



SCHOOL OF ENVIRONMENTAL  
COMMUNICATION



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# LANDFILL REMEDIATION AND HOW IT LINKS TO CLIMATE CHANGE

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# Dumpsites in India – current status



- **3159 dumpsites** (according to Central Pollution Control Board) – an offshoot of waste mismanagement for decades
- Roughly **15000 ha** of land is under dumpsites (CPCB) – which is approximately equal to **21,000 football grounds**
- **1300 million tonnes** of legacy waste to be remediated
- 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 per cent** of the entire SBM allocation would be needed for remediation of our dumpsites

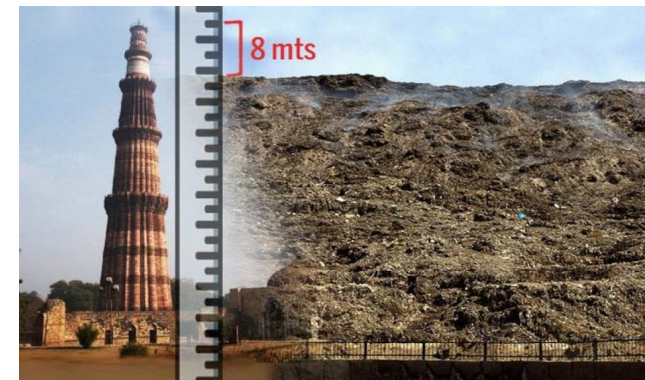


# Dumpsites in India – current status



**Okhla:**  
**Land occupied:**  
46 acres of land  
**60 metres**  
**Total volume:**  
55.6 lakh  
tonnes

**Ghazipur:**  
**Land occupied**  
– 70 acres  
**Height – 65 m**  
**Total volume –**  
140 lac tonnes



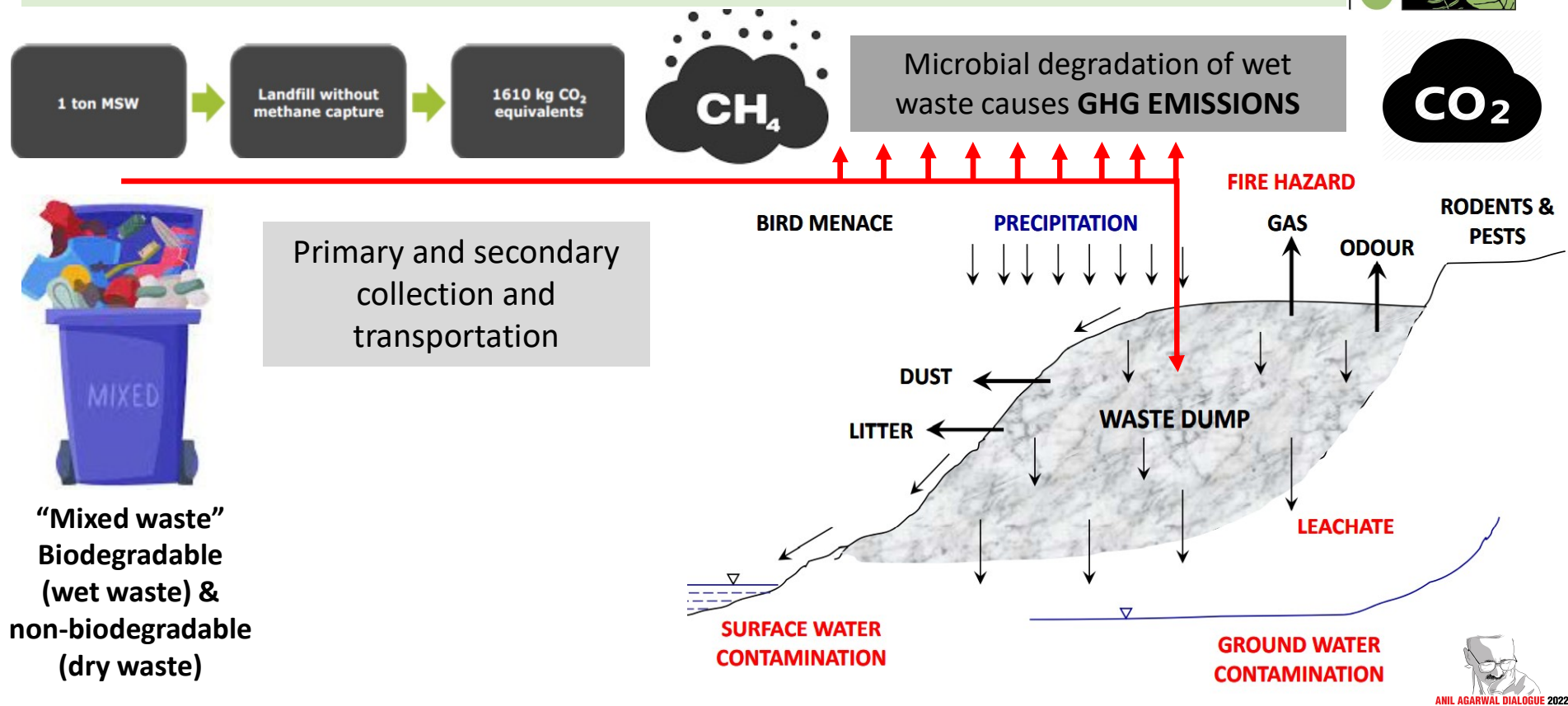
**Kodungaiyur:**  
**Land occupied**  
– 258 acres  
**Height – 91 m**  
**Total volume:**  
64 lakh tonnes

**Deonar:**  
**Land occupied**  
– 326 acres  
**Height – 37 m**  
**Total volume:**  
120 lac tonnes  
of waste





# GHG emissions from Dumpsites



# 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

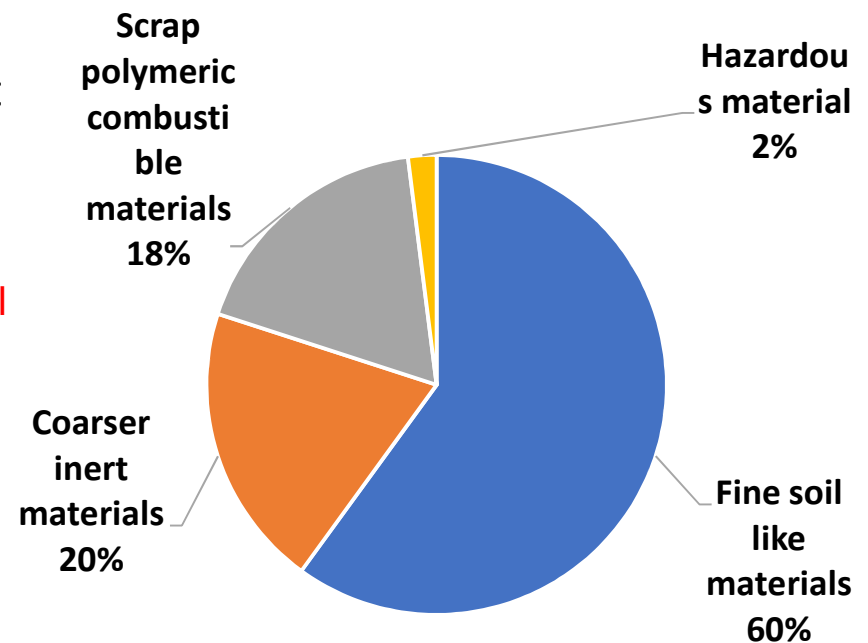
## ***Hybrid model (biomining and bio-capping)***

- 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.



# What happens to the 'reclaimed' material: where can it be used?



Components of legacy waste	Tentative quantities (million tonnes)	Potential applications	Environmental and health hazards
Fine soil like materials	780	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	260	filling of low-lying areas, aggregates in C&D waste processing industry	Presence of leachable heavy metals, organics
Scrap polymeric combustible materials	234	RDF, road making	Contamination with inert, ash content, sulphur content
Hazardous material	26	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.





# Successful Case Studies - Indore





- 100-acre dumpsite
- 15 Lakh MT of legacy waste
- **Total cost: Rs. 10 crore in the entire process**

### **No GHG emission from dumping of waste**

- Recovered valuable land of 100 acres worth Rs. 400 crores
- RDFs was sent to cement plants and also for road making.
- Fine fraction (soil-like material) recovered was used for refilling the ground on the same site where greenery is being developed.
- The C&D waste was recovered and sent to C&D processing facility to produce building materials.
- The left over about 15% of the waste was sent to secured landfill.

# Revenue from carbon credits



- For treatment of organic waste – Indore has installed a 550 TPD bio CNG plant
- 1 tonnes waste treatment by bio CNG plant = 23 carbon credits
- 1 carbon credit = USD 0.45
- Total carbon credit earned by treating 550 tonnes/day = 12,650 carbon credits

**= INR 9,52,121.23/ day**

**= INR 34,75, 24,165/annum**

**PLUS.....**

Earnings from reducing  
the carbon emission

**17,000 kg CNG/day is produced**

**= 62,05,000 kg CNG/annum**

**= INR 34, 74, 80, 000 (considering price of 1 kg CNG = INR 56)**

# Roadmap to a zero landfill nation



- 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**

Thank you

*Let's build a zero landfill nation for our future generations...*