



2023 Report

Public policy recommendations to overcome barriers for methane mitigation in the solid waste sector in six Latin American countries



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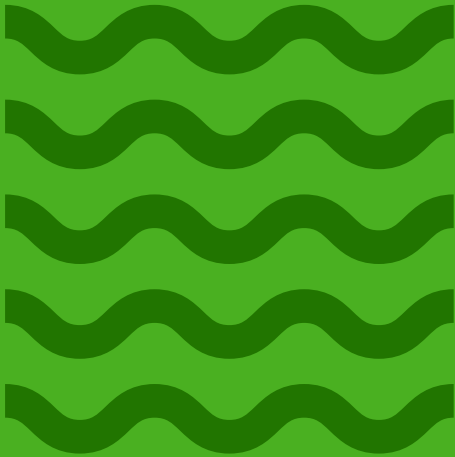
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Acronyms

ANLA: National Environmental Licensing Authority (Colombia)

CAR: Regional Autonomous Corporations (Colombia)

CCAP: Center for Clean Air Policy

CFE: Federal Electricity Commission (Mexico)

CO2eq: CO2 equivalent

CRA: Regulatory Commission for Water and Basic Sanitation Services (Colombia)

ENRO: National Organic Waste Strategy (Chile)

FLW: Food Loss and Waste

FONADIN: National Infrastructure Fund (Mexico)

FONAGRES: National Waste Management Fund (Uruguay)

GHG: Greenhouse Gases

GIZ: German Society for International Cooperation

GMH: Global Methane Hub

IDB: Inter-American Development Bank

IFAM: Institute of Municipal Promotion and Advisory (Costa Rica)

INDER: Rural Development Institute (Costa Rica)

ISWM: Integrated Solid Waste Management

JWMA: Japan Waste Management Association

LAC: Latin America and the Caribbean

MARENA: Ministry of Environment and Natural Resources (Dominican Republic)

MINAE: Ministry of Environment and Energy (Costa Rica)

MINAM: Ministry of Environment (Peru)

MMA: Ministry of Environment (Chile)

MRV: Measurement, Reporting and Verification

MSW: Municipal Solid Waste

NDC: Nationally Determined Contributions

NIMBY: Not In My Backyard

PAYT: Pay As You Throw

MRV: Monitoreo, Reporte y Verificación

PGIRS: Integrated Solid Waste Management Plans

PGIR: Integral Waste Management Program of Mexico City (Mexico)

PMGIR: Municipal Integrated Waste Management Plan (Dominican Republic)

PNGIR: National Program for Integrated Waste Management (Mexico)

PNRS: National Solid Waste Program (Chile)

PPP: Public-Private Partnerships

PRORESOL: Municipal Solid Waste Program (Mexico)

PROVAR: Waste Valorization Program (Uruguay)

RAL: Institute for Quality Assurance and Labeling (Germany)

RDF: Refuse Derived Fuel

RFID: Radio Frequency Identification

SDFs: Sustainable Development Goals

SEA: Environmental Evaluation Service (Chile)

SIGERSOL: Information System for Solid Waste Management (Peru)

SINADER: National Waste System (Chile)

SEMARNAT: Environment and Natural Resources Secretariat (Mexico)

SMA: Superintendence of the Environment (Chile)

SLCP: Short-Lived Climate Pollutants

SMART: Specific, Measurable, Achievable, Relevant and Time-bound Goals

SNI: National Investment System (Chile)

SSPD: Superintendence of Residential Public Services (Colombia)

SUBDERE: Sub-secretariat of Regional Development (Chile)

SUI: Public Services Unified Information System (Colombia)

SWM: Solid Waste Management

UNFCCC: United Nations Framework Convention on Climate Change

VAT: Value Added Tax



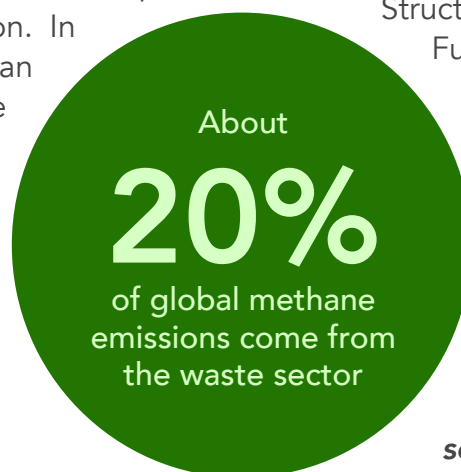
Executive Summary

The waste sector is responsible for about 20% of global anthropogenic methane emissions and is the single largest source after oil and gas and enteric fermentation.¹ Methane is a greenhouse gas that is 86 times more potent than carbon dioxide on a 20-year scale. Methane emissions are generated by the inadequate management of solid waste, specifically the organic fraction. In Latin America and the Caribbean (LAC), more than half of the waste generated corresponds to organic waste,² so there is great potential for mitigation if efforts are focused on this waste stream. However, there are a variety of barriers to the implementation of mitigation actions in different areas.

The Center for Clean Air Policy (CCAP) and ImplementaSur, with the support of the Global Methane Hub, are developing the Reciclo Orgánicos Latinoamérica project. The project seeks to promote the development of methane mitigation projects and generate public policy recommendations in six countries in the region, which have signed the Global Methane Pledge (Chile, Costa Rica, Mexico, Dominican Republic, Peru and Uruguay). The objective of this

report is to develop a set of public policy recommendations to overcome the main barriers that prevent the implementation of methane mitigation actions in the sector, specifically in the management of the organic fraction of solid waste.

The first section of the report Institutional Structure: Basic Requirements for Functional Governance focuses on the institutional framework that is needed to implement the recommendations presented in this report. ***The institutional set-up must have the capacity to execute the necessary actions to overcome the barriers that prevent the solid waste sector from moving towards managing the mitigation of methane emissions.*** Some challenges identified in the studied countries regarding the institutional structure include duplication of roles, conflicts of interest, overlapping responsibilities and lack of clarity about the jurisdiction and sanctioning capacity of different levels of government. Hence, ***the first section defines four sector institutions with clearly defined roles and responsibilities that do not overlap.***



These key institutions are:

Public Policy Governing Body: The governing body is the leader of the waste sector at the national level and is in charge of establishing public policy for solid waste management (SWM). It develops the framework that allows the Monitoring/Compliance agency and the Regulator of Rates and of Quality of Service Provision to generate specific instruments that provide the conditions for executing actions on the ground. It also develops planning instruments and establishes time frames for the implementation of objectives, tools to be developed by the municipal entities and strategies for monitoring progress.

Regulator of Rates and of Quality of Service Provision: This body is responsible for establishing the charging models and the quality parameters for the provision of SWM services. It is recommended that these topics are defined at the national level by an entity independent of the Public Policy Governing Body and Monitoring/Compliance agency.

Monitoring/Compliance agency: The role of the Monitoring/Compliance agency is of vital importance to ensure compliance with the standards established in the regulatory framework. It is responsible for monitoring, follow-up, control, and sanctioning waste management systems in the field. This oversight agency focuses on two general aspects: a) compliance with the environmental and social requirements established in the permits and licenses for waste management sites, and b) the quality of the service provided.

Waste Management service providers: Service providers operate waste management facilities and provide SWM services.

¹ GMI, 2015.
² ONU Medio Ambiente, 2018.



Mapocho Trebal Biofactory,
Santiago, Chile.

After clarifying the roles within the institutional structure, the report continues with a **list of concrete tools that these actors can use to plan and strengthen organic waste management** and achieve the reduction of the associated methane emissions. The tools cover different topics of interest: planning, financing, capacity building, enforcement, citizen collaboration and compliance with biogas capture and flaring requirements. **Each of these sections also includes case studies that exemplify the successful implementation of the tools** listed in various national and local contexts.

The section Strategic planning and organic waste requirements discusses how **organic waste should be included explicitly in the public policy framework within planning instruments. Without a clear perspective in national level planning, it is difficult to implement concrete projects on the ground.** It is recommended that the national/state level establish the instruments that the local level should develop, such as establishing

organic waste valorization targets, sectoral methane emission reduction targets at the national level and GHG inventories at the municipal level.

After generating a planning framework, it is recommended to **initiate voluntary actions and implement incentives to direct citizens towards concrete action.** Suggested voluntary tools to start generating awareness in the population include certifications/seals for organic waste reduction and environmental awards or recognitions. Subsequently, once the country has a clearly defined strategic orientation with respect to methane mitigation from the waste sector, the next step is to **establish legal mandates that allow progress towards the defined objectives, including sanctions** for non-compliance directed at different actors in the sector. These mandates include the requirement of separate collection of organic waste for municipalities, landfill taxes and restrictions on the final disposal of organic waste.

The next section of the report, Sustainable financing to enable improvements, focuses on the issue of financing. **Access to financing and sustainability of management services is one of the most relevant barriers for the sector.** Cost recovery alternatives that can be implemented to move towards financial sustainability include several approaches. First, costs can be recovered by charging citizens through the implementation of fees in existing utility bills, subsidy systems for service charges, and gradual introduction of charges.

In addition, it is recommended to promote public and private investment through tools such as investment funds aimed at the municipal level, Public-Private Partnerships (PPPs), guarantees from public development agencies for private bank financing, access to international cooperation financing and tax exemptions for the purchase of equipment/machinery for GHG emission reduction projects. Finally, to generate income from the sale of valorization products,

it is recommended to develop quality certifications for the commercialization of compost/digestate, establish its use in government procurement processes and/or establish tax exemptions for both products.

The following section of the report, Capacities to address the organic fraction, covers the importance of **strengthening the capacities of the different actors in the sector to manage organic waste**, which is fundamental and involves working with the municipal level and the private sector. The section discusses tools to improve the technical capacities of both, including various types of training programs. It also includes recommendations to encourage waste management at the regional and inter-municipal levels. Finally, a discussion is included on how to encourage the active participation of the private sector by generating an environment of transparency that will attract their capacities to strengthen the sector.

The report then presents the recommendations for oversight under the section Effective enforcement to achieve compliance with regulations. This section presents the tools to strengthen the Monitoring/Compliance agency, according to the barriers identified around its responsibility for control, oversight and sanctioning of service providers and management sites. The section discusses the importance of **ensuring the existence of an independent oversight body that has the resources to reach the entire territory and that has a compliance-oriented sanctioning scheme** that allows it to carry out its role effectively.

Then, the section Active collaboration of citizens presents the concept of citizen input as a fundamental aspect for the development of organic waste management systems that function efficiently and generate high quality products. Initially, tools are presented to **promote a cultural change to encourage citizens to implement sustainable waste management practices at the source** with voluntary programs. These can then be followed by mandates and economic incentives such as charges to citizens by volume or weight of waste generated.

Finally, the section Compliance with biogas capture and flaring requirements presents how the potential for reducing emissions from biogas capture and flaring is immense, given that final disposal is the most widespread management mechanism in the countries studied. Therefore, mandates for compulsory biogas capture and flaring must be accompanied by tools that allow progress towards the effective implementation of these actions, which is a present challenge for the region. To promote compliance with these mandates, the use of financing tools, incentives, and green taxes to guide the sector towards the reduction of methane emissions are proposed.

The report then presents **country-specific recommendations based on the barriers identified for each and using the tools presented in the previous sections**. Finally, a **Policy Toolbox is also included to allow quick reference and identification of tools by type** (i.e., mandates, targets, incentives, financing mechanisms, taxes, tax exemptions, subsidies, standards, sanctions, and cross-cutting measures).

Armony Sustentable
Composting Plant,
Santiago de Chile.



01

Introduction

02



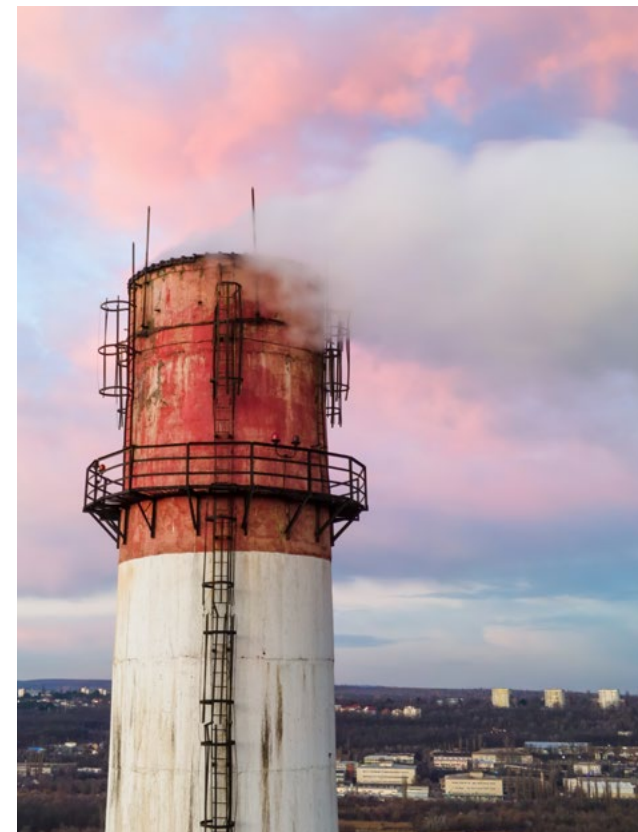
Introduction

Globally, two-thirds of methane emissions originate from human activity, a concerning statistic given that methane is a greenhouse gas (GHG) 86 times more potent than carbon dioxide on a 20-year timescale. Furthermore, its atmospheric concentrations are currently increasing at the highest rate recorded since 1980.³ Because methane is considered a short-lived climate pollutant (SLCP), any actions focused on its reduction will rapidly contribute to mitigating climate change.

The **Global Methane Pledge** was signed in 2021 during the United Nations Climate Change Conference in Glasgow, COP26. The **Global Methane Pledge**, led by the United States and the European Union, has generated a commitment and framework to achieve the goal of reducing methane emissions by at least 30% above 2020 levels by 2030, focusing efforts on three priority sectors: energy, agriculture, and waste. The **Global Methane Hub (GMH)** was set up under this framework of international cooperation. The GMH is a coordinated effort to support, promote and coordinate ambitious and catalytic efforts to achieve the goals set by the **Global Methane Pledge**.



Methane is a GHG
86
times more potent
than CO₂, on a 20-year
timescale



The waste sector, alongside energy and agriculture, is a major contributor to global methane emissions, accounting for 18% of the total emissions. This, added to the fact that between 30% and 60% of the abatement potential for mitigation measures in the waste sector has costs in the order of USD 20 per ton CO₂e⁴ (including options with negative costs), shows that focusing mitigation efforts in this sector is an affordable and high-impact strategy in the short and medium term.

In Latin America and the Caribbean (LAC) just over half of the waste generated⁵ is organic waste, offering significant potential for mitigation by directing efforts towards this waste stream. Methane emission mitigation in the waste sector can generally be achieved through two primary strategies. The priority option is the reduction of organic solid waste generation, its utilization through redistribution for human or animal consumption, or its diversion to valorization processes such as composting, anaerobic digestion and other emerging waste management options. When reduction, reuse and recycling are not viable in the short term, a second option is the development of disposal alternatives, such as landfills, that capture and energetically use biogas. Both strategies can be applied for the two main sources of organic waste: municipal solid waste (MSW) and waste from industrial and agricultural activities.

³ United Nations Environment Programme and Climate and Clean Air Coalition (2021). Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. Nairobi: United Nations Environment Programme.

⁴ Ibid. p. 10.

⁵ UN Environment, 2018. Perspective on waste management in Latin America and the Caribbean. United Nations Environment Programme, Office for Latin America and the Caribbean. Panama City, Panama.



Recycle Organics Program in Chile

Despite a clear technical understanding of available methane emission mitigation options, LAC countries have faced various barriers in implementing them. These barriers are rooted in the unique regional realities. While there are examples of successful project implementation in developed countries, these experiences do not always directly translate to the local contexts of developing countries. This is why it is crucial to understand the reality on the ground, to identify the barriers comprehensively and specifically at the local level to generate solutions that can be adapted to the particular challenges of the region.

The GMH has generated efforts to mitigate methane emissions and, with its support, the Center for Clean Air Policy (CCAP) and ImplementaSur are currently developing a first phase of analysis for six countries in the LAC region. This report is the second of three documents to be developed under this framework. Its aim is to create a set of public policy recommendations for addressing the primary barriers to implementing methane mitigation actions in the waste sector in the six studied countries: Chile, Costa Rica, Mexico, Dominican Republic, Peru and Uruguay.⁶

The third report will feature case studies of successful experiences that have effectively addressed and overcome the main challenges identified in the six countries. It will also showcase how the suggested recommendations can be applied in practice. These best practices report will be public, allowing the lessons learned to be widely disseminated to other countries in the region and to other stakeholders.

This report is divided into two sections. The first section outlines general recommendations for addressing the six most relevant barriers for the six countries, which were identified in the first report. It includes a description of the necessary institutional structure required for their implementation. These recommendations emerge from a comprehensive literature review, insights gained from interviews conducted in the context of the first report, and the expertise of the consultant team.⁷ Additionally, the first section provides relevant concrete examples that illustrate the implementation of these recommendations. The second section corresponds to the application of these recommendations to address the specific barriers in each of the six countries under study. A policy toolbox by category is included at the end, for easy reference.

⁶ Latin America Recycle Organics Program, 2023a.

⁷ Brooks Shaffer is director of CCAP's Methane Mitigation Program and has over a decade of experience working on the development and implementation of climate change mitigation policies, the development of mitigation projects, and the design of financial mechanisms for the implementation of these projects. He has been Coordinator of the Latin American Cities Network for Municipal SWM, is one of the original authors of Peru's waste NAMA, and co-director of the Recycle Organics LAC program.

Guillermo González was head of the Circular Economy Office of the Chilean Ministry of Environment between 2018 and 2022, from where he led the development of the National Organic Waste Strategy Chile 2040 and the Roadmap for a Circular Chile to 2040, among others. Currently, he advises multilateral organizations and governments in the region on circular economy and waste management.

Diana M. Rodríguez V. was in charge of the waste sector in the Climate Change Directorate of the Ministry of Environment and Sustainable Development of Colombia since 2011 and later became part of the Solid Waste group of the IDB Water and Sanitation Division at the IDB headquarters in Washington between 2014 and 2018 where she supported the implementation of technical cooperation and loans for the sector in LAC. Subsequently, she advised various stakeholders on public policy issues, social impacts and co-benefits associated with climate action.

01

02

03

**Key
technologies
to reduce
methane
emissions
in the waste
sector**



Key technologies to reduce methane emissions in the waste sector

The potential to reduce methane emissions in the waste sector is closely linked to the strategies used for managing the organic fraction. There are several management strategies, which can generally be categorized into three main technologies: composting, anaerobic digestion and capture and use of biogas generated in landfills. A brief description of each is presented below.

Composting

Is a biological degradation mechanism that relies on the activity of bacteria, fungi, and microorganisms to biodegrade organic materials under controlled aerobic conditions. The process produces compost, a final product that is relatively stable, reduced in volume (compared to the initial waste amount), and odor-free. Compost is rich in nutrients and can serve as a soil conditioner in gardening, landscaping, horticulture, and agriculture. Depending on its quality, compost may even replace some synthetic fertilizers.

Composting can be carried out on a small or large scale, with system management requirements varying as the system's size increases. In the simplest system, materials are arranged in individual or elongated open piles, which are periodically turned either manually or through mechanized means to ensure proper mixing and aeration. Due to its low complexity, this option can even be implemented at the household level, enabling waste management directly within households and reducing transportation and operational costs. Another



alternative involves vermicomposting, where Californian worms are used to produce humus. Additionally, static piles can be used, with forced aeration introduced to accelerate the process. Finally, there are alternatives with higher infrastructure and equipment demands, where composting takes place in enclosed systems, requiring equipment such as rotating drums or closed tunnels.

In general, composting typically incurs lower costs, both in terms of initial investment and operation and maintenance, when compared to anaerobic digestion and landfill biogas capture and use. The financial sustainability of composting as a business model relies on both local demand for the resulting product and the willingness of waste generators to cover the costs associated with organic waste treatment.

Anaerobic digestion

is a process in which microorganisms break down organic matter in the absence of oxygen. Anaerobic digestion occurs within a sealed reactor that houses complex microbial communities responsible for digesting the waste and producing biogas and digestate (comprising solid and liquid phases). On average, the biogas produced contains 50% to 75% methane, making it effective at mitigating emissions and potentially replacing non-renewable fuels.⁸ This is possible because biogas can be utilized to generate thermal energy for maintaining reactor temperature, treated to generate a natural gas substitute, or used for electricity generation.

Anaerobic digestion processes can be dedicated exclusively to organic SWM. Alternatively, a second option is co-digestion, a process by which waste can be added to digesters used in other industrial processes that treat other types of effluents (e.g., sludge), such as co-digestion of waste in wastewater treatment plants. As for the cost of implementation, European Union estimates for the year 2020 have suggested that the initial investment could range from an average of 2,080 to 5,210 euros per kWe produced. However, it is important to clarify that these estimates are challenging to determine precisely, as the generation of biogas (and therefore of electrical energy) depends on the type of waste being processed.⁹



Anaerobic Digesters,
Mapocho Trebal
Biofactory, Santiago, Chile



Electric Power Generation
System, Santa Marta Sanitary
Landfill, Santiago, Chile

Capture and use of landfill biogas

The final disposal of organic materials in landfills also results in the generation of biogas. Anaerobic bacteria break down these materials, producing a gas consisting of approximately 50-55% methane along with other compounds, such as CO₂. The biogas can be captured and burned in flare systems. Alternatively, as with the biogas generated in anaerobic digestion processes, it can be treated to meet natural gas standards or utilized for energy generation in combustion engines, boilers, turbines, fuel cells and/or micro turbines.

Given that 57% of MSW in LAC is disposed of in landfills,¹⁰ there exists substantial potential for reducing emissions through landfill biogas capture and use. However, it is important to note that these projects require high initial investments (CAPEX) and also entail higher operation and maintenance costs (OPEX).

57%

of LAC's MSW is disposed
of in sanitary landfills

⁸ US EPA (2023). How Does Anaerobic Digestion Work? <https://www.epa.gov/agstar/how-does-anaerobic-digestion-work>

⁹ Lacal Arantegui R, et. al., (2014). Energy Technology Reference Indicator Projections for 2010-2050. EUR 26950. Luxembourg (Luxembourg): Publications Office of the European Union; 2014. JRC92496.

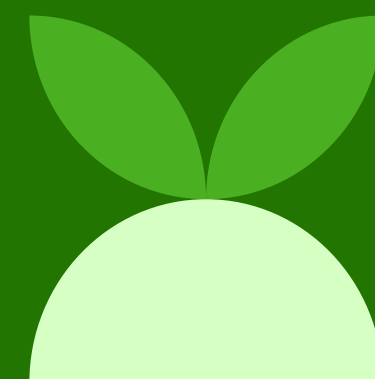
¹⁰ IDB (2023). Financial sustainability of solid waste management in Latin America and the Caribbean. Water and Sanitation Division. TECHNICAL NOTE N° IDB-TN 2663.

02

03

**Recommendations
for overcoming
the most relevant
barriers for the six
countries**

04



The development of methane mitigation projects in the waste sector in LAC faces a number of barriers. These barriers were analyzed in depth¹¹ and this report presents a set of recommendations to address them in a comprehensive manner. It should be noted that not all recommendations are applicable to any country at any time. Nevertheless this section also serves as a general guide on how to move decisively towards actions to mitigate GHG.

The following infographic summarizes the main recommendations to overcome the most relevant barriers:



¹¹ Recycle Organics Program LAC, 2023a

3.1.

Institutional Structure:

Basic Requirements for Functional Governance



The recommendations presented in this report require a solid institutional structure that is capable of executing the necessary actions to overcome the barriers that prevent the solid waste sector from moving towards a management focused on the mitigation of methane emissions. ***Some of the challenges identified during the barrier analysis stage, derive from the lack of clarity in the institutional structure,*** especially regarding aspects such as the duplication of roles, conflicts of interest, overlapping responsibilities or the lack of clarity regarding the jurisdiction and sanctioning capacity of different levels of government (i.e., national, state and municipal).

The different institutions of the sector must have clearly defined roles and responsibilities that do not overlap, so that there is clarity about the jurisdiction of each entity. This in turn allows for resources to be focused on each institution's established functions, so that they do not have to devote efforts to cover responsibilities for which they were not designed and/or for which they do not have the capacity to act. The roles necessary for an institutional framework that functions in a coordinated manner should include a Public Policy Governing Body, a Monitoring/ Compliance agency, a Regulator of Rates and of Quality of Service Provision, and service providers that are independent of each other. This section describes the institutional characteristics of these roles, which are the basis for successful implementation of the recommendations suggested afterwards.

Public Policy Governing Body

The governing body is the leader of the waste sector at the national level and is in charge of establishing public policy for SWM. ***It is important that this role is headed by a single entity,*** so that the country's decisions and progress objectives do not depend on the priorities of other institutions. This entity, which is usually at the ministerial level, develops the framework within which actions for SWM can be established, including the legislative framework (e.g., laws, programs, strategies, plans and technical regulations, among others), the medium and long term macro goals and the development of incentives that establish and orient the country's vision and objectives according to the sector's priorities for progress (see more in Text Box 1).

The governing body must also generate the framework that allows the Monitoring/ Compliance agency and the Regulator of Rates and of Quality of Service Provision to generate the specific instruments that provide the conditions for executing actions in the field. Finally, this agency also develops planning instruments to achieve the proposed objectives. The planning instruments to be developed by this agency must include the specific actions to be developed, as well as the goals and indicators that will allow monitoring the execution of the established actions. The national planning entity establishes guidelines such as time horizons for the implementation of objectives, tools to be developed by municipal entities and strategies for monitoring progress, as detailed in the following Text Box 1.

Instruments to be defined by the Public Policy Governing Body

The sector's governing body must define and/or participate in the processes of defining and updating various instruments that will impact the viability of the sector's progress towards the management of the organic fraction and the reduction of methane emissions. In addition to the public policy for the sector, the barriers analysis identified some additional instruments of great relevance, which are presented below.

Quality parameters for the provision of organic waste management services:

Just as environmental parameters are defined to control and monitor projects, the regulation must also clearly define the parameters to be used to establish quality indicators under which the provision of waste management services can be evaluated. It should also clearly define how the indicators will be used to issue early warnings or sanctions due to deficient service provision. The Regulator

of Rates and of Quality of Service Provision is responsible for defining them, and in the event that this entity does not exist, the sector's governing body should be in charge of this task, so that it becomes a tool that can be easily applied at the municipal level. Additionally, reporting should be defined as an obligation for service providers and the required reporting periodicity should be clear.

Text Box 1:



Regulations for the operation of valorization sites:

Proper operation of organic waste valorization sites begins with the establishment of regulations that set the technical operating requirements for the sites. The regulations should consider the different technologies available for valorization (including open-pile composting, vermicomposting, composting with forced aeration, anaerobic digestion, etc.). Particularly for composting, it is of vital importance to provide guidelines for odor control, including recommendations on:

- Start composting efforts with less contaminated waste streams and gradually incorporate new streams: starting with organic waste from large generators such as pruning of green areas, continuing with the reception of organic waste from food markets, agro-industry waste, restaurants/ food stores, among others, and finally household organic waste.
- Incorporation of membrane technologies and forced aeration or other mechanisms that accelerate the composting process and mitigate odor generation.
- Entry control and control of waste handling on site.

The existence of specific regulations for these technologies adds an environment of trust for other aspects of management, including the participation of the private sector and commercial banks.

Instruments to be defined by the Public Policy Governing Body

Environmental licensing and permitting processes:

In some of the countries analyzed, the approval of environmental permits and licenses to locate organic waste valorization infrastructure becomes a challenge because valorization plants fall under the same category under which landfill permits and licenses are evaluated. Given that the environmental and social impacts of a valorization plant are significantly lower than those of a final disposal site (since these generate less impact on the surrounding populations and areas), it is essential to develop processes with differentiated requirements for the infrastructure associated with waste valorization, according to the technology used and the quantities of waste to be processed.

Land use restrictions:

Similar to the previous point, land use planning should classify organic waste recovery facilities in land use categories that are less restrictive than those required for final disposal sites.



Text Box 1:

Monitoring/Compliance Agency

The role of the Monitoring/Compliance agency is of vital importance to achieve the observance of the standards established in the regulatory framework. This oversight body is responsible for monitoring, follow-up, control and sanctioning waste management systems in the field. It has been observed that, **in the absence of adequate oversight, many standards and requirements are not met in the different countries.**

The Monitoring/Compliance agency focuses on two general aspects:

- a. Compliance with environmental and social requirements established in permits and licenses for waste management sites
- b. The quality of the service provided

The most common institutional structure is one in which there is oversight for (a) but not for (b). Therefore, the authority that oversees a) also oversees b) in a cross-cutting manner, but without a specific focus on providing incentives to improve the quality of the services provided. In other cases, the Public Policy Governing Body or the Regulator of Rates and of Quality of Service Provision also plays the role of overseer (as in the case of the Dominican Republic), which is not advisable.

In the best of cases, each of these functions fall on different entities, as in the case of Chile, where the Ministry of the Environment (MMA, as per its Spanish acronym) dictates

the regulations, the Environmental Evaluation Service (SEA, as per its Spanish acronym) is in charge of approving licenses/permits for projects, and the Superintendence of the Environment (SMA, as per its Spanish acronym) is in charge of oversight. However, this structure requires an institutional scaffolding that is not currently present in most countries and therefore implementing it would require structural changes that can be costly and complex to execute in practice. In many of these cases, it is the municipal level that is responsible for overseeing the providers of waste management services through the obligations established under contractual conditions. Under this scenario, the recommendation to strengthen these oversight bodies is to generate tools so that the municipalities have at their disposal elements to exercise effective control over the providers. **The strategy focuses on developing pre-established formats for contracting and/or bidding at the national level, for use at the municipal level** (see more in *Procurement standards (pre-established contract templates)*).

Regulator of Rates and of Quality of Service Provision

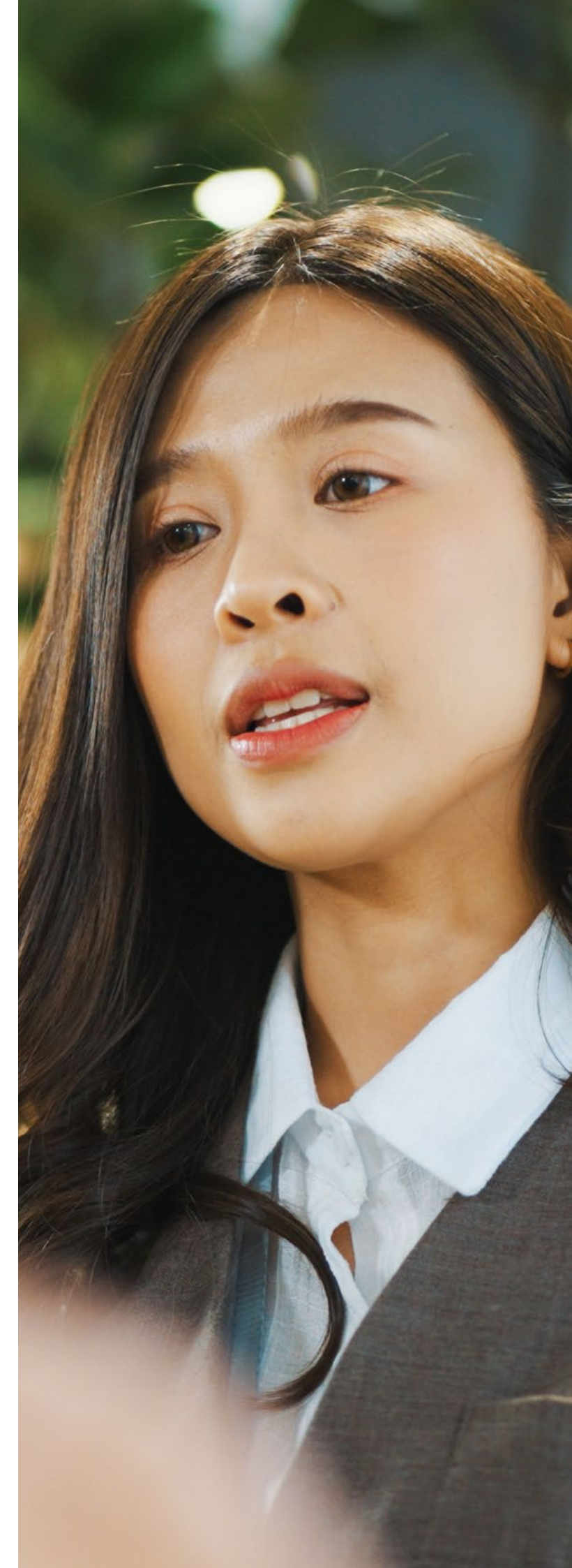
The tariff and service quality regulator is **in charge of establishing the charging models, as well as the quality parameters for the provision of SWM services.** It is recommended that these topics are defined at the national level by an entity independent of the governing body and the Monitoring/Compliance agency, so that the Regulator of Rates and of Quality of Service Provision can focus on analyzing the costs associated with all activities within waste management and define the parameters under which charges must be calculated to provide a high-quality service.

A national level tariff and service quality regulator does not face difficulties or political and/or electoral pressure not to increase and/or update charges, as local authorities do. In many cases the local authorities are the ones in charge of establishing and updating service charges. On the other hand, it is very difficult to find the necessary capacities at the local level to set rates or tariffs based on fixed and variable operating costs, including maintenance costs, replacement/updating of equipment/infrastructure, billing/collection costs, compliance with environmental requirements, among others.

Additionally, **the Regulator of Rates and of Quality of Service Provision should have a national level perspective to include flexibility for the different realities on the ground,** such as the different payment capacities of different areas of the country, the provision capacities of the operators and the reality of service provision on the ground (e.g. in terms of the availability and condition of access routes for collection and transport or the potential for regionalization of certain activities).

Waste management service providers

Service providers are responsible for operating SWM facilities and providing SMW services. Service providers may be public or private. Given the above, and in cases where the municipalities are directly responsible for the role of service provider, it is important that they are independent of the Monitoring/Compliance agency, to avoid having their responsibilities include the supervision of the provision of services and generating a conflict of interest.



3.2.

Strategic planning and organic waste requirements



Having clarified the roles under the institutional structure, the following is a description of the concrete tools that these actors can use to implement actions to strengthen organic waste management and the reduction of methane emissions.

Develop explicit planning for the organic waste fraction

As a first step, **organic waste should be explicitly included in the public policy framework within planning instruments.** Without a clear planning perspective at the national level, it is difficult to implement concrete projects on the ground, as well as to establish legal requirements that aim at a shared vision for the development of the sector. It is important that public policy tools for the waste sector are aligned with other instruments such as the Nationally

Determined Contributions (NDCs), Food Loss and Waste (FLW), and circular economy frameworks.

Planning instruments can have different names, such as national plan, national strategy, or roadmap. These can be for the organic fraction only, as in the case of Chile's National Organic Waste Strategy (ENRO,¹² as per its Spanish acronym), or they can be part of broader sector strategies that specifically address the organic waste fraction, such as Uruguay's National Waste Management Plan.¹³

The municipal level should in turn generate its own planning tools, under the guidelines of the national and/or state planning entity, since it is at this level that projects will be developed, and transformations will be carried out. The national/state level should establish, for example, instruments to be developed at the local level such as Integrated Solid Waste Management Plans (PGIRS, as per its Spanish acronym).

¹² Ministry of the Environment of Chile, 2019.

¹³ Ministry of Environment of Uruguay, 2021.

CASE STUDY 1

Planning with ambitious goals in San Francisco



A successful example of planning with highly ambitious targets and indicators for organic waste management is the city of San Francisco (USA). The city initiated its Zero Waste 2020 program several decades ago. The concept of Zero Waste is defined in San Francisco as avoiding sending waste to final disposal and incineration. The city developed several goals, including recycling and composting requirements for residents and the commercial sector, established in 2009, and a goal to divert 75% of waste from disposal by 2010, which was exceeded, reaching 80%. The system carries out inspections of the waste bins used by residential users periodically and those who fail to comply with the obligations are first issued a warning. If they fail to comply again, they are subject to penalties.

By 2013, waste disposal in the city of San Francisco reached the lowest levels in decades. That year, the city managed to dispose less than half of the waste disposed in 2000 (C40 Cities, 2016). San Francisco has the largest urban food scraps composting program in the United States, and although the city failed to reach its goal of Zero Waste by 2020, it has set new goals to divert 50% of waste from landfills and reduce waste generation by 15% by 2030 (San Francisco Environment Department, 2022).

SOURCES:

C40 Cities (2016, February). Good Practice Guide. Waste to Resources. C40 Cities Climate Leadership Group. <https://www.c40.org/case-studies/c40-good-practice-guides-san-francisco-zero-waste-by-2020/#:~:text=By%20becoming%20a%20zero%20waste,and%20help%20create%20green%20jobs>

San Francisco Environment Department (2022). San Francisco Sets North American Record for Recycling & Composting with 80 Percent Diversion Rate. <https://sfenvironment.org/news/update/san-francisco-sets-north-american-record-for-recycling-composting-with-80-percent-diversion-rate>

Organic waste valorization goals

It is essential that planning establishes outcome goals, which provide clear guidance on the objective being pursued and allow progress to be monitored, for which follow-up mechanisms must be established. The goals should have characteristics that make them “SMART”. This means that they should be specific, measurable, achievable, relevant, and time-bound. The goals should be associated with concrete short, medium and long-term actions to achieve them. National goals should be correlated with goals at the municipal level according to the reality on the ground.

Targets can be defined around the percentage of organic waste going to landfills or the percentage increase of organic waste going to composting, anaerobic digestion and home composting. These goals should also be associated with concrete actions, such as, implementing composting facilities in educational establishments or state institutions.



CASE STUDY 2

Specific targets for the organic waste fraction



CHILE

The Chilean government has established specific goals for the management of organic waste for different types of users by 2030, under the National Organic Waste Strategy (ENRO, as per its Spanish acronym). For residential users, the goal is to have 500,000 families using composting or vermicomposting and 500 neighborhoods implementing these same practices under the “Quiero mi barrio” program. Additionally, it was established that 5,000 educational establishments should have composting and/or vermicomposting facilities, 50% of public entities should implement source separation and organic waste recovery, and all urban parks should reuse their organic waste in their own green spaces (Ministry of the Environment of Chile, 2019).

These are some concrete examples of the type of goals that can be set to increase household organic waste management through composting and vermicomposting for different types of waste generators. As may be noted, the focus is not only on residential waste generators, but also on institutional actors that concentrate a significant proportion of the total waste generated. This represents a strategy that provides the potential for significant impact. In addition, the specific goals defined for each target actor allow the municipal government to focus efforts on identifying where to allocate resources to achieve the established goals.

SOURCE:

Ministry of Environment of Chile (2019). National organic waste strategy Chile 2040. Government of Chile, 2019. <https://economy.circular.mma.gob.cl/wp-content/uploads/2021/03/Estrategia-Nacional-de-Residuos-Organicos-Chile-2040.pdf>

National level sectoral methane emission reduction targets

It is recommended that emission reduction targets for the waste sector be explicitly set in the organic fraction planning, as well as in the NDCs of the countries. These targets can then be broken down into the different activities that contribute to emissions within the waste sector. This targeting structure allows to directly link the defined targets to the country's GHG mitigation efforts, which helps to provide greater access to international climate finance for the actions contained in the planning.



Municipal GHG inventories

The development of national inventories of GHG emissions is an existing practice at the national level under the commitments under the United Nations Framework Convention on Climate Change (UNFCCC). However, this is not the case at the municipal level, even though municipal level inventories have allowed to identify the waste sector as one of the main sources of emissions at the local level (see *Case Study 3*). This realization has encouraged municipal authorities to direct planning exercises towards mitigation actions, establishing goals and prioritizing the allocation of efforts and resources to reduce emissions associated with organic waste management. Hence, municipal level inventories are tools that contribute to planning processes at the local level.

CASE STUDY 3

GHG inventories to guide organic fraction planning

Costa Rica's national government is known for prioritizing climate policy and sustainability. In fact, several municipalities (including San José, Desamparados, La Unión and Montes de Oca) developed local GHG inventories with the support of the German Agency for International Cooperation (GIZ). Thanks to the information gathered by the inventories, the municipalities have been able to prioritize mitigation actions for the sectors that generate the most emissions, which often include the waste sector.

In the case of Desamparados, the inventory prepared in 2017 indicated that the second largest source of GHGs is organic waste. This information has allowed the municipality to redirect mitigation efforts to the waste sector, including the construction of a composting plant that will start operating in 2023 and

will manage waste from weekly farmers' markets. In addition, the municipalities of La Unión and Desamparados have proposed to work together on a medium-scale project for the treatment of this waste. In fact, the municipality of Desamparados has already conducted feasibility studies based on the action plan generated by the GHG emissions inventory, also supported by GIZ.

This example demonstrates the great importance of data availability for decision making and planning at the local level. The development of local GHG inventories strengthens decision making for the benefit of municipalities, making it possible to identify the sectors that are the largest GHG generators so actions and infrastructure projects can be planned to reduce emissions.

SOURCES:

Ministry of Environment and Energy of Costa Rica (2019). Costa Rica 2019: 2nd Biennial Update Report to the United Nations Framework Convention on Climate Change. First Edition.
Latin America Recycle Organics Program (2022). Interview Municipalidad Desamparados Costa Rica.

COSTA
RICA

Promote progress through voluntary actions

After generating a planning framework for organic waste management, voluntary actions can be initiated and incentives implemented to direct citizens and other actors (e.g. the private sector) towards climate action, such as reducing the generation of organic waste and home composting and separation at source. It is advisable for the municipal level to start implementing pilot projects on these issues to obtain information on implementation challenges, citizens' willingness to participate and to identify actions that can successfully create results. Municipalities can use the results obtained in pilot stages when implementing municipal scale systems that incorporate mandates and obligations. Below are some voluntary tools that can be used to start raising awareness of these issues among the population.

Certifications/seals for organic waste reduction

Organic waste reduction seals or certifications under the FLW reduction framework are voluntary tools awarded to establishments that demonstrate, according to standardized criteria, that they have achieved the objective of optimizing their processes to reduce organic waste generation. These can be obtained by different types of public and private institutions (e.g. hotels, restaurants and schools, among others) after passing strict auditing processes. Establishments that obtain these certifications can publicly display them so that their clients, users and community are aware of the standards used in their processes and their environmental commitment.



CASE STUDY 4

Certifications for reduction of Food Loss and Waste -FLW-

SPAIN

In Spain, Bureau Veritas offers a certification system for food waste minimization, which can be obtained by any operator in the food chain including production, handling, storage, processing, packaging, distribution, and consumption stages. The Certification is obtained after a strict independent audit process. The first certification obtained under this system was received in early 2022 by the cafeteria of the outpatient center of the Hospital Universitario 12 de Octubre in Madrid. Since the topic of FLW is also linked to the fulfillment of the Sustainable

Development Goals (SDGs), related actions can be showcased and stand out at the international level.

These certifications encourage the participation of various sectors in the reduction of FLW, giving them visibility as environmental leaders and generating interest for their peers to follow suit, so that the goals of organic waste recovery and methane emission reductions are achieved, supporting the achievement of SDGs.

SOURCES:

Bureau Veritas (2023). Environmental Certification. <https://www.bureauveritas.es/esg-sostenibilidad/medioambiente/certificacion-medioambiente>

Restauracionnews (2022, February 17). Sodexo Iberia obtains certification for its fight against food waste. <https://restauracionnews.com/2022/02/sodexo-iberia-certificacion-desperdicio-alimentario/>

Sustainable Development Goals (SDGs). (2015). Goal 12: Ensure sustainable consumption and production patterns. <https://www.un.org/sustainabledevelopment/es/sustainable-consumption-production/>

Environmental awards or recognitions

Awards and recognitions for successful local initiatives are a tool that has worked well to encourage local authorities and community groups to lead and sustain environmental actions in their territories. Awards give national visibility to local initiatives and generate a sense of belonging and pride among citizens, empowering them to maintain the awarded initiatives and actively participate in their development. This type of initiative generates incentives that have worked effectively. The approach for the waste sector can be incorporated by adding categories under each award, which can include FLW reduction issues, community composting efforts, waste generation reduction, use of anaerobic digesters and biogas by local enterprises, among others. The awards do not necessarily have to be monetary as the recognition itself, through a formal awards event and the presentation of a statuette or trophy, is already of great value to the awarded communities and municipalities.



CASE STUDY 5

Annual sustainability
awards

Costa Rica has several examples of sustainability awards, such as the annual awards granted by the Climate Change Directorate to the municipalities under the Carbon Neutral Country strategy (which grants statuettes with the map of the municipality carved in wood), or the Ecological Blue Flag recognition of the Costa Rican Tourism Institute. The latter awards recognitions under different environmental categories and allows the winners to hoist the blue flag in their municipality. It is a highly emblematic act for the municipalities, communities and actors that receive this recognition. The award includes 20 categories, such as communities, climate neutral, sustainable homes, protected natural areas, community health, fight climate change, special events, among others.

The participation of different actors to obtain an award has increased every year. For example, the number of participating local governments was 16 in 2015 and reached 42 municipalities nominated in 2020. Continuous improvement is also incentivized by displaying earned awards in the form of stars on the banners (UNGL, 2022), so that those who have obtained an award still have the incentive to continue improving their initiatives to receive more stars. The stars by category are color-coded, where for example the purple star is focused on FLW prevention and reduction, which was initially created for the special events category. This type of tool has proven to work very well as an incentive for different types of actors to develop permanent and voluntary improvement efforts in the solid waste sector.

SOURCES:

National Union of Local Governments, UNGL (2022). The Ecological Blue Flag Program (PBAE). <https://www.ungl.or.cr/index.php/areas-de-gestion/direccion-ejecutiva/ambiente/programa-bandera-azul>

Costa Rican Tourism Institute (2011). Ecological Blue Flag Program. <https://www.ict.go.cr/es/sostenibilidad/bandera-azul.html#:~:text=El%20Programa%20Bandera%20Azul%20Azandera%20Ecol%20C3%B3gica,Es%20un%20m%20C3%A9rito%20otorgado%20anually>.

Costa Rican Institute of Aqueducts and Sewerage (AyA). (2021, June 16). Costa Rica Ecological Blue Flag Program <https://dspaceaya.igniteonline.la/bitstream/handle/aya/471/AD00261DOC.pdf?sequence=1&isAllowed=y>

Establish mandates
to ensure diversion of
organic waste

Once the country has a clearly defined strategic direction for methane mitigation from the waste sector, the next step is to establish legal mandates that will allow progress towards the defined objectives. These should include penalties for non-compliance (see *more in section Establish a sanctioning system oriented towards compliance*), especially in Latin America since several policies have not been implemented despite having been in place for several years.¹⁴ If the framework lacks enforceability and a robust monitoring and sanctioning system, it can easily become obsolete.

It is important to emphasize that the introduction of mandates should be gradual (see *Text Box 2*). Mandates can be addressed to different actors in the sector, from municipalities and operators to the general population. The text box below presents some tools focused on municipalities and operators, and the section Establish mandates for users contains measures focused on service users.

¹⁴ Latin America Recycle Organics Program, 2023a.

The importance of gradual introduction of new obligations

It is important to include gradual implementation deadlines each time that new responsibilities are established for organic waste management and GHG mitigation, including new mandates, goals, charges, and/or activities, so that those responsible for the execution of the measures have enough time to prepare for the required changes.

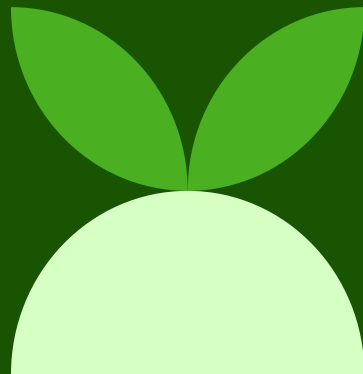
During the analysis of barriers, it was identified that, for all countries to different degrees, actors in the SWM sector generally suffer from a lack of capacity. This happens mainly at the municipal level, but also in the private sector and at the national level.

Moreover, there is an apparent disconnection between the national and local levels, since at the local level there normally is no technical, administrative and/or financial capacity to independently implement what is defined at the national level. This is another reason why a gradual approach plays a fundamental role in generating changes in SWM.

As presented in the tools listed throughout this report, it is advisable to implement them in a gradual manner. A gradual approach gives the actors involved time to adapt to new requirements and take corrective actions or changes in the right direction.

Gradual progress is essential in issues such as:

- a. The introduction of new charges for the provision of SWM services (both from the perspective of the political actors who must implement them and of the citizens who must pay for them) (see **Case Study 7**),
- b. Restrictions on the final disposal of organic waste (by introducing requirements for different fractions of organic waste),
- c. The progress and implementation of goals to increase waste recovery,
- d. The execution of sanctioning mechanisms.



Text Box 2:



It is also important that the tools used are gradually chosen, starting with voluntary measures (to start raising awareness), then gradually incorporating mandatory provisions, so that stakeholders can prepare themselves to comply with requirements without being penalized for lack of readiness.

This report presents the tools in gradual order. The tools initially presented should be implemented as a first step if the development of the waste management sector is still in its early stages, and those designed for more advanced stages are presented after.



Require separate collection of organic waste for municipalities

Advancing waste recovery initiatives at the local level starts with separation at the source in parallel with the provision of differentiated collection for the population. For specific municipal requirements, a coverage goal could be established for example, indicating the number of households that must have access to separate organic waste collection. It is recommended that the goals be established based on differentiated collection pilots, which allow the measurement of expected progress. The goals should be gradually defined, given that the waste management service must be adjusted accordingly (for

instance, the design and optimization of separate collection routes and schedules; the acquisition of vehicles for differentiated collection; the adaptation and construction of organic waste recovery infrastructure; the design, implementation and adjustment of educational campaigns; and the reduction of collection frequencies for non-usable waste).

Landfill tax

A final disposal tax is a measure that seeks to discourage the use of final disposal sites by increasing their cost with an additional tax. The tax also aims to internalize the cost of negative externalities caused by landfill use and incurred on the properties surrounding the site, not only in the form of odors and soil



contamination, but also as loss in economic value. In the absence of a carbon tax (which would have a similar impact), this instrument can intervene and correct the market price of the waste service, since the unregulated law of supply and demand does not capture these negative externalities.

The costs of managing waste through final disposal are lower than the costs of implementing waste recovery technologies, so **adding a tax to this activity can generate incentives for investment in other waste management methods.** In addition, the final disposal tax makes organic waste valorization projects less dependent on revenues from the sale of compost, digestate and biogas, for which most countries' markets are still very incipient.

Moreover, the resources collected by the tax can be reinvested in the waste sector through the creation of funds. They can also subsidize waste valorization technologies

that require additional incentives for their implementation (such as the use of biogas for energy generation). **Ideally, the resources of such a tax should support the advancement of the sector.**

This is a measure that is recommended for advanced waste management systems, where progressive restrictions have already been applied and there are multiple waste management options in operation so that they can be diverted from these management alternatives. The increased cost of landfill disposal also generates incentives for inadequate waste disposal, which in turn requires strengthened enforcement. Finally, its implementation requires properly functioning systems for charging waste generators; otherwise, the tax would impose a cost overrun on an already financially stressed system that could be difficult to bear.

Restrictions on the final disposal of organic waste

An alternative to establishing binding quantitative goals for the diversion of the entire organic waste stream for final disposal is to **establish gradual disposal restrictions, according to specific organic waste streams**. In this way, the incorporation of final disposal restrictions can be started for streams with a lower degree of contamination and lower management complexity, such as pruning and garden waste, followed by waste from fruits and vegetables from supply markets and the agricultural industry, continuing with stores and restaurants, and ending with household waste. In this way, organic waste management systems are established in stages, giving operators time to adapt their systems to a relatively simple management stream and gradually introducing new fractions of more complex waste management.

This strategy allows the identification of separation shortcomings by waste generators and to correctly redirect educational campaigns on separation at source for each actor. Furthermore, it allows waste generators to prepare their establishments and processes enough in advance for how to carry out the correct separation at source. Chile, for example, is planning to start this process following the implementation of progressive restrictions.

Similar to the landfill tax, the key when implementing this measure is to strengthen enforcement both at the entrance of the landfill, to prevent prohibited waste from entering, as well as outside the landfill, to minimize inadequate disposal.

CASE STUDY 6

Successful combination of restrictions and taxes on the final disposal of organic waste

SWEDEN

Under the guidelines of the European Union's Landfill Directive, member countries had to reduce the amount of organic waste going to final disposal by defined percentages based on each country's generation in 1995. In Sweden, the environmental code gave guidelines for the government to generate regulations to prohibit the use of landfills as a way of disposing of organic waste. Under this framework, in 2000 the country introduced a tax on the final disposal of waste. In 2005, Sweden introduced a ban on the disposal of organic waste.

The initial tax was SEK 250 per ton disposed of in the landfill. Between 2001 and 2010, the tax was increased by 74% and it was observed that the total amount of solid waste going to

landfill decreased from 22% in 2001 to 1% in 2010. The rapid tax increase generated an increase in organic waste recovery between 2004 and 2007 of 30%, even though waste generation in Sweden grew by 13% in the same period. In addition, in 2009, sites found to be in breach of the ban on organic waste disposal were closed.

This case shows how a disposal tax, in combination with a post-disposal ban on organic waste, can drive important advances for the solid waste sector. It also demonstrates the impact of a tax increase to disincentivize disposal activity, which together with effective enforcement can allow the sector to migrate towards environmentally sustainable management alternatives.

SOURCES:

European Environment Agency (2013). Municipal waste management in Sweden. <https://www.eea.europa.eu/publications/managing-municipal-solid-waste/sweden-municipal-waste-management>

ImplementaSur (2019, October 03). Informe 1 diagnóstico "Asesoría Sobre el Manejo de Residuos Orgánicos Generados a Nivel Municipal en Chile".



3.3.

Sustainable financing to enable improvements



The issues of access to financing and the sustainability of organic SWM services are some of the most relevant barriers in the LAC region, given that existing resources should be distributed among various priorities to close the inequity gaps that still exist in the region. The waste sector in particular is not usually considered as a high priority issue and lacks a high degree of visibility compared to other sectors, such as water and sanitation, health, transportation, and other infrastructure-related issues. Despite this context, the waste sector can implement tools that incorporate cost-recovery alternatives that would allow it to become financially sustainable. This section presents various tools that can be used to achieve this goal under the categories of cost recovery through charges, public and private investment, and income generated from the commercialization of products coming from valorization processes.

Recover costs through the collection of fees from citizens

One of the most important financial sustainability barriers in the provision of waste management services in the six countries studied is the lack of fees or tariffs that cover their total cost and to which the entire population is obliged to contribute, to the extent of their capabilities. There are several tools to collect financial resources for the waste management system. ***As a first step, the priority is to increase charge collection coverage so as to ensure that all citizens pay according to their capability. Subsequently, the established charges should incentivize the separation at source and/or home composting while discouraging the arrival of organic waste at final disposal sites.*** These mechanisms also serve as economic incentives for citizens to actively participate in the progress of organic waste management.

Charges through existing utility bills

Increasing collection of charges and reducing delinquency can be achieved by using the strategy of charging for SWM services within the bill for another utility service such as water, sewage or electricity. Since non-payment can result in the suspension of the other billed service, this is an effective way to reduce lack of payment. Direct billing for waste management services, independent of other public services, is not a strategy that supports the reduction of delinquency, since non-payment cannot be sanctioned by interrupting waste collection, due to public health risks associated with the accumulation of solid waste in public areas.

It is not advisable to collect funds to finance the operation of waste management through general municipal taxes,¹⁵ since it is preferable to have a fee specifically collected for the provision of SWM services and that goes directly to waste authorities. In addition, **general fees prevent municipalities from quantifying the real cost of providing waste services, hiding the importance of the sector from municipal priorities.** However, the collection of general taxes can be effective when the resources are directly destined to waste management and do not enter the general budget of the municipality. In this case, it is important to ensure that all citizens contribute to the general tax selected, since some people might not pay for the service if there are exemptions.

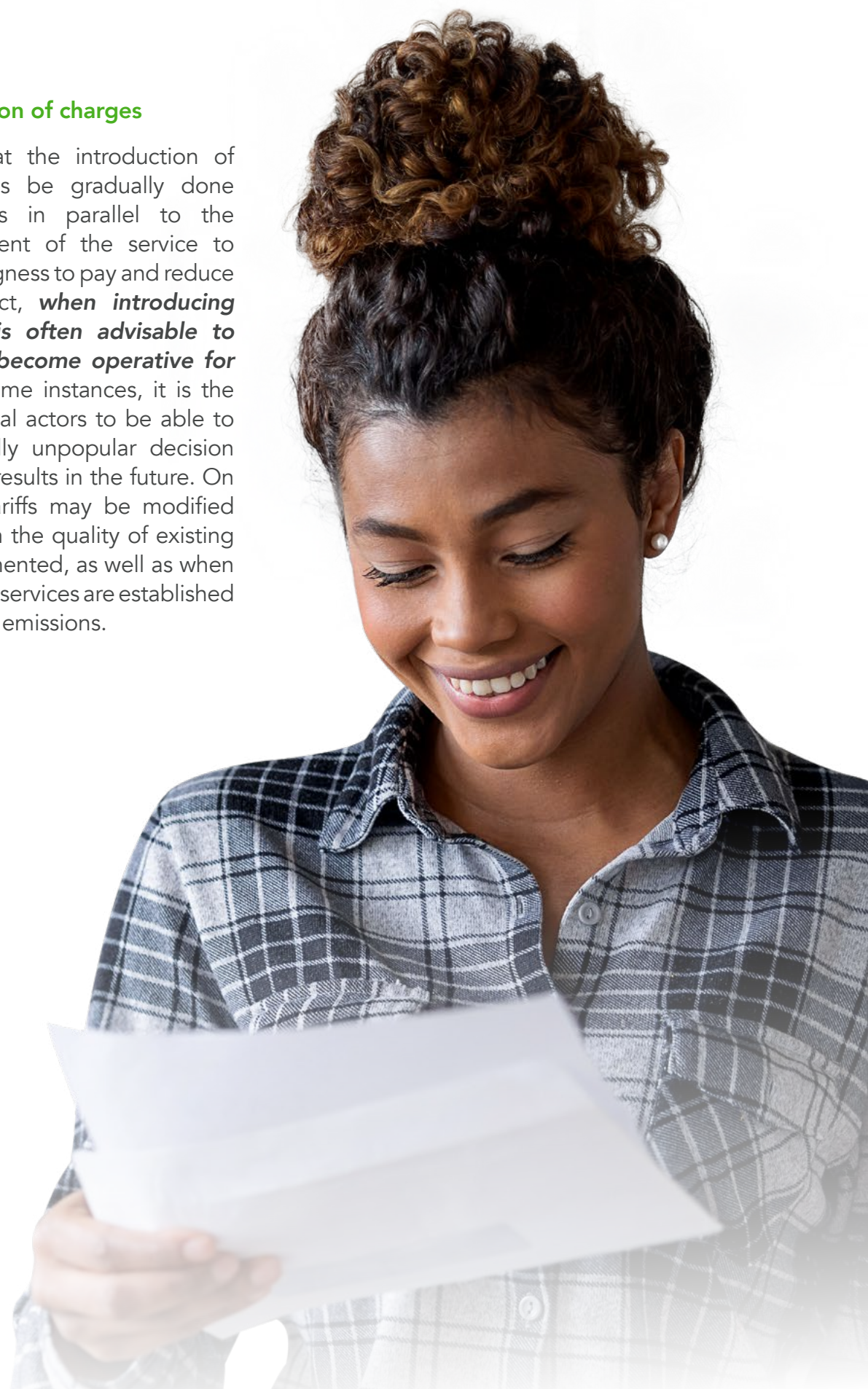
Subsidy systems for service charges

One of the issues affecting the collection of resources to cover the costs of providing SWM services is the ability of some citizens to pay. Understanding that all people need to contribute to the waste management system is important. Lower income sectors of the population might have a lower ability to pay, which can be addressed by introducing subsidy mechanisms to allow service users to pay to the best of their ability (see Case Study 7).

Another option for the redistribution of payments, which is highly relevant for a region with high levels of inequality such as LAC, is the introduction of municipal redistribution subsidy mechanisms, whereby municipalities with lower incomes can receive resources from municipalities with higher incomes to help them cover the costs of SWM. This is the case of Chile's Municipal Common Fund, which redistributes municipal incomes and represents up to 75% of funds for some municipalities.

Gradual introduction of charges

It is advisable that the introduction of charges to citizens be gradually done through fees/tariffs in parallel to the gradual improvement of the service to increase their willingness to pay and reduce delinquency. In fact, **when introducing new charges, it is often advisable to defer when they become operative for a few years.** In some instances, it is the only way for political actors to be able to approve a generally unpopular decision that can only bear results in the future. On the other hand, tariffs may be modified as improvements in the quality of existing services are implemented, as well as when new waste recovery services are established to reduce methane emissions.



¹⁵ For example, in the case of Uruguay, in many municipalities there is a broad municipal tax, which covers waste management, among other things, so that citizens do not explicitly perceive payment for this service.

CASE STUDY 7

Cross-subsidies and gradual introduction of the tariff methodology

In Colombia there is a cross-subsidy mechanism used for the payment of all public utilities, including SWM (sanitation services). This mechanism is based on a classification according to the zone in which the property is located, and is applied nationwide. The zones are classified into strata, from 1 to 6, where 1 corresponds to lower-income zones and 6 to higher-income zones. Strata 5 and 6 pay the full rate for the sanitation service plus a contribution to subsidize strata 1, 2 and 3, while strata 4 pays the full rate (without an additional subsidy contribution). Commerce and industry companies also contribute to the subsidy system. In the event of a shortfall between subsidies and costs, the municipality assumes the difference, using resources that are transferred by the national government from the annual budget and allocated specifically for that use.

SOURCES:

UN Environment (2018). Perspective on waste management in Latin America and the Caribbean. United Nations Environment Programme, Office for Latin America and the Caribbean. Panama City, Panama. Page 217.

Congress of Colombia (1994). Law 142 of 1994 Whereby the regime of domiciliary public utilities is established and other provisions are enacted. Article 99.



It is also important to note that, to introduce the tariff without affecting the public's willingness to pay when it was first implemented in 1997, progressive charge increases were established until 2005. The real cost of providing the services, defined under the tariff methodology, started to be reflected by the charges only then.

This type of tool, which seeks to ensure gradualism in the introduction of charges and establish tariffs proportional to the user's income through subsidies, increases the population's willingness to pay and, consequently, charge collection levels.

Boost public and private investment

Structure investment funds aimed at the municipal level

Difficulty in accessing financing is a major barrier at the municipal level. One of the options to increase the financing of municipal infrastructure is by including national public funds for the solid waste sector in the legislation. It is recommended that these funds include favorable conditions and fewer requirements for financing management infrastructure projects that use organic waste valorization and methane emission reduction technologies instead of other methods, such as final waste disposal, to encourage the development of such initiatives.

In some of the countries studied, there are national-level resources already at the disposal of local governments. However, in many instances, the requirements to access these resources are very demanding at the municipal level as they do not have sufficient capacity to present robust enough proposals.

In these cases, it is important to restructure existing national funds so that they not invest in municipal infrastructure, but also support the preparation of the projects themselves, including:

- a. Feasibility studies
- b. Engineering designs
- c. Social profitability analysis
- d. Structuring of business models (especially for funds that provide reimbursable resources)

This model is somewhat closer to the one used in climate finance at the international level, where resources are focused on supporting the design of initiatives whose implementation are later financed by investment funds. This strategy would provide the technical support needed at the municipal level to structure projects and would increase the project demand for national resources, which, in many cases, remain unclaimed due to the lack of solid proposals meeting requirements to receive financing.



CASE STUDY 8

Investment funds targeted at the municipal level



Japan has a national government mechanism to cover solid waste infrastructure project costs at the municipal level. The support provided includes organic waste valorization sites. The municipalities present the improvements they want to make to the management system within their Integrated Waste Management Plans, which are then sent to the national government to apply for funding. In this way, the local level uses the planning instruments it develops to obtain resources from the national level in an integrated way. The national government covers up to 60% of the initial costs of projects through municipal subsidies (Kaza et al., 2018).

The availability of funding for municipalities is one of the most relevant tools to generate significant change in the waste sector. In the case of Japan, the national government provides the local government not only with the necessary resources, but also with an accessible system to apply for them so as to develop first class infrastructure with high recovery rates.

SOURCE:

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO. Page 149.

Public-Private Partnerships (PPP)

Public-private partnerships, more commonly known as PPPs, can help municipalities overcome existing barriers of access to investment resources for sustainable organic waste management solutions.

A few examples of key benefits include:

- a. **Access to finance:** PPPs can facilitate access to private capital for infrastructure investment and project implementation;
- b. **Efficiency and quality of service:** PPPs can implement processes to improve the quality and efficiency of services, reducing costs and government bureaucracy;
- c. **Sustainability:** PPPs can help ensure the continuity of a program or project despite political and administrative changes. It can also positively influence municipalities to start charging for service delivery, leading to greater cost recovery and financial sustainability.

Although there have been fewer PPP experiences to date in LAC compared to other parts of the world, different waste PPP models have been emerging and succeeding in the region. This is great news for both cities and private sector investors looking to enter new markets. At the national level, countries are beginning to pass laws and regulatory frameworks to formalize PPPs, reduce risk and provide incentives to attract private sector participants. Argentina, for example, passed PPP Law No. 27,328 in 2016 to better regulate PPPs in the country to boost investment in infrastructure projects across all sectors, including energy, transportation, and waste. Mexico has gone a step further and created a national co-financing system to support PPPs in SWM (see Case Study 9).



CASE STUDY 9

PPP for integrated waste management centers

Mexico, seeking to promote sustainable development, created the National Infrastructure Program. Within this framework, Mexico's National Infrastructure Fund (FONADIN, as per its Spanish acronym) was created as a vehicle for coordinating the Federal Public Administration's investment in various sectors to maximize and facilitate the mobilization of private capital, make infrastructure projects bankable and achieve long-term financing under competitive conditions. FONADIN provides 50% of the financing for the projects, the Environment and Natural Resources Secretariat (SEMARNAT, as per its Spanish acronym) provides 25%, and the private sector provides the remaining 25%.

In the case of projects focused on MSW management, FONADIN and SEMARNAT have created the Municipal Solid Waste Program (PRORESOL, as per its Spanish acronym), a strategy to identify and promote private sector projects in the provision of services, and the development of solid waste studies and projects. PRORESOL is aimed at state governments, municipalities, inter-municipal associations, federal public administration entities, among others, providing maximum financing percentages of up to 50% for the preparation or updating of studies; up to 50% of the cost of strategic advice for the bidding and financial closing of the project; and up to 50% of the cost of the initial and replacement investment of the project.

SOURCES:

BNamericas (2021, May 20). Solid waste processing plant in Monterrey, Nuevo León. <https://www.bnamericas.com/es/noticias/monterrey-lanzara-licitacion-de-proyecto-de-residuos-de-us500mn-tras-eleccion-de-medio-periodo>

Mexico Projects (2022, September 06). Design, Construction, Installation, Operation and Maintenance of a System for the Management and Use of Organic Waste through Energy Valorization in the Municipality of Naucalpan de Juárez, State of Mexico. https://www.proyectosmexico.gob.mx/proyecto_inversion/0853-manejo-y-aprovechamiento-de-residuos-organicos-de-naucalpan/#:~:text=The%20project%20seeks%20to%20realize%20a%20reduction%20of%20the%20impact%20on%20the%20environment%20

Mexico Projects (2023, January 24). Construction, Operation, Maintenance, Conservation and Exploitation of a Center for the Integral Management of Urban Solid Waste and Special Handling in the Metropolitan Area of Monterrey, Nuevo León. https://www.proyectosmexico.gob.mx/proyecto_inversion/0851-gestion-integral-de-residuos-solidos-urbanos-y-de-manejo-especial-en-la-zona-metropolitana-de-monterrey-nuevo-leon/#popme

Two notable examples of FONADIN's support in the waste sector are:

1.

1. The organic waste management and recovery project for the Municipality of Naucalpan de Juárez, State of Mexico, which consists of the design, construction, installation, operation and maintenance of a landfill; a valorization system for the treatment of the organic fraction of urban solid waste; and a valorization plant with a segregation system to obtain bio-waste, treated in an anaerobic biodigestion system, for the generation and capture of methane (which is used to generate electricity), , recyclable materials and refuse-derived fuels (RDF). This project represents a 22-year knowledge and management sharing PPP with an investment of approximately USD 55 million, where 70% will be covered by the private sector and 30% by the public sector. The project is currently scheduled to begin execution this year and operation in 2024.

2.

The "Integral Management of Urban Solid Waste and Special Handling in the Metropolitan Area of Monterrey, Nuevo León" project, was tendered for approximately USD 500 million. This project consists of the construction, operation, maintenance, and upkeep of an integrated MSW and special handling management center, which seeks to increase the useful life of the existing landfill to 30 years, take advantage of waste valorization practices, and avoid landfill disposal as much

as possible. Waste is currently transported to the Salinas de Victoria landfill, which stores about 77% of the Urban Solid Waste (USW) of the Monterrey metropolitan area (BNamericas, 2021). However, as the city of Monterrey is the third largest urban area in the country, it is a challenge for municipal authorities to provide a quality waste management service, mainly due to a lack of resources. For this reason, a PPP is being considered to develop this infrastructure project and provide a quality service to its citizens. The project will consist of five processing centers that will complement each other: the admission, registration and quality control center; the waste separation and transformation center; the energy recovery center using a direct combustion process; the methane gas production center using an anaerobic digestion process; and the final disposal center in a sanitary landfill. This project is currently in the pre-investment stage.

FONADIN requires the participation of the private sector to co-finance waste projects, and has found that this cooperation promotes financial sustainability. This cooperation also serves as an incentive for municipalities to participate in PPPs. The private sector and FONADIN can contribute to 100% of the funds, so the municipality does not need to contribute its own resources. By not being limited by local investments or budgets, the quality, coverage, and type of waste services can be improved. As a result, the Monterrey metropolitan area in the Mexican state of Nuevo León now has a landfill gas-to-energy plant in Salinas de Victoria that has reduced 3.6 million tons of CO₂eq and produces energy for the surrounding region.

Although private sector participation can be challenging, greater legal and regulatory stability, the potential for economies of scale through regionalization, and active support from local and national governments are attracting private sector participation in PPP schemes. Interaseo, one of Latin America's largest waste management companies, with operations in Colombia, Peru, Chile, Honduras, Panama and El Salvador, has focused on a PPP model called a "mixed economy company," in which the state or government and Interaseo jointly create a new private sector company responsible for project development. This can be done with a consortium or association of several municipalities, taking advantage of economies of scale through regionalization and reducing the overall cost.

PPPs can be an attractive solution to address public funding constraints for large infrastructure investments, to overcome the lack of experience and expertise of local governments and facilitate the introduction of advanced technology and innovation in LAC's MSW sector, which can improve waste management and effectively reduce GHG emissions. PPPs can also help deliver better public services through improved operational efficiency. As cities move from reliance on landfills to more sustainable SWM systems, PPPs can be a key part of accelerating the transition. Cities that create the right conditions within their national policy frameworks can stay ahead of the competition.



Guarantees from public development agencies for private bank financing

Private banks generally have a high-risk perception of financing projects with technologies that are not yet widely disseminated at the local level, which is a challenge for the implementation of organic waste valorization projects in the countries studied. Public development agencies can help activate private financing through instruments that provide certain guarantees to banks (e.g., debt insurance) to reduce the risk of GHG mitigation projects. As projects are implemented, this perception of risk will decrease.



Access to international cooperation funding

It is important that resources resulting from international cooperation for waste valorization projects focus in large part on supporting the municipal level, where initiatives are implemented. It is advisable that the national level, which generally receives this type of funding, redirects them to the local level, where the projects and technologies for organic waste management are implemented, so as to have the greatest impact possible. *orgánicos.*

Tax exemptions for the purchase of equipment/machinery for GHG emission reduction projects

Tax exemptions for the purchase of equipment that will be used in projects that generate a reduction of GHG emissions is a strategy that has been used in some countries in the region as an incentive for the private sector to invest in emission reduction projects. This is a tool that supports one of the most important challenges when implementing this type of project, which is the amount of initial investment required to install these technologies, including the equipment required. Uruguay, for instance, established a Value Added Tax (VAT) exemption for liquid, solid and gaseous emissions management equipment with clean technologies in the industry and agricultural sectors, which includes, for example, benefits for anaerobic digestion facilities (Biovalor, 2020).

Generate income from the sale of valorization products

Another alternative for the financial sustainability of organic waste management projects is to consider the income that can be generated with the sale of products derived from waste valorization. However, only relying on these revenues is not enough to fully cover the operating costs of waste management, even when high quality products are generated. The collection and transportation components (to a large extent), as well as the waste treatment and recovery process and its commercialization entail costs that must also be partially covered by tariffs or fees associated with the organic waste management service. Yet, the combination of the tools and practices presented below can support the development of markets for the products generated and can represent an incentive for the development of such projects. This section of the report focuses on compost and digestate products, while the issue of biogas capture, flaring and utilization is addressed in more detail afterwards (see *Funds to implement mandatory biogas capture and flaring*).

Quality certifications for the commercialization of compost and digestate

The existence of quality certifications, composition and labeling standards for waste recovery products such as compost and digestate, which are accredited by certification bodies and/or accredited laboratories, can make waste recovery products competitive in the market and allow them to gain access to public programs that require the use of compost. Hence, the products' sale can become an income source for the valorization plants that produce them (see *Case Study 10*).



CASE STUDY 10

Compost Certifications

MUNICH,
GERMANY

In the city of Munich (Germany), compost producers can submit their products, derived from the recovery of organic waste, to the voluntary quality assurance of the German Institute for Quality Assurance and Labeling (RAL, as per its German acronym). The quality assurance system is a process that ensures independent monitoring, continuity and traceability for products that obtain its certifications.

There are five classifications for certifications under the labeling service, including one for compost with 3 subcategories (finished compost, fresh compost and substrate compost; two for digestate (each with two subcategories for solid and liquid digestate, respectively); and a final one for products derived from FLW valorization.

RAL quality assurance generates a high-quality standard, with criteria agreed and coordinated with technical authorities and scientific institutions. Quality determination not only ensures compliance with the applicable legal provisions for authorities, consumers, and the public, but also additional quality assurance requirements.

The tool of compost quality assurance, as well as the existence of certifications and independent quality monitoring have benefited the city of Munich with high-quality by-products, and market confidence in valorized organic waste products.

SOURCE:

ImplementaSur. 2019. "CONSULTANCY ON THE MANAGEMENT OF ORGANIC WASTE GENERATED AT THE MUNICIPAL LEVEL IN CHILE". Page 109.

BGK (2023). Gütesicherung Kompost. <https://www.kompost.de/guetesicherung/guetesicherung-kompost>.

Establish the use of compost and digestate in government procurement processes

Generating market growth or a demand increase for compost and digestate is a task that may require the support of the public sector to encourage the use of these products. One strategy is to ***establish requirements for both the acquisition of compost and digestate derived from waste in public procurement processes, and for its use in green areas, parks, vegetated slopes, or other public sites.***

These requirements can be established either as terms of reference templates, or as

bidding documents for municipal procurement processes. These templates should require minimum quality standards in line with quality certifications, such as the ones described in the previous section. The Mexican state of Jalisco is a good example of waste-generated compost. The state's Integrated Solid Waste Management (ISWM) Law establishes that municipalities that participate in state programs must use the compost generated in their green areas (Government of Jalisco, 2007). In the United States, government agencies, institutions and businesses have been developing green policies and purchasing guidelines that require the purchase of organic compost to enhance their construction or landscaping operations. A

growing number of these entities are requiring the compost purchased to be locally sourced, which minimizes the impact of transportation and creates a local market demand for a sustainable compost products.

Tax exemptions for compost and digestate

Marketing conditions for compost and digestate can be improved by matching these products with the tax exemption conditions of other soil improvers or organic amendments, so that they can compete in the market with other available and already recognized options. This strategy was used in Uruguay,

where fertilizer complementary products were granted the same VAT exemption as fertilizers themselves (Biovalor, 2020). To further promote the demand for compost and digestate, tax benefits for fossil fertilizers could also be gradually eliminated, especially given their contribution to climate change.



3.4.

Capacities to address the organic fraction



It is fundamental to strengthen the capacities of the different actors in the sector to manage the organic fraction. This implies working with both the municipal level and the private sector, who are in charge of the implementation of organic fraction management actions in practice. This section presents various tools to achieve this and underlines the importance of the availability of information systems for decision making.

Waste management information system

The purpose of waste management information systems is to provide up-to-date information for decision making, data on the status of service provision in the sector, as well as transparency for all stakeholders through measurement, reporting and verification (MRV) elements. Ideally, the information system should be online and allow data access to different competent bodies (Public Policy Governing Body, planning and Monitoring/Compliance authorities, as well as the Regulator of Rates and of Quality of Service Provision. Public data and/or periodic reports that allow other interested parties to inform themselves on the status of waste management should also be made available. In addition, SWM service providers should have access to the system under their reporting role.

The information system may vary in its scope as well as level of detail, and may be gradually improved as it becomes more robust and the needs for data measurement, access and reporting are identified. Ideally, the entity in charge of managing the information system should be the same as the one overseeing the quality of service provision, but this may vary according to the context and progress of each country. For example, in contexts where municipalities already oversee the supervision of operators, the national level should be the one in charge of providing the system as a tool to enable municipalities to access it without having to manage it.

It is recommended that the system captures data on the quality of service provision, in particular for the management of the organic fraction, given that many systems do not provide a greater level of detail and granularity of this type of information.

It would be important to include the following type of data:

- a. Collection frequencies (especially separate collection routes for organics)
- b. Tons of organic waste generated by the different types of waste generators and managed by the different types of waste managers and final waste recipients
- c. Tons of waste diverted from the management system (e.g. through home composting programs) or being sent to recovery processes
- d. Number of users serviced
- e. Age/equipment/fleets' useful life
- f. Tons of methane and/or CO₂eq captured, combusted and used for energy recovery, while also indicating the main sources of emissions

The data collected by the information system should include historical data to identify improvements (or setbacks) in the provision of services, as well as flow changes in waste management. This would enable compliance verification with short, medium and long-term goals (e.g., reduction of tons of waste going to final disposal), and to report or corroborate tariff modifications due to changes in the quality of service provision or the quantity of waste managed.

Waste management information availability is fundamental to ensure sector transparency for management institutions. Data availability can also encourage providers to improve service quality.



Improve technical capacity

Training programs are fundamental in many aspects of SWM. They should be periodically developed to include new personnel joining public entities and private operators. Training programs should also be dynamic to remain relevant to regulatory changes, technological advances and topic updates within training programs. Lastly, it is important that training programs are designed with the target audience in mind, so that the language as well as content capture the audience's attention and are adequate for effective learning.



Training programs for civil servants

Training programs for public officials should be developed at all levels of government.

Important considerations for different waste officials can be found below.

At the municipal level, it is important that training programs focus on regulatory changes and/or updates at the national/state level, to keep local officials up to date on the new requirements and the specific strategies provided by the national level on how to implement them at the local level. It is also important to include training on the use of existing information systems. Another important aspect is the capacity of the municipal level to prepare project proposals to be financed by national level funds as trainings should be designed with the requirements of national funds in mind. Training programs for the municipal level should be created and structured at the national level, should include feedback mechanisms to ensure that the material is relevant to municipalities, and should provide national level decision-makers with information about how the established policies are working on the ground.

In terms of training programs for oversight body officials, it is important to strengthen their technical capacities to evaluate the state of SWM operations in the field, especially those related to the organic fraction and biogas management in landfills. Their technical knowledge of the operation of various technologies is also of particular interest.

Important topics should include:

01.

Concepts such as waste mass stability and its relation to the biogas capture system.

02.

Capture processes, passive and active burning of biogas and its use for energy generation.

03.

Operation of organic fraction management facilities such as composting plants, vermicomposting and anaerobic digesters (including the various technologies available, odor mitigation issues, quality of incoming material and quality of the product generated, among others).

It is also important that trainings provide oversight body officials with tools to strengthen their monitoring and control work, especially for the identification of illegal sites (e.g., micro dumpsites or waste management sites operating without legal licenses/permits, among others). During the barrier analysis, it was identified in some cases that, there may be unclear responsibilities for the identification of these types of sites, where other public officials, such as the police, also have authority over these issues. Therefore, **it is important for waste sector officials to clearly understand their role, how to collaborate effectively with other state entities, and how to effectively use the sanctioning capacities available to them.** It is also important that oversight body officials are familiarized with strategies to prevent the appearance of these sites and the actions for their remediation. Lastly, training should include sanctioning tools they can use, as well as how to use existing information systems.



Training programs for composting facility personnel

Composting plant personnel should receive training programs according to the needs of the site, minimally including established operation regulations, compliance with environmental licenses/permits, and applicable service delivery indicators. Knowledge about existing odor control tools is also of vital importance (see more in Text Box 1).



Vermicomposting, La Pintana, Santiago, Chile.



Compost generated in La Pintana, Santiago de Chile.

Experience Exchange Programs

Experience sharing programs is a very useful tool to disseminate successful experiences, common challenges and know about strategies that have not been effective in the past. These programs offer the sharing of experiences, allow participants to ask practical questions and generate joint learning based on concrete cases that have been implemented.

These exchanges can take place between municipalities, community organizations, providers, and representatives from different countries or other actors with common challenges. The identification of practices that are based on real experiences in similar contexts and that have yielded successful results make this type of program an effective way for the participants to exchange their lessons learned. In turn, these programs tend to generate long lasting knowledge networks, collaborative ties, and facilitate continuous learning.

CASE STUDY 11

Exchange of experiences for local level officials



JAPAN

In Japan, there are several tools that facilitate the connection between local and national governments, including the National Governors Association and the Japan Waste Management Association (JWMA), which covers 585 municipal governments (Kaza et al., 2018). At the annual JWMA meeting, the comments of local governments are compiled by the JWMA and sent to national level agencies, such as the Ministry of Environment.

In addition, the information system allows municipal governments to access data from other municipalities that have similar demographic and economic conditions. This information is used to compare their planning and results with municipalities in comparable contexts, so that they can evaluate their progress and obtain ideas to improve their management.

Moreover, Japanese civil servants can perform functions at other levels of government. Hence, national level officials can hold positions at the local level and vice versa for two to three-year periods. This allows national officials to understand the realities and challenges on the ground and to generate national-level policies in line with those realities. It also provides those at the local level with a broader picture of national-level challenges (Kaza et al., 2018).

These available options are valuable for municipal government officials since they update and encourage them to make decisions based on knowledge exchange and the best information available.

SOURCES:

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO. Page 149.

World Bank (2001, May). Personnel Exchange Among Central and Local Governments in Japan Takenori. 28 pages. Stock No. 37173. <https://documents1.worldbank.org/curated/en/799451468050082930/pdf/330410rev0wbi37173.pdf>

Promote regional inter-municipal work

Regional cooperation for waste management is a key tool for optimizing management, particularly in terms of logistics and the use of resources, taking advantage of economies of scale. It is therefore essential that there are clear guidelines at the national level on how to generate joint work initiatives, detailing the minimum requirements for successful alliances to ensure that there are no barriers to a regionalized work.

It is also vital to introduce specific incentives for municipalities that establish regional alliances, such as priority or independent access to funding resources from the national level for joint initiatives. An interesting example is that of the Dominican Republic, where the law on integrated waste management and co-processing defines the concept of shared sanitary landfills, establishing that their construction requires the participation and use of at least three municipalities.

CASE STUDY 12

Public consortia law

BRAZIL

In Brazil, the Public Consortia Law of 2005 promotes inter-municipal work in various sectors. This framework establishes that the municipalities that form consortiums acquire commitments that make them liable to the other municipalities in the event of non-compliance. The process requires extensive documentation, which guarantees compliance with the commitments set and creates confidence in the process.

The results show that more developed regions tend to participate more actively in consortia. However, it has also been observed, for example, that in the case of the central-west region of the country, which historically had administrative and management weaknesses, consortia have strengthened municipalities. In fact, the number of consortia in the region doubled in the 2011-2015 period. It has also been evidenced that the number

of consortia is proportionally inverse to the size of municipalities. In the same period, the expansion of consortia was 11% for municipalities with up to 5,000 inhabitants, while it decreased for municipalities with more than 500,000 inhabitants. This shows the importance and great value of this management model for smaller municipalities.

Over the period of 2005-2015 and for the environmental sector in particular, the increase of municipal consortia was 235%, the third highest growth after the urban development and housing sectors. For the waste sector, the approval of the 2010 National Solid Waste Policy generated concrete incentives by defining that the federal government could only transfer resources to municipalities that are part of a consortium (Grin, E. and Abrucio F., 2017).

SOURCES:

ImplementaSur. 2019. "CONSULTANCY ON THE MANAGEMENT OF ORGANIC WASTE GENERATED AT THE MUNICIPAL LEVEL IN CHILE". Page 158.

Grin, E. & Abrucio F. (2017). Intermunicipal cooperation in Brazil facing the mirror of history: critical background and path dependence of the creation of the law of public consortia. Page 2, 14, 18-20, 23. https://pesquisa-eaesp.fgv.br/sites/gvpesquisa.fgv.br/files/arquivos/la_cooperacion_intermunicipal_en_brasil_frente_al_espejo_de_la_historia_antecedentes_criticos_y_la_dependencia_de_la_trayectoria_despues_de_la_creacion_de_la_ley_de_los_consortios_publicos.pdf.



Attract private sector capacity



Competitive bidding

The active participation of the private sector makes waste management progress possible. **Transparency and competition are vital to encourage the participation of private companies.** Competitive bidding is a tool that provides an environment of certainty for these actors. This tool incorporates extended deadlines for preparing proposals so that all bidders have sufficient time to submit competitive proposals. The process and the variety of proposals consequently submitted reduces costs and increases efficiencies. It is also recommended to not have entry or participation restrictions to the process, requiring, for example, the company to already have the site where the activity will be carried out. In addition, it is important for activities to be independently carried out instead of in groups of services (for example, collection and transfer, final disposal, etc.), since this would exclude the participation of some companies and reduce competition.

Procurement standards (pre-established contract templates)

In many of the countries studied, establishing a uniform tariff structure was not feasible because the institutional structure needed to design a tariff methodology was not in place and/or because the sector's market and the competition practices of providers were already so entrenched that making such a change would generate great opposition. In these cases, charges and service quality requirements can be parameterized through the contract between the municipality and the operator. This tool provides clear and transparent conditions for the private sector, encouraging its participation.

It is recommended that such contracting models contain the following aspects:

1.

Mandatory implementation of standard practices such as weighing at the entrance of final disposal sites and control of collection routes and frequency.

2.

Reporting parameters to generate data for calculating charges for services rendered, eventual sanctioning of operators in case of non-compliance, as well as quality indicators for monitoring control, for example:

- Number of tons managed
- Number of users served
- Distances traveled
- Age/life of fleet/equipment in use
- Hours and frequency of service
- Correct billing of service charges to users.
- Timely response to service users' complaints and claims.

3.

Definition of the fee structure for each activity provided, considering operating costs (fixed and variable), maintenance, compliance with environmental requirements, billing and user fees, if applicable, and investment required to update and/or replace infrastructure and equipment.

4.

Measures to periodically update the waste management fee charged, either by defining the frequency of update and/or the method to be periodically indexed, such as inflation or consumer price indexes.

5.

Service quality indicators based on reporting parameters.

6.

Acceptability and non-compliance ranges for each indicator.

7.

Require the provider to measure and report quality indicators for the provision of services.

8.

Reporting periodicity.

9.

Sanctions for non-compliance with obligations (**see more in section Sanctions for SWM service providers**)

Contracting/bidding frameworks that allow for the establishment of PPPs

PPPs, previously mentioned as a tool to overcome financing barriers, are also an important tool to consider when improving organic waste management, especially in cases where countries or municipalities have a shortage of qualified/experienced professionals to operate management systems. PPPs can bring global experience, technical expertise and access to state-of-the-art technologies. In addition, their implementation can also support the

development of local, technical and managerial capacity by transferring knowledge to local employees. Hence, it is important that PPPs provide technical-level jobs for local people in the country of implementation. PPPs can also contribute to better public services through greater operational efficiency. As cities move from reliance on landfills to more sustainable SWM systems, PPPs can play a key role in accelerating this transition.



Uniform charging structure

A well-defined charging structure provides transparency for operators and promotes basic coverage and service provision expansion throughout the territory. Tariffs should ideally take into account the costs of operation, maintenance, investments required to update equipment and infrastructure, and periods for updating tariffs and/or a method for periodically indexing them according to inflation or other similar parameters.

The tariff structure must be clear and include a methodology, under which costs are calculated, that can be easily applied by the sector's stakeholders.



The methodology should define the data needed to calculate the service charge and, ideally, the formulas that independently specify the costs for each activity, including:

- a. Administrative and billing costs
- b. Costs of cleaning public areas (including pruning and maintenance of green areas)
- c. Collection (including differentiated collection)
- d. Transportation (including transfer)
- e. Organic waste valorization processes (including costs per technology e.g. open-pile composting, vermicomposting, forced aeration composting, anaerobic digestion, etc.)
- f. Valorization of inorganic waste
- g. Final disposal (including leachate treatment costs according to the technology employed, and biogas management, including capture and passive/active flaring)

CASE STUDY 13

COLOMBIA

Charging structure under the tariff methodology

A good tariff methodology example is the one used in the Colombian sanitation service, which is defined in Resolution 720 of the Regulatory Commission for Water and Basic Sanitation Services (CRA, as per its Spanish acronym). The CRA is the regulatory body for tariffs and quality of service provision that establishes the calculation of the tariff enforced nationwide. The methodology specifies the costs that can be charged for each of the activities defined under the sanitation service through ceiling prices (CRA, 2015). Therefore, operators charge rates that do not exceed those defined by the methodology.

The methodology also includes the calculation of fixed costs by activity (commercialization -including invoicing, charges collection, response to requests and complaints, information campaigns-, sweeping and cleaning of roads and public areas, and urban cleaning) as well as variable costs (waste collection and transportation, recovery, treatment, final disposal and leachate treatment).

The CRA periodically revises the tariff methodology, based on the analysis of available information reported by service providers and according to studies conducted on the costs of implementing different waste management technologies, for instance.

In this tariff methodology, the management of the organic fraction is defined under the treatment activity, which came into effect in 2019. The costs of providing management services are paid based on the costs associated with the forced aeration composting technology. Other organic waste recovery technologies may charge the equivalent cost of final disposal plus leachate treatment, under a temporary figure, while the methodology is updated to include greater specificity regarding existing technologies.

It should be noted that tariffs correspond to the main source of income for the sanitation sector in Colombia, which account for 85% of income. National and municipal governments cover the remaining 15% through various resources destined for the sector (UN Environment, 2018). This is a scenario where the provision of services is guaranteed financial sustainability, which allows the active participation of the private sector and the provision of quality services.

SOURCE:

Regulatory Commission for Water and Basic Sanitation Services (CRA). (2015, July 09). Resolución CRA 720 DE 2015. https://normas.cra.gov.co/gestor/docs/resolucion_cra_0720_2015.htm#:~:text=Y%20SANEAMIENTO%20B%C3%81SICO-,Por%20la%20cual%20se%20establece%20el%20r%C3%A9gimen%20de%20regulaci%C3%B3n%20tarifaria,de%20aseo%20y%20se%20dictan

UN Environment (2018). Perspective on waste management in Latin America and the Caribbean. United Nations Environment Programme, Office for Latin America and the Caribbean. Panama City, Panama.

CASE STUDY 14

SOUTH KOREA

Online Information System: Data automation for organic fraction in South Korea.

South Korea uses a SWM information system able to automatically record information from all stages of waste management using three databases. One of these databases focuses exclusively on obtaining food waste management information from residential users, using radio frequency identification (RFID) technology.

Each household has a personalized card with an RFID chip, which allows each user to access waste bins to deposit their food waste. In this way, the system identifies the weight of the waste deposited by each user and estimates the charge. This innovative system, which focuses on the organic fraction and was implemented at the beginning of the 21st century, achieved a 20% reduction in food waste generation in the city of Seoul.

The other two databases collect information on waste transportation and disposal activities (allowing the analysis of collection vehicle routes using geographic information systems) and connect buyers and sellers of recyclable materials, supporting the market of recovered waste. These technological tools have proven to be very useful for the collection and use of data for decision making, and have generated incentives resulting in a behavioral change of Koreans to reduce their organic waste.

SOURCE:

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO. Page 176.



3.5.

Effective enforcement to achieve compliance with regulations

During our analysis of policy barriers, it was identified that the municipal level is, in many cases, responsible for the control, supervision and sanction of service providers and management sites located in its territory. However, municipalities tend to not have the technical, operational or personnel capacities to carry out this work. In addition, municipalities often act as service providers, which generates a conflict of interest when exercising their responsibility to monitor service providers and their compliance with regulations. This section presents the tools available to strengthen the Monitoring/Compliance agency in accordance with the identified barriers.



Ensuring the existence of an independent Monitoring/Compliance agency

It is important that the Monitoring/Compliance agency is established at the national level, or at the state level in the case of federal countries, for it to have sufficient resources and a broad view of the country's reality, regulations and regulatory updates. It is also recommended for the Monitoring/Compliance agency to be independent of the Public Policy Governing Body, the planning body and the waste management service providers to ensure transparent and effective monitoring, control and sanctioning.

Finally, as mentioned in the Monitoring/Compliance agency section, there are the two oversight aspects:

- Compliance with the environmental and social requirements established in the permits and licenses for waste management sites
- The quality of the service provided



It is advisable that both aspects fall under the responsibility of different institutions.

Provide resources to reach the entire territory

The oversight body, set at the national or federal level, must have the capacity to act in the entire territory. The auditing entity should have the necessary resources to monitor the state of the sites and the quality of service provision in the field. Hence, the entity should have the necessary human and financial resources to make periodic visits (both scheduled and unannounced) to the sites where organic waste management services are provided. Technical capacities of officials should also be strengthened to evaluate the state of management operations, particularly those related to the organic fraction, as well as the management of biogas in landfills.



CASE STUDY 15

Dual National Level Institutional Structure of Oversight

In Colombia, the National Environmental Licensing Authority (ANLA as per its Spanish acronym) is the organism in charge of compliance and oversight with environmental and social requirements established by permits and licenses for large-scale projects and some specific sectors. The Regional Autonomous Corporations (CAR, as per its Spanish acronym) oversee projects located in their jurisdiction, and of smaller size and impact. Lastly, the Superintendence of Residential Public Services (SSPD, as per its Spanish acronym), a national entity, is responsible for overseeing the quality of the service provided. The ANLA and the CAR approve and follow up on permits and licenses for SWM sites. Their role focuses on monitoring and controlling the mitigation of environmental and social impacts of project activities.

On the other hand, the functions of the SSPD are related to the supervision of service quality and the evaluation of the technical, financial, commercial and administrative management of service providers, so as to guarantee both the rights of the users and the sustainability of the services provided. This includes, among others,

the monitoring of indicators on compliance with schedules and frequency of service provision, the correct billing of charges to users, timely response to complaints and claims, and compliance with reporting obligations to the Unified Public Services Information System (SUI, as per its Spanish acronym).

The SSPD is also in charge of managing and analyzing the information collected by the SUI. In fact, the SSPD periodically issues reports on the provision of services, with detailed analyses on coverage, quality of service provision by activity, among others, based on the data reported by operators.

This division of supervisory roles works efficiently in the case of Colombia and has allowed the quality and coverage of the provision of sanitation services to be very high. In addition, the national nature of the SSPD allows it to have greater technical and resource capabilities as well as robust tools to execute its oversight and sanctioning roles. It also allows the SSPD to be familiar with the different regional realities, challenges and best practices in the sector. This dual, national-level oversight structure is the most recommended for countries in the region.

SOURCE:

Superintendencia de Servicios Públicos Domiciliarios (Superservicios) (2023, January 23). Aqueduct, sewerage and sanitation. Government of Colombia. <https://www.superservicios.gov.co/Empresas-vigiladas/Acueducto-alcantari-llado-y-aseo/aseo>.

COLOMBIA



Establish a sanctioning system oriented towards compliance

The oversight body must be able to establish and/or strengthen effective sanction mechanisms in the event of non-compliance. Otherwise, it is difficult to guarantee the adequate provision of services and a proper management of the organic waste management infrastructure. ***It is important for the oversight agency to define clear guidelines for issuing sanctions, based on minimum quality parameters for the provision of services,*** and on what is established in the environmental permits and licenses of SWM sites.

The Monitoring/Compliance agency must have access to updated information on providers and possible non-compliance from the waste management information system to support its monitoring and control work when it is not carrying out visits, as well as to corroborate the veracity of the data reported during field visits. The information should also be used to issue early warnings for non-compliance or sanctions, when necessary.



Sanctions for SWM service providers

Operators must comply with their obligations to report data to the information system or competent authority, according to legislation or contractual terms. They must also comply with the acceptability ranges of the service provision quality indicators. In the case of non-compliance, they must be sanctioned. Sanctions may vary depending on the seriousness of the non-compliance, persistence, and/or offence recidivism. Sanctions may range from warnings, fines, immediate suspension of activities, suspension of managers/employees and decreeing contract forfeiture, to intervening the company or prohibiting the offender from providing the service in the long term.

It is important to note that sanctions that work well for private operators may not have the same effectiveness when applied to a public service provider, such as a municipality. For example, the application of fines is diluted in the municipal budget, losing its sanctioning effectiveness. In such cases, the sanctioning tool described below can be used.

Sanctions to salaries of the responsible authorities

A successful sanctioning tool that can be applied to public officials in cases such as failure to implement mandatory actions, to meet binding targets or for non-compliance in their role as a municipal service provider is the salary reduction of the official who leads the entity committing the non-compliance. This is a tool that has worked well in

Chile under the Law on Access to Public Information. This law has established that the authority, head or director of the organ or service of the State Administration that fails to comply with the access to information law may be sanctioned with a fine of 20% to 50% of his/her remuneration (Ministerio Secretaría General de la Presidencia, 2008).



3.6.

Active collaboration of citizens



The collaboration of citizens is essential for the proper management of the organic fraction, since they generate significant volumes of this waste in their homes. Hence, it is necessary to employ a set of parallel strategies, promoting cultural change, but also applying economic mandates and incentives.

Promoting cultural change

Citizen collaboration is a key issue for the development of organic waste management systems that work efficiently and generate high quality by-products. Listed below are several tools to engage and encourage residents to implement sustainable waste management practices at the source.

Citizenship education programs

For initiatives involving citizens, it is necessary to create environmental education programs, including educational and awareness campaigns.

First and foremost, it is essential that education programs focus on creating the habit of separation at the source of organic waste. Since this type of waste is linked to the potential generation of odors and leachate, it is vital for these programs to be practical and include concrete examples and solutions to these particular challenges, such as communities that have successfully implemented separation at the source.

Collaboration with existing community groups is another way to increase interest in participation and disseminate the message more broadly. Campaign messages can also be effectively disseminated when involving well-known and respected community members as well as influencers, who can amplify the messages through social media and other online tools.

Home composting is also an interesting topic to include in citizen training programs. This topic should include practical sessions on the strategies mentioned above (see more at *Home Composting Programs*).

CASE STUDY 16

Citizenship communication strategy

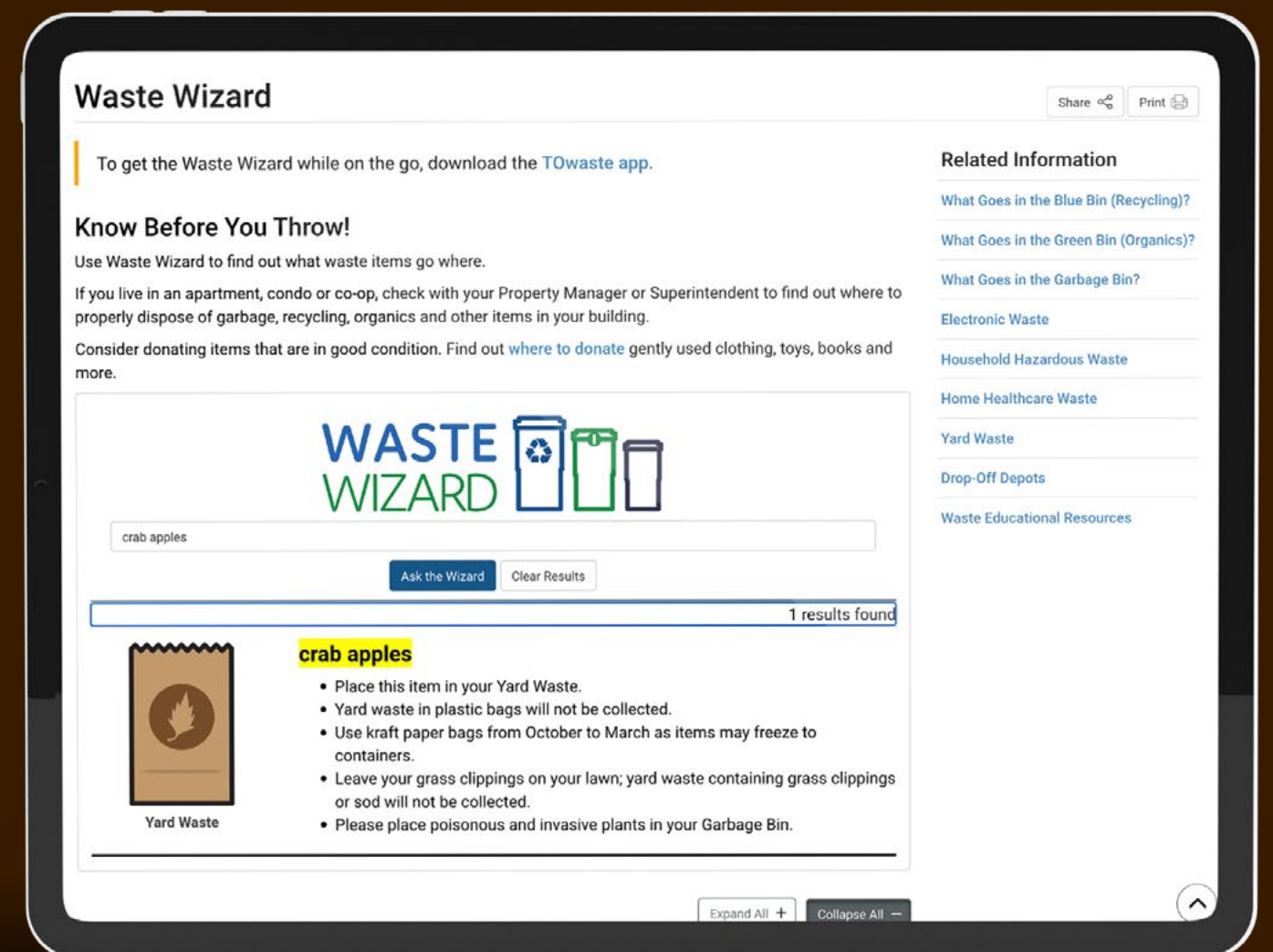


The city of Toronto (Canada) has a robust communication strategy to disseminate waste management messages to its residents, using a variety of digital tools. Its user-friendly website includes all the necessary information for citizens, from source separation provisions, drop-off points and fees to regulations. In addition, the website has a “Waste Wizard” tool, where users can search for any specific item they need to dispose of and the platform gives them a step by step on how to do so. The city also has a mobile app to request waste collection and actively uses social media, YouTube videos in particular, to introduce and explain waste-related topics in a simple and fun way to children.

Moreover, Toronto’s “Love food, hate waste” campaign, which focuses on reducing food waste, was designed taking into account the country’s diversity and delivered information in 11 languages. The campaign has a list of “champions”, composed of personalities,

celebrities, experts on various topics and social media influencers. They have massively disseminated campaign messages to different segments of the population, achieving 23,800 website monthly visits (National Zero Waste Council, 2020).

Other initiatives include a 3R ambassador program, where volunteers share best practices with citizens, and the Mayor’s Towering Challenge, organized in 2016 to highlight reduction and reuse initiatives led by city residents. Toronto also has linked its waste management efforts to its GHG emissions reduction goals, which are included in the environmental education programs provided to citizens (C40 Cities, 2016). The diversity of tools to deliver the city’s messages to the population has made Toronto’s communication strategy a success that can be transferable to other local contexts.



SOURCE:

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO. Page 163.

National Zero Waste Council (2020). Love Food Hate Waste Canada Making Every Bite Count. Our First Three Years - 2018 to 2021. <https://lovefoodhatewaste.ca/wp-content/uploads/2022/06/LFHW-ImpactReport-2018-2021.pdf>

C40 Cities (2016, February). Good Practice Guide. Waste to Resources. C40 Cities Climate Leadership Group. <https://www.c40.org/case-studies/c40-good-practice-guides-san-francisco-zero-waste-by-2020/#:~:text=By%20becoming%20a%20zero%20waste,and%20help%20create%20green%20jobs.>

Home Composting Programs

Home composting is a powerful tool, as it allows for the management of organic waste at the source and reduces the costs associated with its collection, transportation and management. Home composting programs require providing education and outreach platforms to citizens, as well as composting bins to residents interested in participating in the programs on a voluntary basis. In cases where residents have access to gardens or orchards in their homes or neighborhoods, it can become an incentive for them to actively participate in home composting programs, given the benefit of obtaining compost that can be used in these sites.

It is advisable to combine home composting programs with continuous training, visits to users a few months after the compost bin delivery to verify its correct use and clear up concerns, as well as online materials such as practical videos, blogs, and forums. Additionally, these programs work very well when associated with the development of community composting and/or urban gardens as community workspaces tend to generate high levels of interest and participation.



COSTA
RICA

BURKINA
FASO

CASE STUDY 17

Home Composting:

Costa Rica and Burkina Faso are two successful examples of home composting

In the case of Costa Rica, the Composteros program has been implemented in five municipalities of the San José metropolitan area and has 3,500 active participants with a very low dropout rate. The program started in 2018 and, despite the COVID-19 pandemic, was able to generate and maintain the interest of municipal inhabitants, who participated in online trainings.

The program's website contains all the resources for learning how to compost at home, information about the program's achievements and a map of participating composters. Women in the communities are the most active participants and use the compost generated in their gardens, yards and backyards.

The program in Burkina Faso is based on promoting waste management based on a traditional practice called tampouré, where villagers dig pits for manure management and develop composting on their land. The national government financed the creation of 15,000 manure pits between 2005 and 2012 and, according to a 2016 study, 40% of household waste generated in secondary cities and peri-urban areas was managed through these mechanisms, reducing the costs of collection, transport and final waste disposal.

SOURCES:

Composteros. (2018). Costa Rica composting project. <https://composteros.go.cr/>

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO. Page 152.

Latin America Recycle Organics Program (2022). Interview Municipalidad Desamparados Costa Rica.

Programs to promote organic agriculture

Programs to promote organic agriculture support the increase in demand for compost and digestate (when certified for organic production). The programs should be designed with leading public entities (such as the Ministry of Agriculture or territorial authorities that support farmers) and with the participation of private entities. The objective is to disseminate the message among interested stakeholders in an institutional manner and through existing networks that include both large agribusiness players and small-scale agricultural producers.

Behavioral economics applied to promote adequate waste management

This type of incentive focuses on increasing citizen awareness and participation using nudges that lead to behavioral changes. The study of behavioral change economics has established that an individual's behavior is linked to social norms. Studying and understanding the reasons guiding people's behavior makes it possible to identify strategies that can generate changes in decision making in daily life. For example, nudges can be used in voluntary programs where citizens can freely make their own decisions without being influenced by fines or sanctions. Other behavioral economics tools can also be used prior to the introduction of volume/weight-based charging tools (such as Pay As You Throw - PAYT), which will be described later.

For example, a waste management service user who receives information about the environmental benefits produced by their decisions to separate or not waste is likely to start making decisions that promote

their contributions to the community and environment. Messages should always be clear, intuitive and easy to remember for the target population.

Another strategy is to include information comparing individual achievements to those of their neighbors. This can be applied in utility bills, for example. In localities where PAYT type schemes have already been implemented (see section *Incorporate economic incentives*). Comparative information can also be applied to the amount of waste recovered or reincorporated into the production cycle, the reduction of waste sent to final disposal, or the reduction of GHG emissions associated with source separation. These strategies can also increase citizens' willingness to pay and reduce delinquency.

Establish mandates for users

Obligations for source separation of organic waste

Mandatory source separation for the population should be established in parallel with the availability of separate collection routes or home composting programs that allow the organic waste stream to be separately managed. The obligations should be accompanied by sanctions for non-compliance with source separation (**see Case Study 1**). Co-responsibility for inspecting contamination in segregated organic household waste bins can be included in the contracts with operators, since they well-placed to carry out this inspection. Obligations for separation at source should also be established for generators of larger volumes of waste, such as commercial and industrial companies.



CASE STUDY 18

Source separation due to landfill closure

Due to the closure of the landfill used by the city of Panaji (India) and because the city is a major tourist attraction, the local government had to migrate to more sustainable waste management practices. The city of about 115,000 inhabitants (metropolitan area) initiated a separation program including five organic fraction waste streams. A pilot with two streams, organic and inorganic, was initially implemented in 70 residences. Subsequently, the program was extended to the entire city and became mandatory.

Panaji offers daily separate collection routes for organic waste and lower frequencies for dry waste. The city processes a total of 24 tons of organic waste per day under different modalities depending on the generator. Residential organic waste is transported to one of 96 decentralized composting units.

PANAJI,
INDIA

Waste generated by commercial users is taken to one of two open-pile composting sites, and some hotels use on-site anaerobic digestion systems to produce biogas. The compost derived from the commercial sector is used in urban projects for the maintenance of gardens and green areas.

As part of the expansion of the system to the entire city, after the pilot phase, the public campaign “Bin Free in 2003” was launched. All community waste bins were removed, forcing residents to manage their waste at home and to participate in the door-to-door collection routes that were simultaneously established. Residents deliver their waste to the collectors personally, who, as a control mechanism, inspect the waste delivered daily. This encourages compliance with source separation requirements.

SOURCE:

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO. Page 170.

Incorporate economic incentives

Volume charges (bags/labels)

Volume-based charges, also known as Pay As You Throw (PAYT), are a tool for putting into practice the “polluter pays”. ***These mechanism generates incentives for waste generators to manage and reduce their non-recoverable waste, as they will start noticing a reduction in charges.***

Waste generators should be able to buy the bags or tags used in volume charges in places frequented daily (supermarkets, stores, post offices, etc.). Bags of different sizes should also be available to allow the user to save money if they generate less waste and buys smaller bags. The collection system should only collect the waste presented in the assigned bags with the system’s labels. Money can be saved if the user manages to reduce the number of bags used by reducing the amount of non-recoverable waste delivered. To reduce the amount

of waste generated, the user should have options available to independently dispose of different waste streams, either through separate collection routes or recycling points in the neighborhood.

The bag/label charging system can be designed at different levels of complexity, starting with charging for bags of non-usable materials, as explained above, or including bags under a color-coded system for different waste streams. This is the case in Belgium, where the color code considers five separate streams, including an orange bag used for organic waste that also charges a fee to promote home composting (Chilean Ministry of Environment, 2020).

One of the great challenges for the implementation of this tool and the two presented below is that their execution requires the existence of a robust control system since users may choose to improperly dispose of waste to avoid payment. This can only be prevented with an effective monitoring and sanctioning system, which does not yet exist in several of the countries studied.



CASE STUDY 19

Charge with the bag/label system in Zurich

In the Canton of Zurich (Switzerland), the PAYT system uses official waste bags/labels to present non-recoverable waste. There is also an extensive list of options for disposing of the remaining recoverable waste, diverting waste from the bag. Users buy the bags or labels in supermarkets, post offices, and other stores frequented by the population throughout the canton.

Recyclable waste can be taken to various drop-off points (plastics at supermarket collection points, paper and cardboard at door-to-door collection routes, and glass, metals, oil and textiles at collection points).

Given the cost of bags and the options for waste recovery, the inhabitants of Zurich not only have a widespread culture of separation at the source and of composting at home, but also a high participation in the separation of the organic fraction at home. The Canton does offer collection routes for food and garden waste, but many users prefer to compost their waste at home or in community compost bins (in the case of residential complexes) and use the compost in their gardens and orchards.

The Zurich model demonstrates that, to implement the bag system, the user must be able to divert the rest of the waste to other management alternatives. Once such alternative exists, the incentive for charging for bags positively influences the population.

SOURCES:

Kanton Zürich (2022). Waste management. <https://www.zh.ch/de/migration-integration/willkommen/english/living.html#undefined>

Stadt Zürich Entsorgung + Recycling (2002). Correct waste disposal in the City of Zurich. https://www.stadt-zuerich.ch/content/dam/stzh/ted/Deutsch/erz/abfall/richtigentsorgen/ERZ_Richtig-entsorgen_in%20Z%C3%BCrich_Englisch.pdf



Volume charges (waste bins)

Another modality of the PAYT mechanism is for the competent waste authority to give waste bins for each user. Similar to the bag system, waste bins are also color-coded, available in different sizes and used for different waste streams. The larger the size of the container used, the higher the fee. It is important to note that this system requires greater logistical efforts because users can request a change in the size of their bins at any time, which implies collecting the old container and providing a new one. This method also implies the need to coordinate administrative issues, since the charge must be updated every time the size

of the container or the number of inhabitants in the house change. **The implementation of this type of system also requires a more active level of citizen participation**, since the user must decide what container size to use according to the amount of waste generated, and also request a container size change in case waste generation is reduced (or increased). Like in the case of the bag system, more pricing complexity can be added to the charges by incorporating different bin sizes for other waste streams, including organic waste bins. These types of tools have been shown to have benefits by discouraging waste generation because of the cost involved.

CASE STUDY 20

Container volume charging system in Toronto

TORONTO,
CANADA

Toronto (Canada) uses a volume-based charging system with containers or bins. The city charges residents an annual fee based on the size of the bin selected by the user. The available bin sizes are 75 liters, 120 liters, 240 liters, or 360 liters. If the user wants to request a change in size, they can do so by phone or online. Annual costs for each bin range from USD 214 for the small size to USD 409 for the larger size. Subsidies are also in place to cover the costs for lower income residents.

The user is informed that the charge covers not only the management of collected waste but also urban cleaning, waste reception centers, recycling, management of yard, organic, electronic and bulky waste, metals, and landfill decommissioning, among others.

Like in the Swiss case, Toronto inhabitants have access to a system that allows them to reduce non-usable waste with different colors bins. Recyclables are deposited in blue waste bins that were implemented in the 1990s, while the green waste bin is reserved for organic residential waste, which was implemented in 2000. Under this system, in 2021, the city diverted 52% of the residential waste collected from landfills.

SOURCES:

City of Toronto (2022, December 14). Recycling, Organics & Garbage. <https://www.toronto.ca/services-payments/recycling-organics-garbage/>.

ImplementaSur (2019, October 03). Informe 1 diagnóstico "Asesoría Sobre el Manejo de Residuos Orgánicos Generados a Nivel Municipal en Chile".

Charges by weight

Charges by weight require more sophisticated management systems, since the calculation of the fee depends directly on the weight generated by each user. This system is mainly recommended for large commercial and industrial waste generators, although it can also be used for residential users, as it is the case in some cities in Belgium.

The implementation of this type of collection system can vary. The most sophisticated option is the use of vehicles with built-in scales as well as bins with electronic identification mechanisms to allow for weight information to be automatically processed in a centralized system that calculates charges. Other mechanisms work through the use of parameters that allow weight to be calculated, even if it is not directly measured.

CASE STUDY 21

FLANDERS, BELGIUM

Charges by weight to residential users

In the region of Flanders (Belgium), a weight-based collection system is used for waste management. Pilot projects started in the early 1990s. Initially, volume-based fees with the use of bags and labels were implemented, which later evolved to weight-based fees for the non-usable and organic fractions. To encourage home composting, the highest charge is assigned to non-usable waste, followed by organic waste. The collection of paper, cardboard, glass and textiles is free of charge, as it is already covered by the extended producer responsibility (EPR) system.

In this Belgian region, each user is assigned a container with an identification chip that automatically records its weight before and after the waste is collected. This information is used to independently charge each user by weight, which is paid via an online platform.

The initial costs of implementing the system were covered with support from the regional government and subsidies for the municipalities implementing the system. Taxes on final disposal and incineration and differentiated fees complement the financial sustainability of the system. Flanders managed to reduce the portion of waste going to final disposal and incineration to less than 1%.

SOURCE:

Regions for Recycling (R4R) (2014). Good practice Flanders: PAYT. https://www.acrplus.org/images/project/R4R/Good_Practices/GP_OVAM_PAYT.pdf.



Facilitate the acceptance of organic waste management projects

Stakeholder participation mechanisms

Planning processes such as the development of public policy instruments, PGIRS and consultation processes for the implementation of projects, programs and/or installation of new waste management infrastructure should always include the active participation of all interested parties. Therefore, it is important to establish mechanisms to clearly define the consultation process with nearby communities and other stakeholders. They should be invited to meetings where they are informed in a timely manner of the processes underway, where they can resolve their doubts and discuss suggestions. It is recommended that organic waste recovery projects be presented as an alternative to the use of sanitary landfills and as an integrated waste treatment approach, which tends to generate greater trust and support from the public.

The process of formulation of the initiative is as important as the final result obtained. Including opportunities of consultation during the various progress stages allows stakeholders to take ownership of the initiatives. These processes support the reduction of the “not in my backyard” (NIMBY) phenomenon, which refers to communities opposing the development of projects in areas close to their places of residence. It is critical to involve communities in the region’s strategic planning processes of treatment/disposal solutions through transparency. A process that has the participation and input of different stakeholders will always have a higher probability of success.



Incentives for municipalities receiving waste management infrastructure

Establishing agreements on the location of management sites is a challenge that may arise when implementing regionalized work initiatives because municipalities will normally prefer the sites to be located outside their jurisdiction. One solution to this challenge is to establish incentives for municipalities to build regional management sites in their territory. In Colombia, for example, the municipality in which the regional infrastructure is built receives a percentage of the fee collected for the final disposal service. This incentive has worked well in facilitating the location of new regional disposal sites.

This tool was also beneficial when reducing the total number of disposal sites (Correal S., M.C., 2014) and controlling the proliferation of inadequate disposal sites (the latter in parallel with the generation of a mandate for the closure of open dumpsites that was issued a few years later). Additionally, given the economies of scale generated by disposing larger amounts of waste in a single landfill, regional landfills can operate with greater technical rigor. Lastly, from an oversight perspective, having a smaller number of sites to oversee facilitates and optimizes the performance of the Monitoring/Compliance agency.

3.7.

Compliance with biogas capture and flaring requirements



During the barriers analysis, despite the existence of requirements for biogas capture and flaring in landfills in most countries, it was identified that these are rarely complied with. Therefore, mandatory mandates should be accompanied by tools that allow and enforce progress towards the effective implementation of these actions, especially because emissions could be reduced significantly in a short period of time, if mandatory requirements were enforced in the short term. Given that final disposal is the most common SWM mechanism used in the countries studied, the potential for reducing emissions from biogas capture and flaring is huge. The following mechanisms are helpful to increase compliance.

Promote compliance through financing and incentives:

Funds to implement mandatory biogas capture and flaring

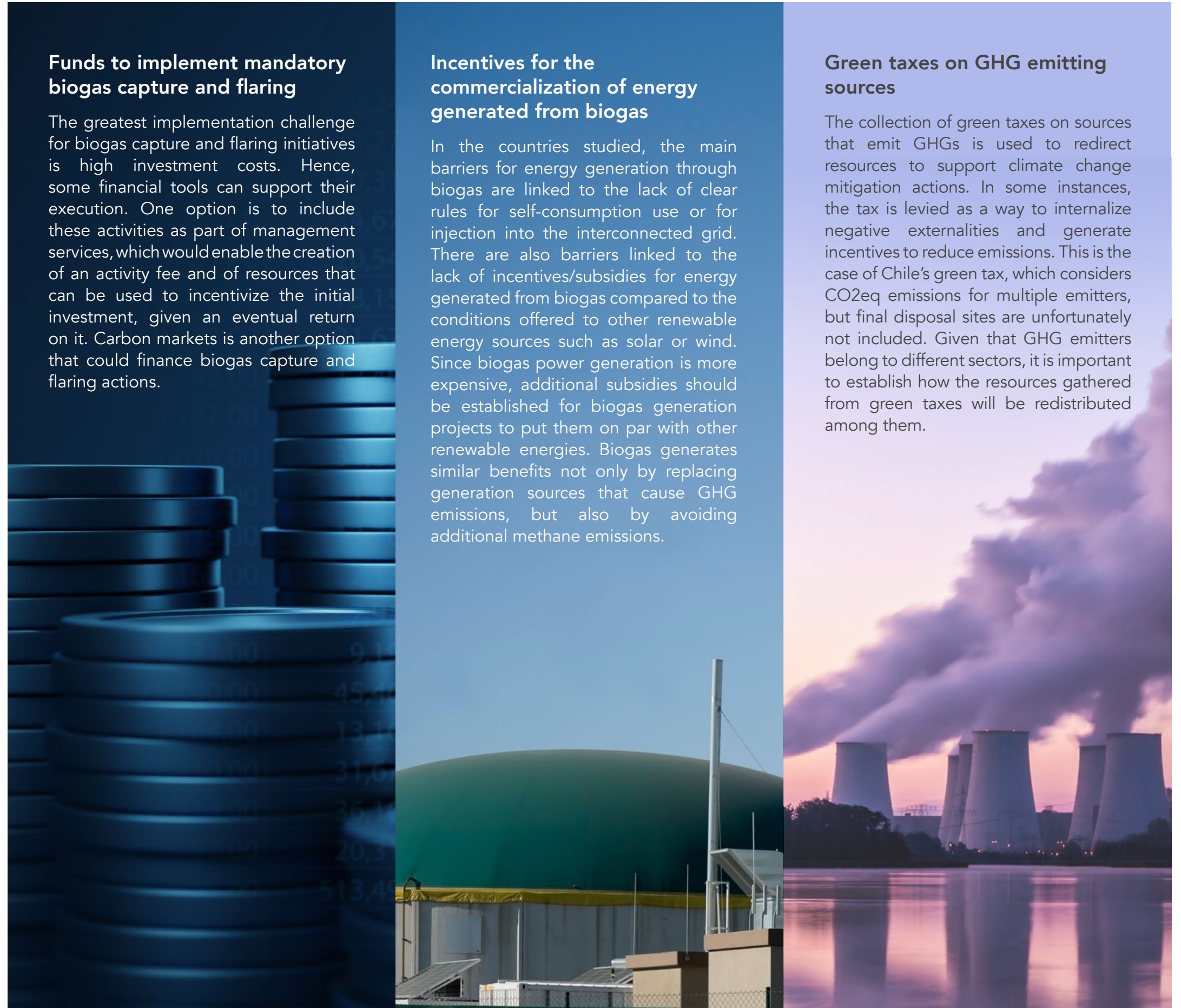
The greatest implementation challenge for biogas capture and flaring initiatives is high investment costs. Hence, some financial tools can support their execution. One option is to include these activities as part of management services, which would enable the creation of an activity fee and of resources that can be used to incentivize the initial investment, given an eventual return on it. Carbon markets is another option that could finance biogas capture and flaring actions.

Incentives for the commercialization of energy generated from biogas

In the countries studied, the main barriers for energy generation through biogas are linked to the lack of clear rules for self-consumption use or for injection into the interconnected grid. There are also barriers linked to the lack of incentives/subsidies for energy generated from biogas compared to the conditions offered to other renewable energy sources such as solar or wind. Since biogas power generation is more expensive, additional subsidies should be established for biogas generation projects to put them on par with other renewable energies. Biogas generates similar benefits not only by replacing generation sources that cause GHG emissions, but also by avoiding additional methane emissions.

Green taxes on GHG emitting sources

The collection of green taxes on sources that emit GHGs is used to redirect resources to support climate change mitigation actions. In some instances, the tax is levied as a way to internalize negative externalities and generate incentives to reduce emissions. This is the case of Chile's green tax, which considers CO₂eq emissions for multiple emitters, but final disposal sites are unfortunately not included. Given that GHG emitters belong to different sectors, it is important to establish how the resources gathered from green taxes will be redistributed among them.



03

04

Country-specific recommendations

05



4.1.

Chile:

From strategy to mandate

The ENRO, launched in March 2021, has set a path that Chile can use to advance towards the prevention and valorization of the organic fraction of MSW. The ENRO incorporates a significant number of the tools described in the previous chapter, such as concrete goals and strategies to address the low coverage of charges to users, to then move towards PAYT systems, capacity building programs for municipal staff and home composting programs among others. The general recommendation is to **strongly promote the implementation of this instrument** through the different lines of work described below.



¹⁶ President Gabriel Boric announced in June 2022 the forthcoming submission to Congress of a bill on organic waste that would include several of the recommendations outlined here. As of the date of publication of this report it has not materialized, but it is key that this happens

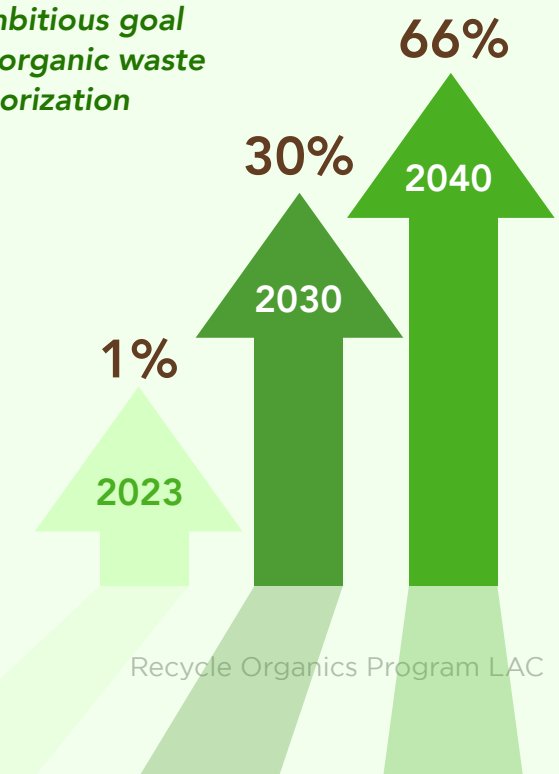
Establish mandates for the differentiated management of the organic fraction

Although the ENRO sets concrete goals and even a monitoring plan, by its nature, it cannot establish obligations. However, **it is unrealistic to think that voluntary measures alone can achieve the ambitious goal** of moving from the current 1% use of the organic fraction to 30% in 2030 and 66% in 2040. It is therefore imperative to establish legal obligations for the different actors in the chain.

The executive branch should promote a law¹⁶ that requires municipalities to provide a differentiated collection service for the organic fraction. This can be established through household coverage goals, as described in the section “Require separate collection of organic waste for municipalities”, where a gradual approach is highly relevant. This law should also include a separation at source obligation for citizens. Its compliance in a first phase can be promoted through instruments based on behavioral economics that appeal to social norms (for example, notifications that are visible to the neighbors of households that do not separate properly), and then

move towards fines. Separation at source and separate collection obligations should also be legally established for large generators. In parallel, and to cover the entire chain, the law should prohibit the disposal of organic waste in landfills, which should be carried out gradually as described in the section restrictions on the final disposal of organic waste.

Ambitious goal of organic waste valorization



Ensure charges to citizens to ensure the financial sustainability of the system

It is necessary to solve the structural deficit that Chilean municipalities have in order to finance new SWM requirements. To this end, it is crucial to **redesign the charging system for the cleaning fee for citizens**, so that all persons who are not exempt by law from paying the fee actually contribute. **A new charging mechanism could be selected, in which the municipalities should be exempted from charging the SWM fees**, such as, for example, payment through the General Treasury of the Republic, a national entity that already collects a variety of taxes, such as real estate taxes, and then transfers the funds collected to the municipalities. This is a method that does not correspond to the best practice in the region, which is to do charge through the drinking water or electricity bills. In Chile it is politically and administratively complex to apply this, since these are private companies for which this would mean a relevant change in the conditions of their concessions.

On the other hand, it is important to **open the discussion about the 25% of households that are exempt from paying** the SWM fee according to the Municipal Revenue Law. Clearly, this is a low-income socioeconomic segment, but, as shown in the case of Colombia, a system of cross-subsidies can be designed so that they contribute, but pay less (**see Case Study 7. Cross-subsidies and gradual introduction of the tariff methodology (Colombia)**).

These actions should be led by the executive branch, and these are adjustments that could be included in the same bill mentioned above.

Establish taxes on landfill disposal

The business models of private organic waste valorization projects operate based on charges and the income per ton received. The shadow price they can charge is the value paid for the final disposal alternative. Private investments will have difficulties to materialize, when the latter is lower than that of the landfill project, as is the case in Chile. This has been solved in most developed countries by establishing a tax on final disposal (**see Landfill tax**). Chile should **move towards this type of systems**, which should be implemented in **the medium term**. Therefore it is advisable to establish them now in legal instruments with deferred validity.

If progress is made with the mandates for municipalities outlined in section 3.2.3, raising the amount municipalities must pay for final disposal may ultimately be too burdensome for the public. However, **establishing this type of tax for large waste generators** could be a powerful way to encourage the diversion of waste in general, and certainly also of the organic fraction. In other words, a law establishing a green tax on final disposal, but limited to these generators, could be considered.



17 In the barrier report (Programa Reciclo Orgánicos Latinoamérica, 2023a) it was shown that the value for disposing waste in a landfill is around USD 12 per ton, compared to around USD 20 per ton for organics valorization projects.

Support municipalities with public funds

GHG mitigation projects from the waste sector must be carried out by municipalities or by their private service providers. Therefore, there is a need to support municipalities with public funds so that such projects can materialize.

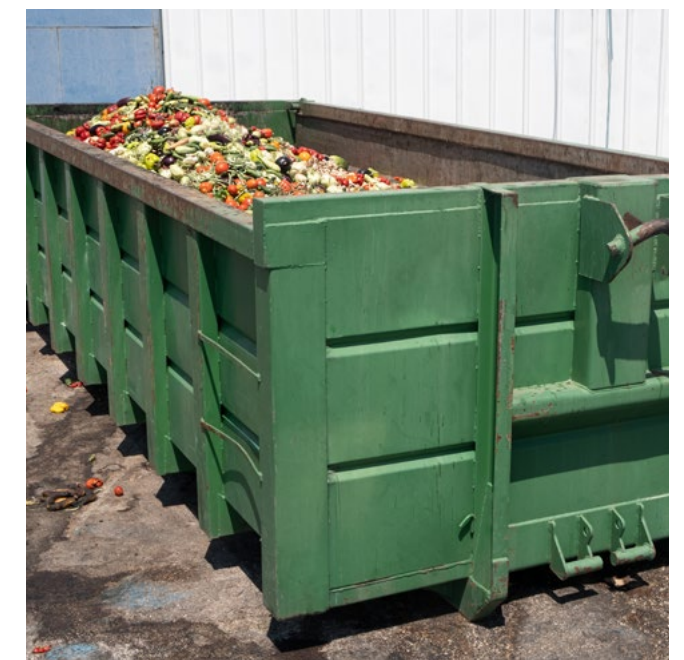
The only way to achieve a pace of project development that allows the ENRO goals to be met, is for projects to pass through the public investment approval processes more quickly. To this end, the **MMA's Circular Communities Program¹⁸ is key**, so that it can catalyze projects, supporting municipalities to speed up the development of conceptual designs, detailed engineering and other requirements of the National Investment System (SNI, as per its Spanish acronym). This would generate a portfolio of relevant projects that can access the fund administered by the National Solid Waste Program (PNRS, as per its Spanish acronym) of the Sub-secretariat of Regional Development (SUBDERE, as per its Spanish acronym) of the Ministry of the Interior.

At the same time, the MMA should take advantage of the fact that it already has a fund created by law for this purpose, the **Recycling Fund, to substantially increase its budget allocation** and thus also use it to promote municipal organic waste management projects. This fund seeks to support municipalities in the development of recycling systems and in 2021 it also expanded its scope to include organic waste recovery projects. However, it has a low level of resources (close to USD 250 thousand per year for the whole country).

18 After publishing the ENRO, the MMA launched the new program "Circular Communes", focused precisely on supporting municipalities in the implementation of this instrument, including the formulation of projects that could take advantage of available public resources (Programa Reciclo Orgánicos Latinoamérica, 2023a).

Redesign governance to bring the ENRO to the territories

The transformation of waste management systems, as has been pointed out, will have to take place in the territories. Although the ENRO contemplates a coordination scheme between the national level, which has led the development of this instrument, and the local level, mediated by the regional level, it is a "soft" articulation mechanism. Progress should be made through a legally established articulation system, where **regional and municipal governments develop plans based on national guidelines** (see section 3.2.1), in which they detail how they will comply with national goals for the use of the organic fraction. The contents of these plans should be auditable, for example, by the SMA, and sanctions should be contemplated for the responsible authorities in case of non-compliance (**see section Establish a sanctioning system oriented towards compliance**).



Promote citizen collaboration

The collaboration of citizens in the differentiated management of the organic fraction is essential for the success of this transformation. In addition to the imposition of the above-mentioned mandate of separation at source, other instruments should be introduced to approach the public on different fronts. For the time being, the introduction of an organics collection truck should mean the **reduction of some days of collection by the mixed waste truck**.

In addition, once the generalized payment of the right to sanitation and the differentiated collection of organic waste is achieved, **PAYT systems** should be **gradually incorporated**. For example, a system of compulsory bags at a certain price could be introduced for the collection of the discarded fraction (see section *Volume charges (bags/labels)*), a formula that is less complex to apply in a reality such as Chile's and other countries in the region. This would generate an economic incentive for people to separate the organic fraction and send it in the organic waste truck, thus avoiding the purchase of more bags for mixed waste.

Finally, the ENRO contemplates a "National Environmental Education Program on Circular Economy and Organic Waste", but it has not yet been implemented. It is key to advance in its development, for which the actions described in the section Promoting cultural change should be considered, as well as seals or certifications such as those indicated in the section Certifications/seals for organic waste reduction.

Introduce mechanisms for project acceptance by the communities

In Chile, it is important to take advantage of the fact that landfills are strongly opposed by local communities, which makes organics recovery projects more attractive. In this sense, the effectiveness of the **conflict resolution mechanism**, which included a strong component of organic fraction utilization in the crisis generated in the **Chiloé archipelago**, should be monitored. If the incorporation of the local communities in the process of developing a strategic plan for that territory leads to the resolution of that conflict and the acceptance of the communities of new waste management infrastructure, **this case could be taken as a model to be followed for other areas**.

In addition, it would be advisable for Chile to open the discussion on the establishment of **economic incentives for the municipality that receives the infrastructure**, as has been done in Colombia (see *Text Box 4. Facilitate the acceptance of organic waste management projects*) and as has been proposed in Chile in relation to the royalty for mining companies, a specific tax for this highly relevant sector of the Chilean economy, which is to be reformed so that part of the proceeds go directly to the municipalities where the projects are located.

Precarious monitoring of inadequate disposal

Increasing requirements for with citizens or for large waste generators entails **strengthening of the control of inadequate disposal** in parallel. Otherwise, measures such as the payment for waste bags for the discarded fraction, or the tax on final disposal, may have the undesired effect of increasing the phenomenon of illegal dumping, which is already widespread.

This requires an **institutional adjustment** in Chile, since there is no authority with a clearly defined role and budget allocated for the prevention and remediation of these sites (see section *Training programs for civil servants*). One possibility is that prevention is set as the responsibility of the police (Carabineros), while regional governments have the role and the funds for the remediation of these sites.

Information systems with breakdown of organic fraction

The follow-up of the ENRO goals proposes a **monitoring system for the reduction of organic waste** going to final disposal, which contemplates a characterization of the organic fraction every five years and an estimation methodology for the years in between. It is necessary to specify this within the National Waste System (SINADER, as per its Spanish acronym) to know if the ambitious goals defined are actually being met.

Consideration should also be given to broadening the range of issues that are monitored in the system, as shown in *Text Box 3. Waste management information system*. This will become even more relevant when the mandates to the different actors described above are legally approved.

Develop a strategy for other sectors

Given that ENRO is limited to the municipal level, Chile has yet to **develop equivalent planning for the agro-industry sector, agriculture sector and for the sludge management** in wastewater treatment plants. . This should be developed in an inter-sectoral manner, involving at least the Ministries of Agriculture, Economy and Public Works. Such a strategy also needs to include concrete targets that can eventually become binding.





Electric Power Generation
System, Santa Marta Sanitary
Landfill, Santiago, Chile

TRAFO TR-6
23/0.4 kV
2.5 MVA

4.2.

Costa Rica:

Multiple opportunities to restructure roles, funds and other existing mechanisms

Opportunity to restructure roles at the national level

The institutional structure at the national level in Costa Rica is a first axis of work on which to focus efforts for the advancement of the sector. The existence of a single Public Policy Governing Body is fundamental, as mentioned above, and although in Costa Rica the Ministry of Environment and Energy (MINAE, as per its Spanish acronym) supports the evaluation and adaptation of the SWM policy, it does not have decision-making capacity. Currently, the Ministry of Health is responsible for formulating and executing the policy, as well as for monitoring, evaluation and control. Therefore, it is of utmost importance to follow up on and **support the bill currently before the Legislative Assembly that proposes to transfer authority over waste sector responsibilities to MINAE**. If the bill comes to fruition, this would allow this ministry, as the sole governing body, to provide guidelines for

prioritizing organic waste management issues and reducing methane emissions derived from valorization processes.

Given this opportunity to restructure roles, and taking into account the oversight challenges currently faced by the Ministry of Health, it is recommended to include the precaution that the monitoring and control responsibilities remain in the hands of an entity independent from MINAE. In addition, that entity should be set at the national level so that it has robust capacities in terms of sanctioning at the municipal level.

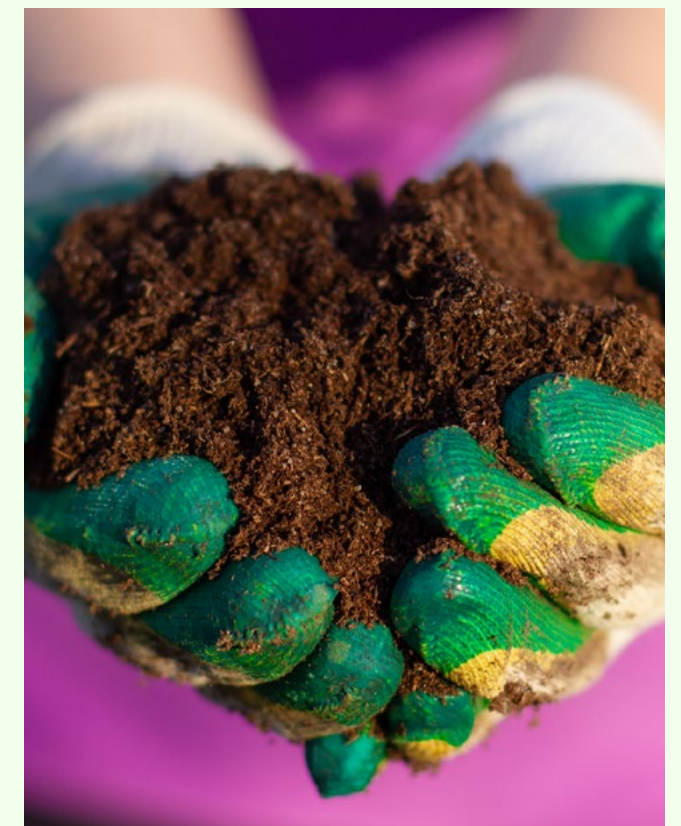
Visibility of the organic waste fraction in the public policy framework

Organic waste should be included in a legal instrument to give it visibility, as it was excluded from the National Law for Waste Management of 2020 (it is not explicitly

mentioned). This makes it difficult to plan and develop specific goals, mandates and incentives for this fraction. It also affects the possibility of spreading the implementation of initiatives on the ground. Establishing a strategy could be an effective mechanism, as Chile did (see Case Study 2. Specific targets for the organic waste fraction (Chile)). Another line of work is to take advantage of the current process to define which entity will lead the National Composting Plan and prioritize the MINAE. Nevertheless, this does not seem to be one of the alternatives under consideration. In any case, it would be important to also work on under this document's framework, since its goals have already been referenced by the NDC. The Plan can be a starting point while an instrument is approved that allows MINAE to generate obligations for the management of organics.

It would also be important for MINAE to **support and follow up on the FLW bills** and conduct an analysis to establish why some have been denied and others are still

being processed. This will allow it to identify lessons learned for the development of future initiatives to increase the likelihood of their approval.



Support for the municipalities to establish charges in a sustainable manner and keep them up to date

Another challenge is the low collection of charges for SWM services. Rates are established by the municipalities and are not updated periodically, which has caused the collected resources to be far below the real costs of providing the services. The main reason why the fees remain stagnant at minimum levels is that their increase is an issue that is opposed by the citizens during electoral times. Given that the responsibility for updating them lies with the municipal authorities, there is no political will to make the necessary adjustments on a regular basis.

Therefore, it is recommended that the **MINAE provides more detailed guidelines than those established by the Municipal Code on how to establish fees**, so that they can be used directly by the municipal level. One way to do this is to generate guidelines through contracting or bidding forms for waste management activities, including considerations on how to calculate the costs to be recognized to providers, as described in section *Procurement standards (pre-established contract templates)*. In this way the local level will have the tools to establish charges that are directly given by the national level and that also include methods to update the tariffs periodically, so that the approval of these increases does not depend on the political will at the municipal level. In the future, and when the MINAE has full authority over the sector, the possibility of migrating towards the creation of an independent Regulator of Rates and of Quality of Service Provision at the national level, can be studied. The regulator could then take on the role of structuring a broader tariff methodology.



All of these efforts to strengthen fees and thereby **increase the collection of charges will also serve to give the private sector greater certainty** to invest in organic waste management technologies, by ensuring a fee structure that eliminates the current focus on least-cost management. Consideration could also be given to the possibility of establishing longer periods of time (than those currently in use) within pre-established contract models. This would minimize the private sector's perception of risk with respect to the recovery of its investments in infrastructure projects with long payback periods, which also hinders investment in new technologies.

Financing focused on project preparation

In terms of access to financing for the implementation of organic waste valorization projects, and given the lack of municipal capacities to access existing funds, it is essential to explore the possibility of **making the requirements for accessing financing** established by the Instituto de Fomento y Asesoría Municipal (IFAM, as per its Spanish acronym) and the Instituto de Desarrollo Rural (INDER, as per its Spanish acronym) more flexible. One suggestion that can be proposed is to restructure part of the **resources to be used in the preparation of projects**, including structuring business models (among other topics), as described in the section on Structure investment funds aimed at the municipal level. This proposal would allow the implementation of a model closer to the one used in climate finance at the international level. If this is not possible, it would be imperative to generate a fund to provide this type of support at the municipal level, such as the fund for organic waste composting, which is proposed under the National Composting Plan, but which has not been established or regulated yet.

Decentralization of management for logistics optimization

It is also necessary to address the challenges of logistics and efficiency of waste transportation, as well as the lack of technical capacity in the private sector. One alternative is to stimulate the decentralization of waste management by creating **incentives for the formation of regional SWM groups**, in accordance with the tools mentioned in the section “*Incentivizing regional inter-municipal work*”. Regional SWM generates solutions located at more reasonable distances, which optimizes the distances traveled and takes advantage of economies of scale that generate additional efficiencies in terms of costs and the quality of the operation of sites for regional use.

In practice, there are already efforts in the country to create this type of initiative, as is the case of five cantons in the metropolitan area (San José, Desamparados, Curridabat, La Unión and Montes de Oca) that developed the first regulations for regional SWM. It would be useful for the Ministry of Health to analyze how easy the process has been for these municipal governments and to **identify existing challenges and possible solutions to facilitate the process for other municipalities**. The development of exchanges of experiences between municipalities could facilitate this analysis, as indicated in the section on Experience Exchange Programs.

Another tool that can be used to optimize logistics is for **municipalities to incorporate efficiency criteria in collection and transportation contracts** by including requirements regarding the quality of service provision, with particular emphasis on the optimization of routes and distances traveled. These parameters can be included in model contracts as discussed in section

Procurement standards (pre-established contract templates). The Ministry of Health should make those model contracts available to municipalities. PPPs can also provide optimized services, so this tool can also be considered as an option to address these challenges.



Disseminate and reward successful cases of separation at source and home composting

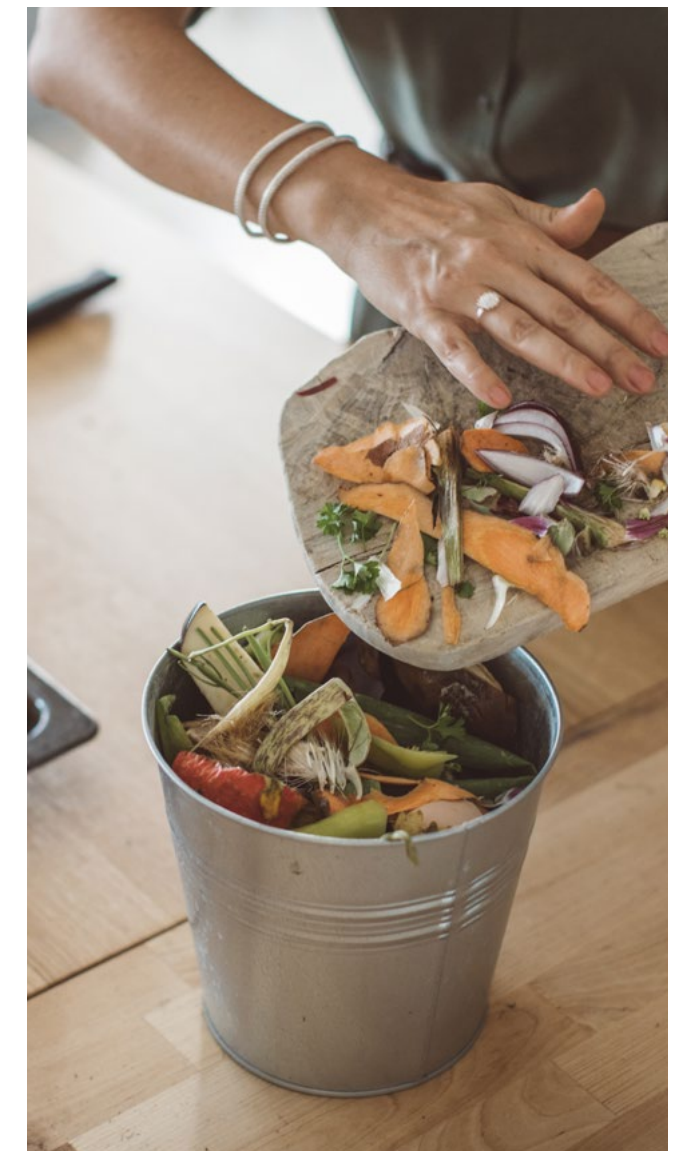
Some areas of the country do not have a culture of separation at source. In contrast, there are also good practices in successful projects in which the community has actively participated in municipal home composting programs. In places without a culture of separation at source or where there is a single waste bag, **training and knowledge programs on organic waste separation are required in parallel to the generation of differentiated collection routes**, so that users see that their effort to separate waste at home is not lost by mixing everything again in a single collection vehicle.

In addition, **exchanges of experiences with successful municipalities**, at the level of public officials, but also for citizens, can become successful strategies to disseminate good practices and to identify the reasons for the success of these initiatives. For example, it has been identified that participants in composting programs perceive as a great benefit to turn in their organic waste and receive in exchange compost for their gardens (or produce it themselves in the case of home composting).

Another important aspect is that, despite the existence of separate collection requirements for municipalities, there are no sanctions for local governments that fail to comply with these mandates. Therefore, it is important that the MINAE begins, on the one hand, by **recognizing the municipalities that have made the effort** to generate successful initiatives for segregated management of organic waste. On the other hand, it the MINAE can **also sanction those municipalities and operators that have not complied** with this requirement, as proposed in the section **Establish a sanctioning system oriented**

towards compliance. As for incentives for successful municipalities, the Blue Flag award system can be used, which works very well in the country, generating a specific category for organic waste management.

Finally, it is recommended that municipalities that have already made progress in the implementation of organic waste management systems begin to explore the incorporation of mandates for the **gradual diversion of organics from final disposal and economic incentives for service users**, such as PAYT systems. This would expand the impact of voluntary initiatives and support the country to move towards integrated organic waste management.



4.3.

México:

Actions to move towards regulatory compliance

Develop a country vision on organic waste

The National Program for Integrated Waste Management 2022-2024 (PNGIR, as per its Spanish acronym) was only recently published. With organic waste being by far the most relevant fraction of all MSW in the country (47%), it is unfortunate that this program does not give it much attention, beyond a couple of underdeveloped actions.

A primary recommendation for Mexico is to **develop a planning instrument with a long-term horizon and a focus on how to address this type of waste**. The example of Chile's 2040 ENRO, both in terms of its creation through a broadly participatory process and its down-to-earth content, with result-oriented goals and concrete actions to achieve them, is a possible way forward (see section Case Study 2. Specific targets for the organic waste fraction (Chile)).

47%

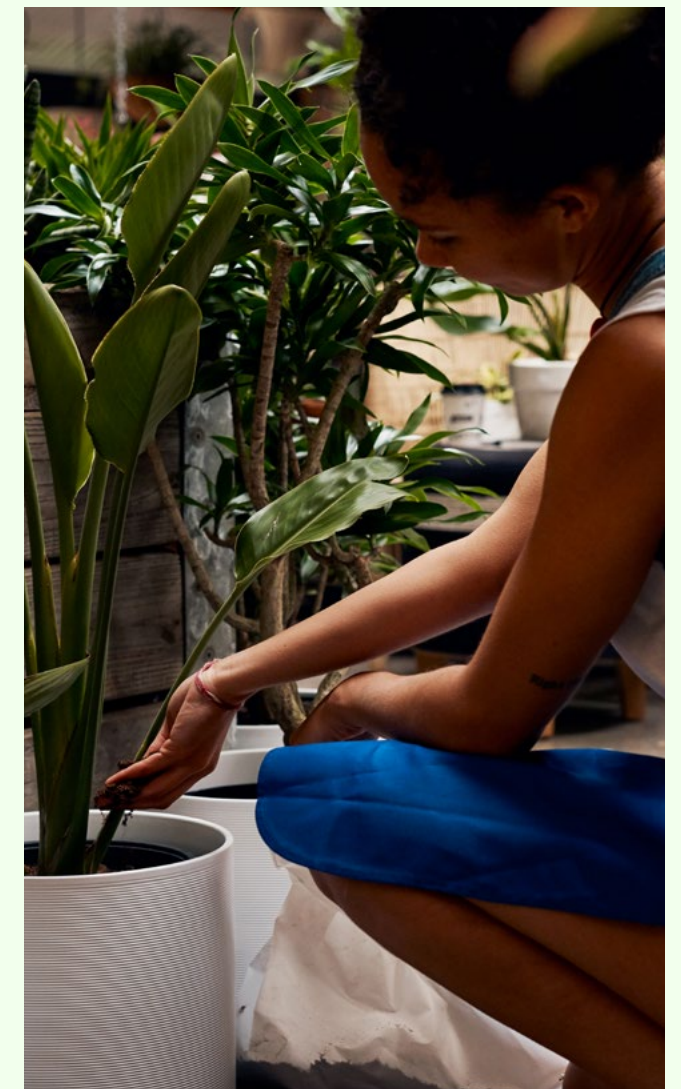
Organic waste being by far the most relevant fraction of all MSW in the country

Regarding strategic planning at the national level, it is also relevant that, although the NDC update published in 2022 establishes a greater degree of ambition, it is necessary that this planning instrument is strengthened with specific objectives for the waste sector, and especially, with specific actions that allow compliance. A concrete opportunity to do so is when Mexico **updates its Long-Term Climate Strategy**. This report of recommendations, which aims precisely to help countries identify systems, programs, policy tools and initiatives that promote GHG mitigation through the strengthening of SWM, is a guide to the most appropriate actions that can be included in this strategy.

The strategic prioritization of organic waste requires an institutional correlate. Mexico, with more than 20 million tons of municipal organic waste generated each year, has more than enough scale to have a **national team specifically dedicated to the issue**.

Considering its federal government structure, it is also key to **define how national objectives will be met through actions at the subnational government level**, both federal entities and municipalities. The case of Mexico City, which developed an ambitious Integrated Waste Management Program 2021-2025 (PGIR, as per its Spanish acronym), is a good example for other states to imitate. The development of GHG inventories at the state and even municipal level, as has been done in Costa Rica (see Case Study 3. GHG inventories to guide organic fraction planning), is also advisable to nurture these processes, since it allows visualizing the relevance of this sector for the fulfillment of climate commitments.

Once the country has clarity on the direction to take with respect to organic waste management, it would be advisable to move forward with other types of regulatory tools, such as the mandates and taxation requirements described in section 3.2.3 *Establish mandates to ensure diversion of organic waste*.



Move towards financial sustainability

Addressing the issue of ‘financial insolvency’ as outlined in the PNGIR 2022-2024 is an unavoidable challenge for Mexico, particularly if it aims to transition toward more advanced organic waste management systems. It is essential to **move towards the formalization of the collection of waste collection fees** in all areas where this is legally possible. However, this poses a significant challenge, given the deeply ingrained informal system of collection of fees, especially considering the social dimension of this problem. Therefore, progress toward transitioning fee-based income for collectors to formal income should be made gradually and accompanied by a project that enhances service quality and effective communication. It’s essential to convey that waste is being treated in accordance with higher environmental standards aimed at combating climate change. Additionally, the possibility of implementing cross-subsidy schemes should be considered to ease the burden on lower-income individuals, similar to practices in Colombia. (see Case Study 7. *Cross-subsidies and gradual introduction of the tariff methodology (Colombia)*).

Additionally, generating information on the financial situation of different municipalities would be a valuable contribution. In the case of Brazil, which is also a federal country, for more than 20 years, urban SWM diagnostics have been carried out and have measured the indicator of “financial self-sufficiency of the managing body” in each of the country’s municipalities (SNIS, 2023). This provides detailed and updated information on the areas with the greatest financial gaps, enabling the prioritization of actions from the national level and the comparison between different municipalities in the country.



Increase financing for investments and facilitating access to finance

Mexico needs a **large-scale mechanism to support investment in methane mitigation projects**. To this end, FONADIN’s PRORESOL could be re-enhanced or a new initiative could be created. Given the country’s magnitude, these initiatives may attract significant interest and support from various international climate finance sources.

In order for these funds to materialize effectively in projects, it is necessary to narrow the gap between the requirements for obtaining them and the limited capacities of the applicant organizations. First, it is essential to **simplify the long and complex project approval processes** in PRORESOL, as exemplified in the case of Japan (see Case Study 8. *Investment funds targeted at the municipal level*). Additionally, these funds must find a way to fill the gaps generated by limited municipal capacities, for example, by replicating what is done in the case of climate finance. There, the **executing agencies are accompanied both in the formulation and processing**, as well as in the execution of these projects, which are complex by nature.

19 As indicated in the Barreras report, in Mexico City the state constitution establishes that the sanitation service must be provided free of charge.

Promote the sale of products derived from valorization

In view of the limited charges that can be imposed in Mexico for the disposal of organic waste at treatment plants, it is crucial to create demand for the products derived from their valorization. This approach not only generates income for plant operators but also ensures a proper destination for these products. To this end, **their treatment should be put on an equal footing with that of synthetic fertilizers**, which currently receive subsidies in Mexico despite their greater climate and environmental impact. In addition, **requirements for compost use should be incorporated into public works tenders** and the management of urban green areas, with certification being a prerequisite.

As for the sale of electricity generated with biogas, **it is essential that the Federal Electricity Commission** (CFE, as per its Spanish acronym) **resumes its purchase of energy from such projects**. In the absence of this, other ways of using and/or commercializing this biogas should be explored. Given the scale of waste management facilities in Mexico, there may be a profitable opportunity to use the purified biogas as a fuel source for vehicles or to inject it into natural gas networks.

Strengthen municipal capacities and advancing in associativity

Strengthening municipal capacities in organic waste management is a significant challenge for Mexico. A first step is to carry out the 14 training sessions for municipal officials as outlined in the PNGIR 2022-2024. In addition, considering the country's size and the diversity

of situations and levels of progress across its more than two thousand municipalities, it is advisable to expand efforts and implement experience exchange programs, drawing inspiration from successful models like those in Japan (see *Case Study 11. Exchange of experiences for local level officials (Japan)*). However, in addition to improving the technical capacities of existing officials, it is necessary to **increase the number of technical teams for this function**.

Inter-municipal work can also address this deficiency by generating economies of scale, enabling the hiring of higher-level technical teams for several municipalities. This doesn't happen spontaneously; there must be **incentives or requirements** for it to happen, along with a set of clear rules to limit the inherent tensions and difficulties of

inter-municipal work. The case of Brazil's law on public consortia (see *Case Study 12. Public consortia law (Brazil)*) provides a clear path for Mexico to enhance municipal associativity through public policies.

Moreover, working jointly on inter-municipal projects, also makes it possible to deal better with the fact that municipal terms last only three years in Mexico, which in many cases interrupts the development of projects of different natures, including waste management projects. In this way, **forms of governance can be established that transcend the governments in office**. While there is always a risk of changing political administrations, as multiple municipal authorities are involved and these projects possess a certain degree of autonomy from each individual municipality, the risk is diminished.

Promote separation at source through cultural change

In a country like Mexico, where the culture of waste separation at source is still limited (only 144 of the 2,446 municipalities have a separate collection system, and when it exists, the focus is generally on recyclable waste), it is key to start with cultural change. To this end, all of the tools described in the section on **Promoting cultural change** could be employed, with a particular emphasis on **citizen education programs**.

Promoting home composting is also a powerful way of building knowledge, generating interest, and subsequently creating demand from the public for the use of the organic fraction. This demand should later influence the decisions made by public policy decision-makers. The experiences of Costa Rica and Burkina Faso, described in the Home Composting Programs section, provide some insight on how to carry them out.

For areas in Mexico where logistics and source separation obligations already exist, educational efforts should continue, but progress can also be achieved by employing some of the other tools described in the section Incorporate economic incentives. One way to encourage citizen participation is through a **paid bag system**. In this system, the collection of organic and recyclable fractions would be free of charge, and only the official bag would need be purchased for collecting the discarded fraction. These measures should be implemented very gradually, and it is recommended to pilot them in different areas of the city to assess their effectiveness before scaling them up to cover the entire city. Such measures could help, at least partially, address the financial deficits faced by municipalities.





Create incentives and initiatives to reduce food waste

Mexico serves as a reference in the region due to the number of states that have passed laws targeting FLW. However, to make substantial progress, it's crucial to **activate the enforcement mechanisms** included in these laws. **Complementary strategies** must also be considered. For instance, implementing a certification system similar to the one in Spain could serve as a strong incentive for businesses in the hotel and restaurant sector to address FLW (see *Case Study 4. Certifications for reduction of Food Loss and Waste -FLW- (Spain)*).

Likewise, **replicating the experience of Mexico City's Central de Abasto**, which recovered 268,000 tons of food in 2021, **in the other 95 supply markets across the country** could be an effective way to reduce FLW, at points that have a comparatively simpler level of complexity. Given the vast size of Mexico, a project of this scale might benefit from international financing support and could eventually be extended to other countries in the region. The existing Mexican Food Bank Network, with a presence in 29 of the 32 states, is a platform that is operational and from which a larger project could be generated.

In 2021, the Central
de Abasto of Mexico
City recovered

268

thousand tons of food
waste

Support with funding for compliance with the regulation requiring biogas flaring

Just like in most other countries, Mexico **is not complying with what the regulations require in terms of capture and flaring or use of biogas**. The PNGIR 2022-2024 recognizes that the initial investment is one of the major barriers for the development of these solutions.

In addition to the aforementioned recommendation to have a fund for investments in methane mitigation projects, it is recommended to **develop a short-term fund** dedicated to support the various disposal sites to catch up with the regulations, given the enormous potential to quickly mitigate GHG emissions in this manner. The other recommendation mentioned above, which involves the CFE purchasing electricity from these types of projects, is also crucial in achieving economic sustainability for these facilities.



4.4.

Peru:

An approach focused on organic waste and capacity building of municipalities

Develop a specific public policy tool to address organic waste

Peru is currently reviewing and updating its ***national waste strategy***, presenting a ***valuable opportunity to set goals and objectives centered on managing organic waste effectively***. As mentioned in the section Organic waste valorization goals, the use of SMART goals and objectives can greatly contribute to ensure their achievement. Targets serve as a guide for those responsible for service delivery, enabling them to clearly understand the necessary actions, plan, monitor progress, and deliver the specified change. Furthermore, targets provide transparency to the general public regarding the country's priorities, and they communicate the nation's intended direction to the private sector. This approach offers a means by which long-term strategic objectives can overcome short-term pressures that might

hinder the achievement of those objectives (e.g., pressure to develop new disposal sites). Successful achievement of a goal usually requires incentives or sanctions to drive behavioral changes.

A national strategy focused specifically on organic waste can help to implement such a system. For instance, it could encompass objectives aimed at increasing the treatment and recovery of organic waste at the municipal level, engaging in activities aimed at enhancing the capabilities of municipalities, including rural areas, in the management of organic waste. It should also provide technical and financial support to facilitate their pursuit of the objective and secure funding for new projects. Moreover, the strategy could articulate actions to encourage citizen participation in home composting (see more detail in *Home Composting Programs*) and gauge their willingness to pay for waste management services. The development of new guidelines for specific environmental management plans for organic

waste treatment plants should also be part of this approach. This strategy can generate the necessary momentum to overcome identified barriers to the development of organic waste treatment projects, reducing associated risks and unlocking private sector investment to develop such projects. Chile has committed to advancing its ENRO in its 2020 NDC update, and the subsequent report has set an ambitious target of valorizing 30% of organic waste by 2030 and 66% by 2040. Peru could consider following a similar path.



Improve cost recovery by increasing the rate charged and set nationally

The lack of financing and cost recovery for organic waste projects is one of the main problems faced by Peruvian municipalities, as the fees charged to citizens for waste collection and management services are low and often do not cover the costs. This has an impact on the quality of service. The average fee collected in Peru is US\$2.14 per household. Neighboring countries such as Ecuador, Colombia, and Chile charge significantly more: USD 5.97, USD 5.74, USD 8.65 per month respectively.

Peru can implement specific systems to enhance costs and investment recovery, aimed to charge for the cost of the service and making payment mandatory. Adopting **tools to assist municipalities in estimating the cost of provided services and how much they should charge** is also recommended. The service fee charged should reflect not only to the current service cost but also maintenance and future investments required for improved management. Although it does not yet include information for estimating the cost of organic waste treatment, the IDB has a tool that can help municipalities estimate costs such as differentiated collection and transportation. Charging for service costs in this manner offers multiple benefits, including facilitating access to financing for new projects and revealing subsidy needs.

Colombia serves as good case study for assisting municipalities in the cost estimation (see *Case Study 13. Charging structure under the tariff methodology in Colombia*). It exemplifies a country where the rates are regulated by the national government, rather than by municipalities. This approach provides transparency in terms of methodology, standardizes tariffs across the country and ensures that rates cover maintenance costs and improvements. Colombia's tariff increase and improved cost recovery have resulted in 98% waste collection coverage with enhanced service quality. This improved service quality, in turn, has a collateral benefit of increasing users' willingness to pay, creating a positive feedback loop.

Improve the collection of waste service fees by including the waste management fee in the bill for another utility

In Peru, collecting waste management fees is not mandatory, and a large percentage of the country's population does not pay - there are more than 60% delinquent, according to interviews with the Ministry of Environment (MINAM, as per Spanish acronym). **Leveraging the use of another utility bill can increase waste management fee collection** compared to using a separate waste utility bill because it offers an effective control mechanism. In case of non-payment, an effective sanction can be applied, momentarily disconnecting electricity, gas, or water until payment is made.



In Colombia, Greece, Grenada and Jordan, the linking of waste tariff collection to electricity bills has been successfully implemented. Property tax collection is also a viable option, although it lacks an equally effective control mechanism. In any case, property taxes tend to have low delinquency rates, which can improve the collection of the waste fee. Therefore, despite current challenges, it is recommended to continue studying the possibility of incorporating the collection within other utility bills (see more in *Charges through existing utility bills*) and consider a mandate to make it mandatory. Implementing such a change would be a complicated legal process for Peru, requiring the approval of the Peruvian Congress. However, the effort is worthwhile, as it is essential to improve fee collection to enhance the basic sustainability

of the system and begin investing in projects that reduce methane emissions. The MINAM will have to choose whether to charge citizens through the electricity fee, through the water and sanitation fee, or other. Based on its coverage, **billing through the electricity bill is preferable**, as it reaches more than 90% of households, while the water and sanitation bill covers less than 70%.

Over time, Peru could move towards the development of a PAYT volume payment system (see *Incorporate economic incentives*). However, although these structures encourage residents to divert as much waste as possible from landfills, their implementation can be initially much more challenging and costly and may incentivize improper disposal if there is no robust enforcement system and established recovery alternatives available to users.

²⁰ <https://publications.iadb.org/en/regional-evaluation-urban-solid-waste-management-latin-america-and-caribbean-2010-report>

²¹ <https://publications.iadb.org/es/estimacion-de-costos-de-recoleccion-selectiva-y-clasificacion-de-residuos-con-inclusion-de>

²² Magda Correal, Cost Recovery Mechanisms for Solid Waste Projects, Latin American Workshop on Municipal Solid Waste, Santiago, Chile, 2017.

²³ Interview with MINAM, December 6, 2022

²⁴ Interview with MINAM, December 19, 2022.

Technical assistance to municipalities to improve data collection in the waste sector

Peru currently operates a centralized data collection platform for the waste sector known as Information System for Solid Waste Management or SIGERSOL, as per its Spanish acronym). However, the system's adoption is not yet widespread. In 2022, only 55% of municipalities uploaded their waste management data to SIGERSOL. While this marks an improvement compared to previous years, and the fact that the largest municipalities make use of it, the system still does encompass waste management data across the country, especially in rural areas.

To improve data collection, the **MINAM should provide training to municipalities on how to use the system and should leverage incentives and/or sanctions** to ensure compliance with requiring municipalities to submit their data. The quality of the analysis derived from the data depends on the quality and accuracy of the data entered into the system. Now that the system is operational, Peru should concentrate on assisting municipalities in submitting data to improve both the quantity and quality of data received. With more accurate data from across the country, Peru could better identify opportunities, target projects, establish realistic and ambitious national valorization targets based on real data, actively measure progress in implementation, and provide more accurate reporting on emissions from the waste sector to the UNFCCC.

In addition to working with municipalities, SIGERSOL should be expanded to collect information on industrial waste, especially industrial organic waste from agriculture and livestock. This expansion will enable the MINAM to have a more comprehensive overview of the sector's methane emissions associated with decomposition of organic waste and will facilitate the identification of municipalities and companies for the implementation of organic waste treatment projects.



Establish measures for organic fractions that can be easily managed

The MINAM should start by implementing **restrictions on the final disposal of easily manageable organics, such as pruning and urban green waste**. Differentiated collection of this fraction should be relatively simple, as it is often already managed separately from household solid waste. Additionally, the treatment of branches, leaves and grass, through composting facilities is easy to manage and generates fewer odors or attraction of flies or mice, making it suitable for urban areas, such as urban parks.

Another critical area that regional governments should address is **organic waste from food markets**. In this case, the focus should be on **reducing FLW**. For this reason, they should encourage the development of food banks, similar to what has been done in Mexico (see more in section *Create incentives and initiatives to reduce food waste*).

By developing these initiatives, Peru can build the experience and capacities to later expand restrictions to other organic waste fractions and eventually introduce a landfill disposal tax (see more at *Restrictions on the final disposal of organic waste and Landfill tax*).

Promote the development of the market for organic waste treatment plant products

Peru has an underdeveloped market for the products of organic waste treatment plants, such as compost, digestate, and biogas. This results in lower demand and lower prices, which has a negatively impacted potential project revenues and the economic sustainability of methane reduction projects in the sector. In the case of compost, many farmers are unaware of its benefits and currently rely on synthetic fertilizers.

The MINAM can address this challenge through three approaches. First, it can help **develop and accelerate the market for compost and other products derived from organic waste treatment by conducting awareness and sensitization campaigns** aimed at citizens and agribusinesses. This indirect support can stimulate the commercialization of organic waste treatment projects (see more at *Citizenship education programs*). For example, Chile's Ministry of Environment promotes the benefits of compost and other organic waste valorization products through its #YoReciclOrgánicos social media campaign. The campaign highlights composting's ability to provide essential plant nutrients and to improve soil quality without emitting odors, and contribute to reduce emissions and combat climate change. Such campaigns can help companies and municipalities to publicize the benefits of various compost products, expand their customer base, and compete with well-known chemical fertilizers, which are often imported and have a high carbon footprint.

Second, the Peruvian government should contribute to market growth by **enhancing its compost and digestate certification system**, including the categorization of different

product qualities. National certification and categorization systems have proven effective in promoting the market by ensuring product quality and increasing customer confidence, resulting in higher demand and prices. Gradually making certification mandatory for sales is another option, although it may pose a barrier if the certification process is slow or expensive. However, it can drive the adoption of certification systems and prevent low-quality, uncertified compost from negatively affecting consumer perception and the reputation of compost in the market.

Finally, Peru could **employ green procurement** to kick-start the market by using products like local organic compost to enhance public green spaces and rehabilitate degraded public land (see more in *Establish the use of compost and digestate in government procurement processes*).



Develop municipal capacity and provide resources to implement nationally defined laws

In Peru, as in many Latin American countries, waste policy is set at the national level, but waste management is decentralized, with subnational governments and municipalities primarily responsible for its successful implementation. Therefore, the aspirations of the central government encoded in policy objectives depend on the capacity of subnational governments and municipalities to implement them. Unfortunately, municipalities often lack the necessary resources and expertise to effectively implement these policies. As a result, even ambitious national waste policies requiring local implementation can fall short of their goals. To address this, ambitious new national waste policies should not only set forth objectives but also provide local authorities with the leadership, support and resources needed for successful implementation. However, this essential support is often lacking.

One clear example of this in Peru is the separation at source law, which, despite being legislated in the General Law of Solid Waste (Law No. 27314), is not effectively enforced. To rectify this, the **Peruvian government could assist municipalities in several ways: by launching a national social media campaign to educate and influence Peruvian citizens** to begin separating and recycling organic waste, by supporting home composting programs in key municipalities, and by incorporating environmental and circular economy education into the national education system (see more in section *Promoting cultural change*).

In addition to promoting behavioral change through government-sponsored educational programs, awareness campaigns, and practical training, the government must provide



municipalities with training and **resources to develop differentiated collection systems and organic waste treatment projects**. The National System for Multi-Year Programming and Investment Management, known as InviertePe, is a national government program that supports infrastructure development, including the waste sector. However, funding is only granted after proposals have been developed and submitted, and many municipalities require technical and financial assistance in the initial project structuring phase before submission. One suggestion could involve considering whether part of the resources from the recommended additional tax on final disposal could be allocated to support project preparation, including business models and pre-feasibility studies, or to allow program resources to be used to directly support project structuring (see more in section *Structure investment funds aimed at the municipal level*).



4.5.

República Dominicana:

Advancing towards the implementation of the new law

Gradually moving towards the implementation of the new law

The Dominican Republic has succeeded in creating a robust legal framework for SWM with the approval of Law 225-20 in 2020. The challenge is to achieve the **materialization of everything set in this ambitious policy framework**. The first step in this direction is the **development of the National Plan for the Prevention and Integrated Management of Waste** contemplated in the same law, which is more than a year behind schedule. There are several recent national waste management plans in the region that can serve as a guideline for the country, such as Uruguay's 2021 and Brazil's 2022, and also the Roadmap for a Circular Chile by 2040 of 2021. It is essential



that the goals set are ambitious, but at the same time realistic, considering that the country's starting point has a significant lag.

The Dominican Republic has set mandates established in the law (among others, separation at source and differentiated collection) before having a plan that established the set of actions necessary to comply with such requirements. In other words, the order followed was the reverse of the sequence outlined in the section on Strategic planning and organic waste requirements. Therefore, it is essential that the **implementation of the new legislation considers a significant start-up period** until the above-mentioned provisions become effective, given that generating the cultural change for separation at source and setting up differentiated collection systems takes time and requires achieving a set of conditions that are described below.

Multiple actions to strengthen municipal capacities

A central axis of the planning to achieve the objectives of the law should be the generation of capacities in the municipalities. **A comprehensive training program should be designed for municipal officials on waste management** in general and on organic waste management technologies in particular. In addition, given the limited experience accumulated in the management of organic waste in the country, **a program can be organized that allows them to learn** (in person or virtually) **about concrete experiences in other countries**. The trust fund mentioned below could also be used to finance the development of Municipal Integrated Waste Management Plans (PMGIR as per its Spanish acronym), thus enhancing municipal capacities.

As for inter-municipal work, the law promotes it since it only allows the construction of a sanitary landfills for three or more municipalities that are grouped together. This will certainly serve to generate economies of scale, allowing several municipalities to have better professional teams than if they had developed it alone. However, it is imperative that **clear rules are developed for inter-municipal work**, in order to avoid conflicts or failures on these systems. Brazil's law on Public Consortia is a good guide for this (see Case Study 12. Public consortia law (Brazil)).



Regulate the financing mechanisms to achieve effectiveness

As indicated in the Barriers report, the new waste law creates the ISWM trust fund, which is financed mainly through a special ISWM contribution that every legal entity must pay based on its income. The funds collected will be used to pay for the operation of various types of ISWM projects, including organic fraction projects.

It is essential that the rules of operation, which have not yet been issued, in addition to funds for the construction of infrastructure, also **contemplate lines of financing for the formulation of projects**, as described in detail in the section “Structuring of funds for investment directed at the municipal level”, to supplement the weak municipal capacities mentioned above. It is also key that the project approval process has clear criteria and transparency in its allocation, to ensure the interest of the municipalities. Incidentally, it is very important that the trust fund prioritizes waste management initiatives aimed at methane mitigation.

With regard to the **charging system** for the service (also established by the law), it is essential that the regulations **consider a long period of gradual introduction**, considering the low levels of payment that exist in the country. The case of Colombia, which at the beginning of the century took a period of eight years of gradually increasing the tariff until it covered all the costs of the system is a good reference to keep in mind (see Case Study 7. Cross-subsidies and gradual introduction of the tariff methodology (Colombia)).

Comprehensive approach to community participation for the definition of projects areas

The Dominican Republic has a series of restrictions (geographical, hydrological and demographic) that limit the construction of new waste management projects, which is further complicated by the generalized resistance of the population to these facilities. It is essential to move forward with the implementation of the tools described in Text Box 4. Facilitate the acceptance of organic waste management projects.

It is recommended that **municipalities promote a substantive participation of the communities** in the development of the PMGIR, an instrument for the strategic definition of their territory, and not only in the consultation instances of specific projects. It will be beneficial to have the support of the communities for the decisions adopted there, which should include the location of new infrastructure. It is also suggested to **consider incentives for municipalities that receive waste management infrastructure**, as Colombia has done (see Case Study 7. *Cross-subsidies and gradual introduction of the tariff methodology (Colombia)*).



Strengthen the institutional framework for monitoring/ compliance

In order to achieve the objectives of Law 225-20, a key element is to have adequate oversight of the multiple obligations established therein. As gradual progress is made in the implementation of these mandates, as recommended, it is essential to also strengthen the Ministry of Environment and Natural Resources' (MARENA, as per its Spanish acronym) oversight capacity.

It is recommended to **move towards a system in which the (MARENA) and the municipalities transfer their oversight role to a separate agency**, such as Colombia's SSPD (Case Study 15. *Dual National Level Institutional Structure of Oversight (Colombia)*). It is also key to ensure that this institution (or, for the moment, MARENA and local governments) have personnel with the capacity to oversee projects throughout the territory. The aforementioned trust fund could allocate a fraction of its income for this purpose.



Promote cultural change to advance in separation at source

As noted, the mandate of separation at source established in the new law appears in a context in which there are still problems in the country regarding the proper disposal of waste. Therefore, the recommendation for the Dominican Republic is to make every **effort to generate awareness and education on the proper management of waste** in general and the organic fraction in particular. The development of massive training programs for citizens is key for the current situation of the country. MARENA should evaluate whether funds from the trust fund can also be used for this purpose.

One of the problems that mass educational campaigns usually have is that citizens are invited to carry out waste separation, but are not offered the necessary logistics to carry it out, which generates frustration and disenchantment with what they have learned. Given that the organic fraction can be valorized at the household level, it is recommended that such campaigns be accompanied by **initiatives to deliver home compost bins** to families who volunteer (i.e. show interest). The successful pilots of this type carried out in the municipal districts of Las Placetas and Mao should be made known to other local governments in order to promote this type of activity.



Strengthen the waste information system

La ley Law 225-20 creates the National Waste Information Subsystem within the National Information System for the Environment and Natural Resources. Ensuring the development of solid waste inventories for the sector, in accordance with the law, that are technically robust and provide clear information on the different territories is key to the proper functioning of the system as a whole. It is also essential that the regulations require reporting **disaggregated information on the organic fraction**. Given that this information will have to come from the municipalities and solid waste operators, it will be essential that **MARENA generates mechanisms to accompany the correct collection of the information** that will be reported to the system, through well applied training and even technical personnel that can travel to the different municipalities to advise municipal officials and operating companies.

It is recommended that, once this system, enters into force, MARENA move towards an annual reporting structure, which will allow for a closer follow-up of the ambitious objectives of the law and will put the Dominican Republic on par with the most advanced countries in the region. Currently the system establishes an update every four years.

4.6.

Uruguay:

Strategies for collaboration in the territory

Improvements in the quality of service provision

In the context of waste management services in Uruguay, these services are primarily provided by departmental or regional governments, referred as Intendencias, some of which face challenges in delivering a high-quality service. Furthermore, the costs associated with transporting organic waste to recovery plants are substantial, as these facilities are located in limited areas of the country. To optimize service provision and reduce waste management and transportation expenses, it is essential to **strengthen regional management solutions** that leverage economies of scale, as outlined in the Incentives for Municipalities Receiving Waste Management Infrastructure (Text Box 4) and Promote regional inter-municipal work sections. This approach enables local governments to pool their

economic, technical, and administrative capabilities to enhance the quality of waste management services.

Particularly in the Uruguayan context, it is essential for the Ministry of Environment to promote **local and decentralized initiatives in collaboration with the agribusiness and livestock sectors**, which already possess experience in organic waste management projects. Furthermore, implementing **home composting programs can significantly reduce transportation costs and logistical challenges**, as the waste is managed at the same location where it is generated (see *Home Composting Programs*).

However, to enhance the quality of the services provided by the regional governments, it is also important that they are held accountable for compliance with service quality indicators, which should be nationally defined. While the Ministry of the Environment currently oversees this responsibility, it is recommended that the central government consider establishing

an **independent Monitoring/Compliance agency through legislation**. This agency would have the authority to monitor and enforce compliance in the field, as described in the Effective enforcement to achieve compliance with regulations section. This move would enable greater control over the roles of the intendancies and provide incentives for continuous improvement in their management activities.

On the other hand, the active involvement of the private sector in waste management systems in Uruguay is met with skepticism by unions in several parts of the country. There are also disincentives for

private sector participation, such as extensive bidding processes. However, **engaging the private sector within a competitive framework environment**

can support the sector's development, enhance the quality of the service provision, and introduce new management technologies, especially in cases where the municipalities lack the capacity to improve their services.

PPP systems offer an intermediary approach, where public sector involvement remains active and could be an alternative to encourage private sector participation while also involving the public sector.



Restructure of charging mechanisms

Los cobros de los servicios de gestión en Uruguay are typically determined through comprehensive municipal fees established by the local level, following guidelines provided by the Ministry of Environment that allow them to be set independently. However, there are issues with high delinquency and low capacity to pay departmental taxes in certain population sectors. In addition, delegating the responsibility of quantifying the costs to define these charges to the local level often disregards the technical limitations of some municipalities.

On the other hand, there is no uniformity in the tipping fees to final disposal sites. In some cases, fees are imposed, while in others, entrance is free. Consequently, the total costs of providing waste management services are often not fully covered. Therefore, **having more specific guidelines for the establishment of charges**, set at the national level, would support the strengthening of fee collection. These guidelines could include aspects such as formulas for establishing the costs per activity, as well as the frequency of updating the charges. Such guidance would be very useful for local governments and could encourage private sector participation (see more details in section *Uniform charging structure*).

However, charging through general rates results in citizens being unaware of the payment, and governments remain uninformed about the actual operating costs. It is advisable to transition from general municipal rates to invoicing mechanisms adopted by other public utilities, introducing this change gradually. It is also important to introduce subsidy mechanisms that enable individuals with limited financial capacity to pay according to their means. Further details regarding these mechanisms are explained in greater detail in the section Sustainable financing to enable improvements.

Opportunity to structure the information system of the sector

Uruguay's waste management information system is currently under development by the Ministry of Environment. This is a significant opportunity for the system to integrate the **collection of specific data on organic fraction and methane emissions**. Furthermore, to address the concerns mentioned in the preceding sections, it is recommended that the system also incorporate data regarding the quality of service provision. This data can be directly reported to the system by the operators of the different activities (see more details in *Text Box 3. Waste management information system*).

This initiative must be accompanied by regulatory instruments that impose **data reporting requirements on operators and penalties** for non-compliance. This is essential to facilitate the estimation of the actual costs of SWM, which currently presents a capacity gap. The online data collection will allow the Ministry of Environment to analyze the information, which should be done periodically, as the SSPD does in Colombia with the SUI (see more at *Case Study 15. Dual National Level Institutional Structure of Oversight (Colombia)*). This in turn will support the improvement in the quality of collection and transportation services, which are often disparate throughout the country.



Strategies to support progress at the local level

It is essential for the Ministry of Environment to design mechanisms to **strengthen capacities at the local level**, establishing incentives and developing programs for separation at source, differentiated collection, organic waste recovery, and home composting. These are priority issues for the national government. In the first instance, local governments require support in capacity building in these topics and opportunities to **exchange experiences with municipalities in other countries** that have successfully implemented similar initiatives at the local level, such as Costa Rica and Chile (see more at Case Study 17. Home Composting: Costa Rica and Burkina Faso). Many of these efforts will depend heavily on the active participation of citizens. Providing citizens with mechanisms to deliver organic waste for valorization is crucial. Therefore, the tools outlined in the sections Promoting cultural change and Establish mandates for users will be relevant need to be implemented at both the national and local levels.

Simultaneously, and to enable valorization sites to compete with the costs of final disposal, additional incentives are required to make alternative waste management options financially appealing. Establishing a national cost structure, as previously suggested, represents a first step. In addition, it is recommended for the Ministry of Environment to **explore legal modifications for the introduction of a landfill tax** (see Landfill tax), while also implementing actions such as those outlined under the section Promote progress through voluntary actions. These actions can generate 'soft' incentives to strengthen progress in organic waste management. As greater progress is achieved, it becomes possible to transition towards implementing gradual restrictions on the final disposal of organic waste by fraction.

Focus of funds on small-scale project design

Obtaining financing for valorization projects, particularly those involving the generation and use of alternative fuels, present a challenge due to Uruguay's small-scale context. This situation requires technical support and capacity building to identify possible implementation routes in this field. Accessing international resources for climate change cooperation offers an option for funding feasibility studies and project design involving emission reduction technologies.

However, it is important that **existing national level funds**, such as the National Waste Management Fund (FONAGRES, as per its Spanish acronym) and in particular the Waste Valorization Program (PROVAR, as per its Spanish acronym) (once regulated), **allow the use of resources not only for project implementation but also for project design**. This includes the analysis for structuring business models, aligning with the necessity to address the issue of scale (see more in Structure investment funds aimed at the municipal level).

Strategies for valorization products

Uruguay cuenta con experiencias de Uruguay has experiences of composting, mainly of organic waste from industries. However, there is a need for technical support, especially to improve odor control, which has posed sustainability risks for these projects. Additionally, in some cases, there is a need to enhance the quality of the product. To address these issues, it is fundamental to implement **training programs for composting facility personnel**, as well as to establish **regulations that provide technical operational guidance** for these sites, including specific strategies to address this particular

issue (see more in *Text Box 1. Instruments to be defined by the Public Policy Governing Body*). The exchange of experiences is also vital for this purpose (for example, with projects implemented and optimized in Chile under the Recycle Organics program), since the institutions that have implemented valorization plants have a more detailed vision of the implementation challenges.

Additionally, although there are incentives for commercialization, such as VAT reduction to align compost with chemical synthesis fertilizers, there is interest in **setting standards for the substitution of chemical fertilizers**. This would contribute to the economic sustainability of such projects by positioning the products in the market. Additionally, the Ministry of Environment should address the logistical challenges for compost commercialization, including transportation and application through decentralization strategies for valorization sites, as mentioned at the beginning of this section. The promotion of organic agriculture programs at the national level would further support market development, as well as the inclusion of the use of these products in government purchases (see more at *Establish the use of compost and digestate in government procurement processes*).

Regarding the utilization of biogas, it is essential to acknowledge that the prices for energy generation from biogas are not competitive when compared to other alternative energy sources. This lack of competitiveness results in unattractive rates of return for investments in such projects. Therefore, it is necessary for the government to evaluate the establishment of **incentives and/or subsidies for the commercialization of energy generated from biogas or green taxes** on GHG emitting sources (see more at Promote compliance through financing and incentives).

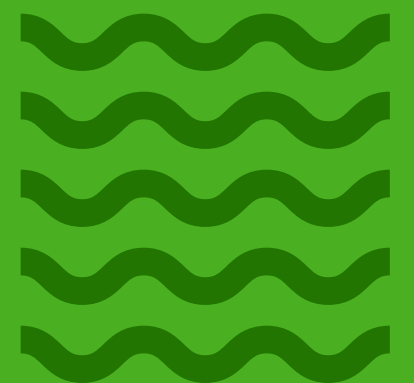


04

05

06

Policy toolbox



Mandates

Uniform charging structure.

Tool to increase charging coverage, guaranteeing that all citizens make the payment they are entitled to. (See in section *Uniform charging structure*).

Quality parameters for the provision of organic waste management services.

Tool to establish in the regulation which parameters will be used to establish quality indicators under which the provision of services by operators can be evaluated (see *Text Box 1. Instruments to be defined by the Public Policy Governing Body*).

Licensing and permitting processes.

Differentiated requirements for infrastructure associated with waste valorization according to the technology used and the quantities of waste to be processed (see *Text Box 1. Instruments to be defined by the Public Policy Governing Body*).

Land use restrictions.

A tool for land-use planning to classify organic waste recovery facilities in different (less restrictive) land-use categories than those required for final disposal sites (see *Text Box 1. Instruments to be defined by the Public Policy Governing Body*).

Stakeholder engagement mechanisms.

Mechanisms through which consultation processes with nearby communities and other interested parties are clearly defined (see *Text Box 4. Facilitate the acceptance of organic waste management projects*).

Establish use of compost and digestate in state procurement processes.

Requirements for the acquisition of waste-derived compost/digestate in public procurement processes and its use for the reconditioning of green areas, parks, vegetated slopes, or other public sites to support the demand for this product. (See in section *Establish the use of compost and digestate in government procurement processes*).

Regulations for the operation of valorization sites.

Correct operation of organic waste valorization sites with the establishment of regulations with technical requirements for their operation (see *Text Box 1. Instruments to be defined by the Public Policy Governing Body*).

Restrictions on the final disposal of organic waste.

Prohibition on the reception of organic waste at final disposal sites, which may be progressive according to specific organic fraction streams (see in section *Restrictions on the final disposal of organic waste*).

Selective organic waste collection requirements for municipalities.

Progress at the local level in waste recovery initiatives begins with source separation and the provision of differentiated collection for their inhabitants, which can be made mandatory (see in section *Require separate collection of organic waste for municipalities*).

Source separation obligations for users of organic waste.

These should be established in parallel to the availability of separate collection routes or home composting programs that allow residents to manage the organic waste stream separately (see in section *Obligations for source separation of organic waste*).

Goals

Explicit planning on organic fraction.

Sector planning tool to guide all stakeholders on the objectives to be pursued regarding the management of the organic fraction (see in section *Develop explicit planning for the organic waste fraction*).

National-level sectoral methane emission reduction targets.

Emission reduction targets for the waste sector that should be explicitly set out in countries' sectoral plans and NDCs (see in section *National level sectoral methane emission reduction targets*).

Organic waste recovery targets.

Specific targets for the organic waste fraction are important so that government stakeholders can have concrete goals to move towards (see in section *Organic waste valorization goals*).

Incentives

Incentives and/or requirements for regional inter-municipal work.

Regional cooperation for waste management is a key tool to optimize waste management, particularly in terms of logistics and the use of resources, taking advantage of economies of scale. (See in section *Promote regional inter-municipal work*).

Incentives for municipalities receiving waste management infrastructure.

Tool to establish incentives for municipalities to build regional management sites in their territory (see *Text Box 4. Facilitate the acceptance of organic waste management projects*).

Behavioral economics applied to promote proper waste management.

Increase citizen awareness and participation using signals that lead to behavioral changes in accordance with public policy objectives (see in section *Behavioral economics applied to promote adequate waste management*).

Volume charges (bags/labels).

The collection system collects only the waste that is presented in the assigned bags or that has the system labels (see in section *Volume charges (bags/labels)*).

Volume charges (waste bins).

The waste bins are also used for different waste streams using color coding, as in the bag system, and can also give the user a choice of different waste bin sizes (see under section *Volume charges (waste bins)*).

Charges by weight.

The calculation of the charge depends directly on the weight generated by each specific user, so the amount of waste generated must be weighed in order to make the calculation (see section *Charges by weight*).

Incentives for commercialization of energy generated from biogas.

Biogas energy generation should be put on par with incentives for other renewable energies since they generate the same benefits not only by replacing generation sources that cause GHG emissions, but also because their use avoids additional methane emissions (see section *Incentives for the commercialization of energy generated from biogas*).

Environmental awards or recognitions.

Awards and/or recognitions for successful local initiatives are a tool that has worked well to encourage local authorities and community groups to lead and maintain environmental actions in their territories (see section *Environmental awards or recognitions*).

Financing Mechanisms

Financing to implement mandatory biogas capture and flaring.

Compulsory mandates must be accompanied by tools that allow progress towards the effective implementation of these actions, for which financing plays a key role (see in section *Funds to implement mandatory biogas capture and flaring*).

Structuring of investment funds targeted at the municipal level.

Funds that include more favorable conditions and fewer requirements for the financing of



projects and management infrastructure that use organic waste valorization and methane emission reduction technologies (see section *Structure investment funds aimed at the municipal level*).

Access to international cooperation funding.

A tool that allows international cooperation resources for waste valorization projects to be largely focused on support at the municipal level, where the initiatives are implemented (see in section *Access to international cooperation funding*).

Guarantees from public development agencies for private bank financing.

Public development agencies can help leverage private financing through instruments that provide certain guarantees to banks (e.g., debt insurance) with the objective of reducing the risk of GHG mitigation projects (see section *Guarantees from public development agencies for private bank financing*).

Public-Private Partnerships (PPPs).

They are an important tool to improve organic waste management, especially to provide financing that the public sector lacks, as well as management capacity (see in section *Public-Private Partnerships (PPP) and section Contracting/bidding frameworks that allow for the establishment of PPPs*).

Collection through existing utility bills.

Tool for charging waste management services within the bill of another service such as water, sewage or electricity, which substantially improves the collection levels (see in section *Charges through existing utility bills*).

Taxes, Tax Exemptions and Subsidies

Landfill tax:

A tax is levied on the disposal of each ton of waste that enters the landfill, internalizing the negative externalities of final disposal, and making viable recovery alternatives that may be more costly than the value currently charged for landfills (see in section *Landfill tax*).

Green taxes on GHG emitting sources.

The establishment and collection of green taxes on GHG emitting sources is used to redirect the resources obtained to support climate change mitigation actions (see section *on Green taxes on GHG emitting sources*).

Tax exemptions for the purchase of equipment/machinery for GHG emission reduction projects.

Tax exemptions for the purchase of equipment to be used in projects that generate a reduction of GHG emissions is a strategy that has been an incentive for the private sector to invest in emission reduction projects (see in section *Tax exemptions for the purchase of equipment/machinery for GHG emission reduction projects*).

Tax exemptions for compost and digestate.

The marketing conditions for compost and digestate can be improved by bringing these products in line with the tax exemption conditions for other soil improvers or organic amendments, so that they can compete in the marketplace (see in section *Tax exemptions for compost and digestate*).

Subsidy systems for service charges.

Low capacity to pay can be addressed by introducing cross-subsidy mechanisms so that all service users pay for the service to the extent of their ability to pay (see in section *Subsidy systems for service charges*).

Standards

Public procurement standards (pre-established contract models).

The contract between the municipality and the operator is the tool through which the charges and quality requirements for the provision of services can be parameterized (see in section *Procurement standards (pre-established contract templates)*).

Quality certifications for compost/digestate commercialization.

The existence of quality certifications can make these products competitive in the market compared to other available options and gain access to public programs that require the use of compost (see in section *Quality certifications for the commercialization of compost and digestate*).

Organic waste reduction certifications/seals.

Organic waste reduction seals or certifications under the FLW reduction framework are tools that are awarded to establishments that demonstrate this, according to standardized criteria (see in section *Certifications/seals for organic waste reduction*).

Sanctions

Sanctions for SWM service providers.

Tool for operators to comply with their obligations, according to legislation or contractual terms (see in section *Sanctions for SWM service providers*).

Sanctions on the salaries of the responsible authorities.

A sanction that may be applied to public officials in cases of non-compliance with binding goals or even for non-compliance in their role as municipal service provider, is the reduction of the salary of the official who heads the entity that commits the non-compliance (see in section *Sanctions to salaries of the responsible authorities*).

Other Tools

Municipal GHG inventories.

The development of GHG emission inventories for the municipal level is a tool to identify the waste sector as one of the main emission sources (see in section *Municipal GHG inventories*).

Competitive bidding.

The development of competitive bidding processes generates a climate of transparency and competition, which is vital to encourage the participation of private companies (see in section *Competitive bidding*).

Cross-cutting Measures

Graduality

Gradual deadlines for the municipal level.

A tool to gradually advance in issues such as the establishment of restrictions on the final disposal of organic waste, the progress and implementation of goals for the increase of its valorization, the entry into effect of sanctioning mechanisms, among others (see in *Text Box 2. The importance of gradual introduction of new obligations*).

Introduction of charges.

Introduction of charges to citizens through fees/rates that are introduced gradually according to the continuing improvement of the service, in order to increase citizens' willingness to pay and reduce delinquency (see in section *Gradual introduction of charges*).

Waste management information system.

Systems to strengthen the collection of specific data on the organic fraction and the emissions associated with its management (see *Text Box 3. Waste management information system*).



Training and education programs

Training programs for public officials.

A tool focused on regulatory changes and/or updates, to keep public officials up to date on new requirements and specific strategies foreseen by the national level on how to implement them at the local level (see in section *Training programs for civil servants*).

Training programs for composting facility personnel.

Training according to site needs, including at a minimum the topics established in regulations regarding operating requirements and compliance with applicable environmental licenses/permits and indicators (see in section *Training programs for composting facility personnel*).

Training and education programs for citizens.

Awareness-raising for citizen collaboration in the development of organic waste management systems that work efficiently and generate high quality by-products (see in section *Citizenship education programs*).

Experience Sharing Programs.

These programs are designed to share experiences and allow participants to ask practical questions and generate joint learning based on concrete cases that have been implemented (see in section *Experience Exchange Programs*).

Organic agriculture promotion programs.

Urban agriculture promotion programs support the increase in demand for products such as compost and digestate (see in section *Programs to promote organic agriculture*).

Home composting programs.

Training programs in the use of home composting that are normally accompanied by the delivery of the necessary equipment and a follow-up to verify correct management (see in section *Home Composting Programs*).



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References



References

- BGK (2023). Gütesicherung Kompost. <https://www.kompost.de/guetesicherung/guetesicherung-kompost>.
- IDB (2023). Sostenibilidad financiera de la gestión de residuos sólidos en América Latina y el Caribe. División de Agua y Saneamiento. TECHNICAL NOTE N° IDB-TN 2663.
- Biovalor (2020, March 20). Normativa Ambiental que impulsa la Economía Circular. <https://biovalor.gub.uy/normativa-ambiental/>.
- Bnamerica (2021, May 20). Planta de procesamiento de residuos sólidos en Monterrey, Nuevo León. <https://www.bnamerica.com/es/noticias/monterrey-lanzara-licitacion-de-proyecto-de-residuos-de-us500mn-tras-eleccion-de-medio-periodo>
- Bureau Veritas (2023). Certificación Medioambiente. <https://www.bureauveritas.es/esg-sostenibilidad/medioambiente/certificacion-medioambiente>
- C40 Cities (2016, February). Good Practice Guide. Waste to Resources. C40 Cities Climate Leadership Group. <https://www.c40.org/case-studies/c40-good-practice-guides-san-francisco-zero-waste-by-2020/#:~:text=By%20becoming%20a%20zero%20waste,and%20help%20create%20green%20jobs>.
- Correal S., M.C. (2014). Colombia: Desarrollo Económico Reciente en Infraestructura. Preparación de la Estrategia Nacional para el Desarrollo de la Infraestructura. National Planning Department (Colombia).
- Correal, M. (2023, January 19). Special communication with the Senior Specialist of the Water and Sanitation Division of the IDB. Washington, DC. United States. Ministry of Environment and Energy of Costa Rica (2019). Costa Rica 2019: 2nd Biennial Update Report to the United Nations Framework Convention on Climate Change. First Edition.
- Comisión de Regulación de Agua Potable y Saneamiento Básico (CRA). (2015, July 09). Resolución CRA 720 DE 2015. https://normas.cra.gov.co/gestor/docs/resolucion_cra_0720_2015.htm#:~:text=Y%20SANEAMIENTO%20B%C3%81SICO,Por%20la%20cual%20se%20establece%20el%20r%C3%A9gimen%20de%20regulaci%C3%B3n%20tarifaria,de%20aseo%20y%20se%20dictan
- Composteros (2018). Proyecto compostaje Costa Rica. <https://composteros.go.cr/>
- Congress of Colombia (1994). Ley 142 de 1994 Por la cual se establece el régimen de los servicios públicos domiciliarios y se dictan otras disposiciones. Article 99.
- City of Toronto (2022, December 14). Recycling, Organics & Garbage. <https://www.toronto.ca/services-payments/recycling-organics-garbage/>.
- Dirección General De Normas (2018). Norma Mexicana NMX-AA-180-SCFI-2018. Page 18. <https://biblioteca.semarnat.gob.mx/janium/Documentos/Ciga/agenda/PPD1/NMX-AA-180-SCFI-2018.pdf>
- Grin, E. and Abrucio F. (2017). La cooperación intermunicipal en Brasil frente al espejo de la historia: antecedentes críticos y la dependencia de la trayectoria de la creación de la ley de los consorcios públicos. Page 2. Revista Políticas Públicas 2017. Vol.10(2): ISSN 0718-462X. https://pesquisa-eaesp.fgv.br/sites/gvpesquisa.fgv.br/files/arquivos/la_cooperacion_intermunicipal_en_brasil_frente_al_espejo_de_la_historia_antecedentes_criticos_y_la_dependencia_de_la_trayectoria_despues_de_la_creacion_de_la_ley_de_los_consortios_publicos.pdf
- Government of Jalisco Secretaría General de Gobierno Estados Unidos Mexicanos. Ley de Gestión Integral de los Residuos del Estado de Jalisco. Article 65 and 66. Page 21. https://info.jalisco.gob.mx/sites/default/files/leyes/ley_de_gestion_integral_de_los_residuos_del_estado_de_jalisco.pdf
- European Environment Agency (2013). Municipal waste management in Sweden. <https://www.eea.europa.eu/publications/managing-municipal-solid-waste/sweden-municipal-waste-management>
- Costa Rican Institute of Aqueducts and Sewerage (AyA). (2021, June 16). Programa Bandera Azul Ecológica Costa Rica <https://dspaceaya.igniteonline.la/bitstream/handle/aya/471/AD00261DOC.pdf>
- Costa Rican Tourism Institute (2011). Programa de Bandera Azul Ecológica. <https://www.ict.go.cr/es/sostenibilidad/bandera-azul.html#:~:text=El%20Programa%20Bandera%20Azul%20Azandera%20Ecol%C3%B3gica,Es%20un%20m%C3%A9rito%20otorgado%20anualmente>.
- ImplementaSur (2019, October 03). Informe 1 diagnóstico “Asesoría Sobre el Manejo de Residuos Orgánicos Generados a Nivel Municipal en Chile”.
- Kanton Zürich (2022). Waste management. <https://www.zh.ch/de/migration-integration/willkommen/english/living.html>
- Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO.
- Lacal Arantegui R, Jaeger-Waldau A, Vellei M, Sigfusson B, Magagna D, Jakubcionis M, Perez Fortes M, Lazarou S, Giuntoli J, Weidner Ronnefeld E, De Marco G, Spisto A, Gutierrez Moles C, authors Carlsson J, editor. ETRI 2014 - Energy Technology Reference Indicator projections for 2010-2050. EUR 26950. Luxembourg (Luxembourg): Publications Office of the European Union; 2014. JRC92496
- Ministry of Environment of Uruguay (2021). Uruguay + Circular: Plan Nacional de Gestión de Residuos 2022 - 2032. <https://www.ambiente.gub.uy/oan/consulta-publica-plan-nacional-residuos/>

Ministry of Environment Chile (2020, April 03). Análisis sobre el esquema tarifario establecido en la recolección municipal de residuos. Pages 135 - 141. <http://catalogador.mma.gob.cl:8080/geonetwork/srv/spa/resources.get?uuid=50d3d02b-a75f-4150-bce1-323d5733aada&fname=20200403%20Informe%20Final%20v3.pdf>

Ministry of Environment of Chile (2019). Estrategia nacional de residuos orgánicos Chile 2040 (National organic waste strategy Chile 2040). Government of Chile, 2019. <https://economy.mma.gob.cl/wp-content/uploads/2021/03/Estrategia-Nacional-de-Residuos-Organicos-Chile-2040.pdf> Ministerio Secretaría General de la Presidencia Chile. (2008, August 20). Law 20.285 on Access to Public Information. Article 45. <https://www.bcn.cl/leychile/navegar?idNorma=276363&idParte=8564031>

Sustainable Development Goals (SDGs). (2015). Goal 12: Ensure sustainable consumption and production patterns. <https://www.un.org/sustainabledevelopment/es/sustainable-consumption-production/>

Latin America Recycle Organics Program (2022). Interview Municipality of Desamparados, Costa Rica.

Latin American Recycle Organics Program (2022). Interview Ministry of Environment, Peru.

Latin America Recycle Organics Program (2023a). Barreras para la mitigación del metano del sector residuos sólidos en seis países de Latinoamérica.

Latin American Recycle Organics Program (2023b). Interview SIGERSOL Team, Peru.

National Zero Waste Council (2020). Love Food Hate Waste Canada Making Every Bite Count. Our First Three Years - 2018 to 2021. <https://lovefoodhatewaste.ca/wp-content/uploads/2022/06/LFWH-ImpactReport-2018-2021.pdf>

UN Environment (2018). Perspective on waste management in Latin America and the Caribbean. United Nations Environment Programme, Office for Latin America, and the Caribbean. Panama City, Panama.

Mexico Projects (2022, September 06). Diseño, Construcción, Instalación, Operación y Mantenimiento de un Sistema de Gestión y Aprovechamiento de Residuos Orgánicos Mediante Valorización Energética en el Municipio de Naucalpan de Juárez, Estado De México. https://www.proyectosmexico.gob.mx/proyecto_inversion/0853-manejo-y-aprovechamiento-de-residuos-organicos-de-naucalpan/#:~:text=The%20project%20seeks%20to%20realize%20a%20reduction%20of%20the%20impact%20on%20the%20environment%20

Mexico Projects (2023, January 24). Construcción, Operación, Mantenimiento, Conservación y Explotación de un Centro para la Gestión Integral de Residuos Sólidos Urbanos y de Manejo Especial en la Zona Metropolitana de Monterrey, Nuevo León. https://www.proyectosmexico.gob.mx/proyecto_inversion/0851-gestion-integral-de-residuos-solidos-urbanos-y-de-manejo-especial-en-la-zona-metropolitana-de-monterrey-nuevo-leon/#popme

Regions for Recycling (R4R). 2014. Good practice Flanders: PAYT. https://www.acrplus.org/images/project/R4R/Good_Practices/GP_OVAM_PAYT.pdf Restauracionews. (2022, February 17). Sodexo Iberia obtains certification for its fight against food waste. <https://restauracionnews.com/2022/02/sodexo-iberia-certificacion-desperdicio-alimentario/>

San Francisco Environment Department (2022). San Francisco Sets North American Record for Recycling & Composting with 80 Percent Diversion Rate. <https://sfenvironment.org/news/update/san-francisco-sets-north-american-record-for-recycling-composting-with-80-percent-diversion-rate>

Ministry of Environment and Natural Resources (SEMARNAT). (2010). Especificaciones Técnicas para el Diseño y Construcción de Biodigestores en México. <https://biblioteca.semarnat.gob.mx/janium/Documentos/Ciga/libros2009/CD001057.pdf>

Secretariat of Environment and Natural Resources (2004, October 20). NORMA Oficial Mexicana NOM-083-SEMARNAT-2003. https://www.dof.gob.mx/nota_detalle.php?codigo=658648&fecha=20/10/2004#gsc.tab=0

SNIS (2023). Diagnóstico Anual de Resíduos Sólidos. Last accessed March 25, 2023 at: <https://www.gov.br/mdr/pt-br/assuntos/saneamento/snis/produtos-do-snis/diagnosticos/residuos-solidos>

Stadt Zürich Entsorgung + Recycling (2002). Correct waste disposal in the City of Zurich. https://www.stadt-zuerich.ch/content/dam/stzh/ted/Deutsch/erz/abfall/richtigentsorgen/ERZ_Richtig-entsorgen_in%20Z%C3%BCrich_Englisch.pdf

Superintendencia de Servicios Públicos Domiciliarios (Superservicios) (2023, January 23). Acueducto, alcantarillado y aseo. Gobierno de Colombia. <https://www.superservicios.gov.co/Empresas-vigiladas/Acueducto-alcantarillado-y-aseo/aseo>. National Union of Local Governments, UNGL (2022). The Ecological Blue Flag Program (PBAE). <https://www.ungl.or.cr/index.php/areas-de-gestion/direccion-ejecutiva/ambiente/programa-bandera-azul>

United Nations Environment Programme and Climate and Clean Air Coalition (2021). Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. Nairobi: United Nations Environment Programme. https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf

United States Environmental Protection Agency (EPA) (2021). U.S. Environmental Protection Agency. <https://www.epa.gov/>

US EPA (2023). How Does Anaerobic Digestion Work? <https://www.epa.gov/agstar/how-does-anaerobic-digestion-work>

World Bank (2010, December 23). The World Bank Finances Možura Sanitary Landfill. <https://www.worldbank.org/en/news/press-release/2010/12/23/the-world-bank-finances-mozura-sanitary-landfill> World Bank. (2001, May). Personnel Exchange Among Central and Local Governments in Japan Takenori. 28 pages. Stock No. 37173. <https://documents1.worldbank.org/curated/en/799451468050082930/pdf/330410rev0wbi37173.pdf>



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Glossary



Glossary

Anaerobic digestion:

Treatment of organic waste through an anaerobic process (without the presence of oxygen). The final product is biogas and digestate.

Biogas

Gas produced by the anaerobic decomposition of organic waste. It is mostly composed of methane, carbon dioxide and nitrogen.

Co-processing:

Incorporation of previously conditioned waste into the cement production process.

Compost:

Product obtained by composting.

Composting:

Process of biological degradation of organic waste in the presence of oxygen and under controlled conditions.

Controlled landfill:

Final disposal sites that have some type of control, but do not meet the requirements of a sanitary landfill.

Differentiated or separate/selective collection:

A system of separate collection of specific waste streams that can be recovered.

Digestate:

Solid or liquid product of an anaerobic digestion process, which can be used as a soil improver.

Energy recovery:

Use of waste with the purpose of taking advantage of its calorific value for energy production.

Final disposal:

The process of depositing solid waste in the ground in a definitive manner.

Generator:

Individual or legal entity, public or private, that, as a result of its activities, produces waste when developing productive processes, services, commercialization, import and consumption, among others.

Incineration:

Process of controlled thermal oxidation of any material at high temperatures.

Inorganic waste:

Waste that does not come from organic matter, but has been manufactured, such as glass, metals, plastics, tires, among others.

Landfill:

A method of final disposal that consists of placing waste on site, compacting, and covering urban solid waste by means of engineering techniques, which foresees and controls the impacts that may be caused by liquids and gases produced by the decomposition of organic matter, in order to prevent environmental contamination and protect the health of the population.

Leachate:

Liquid contaminant substance that percolates through the mass of solid waste, dragging dissolved and suspended materials, generated by the moisture present in the waste and by water from rainfall, runoff, and decomposition of organic matter.

Municipal or urban solid waste:

Waste generated in homes, resulting from domestic activities, from the products consumed and their containers, packaging, or wrappings; waste with similar characteristics to those generated in homes, resulting from any other activity in establishments or on public roads; and waste resulting from the cleaning of public roads and places.

Open dumpsite:

A place where waste is disposed of without any control or safety measures for health or the environment and which constitutes an eminent source of contamination. Also known as an open dump.

Operator:

Synonym for service provider.

Organic waste:

Waste from organic matter that decomposes aerobically or anaerobically.

Prevention:

The set of measures aimed at avoiding the generation of solid waste, achieving its reduction, or that of the amount of hazardous substances or pollutants present in it.

Recoverable waste:

Waste that has a potential for recovery.

Recovery:

Industrial or manual process by which materials recovered from waste are incorporated into the economic and productive cycle in the value chain, either as process inputs or energy.

Recycling:

The transformation of solid waste within a production process, for its initial purpose or for other purposes, including composting and biomethanization, but not incineration with energy recovery.

Separation at the source or at origin:

Procedure to avoid mixing of waste at the source, in order to facilitate the use of recoverable materials.

Service provider:

Individual or legal entity authorized to provide waste management services for a fee.

Storage:

The temporary deposit of waste prior to its delivery to the collection and transportation service, recovery, or final disposal.

Transfer station:

Facility where solid waste is unloaded and transferred from a smaller capacity vehicle to a larger capacity vehicle for subsequent transport to the final disposal site, recovery, or co-processing plant.

Valorization:

Set of actions aimed at taking advantage of the resources, whether material or energetic, contained in the waste, which represent an economic benefit.

Waste:

Solid, semi-solid or liquid material whose generator or holder must or requires disposing of it, and which can or must be recovered or treated responsibly or, failing that, be handled by authorized final disposal systems.



RECYCLE ORGANICS

Reducing Methane
From Waste

Public policy recommendations to overcome barriers for methane mitigation in the solid waste sector in six Latin American countries