



India's Waste Blind Spot

*~ SLCP emissions and
their Impact on Climate*

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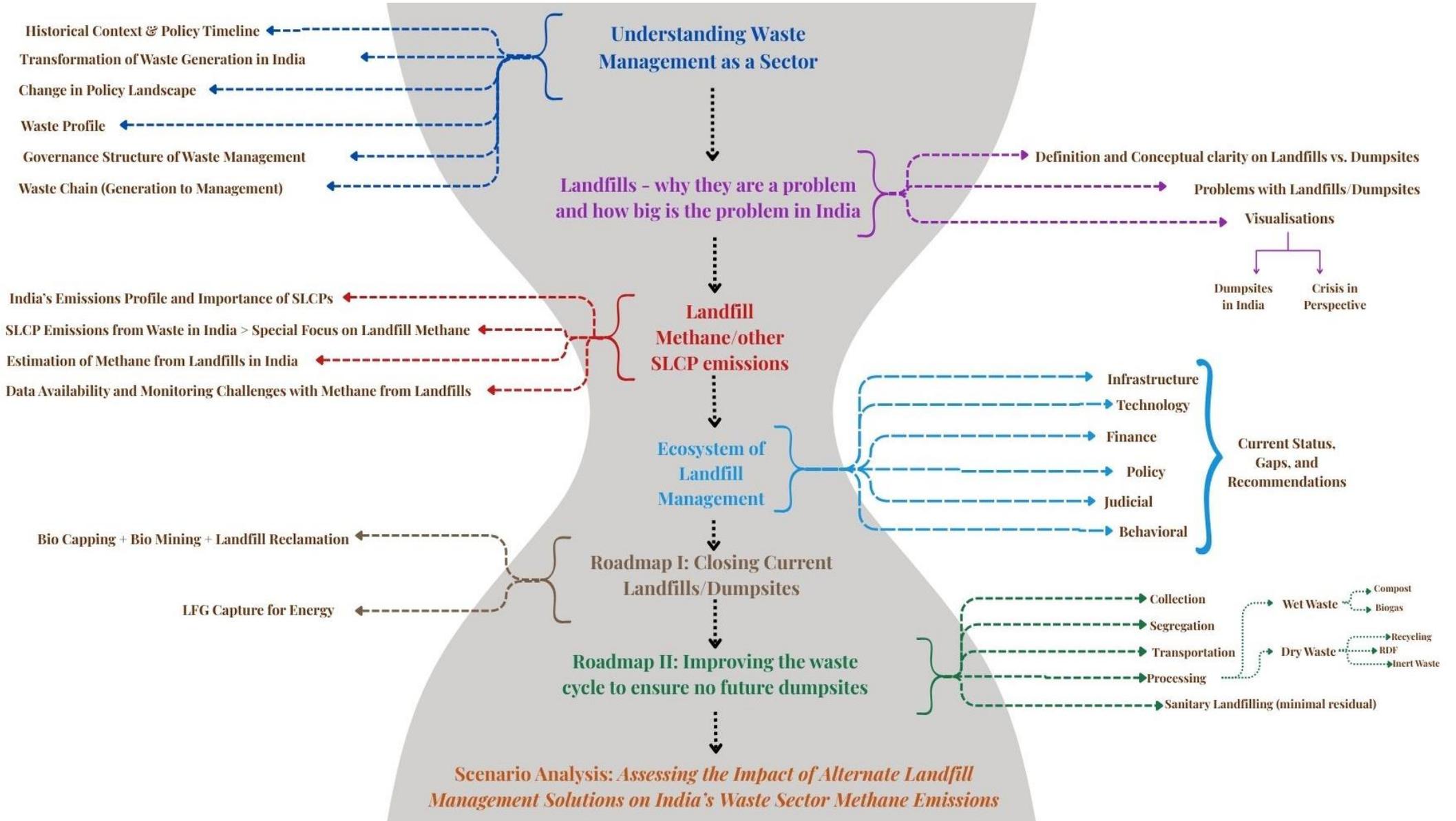
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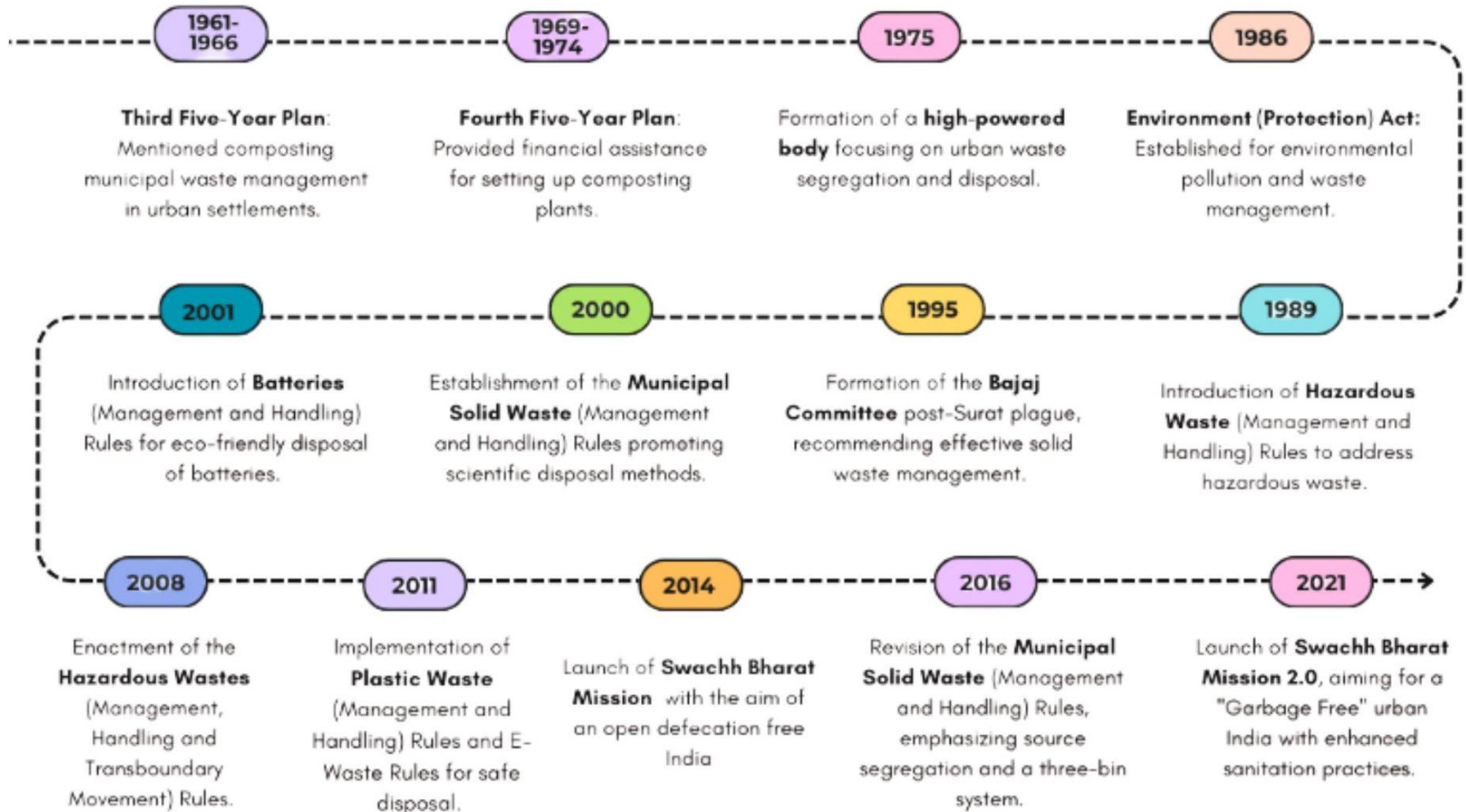
METHODOLOGY



STRUCTURE



WASTE MANAGEMENT POLICY TRAJECTORY





POLICY & GOVERNANCE

INSIGHT

Waste Composition Shift: Waste changed from organic to complex, toxic materials (plastics, e-waste).

Policy/Enforcement Gap: SWM rules and SBM exist, but enforcement remains weak.

Decentralization Push: Policy favors localized SWM to reduce transport costs and burdens.

KEY BARRIERS

Inflexible Infrastructure: Facilities are designed for old, mixed, organic-heavy waste streams.

Weak Institutional Capacity: ULBs are unable to efficiently utilise the resources at hand.

NIMBYism & Centralized Preference: Local resistance to sites; preference for large, central projects.

RECOMMENDATIONS

Ecosystem of waste management must actively adapt to the changing composition of waste.

Better diversion of funds in waste reduction, recycling, and composting infrastructure.

Behaviour push amongst public and choosing the most viable approach based on geography and funds.

WASTE PROFILE: Composition, Growth & Value Chain

INSIGHT

1. **Organic Waste Mismanagement:** A huge volume of organic waste is improperly dumped, causing methane emissions.
2. **Growing Waste Volume:** Waste is projected to triple by 2050 due to consumption and growth.
3. **Informal Sector Overwhelmed:** Waste pickers are critical for recycling but cannot handle the complex scale.
4. **High-Value Waste Loss:** Recyclables are lost to dumping/burning due to mixed collection.

KEY BARRIERS

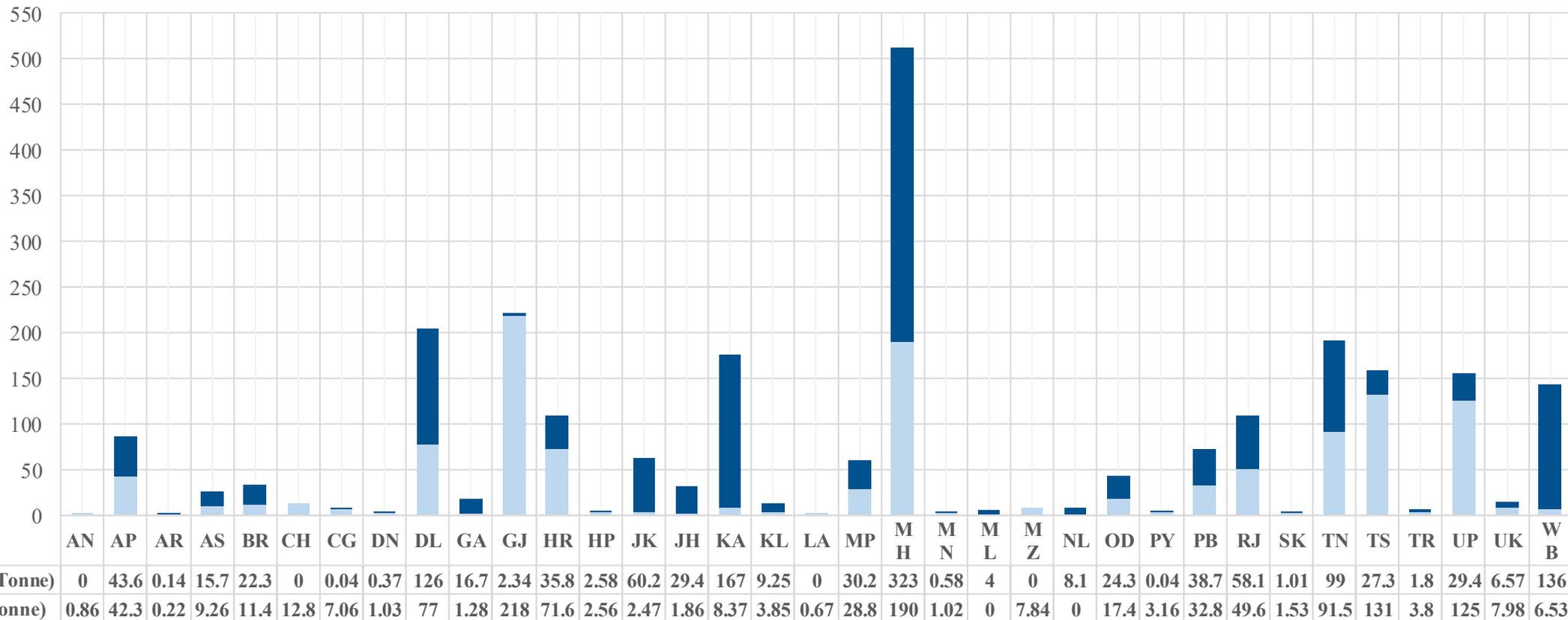
1. **Poor Source Segregation:** Citizens/generators mix wet (organic) and dry waste universally.
2. **Linear Consumption Model:** No producer accountability for packaging or product life cycle.
3. **Exclusion/No Integration:** Informal sector lacks formal safety, security, and municipal linkage.
4. **Data Gaps/Inefficient Tracking:** Poor data on waste flow prevents identifying resource leakage.

RECOMMENDATIONS

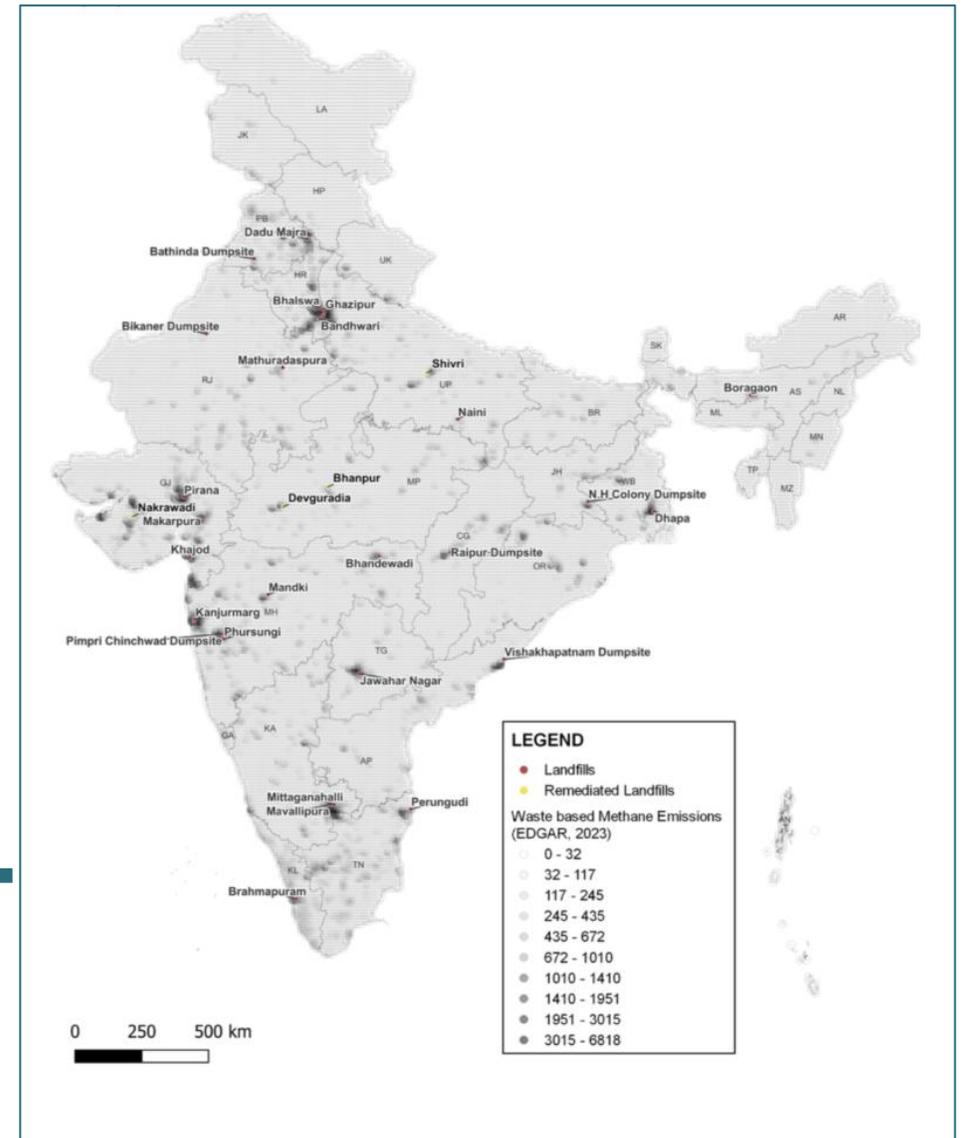
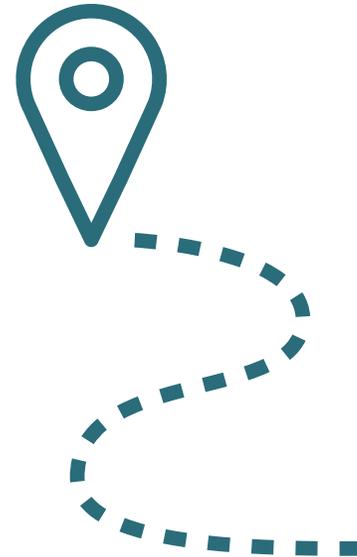
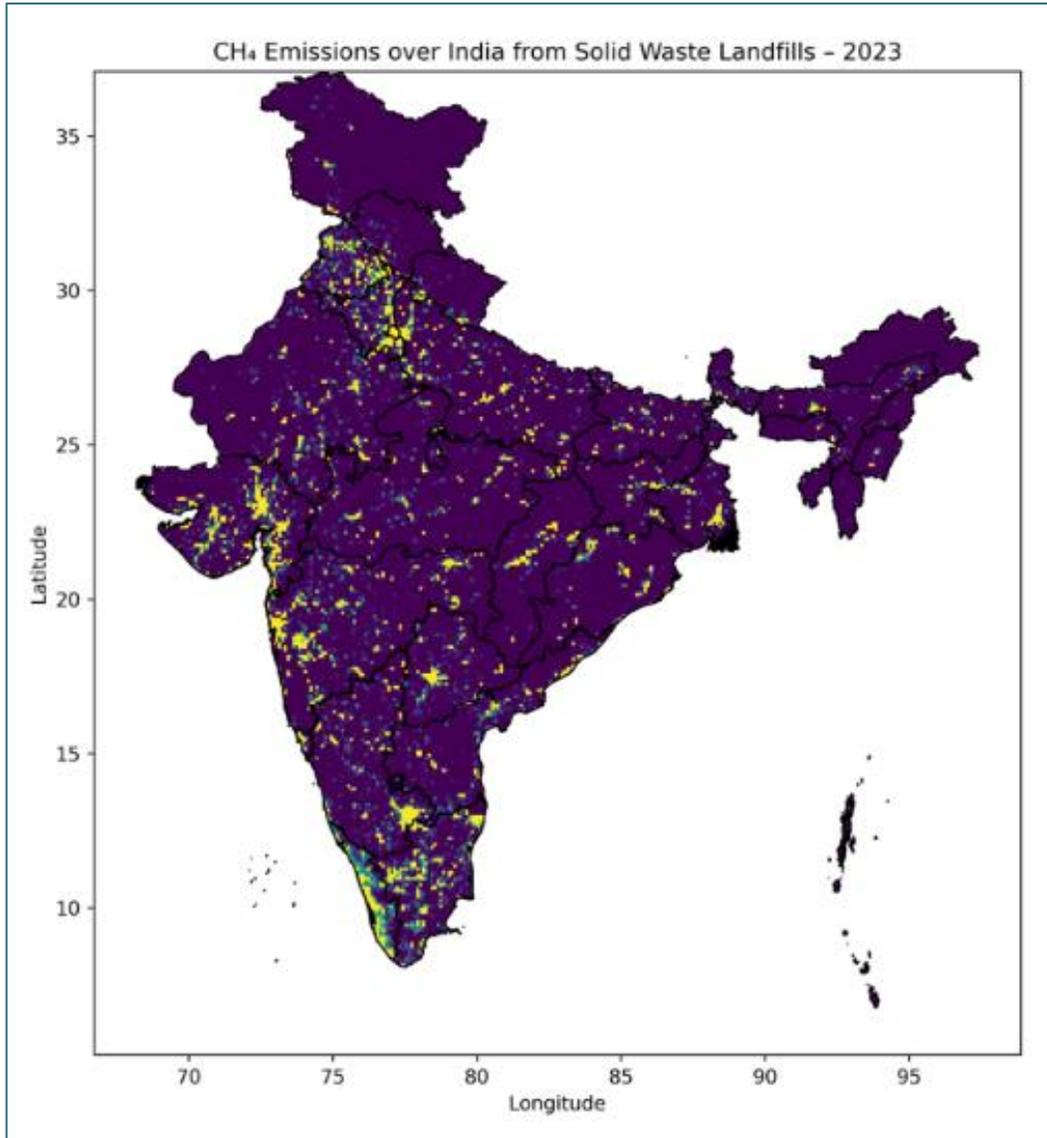
1. **Better source segregation can reduce the percentage of organic waste reaching landfills.**
2. **Increase investment in waste reduction, recycling, and composting infrastructure.**
3. **Formalize the role of waste pickers ("kabbadiwaalas").**
4. **Collect better data and conduct on-the-ground validation.**

DUMPSITE CRISIS IN PERSPECTIVE

As per the SBM Dashboard (as of October, 2025), India's legacy waste is lying across more than **15,000 acres of dumpsites**. This means that dumpsite waste in India takes up the same area as roughly **241 Motera stadiums**.



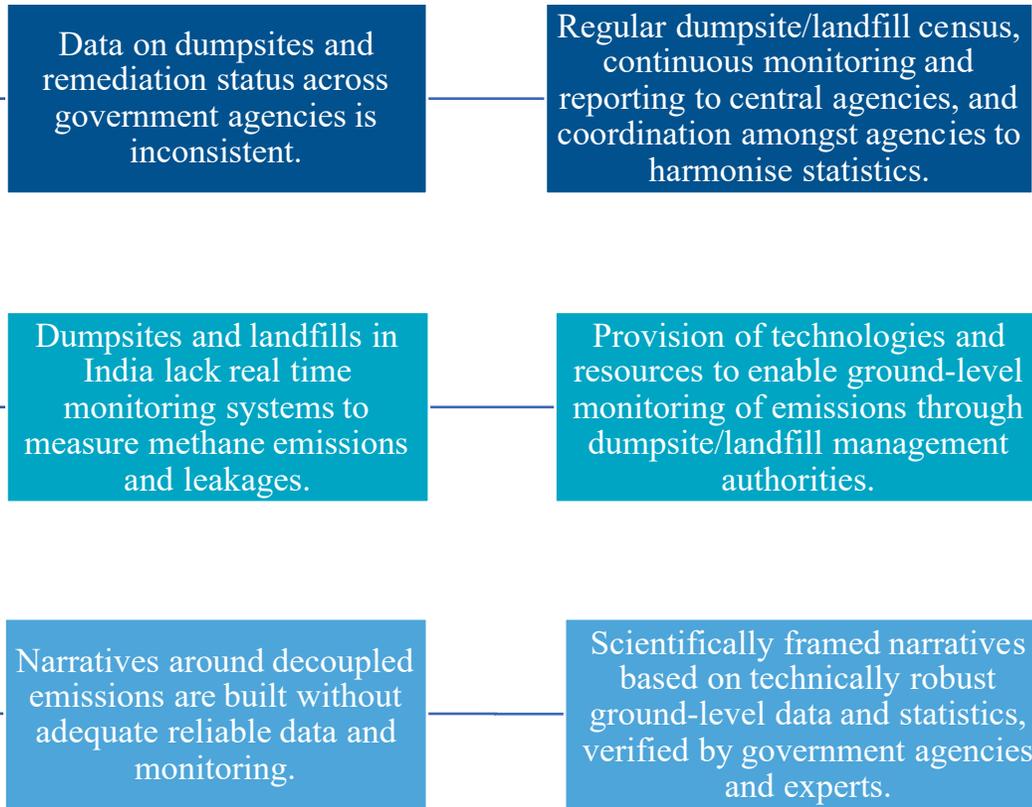
HOTSPOT IDENTIFICATION



METHANE EMISSIONS

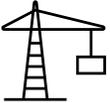
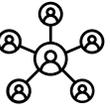
~ *Monitoring & Estimation*

Critical Gaps and Recommendations



Estimation Tools/Methodologies		
LandGEM Model 	Handheld Instruments 	LCA
SWEET 	Drone Surveys 	Gas Chromatography
Surface Flux Chambers 	IPCC Guidelines 	Mobile Methane Systems
Remote Sensing 	Emission Factor Database 	Inventory Tools

ANALYSIS OF THE LANDFILL MANAGEMENT ECOSYSTEM

Lever	Current Reality	Structural Gap / Risk
 Infrastructure	~2,400 active open dumpsites; only ~54% of MSW scientifically treated (CPCB 2021–22)	Most sites lack liners, leachate collection, and LFG capture, driving methane emissions, fires, and groundwater contamination
 Policy	Comprehensive framework via SWM Rules 2016 and SBM-U 2.0	100% segregation and processing mandated, but enforcement remains weak and methane monitoring is largely absent
 Judicial	Courts have shifted from reactive (1990s–2000s) to proactive oversight post-2010	Remediation-focused rulings unintentionally divert attention from upstream segregation and waste reduction
 Finance	ULBs spend ~₹500–1,500 per ton on SWM	50–70% of budgets go to collection and transport; <5% allocated to processing and landfill management
 Behavioral	~50% of households segregate waste regularly	Low risk perception, public apathy, and irregular door-to-door collection weaken compliance
 Technology	Proven solutions exist across the landfill lifecycle	Technologies are deployed late, in silos, and without alignment to waste quality or city capacity

TECHNOLOGY LANDSCAPE



Landfill Gas Capture

LFG Capture offers a **recoverable energy potential of 5,000–14,000 MW**; projects like Gorai, (Mumbai) and Ghazipur landfill, Delhi demonstrate gas capture.

Bio-covers

Biocovers can **reduce methane emissions by 30–80%**, and up to 90% when combined with gas capture systems. They're particularly suited for Tier-2 and Tier-3 cities where landfill gas or WtE projects are not financially viable.

Landfill Reclamation

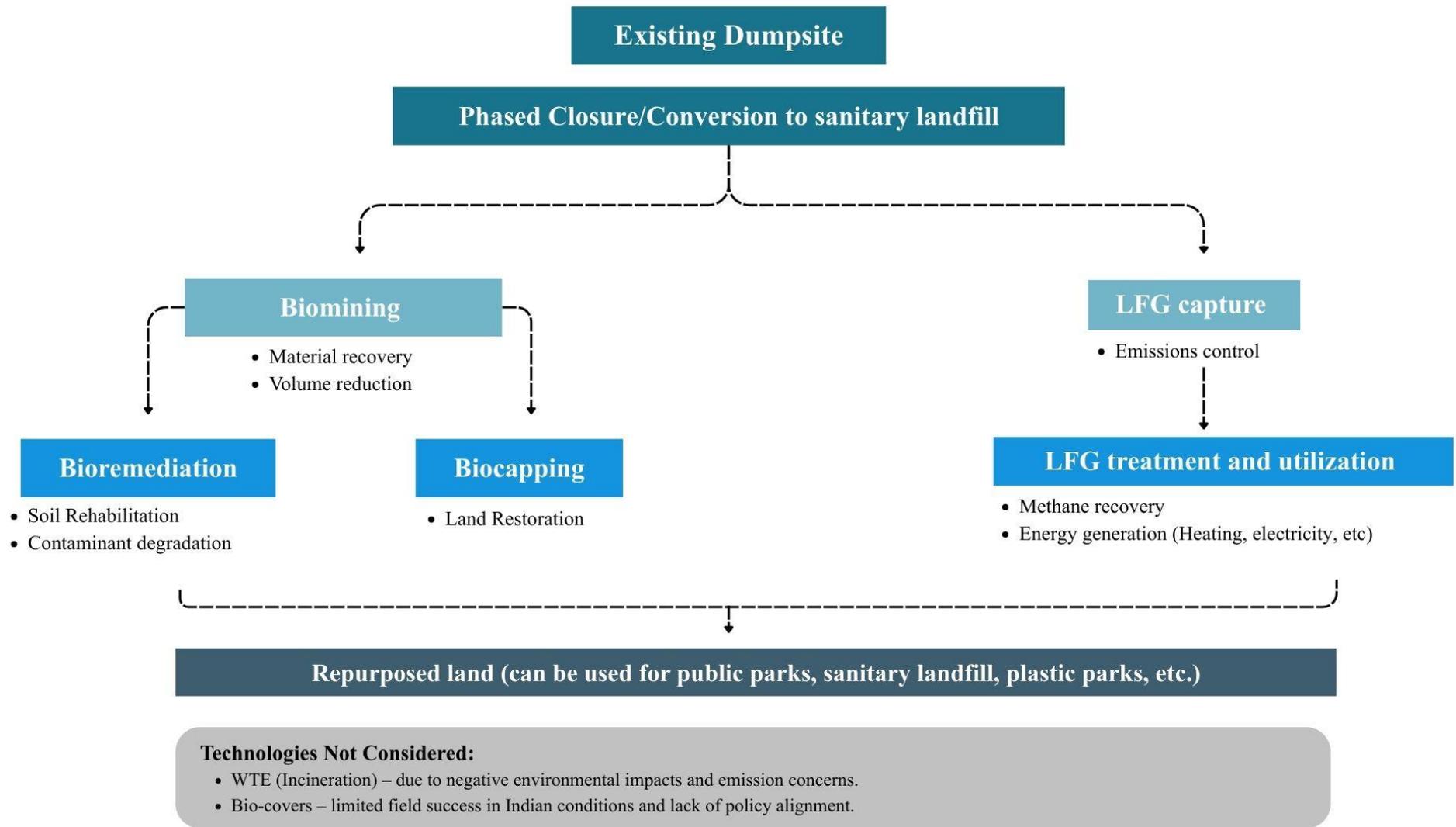
As per the latest compiled data from the SBM portal, **around 64% of India's legacy waste remains unremediated across dumpsites, while only about 36% has been remediated.**

WTE Incineration

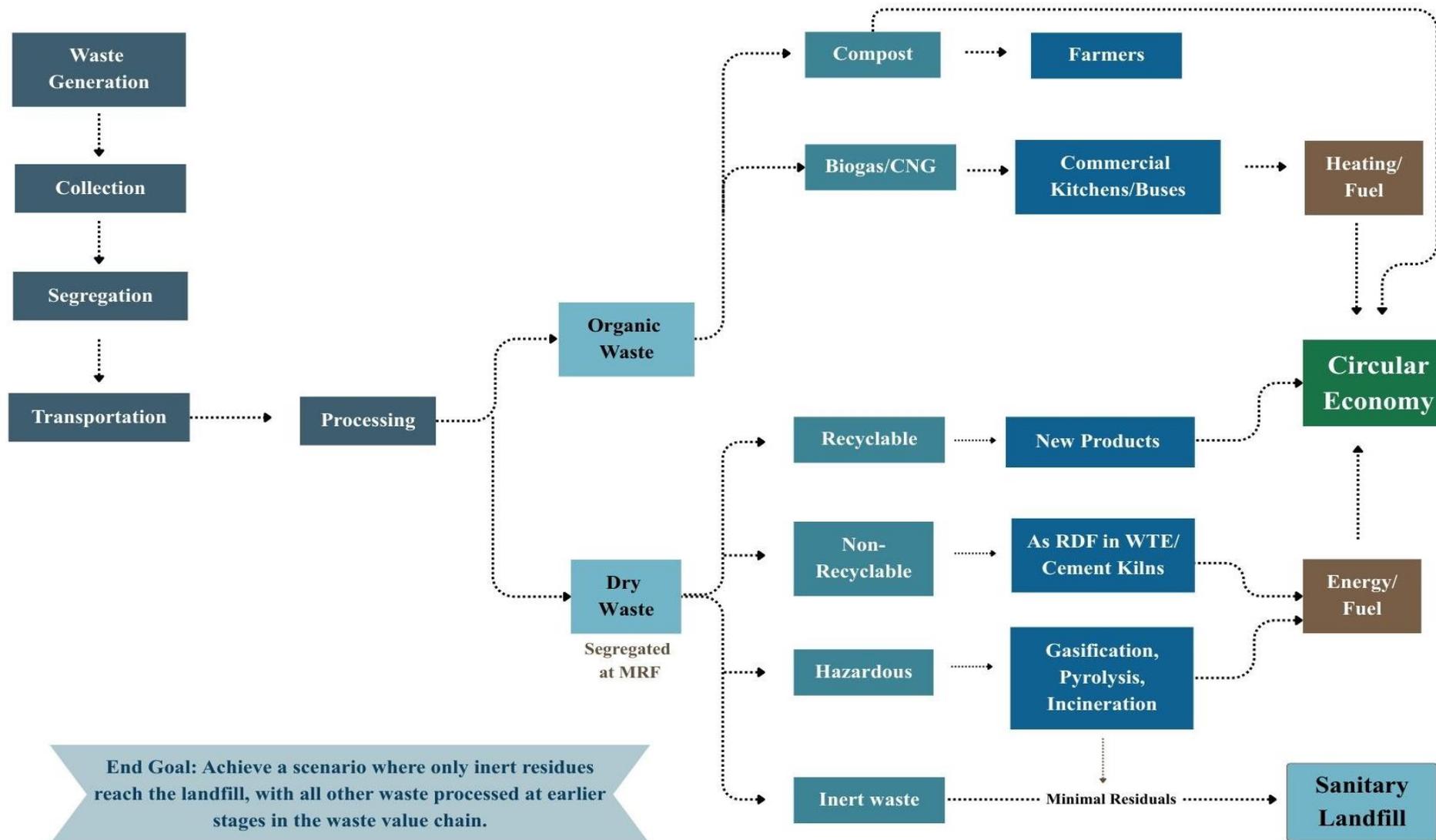
Across India, there are at least 20 major waste-to-energy plants, though only **12 have been operational**, according to a November 2022 report by the union ministry of new and renewable energy.

ROADMAP I: *Closing Existing Dumpsites*

Restore and safely close legacy dumpsites while recovering resources like recyclables, SLF's, alongside mitigating methane emissions.

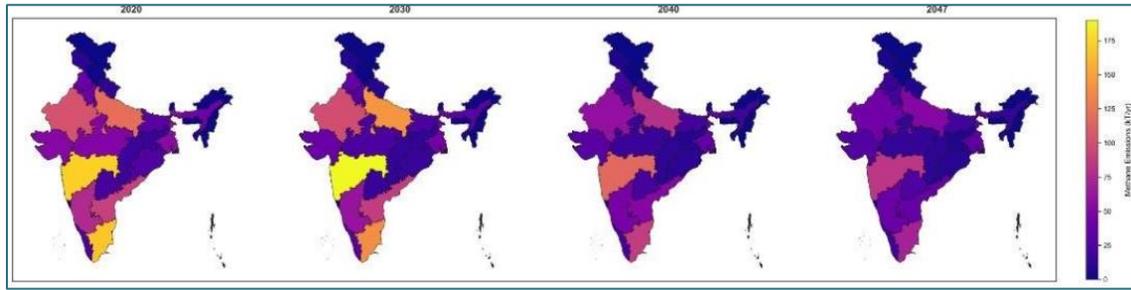


ROADMAP II: *No Future Dumpsites*

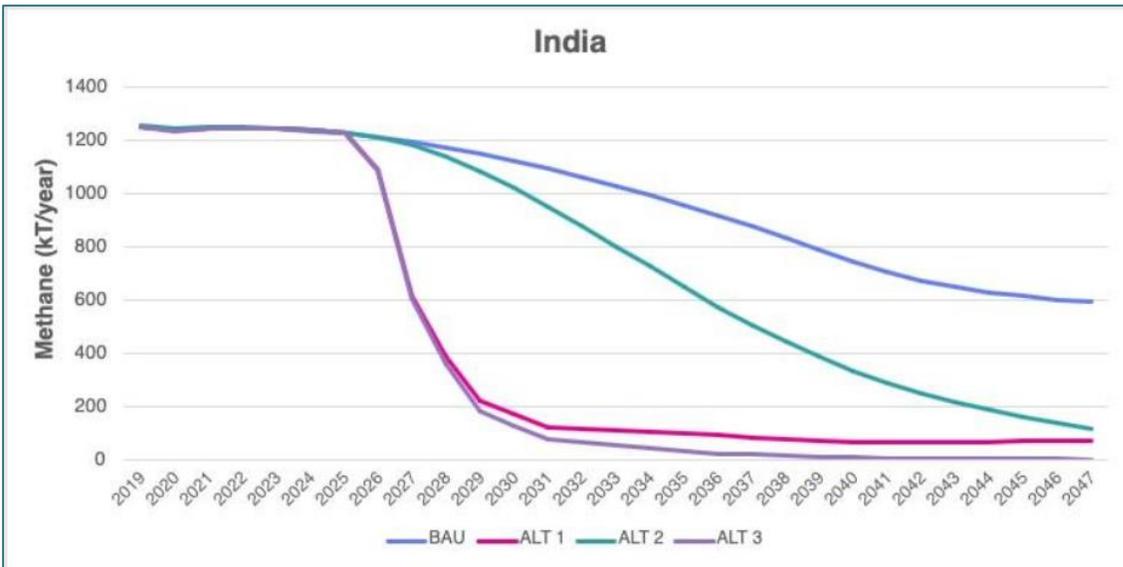


Strategy for efficient waste management at each level of the value chain

DEVELOPING POLICY ALIGNED SCENARIOS

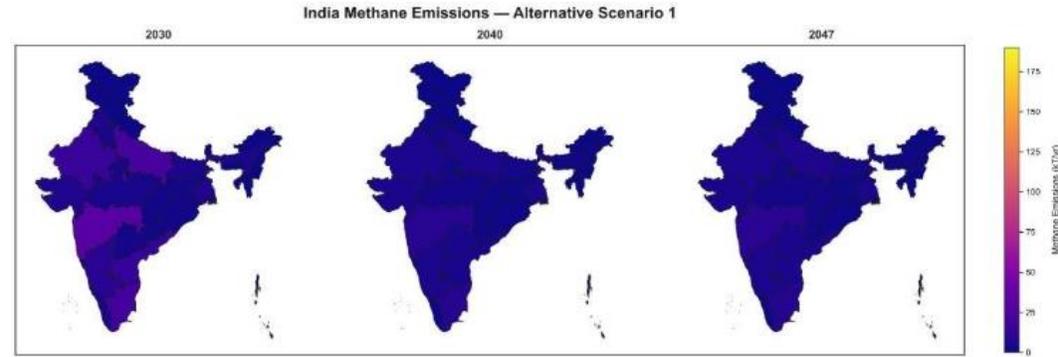


BAU: Projected Methane Emissions from India's Solid Waste Sector (2019–2047)

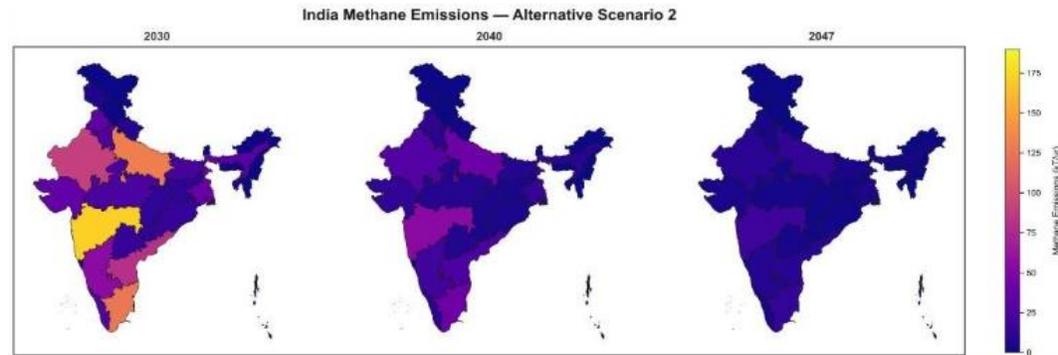


Scenario Analysis and Outcomes: Methane Emission Trends (2019–2047)

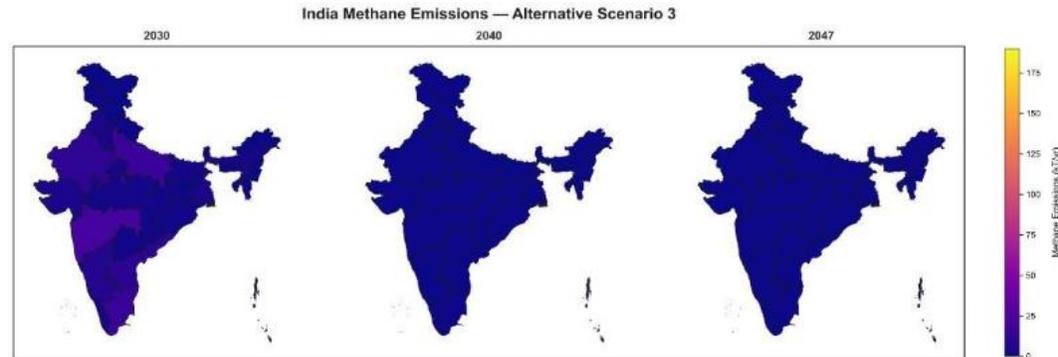
ALT-1: Methane Emissions with Legacy Waste Remediation and LFG Capture (2019–2047)



ALT-2: Methane Emissions under 100% Waste Management Across the Value Chain (2019–2047)



ALT-3: Methane Emissions under an Integrated Waste Management Approach (ALT1 + ALT2) (2019–2047)



SUMMARY

~ *Final Recommendations for Policymakers*

Policy → Implementation

Policy reforms in waste management have moved faster than local capacity and enforcement, creating a persistent implementation gap despite strong regulations.

Centralised vs Decentralised

Waste systems must be context-specific—decentralised models work best for organic-heavy, smaller cities, while centralised systems are needed only for residual waste in dense metros.

India-specific Measurement

Reliance on global default methane factors masks India's true emissions—country-specific measurement tools are critical for credible mitigation planning.

Dual Pathways

Clearing existing dumpsites and preventing future ones are equally critical and must progress in parallel to achieve lasting methane reductions

Recognising Dumpsites

Unmapped and unclassified dumpsites create major data blind spots; formal recognition is essential for accurate methane inventories.

Finance

Methane mitigation is technically viable but financially fragmented—blended finance and carbon-linked incentives are key to scaling solutions.

Behaviour

Without sustained source segregation and compliance, infrastructure investments fail—behavioural change must be enforced, not assumed.



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Thank You

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