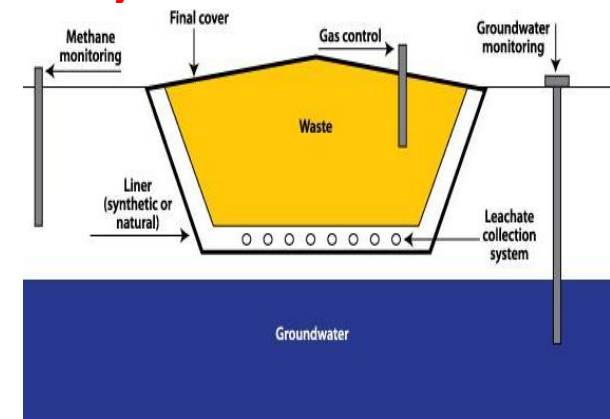


- Maximum utilization of mined fraction without harming the environment
- Reclamation of maximum land and re-use them
- Complete ban on landfilling of wet waste and combustible waste is imposed as a legal mandate
- Scientific landfill to be used only for a negligible amount of residual wastes (rejects) should reach the sanitary landfill (about 10-15% of the total quantity)
- **Fresh wastes are not taken to the dumpsites**

Key to sustainable solid waste management in NE-States



- Legacy waste dumpsite remediation
- Efficient treatment and recycling
- Sustainable landfill construction & operations for rejects only



Landfills in hilly areas



- Construction of landfill on the hill shall be avoided.
- A transfer station at a suitable enclosed location shall be setup to collect residual waste from the processing facility and inert waste.
- A suitable land shall be identified in the plain areas down the hill within 25 kilometers for setting up sanitary landfill.
- The residual waste from the transfer station shall be disposed of at this sanitary landfill.
- In case of non-availability of such land, efforts shall be made to set up **regional sanitary landfill** for the inert and residual waste.

Key consideration for Landfills in NE-States



- Landfill sites shall meet the specifications as given in Schedule-III of the SW Rules, 2016 – **with special focus on - site selection, site investigation, ecosystem type, EIA etc.**
- Suitable for receiving only non-biodegradable, non-recyclable, non-combustible and non-reactive inert waste
- Suitable for receiving: Residues of waste processing facilities and inerts
- Landfilling of mixed waste shall be avoided
- Under unavoidable circumstances or till installation of alternate facilities, landfilling shall be done following proper norms.

Criteria for Operations



- **Compaction:** Waste shall be compacted in thin layers to achieve maximum capacity of landfill
- **Daily cover:** The landfill cell shall be covered at the end of each working day with minimum 10 cm of **soil, inert debris or construction material** .
- **Monsoon Cover:** Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil shall be placed on the landfill with proper compaction and grading.
- **Proper drainage system:** shall be constructed to divert run-off away from the active cell of the landfill.

Thank you

Let's build zero landfill North-eastern States for our future generations...