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## India's Landfills Among World's Top Methane Emitters — Hyderabad 4th, Mumbai 12th Globally

25 April 2026

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CURATED &amp; WRITTEN BY

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# India's Landfills Among World's Top Methane Emitters — Hyderabad 4th, Mumbai 12th Globally

25 April 2026 · 3 min read

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## WHY IN NEWS

A **UCLA study** titled “*Spotlight on the Top 25 Methane Plumes in 2025: Landfills*” — using data from **Planet Labs’ Tanager-1 satellite** and **NASA’s EMIT instrument** (aboard the International Space Station) — found that India has **two landfills among the world’s 25 largest methane emitters**:

- **Jawaharnagar landfill, Secunderabad (Hyderabad): 4th globally — 5.9 tonnes/hour**
- **Mumbai landfill: 12th globally — 4.9 tonnes/hour**

The climate impact of 5 t/hr methane is equivalent to **1 million large SUVs or a 500 MW coal power plant** operating continuously.

## THE TECHNOLOGY — HOW SATELLITES DETECT LANDFILL METHANE

### NASA EMIT (Earth Surface Mineral Dust Source Investigation)

- Installed on the **International Space Station** in July 2022
- Originally designed to map surface minerals, it was discovered to also detect **methane plumes** with high precision
- Measures methane in parts per million (ppm) from Low Earth Orbit
- Has detected >1,000 “super-emitter” methane sources globally

### Planet Labs Tanager-1

- A **commercial satellite** by Planet Labs
- Equipped with a **methane imaging spectrometer** specifically designed for GHG detection
- Much higher revisit frequency than government satellites — enabling systematic monitoring

## LANDFILL METHANE — THE SCIENCE

### How Landfills Produce Methane

STEP	PROCESS
1	Organic waste (food scraps, paper, yard waste) deposited in landfill
2	Anaerobic bacteria decompose organic matter without oxygen
3	Decomposition produces <b>biogas</b> : ~50-60% CH <sub>4</sub> (methane) + ~40-50% CO <sub>2</sub>
4	CH <sub>4</sub> escapes through landfill surface (if not captured)

### Why Methane Matters

PROPERTY	DETAIL
<b>GWP (100-year)</b>	<b>28x</b> more potent than CO <sub>2</sub>
<b>GWP (20-year)</b>	<b>80x</b> more potent than CO <sub>2</sub> (short-lived but powerful)
<b>Atmospheric lifetime</b>	~12 years (vs CO <sub>2</sub> : centuries)
<b>Climate impact</b>	Responsible for ~0.5°C of observed warming since industrial era

Landfills contribute ~**11%** of India's methane emissions (the rest comes from agriculture — paddy fields, enteric fermentation in livestock).

## INDIA'S TWO SUPER-EMITTING LANDFILLS

### 1. Jawaharnagar Landfill (Secunderabad/Hyderabad)

PARAMETER	DATA
Location	Secunderabad, Hyderabad, Telangana
Global rank	<b>4th</b> — world's 4th largest landfill methane emitter
Emission rate	<b>5.9 tonnes/hour</b>
Operator	<b>Ramky Enviro Engineers Ltd</b>
Area	~100 hectares
Status	Active open dump; receives ~2,000 tonnes/day of MSW

### 2. Mumbai Landfill

PARAMETER	DATA
Location	Mumbai, Maharashtra
Global rank	<b>12th</b>
Emission rate	<b>4.9 tonnes/hour</b>
Operator	<b>Antony Waste Handling Cell Ltd</b>
Key sites	Deonar (Asia's oldest landfill, ~130 ha) or Kanjurmarg site

## INDIA'S WASTE MANAGEMENT — GOVERNANCE FAILURE

### Scale of the Problem

INDICATOR	DATA
MSW generated daily	~170,000 tonnes
MSW that is landfilled	~40-50% (insufficient segregation + processing)
Open dumpsites	3,000+ across India
Landfill area	Thousands of hectares nationally
Landfill gas utilised	<5% (most escapes uncontrolled)

### The Regulatory Gap

- **Solid Waste Management Rules, 2016:** mandated source segregation, processing, and scientific landfilling — largely unimplemented
- **Extended Producer Responsibility (EPR):** operational for plastics; not yet effective for organic waste-to-landfill reduction
- **Swachh Bharat Mission:** reduced open defecation but did not adequately address MSW processing
- **Landfill gas capture:** only a handful of Indian cities (Kolkata, Surat) have any LFG capture-to-energy systems

### What Should Be Done

- 1 **Source segregation** — wet (organic) + dry (recyclable) + hazardous: reduces landfill organic load
- 2 **Composting and biomethanation** — convert wet waste to compost or biogas instead of landfilling
- 3 **Landfill gas-to-energy (LFGE)** — capture methane, generate electricity (CDM projects possible)
- 4 **Extended Producer Responsibility** — shift waste management cost to producers

## UPSC RELEVANCE

### Prelims

- UCLA study: *Spotlight on the Top 25 Methane Plumes in 2025: Landfills*
- Satellites used: Tanager-1 (Planet Labs) + EMIT (NASA, ISS)

- Hyderabad (Jawaharnagar): 4th globally; 5.9 t/hr; Ramky Enviro Engineers
- Mumbai: 12th globally; 4.9 t/hr; Antony Waste Handling Cell
- Methane GWP: 28x CO<sub>2</sub> (100-year); 80x CO<sub>2</sub> (20-year)

## Mains

- “India’s solid waste management failures are now a measurable climate liability. Analyse with reference to landfill methane emissions.” (GS3)
- EPR, SWM Rules 2016, Swachh Bharat — governance gaps in waste management

## FACTS CORNER

FACT	DETAIL
Study	UCLA — <i>Spotlight on Top 25 Methane Plumes in 2025: Landfills</i>
Data sources	Tanager-1 (Planet Labs) + NASA EMIT (on ISS)
Hyderabad rank	4th globally — Jawaharnagar, Secunderabad
Hyderabad emission	5.9 tonnes/hour
Hyderabad operator	Ramky Enviro Engineers Ltd
Mumbai rank	12th globally
Mumbai emission	4.9 tonnes/hour
Mumbai operator	Antony Waste Handling Cell Ltd
Methane climate impact	5 t/hr ≈ 1 million SUVs or 500 MW coal plant
Methane GWP	28x CO <sub>2</sub> (100-year); 80x (20-year)
Landfills in top 25	India: 2 (of global 25)
SWM Rules	Solid Waste Management Rules, 2016

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