Source Segregation of Waste: Key to Methane Reduction from the Waste Sector

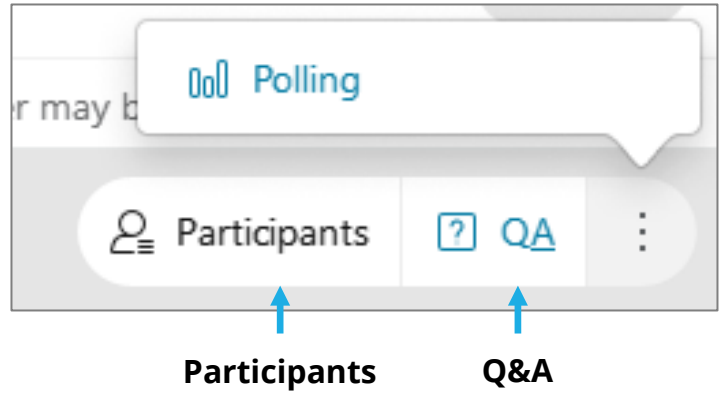
26 June 2024

Call in Details: 1-415-655-0002, ID 2429 429 1218

Webinar Panels

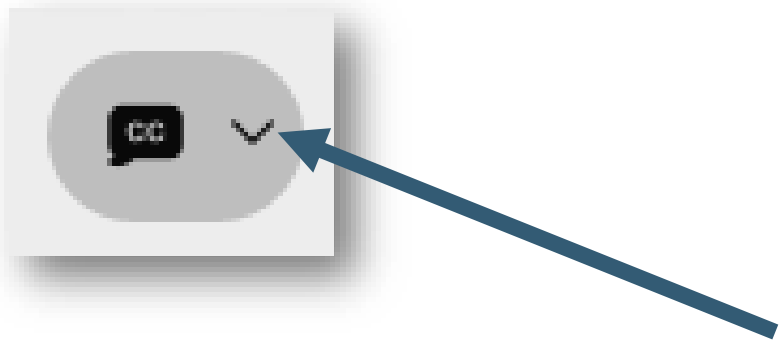
- We will use two panels
  - Participants and Question & Answer (Q&A)
  - Use the arrow to expand or collapse the panels

- Adding Panels
  - If some panels don't appear, select the desired panels in the lower right corner



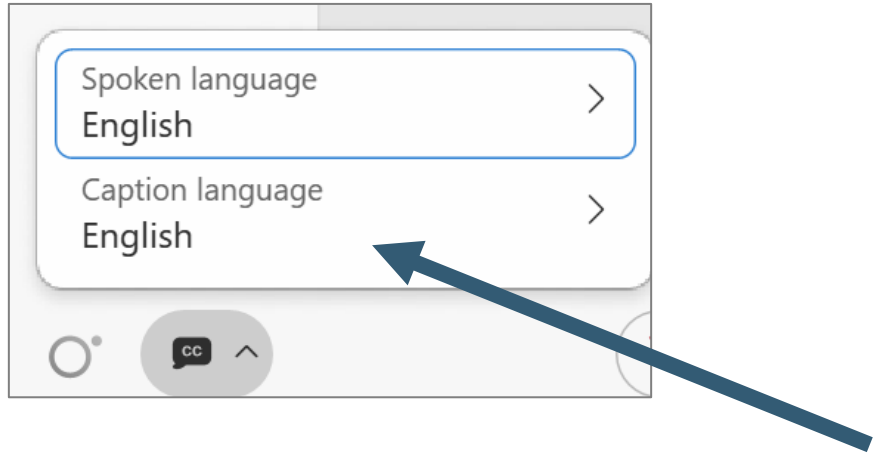
Access Live Captioning

- This webinar is being recorded
- Live captioning is available for this event. To view/hide captions, click the closed caption (CC) button on the lower left-hand side of your screen
- Click the small arrow beside the closed caption button to select your preferred caption language



Access Live Captioning

- Only the host will be changing the spoken language between English and Spanish throughout this event to follow along with our speakers
- For captions to be reflected, you must click the closed caption button and select the preferred language via the dropdown arrow
- It is recommended to make your CC language selection now as it will remain enabled for the remainder of the event



Q&A

- Participants are muted
- Questions will be moderated at the end of the webinar
- To ask a question:
  - Select “All Panelists” from the drop-down menu
  - Enter your questions in the Q&A box
  - Hit “Send”

- Final materials will be posted to the Global Methane Initiative (GMI) website: www.globalmethane.org

Agenda

- Introduction to GMI
  - Patrick CoatarPeter, Environmental Policy Analyst, U.S. EPA
- Guidelines to implement the separation phase at the source of waste and non-hazardous solid waste
  - Luis Vallejo, Coordinator, Waste Management and Circular Economy Project (GRECI), Ministry of Environment, Water and Ecological Transition, Ecuador
- Case Study in Indore, India
  - Aditi Ramola, Technical Director, International Solid Waste Association (ISWA)
  - Shraddha Tomar, Solid Waste Management Expert, Indore Municipal Corporation (IMC)
- Case Study in Olavarria, Argentina
  - Jeremy Douglas, Director of Global Partnerships Delterra
  - Mariano Kristoff, Project Lead, Behaviour Change, Delterra
- Questions and Answers

Introduction to GMI and the Biogas Toolkit

Global Methane Initiative (GMI)

- International public-private partnership focused on advancing:
  - Cost-effective, near-term methane abatement
  - Recovery and use of methane as a valuable energy source
- Provides cost-free technical support to deploy methane mitigation and methane-to-energy projects around the world
- Supports three key sectors:
  - **Biogas (municipal solid waste, agriculture, wastewater)**
  - Coal mines
  - Oil & gas

globalmethane.org

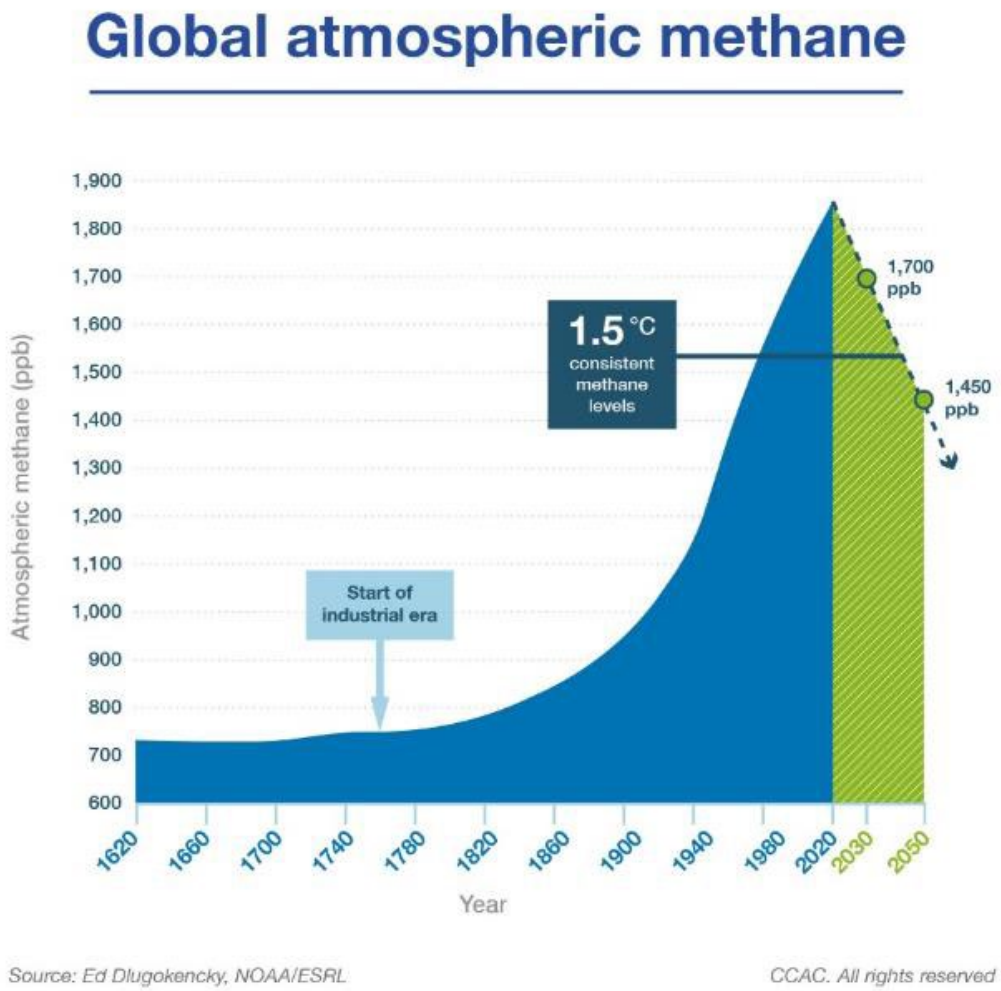
Global Methane Initiative

- 49 Partner Countries
- 700+ Project Network members
- Alliances with international organizations focused on methane recovery and use

GMI Partner Countries represent approximately 75% of methane emissions from human activities.

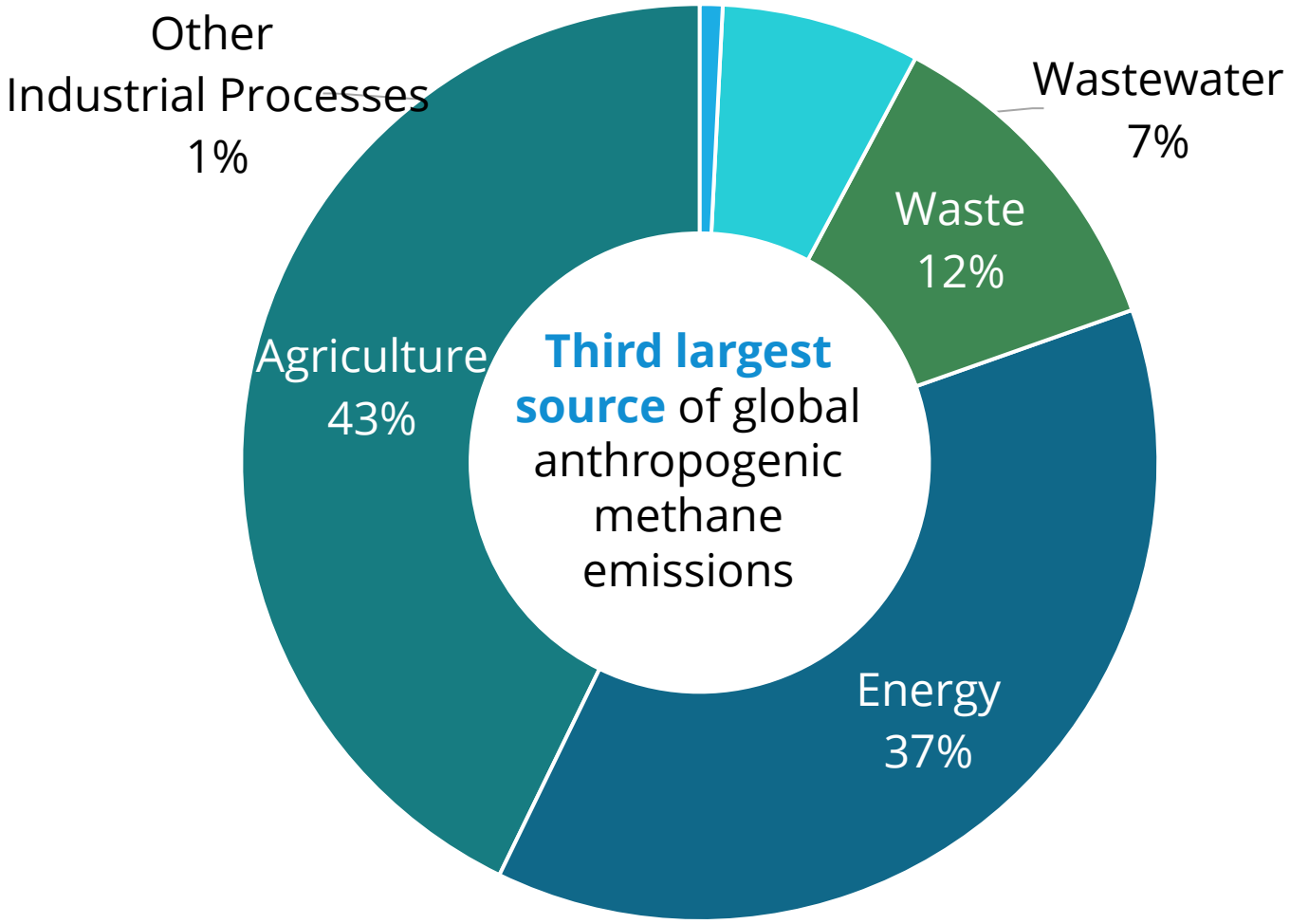
Why Methane?

- **Powerful greenhouse gas (GHG).** One ton of methane can trap 28-34 times more heat than one ton of carbon dioxide (CO_2) over a 100-year period
- **Precursor to tropospheric ozone**, an air pollutant and GHG
- **Short-lived climate pollutant** with an atmospheric lifetime of 12 years
- **Opportunity for fast climate action**
  - Cutting methane now delivers substantial, immediate climate benefits
  - Capturing and converting methane into clean energy can enhance energy security



Source: United Nations Environment Programme and Climate and Clean Air Coalition. Global Methane Assessment.

Why Focus on the Municipal Solid Waste (MSW) Sector?



Co-benefits of Waste Methane Mitigation

- ✓ Improved air and water quality
- ✓ Improved public health
- ✓ Increased worker safety
- ✓ Enhanced energy security
- ✓ Increased agricultural productivity
- ✓ Reduced odors

Source: U.S. EPA's Global Non-CO_2 Emissions Database

Advancing the Global Methane Pledge

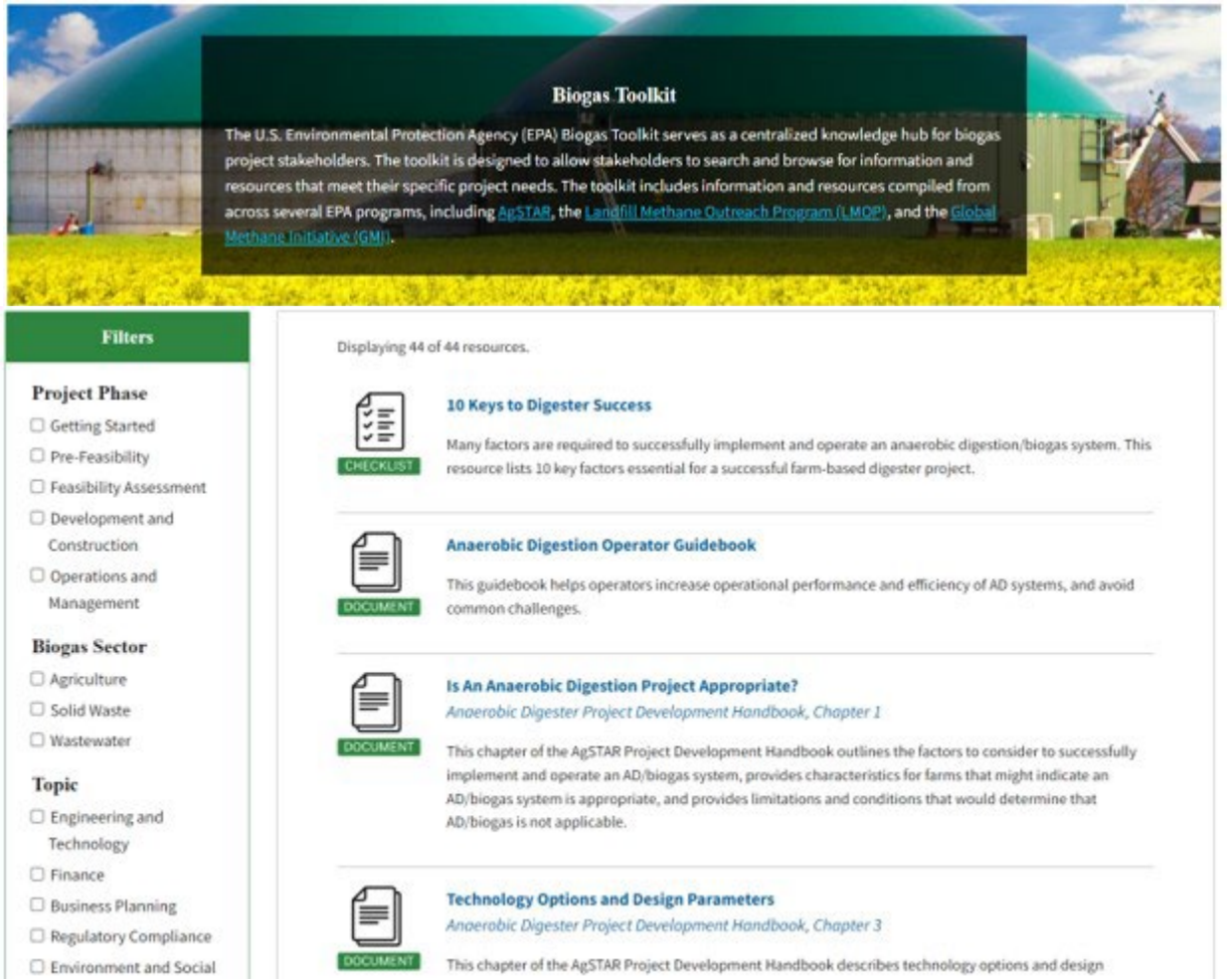
- **The Global Methane Pledge** is an agreement to collectively cut global methane emissions by at least 30 percent from 2020 levels by 2030
- **Achieving the Pledge** will require substantial mitigation action across all methane-emitting sectors
- **GMI provides support** to Partner Countries to contribute to the Pledge goal
- **34 GMI Partner Countries** are Pledge signatories

Global Methane Pledge

158 countries have signed the Global Methane Pledge

EPA Biogas Toolkit

- A web-based toolkit with 38 tools and resources
- Cross-agency collaboration
- Roadmap for planning and implementing projects and quantifying economic and environmental impacts
- Audience: Project implementers, developers, financiers, and policymakers



www.epa.gov/agstar/biogas-toolkit

GMI Biogas Tools

All tools are available within

Solid Waste Emissions Estimation Tool (SWEET)

Anaerobic Digestion Screening Tool (AD-ST)

Organics Economics (OrganEcs)

Landfill Gas Screening Tool (LFG-ST)

Biogas Toolkit

- A web-based toolkit with over 30 tools and resources to facilitate biogas project development
- Roadmap for planning and implementing biogas projects and quantifying economic and environmental impacts
- **Audience:** Project implementers, developers, financiers, and policymakers

GMI Biogas Tools

Solid Waste Emissions Estimation Tool (SWEET)
Quantifies emissions of greenhouse gases and other air pollutants from the MSW sector

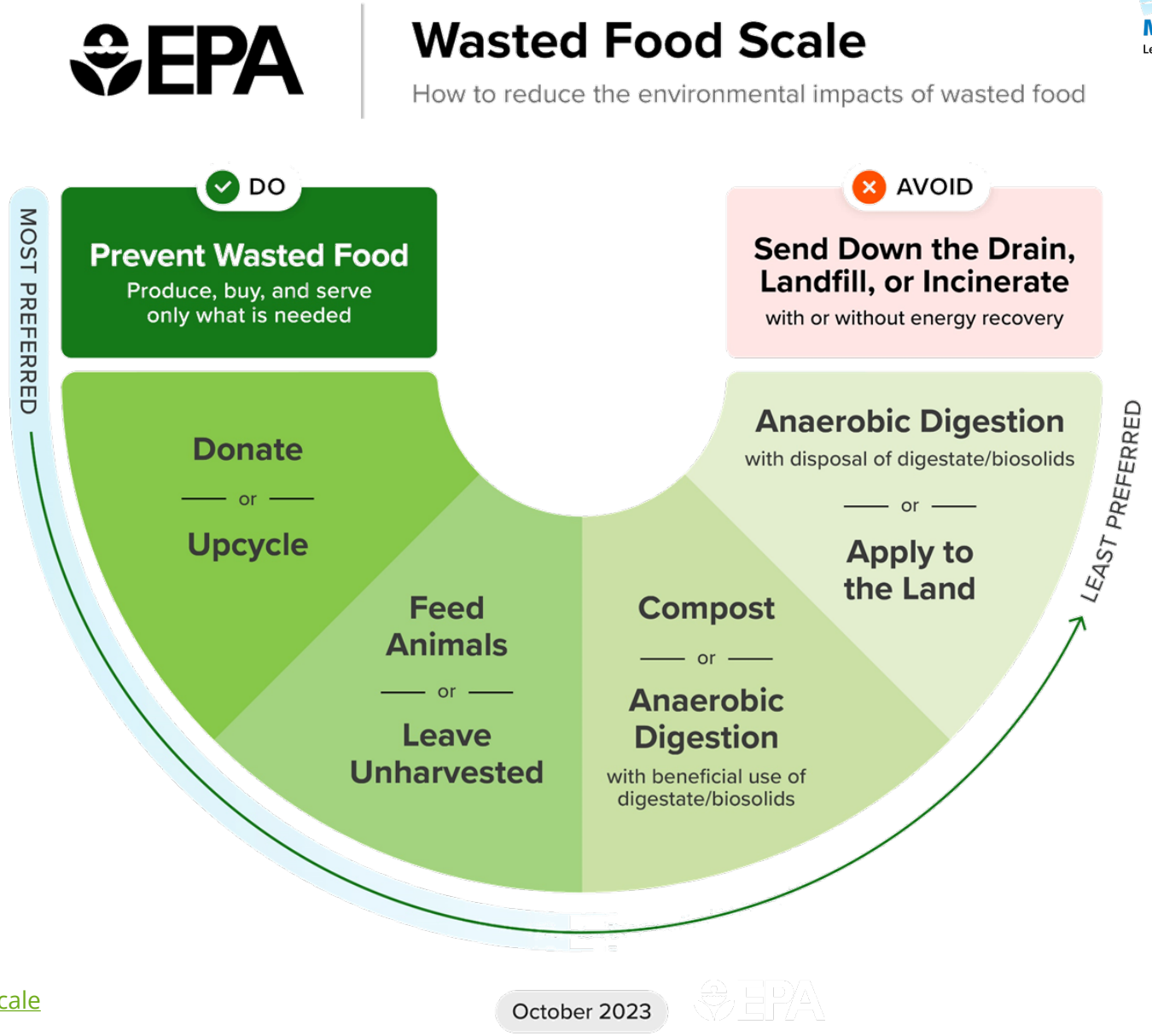
Anaerobic Digestion (AD) Screening Tool
Estimates the quantity of biogas and digestate produced by AD systems and methane emissions reductions

Organics Economics (OrganEcs)
Estimates costs, revenues, and profitability with composting and AD projects

Landfill Gas (LFG) Screening Tool
Estimates LFG recovery rate and provides potential project type and size

Waste Characterization Tool
Calculates and analyzes waste characterization study data by material types

EPA Wasted Food Scale



www.epa.gov/sustainable-management-food/wasted-food-scale

GMI Biogas Subcommittee Workshop Series:

Mobilizing Methane Action at Open Dumpsites and Landfills

https://globalmethane.org/events/details.aspx?eventid=761

Global Methane Initiative
Leading methane action since 2004

In partnership with

Environment and Climate Change Canada
Environnement et Changement climatique Canada

ISWA International Solid Waste Association

EPA United States Environmental Protection Agency

1. Global Opportunities and Strategies for Addressing Landfill Methane - *23 January 2024*
2. Methane Mitigation Project Phases, Practical Solutions, and GHG Emission Quantification – *5 March 2024*
3. Understanding Your Waste Stream to Develop Methane Reduction Strategies - *16 May 2024*

Case Studies - Country

Ministerio de Ambiente, Agua y Transición Ecológica

Proyecto de Gestión de residuos sólidos y economía circular inclusiva - GRECI

WEBINAR SEGREGACIÓN DE RESIDUOS EN ORIGEN: CLAVE PARA LA REDUCCIÓN DE METANO EN EL SECTOR RESIDUOS

GUÍAS DE CARACTERIZACIÓN Y SEPARACIÓN EN LA FUENTE DE RESIDUOS Y DESECHOS SÓLIDOS NO PELIGROSOS

GRECI
PROYECTO GESTIÓN DE RESIDUOS SÓLIDOS Y ECONOMÍA CIRCULAR INCLUSIVA

Global Methane Initiative

EL NUEVO ECUADOR

Ministerio del Ambiente, Agua y Transición Ecológica

CONTENIDO

01 Datos y cifras contexto Ecuador

02 Marco normativo e institucional residuos sólidos Ecuador

03 Formulación del Plan Nacional Gestión Integral de Residuos Sólidos (GIRS)

04 Guía de Cuantificación y caracterización de residuos sólidos

05 Instructivo de separación en la fuente de residuos sólidos

06 Proyectos e iniciativas relevantes de separación en la fuente

DATOS Y CIFRAS CONTEXTO ECUADOR

Ubicación:

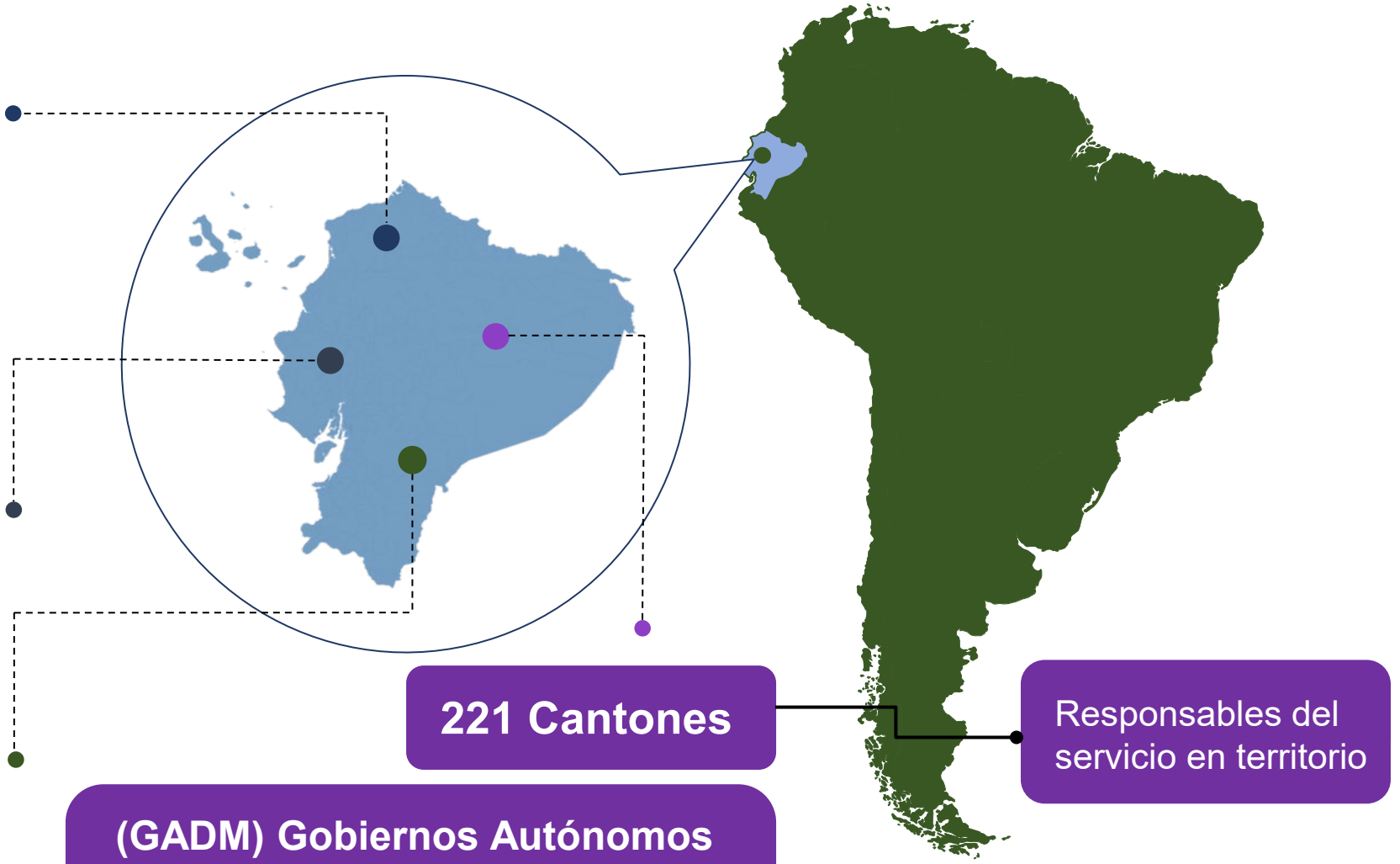
- ✓ Sobre la línea ecuatorial o paralelo 0°.
- ✓ Noroeste de América del Sur.

Extensión:

- ✓ 257.217,07 km².

Población (INEC Censo 2010):

- ✓ 9.035.142 hombres.
- ✓ 9.191.370 mujeres.



221 Cantones

Responsables del servicio en territorio

(GADM) Gobiernos Autónomos Descentralizados Municipales
Unidades territoriales para administrar los cantones.

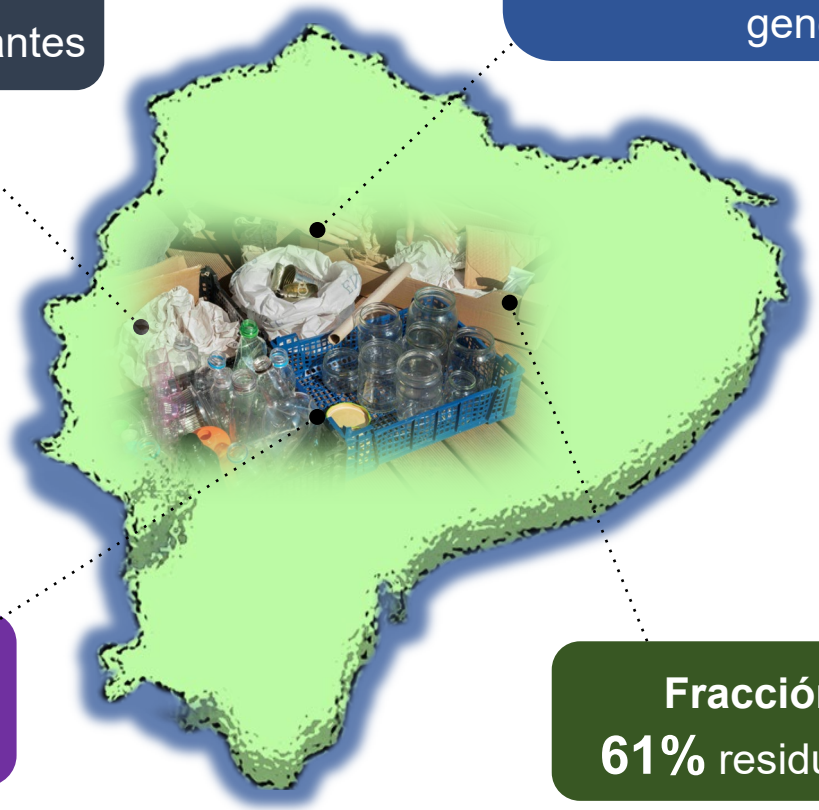
DATOS Y CIFRAS CONTEXTO ECUADOR

GENERACIÓN DE RESIDUOS SÓLIDOS 2023

Población:
18.226.512 habitantes

Fuente: INEC

Generación Anual:
5,3 millones de toneladas que representa el **0,23%** de generación mundial



PPC:
0,805 kg/hab*día

Fracción orgánica:
61% residuos generados

Proyección de generación anual de residuos sólidos – escenario actual

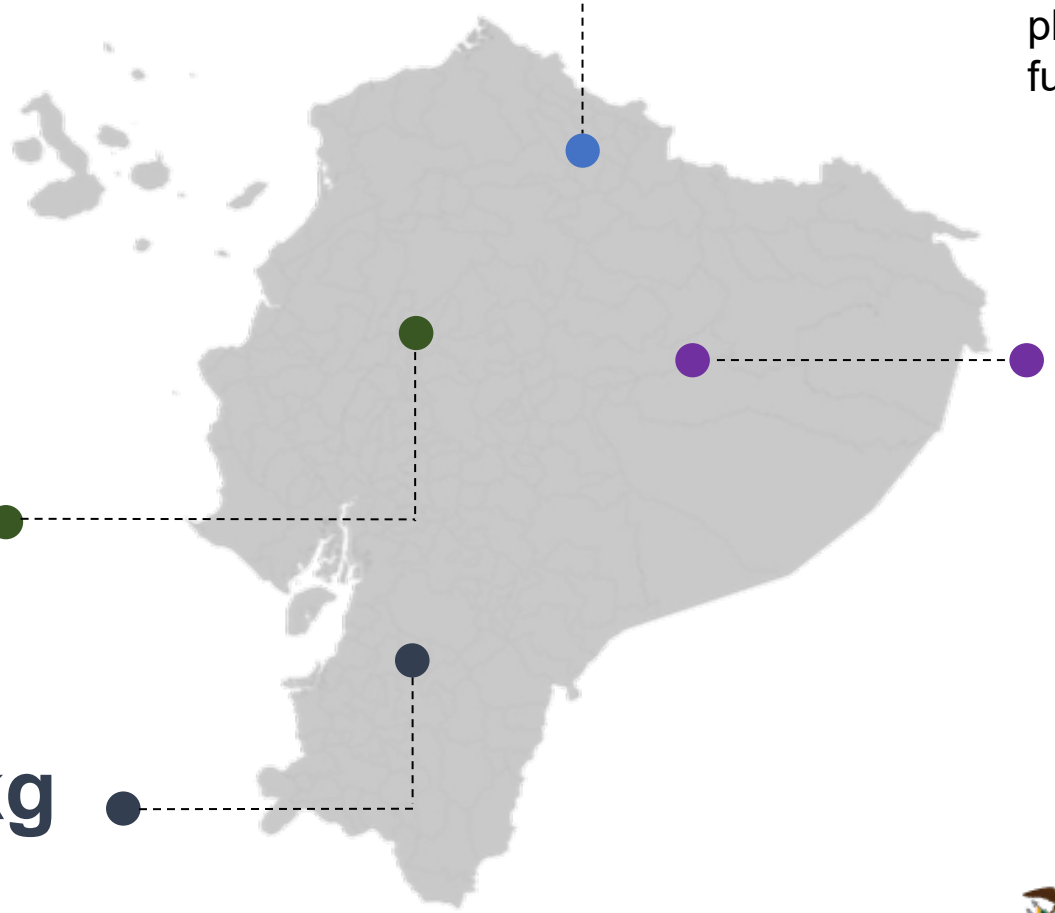
2023	5,3 millones de toneladas
2030	5,8 millones de toneladas
2040	6,4 millones de toneladas
2050	6,8 millones de toneladas

DATOS Y CIFRAS CONTEXTO ECUADOR

RESIDUOS PLÁSTICOS : Línea base 2022

Se generaron **627 mil** toneladas de residuos plásticos municipales, que representa el **0,17 %** de la generación mundial.

Un ecuatoriano genera **34,8 kg** de residuos plásticos al año.



En promedio el **87%** de todos los residuos plásticos generados fueron recolectados.

El **52%** de residuos plásticos se depositan en rellenos sanitarios.

DATOS Y CIFRAS CONTEXTO ECUADOR

GESTIÓN MUNICIPAL DE RESIDUOS SÓLIDOS SEPARACIÓN EN LA FUENTE Y ALMACENAMIENTO

33%

Municipios

Desarrollan procesos o actividades de separación

14%

Municipios

Separación en la fuente a nivel cantonal

48%

Municipios

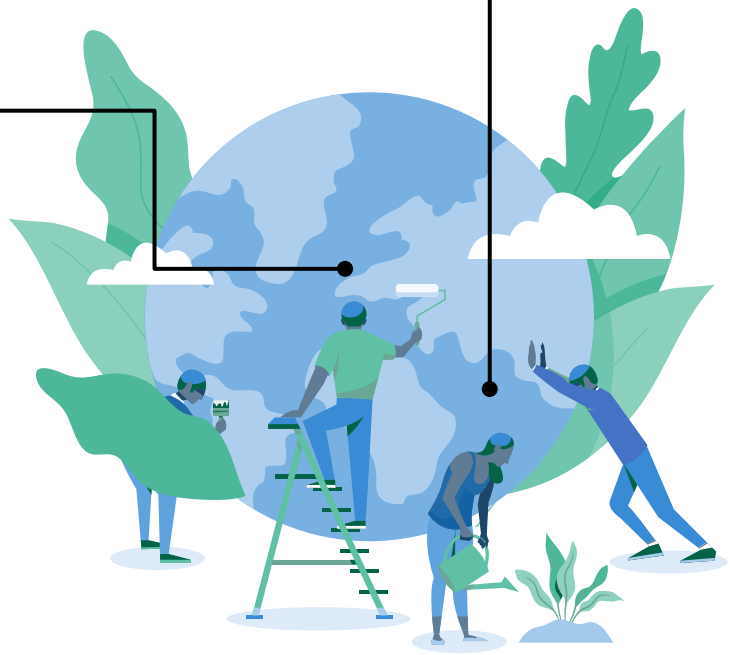
Cuentan con procesos de contenerización (parcial o total)

MARCO NORMATIVO E INSTITUCIONAL RESIDUOS SÓLIDOS ECUADOR

MINISTERIO DEL AMBIENTE, AGUA Y TRANSICIÓN ECOLÓGICA DEL ECUADOR (MAATE)

Facultades y responsabilidades del MAATE

- ✓ Rectoría: Dictar políticas GIRS.
- ✓ Planificación: Elaborar Plan Nacional GIRS.
- ✓ Regulación: Instrumentos normativos GIRS.
- ✓ Control: Verificar cumplimiento de planes, normas y procedimiento GIRS.
- ✓ Gestión: Implementar proyectos alcance nacional GIRS.



Proyecto Gestión de Residuos Sólidos y Economía Circular Inclusiva (GRECI)

Implementar la GIRS en el ámbito público y privado, con enfoque de economía circular y reciclaje inclusivo, apoyada en tecnología e innovación.

COMPONENTE 1

Plan Nacional de residuos sólidos no peligrosos

FORMULACIÓN DEL PLAN NACIONAL GIRS

Plan Nacional GIRS:

- Instrumento de política pública a través del cual se generarán las metas, políticas, estrategias, planes, programas y proyectos para la gestión integral de residuos y desecho sólidos no peligrosos.
- Construcción participativa con GADM, entidades competentes, sector privado, sociedad civil y academia.

1. DIAGNÓSTICO SECTORIAL

2. PLAN NACIONAL GIRS

3. LINEAMIENTOS TÉCNICOS

- Instructivos/Herramientas.
- Guías.
- Manuales.
  (2 publicaciones)

4. DIFUSIÓN

CUANTIFICACIÓN Y CARACTERIZACIÓN DE RESIDUOS SÓLIDOS

GUÍA DE CUANTIFICACIÓN Y CARACTERIZACIÓN DE RESIDUOS SÓLIDOS

OBJETIVO

Establecer los lineamientos, parámetros y procedimientos que deben aplicar los GADM para elaborar su estudio de cuantificación y caracterización de residuos y desechos sólidos no peligrosos (ECCRS).

USUARIOS

- Funcionarios de municipios, responsables de las unidades de residuos sólidos.
- Especialistas y técnicos que formulen proyectos de residuos sólidos.
- Profesionales de instituciones públicas y privadas vinculadas a la gestión de los residuos sólidos.

IMPLEMENTACIÓN Y VIGENCIA

El ECCRS deberá realizarse y presentarse a la Autoridad Ambiental Nacional (AAN) al menos una (1) vez cada cuatro (4) años.

Etapas de la Guía:

Etapa de planificación

Se conformará el personal que dirigirá la elaboración del estudio, se coordinarán y programarán acciones para recabar información existente conforme a los procedimientos establecidos.

Etapa de diseño

Se identifican los parámetros necesarios para la estructuración del estudio (tipo de generadores, población, categorización del cantón, tamaño de muestra)

Etapa de campo

Es la etapa del estudio en la que se ejecutan actividades para recopilar la información primaria del muestreo realizado.

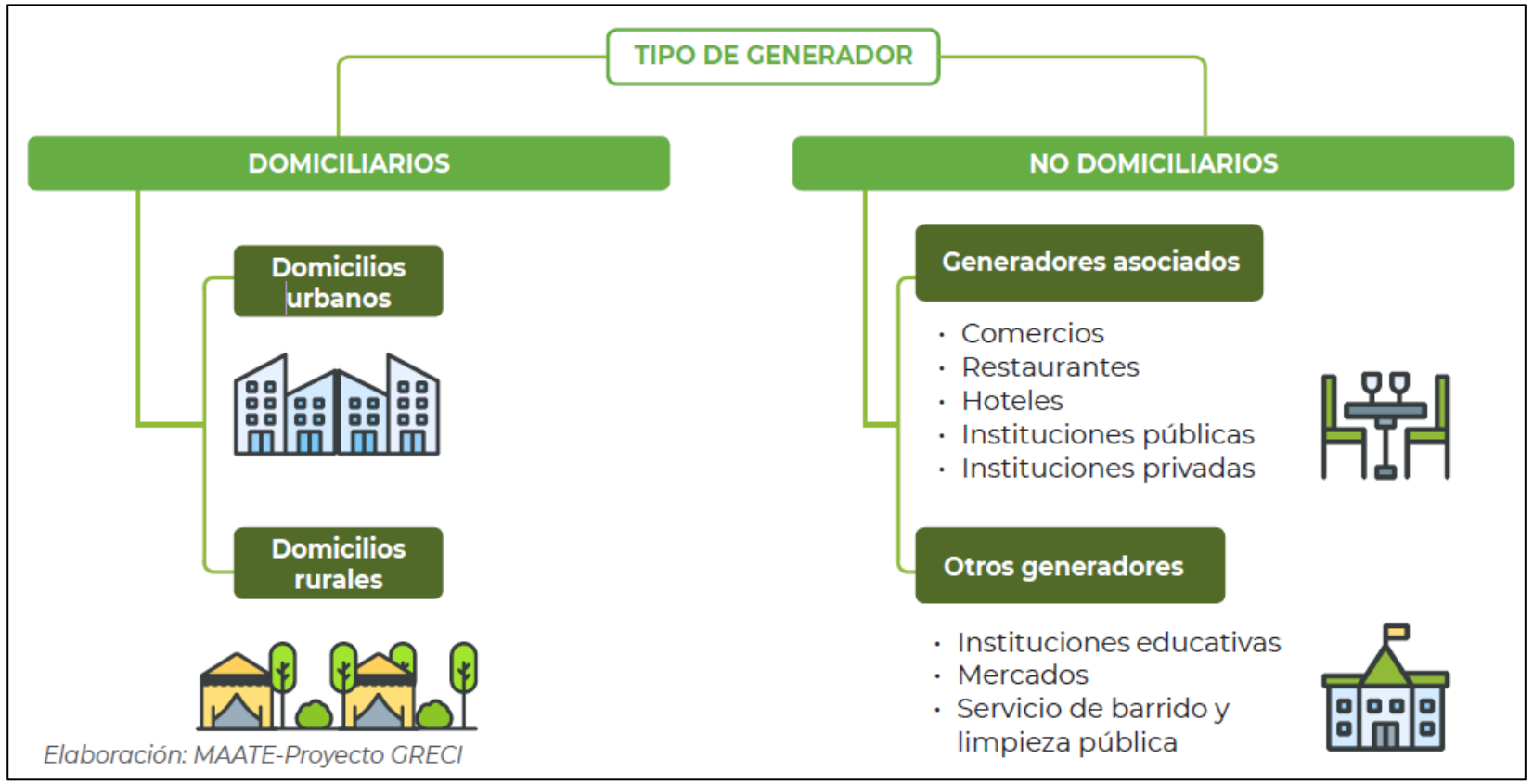
Etapa de análisis

Se realizará la tabulación, sistematización y análisis de los datos para determinar los parámetros de cuantificación y caracterización.

GUÍA DE CUANTIFICACIÓN Y CARACTERIZACIÓN DE RESIDUOS SÓLIDOS

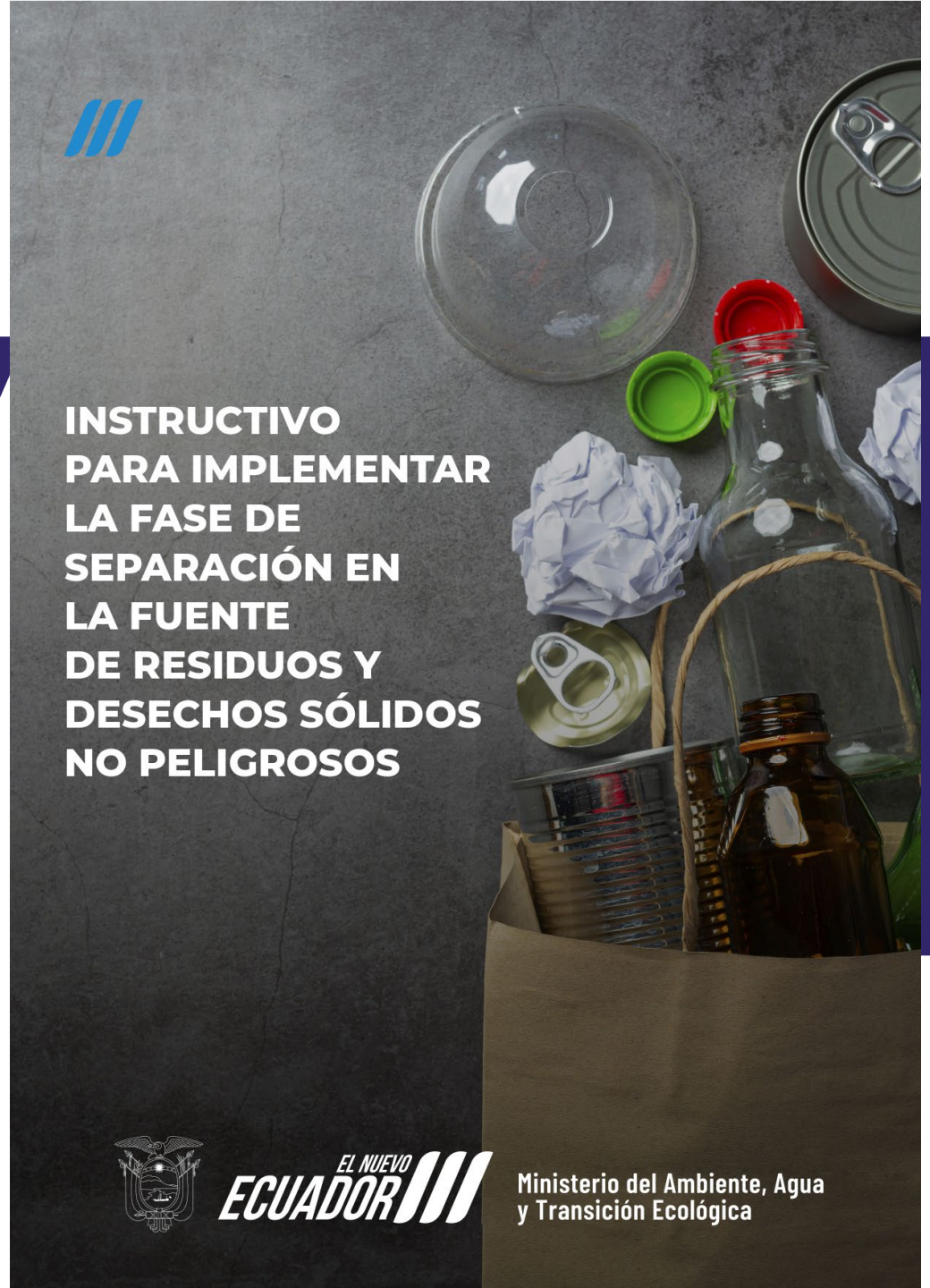
Características de la Guía:

- Estandarización de los tamaños de las muestras, según la categorización de los cantones (5 categorías).
- Consideración de los generadores más representativos presentes en el cantón.
- Determinación de Producción per cápita (PPC) ponderada, densidad, composición y generación de residuos sólidos a nivel cantonal.
- Cálculos y validaciones de información.
- Elaboración del estudio de cuantificación y caracterización.



PILOTAJE EN EL GOBIERNO AUTONOMO DESCENTRALIZADO MUNICIPAL (GADM) DE PUERTO LÓPEZ

PILOTAJE EN EL GADM DE CAYAMBE



SEPARACIÓN EN LA FUENTE DE RESIDUOS SÓLIDOS

INSTRUCTIVO DE SEPARACIÓN EN LA FUENTE DE RESIDUOS SÓLIDOS

Objetivos:

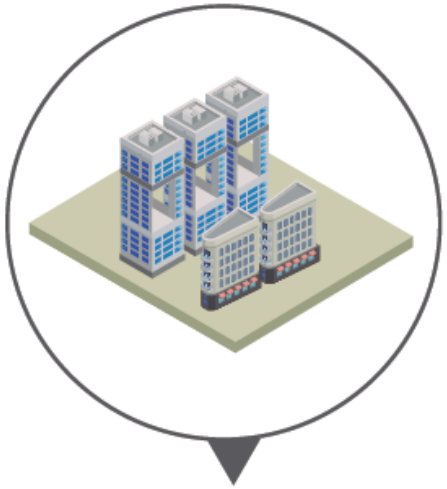
- Llevar a cabo la separación en la fuente de una manera correcta y efectiva.
- Fomentar la adopción de prácticas de la GIRS y la reducción de desechos enviados a los sitios de disposición final.
- Se podrá identificar y separar adecuadamente, tales como orgánicos, reciclables y no reciclables.
- Educar a la población sobre los beneficios de la separación en la fuente.
- Reducir la contaminación y la promoción de una cultura de consumo responsable.
- Proveer el acceso a información relevante, ubicación de puntos de reciclaje y la correcta disposición de residuos y desechos sólidos.

INSTRUCTIVO DE SEPARACIÓN EN LA FUENTE DE RESIDUOS SÓLIDOS

Actores que participan en la fase de separación:

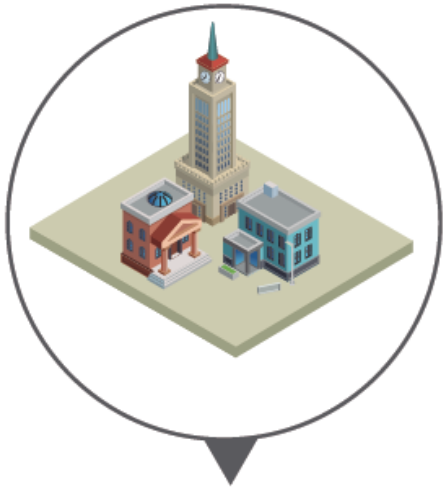
DOMICILIARIOS

Residencias
Casas
Viviendas

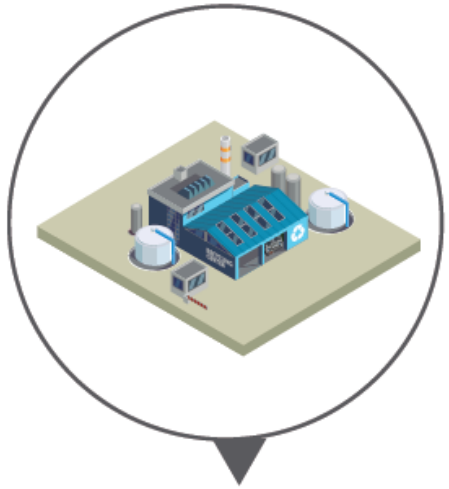


Conjuntos habitacionales, urbanizaciones, condominios

NO DOMICILIARIOS



Instituciones: educativas, públicas y privadas



Establecimientos comerciales, industrias, mercados, hoteles, restaurantes

INSTRUCTIVO DE SEPARACIÓN EN LA FUENTE DE RESIDUOS SÓLIDOS

Criterios:

Conforme al Reglamento de Código Orgánico del Ambiente.

En su Art. 587. Separación el fuente.

Los residuos y desechos deberán ser clasificados en orgánicos, reciclables y desechos.

Además, se emplea la Norma INEN 2841: Estandarización de colores para recipiente.

INSTRUCTIVO DE SEPARACIÓN EN LA FUENTE DE RESIDUOS SÓLIDOS

Fases de implementación de la separación en la fuente:

Fase de planificación

1. Organización para el proceso de separación en la fuente
2. Diagnóstico y determinación de parámetros técnicos de implementación.
3. Diseño de actividades para implementación de separación en la fuente.

Fase de socialización y sensibilización

1. Vinculación de actores estratégicos.
2. Comunicación sobre el proyecto a actores estratégicos.
3. Coordinación de reuniones informativas.
4. Diseño de material de difusión.
5. Campañas de educación y concientización.

Fase de implementación

1. Articulación con gestores y recicladores y recicladoras de base.
2. Capacitación al personal operativo.
3. Difusión del programa.
4. Lanzamiento del programa.
5. Aplicación del proceso de separación

Fase de resultados

1. Indicadores:
- Municipales
- Reciclaje inclusivo/Gestores ambientales.

INSTRUCTIVO DE SEPARACIÓN EN LA FUENTE DE RESIDUOS SÓLIDOS

Recomendaciones:

Papel y Cartón

Libres de grapas y cintas adhesivas. Entregar limpios y secos, sin presencia de restos de comida. Enjuagar, escurrir y aplastar los cartones tipo tetrabrik, colocando sus tapas. Agitar el papel kraft para eliminar cualquier residuo en su interior.

No se recicla

Papel: higiénico, carbón, parafinado, térmico para fax, aluminio, de radiografía, de fotografía y etiquetas adhesivas.

Plásticos

Entregarlos limpios y secos, sin presencia de adhesivos, restos de comida, sustancias perjudiciales o elementos extraños.

No se recicla

El plástico que haya estado en contacto con sustancias y desechos peligrosos, no puede ser reciclado ni mezclado con los demás residuos aprovechables.

Vidrio

Vaciar totalmente su contenido, no es necesario lavarlos y entregarlos secos.De ser posible, los objetos de vidrio deben separarse en una caja de cartón sellada y etiquetada para evitar lesiones.
Piensa en un segundo uso doméstico antes de rechazar.

No se recicla

Lámparas y sus restos, frascos de medicamentos, tubos fluorescentes, vajillas, vidrios de espejos, vitrocerámica o sus restos, cristales de ventanas, faros y vidrios de autos.

Metal

Limpiarlos y secarlos apropiadamente de residuos alimentarios y líquidos, para garantizar su calidad de aprovechamiento.
No deben contener impurezas como pintura, restos de madera o vidrio y, de ser posible, deben estar libres de polvo, agua, aceites o lubricantes.

No se recicla

Pilas y baterías, productos electrónicos, chatarra con elementos químicos, residuos metálicos de construcción (RCD), canecas con químicos.

Crédito fotografías: GIRA

Comprar solo lo necesario.
Revisar fechas de vencimiento para evitar desperdicios.
Algunos insumos pueden usarse como compost para jardín.

No depositar residuos especiales como pilas, celulares, focos fluorescentes, aparatos eléctricos y electrónicos.
Este tipo de residuos y/o desechos especiales no peligrosos y peligrosos deben ser depositados en puntos de acopio en lugares estratégicos.

PROYECTOS E INICIATIVAS RELEVANTES DE SEPARACIÓN DE RESIDUOS

Proyecto: Mi Quito Recicla

Inicio:
Mayo 2024

Fase:
Piloto

Objetivo:
80%
aprovechamiento 2027

Beneficiarios:
30.000 habitantes

Sitios:

- Conocoto
- Nayón
- Cumbayá

PROYECTOS E INICIATIVAS RELEVANTES DE SEPARACIÓN DE RESIDUOS

Proyecto: Mancomunidad Pueblo Cañari

Ubicación:

4 cantones Cañar

Fase:

Implementación

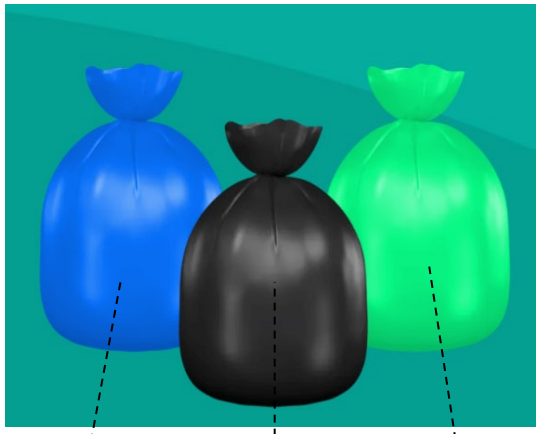
Beneficiarios:

114.625 habitantes

Actividades complementarias:

- Programa educación ambiental.
- Máquinas recicladoras.

Tipo separación:



Reciclables y reutilizables

Desechos

Orgánicos

INFORMACIÓN GENERADA PROYECTO GRECI

Micrositio página MAATE:
www.ambiente.gob.ec/proyecto-gestion-integral-de-residuos-solidos-y-economia-circular-inclusiva-greci/

GRECI
PROYECTO GESTIÓN DE RESIDUOS SÓLIDOS Y ECONOMÍA CIRCULAR INCLUSIVA

Descarga aquí

GRACIAS

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Case Studies – Municipalities

ISWA
International Solid Waste Association

Presenter: **Aditi Ramola and Shraddha Tomar**

Source separation of waste – *an imperative for a circular economy*

The case of Indore and other jurisdictions in India

International Solid Waste Association (ISWA)

ISWA is the world's leading network promoting professional and sustainable waste- and resource management.

ISWA represents all aspects and stakeholders within the waste management sector: the public, the private and the academic.

With more than 1,300 Members in 109 countries, ISWA has a unique global network.

To Promote and Develop Sustainable and Professional Waste Management Worldwide and the transition to a Circular Economy

- Our mission

Potential contribution of better Waste and Resource Management to mitigation of GHG emissions

Global Methane Initiative
Leading methane action since 2004

	Methane from decomposition of organic wastes	Other direct emissions
Direct emissions from waste management	**Around 10% of national GHG emissions prior to control measures** • Uncontrolled disposal • Controlled landfill without gas collection • *Landfill with gas collection and flaring or recovery* • *Divert biodegradable wastes from landfills* 	**Small % of global GHG emissions** • Black carbon from open burning by the waste generator – *extend waste collection* • Black carbon from open dumps on fire - *upgrade to controlled landfill* • Nitrous oxide (N_2O) and CO_2 from composting or incineration 
Indirect savings from the circular economy	 • *Avoid food waste – reduce waste from food production, distribution and consumption* • *Extend product life, repair, refurbish, reuse – clothes, electronic products, etc.* • *(Excludes significant additional circular savings from the building and transport sectors)* **5-10% of global GHG emissions** **Waste prevention**	 • *Substitution of virgin materials – metals, glass, paper, plastics, textiles, etc.* • *Organics recycling displacing e.g. fertiliser* • *Energy recovery, including landfill gas and anaerobic digestion* **5-10% of global GHG emissions** **Recycling and energy recovery**
Data caveats	*Measurement is difficult and uncertain, and the 'system boundary' is a bit 'fuzzy'*	*Adding together the four uncertain ranges for the four quadrants increases the uncertainty*

High confidence that overall potential contribution to mitigation of global GHG emissions is **SIGNIFICANT!**

Makes no difference whether overall estimate is 15%, 20%, 25%

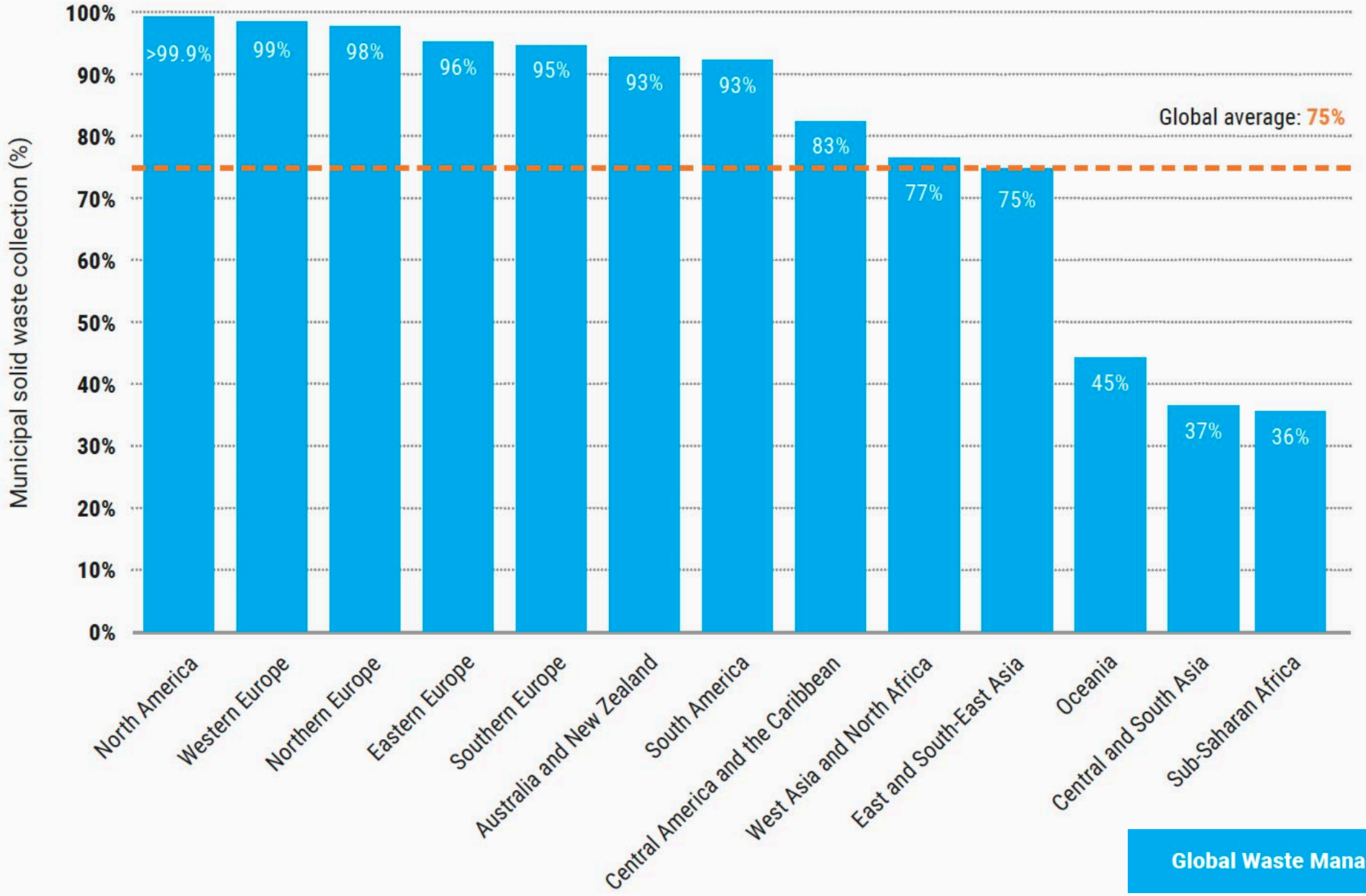
We need ACTION NOW!

Key: Emission sources are shown in plain text | *Mitigation measures shown in italics*

Note: Figures are estimates of % total global (or national) emissions, expressed as CO_2 equivalents

Upcoming in the special issue of the peer reviewed journal Waste Management and Research:
Unlocking the significant worldwide potential of better waste and resource management for climate mitigation: with particular focus on the Global South

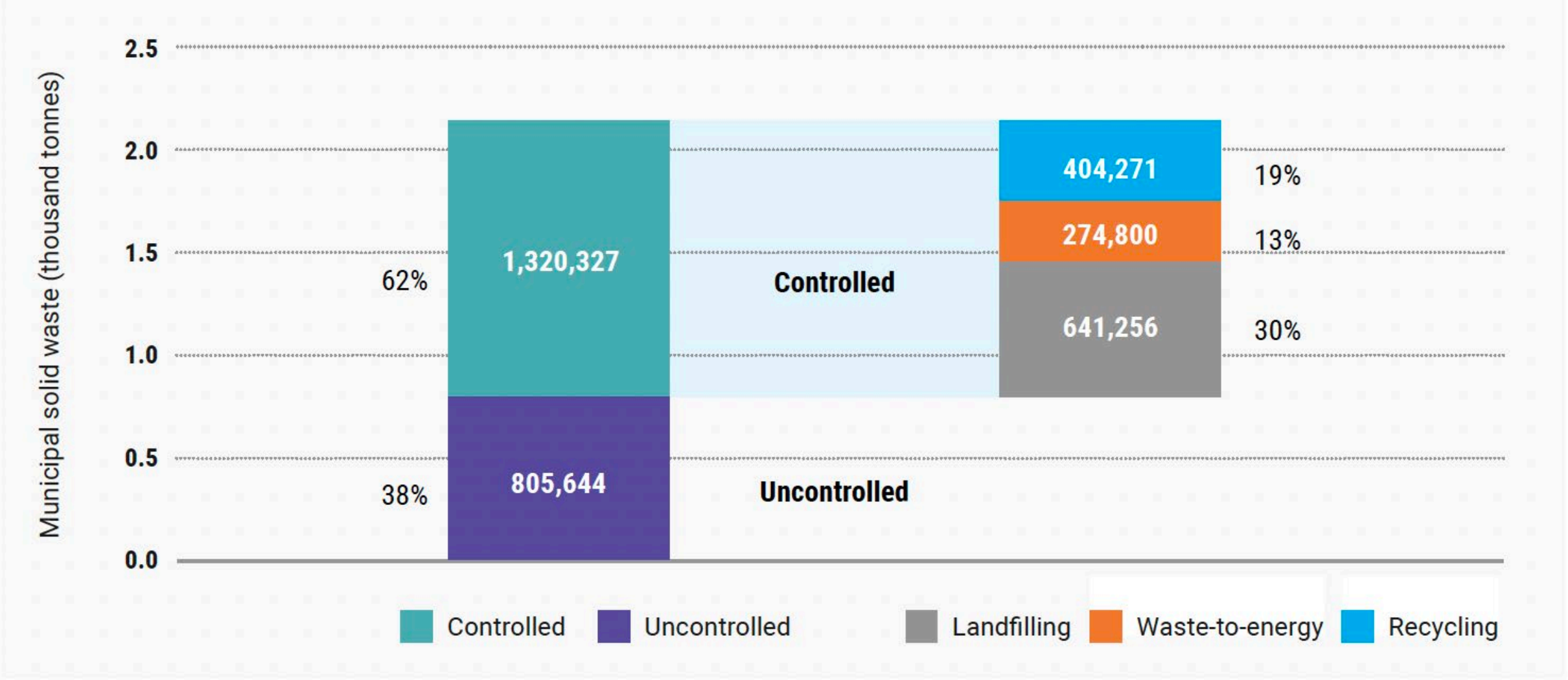
Municipal Solid Waste (MSW) collection rates by region



Some **2.7 billion** people do not have their waste collected.

Global Waste Management Outlook 2024

MSW Destinations in 2020



Waste management priorities

01

To prevent runaway negative impacts from municipal solid waste, actions must be taken urgently to halt waste growth and to shift towards zero waste and circular economy models.

02

Municipal solid waste management must be prioritised, in order to provide all communities with affordable services and end the harmful and widespread practice of open dumping and waste burning.

03

Producers and retailers need to be motivated to provide goods and services in ways that avoid waste generation, while the most problematic and polluting materials should be phased out.

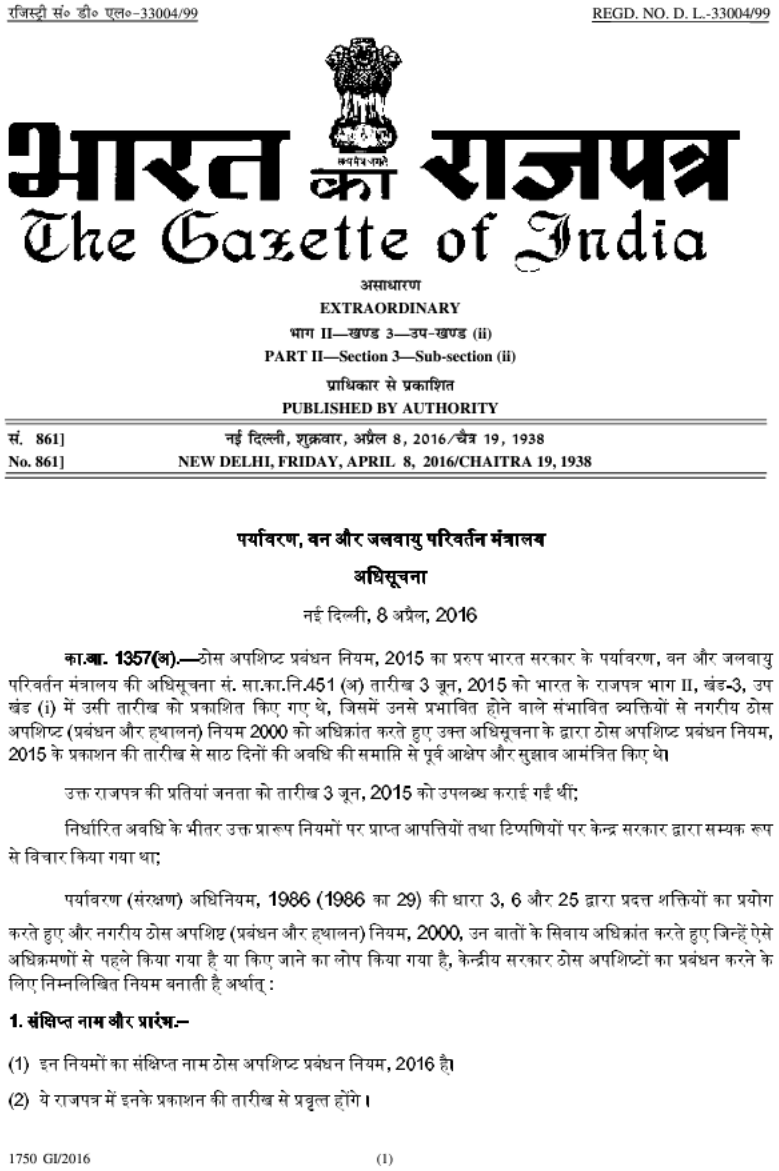
Source separation and collection of waste with a focus on organics

- Resource conservation
- Reduction in GHG emissions
- Better recycling efficiency (dry recyclables and organic)
- Promotion of a circular economy

Source: NDTV

National legislation – India

- The Solid Waste Management Rules, 2016 make waste segregation mandatory for all
  - Households and other waste generators are required to separate waste into three streams: organic/biodegradable waste, dry waste, and domestic hazardous.



रजिस्ट्री सं० डी० एल०-33004/99 REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)
प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 861] नई दिल्ली, शुक्रवार, अप्रैल 8, 2016/चैत्र 19, 1938
No. 861] NEW DELHI, FRIDAY, APRIL 8, 2016/CHAITRA 19, 1938

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 8 अप्रैल, 2016

का.आ. 1357(अ).—ठोस अपशिष्ट प्रबंधन नियम, 2015 का प्ररुप भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की अधिसूचना सं. सा.का.नि.451 (अ) तारीख 3 जून, 2015 को भारत के राजपत्र भाग II, खंड-3, उप खंड (i) में उसी तारीख को प्रकाशित किए गए थे, जिसमें उनसे प्रभावित होने वाले संभावित व्यक्तियों से नगरीय ठोस अपशिष्ट (प्रबंधन और हथालन) नियम 2000 को अधिक्रांत करते हुए उक्त अधिसूचना के द्वारा ठोस अपशिष्ट प्रबंधन नियम, 2015 के प्रकाशन की तारीख से साठ दिनों की अवधि की समाप्ति से पूर्व आक्षेप और सुझाव आमंत्रित किए थे।

उक्त राजपत्र की प्रतियां जनता को तारीख 3 जून, 2015 को उपलब्ध कराई गई थीं;

निर्धारित अवधि के भीतर उक्त प्रारूप नियमों पर प्राप्त आपत्तियों तथा टिप्पणियों पर केन्द्र सरकार द्वारा सम्यक रूप से विचार किया गया था;

पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3, 6 और 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और नगरीय ठोस अपशिष्ट (प्रबंधन और हथालन) नियम, 2000, उन बातों के सिवाय अधिक्रांत करते हुए जिन्हें ऐसे अधिक्रमणों से पहले किया गया है या किए जाने का लोप किया गया है, केन्द्रीय सरकार ठोस अपशिष्टों का प्रबंधन करने के लिए निम्नलिखित नियम बनाती है अर्थात् :

1. संक्षिप्त नाम और प्रारंभ.–

(1) इन नियमों का संक्षिप्त नाम ठोस अपशिष्ट प्रबंधन नियम, 2016 है।

(2) ये राजपत्र में इनके प्रकाशन की तारीख से प्रवृत्त होंगे।

1750 GI/2016 (1)

Case of Indore, India

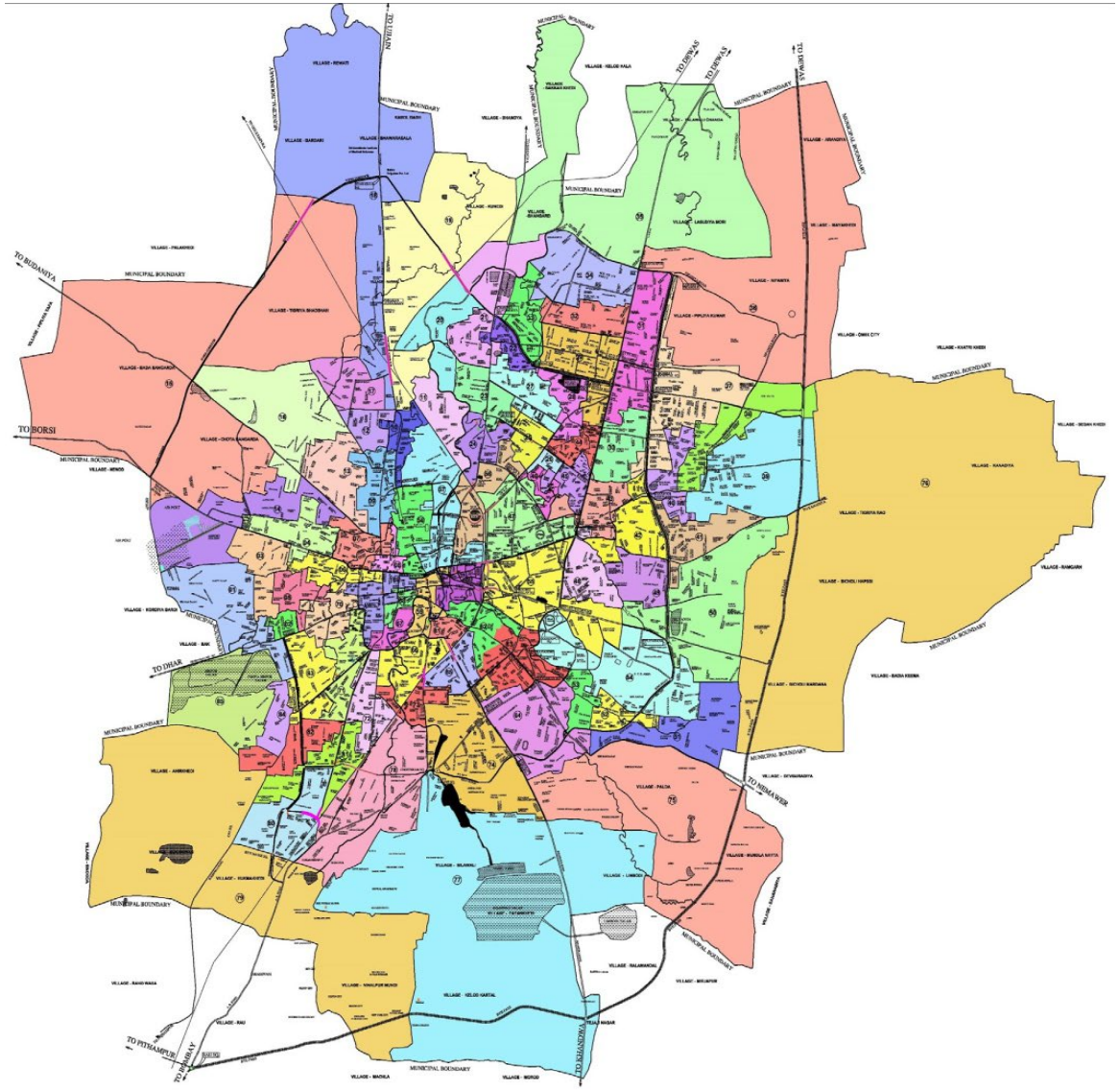
The city of Indore is located in the state of Madhya Pradesh in central India. It has been ranked the cleanest city in India 7 times in a row. It wasn't always clean -> hear about the journey from:

Ms. Shraddha Tomar
Solid Waste Management Expert,
Indore Municipal Corporation

Source: Wikimedia Commons

Introduction to Indore

State	Madhya Pradesh		
Urban Local Body	Indore Municipal Corporation		
Zones/ Wards	19 Zones 85 Wards 5,89,000 residential units (households) 71,764 non-residential		
Demography	Year	Population	
	2024	2,996,000 (floating 272,367)	
Waste generation (in TPD)	Total SW generated	Wet waste generation	Dry waste generation
	1176.63	680.86	477.13
	Sanitary	Domestic Hazardous Waste (DHW)	E-waste
	12.67	3.51	2.46
Inert	22.9 Tons per day		
(per capita)	0.397 kg		



First Water Plus City
First 7 Star-rated city
7 times Cleanest City of India award

Global Model for Waste Management

Indore in 2024

[1]IEC/BC: Information Education and Communication/Behavior change
[2]ICT: Information and Communication Technology

Challenges in 2015

Garbage dumps and stray cattle

Lack of waste management infrastructure

Presence of 3000+ secondary storage bins

Challenges in 2015

100 years of legacy waste

Strategic initiatives to address these challenges

Progressive steps taken by the Indore Municipal Corporation (IMC)

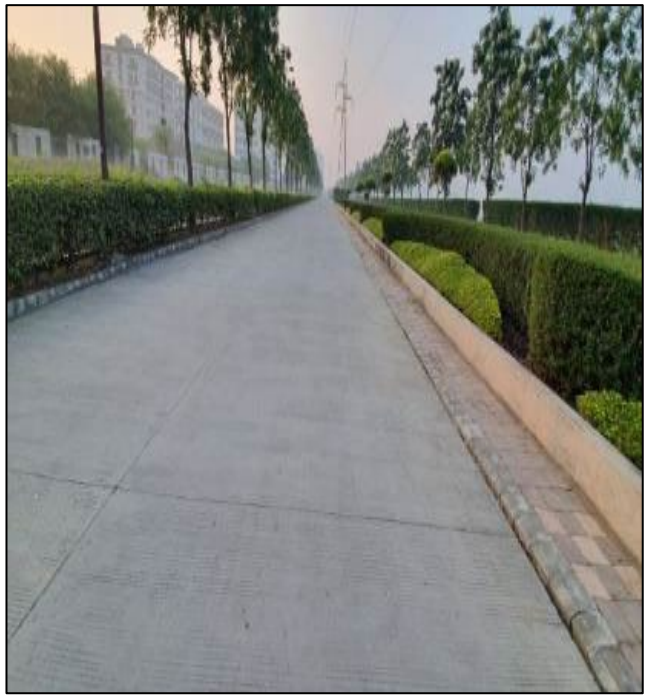
May 2015 – May 2016 (1 Year)	• Setting up infrastructure for Solid Waste Management (SWM) • Collection, Segregation, Transportation of Waste • Purchase of vehicles for waste collection/transportation • Training of Municipal/Sanitation Staff
May 2016 onwards	• Community engagement activities to create awareness • Targeted community involvement at various levels i.e., RWA*s, Commercial Establishments, Social Organizations, etc., • Non-Governmental Organizations were mobilized for large scale awareness campaigns
May 2020 onwards	• Enhanced public participation like Zero Waste Ward, Air Quality etc. • Technological interventions to upgrade waste management processes • Shift from 3 bin to 6 bin segregation at home • Waste to wealth - Carbon credits, Bio compressed natural gas (Bio-CNG) plant, Dry waste processing plant at trenching ground • Kahn and Sarswati cleaning and river rejuvenation project

*RWA: Residents Welfare Associations

Indore in 2024

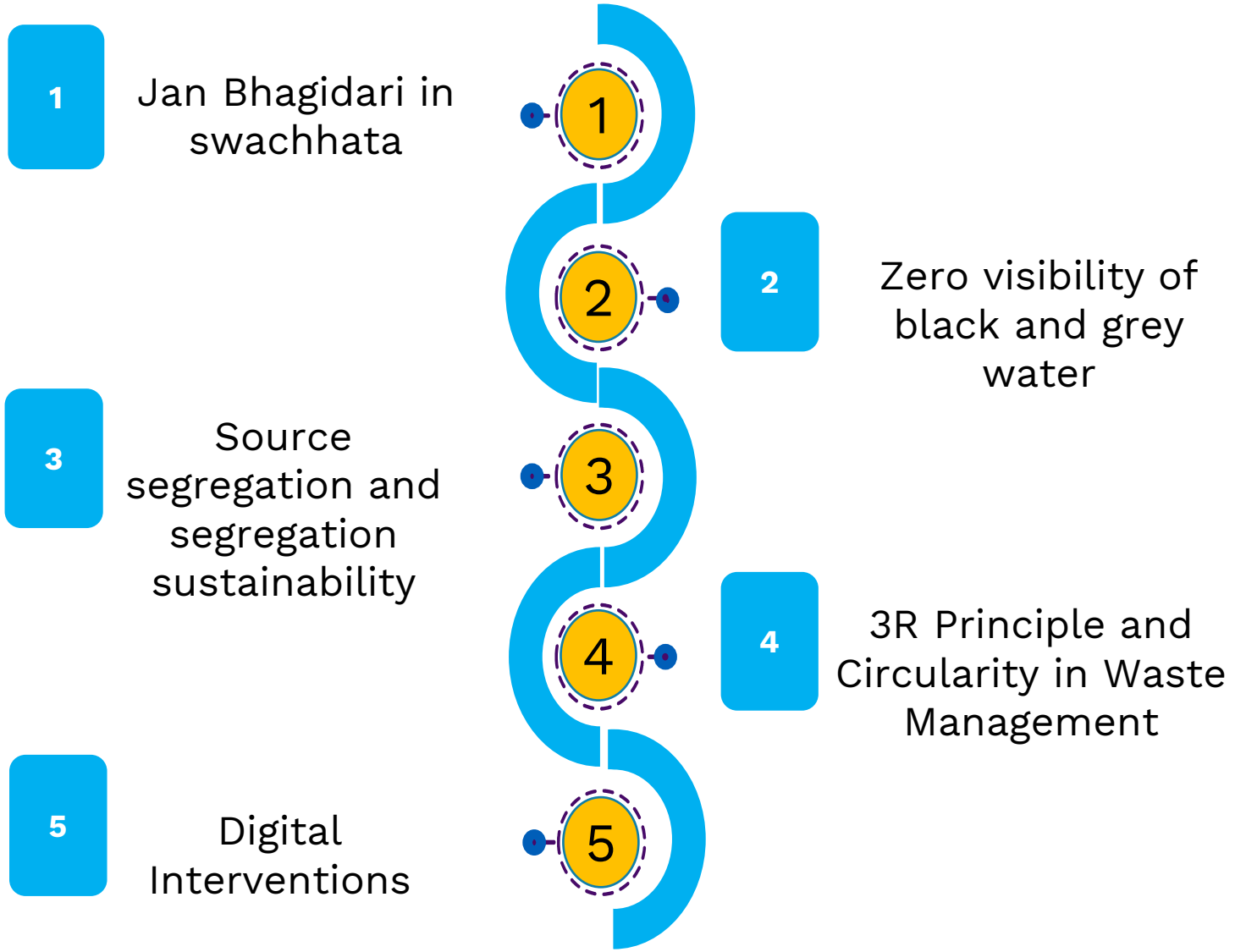
Under the Swachh Bharat Mission (U), IMC planned to make Indore city:

- Secondary storage bin free
- Litter free
- Dust free
- Air Quality
- Water Quality Improvement
- Zero visibility of Black and Grey water



Indore in 2024

‘Panch Sutra’- Five Pillars of Indore



Solid Waste Management

Bin Free City initiative- over 3,000 secondary storage bins removed (2015 – 2021)

January 2015	March 2015	March 2016	October 2016	December 2016	September 2021
Pilot Project Started in Ward 71 and 42	Door to Door Collection of Waste in 10 Wards	Bin Free Initiative Started	Door to Door Collection of Waste in all Wards	Indore got the status of Bin Free City	Indore Bin Free City

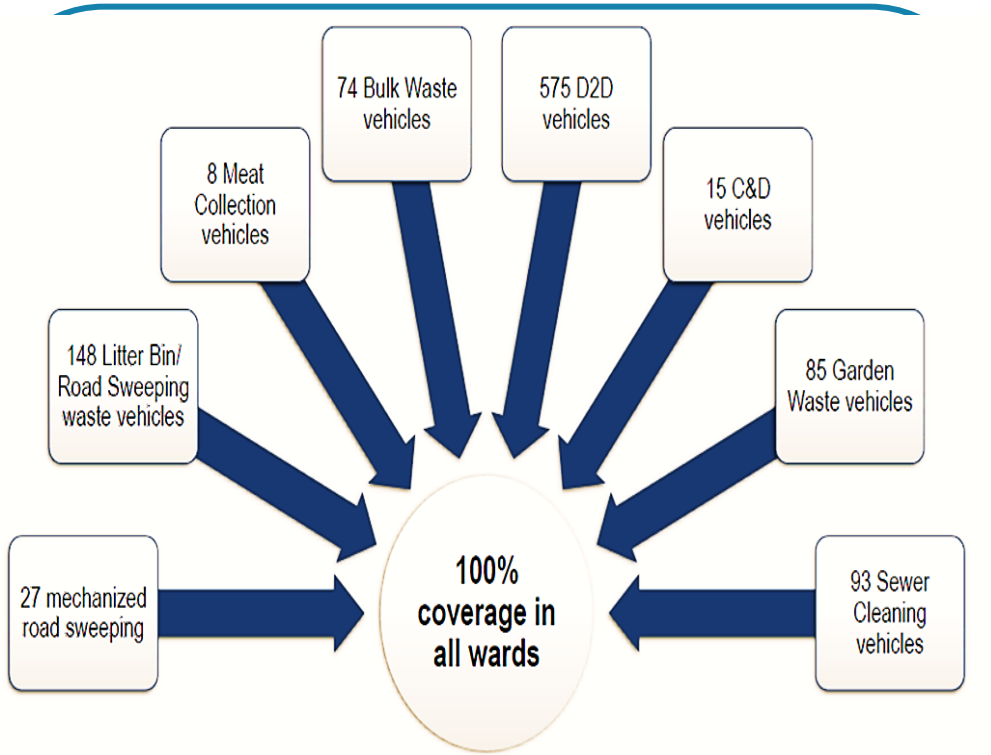
Solid Waste Management

Safe containment and segregated transportation

100% source segregated waste collection

10 ultra modern mechanized transfer stations

Processing/ recycling/ repurpose



Specially designed/fabricated collection vehicles

Separate mechanism of collection of waste from bulk waste generators

- **Collection of waste from more than 4532 commercial bulk waste generators**
- **Collection of waste from 206 hospitals and nursing homes**

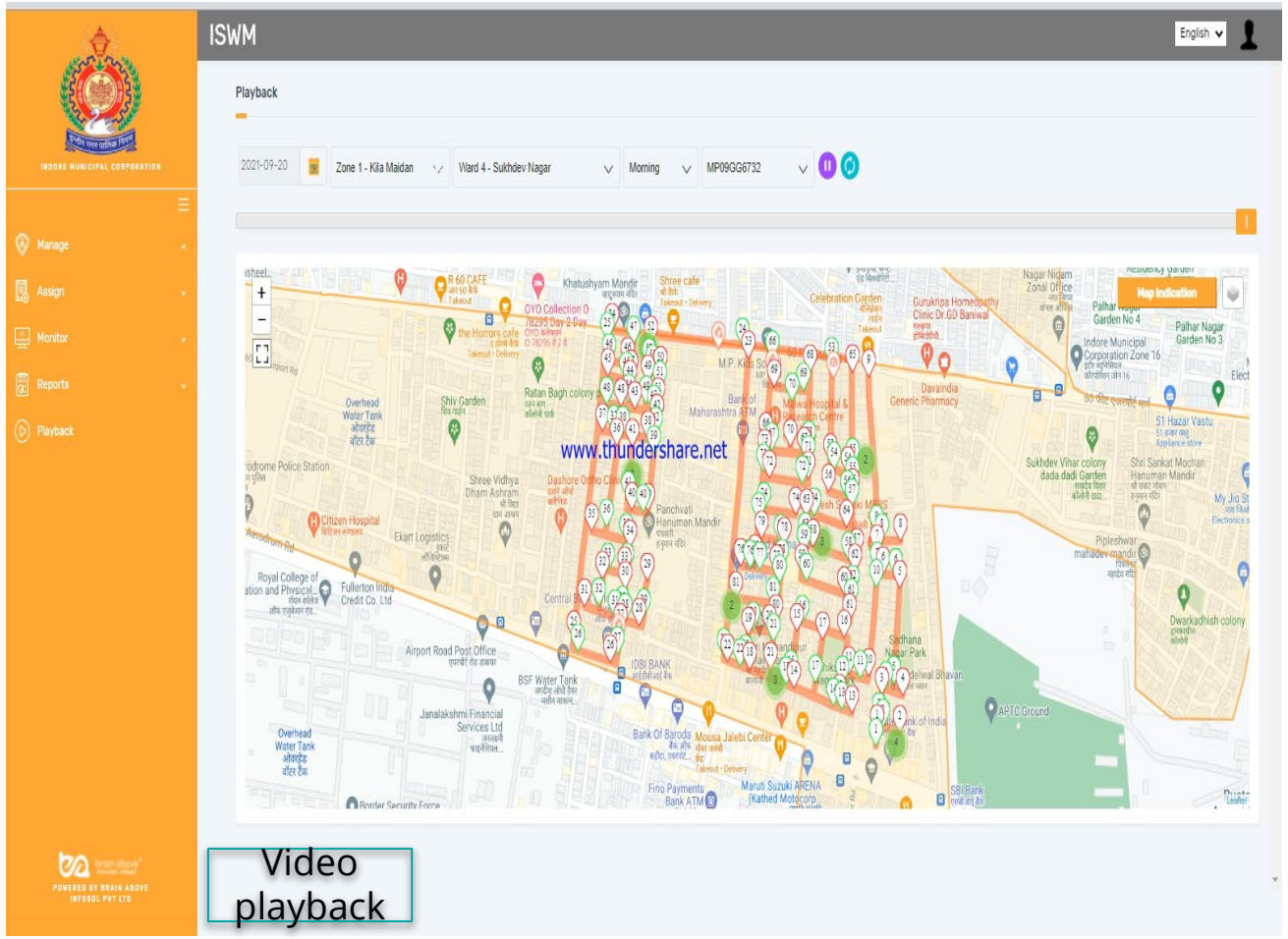
Collection of waste from meat market, fish market & poultry market

08 Separate vehicle for collection of waste from meat market,
fish market & poultry market

Technology interventions

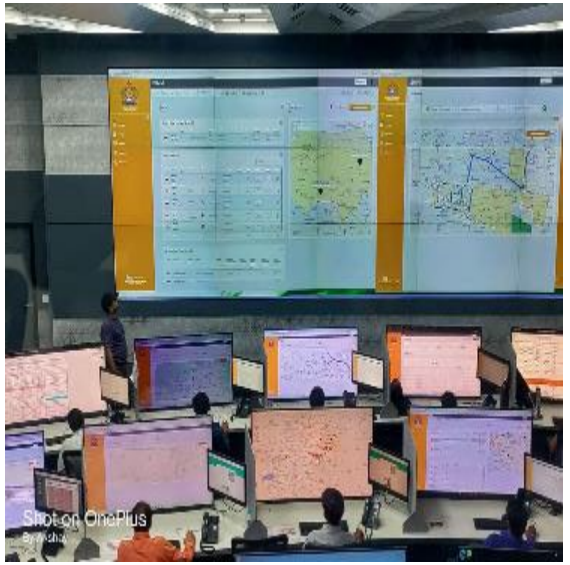
ICT tool: Vehicle Tracking & Monitoring System (VTMS)

Installation of GPS receivers in 700+ vehicles	Web based vehicle tracking solution	Dashboard, Live Vehicle Tracking, Route Replay, Admin module	Reports, Alerts, Integration requirement	Integration with weight bridge



Video playback

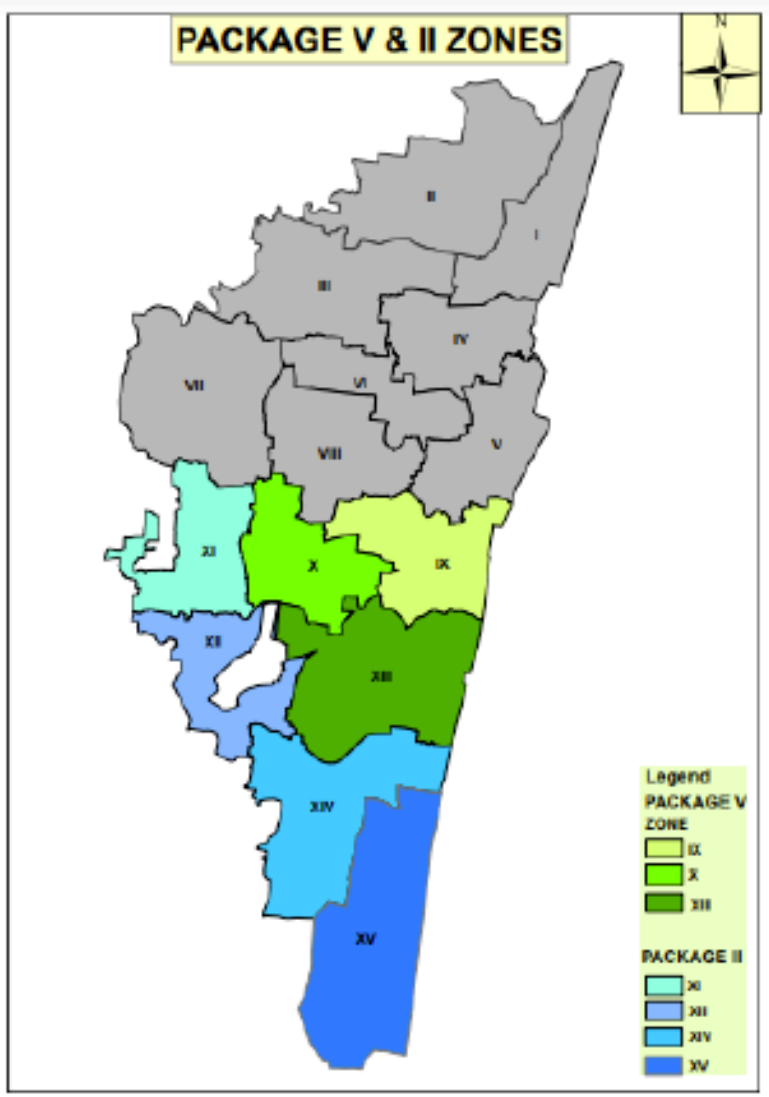
Integrated Command Control Centre (ICCC)



Case of Chennai

- Megacity on the East coast of India in the state of Tamil Nadu
- 15 zones, 200 wards
- Population of the metro ~12 million

Chennai overview – Public-Private Partnership (PPP) with Urbaser-Sumeet



39,15,152
POPULATION
V – 24,47,195
II – 14,67,957

207.60
SQ KM
V – 88.57
II – 119.03

8,91,055
HOUSEHOLDS
V – 5,24,113
II – 3,66,942

3,338
TONS / DAY
V – 2,195
II – 1,143

68,160
COMMERCIAL
V – 45,445
II – 22,715

.74
PER CAPITA
V 0.85
II 0.65

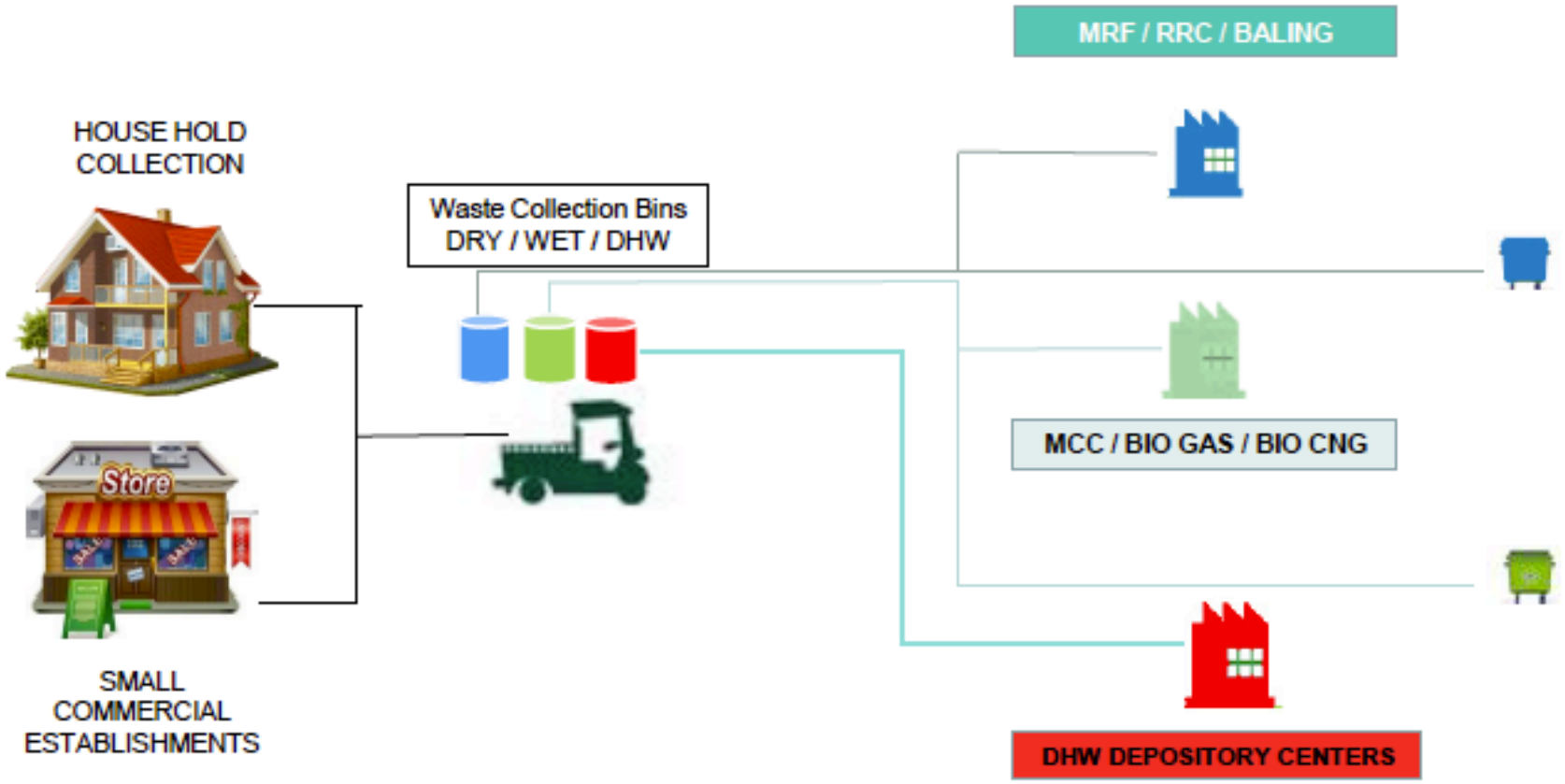
OPERATING ZONES

- ZONE 13 (WARDS 13) ADYAR
- ZONE 9 (WARDS 18) TEYNAMPET
- ZONE 10 (WARDS 16) KODAMBAKKAM
- ZONE 15 (WARDS 9) SHOLINGANALLUR
- ZONE 14 (WARDS 11) PERUNGUDI
- ZONE 12 (WARDS 12) ALANDUR
- ZONE 11 (WARDS 13) VALASARAVAKKAM

Source segregation for primary collection

STREET CORNERS HAS SIGNAGE BOARDS
WITH TIMING AND PHONE NUMBER

Primary collection

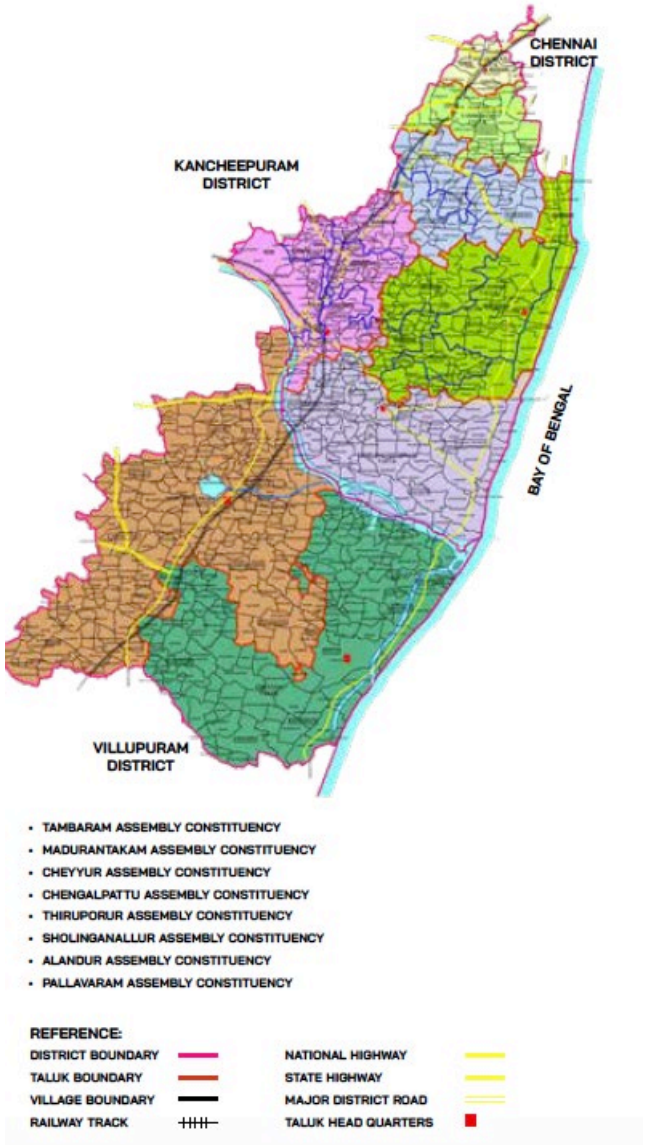


2,919
BOV'S *

450-500
HOUSEHOLD'S BOV

*BOV: Battery operated vehicle

Chengalpattu, TN



- Northeast coast of Tamil Nadu.
- Geographical area: 2800 sq. km.
- One municipal corporation, four municipalities, 6 town panchayats, 8 panchayat blocks, 359 village panchayats.
- Population ~2.8 million.


ECO WARD
Sustainable Waste Management
Awareness Programme


ECO WARD
Sustainable Waste Management
Awareness Programme


ECO WARD
Sustainable Waste Management
Awareness Programme


ECO WARD


சமூக நல சுத்திகரிக்கப்பட்ட குடிநீர் திட்டம்
ECO WARD
Sustainable Waste Management
Awareness Programme

The Clean Oceans through Clean Communities (CLOCC) tuk-tuk

Thank You!

- aramola@iswa.org

delterra

Real Change, At Scale.

We are Delterra

A unique non-profit **punching above our weight** as we **work around the world** to make **materials more circular**

Innovative scalable solutions that redesign human systems for the good of people and the planet

An **entrepreneurial test, learn, and iterate** approach to create proven impact **in the real world that affects real lives**

WE ENVISION
a world where human activities protect and restore a healthy planet

WHERE WE WORK

ARGENTINA

BRAZIL

INDONESIA

Delterra's core programs cover the full value chain

RETHINKING RECYCLING

We work with cities & communities to build recycling systems that maximize the quality and quantity of waste recovered

Generators (e.g., households, businesses), collectors & sorters

RESHAPING MARKETS

We build markets, unlock processing capacity and demand and make value chains more efficient, transparent and ethical

Aggregators, transporters & recycling processors

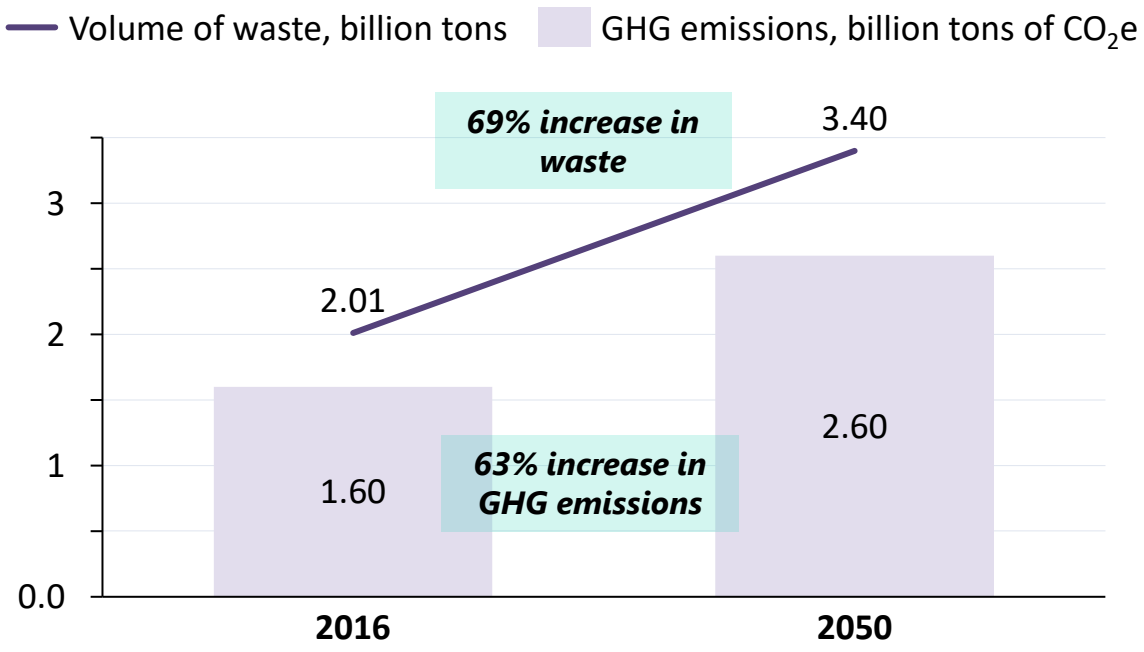
REDESIGNING PACKAGING

We help organizations to produce less waste and more circular packaging through better design

Producers (e.g., packaging manufacturers FMCGs)

Globally, unprocessed waste is a major contributor to GHG emissions

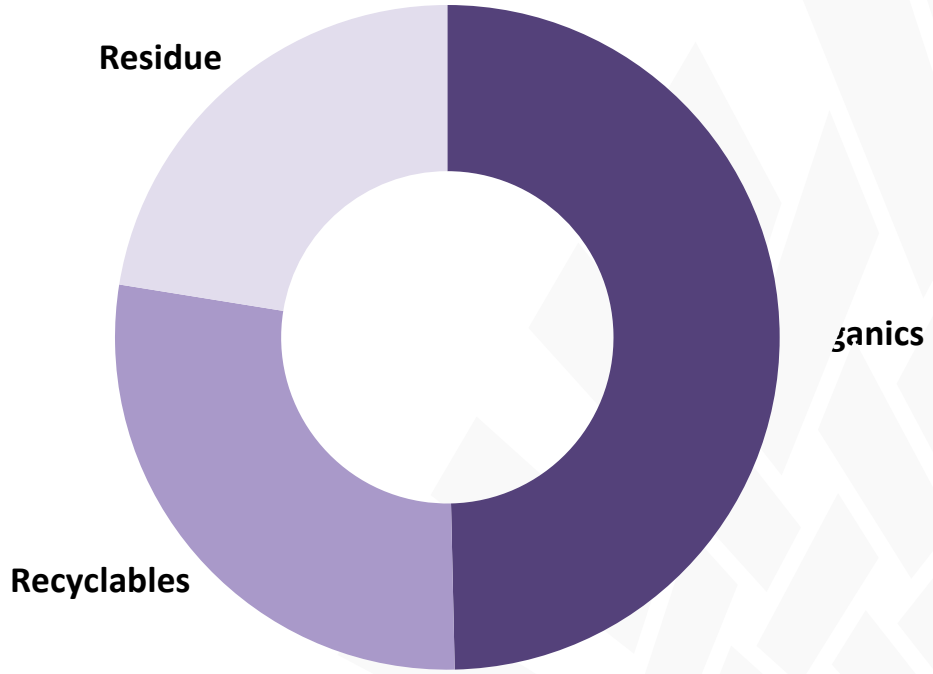
In a business-as-usual scenario, the increase of waste and GHG emissions is expected to continue[1]



GHG emissions from waste currently accounts for ~3% of total global GHG emissions

Solid waste is primarily composed of organic waste

Solid waste composition globally, % of total solid waste[1]



1. World Bank
2. Clean Air Task Force "How our trash contributes to climate change — and what we can do about it (2022); UN Environment Programme- Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions (2021)

Despite the impact of waste on GHG emissions, composting and recycling rates for Municipal Solid Waste remain low in Argentina, Brazil, and Indonesia

Waste profile and recycling rates in Argentina

50% Percentage of Municipal Sold Waste that is organic[1]

<10% Percentage of Municipal Solid Waste that is composted or recycled[2]

Waste profile and recycling rates in Brazil

45% Percentage of Municipal Sold Waste that is organic[3]

<1% Percentage of Municipal Solid Waste that is composted or recycled[4]

Waste profile and recycling rates in Bali, Indonesia

60% Percentage of Municipal Sold Waste that is organic[5]

<4% Percentage of Municipal Solid Waste that is composted or recycled[6]

1. Argentina Ministry of Health and Environment
2. Argentina Ministry of Health and Environment
3. CCAC
4. Fatima Lino, Kamal Ismail, and Juan Castaneda-Ayarza “Municipal Solid Waste treatment in Brazil: A comprehensive review”
5. Delterra Analysis
6. Delterra Analysis

Delterra empowers cities and communities to build self-sustaining collection and recycling systems

Community Engagement

Behavior Change

Capability Building

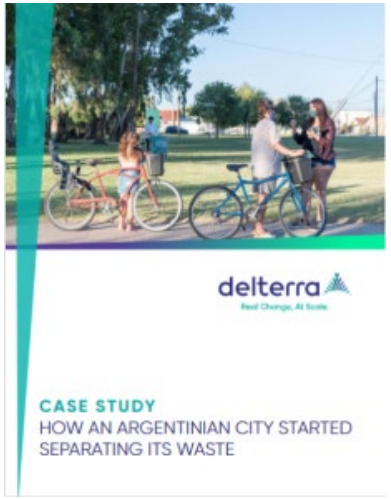
Material Sales

DIGITAL ENABLEMENT

Digital tools for behavioral change education and operational productivity

Insights from Delterra's on-the-ground behavior change programs in Indonesia and Latin America

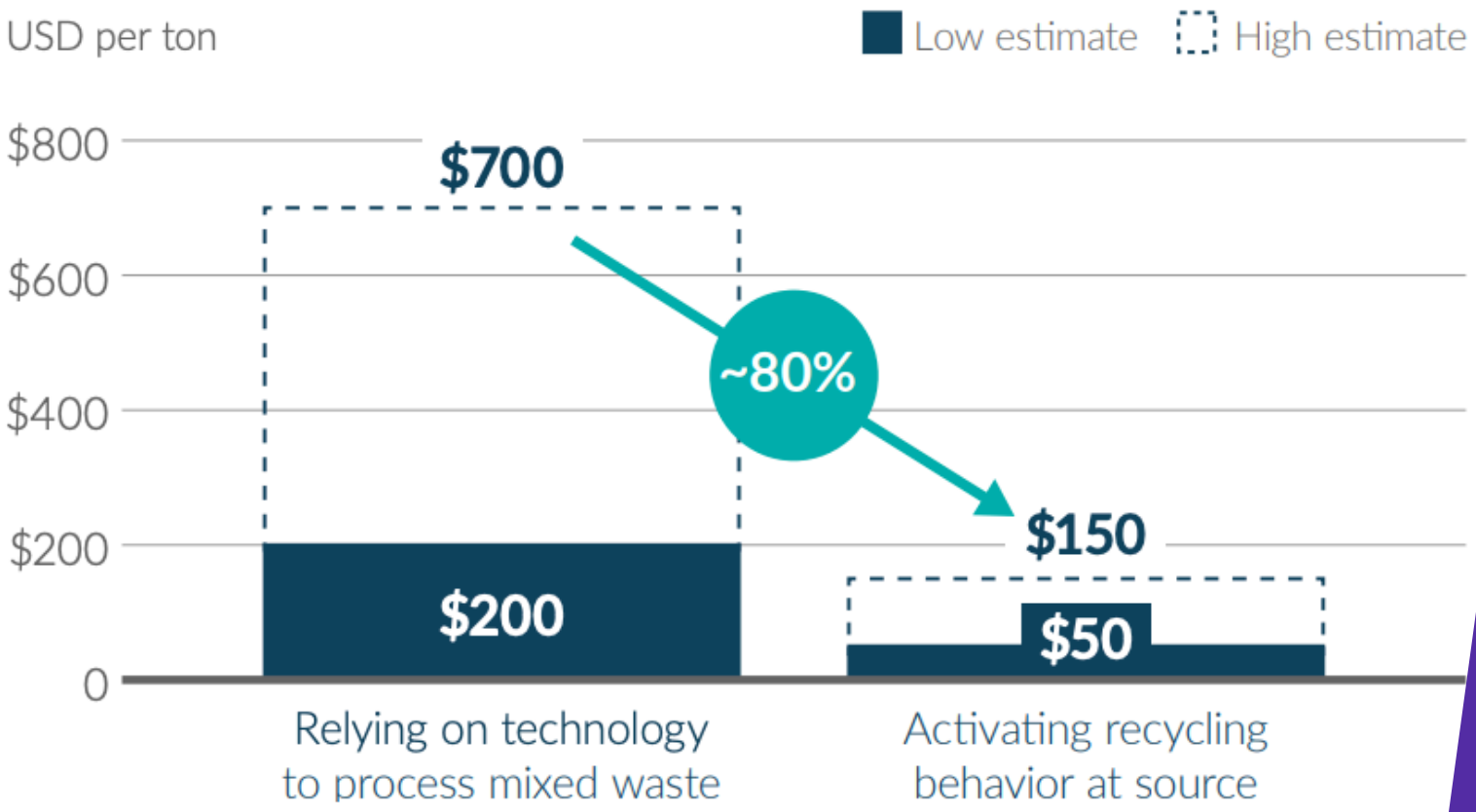
We have published our insights and experience with our behavior change research series



Insight 1

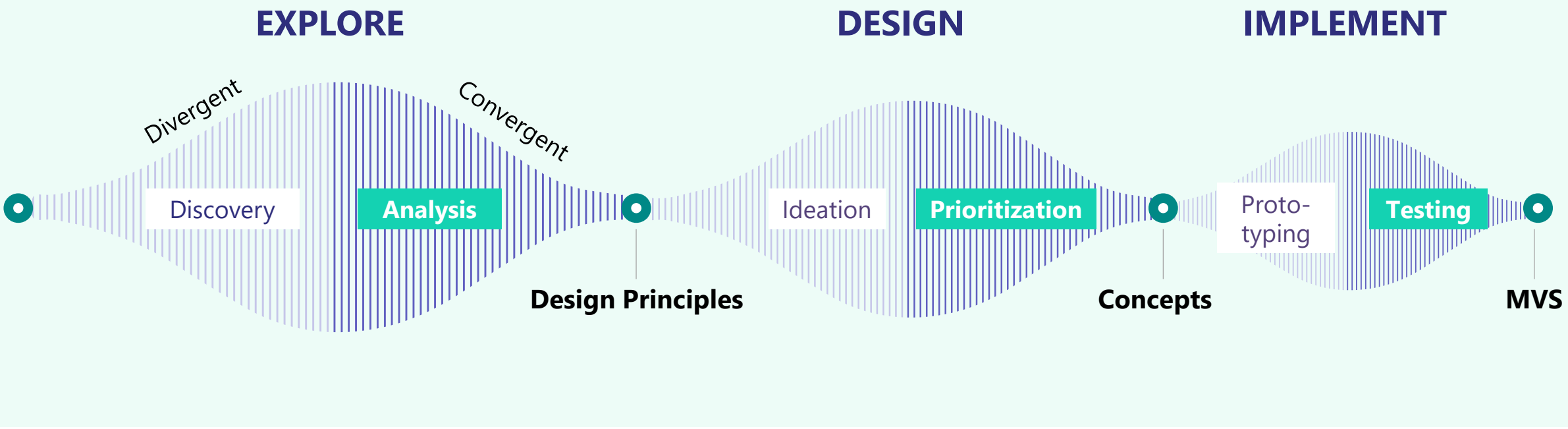
Boosting recycling behavior is more cost-effective than relying on technology to do the work

Comparison of costs of technology vs behavior change



RECYCLING BEHAVIOR JOURNEY

Human-centered design (HCD) framework at the core of our recycling behavior change program's design and implementation



User-research (Qual/Quant)

Online Survey
In-depth interviews
Video Diaries

Cultural/Behavioral Insights

Collaborative Ideation

Prototyping and testing

Online Survey
Focus Groups

Piloting

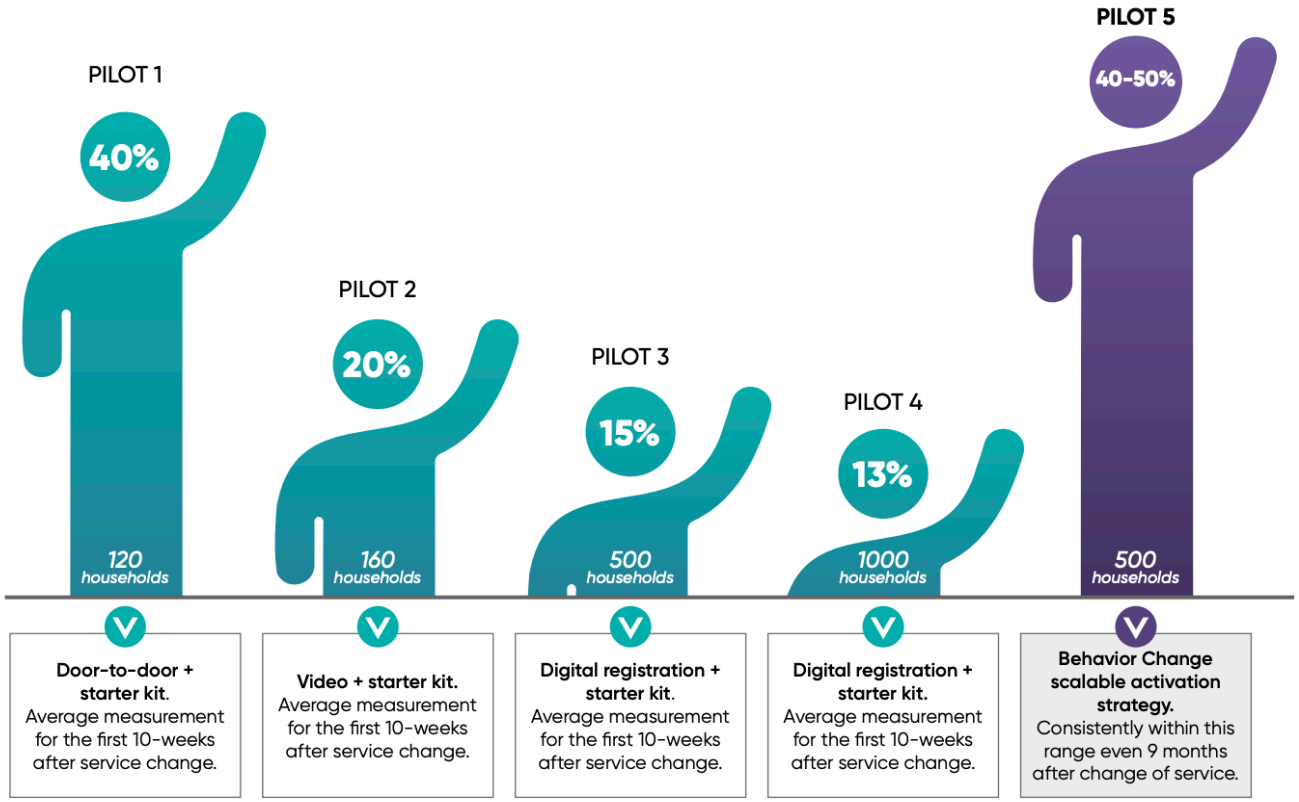
We test different pilots to see what will have the best results to scale across an entire city

After testing various options, we understood that a blend focused on door-to-door interactions, but supplemented by top-down and digital channels, was the most effective approach.

AVERAGE HOUSEHOLDS PARTICIPATION PER PILOT

Households which separate at source and dispose on the proper collection day over total households in the pilot zone

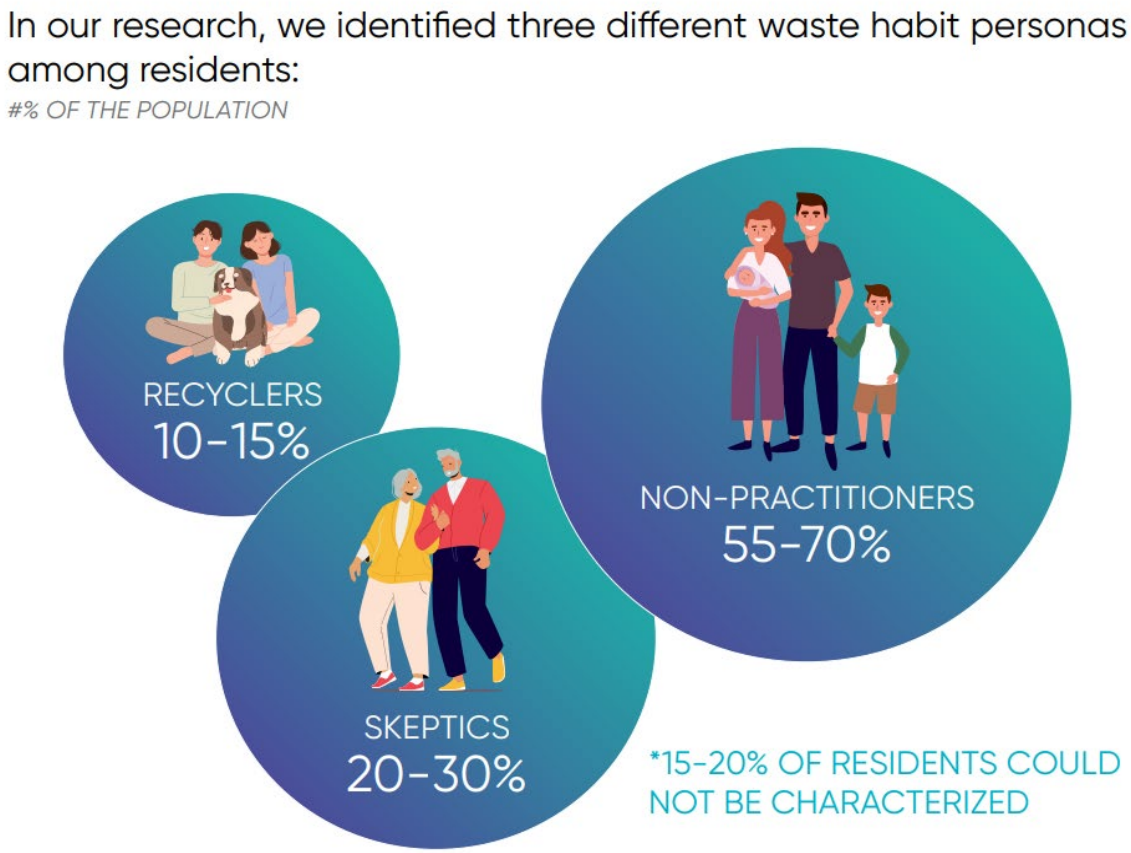
**Avg. Participation Rate: households separating and complying with new service over total households in the pilot from measurements taken at different stages.*



Behavior Change Strategy

Intervention:

- ✓ In the First door-to-door, we profiled users and then focused on the profile of potential recyclers (non-practitioners).



Barriers and Interventions examples

Barrier:

✓ Lack of knowledge about **how** to properly separate

Intervention:

✓ In the second face-to-face visit (Door to Door #2), we targeted potential recyclers, providing guidance on the practice of collecting organic waste over one week (Example: using airtight containers to prevent odors and insects, mixing with soil and grass)

✓ Chatbot flow on how to compost, enhanced with a trivia game to add a playful element to the digital interaction.

Barriers and Interventions examples

Barrier:

✓ Citizens not feel equipped enough to start this new practice

Intervention:

✓ Stickers to put on each type of bin.

Barriers and Interventions examples

Barrier:

- ✓ Belief that after it is collected, it ends up in the same place and ultimately does not generate a positive impact.

Interventions:

- ✓ Intervened with separate streams in the trucks
- ✓ Added Chatbot flow with visual content on how the materials end up correctly separated
- ✓ Distributed compostable materials from the plant at public events.

Thank you!

Contact:
Jeremy Douglas
Global Director of Partnerships
jeremy@delterra.org
Linkedin.com/in/jeremydouglas

Question & Answer Session

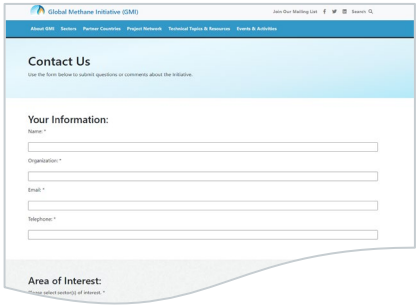
Webinar Materials and More:

www.globalmethane.org

Contact and Questions:

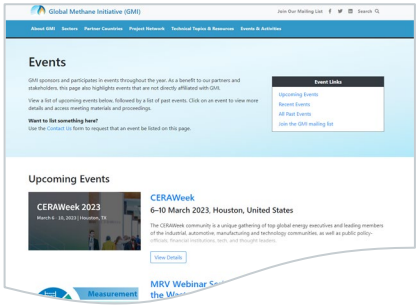
secretariat@globalmethane.org

Engage with GMI



Submit a Contact Us Request

Let us know how we can help you:
globalmethane.org/contact-us/



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