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

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

Source: CPCB Annual Report 2019-2020
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
Primary and secondary collection and transportation

“Mixed waste” Biodegradable (wet waste) & non-biodegradable (dry waste)

Microbial degradation of wet waste causes GHG EMISSIONS

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
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?

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

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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...