

INTRODUCING

WASTEMAP

Thursday, February 29, 2024



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RMI is an independent, non-partisan, non-profit organization that transforms the global energy system to secure a clean, prosperous, zero-carbon future for all.

Speakers



**CAROLINA
URMENETA**

Program Director,
Waste and Circular Economy,
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Global Methane Hub



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WANG**

Manager, Climate
Intelligence Program,
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**EBUN
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Manager, Climate-
Aligned Industries,
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**KAIT
SIEGEL**

Waste Sector Manager,
Methane Pollution
Prevention, Clean Air
Task Force



**VISHWAS
VIDYARANYA**

Co-founder and
Managing Director,
Ambire Global

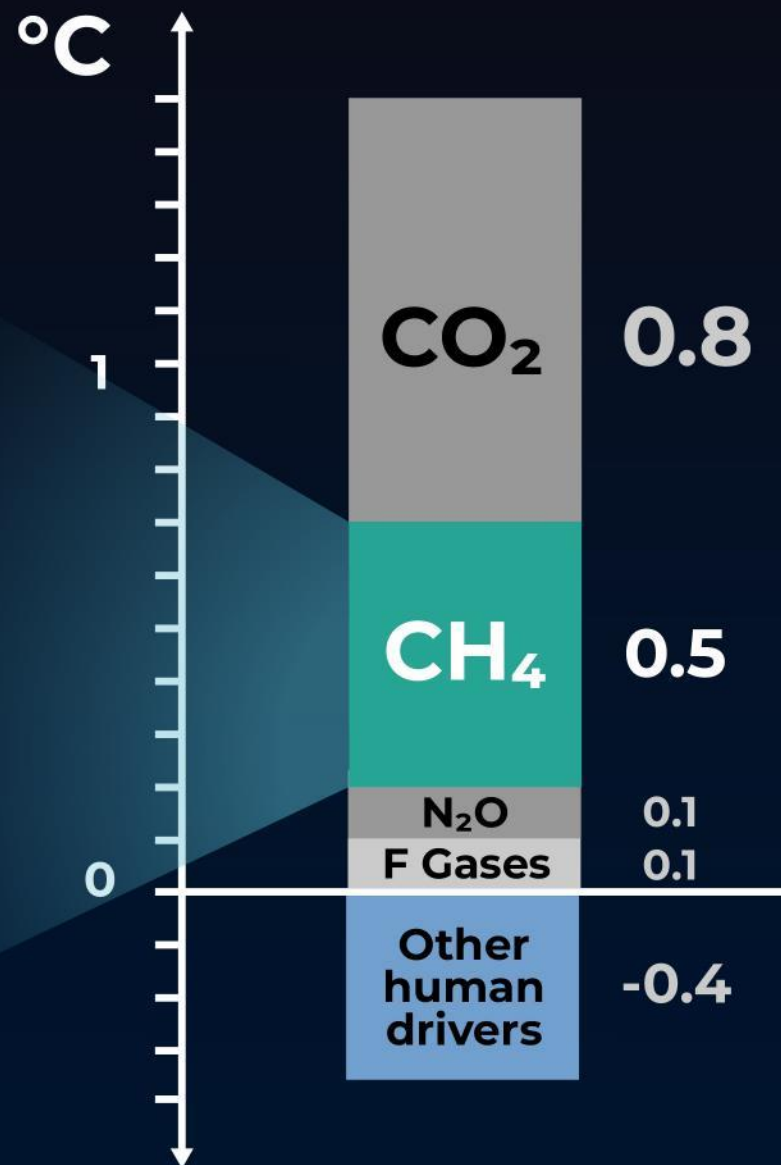


Agenda

- Introducing WasteMAP
- Platform Demo
- Playbooks and Resources
- Country Engagement
- Waste Methane Reduction - Colombia
- Q&A

CH₄ has contributed to 45% of recent net warming

IPCC AR6 report.



WASTEMAP

<https://wastemap.earth>



Mexico City



Casablanca



Santiago



Buenos Aires

-  Heat Map & Emissions Data
-  Decision Support Tool
-  Citizen Waste Champions Community
-  End-to-End Waste Management Strategies Playbook
-  South-to-South Convenings & Information Sharing

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Data Partners



Referential picture



LOW Methane Partnership

(lowering organic waste)

VISION: 40 subnational jurisdictions unlocking \$10 billion to cut at least 1 million tonnes/yr of methane well before 2030.

JURISDICTIONS

National governments

Nigeria, Chile, Dominican Republic, Indonesia, others

Subnational jurisdictions

Lagos, Santiago, Rio de Janeiro, Santo Domingo,

PARTNER SUPPORT

from governments, multilaterals, NGOs, philanthropies, and private sector

- ✓ **Data & Transparency**
- ✓ Finance
- ✓ Technical Capacity
- ✓ Policy

JURISDICTION COMMITMENTS

- ✓ **Methane target:** Declare a waste methane reduction target
- ✓ **Multi-level approach:** Commit to a multi-level approach
- ✓ **Partnership:** Commit to work with LOW-Methane partners





**Stop pouring gasoline
on the planet**

**Reduce
your organic
waste**

Cook only what you plan to eat.
Reduce leftovers and compost

1.3 liters of
gasoline
=
1 kg of organic
waste

WasteMAP: A Two-Pronged Approach to Waste Methane Mitigation

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Open Platform

designed to collect and improve availability and robustness of global waste sector data and enable methane emissions transparency



Decision Support Tools

the platform includes a choropleth map of methane emissions from waste, playbooks for waste methane mitigation, and case studies



COUNTRY ENGAGEMENT



On-the-Ground Support

Subnational and national engagement to support a pathway for waste management improvements, improve public health, and reduce environmental impact



Information Sharing

Creating and Convening a network of waste experts and peer-to-peer exchange to share global waste management practices

WasteMAP Live Demo

Rose Wang, Manager, Climate Intelligence Program, RMI

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Waste Strategy Playbooks & Resources

Ebun Ayandele, Manager, Climate-Aligned Industries, RMI

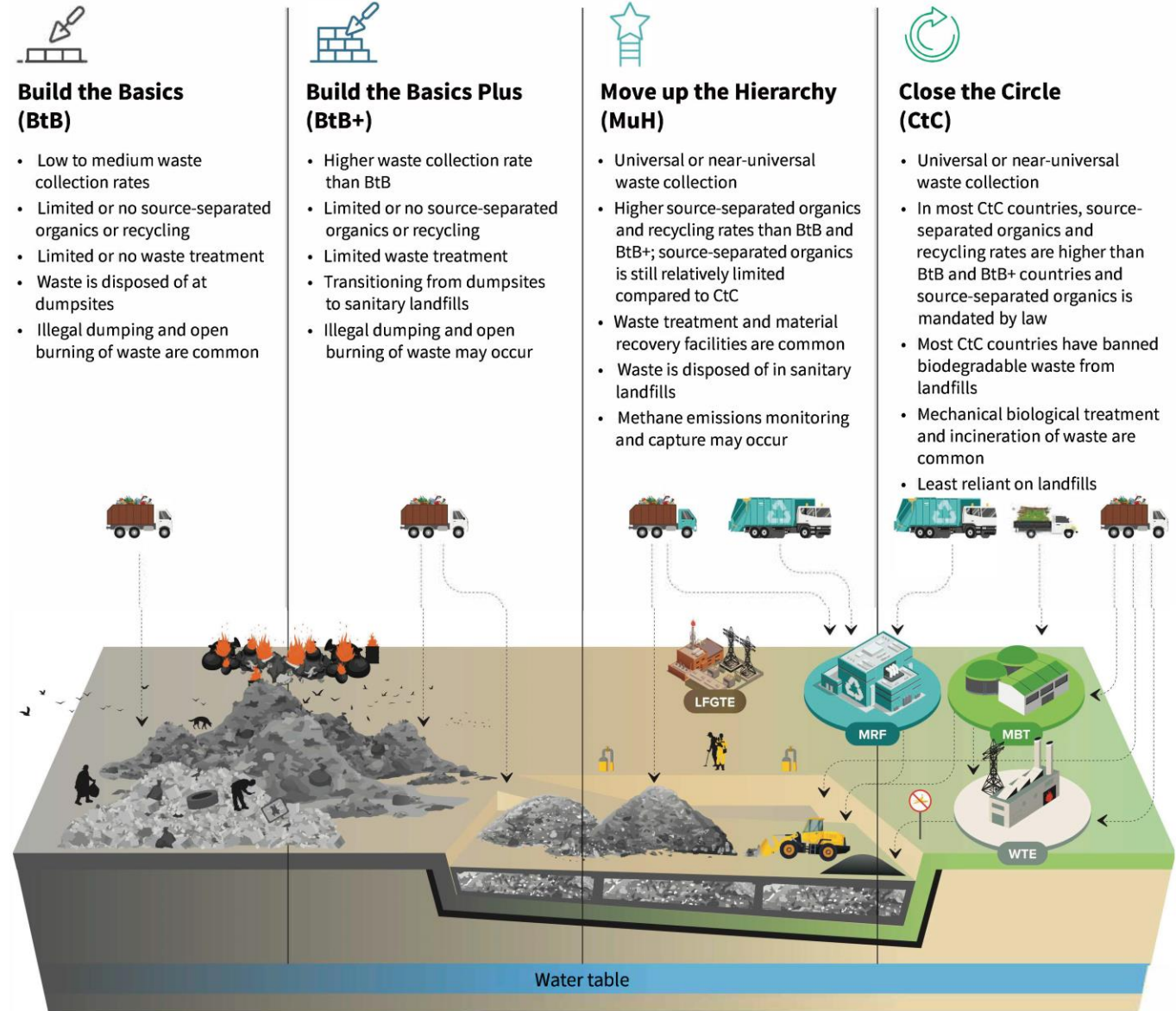
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A Global Playbook for Mitigating MSW Methane Emissions

- Develops four MSW management archetypes
- Examines challenges and opportunities across archetypes
- Develops methane mitigation strategies

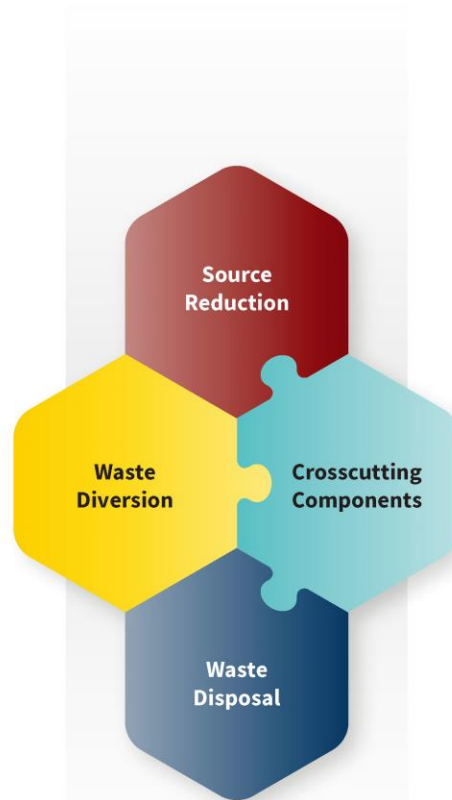
Global Municipal Solid Waste Management Archetypes



Waste collection, treatment, and disposal activities occur at different sites. Note that the primary outputs from the materials recovery facility and the mechanical biological treatment plant (e.g., plastics and biogas) are not depicted. The graphic has been simplified for illustrative purposes.

These archetypes are informed by building blocks

Building Blocks



Building Block Elements

Guiding Questions

Food Loss and Waste Prevention	Are there initiatives to reduce food waste?
Generation	Is waste separated at the source?*
Collection and Transport	What is the collection rate and coverage?
Recovery and Treatment	What is the recycling rate?*** Are technologies deployed to manage and transform waste to beneficial end uses?
End-of-Life Disposal	What final waste disposal systems exist?
Policy and Regulatory Framework	Are there policies and regulations for waste management? Are there policies and regulations that address methane emissions from decomposed waste?
Emissions Transparency	Are technologies deployed to detect and mitigate emissions from biodegradable waste? Are waste data (e.g., waste characterization and waste flow) and emissions data publicly available?
Finance	Is financing available for waste management projects? Is there a cost recovery mechanism to ensure sustainable operations?
Stakeholder Awareness and Capacity Building	What is the local community's level of awareness and compliance towards waste management best practices? Is there technical capacity to operate and maintain waste management technologies locally?

*Source separation refers to segregating waste at the point of generation including recyclable materials such as plastics, glass, metals as well as biodegradable waste like food and yard waste.

**The recycling rate refers to the entire MSW stream, including the recycling of plastics, glass, metals as well as biodegradable waste like food and yard waste

The playbook recommends key levers for aligning with the waste management hierarchy



A playbook which leverages the BtB archetype to develop tailored methane mitigation strategies for Lagos, Nigeria

National and Subnational level engagement

- Key stakeholders: NCCC, NESREA, LAWMA, OGWAMA

Lagos engagement

- Playbook for mitigating MSW methane
- Providing technical assistance

Organic Waste Management Workshop

- Workshop with NCCC, RMI and ISWA in October 2023
- Training modules on organic waste segregation, treatment, landfill design and operation, LFG capture



Mitigating Methane Emissions from Municipal Solid Waste

A Playbook for Lagos, Nigeria



Report / February 2024

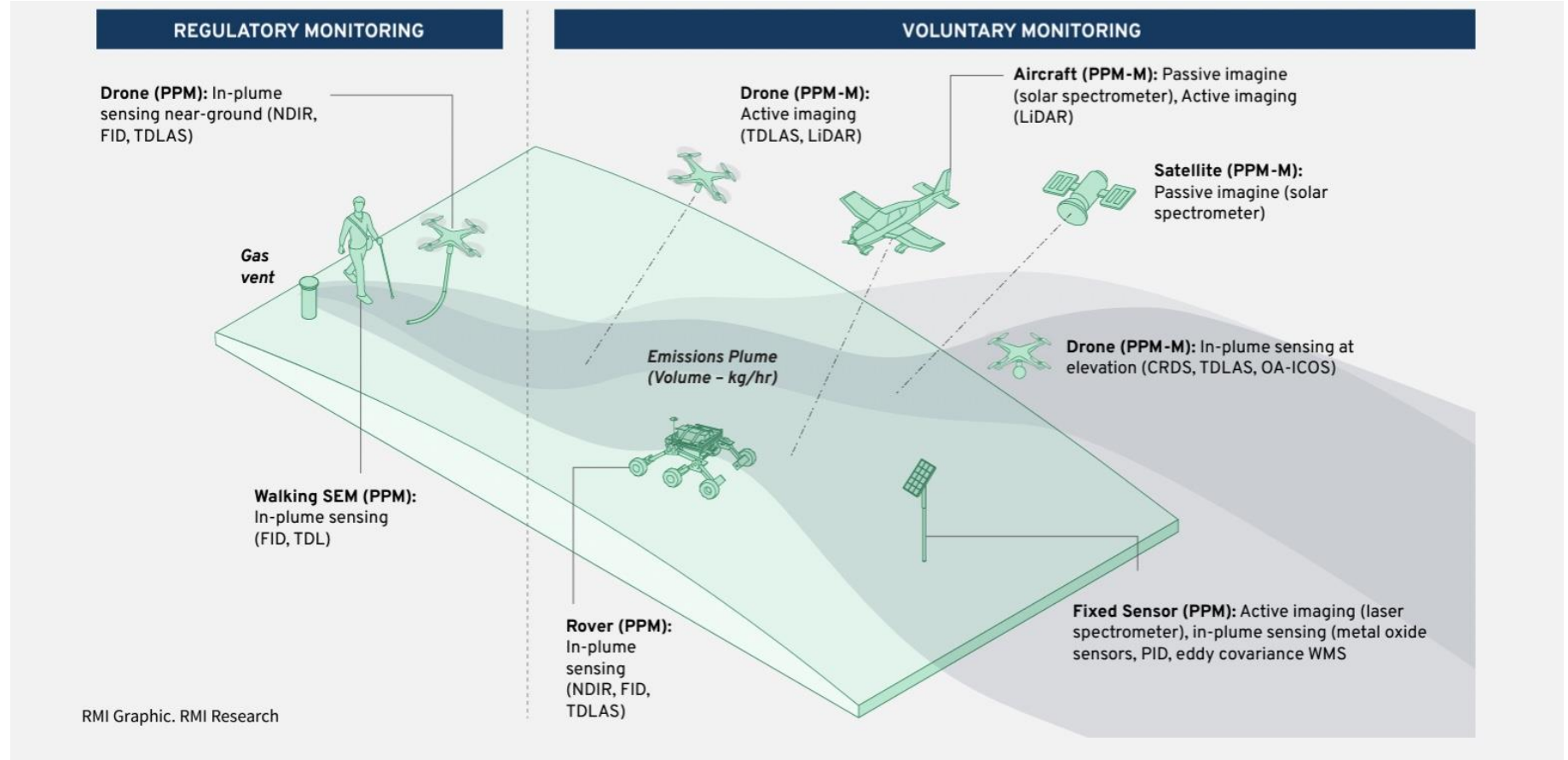
A US playbook on deploying advanced monitoring technology to detect and repair methane leaks

Partners

- WM, EREF

Key objective

- Improve voluntary deployment at US landfills
- Optimize methane leak detection and repair



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WasteMAP Country Engagements

Kait Siegel, Waste Sector Manager, Methane Pollution Prevention

February 2024

CATF's Super Pollutants History

CATF was the first NGO globally to focus on reducing methane and the other short-lived climate pollutants.

We advance **technology and policy changes** needed to slow global warming

Alongside our team of experts, we leverage an extensive network of collaborators in civil society, industry, academia and government.



1996



2000

Launched Campaign Against Super Pollutants



2002

Broadened

Country Engagement Overview

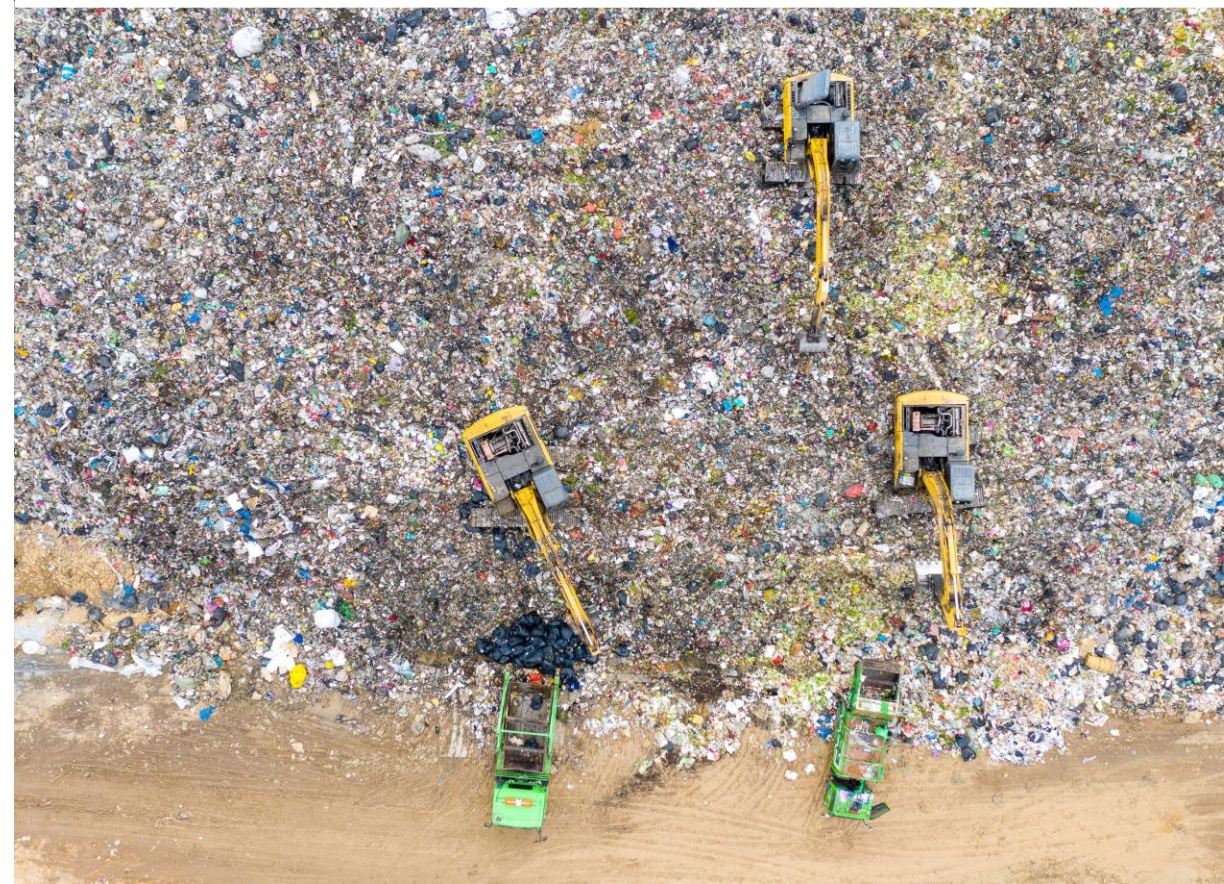
Provide an ongoing mechanism for **data gathering** and **engagement** at national and subnational levels in select countries

National and Subnational Level

- Supporting policymakers in setting and meeting waste methane reduction targets
- Engagement with subnational governments, waste officials, and waste management staff

Subnational Level

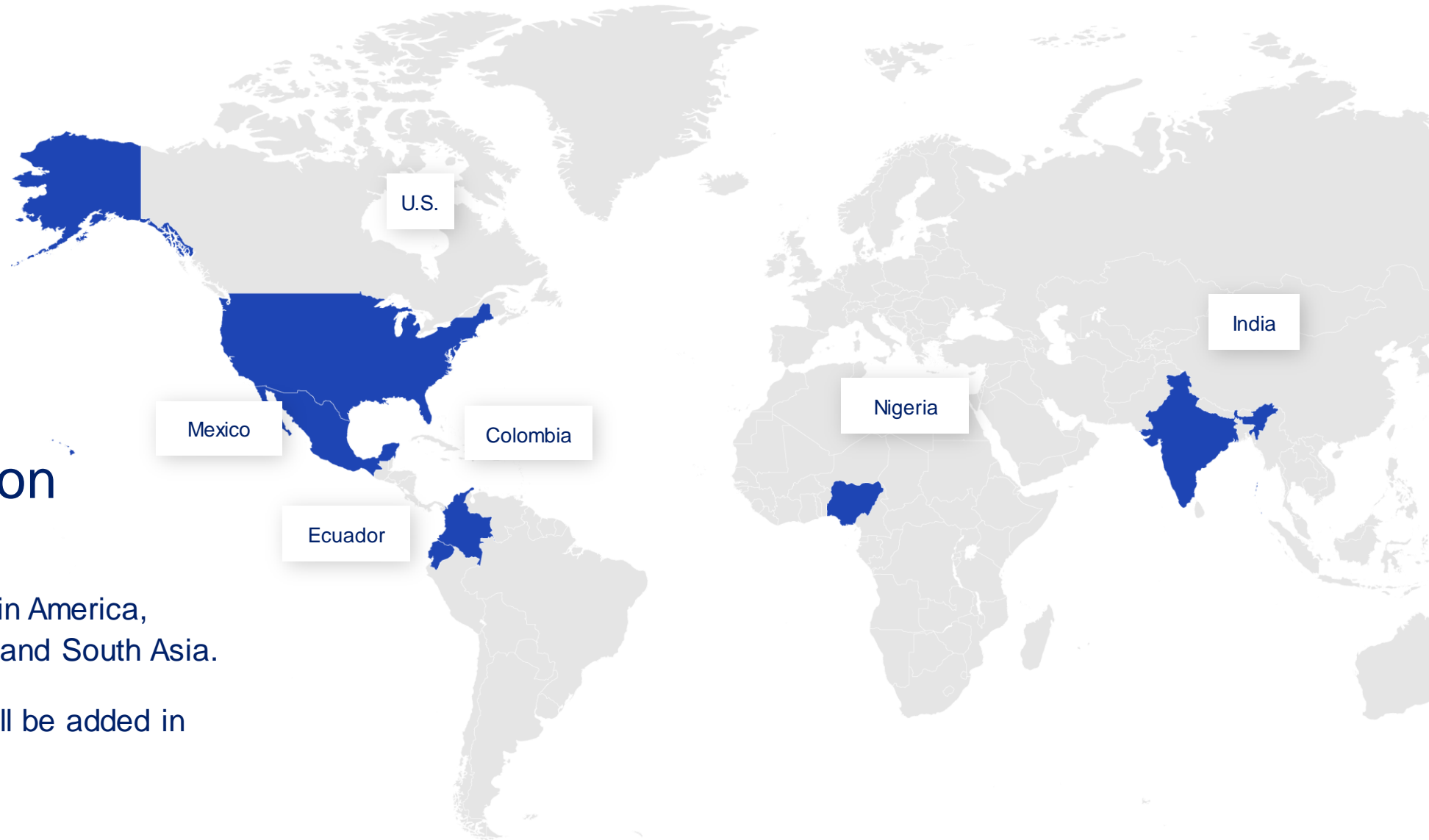
- Providing technical assistance, facilitating peer-to-peer exchanges, and improving site specific data and understanding



First Year of Implementation

Target countries in Latin America, North America, Africa, and South Asia.

Additional countries will be added in subsequent years.



Waste MAP Latin America Network



WasteMAP Mexico

Naucalpan de Juárez

- **Population:** > 800,000
- **Annual Waste Generation:** nearly 500,000 metric tons
- **Current Management System:** final disposal in sanitary landfill with limited gas capture and flaring
- **Baseline Methane Emissions:** Methane emissions for 2030 under a BAU scenario are estimated at approx. 120,00 MT CO₂eq (draft estimate).
- **Planned Improvements:** mechanical separation facility with anaerobic digestion (1,300 tons/day)
 - **Methane Emissions Reductions:** Considering different scenarios methane emissions for 2030 could be reduced by approx. 32,000 – 58,000 MT CO₂eq (draft estimate).

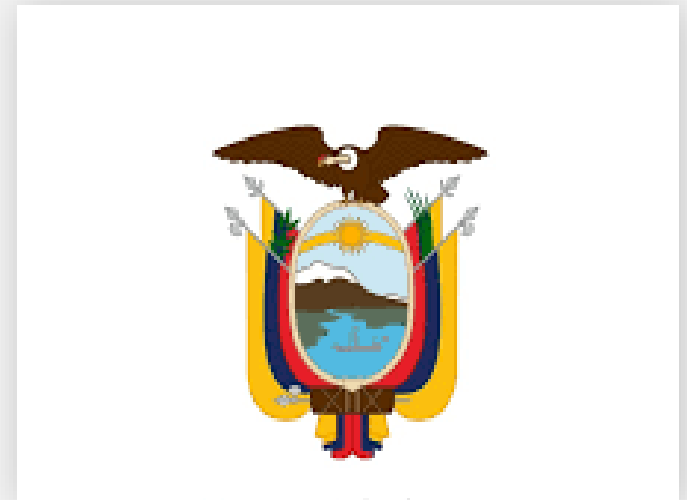


WasteMAP Ecuador

Partnering with the Ministry of Environment, Water, and Ecological Transitions (MAATE)

Technical assistance and capacity strengthening for guidelines and policies on waste data and management

- Assistance in the development of national guidelines for 1) solid waste characterization and 2) source separation of solid waste.
- Capacity strengthening at the subnational level --> virtual courses on new guidelines for stakeholders.
- Publication and launch of the new guidelines
- Strategic Component of the National Plan for the Integrated Management of Urban Solid Waste (PNGIRS).



EL NUEVO
ECUADOR 

**Ministerio del Ambiente,
Agua y Transición Ecológica**

National Waste Characterization Guidelines

- MAATE developed a comprehensive methodology for conducting **waste characterizations** to understand waste generation across the country
- **MAATE and CATF piloted this method in 2 municipalities in Ecuador**
- Based on the lessons learned from these pilots, a national guideline on **waste characterization will be developed and published to use in municipalities throughout Ecuador**

Cayambe

- Population > 50,000
- Annual Waste Generation: 80,21 t/d (2022)
- 64,2% Organic waste
- Waste characterization conducted July 12 – 21, 2023

Puerto López

- Population < 50,000
- Annual Waste Generation: 16,13 t/d (2022)
- 65% Organic waste
- Waste characterization conducted July 31 – August 9, 2023

Municipality of Cuenca, Ecuador

Calculation of the emission reductions from the composting plant "Ecoparque El Valle"

- The facility has been operating since 2008.
- Currently 25-50 t/day of organic waste from the city's market is being composted.
- In 2026, the city plans to double its capacity.
- From 2008 to 2046, the compost facility will reduce approx. 9,426 tons of methane.
- These reductions have not been included in Ecuador's NDC or national inventories.



Strengthening Capacity

Workshops and Waste Clinics

- **Objective:** Raise awareness about the importance of waste methane at the national and subnational level; connect with municipalities to understand their challenges & highlight solutions
- **Participants:** 2-3 relevant national ministries, approx. 16 municipalities, NGOs, local partners, etc.
- **Day 1:** Full day capacity strengthening session with presentations from CATF, the local government, and regional experts on food waste prevention, organics diversion and treatment, and landfill management.

TALLER

Metano en el sector de residuos sólidos de Colombia



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Departamento Nacional
de Planeación - DNP



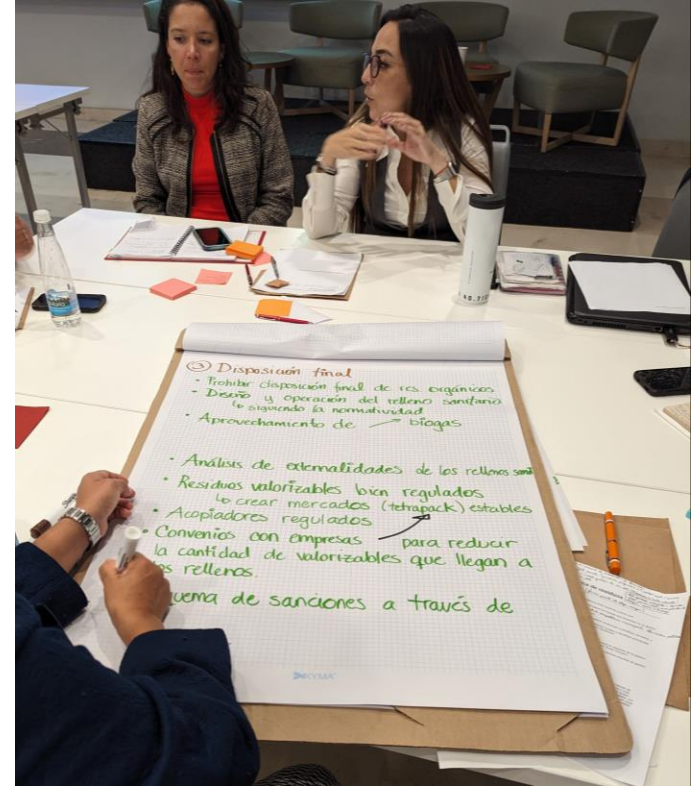
Global
Methane
Hub



ambire
GLOBAL

Workshops and Waste Clinics

- **Day 2:** Dedicated to a waste clinic to hear from municipalities and help them think through the solutions introduced in day 1.
- **The Waste Clinic is an expert and peer assist group session that:**
 - Focuses on the specific challenges faced by **local governments (the patients)** in managing their municipal solid waste
 - Draws on the perspectives and knowledge of each other
 - Is facilitated by **experts (the doctors)** who help diagnose problems and identify remedies



Waste Methane reduction

Colombia

February 2024

Agenda

1. Overview
2. Pre-feasibility study - Barranquilla
3. Pre-feasibility study - Cartagena



Overview 2023

- Development of the workshop "**Methane in Colombia's solid waste sector**" which included panels and working sessions involving experts, 16 **municipal representatives from the country** and other key stakeholders.
 - ✓ **Municipal Waste Clinic : Barriers and Challenges and Identifying Solutions and Drafting Action Plans**
- Development of the country assessment report with information on methane emissions, framework conditions and solid waste generation in Colombia.
- Identification of municipalities (Barranquilla and Cartagena) interested in solid waste management and methane mitigation and in need of technical assistance.



Barranquilla - Pre-feasibility study - Organic waste treatment plant



Diagnosis of the current situation

- Daily generation: 13.5 ton/day
- Cost of disposal: 47,483 \$/ton
- Problem: There are no established waste collection points, nor separation at source.

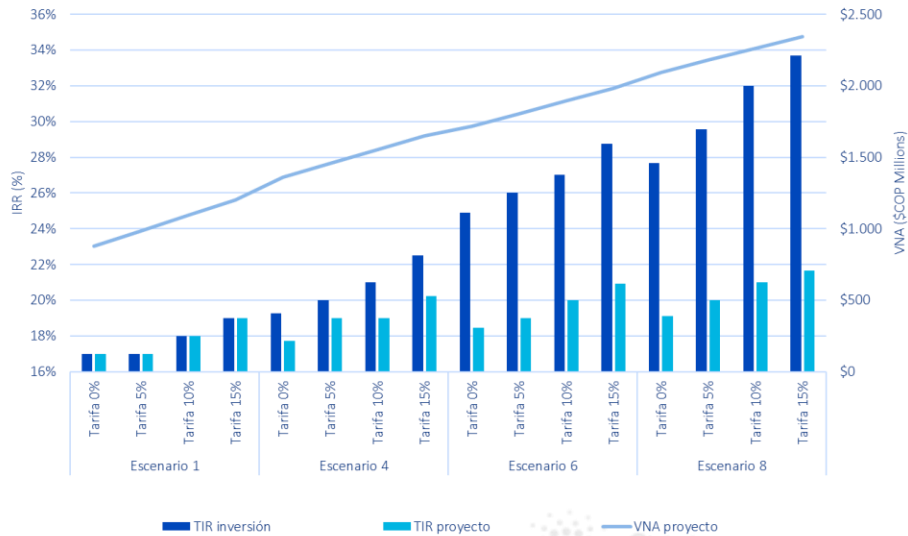
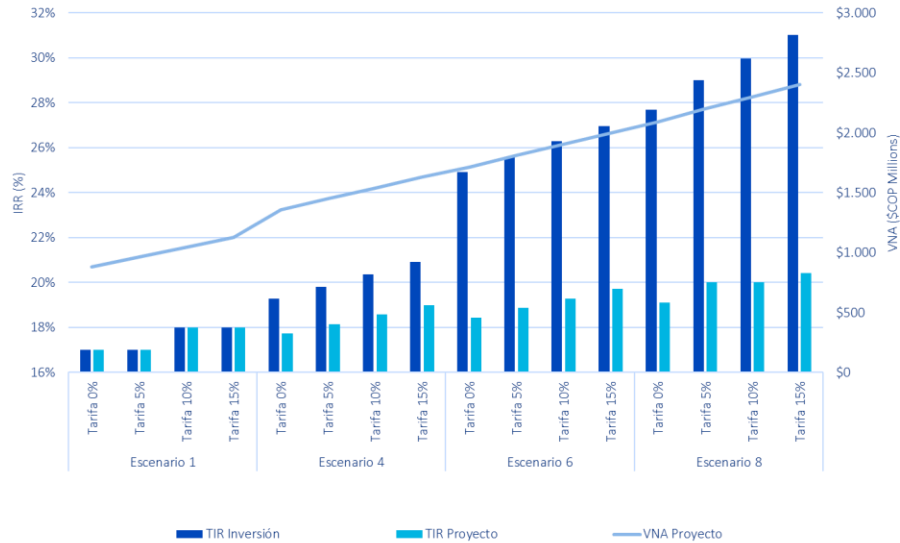
Financial information

- Cost of biodigester: \$ 2,533,320,000COP
- Space required: 750 m²
- CAPEX with tax benefits: \$ 2,859,589,076 COP

Technical information

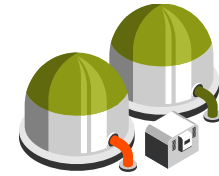
- Biogas generated per year: 281,445 m³/year
- Electricity generated: 408,095 kWh/year
- Generation of organic fertilizer: 402t/year

Sensitivity analysis



Variation in the cost of final waste disposal

Current : 76,41 \$/kg
5% : 80,23 \$/kg
10% : 84,05 \$/kg
15% : 87,87 \$/kg



CAPEX Discount Value

Current: \$ 2.859.589.076
5% : \$142.979.454
10% \$ 285.958.908
15% \$ 428.938.361

Environmental benefits

- The avoided emissions are 288 tonCO₂e/year by implementing an anaerobic digestion system.
- Additionally, by having an organic waste treatment system less than 5 km from the marketplaces, there is a decrease in transport related emissions of 132 tonCO₂e/year.
- The digestate generation potential is approximately 402 ton/year which can be used as organic fertiliser. The digestate can be treated and used as fertiliser as it contains nutrients necessary for soil remediation, such as nitrogen, phosphorus and potassium.
- Saves 16,084 m³/year of waste volume going to landfill.

Social benefits

- Reduction of soil and water pollution contributing to environmental preservation and the creation of a cleaner and healthier environment for the general well-being of the community.
- Implementation of environmental education programmes on the importance of separation at source, waste reduction and proper waste management.
- Anaerobic digestion requires technical personnel for the handling and functionality of the technology, as well as operators to help with the management and control of organic waste. This helps to boost the local economy and improve employment opportunities.

Cartagena - Pre-feasibility study - Organic waste treatment plant



Diagnosis of the current situation

- Daily generation: 31,4 ton/day
- Cost of disposal: 141.046 \$/ton
- Problem: There is no implementation of separation at source.

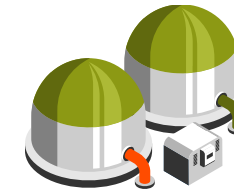
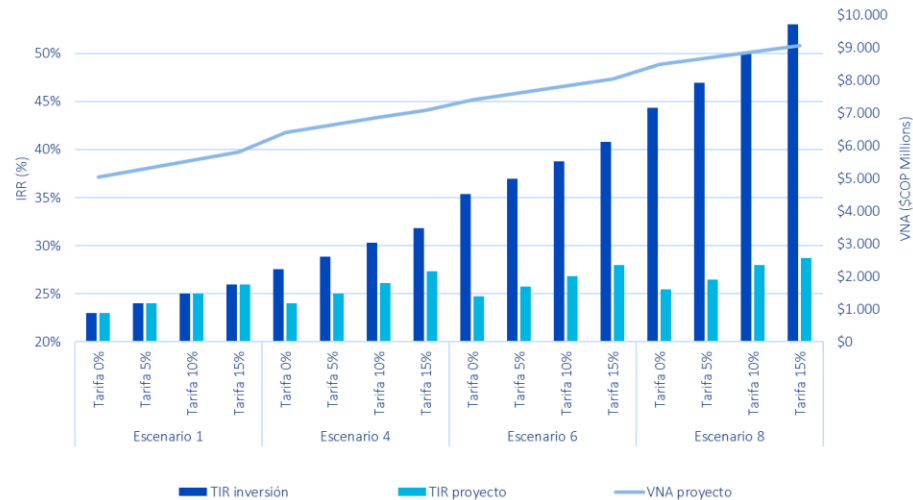
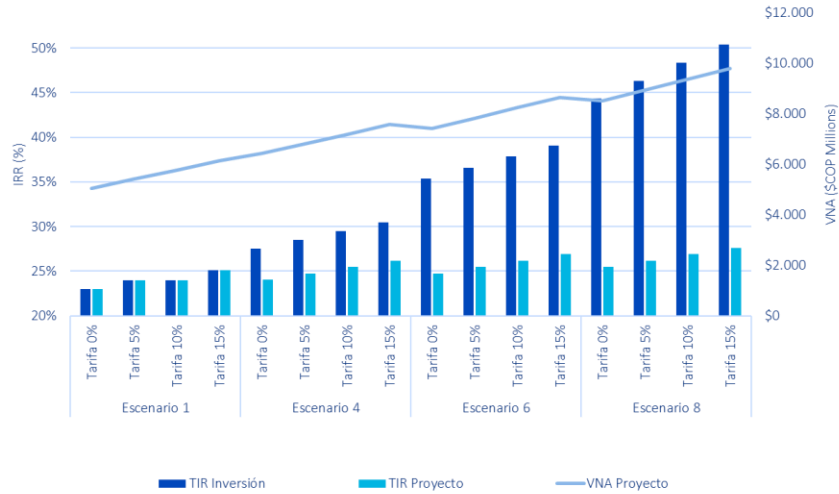
Financial information

- Cost of biodigester: \$ 6.129.000.000 COP
- Space required: 1.800 m²
- CAPEX with tax benefits: \$ 6.690.042.017 COP

Technical information

- Biogas generated per year: 654.619 m³/year
- Electricity generated: 949.198 kWh/year
- Generation of organic fertilizer: 935 t/year

Sensitivity analysis



CAPEX Discount Value

Current: \$ 2.859.589.076
5% : \$142.979.454
10% : \$ 285.958.908
15% : \$ 428.938.361



Variation in the cost of final waste disposal

Current : 76,41 \$/kg
5% : 80,23 \$/kg
10% : 84,05 \$/kg
15% : 87,87 \$/kg

Environmental benefits

- The avoided emissions are 466 ton/year CO₂e by implementing an anaerobic digestion system.
- Additionally, by having an organic waste treatment system less than 5 km from the marketplaces, there is a decrease in transport-related emissions of 149 ton/year CO₂e.
- The digestate generation potential is approximately 935 ton/year of digestate that can be used as organic fertilizer.
- The digestate can be used as fertilizer which contains all the nutrients and micronutrients necessary for soil amendments, such as nitrogen, phosphorus, and potassium.
- Saves 37,408 m³/year of waste volume going to landfill.

Social benefits

- Pollution reduction contributing to environmental preservation and the creation of a cleaner and healthier environment for the general wellbeing of the community.
- Implementation of environmental education programmes on the importance of separation at source, waste reduction and proper waste management.



Q&A

Thank you, data partners:

Climate Trace

Carbon Mapper

SRON

Stanford METER-ML group

World Bank What A Waste

UN Habitat Waste Wise Cities

UNFCCC

EDGAR

Inter-American Development Bank Solid Waste and Circular Economy Hub

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Recording and Resources

