GAIA Technical Guidance Series for Policymakers
and Financiers on Fast Action on Waste and Methane

Addressing Landfill Methane Emissions with Environmental Justice

Index

Executive Summary

As governments respond to the growing pressure to reduce methane emissions under the Global Methane Pledge and broader climate goals, landfills and dumpsites have emerged as a critical point of intervention for climate mitigation. These sites, many of which are uncontrolled, decades old, and located near marginalized communities, pose serious environmental, social, and public health risks. Methane emissions, groundwater contamination, fire hazards, and human exposure to toxic pollutants all persist long after waste disposal ends. Yet while political momentum for methane reduction is increasing, too many proposed interventions focus narrowly on technical fixes that risk deepening social and environmental inequities.

This report outlines the risks of business-as-usual (BAU) approaches to landfill methane mitigation and makes the case for a sustainable, justice-centered response. It draws on international evidence, current policy trends, and community experience to identify what works, and what doesn't, when it comes to landfill closure and organics management.

Methane emissions from existing and future landfills must be addressed with solutions that are environmentally sound, socially just, and economically appropriate. These solutions include:

- Diverting organic waste from landfills through source separation, composting, and anaerobic digestion (AD) to prevent future methane emissions.
- Zero waste strategies focused on upstream prevention, reuse, and inclusive recycling.
- Biological stabilization of residual organic waste to minimize methane emissions, with optional integration of MRBT (Mechanical Recovery and Biological Treatment) where appropriate.
- Use of biologically active covers to mitigate emissions from closed landfills.
- Inclusion of waste pickers and informal workers as key actors in building sustainable systems.
- Gender-responsive planning to ensure women benefit from and participate in the zero waste transition.

What will not work are approaches that prioritize:

- **Waste-to-energy (WTE) incineration**, which trades short-term methane reductions for high long-term CO_2 emissions, toxic pollution, and financial lock-in.
- **Privatization and capital-intensive technologies** that exclude waste pickers and deepen economic injustice.
- **Sanitary landfill upgrades and landfill gas (LFG)** capture plans that neglect upstream diversion, missing opportunities to create jobs and support community-based livelihoods.

By integrating climate, social, and gender justice goals into landfill remediation and diversion efforts, governments can turn waste sector investments into powerful engines of emissions reduction, job creation, and equitable development, transforming one of the world's dirtiest problems into a foundation for sustainable and inclusive climate action.

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CHAPTER 1

Understanding the Challenge: Methane, Waste Systems, and Equity

As countries respond to global methane reduction commitments such as the Global Methane Pledge and the COP29 Declaration on Reducing Methane from Organic Waste (ROW), landfills and dumpsites have emerged as key targets for intervention. These sites are major sources of methane emissions, driven by anaerobic decomposition of organic waste, as well as sources of air pollution, groundwater contamination, and fire hazards.

However, the dominant approaches typically promoted – such as landfill gas (LFG) capture systems, waste-to-energy (WTE) incineration, Refuse-Derived-Fuel (RDF) production, and privatized landfill remediation – often reinforce structural inequalities. These strategies can displace informal waste workers, commonly known as waste pickers, who are responsible for the majority of recycling in many cities, and undermine long-term climate objectives. This chapter outlines the limitations of conventional landfill and dumpsite remediation efforts and makes the case for integrating environmental justice principles into waste management strategies to achieve better social and climate outcomes.

Global Commitments: Current Political Drivers for Transition

Momentum to tackle methane emissions has accelerated rapidly in recent years, creating both a critical opportunity and responsibility for those working in waste management and environmental justice. The manner in which interventions are implemented, however, will determine whether they generate durable climate benefits or reinforce existing social and environmental issues.

Methane, a greenhoue gas (GHG) over 80 times more potent than CO_2 over a 20-year timeframe, is estimated to account for between 20-30% of global warming to date, and is now recognized as critical to address for near-term climate mitigation.[1] The 2021 launch of the Global Methane Pledge (GMP), in which countries committed to collectively reduce global methane emissions by at least 30% by 2030 compared to 2020 levels, marked a major turning point. The waste sector, which accounts for about 20% of global human-caused methane emissions, is a central focus of these efforts.[2] Complementing the GMP, the Paris Agreement has created a framework where countries' climate commitments (Nationally Determined Contributions, or NDCs) increasingly include methane reduction strategies. More recently, the Declaration to Reduce Methane from Organic Waste adopted at COP29 and currently signed by 65 countries,[3] further elevated organic waste management as a core area of action, explicitly linking it to both climate goals and sustainable development objectives.

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Despite this growing political momentum, methane emissions are not declining at the rate required to achieve these goals. Analyses by UNEP Global Methane Assessment and the International Energy Agency show current efforts will fall short of 2030 goals without major new action, especially in waste and agriculture.[4,5] Many countries have incorporated methane goals into updated NDCs under the Paris Agreement, but implementation remains uneven, and financing for community-based, zero waste solutions remains limited.[6]


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In the waste sector, there is growing concern that short-term methane reduction targets may incentivize infrastructure-heavy, capital-intensive approaches, such as sanitary landfill upgrades, LFG capture systems, RDF production, and WTE incinerators, over more sustainable, holistic and community-based, and income-generating strategies. While these technologies may achieve modest methane reductions in the near term, they often neglect upstream interventions such as organics diversion, source separation, recycling, and the integration of waste pickers. Without complementary systems for waste reduction and inclusion, these pathways risk increasing long-lived CO_2 emissions, displacing waste picker communities, and exacerbating social inequalities. The closure of dumpsites without robust systems for organics management or waste picker integration may offer temporary methane gains but at the expense of longer-term climate goals, community resilience, and justice. When done inclusively, however, closures can also go hand-in-hand with investments in upstream waste prevention, source separation, and livelihoods for waste pickers. These choices not only shape environmental outcomes, but also determine who benefits, and who bears the cost, of climate action. A closer look at the role of waste pickers highlights what is at stake.

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Indonesia dumpsite closure [7,8,9,10,11]

On March 10 2025, Indonesia's Minister of Environment, with support from the President and the Coordinating Minister for Food, announced a plan to close 343 out of 550 open dumping disposal sites over the following six months. The plan applies to 337 municipalities across six provinces and aims to bring all disposal sites into compliance with national standards within five years. While long overdue (the law requiring the closure of open dumps was passed in 2008 with a 2013 deadline) this announcement marks a significant policy shift. The government has already begun shutting down 37 dumpsites and has taken legal action against at least seven jurisdictions for environmental violations.

While the policy is an important step toward improving environmental health, it has sparked serious concern among local governments and the estimated 600,000 waste pickers and their families represented by the Indonesian Waste Pickers Association (IPI-PPIM). Environmental justice groups, including WALHI and the Indonesian Center for Environmental Law (ICEL), support the goal of ending open dumping but caution that closures must be accompanied by inclusive planning and robust support systems. Without adequate infrastructure, funding, and consultation with affected communities, the closures could lead to uncollected waste, increased hardship for waste pickers, and strain on already overstretched municipal budgets. Local governments also need time and support to revisit their development plans and reallocate their municipal budget to prioritize proper waste management systems.


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Incinerator in Addis Ababa, Ethiopia

Promoted as a groundbreaking solution to the city's waste crisis, the Reppie WTE incinerator in Addis Ababa has fallen far short of its promises. Originally designed to burn 1,400 tonnes of waste daily and generate 185 GWh of electricity per year, the plant processes less than half that amount, between 400 and 700 tonnes per day, and delivers only 92.8 GWh annually.[12] Addis Ababa's waste, which is over 70% biodegradable, is full of moisture and often requires pre-treatment or added fuel to sustain combustion, undermining both environmental and economic viability.[13,14] Despite pledges to employ thousands of youth, the facility has failed to create meaningful jobs, with local waste workers reporting displacement instead. The facility generates 85 tonnes of toxic ash daily and operates at an annual cost of approximately $6.2 million.[15] Given that over 90% of household waste in Addis is compostable or recyclable,[16] such funds could have been better spent on composting, recycling, and zero waste strategies, solutions more aligned with the city's waste composition and economic needs.

Residents from Navagam village impacted by the WTE incinerator plant in Jamnagar protesting at the District Collector's of ice against the pollution from the plant in 2021. © GAIA Asia Pacific

Gujarat, India [17,18]

In Gujarat State, India, an energy company proposed building four WTE incinerators in Rajkot, Vadodara, Ahmedabad, and Jamnagar, with financial support from the International Finance Corporation (IFC), the private lending arm of the World Bank. Together, the plants would have burned 3,750 tonnes of mixed municipal waste per day, producing CO_2 emissions equivalent to 1.875 million cars annually, while displacing waste pickers and undermining recycling systems. An existing plant operated by Abellon in Jamnagar has already triggered widespread community complaints, including reports of asthma, skin conditions, persistent air pollution, and waste picker displacement. The projects also raised serious financial red flags. Abellon's losses nearly doubled from 2021 to 2023, with a debt burden far exceeding its capacity to make interest payments. Despite these concerns, public agencies have provided over ₹300 crore in loans (approximately $34 million USD), putting taxpayer money at risk of supporting a stranded asset. Following sustained pressure from impacted communities and over 170 civil society organizations, the IFC formally withdrew its proposed $40 million investment in February 2025. This decision marked a significant victory for environmental justice and reinforced the urgent need to redirect public funding away from polluting, exclusionary technologies and toward safer, low-carbon, community-centered waste solutions.

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The Critical Role of Waste Pickers and the Risks of Exclusion

Informal recyclers, or waste pickers, have long played an essential yet undervalued role in urban waste systems, particularly in the Global South. In many cities, they are the primary drivers of recycling, responsible for collecting, sorting, and processing post-consumer materials without formal recognition, protections, or employment. Globally, an estimated 12.6 to 56 million people work in the informal recycling sector, a number likely higher today.[19] Waste pickers recover up to 80–90% of packaging and paper in countries like South Africa, and achieve 20–50% recycling rates in parts of Asia and Latin America.[20,21]

Their labor diverts enormous volumes of waste from landfills, reduces methane emissions, and saves municipalities millions in disposal costs – a critical contribution in cities where waste management can consume up to 19% of local budgets.[22]

Yet waste pickers remain largely invisible in official planning processes, and infrastructure-led reforms often push them out of the systems they've built. Privatization, where services are contracted to private companies – or even to non-government organizations (NGOs) or expanded municipal operations – often prioritizes centralized, capital-intensive technologies such as WTE incinerators and dumpsite upgrade projects. **Waste pickers are particularly vulnerable to exclusion when existing landfills are remediated and dumpsites are closed without parallel efforts to create inclusive alternatives.** Landfill upgrades, for example, while sometimes important for improving environmental controls, often restrict access to material at the landfill and cut waste pickers off from their primary income sources. Similarly, incinerators consume large volumes of mixed waste, disincentivizing source separation, diverting recyclables away from recovery and the waste pickers that depend on them, and offer fewer permanent jobs than recycling or composting.[23] Waste picker organizations are too rarely consulted in the design of dumpsite closure or remediation plans.

The impacts of exclusion are especially severe for women, who face lower pay, greater exposure to violence, and fewer opportunities to participate in transition processes.[24,25] Children working at open dumpsites are also at risk, facing daily exposure to toxins, pathogens, and hazardous materials.[26] Recognizing the dangerous and unhealthy conditions under which many waste pickers operate is essential – and so is ensuring that policies to address those harms do not inadvertently deepen inequality by cutting off livelihoods without alternatives.

This pattern of exclusion is not only profoundly unjust; it undermines environmental goals. Displacing waste pickers weakens recycling performance, increases landfill burden, and eliminates one of the most effective, low-cost, and climate-aligned waste management strategies available. Privatized contracts can lock cities into long-term, inflexible and expensive infrastructure that drains public budgets and hinders community-driven systems.

To ensure landfill remediation efforts do not deepen inequality or undermine recycling systems, waste picker inclusion must be a core policy requirement, not an afterthought. This means recognizing their expertise, protecting their livelihoods, and building formal partnerships that uphold environmental and social objectives together. Without this shift, landfill interventions risk reinforcing the very harms they are meant to repair. For recommended approaches to waste picker inclusion, see Chapter 2.

Risks Associated with Sanitary Landfills

Sanitary landfills are frequently promoted as an improvement over open dumpsites, and when properly designed and managed, they can mitigate some of the immediate environmental hazards associated with uncontrolled waste disposal — such as fires, leachate leakage, and uncontrolled methane emissions.

However, upgrading dumpsites to sanitary landfills without organics diversion, effective pretreatment to reduce the methane potential of residual waste, or broader systemic change fails to address core challenges.

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Most models still rely on large-scale disposal of mixed waste, including organics and recyclables. This perpetuates high methane emissions, even when LFG capture systems are installed. LFG systems typically capture only a portion of the methane generated—commonly around 50%—with additional fugitive emissions escaping through leaks in piping and transport infrastructure.[27,28]

Moreover, reliance on LFG capture as a mitigation strategy alone is more carbon-intensive than upstream solutions like composting or AD, and in some cases, financial incentives tied to LFG recovery have perversely encouraged municipalities or waste companies to landfill more organic waste rather than investing in source separation and diversion programs.[29,30] As a result, dependence on LFG systems not only offers limited effectiveness, but can also actively undermine zero waste strategies if not carefully regulated.

Beyond technical limitations, sanitary landfills lock cities into disposal-based systems, diverting attention and funding away from waste reduction, recycling, and composting.

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Development costs are high—particularly in low- and middle-income countries where waste often accounts for a large share of municipal spending. This financial burden leaves little room for investment in zero waste infrastructure or community engagement. Without complementary policies—such as source separation, waste reduction, and support for waste pickers—transitioning from dumpsites to sanitary landfills offers limited environmental benefit and risks entrenching costly, exclusionary, and ultimately unsustainable systems.

Risks of Waste-to-Energy Incinerators

WTE incineration is often promoted as a way to avoid methane emissions from decomposing organic waste, by burning that waste before it can decompose, releasing CO_2 instead of methane.

However, this approach obscures deeper problems. Incineration releases vast quantities of CO_2, both biogenic (from organics and paper) and fossil (from plastics and synthetic textiles). Studies show incinerators emit more GHG per energy unit than coal plants.[31]

Rather than eliminating emissions, incineration simply transfers them from methane at the landfill to irreversible carbon emissions at the smokestack, undermining long-term decarbonization strategies.


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Incinerators also produce toxic ash and air pollutants, including dioxins, heavy metals, and PM2.5.[32] According to the US Environmental Protection Agency (EPA), incinerators are among the top industrial sources of dioxins and furans, substances linked to cancer and immune disorders.[33]

Moreover, the vast majority of what is typically incinerated (paper, plastic, organics) could be reused, recycled, or composted. Recycling and composting save more energy than incineration generates,[34] and many incinerators consume more energy during waste processing than they produce.[35] These systems also create dependence on continued waste generation to keep incinerators running, locking cities into long-term contracts and undermining zero waste efforts.

From an economic standpoint, incinerators are among the most expensive forms of waste management. Construction costs can reach as high as over US$1B for an incinerator that can process one million tonnes per year, while operation and maintenance costs are more than double that required for landfilling or composting.[36] These costs have bankrupted cities like Harrisburg, Pennsylvania and heavily burdened others like Detroit.[37] Additionally, WTE incinerators create few permanent jobs, averaging only about 1.7 jobs per 10,000 tonnes per year, 10-20 times fewer than recycling, composting, or reuse programs.[38]

Health and environmental risks are substantial. Incinerators generate toxic ash that must be carefully landfilled or treated. Nearby communities suffer higher rates of respiratory illness, heart disease, and cancer. Even advanced plants release thousands of hazardous pollutants, contaminating air, water, and soil.[39]

From an energy transition and decarbonization perspective, WTE incinerators lock in fossil fuel dependency and swap methane for carbon. They also derail the need for finance in the energy sector to shift towards renewable energy projects. In fact, energy generated from incineration is estimated to have roughly twice the carbon intensity of the current EU electricity grid average and produces even greater climate impacts than conventional fossil fuels like natural gas.[40] In the US, incinerators emit 3.8 times more GHG per unit of electricity than the national grid average—including 15 times more methane, 66 times more biogenic CO_2, and significantly higher levels of harmful air pollutants like NO_x and SO_2—making them the dirtiest form of energy generation currently on the grid.[41]

Globally, the trend is moving away from incineration. Many provisions adopted in the EU in last few years provide roadmaps to transition away from incineration, including a full phase out of subsidies based on a "Do No Significantly Harm" principle (i.e. incineration is kept out of any funding scheme, based on the fact it harms both circular economy and climate commitments). The US has not built a new incinerator since 1997. Countries like Denmark and Sweden are even importing waste to keep plants running, highlighting the model's unsustainability,[42] and Denmark has started adopting some decommissioning plans in order to meet the climate commitments.[43]


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In short, WTE incineration is not a sustainable solution for waste management or energy generation. It exacerbates climate change, wastes valuable materials, burdens municipal budgets with high upfront and operating costs, and contributes to debt in many Global South cities. It creates minimal economic benefits and poses serious health risks. Real climate leadership means investing in zero waste systems that reduce waste generation, recover materials, and build resilient, community-driven economies.

Understanding the Difference: MBT vs. MRBT

Mechanical Biological Treatment (MBT) can refer to a range of mixed waste treatment systems. Some are designed primarily to produce Refuse-Derived Fuel (RDF) for incineration. Others such as Material Recovery and Biological Treatment (MRBT), focus on recovering recyclables and stabilizing organic waste before landfilling. This distinction is important. MBT systems that focus on RDF production ultimately support combustion-based disposal pathways. MRBT systems, by contrast, aim to reduce methane emissions and landfill reliance, recover materials that would otherwise be lost, and support a transition toward zero waste. This section focuses on the risks of MBT systems that produce RDF. A later section of the report will explore MRBT in more detail as a climate-aligned and inclusive alternative.

Risks of MBT and RDF Production

Mechanical Biological Treatment (MBT) facilities are often presented as more sustainable alternatives to incineration. MBT typically includes a biological treatment process to stabilize the organic fraction in mixed waste, sometimes followed by a mechanical process that separates out recyclables and extracts the burnable fraction (typically paper, plastics, and textiles) to produce RDF. RDF is then used as a fuel substitute in cement kilns, industrial boilers, or dedicated WTE incinerators. In this way, MBT systems that prioritize RDF are essentially an indirect form of incineration.

Several issues undermine the supposed environmental benefits of MBT and RDF. While MBT may reduce the volume of landfilled waste, it still relies on burning, generating GHG, toxic ash, and hazardous emissions. Cement kilns, power plants, and industrial boilers are typically not designed for the heterogeneous, contaminated nature of waste-derived fuels, and they often have weaker pollution controls than dedicated incinerators. Additionally, the growing use of RDF as an "alternative fuel" in these facilities is emerging as a strategy to extend the operation of high-emitting infrastructure under the guise of partial decarbonization. For example, in Indonesia's JETP process, RDF is being introduced as a transitional fuel in cement kilns and coal-fired power plants, potentially locking in fossil-based operations rather than accelerating their decommissioning.[44] This trend risks undermining the goal of a just, rapid, and deep

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decarbonization in the energy and industrial sectors. It also results in the release of heavy metals, dioxins, lead, cadmium, and mercury into the environment.[45]

MBT systems may also produce low-quality, compost-like outputs that cannot be safely used as soil amendments or in agriculture due to the presence of plastics, metals, and toxic substances. This stands in contrast to high-quality compost from source-separated organic waste. Moreover, MBT facilities are often marketed as climate-friendly waste solutions — when in practice they are misleading substitutes that entrench combustion-based models.

Investing in MBT with RDF production diverts resources away from upstream zero waste strategies such as prevention, source separation, composting, and recycling.

These facilities typically require high capital investment and operational complexity, and may create structural incentives to maintain mixed waste streams in order to meet RDF production targets, undermining separate collection and long-term circular economy goals. On the other hand, MRBT systems are designed to stabilize organics and recover materials without producing RDF. These models align better with zero waste and climate goals. However, most MBT infrastructure currently in use, especially those focused on RDF generation, remains incompatible with both environmental justice and sustainable waste management principles.

CHAPTER 2

Policy Solutions and Recommendations for Implementation

Priority 1 - **Organics Diversion: Source Separation, Treatment, and Landfill Restrictions**

Organic waste is the primary driver of methane emissions in landfills and dumpsites, and its removal remains the most effective intervention for cutting short-lived climate pollutants in the waste sector.

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As global methane reduction commitments gain traction, cities and countries must pursue integrated strategies to keep untreated organic waste out of disposal sites – through source separation, organics diversion, and appropriate treatment of residuals. Meeting these goals requires not only technical solutions, such as composting, AD, and MRBT, but also policy frameworks, financing mechanisms, and inclusive governance models that support just transition, prioritize low-cost and community-based approaches, and avoid locking in high-carbon infrastructure. Without this broader systems shift, continued burial of untreated organic waste will undermine both near-term climate targets and long-term circular economy goals.

Prevention, Source Separation, and Diversion

Preventing methane formation is far more effective than capturing it after the fact. Organics diversion aims to keep biodegradable waste – like food scraps and garden waste – out of landfills entirely. This requires source separation, in which households, businesses, and institutions separate organic waste from other streams. Once separated at source, organics should be collected separately before it is processed through composting, which uses aerobic decomposition to produce nutrient-rich soil amendments, or through AD, which produces biogas and digestate in sealed, oxygen-free systems.

Upstream food waste prevention is also essential. Reducing spoilage, improving supply chains, and changing consumer behavior cuts both disposal emissions and the larger climate footprint of food production, a sector responsible for 40% of global anthropogenic methane emissions.[46] Together, prevention and diversion tackle methane emissions at the source.

Cities can choose from a range of organics processing strategies depending on context. In decentralized systems, households compost at home with support from municipal subsidies or training programs — as seen in Trivandrum, India.[47] At the community scale, neighborhood composting sites allow residents to drop off organics locally, reducing transportation needs and fostering public participation. Larger jurisdictions may opt for centralized composting or AD facilities, which can handle higher volumes but require greater capital investment, technical capacity, and community engagement to avoid negative outcomes, such as the displacement of waste pickers. **Hybrid approaches, combining centralized processing with decentralized collection, can maximize flexibility and social inclusion – especially when implemented in partnership with waste picker cooperatives or public-private partnerships.**

Ultimately, effective diversion depends on clean, uncontaminated organic waste streams. This requires investment in public education, separation infrastructure, and inclusive governance that engages communities and informal sector participation.

Only through coordinated efforts across government, service providers, and citizens can organics diversion deliver its full climate and environmental benefits.

Prohibiting Landfilling of Untreated Organic Waste

Beyond collection models, regulations play a key role in ensuring that organic waste is managed responsibly at scale. Governments should adopt policies to prohibit the landfilling of untreated organic waste. These bans provide regulatory clarity and create strong incentives for stakeholders to invest in separate collection and composting systems. In the EU, for example, the Landfill Directive has helped drive diversion by requiring pre-treatment of biodegradable waste.[48]

However, bans must be carefully designed. Without accessible collection services or processing options, they risk pushing waste into informal dumping or burning. Moreover, bans should allow for the safe landfilling of treated organics (biostabilized waste), especially where full source separation is not yet feasible. In such contexts, stabilizing the organic fraction of residual waste becomes a critical bridge strategy that will be discussed in the next section.

A well-designed policy strategy that combines organic waste landfill bans with investments in separate collection and composting infrastructure can rapidly cut methane emissions, protect public health, and support just and inclusive waste systems.

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Scaling Composting, Anaerobic Digestion, and Black Soldier Fly Operations

To support these regulatory efforts, governments must also scale up the systems needed to process organic waste effectively. Scaling up composting, AD, and emerging options like Black Soldier Fly (BSF) processing can transform organic waste from a climate liability into a valuable resource, supporting emissions reductions, soil health, food security, and green job creation.[49] To unlock this potential, strong, coherent policies must align with broader zero waste and climate goals.

Composting is one of the most proven strategies for methane mitigation, capable of preventing up to 99% of emissions that would otherwise occur from landfilling.[50,51] In well-managed systems, composting decomposes organics aerobically, minimizing methane. It also restores soil carbon, improves water retention, enhances agricultural productivity, and supports carbon sequestration.

AD complements composting, especially in dense urban areas. AD captures methane from organic material decomposed in a sealed, oxygen-free environment, and produces digestate that can be composted and made into soil amendment. Supportive policies should prioritize clean, source-separated feedstocks and avoid reliance on dedicated energy crops, such as corn or sugarcane grown solely to fuel biodigesters, which compete with food production, require large land and water inputs, and contradict waste prevention goals. Instead, AD systems should be designed to process actual waste. Small-scale AD units can also expand access in rural or off-grid areas, contributing to decentralized, renewable energy solutions.

BSF systems, though less common, are an additional tool for organic waste recovery. BSF larvae rapidly convert food waste into protein-rich animal feed and nutrient-dense frass for soil. Governments can support BSF by clarifying regulatory pathways, funding research and development, and offering technical assistance for safe, effective deployment.

Across all strategies, coherent policy frameworks are essential.

Climate plans should set organic waste recycling targets with clear accountability mechanisms, timelines, and responsible agencies.

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Governments can adopt policies such as mandatory source-separated collection of organic waste as well as financial subsidies or capital grants for organics management infrastructure. Streamlined permitting processes, with clear regulatory guidance, can reduce administrative delays and encourage private or cooperative sector participation. Procurement policies that require the use of locally produced compost in public landscaping and agriculture can help create stable demand and support market development.

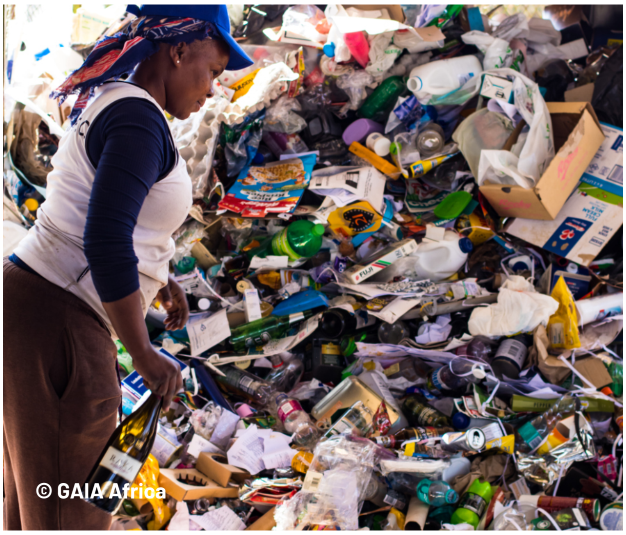
To build the necessary capacity, governments should also fund technical training and workforce development programs in composting operations, biogas maintenance, and safe BSF deployment – especially targeting informal sector workers and small enterprises. Tax incentives or low-interest loans for small and medium enterprises involved in composting, AD, or BSF can further scale innovation and adoption. By integrating these policies into a zero waste framework, cities and countries can significantly reduce methane emissions while building healthier soils, stronger local economies, and more resilient communities. Real-world examples of successful organics management programs – from community composting in India to municipal-scale AD in Europe – are explored in the case studies later in this chapter.

Deploying MRBT for Residual Mixed Waste

In areas where source separation remains incomplete, MRBT offers a transitional strategy to reduce methane from residual waste. MRBT involves two steps: mechanical recovery of recyclables (e.g., plastics, metals, paper) from mixed waste, and biological stabilization of the remaining organics to reduce methane potential before landfilling.

Unlike MBT systems designed to produce RDF for combustion, MRBT does not rely on burning waste for energy. Instead, it aligns with zero waste and climate goals by stabilizing organic content and extracting additional recyclables—often in partnership with waste pickers.

Biostabilization prior to landfilling has been shown to significantly reduce methane generation, making landfill gas capture systems largely unnecessary.[52]



MRBT further enables the extraction of additional recyclables that would otherwise be lost, a process that waste pickers can participate in, and helps recover rather than destroy valuable materials. At scale, MRBT can reduce the amount of residual waste requiring final disposal by up to 80%, reinforcing its role in circular economy transitions.[53]

Financially, MRBT is also far more accessible than incineration. Capital costs are typically less than half those of incinerators.[53] These systems become particularly cost-effective when paired with higher landfill gate fees or materials revenue, and are more easily scaled or adapted to changing conditions than capital-intensive WTE plants.[53] Additionally, modular MRBT systems can be scaled according to city or regional needs and adapted over time as separate collection rates improve, compared to large WTE facilities that lock-in significant costs and require continuous waste generation to operate decades into the future.

While biological treatment alone is the most cost-effective and impactful for methane reduction, full MRBT systems can be helpful in higher-income contexts with established markets for dry recyclables and economic incentives for diversion. Where market conditions or infrastructure limit the feasibility of full MRBT systems, biological stabilization alone still offers a lower-cost, high-impact alternative for reducing methane from residual waste.

Priority 2 - **Minimization of Methane Emissions in Legacy Landfills**

Even after robust organics diversion is achieved, legacy landfills – sites where waste has already been deposited – will continue emitting methane for decades unless proactively addressed. Methane from these sources accounts for an estimated 9% of total landfill methane emissions.[54] While smaller than emissions from active sites, legacy emissions still pose a serious climate risk and require targeted, cost-effective remediation strategies.

One of the most promising solutions is the use of biologically active covers, or biocovers. These systems involve applying a layer of compost or organic material over the landfill surface to foster methane-oxidizing microbes that convert methane into CO_2 as it rises. Especially effective at aging or low-output sites,[55] biocovers can reduce methane emissions by an average of 63%, and in some cases, achieve net-negative emissions.[56] They are low-cost, flexible, and well-suited for areas where capacity for high-cost infrastructure is limited.

Using locally available compost for biocovers further supports circular economy goals, while aligning with broader methane reduction and waste diversion strategies.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The CCAC's Technology and Economic Assessment Panel (TEAP) highlights biocovers as an underutilized, scalable option with significant mitigation potential.

By contrast, LFG capture systems, which extract methane through pipes and wells for flaring or energy use, are expensive and poorly suited for legacy sites. Capture rates vary considerably, as substantial methane is emitted before gas collection systems are operational, and additional losses occur through leaks in pipes and fittings. Over time, as gas production wanes, LFG systems become even less effective. Moreover, energy-revenue incentives tied to LFG can perversely encourage the continued landfilling of organic waste, undermining diversion programs.[57,58] For older or low-output sites, biocovers are typically more climate-aligned and financially viable.

A less suitable approach is landfill mining, which is gaining attention in countries like China. While sometimes framed as a land recovery or recycling opportunity, it often releases trapped methane and toxins, disturbs stabilized waste, and offers little material recovery.[59,60,61,62] The practice introduces new emissions and health risks without meaningfully reducing long-term methane generation.

Priority 3 - **Ensuring a Just Transition and Waste Picker Inclusion**

As described in Chapter 1, exclusionary waste policies often displace the very people who built the foundation for urban recycling systems – weakening environmental outcomes and deepening social inequality. A truly just transition begins with a clear do-no-harm commitment: recognizing and addressing risks to vulnerable groups, ensuring that no one is made worse off, and protecting basic rights to identity, dignity, and livelihood. According to the International Labour Organization (ILO), nearly 20 million people worldwide earn a living from recycling waste – many as informal waste pickers who work in unsafe and precarious conditions, collecting, sorting, and recovering materials from streets, landfills, and dumpsites.[63] Recognizing and supporting these workers is not only a matter of social justice but also key to environmental effectiveness.

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When integrated into formal systems, waste pickers deliver proven results. In cities like Buenos Aires, Santiago, Bengaluru, and Dois Irmãos, cooperatives contracted by local governments have seen improvements in wages (up to 2.5 times the local minimum), along with access to protective equipment, health care, banking, and greater public recognition.[64] Semi-mechanized recycling systems – like those operated by many waste picker cooperatives – can support an estimated 321 jobs per 10,000 tonnes of waste per year, dramatically outpacing the employment generated by capital-intensive WTE or landfill systems.[65] In Rabat and Baku, former waste pickers now enjoy stable salaries, health insurance, and even access to affordable housing. In Brasília, Brazil, a comprehensive, participatory approach to closing Latin America's largest dump included the formation of cooperatives, transitional support, and contracts for collection and sorting – demonstrating how coordinated government action, when paired with strong waste picker organizations, can ensure dignified work, access to education and health programs, and long-term livelihood protection.[66]

A just transition also requires ensuring meaningful, equitable participation in decision-making. Ensuring a just transition requires grounding integration efforts in rights-based principles—such as the right to decent work, freedom of association, protection from discrimination, and inclusion in social protection systems.[67] Waste pickers and affected communities must be involved from the start — from project design to implementation and oversight, guided by the principle of free, prior, and informed consent. Resources such as the policy position paper on dump closures by Women in Informal Employment: Globalizing and Organizing (WIEGO), provide an overview of best practices for integrating waste pickers into landfill remediation processes, including recommendations on safeguarding livelihoods, improving working conditions, and establishing inclusive planning mechanisms.[68]

Inclusive platforms, such as multi-stakeholder forums or monitoring committees, are essential to ensure that waste pickers are recognized as equal partners in decision-making. Special attention must be paid to groups historically marginalized on the basis of race, caste, gender, disability, and indigeneity. Policies must respect the cultural integrity of all communities, especially Indigenous Peoples, and address cumulative environmental harms in overburdened areas often referred to as "sacrifice zones."

Community-led organizations are critical allies. They bring trust, local knowledge, and proven strategies for advancing zero waste and environmental justice. Rather than displacing or duplicating their work, waste systems should build on existing efforts by investing in low-impact, climate-resilient, and locally-appropriate waste solutions. This approach strengthens local economies and respects communities' right to shape their futures. By centering waste pickers and local actors, and grounding policies in human rights and equity, a just transition can deliver climate action that is socially transformative.

Best Practices on Source Separation and Separate Collection: Case Studies

Effective source separation is the foundation of successful organics diversion and circular waste systems. Both European municipalities and cities like Dar es Salaam demonstrate that high-performing systems rely on strong community engagement, consistent collection, and appropriate infrastructure scaled to local conditions. This section highlights key takeaways from best practice cases across geographies.

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1

Community-Scale, Decentralized Collection in Dar es Salaam[69]

The Bonyokwa neighborhood of Dar es Salaam, Tanzania, has implemented a zero waste model rooted in source separation and community engagement. In this low-income, high-density area, over 95% of households and businesses separate waste at source. This success is driven by intensive public awareness efforts, decentralized collection led by a cooperative of waste pickers, and proximity to local Material Recovery Facilities (MRFs) that process organics and recyclables. Each household receives clearly marked containers, and collection occurs five days a week. With 1.74 tonnes collected daily from 2,998 households, the program has achieved a 95% segregation rate and prevented an estimated 16.4 tonnes of methane annually. The model shows how decentralized, inclusive systems can achieve high diversion even with limited infrastructure.

2

Door-to-Door Collection Paired with Economic Incentives in Hernani, Spain[70]

In Hernani, a small industrial town in the Basque Country, Spain, a door-to-door system with mandatory participation has helped achieve 81% overall diversion and 90 kg per capita collection of kitchen waste. Source separation is supported by the use of paper or compostable bags and daily outreach. The town provides reusable 20-liter caddies and ensures frequent pick-up: organics are collected three times per week. Households who fail to comply with sorting rules are penalized, reinforcing participation and high compliance. Hernani also became MiZA-certified as the first Zero-Waste municipality in the Basque Country, underlining its leadership in zero waste policy implementation.[71]

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3

Regional Models with Shared Infrastructure: Berguedà, Catalonia[72]

The county of Berguedà in Catalonia (Spain), shows how a shared infrastructure approach can work in less densely populated regions. With door-to-door collection in 12 towns and community composters in others, the county has achieved a 70% diversion rate. Compostable liners are provided and required, while composting facilities process both kitchen and garden waste. To discourage residual disposal, the region levies taxes and plans to implement a PAYT (pay-as-you-throw) system. By centralizing processing while decentralizing collection logistics, Berguedà balances efficiency with accessibility.


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4

Decentralized, Source-Based Management in Thiruvananthapuram, Kerala[73]

After public protests led to the closure of its only centralized composting plant in 2011, the city of Thiruvananthapuram in Kerala, India, adopted a decentralized waste management system that treats most waste at or near the point of generation. With organic materials making up over 70% of the city's waste, officials prioritized household composting by subsidizing simple systems like biogas and pipe compost units. As a result, nearly 40% of households now manage their food waste at home. Businesses and institutions are required to treat their own organic waste, while non-recyclable materials are sent to government-run sorting centers. The state also implemented green protocol to prevent single-use plastics at public gatherings, fairs, and elections, dramatically reducing the amount of waste produced at festivals and other large events. Community volunteers and local officials play a key role in outreach and enforcement, supported by tools like a city-run waste management app. Thiruvananthapuram's model shows how local, people-driven approaches can create effective, low-cost alternatives to centralized landfill systems—even in large, urban areas.

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5

A national benchmark for organic waste recovery in Florianópolis (Brazil)[74]

The system for collecting, transporting, and recovering organic waste in Florianópolis, Santa Catarina (Brazil), is a nationwide reference. Following the establishment of ambitious targets through specific programs and legislation — such as the Florianópolis Capital Lixo Zero Program and the Municipal Composting Law — the city began diversifying its strategies to promote the recovery of compostable organic waste. Currently, it collects approximately 12,300 tonnes of organic waste per year, achieving a recovery rate of 12.9% of the total waste collected by the city (including dry recyclable and residual waste). Since 2008, Florianópolis has been investing in a range of composting models, including centralized, decentralized (with proper remuneration for the service), community-based, school-based, and household composting systems. The model applied by the municipality demonstrates how the integration of different strategies and partnerships between various social actors can generate significant environmental and social benefits.

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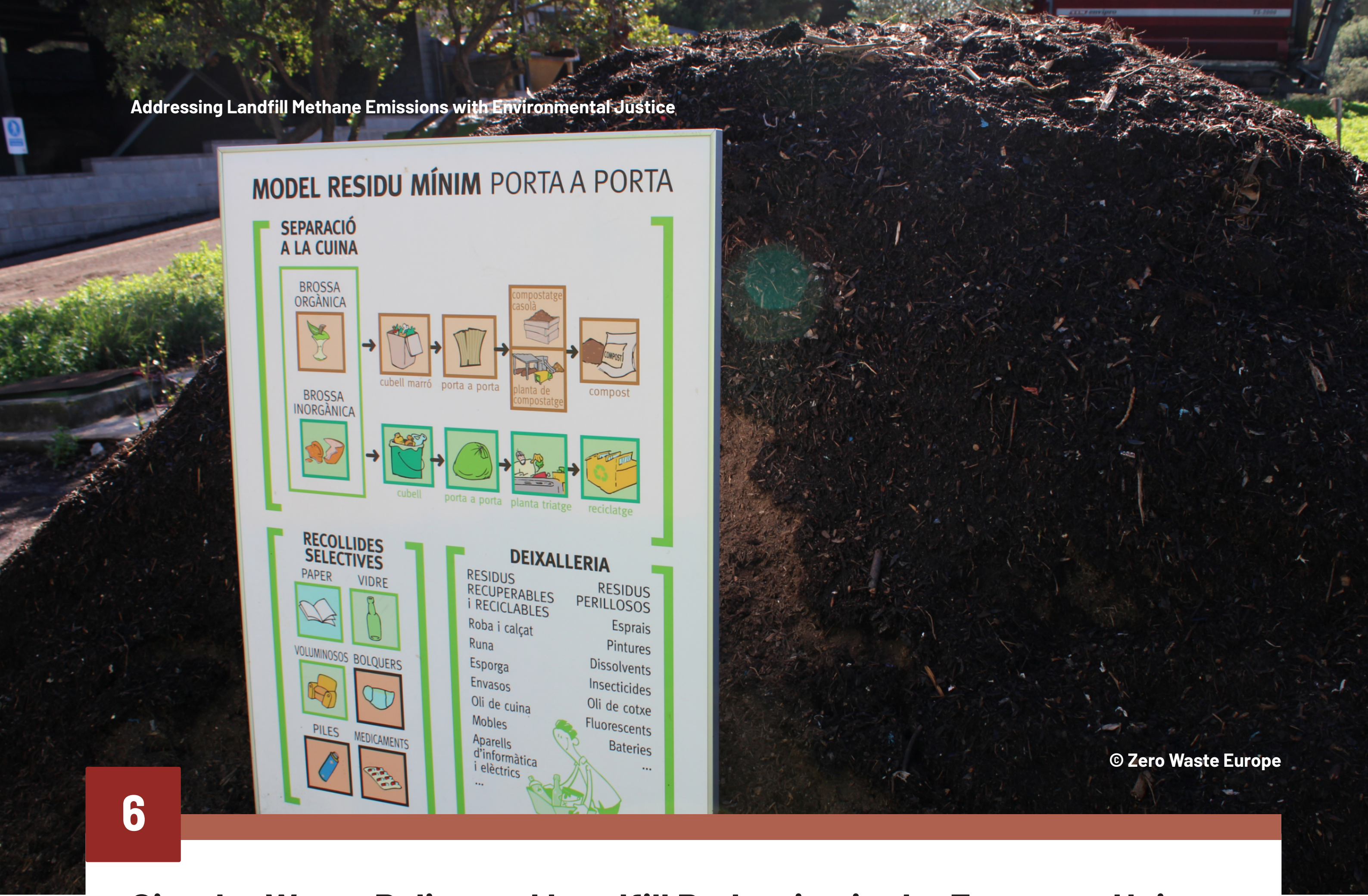

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6

Circular Waste Policy and Landfill Reduction in the European Union

The EU Circular Economy Action Plan provides a policy model for reducing landfill methane while advancing social and environmental goals. It treats incineration and landfilling as resource leakage, excluding them from green investment criteria under the Do No Significant Harm principle. EU policy now emphasizes source separation, material recovery, and pre-treatment of waste prior to landfilling. By 2035, member states must reduce landfilling of municipal waste to below 10% and recycle at least 65%.[75] Cities like Milan and Ljubljana show that combining strong source separation with biological stabilization of waste before landfilling yields high diversion rates and methane reductions.[76] MRBT reduces reliance on landfilling and dumping without locking into expensive or polluting technologies—making it an appropriate bridge strategy for Global South contexts as well. By centering recovery, biostabilization, and circularity, MRBT supports a more just and climate-aligned transition in waste management systems globally.

In sum, methane from legacy landfills remains a significant climate risk, and policy frameworks are evolving to support safer, lower-emission closure strategies. The US EPA emphasizes long-term gas monitoring and management; the EU Landfill Directive restricts landfilling of biodegradable waste and mandate methane controls; UNEP and International Environmental Technology Centre (IETC) have issued closure guidelines in Sri Lanka focused on environmental and community safety; and Japan has pioneered landfill repurposing projects that integrate environmental safeguards. A just transition must do this and more, ensuring that landfill closure and remediation strategies minimize harm, support ecological restoration, and align with broader zero waste and climate resilience goals.

CHAPTER 3

Recommendations for Financial Sustainability

Landfill methane mitigation is an urgent and resource-intensive challenge for local governments worldwide, especially in the Global South. Cities are already under immense pressure to deliver basic services like universal waste collection and source separation, services that are labor and cost-intensive but essential for effective waste systems. Many cities lack the financial capacity to manage landfills effectively while also addressing growing waste volumes. While local governments hold the majority of responsibilities in delivering this basic service, national governments also have a critical role to play in creating the financial and regulatory frameworks to support cities in implementing just and sustainable waste management systems, including remediation plans for legacy landfills.

In many regions, landfills operate with minimal and often no controls (e.g. open dumping sites or dumpsites), creating serious environmental and social harms. Addressing these sites requires adequate and sustained investment—not just for technical upgrades like capping and leachate treatment, but also to mitigate social impacts such as displacement of nearby communities and the exclusion of waste pickers.

Governments and financiers should center environmental justice to all remediation plans by ensuring inclusion, meaningful, and equitable participation of all impacted rights holders, particularly waste pickers.

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Adding to the challenge, many cities have tried to solve the problem through capital-intensive technologies like WTE incinerators, LFG capture systems, or landfill mining for RDF. These systems are often prohibitively expensive, financially rigid, and create few jobs, while introducing new environmental risks. Globally, the majority of waste sector finance — driven largely by the private sector — flows to WTE incinerators, which receive 99% of methane abatement funding in the sector (US$4.08 billion), compared to just 1% (US$22 million) for organic waste management.[77] This commercial viability depends heavily on substantial public subsidies, further locking cities into high-cost, high-carbon infrastructure. In contrast, context-appropriate options such as source-separated decentralized organic waste treatment, MRBT, and biocovers offer lower capital costs, greater operational flexibility, and better integration with existing waste systems. These approaches also support local employment and are more compatible with zero waste goals.

Decentralized organic waste treatment models, particularly those led by communities and waste pickers, offer a cost-effective and job-rich alternative to capital-intensive waste infrastructure.[78] Operating close to the source of waste generation, these models avoid costly investments in land acquisition, transportation, and large-scale facilities. Experiences from Indonesia and Brazil demonstrate that decentralized approaches not only reduce operational costs, but also create significantly more local jobs than landfilling or centralized composting. Beyond cost savings, these systems deliver a range of social and environmental co-benefits such as improved public health outcomes through reduced waste accumulation, enhanced community engagement, and strengthened local agriculture through access to high-quality compost and soil amendments However, despite their proven potential, community-led and informal sector models often face persistent barriers—including inadequate funding, lack of legal recognition, and limited access to mainstream finance mechanisms. Unlocking their full value will require targeted public support, regulatory inclusion, and dedicated financing tools that align with their decentralized and inclusive nature.

By embedding the principles outlined in previous chapters, cities can better target investments to prevent future emissions, remediate legacy waste, and build landfill systems that are safer, more sustainable, and economically resilient. The following sections outline short-, medium-, and long-term financing strategies to scale cost-effective, waste hierarchy-aligned solutions while ensuring fair, inclusive support for community groups and informal workers.

Short-Term Recommendations

Prioritize Funding for Scalable, Context-Appropriate, Low-Cost Interventions

Cities should direct limited short-term resources toward cost-effective solutions such as composting, biostabilization, and MRBT systems, which offer immediate methane mitigation without locking municipalities into expensive, long-term infrastructure. These approaches are financially flexible, easier to pilot and scale, and better suited to evolving local conditions—especially in low- and middle-income contexts. Prioritizing investments in these adaptable systems allows cities to reduce emissions quickly while laying the foundation for more inclusive, community-driven waste management.

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Expand Access to Tailored Microfinance for Community-Based Waste Solutions


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To unlock the full potential of decentralized, low-carbon waste systems, public finance and climate funds must include dedicated microfinance mechanisms for decentralized systems that are operated and led by local community and informal workers groups – especially waste picker cooperatives, community composting hubs, and home composting programs. These initiatives are often overlooked by traditional funding systems despite delivering measurable climate and social benefits. The following are some key findings from a recent publication by the Climate Policy Initiative that highlights the enabling conditions for scaling up organic waste management models taken from 16 case studies in Indonesia and Brazil[78]:

- Home composting stands out as one of the most financially efficient decentralized waste treatment models, with exceptionally low levelized costs—ranging from US$1.69 to US$19.12 per tonne—due to minimal capital expenditure (CAPEX) and negligible operating expenses. These programs typically require only a one-time investment in composting kits, with most activities carried out by households, resulting in short payback periods of 0.3 to 1.6 years. In Brazil, they have been primarily funded through philanthropic grants and government contributions, offering a replicable model for cost-effective and scalable methane mitigation.

- Community-led decentralized organic waste treatment models, including waste picker cooperatives in Brazil and community groups in Indonesia, are cost-competitive alternatives to large-scale facilities, with levelized costs ranging from US$17.63 to US$63 per tonne. Their cost efficiency comes from operating close to the source, which reduces land and transportation expenses, though many struggle with negative operating margins due to small volumes, high labor intensity, and lack of stable operational funding. These models often rely solely on revenue from service provision or recovered materials, underscoring the need for blended finance solutions that cover both capital and ongoing costs to ensure long-term viability.

Governments and development partners should design financing programs that cover early-stage development, working capital, and technical assistance. These programs should avoid any mechanisms that lead to indebtedness while ensuring context suitability for finance recipients. For example:

- Grants for community- and waste picker-led projects for procuring household composting kits and communal composting facilities, community outreach programs to promote source separation and decentralized composting, land and building acquisition grants.
- Start-up capital for community groups and waste picker cooperatives to acquire basic equipment like carts, tricycles, safety gear, composting facilities and tools, black soldiers fly farming kits.
- Low-interest loans or blended finance to establish or upgrade decentralized organic waste treatment infrastructure and operation systems.
- Performance-based grants tied to specific outcomes, such as robust regulatory and governance framework, source separated waste collection reach, compliance rate of source separation, organic waste diversion from landfills and incinerators.
- Funding for technical assistance and training for community-led projects, including financial literacy, bookkeeping training, business planning and modeling, operations management and optimization, cooperative governance and management skills, legal framework literacy, MRE (monitoring, reporting, and evaluation) systems.
- Legal and regulatory support to help informal waste workers formalize and access finance, land-use rights, and long-term contracts.


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Tailored financial tools like these can help community actors scale up, formalize, and participate in climate-aligned waste systems. Unlike capital-intensive infrastructure, these solutions are low-cost, job-rich, and adaptable, offering high returns on public investment and helping to embed justice and inclusion into climate finance.

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Quantify and Integrate Cost Savings and Co-Benefits as Project Success Indicators

Embedding cost-benefit analysis (CBA) into planning is essential to making the financial case for organic waste diversion. Highlighting avoided costs – such as lower landfill disposal fees, delayed landfill expansion, and reduced public health expenditures – can clarify the return on investment for low-cost, climate-aligned solutions.

Crucially, CBA should also quantify broader co-benefits, including:

- Local job creation in composting and waste processing sectors
- Improved soil productivity through compost application
- Reduced vector-borne disease incidence due to less organic waste in landfills
- Decreased greenhouse gas (GHG) emissions, contributing to climate mitigation goals

For example, a community-led composting project in Durban (South Africa) achieved a Benefit-Cost Ratio (BCR) of 2.38, signifying that benefits outweigh costs when the ratio is greater than one. It showed net benefits of R18 million (approx. US$1 million) over a decade, primarily from landfill cost savings and deferred expansion. Additionally, it also successfully created local green employment opportunities for the city, with an estimated seven full-time and four part-time jobs for 737 tonnes of organic waste diverted.[79] Yet many municipalities fail to track cost savings and benefits, undercutting the case for investment.

To support accountability and replication of organic waste programs, governments should adopt a comprehensive set of clear, measurable, and transparent indicators that capture financial performance, environmental impact, social benefits, and operational efficiency. Lessons from the Durban Zero Waste project show that tracking metrics such as net financial benefit, GHG reductions, compost output, job creation, and baseline waste data can guide effective planning, justify public investment, and inform scalable models.

Governments should also require reporting on specific indicators—such as budget savings from reduced landfill use, emissions reductions (e.g., avoided methane), and quantified health and environmental co-benefits—as part of project performance evaluations. Doing so not only strengthens accountability but also helps build the case for scaling successful models, securing early-stage support, and integrating organic waste solutions into broader climate and development strategies.

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Medium-Term Recommendations

Access Debt-Free External or International Finance

Cities require debt-free financing sources —including technical assistance and grants— to initiate and sustain inclusive and climate-smart waste management systems. These resources should come from a broad base: philanthropic organizations, national and federal governments, multinational and local development banks, and Official Development Assistance (ODA).

Public international finance—through institutions like the Green Climate Fund, Global Environment Facility, and Adaptation Fund—can play a transformative role in supporting infrastructure development, capacity-building, and technology transfer, provided there are adequate direct channels to deliver funds effectively to cities and local communities. Meanwhile, other sources of climate finance, including multilateral development banks and private sector capital, hold significant potential to scale up composting, anaerobic digestion, and recycling systems. Ultimately, philanthropic and impact funds have—and continue to—serve as crucial catalysts for early-stage projects, innovation, and community-led zero waste initiatives, bridging critical financing gaps where more traditional funding streams often fall short.

In 2025, the stakes are high. Waste sector commitments are often positioned in the conditional sections of NDCs—explicitly dependent on international support. This creates a clear investment signal: climate finance, technology transfer, and capacity-building are not optional extras but prerequisites for delivery. Given waste's proven cost-effectiveness and its broad co-benefits—improved public health, job creation, reduced pollution—channeling finance here delivers high returns across multiple Sustainable Development Goals (SDGs). For funders and negotiators, prioritizing waste methane mitigation offers an opportunity to demonstrate rapid, measurable climate impact while helping countries meet both their conditional NDC targets and global climate goals before 2030.


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Still, to maximize impact, it is absolutely critical that grants are strategically coupled with appropriate climate finance mechanisms that facilitate direct resource flows to local implementers, such as municipal governments, community-based organizations, and waste picker cooperatives. This approach enables the design and execution of waste interventions that align with the waste hierarchy, focusing on food loss prevention, organic waste diversion, and landfill remediation — all of which contribute to meaningful GHG emissions reductions.

In parallel, technical assistance for governments is essential for creating the enabling conditions that ensure long-term operational and financial sustainability. This includes:

- Developing robust regulatory and policy frameworks;
- Strengthening waste governance systems;
- Aligning with national climate commitments (e.g., NDCs, Waste Methane Action Plans, or Climate Action Roadmaps), and
- Supporting early-stage project preparation, including feasibility studies; stakeholder engagement, and institutional design.

This institutional support must work hand-in-hand with the targeted technical assistance provided to community groups, as outlined in the Short-Term Recommendations. Community-level technical assistance helps informal and grassroots actors access, manage, and report on funds. In turn, institutional-level support enables governments to design inclusive, climate-aligned waste systems.

When well-structured, both forms of technical assistance can unlock domestic public finance, attract private and international investment, and de-risk climate finance for long-term waste sector transformation.

Unlock Domestic Budgets from Other Sectors

Organic waste treatment delivers a range of co-benefits that, if properly recognized and quantified, can significantly strengthen the investment case for decentralized and climate-aligned waste solutions. By framing waste investments as multi-sectoral public goods, cities can tap funding from outside the sanitation budget, reducing pressure on municipal waste management departments. Health agencies may support composting to reduce disease vectors; agriculture agencies may fund compost distribution to improve yields; and social development funds may back cooperative-led initiatives that create dignified employment. This reduces the financial burden on sanitation departments and encourages integrated urban planning and budgeting.

For example, a community-led composting project in Durban demonstrated that composting creates significantly more jobs than landfilling or incineration. This can justify budget allocations from social development, economic development, or labor departments.[80]

Moreover, the cost-benefit analysis of the Warwick Zero Waste Project — based at the Early Morning Market in Durban, South Africa — demonstrated how organic waste interventions directly reduce expenditures across multiple municipal departments:

- **Cleansing and Solid Waste Unit (CSW):** Diverting organic waste resulted in significant savings on landfill disposal and preserved landfill airspace, totaling approximately R1.3 million (-US$70,000) annually.
- **Business Support/Markets (BSMTAU):** Reduced waste disposal fees for municipal markets freed up funds for reinvestment in market infrastructure, contributing to combined savings of R1.3 million (-US$70,000) annually for the Business Support and Parks units.
- **Parks, Recreation and Culture Unit (PRC):** By producing free, high-quality compost for municipal use, the project helped the PRC Unit avoid compost purchases, saving about R300,000 (-US$16,500) annually.

To enable this kind of cross-sector financing, governments should:

- Quantify relevant co-benefits through CBA;
- Embed organic waste goals into urban development plans; and
- Coordinate funding streams across sectors.

This approach not only broadens funding bases but also ensures that investments in waste management contribute directly to a more integrated and resilient development agenda.

Reform Public Subsidies to Prioritize Climate Emissions Reduction and Benefits-generating Interventions

To maximize climate and development outcomes, public funding must be redirected toward upstream waste interventions that both reduce methane emissions and generate co-benefits. National governments should reallocate subsidies currently supporting and perpetuating downstream, high-emission waste disposal technologies — such as landfill tipping fee subsidies, Power Purchase Agreements (PPAs) on WTE Incinerators, and RDF market guarantees — toward preventive and decentralized organic waste solutions.

WTE PPAs, for instance, are long-term contracts that commit governments to purchase electricity from incinerators at fixed, often above-market rates. These agreements guarantee revenue for private developers, incentivizing the continued generation and burning of waste, rather than its reduction. Similarly, tipping fee subsidies and RDF price supports lock public funds into high-carbon, low-job-yielding infrastructure, undermining the goals of circularity and community development. Another example is the subsidies for LFG capture and utilization projects that create a perverse incentive for keeping organic waste entering landfills for methane gas productions.

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Redirecting these subsidies to support waste prevention, source separation, composting, and decentralized organics diversion can:

- Deliver stronger methane and GHG reductions,
- Create significantly more jobs per dollar invested, and
- Strengthen community ownership and system resilience.

In the organic waste sector, governments can further catalyze market development by:

- Shifting subsidies from petrochemical industries expansion towards interventions that follow the waste hierarchy and prioritize waste prevention, for example: a petrochemical industry in Indonesia has received a tax holiday incentive from the Ministry of Finance[81] for the development of its second petrochemical complex with 100% corporate income tax cut for the first 20 years after the petrochemical complex is operational, and 50% for the next two years;

- Shifting subsidies or tax incentives from chemical fertilizers to compost and organic soil amendments; and

- Providing targeted support for alternative animal feed products, such as those derived from BSF larvae, to improve competitiveness with conventional soy-based feeds.

These policy shifts can realign financial flows with climate and development objectives, reduce fiscal lock-in to outdated technologies, and stimulate green, inclusive markets that support long-term resilience.

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Long-Term Recommendations

Increase Municipal Budgets to Ensure Universal Access to Waste Services

While often politically sensitive, increasing municipal budgets for waste management is ultimately essential to achieving universal waste collection and source separation.

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These foundational services are public goods — they generate broad societal and environmental benefits but are financially risky and unattractive to private investors due to their high upfront costs and low short-term returns. As such, public funding must step in to fill the gap where private capital will not.

The current public funding mechanisms, however, typically focus on capital investments, leaving cities burdened with long-term operational costs that are just as critical — and often higher over the lifecycle of a project. To counter this, financing must be predictable, continuous, and flexible — supporting not only infrastructure but also ongoing operational needs such as staffing, maintenance, and fuel. Over a 10- to 15-year period, operational expenses can surpass capital outlays, acknowledging that waste management is a labor-intensive system.

This is where a long-term commitment of public fund allocation plays a critical role, as market-driven mechanisms, including carbon credit mechanisms, may not be able to provide those needs. Carbon markets, while helpful in some contexts, are performance-based and subject to market volatility, and rarely cover foundational service needs such as labor, equipment maintenance, and community engagement.

Moreover, municipalities must also strengthen their financial management capacities to align various budget sources with the finance needs of their waste management services, particularly for recurring expenditures. This includes overcoming structural barriers such as borrowing restrictions, rigid fiscal rules, or lack of access to credit, which often limit municipalities' ability to finance long-term operational needs. Dedicated support for public financial management reform is essential to unlocking these resources.

Expanding municipal budgets is a long-term process that requires strong political will, intergovernmental coordination, and thorough budgetary approval mechanisms. However, without adequate and sustained public investment, cities will struggle to provide equitable and climate-aligned waste services – especially in underserved communities.

To support this transition, national governments and development partners can:

- Design tiered intergovernmental transfers that pair a guaranteed, untied core-operations grant, to cover essential staffing, equipment maintenance, fuel, and administrative costs, with three targeted "top-up" components:
    - Performance incentives—small, formula-driven payments tied to verifiable service metrics (e.g., percentage of households served, volume of source-separated organics collected);
    - Equity adjustments—additional funding for municipalities with fewer resources to help them close service gaps; and
    - Dedicated funds—money set aside for one-time expenses such as buying protective gear, running community outreach, and setting up digital billing systems;
- Provide long-term technical assistance for budget planning and cost recovery strategies with adequate support of experts supply; and
- Encourage integration of waste services into national development and climate finance strategies while ensuring equitable access for cities under various capacities and local contexts.

Increased public budgets, however, must be strategically aligned with waste hierarchy principles to avoid reinforcing capital- and emission-intensive technologies such as WTE incineration or RDF infrastructure.

Directing new funding toward community-led decentralized waste management systems ensures both climate impact and social inclusion towards a just transition.

By committing to sustained public financing, cities can lay the foundation for resilient, inclusive, and sustainable waste systems that meet both climate and equity goals.

Center Justice in Financing Landfill Methane Mitigation

Ultimately, financing landfill methane mitigation must extend beyond technical fixes. True impact lies in integrating environmental, social, and economic justice – ensuring that communities living near landfills are protected, waste pickers are recognized and supported, and long-term emissions reductions are both real and equitable.

With the right blend of public investment, context-appropriate financing mechanisms, accessible financing models, and meaningful community participation, even the most neglected and environmentally degraded landfill sites can be transformed into community-serving infrastructure that supports healthier environments, restoring land, and building inclusive economies. This people-centered approach not only strengthens climate outcomes but also ensures that the benefits of waste sector transformation are shared broadly, laying the groundwork for a just and sustainable future.

Conclusion

The global momentum to cut methane emissions—driven by frameworks such as the Global Methane Pledge, the Paris Agreement, and the COP29 ROW Declaration—has created a critical opportunity to transform waste systems. The ongoing NDC 3.0 cycle further amplifies this moment, offering a key opportunity for countries to set more ambitious methane reduction targets. But the financing and policy choices governments make will determine whether this transition reinforces long-standing inequalities or builds a more just, sustainable future.

Landfills are not only environmental liabilities — they reflect systemic failures in waste governance that disproportionately harm vulnerable communities. Yet high-cost, exclusionary responses like privatization, incineration, and MBT/RDF production continue to dominate policy agendas despite limited climate benefits. A more effective path centers on low-cost, source-separated organics systems, and the inclusion of community and waste picker groups. These solutions can deliver immediate methane reductions, generate local jobs, and avoid long-term financial lock-in.

Proven, scalable technologies already exist across the waste stream. Source-separated organics can be processed through composting or AD, MRBT can serve as a transitional method for residuals, and biocovers offer a cost-effective solution for legacy landfills — often outperforming landfill gas systems at aging or low-output sites. To scale these interventions, governments should embed co-benefits metrics — tracking not only GHG reductions but also public health, job creation, and landfill cost avoidance. These indicators can unlock funding from health, agriculture, and social development budgets, expanding financial viability.

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Safe and just landfill remediation requires sustained public investment — not only to address past harms but to prevent future emissions. For many cities, especially in the Global South, capital-intensive options like WTE or LFG capture are financially unviable. Instead, financing strategies should prioritize grants and flexible, job-creating solutions such as composting, MRBT, and biocovers. Reforming public subsidies away from downstream, high-emission technologies toward upstream prevention, decentralized treatment, and markets for organic waste products will yield greater impact per dollar and foster inclusive, circular economies. All funding decisions must be co-developed with waste pickers and frontline communities to ensure equitable outcomes and accountability.

The transformation of waste systems is both a climate and justice imperative. To ensure long-term equity and resilience, governments must increase predictable municipal funding for both infrastructure and operations. The decisions made today will determine whether we build inclusive, sustainable systems—or repeat the failures of the past. With the right financing strategies, even the most neglected landfills can become platforms for environmental restoration, economic inclusion, and climate action.

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About GAIA

GAIA is a network of grassroots groups as well as national and regional alliances representing more than 1000 organizations from over a hundred countries. With our work we aim to catalyze a global shift towards environmental justice by strengthening grassroots social movements that advance solutions to waste and pollution. We envision a just, Zero Waste world built on respect for ecological limits and community rights, where people are free from the burden of toxic pollution, and resources are sustainably conserved, not burned or dumped. www.no-burn.org

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