Climate Action Network

Submission: Opportunities, actionable solutions, best practices, challenges and barriers, relevant to the Mitigation Work Programme 6th Dialogue on "Waste and Circular Economy"

June 2025

Climate Action Network (CAN) is a global network of more than 1,900 civil society organisations in over 130 countries driving collective and sustainable action to fight the climate crisis and to achieve social and racial justice.

In response to the encouragement to parties, observers, and non-party stakeholders to submit their perspectives regarding the sixth global dialogue in 2025 under the Sharm el-Sheikh mitigation ambition and implementation work programme (MWP), CAN International submits its views on opportunities, best practices, actionable solutions, challenges and barriers relevant to the topics of the dialogues regarding the topic of "waste and circular economy".

Summary of recommendations and priorities

CAN recommends that the conversations on solutions at this dialogue reflect the following priorities:

Ambition

Recognizing that waste methane mitigation is one of the most cost-effective and immediate opportunities for climate action, **the Global Dialogue must address the existing gap within the UNFCCC framework in recognizing and harnessing the full potential of the waste sector.** Rapid mitigation, adaptation, and just transition efforts in the sector can significantly contribute to the implementation of the Global Methane Pledge, the Declaration on Reducing Organic Waste (ROW), and the emerging Global Plastic Treaty. The Mitigation Work Programme must fully integrate waste methane mitigation as a priority action for near-term climate gains.

Sustainable Development and Just Transition

We urge Parties to **align all methane mitigation efforts in the waste sector with the waste hierarchy and the principles of sustainable development.** This includes safeguarding the livelihoods and rights of waste pickers and waste workers, who are central to waste management systems in many countries. As landfills remain the largest anthropogenic source of methane emissions in the waste sector, dumpsite closures often lead to waste disposal infrastructure and displacement of informal workers. Delivering a just transition requires elevating the visibility and voice of informal and cooperative workers, recognizing their historic and ongoing contributions, and affirming their inherent dignity and human rights. True climate action in the waste sector must be inclusive, equitable, and rooted in social and environmental justice.

Finance

Access to finance and capacity support mechanisms remains a major barrier to effective action at the local level. There is an **urgent need for clear, direct, and inclusive financing pathways—particularly for frontline implementers such as local governments, waste picker cooperatives, and community-based organizations.** Climate finance must be designed to support operational costs and long-term sustainability, not just capital-intensive infrastructure. Equally important is the need to strengthen sub-national capacity through targeted capacity building and technical support.

Innovation and Scalability

Technological solutions for waste methane mitigation already exist and are both scalable and cost-effective. However, innovation must be accompanied by inclusive design and deployment strategies that ensure accessibility, appropriateness for local contexts, and alignment with community-based approaches. Scaling up zero waste strategies, decentralized systems, and circular economy models presents an opportunity for transformative change that benefits both people and the planet.

Introduction: Waste and the Pre-2030 Emissions Gap

CAN International welcomes the inclusion of the waste sector in pre-2030 climate dialogues, emphasizing its critical role in achieving the 1.5°C target. As the third-largest source of methane emissions, the sector offers fast, cost-effective climate gains. Upstream solutions like waste prevention, composting, and recycling provide multiple benefits—reducing emissions, improving health, supporting livelihoods, and enhancing soil and water resilience.

On 14 December 2022, the United Nations General Assembly adopted a resolution at its seventy-seventh session to proclaim 30 March as International Day of Zero Waste. It highlights the sector's link to SDGs 11 (inclusive, safe, resilient and sustainable cities) and 12 (sustainable consumption and production). These goals address all forms of waste, including food loss and waste, natural resource extraction and electronic waste. A zero waste approach promotes resource conservation and environmental and social equity.

Climate action in waste must be systemic and just, addressing not just emissions but the needs of informal workers, such as waste pickers, and vulnerable communities impacted by pollution. A just transition should ensure social protection, decent work, and capacity building.

As countries update their NDCs, they must prioritize the waste sector for its high mitigation potential and broad co-benefits, seizing this opportunity for inclusive, sustainable, and ambitious climate action.

Opportunities in the policy landscape

As CAN, we view the upcoming MWP Global Dialogue on "Waste and Circular Economy" as a critical opportunity to raise ambition within the Mitigation Work Programme agenda. This dialogue can serve as a platform to develop and promote robust policy drivers aimed at reducing methane emissions from the waste sector. Strengthening action in this area would reinforce the existing mandate under the Paris Agreement and its Ambition Mechanism to address waste-related methane emissions. Importantly, it would also help bridge the Paris Agreement with other key global policy frameworks that have emerged in recent years.

In this context, enhancing the mandate for waste methane mitigation presents several critical opportunities, including:

- **<u>Contribution to the Paris Agreement and the Ambition Mechanism.</u>**
    - Although the Paris Agreement does not explicitly mandate which gases must be covered, CMA.5 and CMA.6 decisions are evolving the definition of ambition to include short-lived climate pollutants (SLCPs) like methane, HFCs, nitrous oxide, and black carbon.
    - Moreover, the first Global Stocktake (GST-1) further highlights the availability of low-cost, feasible options to mitigate non-CO_2 emissions. Thus, Parties that previously excluded SLCPs—especially those with methane-intensive sectors—are now expected to broaden their NDC scope to reflect this evolving ambition.
    - The Glasgow Climate Pact (COP26) and subsequent CMA.5 Global Stocktake outcome (FCCC/PA/CMA/2023/L.17) explicitly call for: "Deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5°C pathways... including in particular methane emissions by 2030."
    - This language, while not legally binding, establishes a normative expectation for Parties to act. Under Article 4.3 of the Paris Agreement, all NDC updates must reflect the highest possible ambition. A failure to include, maintain, or strengthen methane mitigation efforts in NDC 3.0 (due 2025) could be interpreted as backsliding, especially under scrutiny from the Technical Expert Review (TER) and the Second Global Stocktake (GST-2) processes.
    - Other relevant articles:
        - Article 2 on Purpose: reinforces the goal to limit temperature rise to 1.5º, recognising the role of fast-acting climate pollutants like methane.
        - Article 4 on NDCs: signals an expectation for Parties to enhance NDCs by including methane emissions targets and ambitions. Furthermore, article 4.7 highlights the importance of mitigation co-benefits, which action on waste methane can deliver on (see section on Co-Benefits and Just Transition).
        - Article 13 on Transparency: signals that methane emissions will need to be tackled and reported transparently, including through national inventories, and progress reports.
        - Article 14 Global Stocktake: This finding provides clear, science based guidance to Parties on where ambition must increase, informing the next NDC updates.
        - Article 9 of the Paris Agreement mandates developed countries to provide adequate financial support to developing countries, emphasizing the critical need for climate finance to scale up ambitious climate solutions.
        - CMA 5 para 28 (f): Accelerating and substantially reducing non-carbon-dioxide emissions globally, including in particular methane emissions by 2030.

- **Global Methane Pledge and ROW Declaration**

Launched at COP26, the **Global Methane Pledge (GMP)** unites 159 countries and the European Commission in a collective commitment to reduce global methane emissions by 30% below 2020 levels by 2030. Nearly 100 countries have developed or are in the process of preparing national methane action plans. The **Climate and Clean Air Coalition (CCAC)**, convened by the United Nations Environment Programme (UNEP), is supporting 90 of these countries, including direct implementation funding in 65.

To drive methane mitigation specifically in the waste sector, the **COP29 Presidency** introduced the **Declaration on Reducing Methane from Organic Waste (ROW Declaration)**. This initiative aims to reduce methane emissions from organic waste by improving waste management systems, minimizing food loss and waste, and promoting circular economy solutions consistent with the waste hierarchy—prioritizing waste prevention, reuse, and zero-waste practices.

The declaration calls on signatories to set national methane reduction targets, adopt relevant policies and action plans, and scale up investments in waste infrastructure and technologies by 2030. Over 60 countries have endorsed the ROW Declaration to date.

Furthermore, the ROW Declaration highlights the negative impacts of open dumps and illegal landfills on environmental and social justice. It underscores the importance of inclusive and collaborative approaches to waste management. Signatories commit to accelerating action by strengthening coordination across international, regional, and local levels, and by engaging key stakeholders—such as farmers, waste pickers, and bioenergy suppliers—in diverting and productively utilizing organic waste

- **Contribution to the Just Transition Programme**

At its fourth session, the CMA decided to establish a Work Programme on Just Transition Pathways to support the implementation of Article 2.1 of the Paris Agreement, in the context of Article 2.2 (*Decision 1/CMA.4, para. 52*). Climate action in the waste sector presents a critical opportunity to advance this work programme by promoting a fair and inclusive shift to sustainable waste systems—particularly through zero waste circular economy approaches.

This transition must prioritize the rights, livelihoods, and well-being of those most affected, especially waste pickers and other workers under informal and cooperative settings — recognizing their fundamental human dignity and their historic contribution. A just transition in this context means ensuring no one is left behind, including waste workers, wastepickers, marginalized communities, and vulnerable populations. It requires delivering decent work for all, advancing social inclusion, providing social protection, training and reskilling opportunities, facilitating appropriate technology transfer, investing in inclusive infrastructure, and supporting the organization and representation of waste workers.

The just transition framework should explicitly recognize and support waste pickers and workers in informal and cooperative settings who are most vulnerable to occupational disruption from climate change and waste management investments. Their historic and ongoing contributions to climate mitigation, recycling, and sustainable development must be acknowledged, and they must be included as key stakeholders in the planning and implementation of waste sector policies.

- **Integration with Sustainable Development Goals**

In 2023, the United Nations Environment Programme (UNEP) underscored that sustainable waste management is essential to achieving the Sustainable Development Goals (SDGs).[1] In its declaration, UNEP called on all stakeholders to prioritize waste reduction, recycling, and environmentally sound disposal as critical actions to address some of the most pressing social, economic, and environmental challenges of our time. UNEP further affirmed its commitment to making sustainable waste management a central pillar in the pursuit of the SDGs, emphasizing that waste management is cross-cutting and intrinsically linked to all 17 Goals.

- **Integration with Global Plastic Treaty**

The Global Plastics Treaty is fundamentally anchored in systems change and waste management strategies, aiming to end plastic pollution by 2040. A key driver of this ambition is the climate impact of plastic: at current production rates, primary plastic alone could consume the entire 1.5°C carbon budget between 2060 and 2083.[2] To remain within this limit, plastic production must decline by 12–17% annually.[3]

Recognizing this, over 100 countries have called for scaling down plastic production to sustainable levels within treaty negotiations.[4] Recycling is not a viable solution to this crisis: post-consumer plastics cannot be converted into virgin-quality polymers, meaning recycling does not displace primary production or create a truly circular system.

Achieving true circularity[5] requires a shift toward durable, reusable, and toxic-free materials that can be safely recovered and reused at the end of life in a just system that includes waste pickers and workers in cooperative settings.

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[1] https://www.unep.org/resources/report/towards-zero-waste-catalyst-delivering-sustainable-development-goals
[2] https://eta.lbl.gov/publications/climate-impact-primary-plastic
[3] https://www.no-burn.org/resources/plastics-treaty-climate-imperative/
[4] https://www.bridgetobusan.com/
[5] https://www.no-burn.org/resources/plastics-circularity-beyond-the-hype/

Potential for climate change mitigation

Human-driven methane emissions are responsible for nearly 45% of current net global warming (IPCC, 2023), with waste (solid and wastewater) contributing around 20% (UNEP and CCAC, 2021). The waste sector is the third-largest source of anthropogenic methane emissions worldwide, contributing roughly 20% of all such emissions.[6,7,8] Methane in the waste sector is produced when biodegradable material, including food, garden clippings, human waste, wood and paper break down in anaerobic conditions with restricted oxygen level. Most of the methane from the waste sector is released from dumpsites, landfills or sewage treatment environments.

Municipal solid waste (MSW) is of particular concern, as it is responsible for the majority of waste sector emissions.[9] In some regions, landfills are even the primary source of all methane emissions.[10] While wastewater is also a significant contributor, methane reduction strategies in solid waste represent three to six times the mitigation potential of wastewater and should be the priority for policy.[11]

It should be noted that there is significant uncertainty around methane emissions from landfills and dumps. Emission rates can vary by as much as six orders of magnitude, depending on temperature, moisture and organic content, making direct measurement challenging.[12] Models developed to estimate emissions in lieu of direct measurements, such as the IPCC's 'first-order decay model,' have also been criticised as inaccurate.[13] New satellite monitoring techniques are improving estimation accuracy, but until they are more widely utilised, we must rely on existing literature while keeping the above limitations in mind.

Based on mean emission factors drawn from academic literature, composting alone could reduce MSW methane emissions by 78%. Composting, bio-stabilisation of residuals, followed by use of biologically active cover in disposal sites together could reduce MSW methane emissions by 95%, for an overall waste sector emission

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[6] Intergovernmental Panel on Climate Change (2021) *Climate change 2021: The physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* [ONLINE] Available at: https://www.ipcc.ch/report/ar6/wg1/#FullReport

[7] United Nations Environment Programme and Climate and Clean Air Coalition (2021) *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions.* [ONLINE] Available at: https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions

[8] Höglund-Isaksson, L., Gómez-Sanabria, A., Klimont, Z., Rafaj, P. & Schöpp, W. (2020) Technical potentials and costs for reducing global anthropogenic methane emissions in the 2050 timeframe–results from the GAINS model. *Environmental Research Communications*, 2(2). [ONLINE] Available at: https://doi.org/10.1088/2515-7620/ab7457

[9] United Nations Environment Programme and Climate and Clean Air Coalition (2021) *Global Methane Assessment*.

[10] Jeong, S., Cui, X., Blake, D. R., Miller, B., Montzka, S. A., Andrews, A. & Fischer, M. L. (2017) Estimating methane emissions from biological and fossil-fuel sources in the San Francisco Bay Area. *Geophysical Research Letters*, 44(1): 486–495. [ONLINE] Available at: https://doi.org/10.1002/2016GL071794

[11] United Nations Environment Programme and Climate and Clean Air Coalition (2021) *Global Methane Assessment*.

[12] National Academies of Sciences, Engineering, and Medicine (2018) *Improving characterization of anthropogenic methane emissions in the United States*. [ONLINE] Available at: https://doi.org/10.17226/24987

[13] National Academies of Sciences, Engineering and Medicine (2018) *Improving characterization of anthropogenic methane emissions*.

reduction of 58%.[14] Figures assume 80% implementation of composting, 70% implementation of bio-stabilisation and 70% implementation of biologically active cover for landfills. While not included on this table, waste prevention remains the most effective intervention of all.

Intervention	**Mean reduction in methane emissions from MSW**	**Mean reduction in methane emissions from entire waste sector** (61% of waste sector emissions are from MSW)[15]
Composting	78%	48%
Composting and bio-stabilisation of residuals	90%	55%
Composting + bio-stabilisation + biologically active cover	95%	58%

Recommended interventions: technological innovations along the Waste Hierarchy

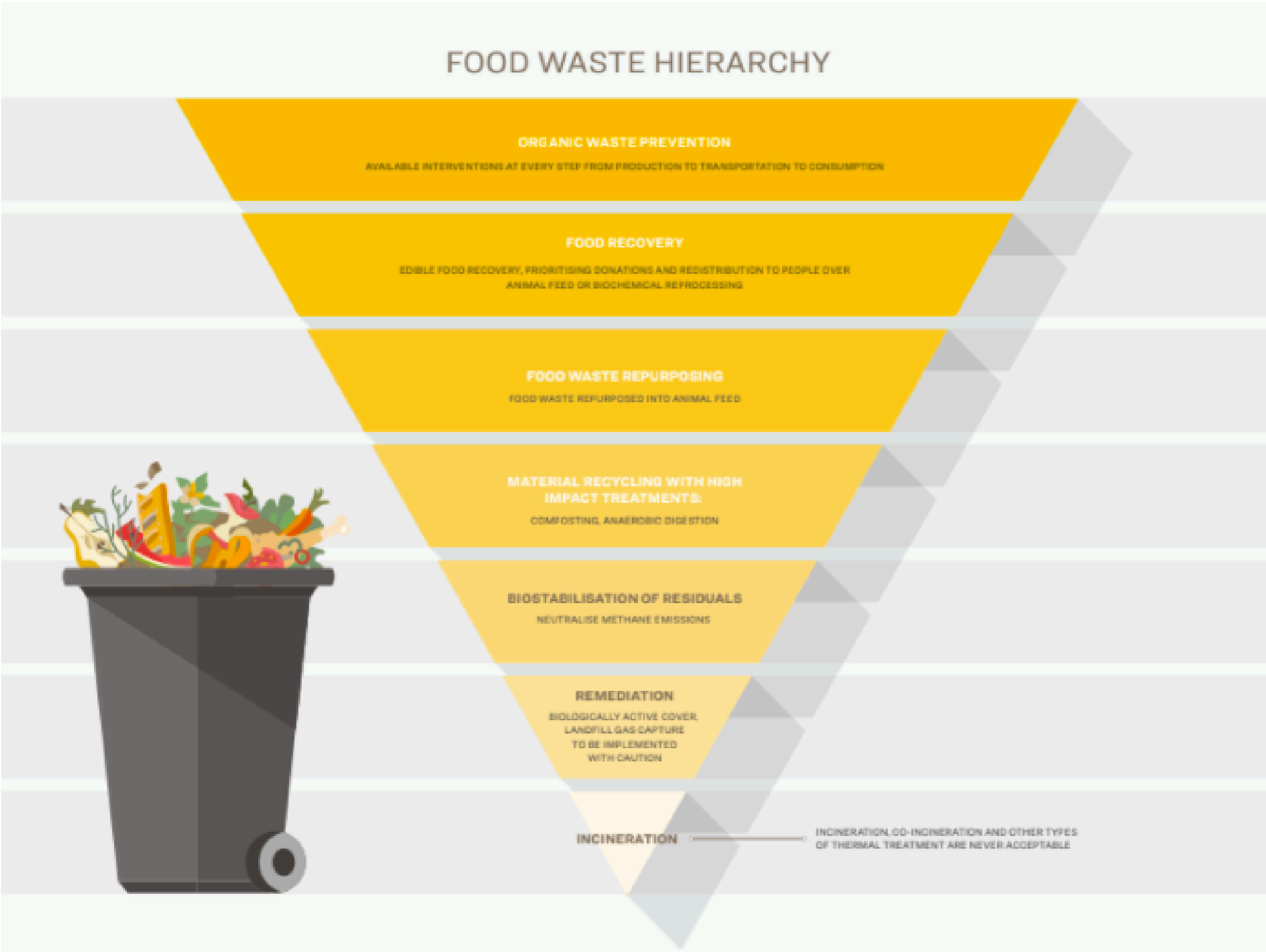
The most important strategies for mitigating solid waste methane emissions – food loss and waste prevention, source separation and decentralised organic waste treatment – are low-cost, scalable and easy to implement anywhere in the world. These measures do not require sophisticated technologies, rather it can be done using simple and easy-to-access tools and technologies, such as composting. In the context of source separation and food loss and waste prevention, education and holistic policy measures are the key determining factor in building a system that adheres to the waste hierarchy.

A useful tool for prioritising these strategies is the waste hierarchy, which orders interventions based on environmental impact and supports a larger transition towards a zero-waste circular economy. Using the hierarchy to manage organic discards can reduce solid waste methane emissions with significant co-benefits, all while avoiding costlier, riskier alternatives like landfill gas capture and waste incineration.

[14] GAIA, Changing Markets, EIA, *Methane Matters: A Comprehensive Approach to Methane Mitigation.* March 2022. Available here: https://www.no-burn.org/resources/methane-report/

[15] Saunois, M., Stavert, A. R., Poulter, B., Bousquet, P., Canadell, J. G., Jackson, R. B. & Zhuang, Q. (2020) The global methane budget 2000–2017. *Earth Systems Science and Data*, 12: 1561–1623. [ONLINE] Available at: https://doi.org/10.5194/essd-12-1561-2020

Figure - Waste hierarchy for waste methane prevention



1. *Organic waste prevention (available interventions at every step from production to transportation to consumption)*
2. *Food recovery: Redistribution to people, reprocessing into preserved food products*
3. *Food waste recovery: Redistribution to animal feed*
4. *Material recycling: Composting and AD*
5. *Bio-stabilisation of residuals*
6. *Remediation: Biologically active cover, landfill gas capture – to be implemented with caution*
7. *Never acceptable: Incineration, co-incineration and other types of thermal treatments*

<u>Organic Waste Prevention</u>

Waste prevention and source separation of organic discards

Waste prevention is the most important methane reduction strategy in the waste sector; every tonne of organic material that never enters the waste stream avoids the methane that it would have generated in a landfill, as well as the upstream emissions involved in its production and transport. Food systems contribute an estimated one-third of anthropogenic greenhouse gas emissions.[16] Food waste, which is responsible for 10% of all GHG emissions worldwide[17] and a majority of solid waste methane emissions[18] is especially important to avoid. Opportunities for organic waste prevention are available at every step of the food supply chain, from amending subsidies that encourage food overproduction, to instituting demand-planning programmes or food donation mandates in supermarkets, to educating consumers about waste prevention.[19,20] France's recent food waste prevention law, for example, fines supermarkets that exceed a set cap for discarded food.[21]

Waste recovery

Where direct prevention fails, recovery is the next best option – discarded food can be redirected to people in need or repurposed for preserved products like jams. Collaboration between food banks, grocery stores and local government in Milan, Italy, for example, has led to 130 million tonnes of food waste saved annually in just three years, putting the city well on its way to achieving its goal of 50% food waste reduction by 2030.[22,23]

Waste separation at source

Even with effective waste prevention programmes in place, some organic waste will still be generated. For this discarded material, source separation – where organic discards are separated out from other waste at their point of generation (homes, businesses etc.) – is critical. Source-separated organic waste needs to be separately collected, ensuring a clean stream of organic material ideal for high-impact treatment methods such as composting, anaerobic digestion (AD) and diversion to animal feed, which can be done on site, at decentralised, community-scale facilities or at larger, centralised facilities depending on local capacities and needs.

Animal feed out of waste

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[16] Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F.N. and Leip, A. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. Nature Food 2, 198-209. https://doi.org/10.1038/s43016-021-00225-9.

[17] Gikandi, L. (2021) *10% of all greenhouse gas emissions come from food we throw in the bin.* [ONLINE] Available at: https://updates.panda.org/driven-to-waste-report

[18] Brown, S. (2016) Greenhouse gas accounting for landfill diversion of food scraps and yard waste. *Compost Science & Utilization*, 24(1): 11–19. [ONLINE] Available at: https://doi.org/10.1080/1065657X.2015.1026005

[19] Zero Waste Europe and Slow Food (2021) *Reducing food waste at the local level: Guidance for municipalities to reduce food waste within local food systems.* [ONLINE] Available at: https://www.slowfood.com/wp-content/uploads/2022/01/Guidance-on-food-waste-reduction-in-cities-EN.pdf

[20] ReFED (n.d.) *Roadmap to 2030: Reducing US food waste by 50%.* [ONLINE] Available at: https://refed.org/food-waste/the-solutions/#roadmap-2030

[21] Zero Waste Europe (2020) *Zero waste Europe factsheet: France's law for fighting food waste.* [ONLINE] Available at: https://zerowasteeurope.eu/wp-content/uploads/2020/11/zwe_11_2020_factsheet_france_en.pdf

[22] Bottinelli, S. (2021) The city of Milan's Local Food Hubs reduce 130 tonnes of food waste a year, and win EarthShot Prize. *Food Matters Live*, 18 October 2021. [ONLINE] Available at: https://foodmatterslive.com/discover/article/milan-local-food-hubs-reduce-130-tonnes-of-food-waste-a-year-and-win-earthshot-prize

[23] Food Policy di Milano (2021) *"Milan Food waste hub" won Prince William's Earthshot Prize*. [ONLINE] Available at: https://foodpolicymilano.org/en/milan-food-waste-hub-won-prince-williams-earthshot-prize/

Similarly, diverting organic discards to feed livestock avoids landfill methane emissions and can displace conventional, energy-intensive feed crops (see section 2). Though estimates of the methane reduction potential of using organic discards for animal feed are lacking, one life cycle analysis found that the practice can deliver greater overall GHG reductions than composting or AD.[24,25]

High-impact treatments

Composting

Unlike landfills, well-managed compost operations produce minimal amounts of methane, most of which is destroyed by bacteria.[26,27,28] Composting can prevent as much as 99% of methane emissions that would otherwise be released from landfills,[29,30] greatly reducing waste sector emissions. Where possible, decentralised, on-site management is considered best practice, but there are composting units and methods for all contexts.[31]

Anaerobic digestion

In some cases, AD – where organic discards are intentionally broken down in the absence of oxygen to produce methane for fuel – can be a suitable complement or alternative to composting. Unlike landfills, which constantly leak methane into the atmosphere, anaerobic digesters are sealed vessels that collect methane until it is burned as fuel, converting it into biogenic CO_2. AD also generates a small proportion of residual organic matter, called digestate, which can be composted and used as soil amendment. AD is often well suited for dense areas with large amounts of organic discards and little room for composting facilities, but has higher capital costs and requires more technical training to operate.[32] Cheaper, small-scale AD units have also

[24] Salemdeeb, R., Zu Ermgassen, E. K., Kim, M. H., Balmford, A. & Al-Tabbaa, A. (2017) Environmental and health impacts of using food waste as animal feed: A comparative analysis of food waste management options. *Journal of Cleaner Production*, *140*: 871–880. [ONLINE] Available at: https://doi.org/10.1016/j.jclepro.2016.05.049

[25] Broom, D. (2019) South Korea once recycled 2% of its food waste. Now it recycles 95%. *World Economic Forum*, 12 April 2019. [ONLINE] Available at: https://www.weforum.org/agenda/2019/04/south-korea-recycling-food-waste/

[26] Cabanas-Vargas, D. D. & Stentiford, E. I. (2006) Oxygen and CO_2 profiles and methane formation during the maturation phase of composting. *Compost Science & Utilization*, 14(2): 86–89. [ONLINE] Available at: https://doi.org/10.1080/1065657X.2006.10702269

[27] Jäckel, U., Thummes, K. & Kämpfer, P. (2005) Thermophilic methane production and oxidation in compost. *FEMS Microbiology Ecology*, 52(2): 175–184. [ONLINE] Available at: https://doi.org/10.1016/j.femsec.2004.11.003

[28] Hermann, B. G., Debeer, L., De Wilde, B., Blok, K. & Patel, M. K. (2011) To compost or not to compost: Carbon and energy footprints of biodegradable materials' waste treatment. *Polymer Degradation and Stability*, 96(6): 1159–1171. [ONLINE] Available at: https://doi.org/10.1016/j.polymdegradstab.2010.12.026

[29] Boldrin, A., Andersen, J. K., Møller, J., Christensen, T. H. & Favoino, E. (2009) Composting and compost utilization: accounting of greenhouse gases and global warming contributions. *Waste Management & Research*, 27(8): 800–812. [ONLINE] Available at: https://doi.org/10.1177/0734242X09345275

[30] Zhao, H., Themelis, N., Bourtsalas, A. & McGillis, W. R. (2019) *Methane emissions from landfills.* Columbia University [ONLINE] Available at: https://www.researchgate.net/publication/334151857_Methane_Emissions_from_Landfills

[31] Nair, S. K. (2022) *Back to Earth. Composting for various contexts. GAIA - Global Alliance for Incinerator Alternatives*. [ONLINE] Available at: https://www.no-burn.org/wp-content/uploads/2022/01/Back-to-Earth-Organics-Manual_Spread.pdf

[32] United Nations Environment Programme and Climate and Clean Air Coalition (2021) *Global Methane Assessment*.

been employed with great success in remote communities with less-reliable access to energy grids in countries such as Bangladesh, India and China.[33]

However, it is worth highlighting foreseeable AD pitfalls such as landfilling AD digestate, flaring AD biogas instead of using it as fuel, burning fossil fuels to increase processing temperatures, digesting new, energy-intensive agricultural crops, rather than organic discards and perceived or actual competition with renewable wind and solar energy. As highlighted in section 2, AD in the agricultural sector can also provide perverse incentives for continued manure or organic waste generation, undercutting other options, for example waste reduction or composting.[34] AD, therefore, can work well with a clean organic waste stream in certain areas, but, like composting, needs to be integrated in an overall zero-waste system that prioritises prevention.

Additional mitigation measures

Bio-stabilisation

Given that some organic discards will still remain in residual waste streams even after source separation and treatment of organics, residual waste should never be landfilled without first undergoing biological stabilisation. This can include simple mixing and aeration techniques or more complex material recovery and biological treatment systems. In this way, bio-stabilisation provides a final screen for organic material, including contaminated or 'dirty' organics still in the residual waste stream.

Biologically active cover for remaining emissions

Even when complete diversion of organics is achieved, ongoing methane emissions from past discards buried in landfills will still need to be addressed, as landfills can continue to emit methane for decades after they have stopped accepting new waste.[35] Fortunately, active landfills are responsible for the majority of emissions and emissions from closed landfills – also known as legacy emissions – only represent about 9% of the problem.[36] A growing body of research suggests that biologically active cover – a layer of compost or other organic material over landfills – can greatly reduce these emissions. By fostering communities of microbes that digest methane as it rises up from the landfill below, biologically active cover can reduce landfill emissions by 63%

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[33] Paul, A. S. (2021) Thanks to high LPG price, homemakers turn to biogas. *The Hindu*, 11 September 2021. [ONLINE] Available at: https://www.thehindu.com/news/cities/Thiruvananthapuram/thanks-to-high-lpg-price-homemakers-turn-to-biogas/article36401902.ece

[34] Zero Waste International Alliance (2017) *Choosing between composting and anaerobic digestion: Soil, fuel or both?* [ONLINE] Available at: https://zerowasteeurope.eu/library/choosing-between-composting-and-anaerobic-digestion-soil-fuel-or-both/

[35] Agency for Toxic Substances and Disease Registry (2001) *Landfill gas primer: An overview for environmental health professionals*. [ONLINE] Available at: https://www.atsdr.cdc.gov/hac/landfill/html/ch2.html

[36] Powell, J. T., Townsend, T. G. & Zimmerman, J. B. (2016) Estimates of solid waste disposal rates and reduction targets for landfill gas emissions. *Nature Climate Change*, 6(2): 162–165. [ONLINE] Available at: https://doi.org/10.1038/nclimate2804

on average.[37,38,39,40] Depending on environmental conditions, it can even generate 'negative' emissions by drawing down methane from the atmosphere.[41,42]

Avoiding landfill gas capture and waste incineration

A final method for remediating methane emissions – which should only be explored after the implementation of zero-waste strategies – is gas capture from existing landfills.

In this process, landfills are equipped with tubes that allow some of the landfill gas (LFG), which is composed of 35–50% methane,[43] to be collected and piped to the surface. From there it can either be flared or burned for energy, converting the contained methane to CO_2. Capture efficiencies can vary significantly, however, with 10–65% of the target methane escaping into the atmosphere[44] and additional fugitive emissions arising from leaky pipes and transportation infrastructure.[45,46] LFG capture is more carbon-intensive than composting and AD[47] and should be employed with caution. In some cases financial incentives to collect LFG have motivated waste management companies or municipalities to redirect organic discards from diversion programmes (such as animal feed or composting) back to landfills to increase LFG production.[48,49]

Incineration should never be used to manage organic discards. Incineration is highly polluting, expensive and carbon-intensive, with large capital costs and high

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[37] Boldrin, A., Andersen, J. K., Møller, J., Christensen, T. H. & Favoino, E. (2009) Composting and compost utilization: Accounting of greenhouse gases and global warming contributions. *Waste Management & Research*, 27(8): 800–812. [ONLINE] Available at: https://doi.org/10.1177/0734242X09345275

[38] Lou, X. F. & Nair, J. (2009) The impact of landfilling and composting on greenhouse gas emissions–a review. *Bioresource Technology*, 100(16): 3792–3798. [ONLINE] Available at: https://doi.org/10.1016/j.biortech.2008.12.006

[39] Stern, J. C., Chanton, J., Abichou, T., Powelson, D., Yuan, L., Escoriza, S. & Bogner, J. (2007) Use of a biologically active cover to reduce landfill methane emissions and enhance methane oxidation. *Waste Management*, 27(9): 1248–1258. [ONLINE] Available at: https://doi.org/10.1016/j.wasman.2006.07.018

[40] Barlaz, M. A., Green, R. B., Chanton, J. P., Goldsmith, C. D. & Hater, G. R. (2004) Evaluation of a biologically active cover for mitigation of landfill gas emissions. *Environmental Science & Technology*, 38(18): 4891–4899. [ONLINE] Available at: https://doi.org/10.1021/es049605b

[41] Lou, X. F. & Nair, J. (2009) The impact of landfilling and composting on greenhouse gas emissions–a review.

[42] Stern, J. C., Chanton, J., Abichou, T., Powelson, D., Yuan, L., Escoriza, S. & Bogner, J. (2007) Use of a biologically active cover to reduce landfill methane emissions and enhance methane oxidation.

[43] Johannessen, L. M. (1999) *Guidance note on recuperation of landfill gas from municipal solid waste landfills*. Washington DC, USA: International Bank for Reconstruction and Development/World Bank.

[44] Stanisavljević, N., Ubavin, D., Batinić, B., Fellner, J. & Vujić, G. (2012) Methane emissions from landfills in Serbia and potential mitigation strategies: a case study. *Waste Management & Research*, 30(10): 1095–1103. [ONLINE] Available at: https://doi.org/10.1177/0734242X12451867

[45] The Landfill Gas Expert (2019) *Fugitive emissions of methane and landfill gas explained.* [ONLINE] Available at: https://landfill-gas.com/fugitive-emissions-of-methane-landfill-gas

[46] Inter-American Development Bank (2009) *Guidance note on landfill gas capture and utilization* [ONLINE] Available at: https://publications.iadb.org/publications/english/document/Guidance-Note-on-Landfill-Gas-Capture-and-Utilization.pdf

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[48] Global Alliance for Incinerator Alternatives (n.d.) *Clean development mechanism funding for waste incineration: Financing the demise of waste worker livelihood, community health, and climate* [ONLINE] Available at: https://www.no-burn.org/wp-content/uploads/Clean-Development-Mechanism-Flyer.pdf

[49] Global Alliance for Incinerator Alternatives (2013) *Recycling jobs: Unlocking the potential for green employment growth*. [ONLINE] Available at: https://www.no-burn.org/wp-content/uploads/2021/03/Recycling-Jobs-Unlocking-Potential-final.pdf

operational costs incurred from covering pollution control, air quality monitoring, wastewater management and ash disposal.[50] These costs often lead to incineration facility closures and have drained municipal budgets of hundreds of millions to more than a billion US dollars in some cases,[51] compared with composting, which tends to have lower waste management costs and has very low capital costs.[52,53,54] Incineration also fares very poorly from a climate perspective. While it can save methane emissions from organic discards, it generates huge amounts of fossil-based CO_2 when plastics and synthetic textiles burn in mixed municipal waste.[55] When used for energy production, so called 'waste-to-energy' incinerators generate more GHG emissions per unit of energy produced than any other energy source.[56] For these reasons, source separation and treatment of organic discards is always preferable to LFG capture and incineration.

Co-benefits and Just Transition

Organic waste prevention, source separation and separate treatment all synergise with larger zero-waste goals and generate many co-benefits as part of a transition to a new, circular economy and sustainable food system.

Co-benefits are particularly present in government- and community-operated business models. Co-benefits include job creation, provision of food from farming using waste management byproducts, and improved air and water quality from reduced methane and CO_2 emissions from waste processing and transportation.

Cost savings for municipalities

Organics represent the largest component of global waste streams,[57] particularly in the Global South. Thus organic waste prevention and source separation can greatly reduce the volume of material sent to landfills or incinerators. This in turn avoids the costly construction of new disposal infrastructure. When it comes to alternative treatment options, composting is cost-effective, has low start-up costs and requires less land area than landfills.[58] In countries where governments are expanding waste

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[51] Global Alliance for Incinerator Alternatives (2021) *The high cost of waste incineration.*

[52] The New School Tishman Environment and Design Center (2019) *US solid waste incinerators: An industry in decline.* [ONLINE] Available at: https://grist.org/wp-content/uploads/2020/07/1ad71-cr_gaiareportfinal_05.21.pdf

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[55] Tangri, N. V. (2021) Waste incinerators undermine clean energy goals. *Earth ArXiv* [ONLINE] Available at: https://doi.org/10.31223/X5VK5X

[56] Tangri, N. V. (2021). Waste incinerators undermine clean energy goals. *Earth ArXiv* [ONLINE] Available at: https://doi.org/10.31223/X5VK5X

[57] Kaza, S., Yao, L., Bhada-Tata, P. & Van Woerden, F. (2018) *What a waste 2.0: A global snapshot of solid waste management to 2050*. Washington: World Bank Publications. [ONLINE] Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/30317/211329ov.pdf

[58] United Nations Environment Programme and Climate and Clean Air Coalition (2021) *Global Methane Assessment.*

services, the low cost of composting can free up funds for expanded waste collection coverage. Finished compost can also be sold to help cover operational costs. Decentralised treatment can save further resources spent on collection, transportation fuel and traffic, and large infrastructure.[59]

Avoiding pollution

Landfills and incinerators are responsible for leachate leakage, water contamination, fires, air pollution and toxic ash all over the world,[60,61,62] and are often sited in low-income communities and communities of colour.[63] Organic waste prevention, source separation and separate treatment reduce reliance on these polluting practices.

Reducing further climate emissions

Organic source separation reduces contamination in recycling waste streams, increasing recycling rates and driving further GHG savings.[64] Finished compost sent to gardens and farms returns organic matter and nutrients to the soil, boosting its carbon sequestration capacity, resistance to flood and drought and reducing irrigation and tilling needs.[65] When compost replaces synthetic fertilisers, the impact is even greater, saving energy and reducing emissions of nitrous oxide, a powerful GHG.[66]

Creating jobs and fostering social benefits

Holistic prevention, donation and recovery programmes can not only reduce methane emissions but also support local food production, create jobs in education and outreach, and improve local access to healthy food.[67] Compared with landfilling and incineration, separate organic waste treatment methods such as composting can create three times as many jobs on a tonne-for-tonne basis,[68] contributing to stronger and healthier local economies.

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[59] Government of India Ministry of Environment, Forest and Climate Change (2016) Ministry of Environment, Forest and Climate Change notification. *The Gazette of India*, 8 April 2016. [ONLINE] Available at: https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf

[60] Ma, S., Zhou, C., Pan, J., Yang, G., Sun, C., Liu, Y. & Zhao, Z. (2022) Leachate from municipal solid waste landfills in a global perspective: Characteristics, influential factors and environmental risks. *Journal of Cleaner Production*, 333: 130234. [ONLINE] Available at: https://doi.org/10.1016/j.jclepro.2021.130234

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[62] Global Alliance for Incinerator Alternatives (2019) *Pollution and health impacts of waste-to-energy incineration.* [ONLINE] Available at: https://www.no-burn.org/wp-content/uploads/Pollution-Health_final-Nov-14-2019.pdf

[63] Global Alliance for Incinerator Alternatives (2019) *Pollution and health impacts of waste-to-energy incineration*.

[64] Zero Waste Europe (2018) *The story of Parma: Case study.* [ONLINE] Available at: https://zerowasteeurope.eu/library/the-story-of-parma/

[65] Favoino, E. & Hogg, D. (2008) The potential role of compost in reducing greenhouse gases. *Waste Management & Research*, 26(1): 61–69. [ONLINE] Available at: https://doi.org/10.1177/0734242X08088584

[66] Favoino, E. & Hogg, D. (2008) The potential role of compost in reducing greenhouse gases.

[67] Zero Waste Europe and Slow Food (2021) *Reducing food waste at the local level: Guidance for municipalities to reduce food waste within local food systems.* [ONLINE] Available at: https://www.slowfood.com/wp-content/uploads/2022/01/Guidance-on-food-waste-reduction-in-cities-EN.pdf

[68] Global Alliance for Incinerator Alternatives (2021) *Zero waste and economic recovery: The job creation potential of zero waste.* [ONLINE] Available at: https://zerowasteworld.org/wp-content/uploads/Jobs-Report-ENGLISH-2.pdf

Separate organic waste management offers an opportunity to integrate and support informal sector workers who have provided valuable waste management services to their communities for decades. New jobs in collection, outreach and education, compliance monitoring and processing at decentralised or centralised facilities can provide stable livelihoods at higher rates than conventional disposal methods.[69] These jobs can also provide a critical alternative livelihood to plastic collection as the world moves to implement other, zero-waste goals such as plastic reduction.

Waste mitigation experiences, best practices and actionable solutions

Tanzania: In Dar Es Salaam, the World Bank has announced new funding to expand the groundbreaking zero waste initiative led by local organisation Nipe Fagio. The successful zero waste model in Bonyokwa ward collects 1.74 tonnes of waste daily from 4.500 households (95% of households), achieving 95% diversion (source segregation rate) and 100% of organic waste diversion from disposal. This is equivalent to a reduction of 16.4 tonnes of methane emissions per year. This groundbreaking experience has been successfully replicated in other jurisdictions such as Arusha and Zanzibar. It opened doors for further engagement with the Tanzanian government, several municipalities in Dar es Salaam and other important players such as the World Bank, GIZ, USAID, and C40. Moreover, the Zero Waste Academies received more than 400 applicants across Africa (2023-2024) and provided microgrants for zero waste implementation in 9 African countries, launching the Africa Zero Waste Alliance to have a collaborative space for mutual support.

Brazil: more than 20 waste picker organisations are to implement organic waste recycling systems, including two in big cities São Paulo and Brasília. The national government has launched the National Strategy for Municipal Biowaste focused on promoting food waste prevention, food rescue, composting and anaerobic digestion, and announced funds (over 70 M USD) to support waste pickers' work, prioritising funding on organic waste recycling. In preparation for its implementation, Instituto POLIS has led the delivery of training in around 400 municipalities, support for more than 20 waste picker organisations to implement organic waste recycling systems, including two in big cities São Paulo and Brasília, and 41 waste picker organisations are promoting their work with organic waste.

The Philippines: the Zero Waste Cities Network was launched with 37 cities uptaking the Cities Methane Pledge, committing to reduce 70% of their methane emissions from waste by 2030. In 2023, the Zero Waste Cities Network was launched in the Philippines with 37 founding members, 30 of whom were local government officials. This year, 16 officials formed the network’s leadership, chaired by Vice Governor Mei Ling Quezon of Siquijor while Vice Mayor Benedict Jasper Lagman of

[69] Global Alliance for Incinerator Alternatives (2021) *Zero waste and economic recovery: The job creation potential of zero waste.*

City of San Fernando Pampanga as the President, with a commitment to implementing and advocating transformative practices rooted in the principles of equity, inclusivity, and dignity. Meanwhile, the Philippine National Waste Workers Alliance (PNWWA) was established in February 2024, uniting over 1,000 waste workers from seven regions to advocate for their rights. Key demands include labour standards enforcement, hazard pay, health insurance, job security, just compensation, safe working conditions, training, right to organise and meaningful participation in policy spaces.

South Africa: in Durban, a zero waste project that started in one market now ready to scale up and recover waste from the 3rd market which is the 3rd biggest in the country, creating four jobs per 400 tons of waste processed. Food waste from the Warwick markets has been transformed into nutrient-rich compost for the Durban Botanic Garden, helping to reduce landfill costs, which are estimated to be approximately USD 93 per ton of waste in Durban. The project team is aiming to scale up and compost the total 400 tonnes of organic waste generated by the market every year. Moreover, the project has been successfully replicated on a second market -Bangladesh Market-and is currently expanding to the Clairwood Market, the 3rd biggest in the country. In the longer term, the project team is targeting all nine fresh fruit and vegetable markets in Durban, proving the model's feasibility and efficacy on a larger scale. As this project is scaled up, composting is estimated to create four jobs per 400 tons of waste processed.

Ghana: in Accra, GAYO's work on methane reduction with organic waste treatment project won the Earthshot prize in the clean air category. The organisation Green Youth Africa Organization (GAYO) has expanded their Zero Waste Accra project, now working with 5 municipalities. This initiative, which recently won the Earthshot Prize 2024, focuses on integrating informal waste workers into city waste management systems, promoting waste segregation at source, and improving air quality through avoiding waste burning. To date, over 600 marginalised informal waste workers have been integrated into the municipal waste management system, providing them with stable employment and improving their livelihoods. Furthermore, waste workers and local communities have received training on composting, mushroom production and urban gardening.

Europe: nearly 500 municipalities now who are committed to zero waste, led by the world's first Zero Waste Cities Certification, leading the way on best practices to reduce waste methane at the local level.

- Milan, Italy. Milan is one of the best examples of how a big metropolis city, with an extremely diverse population in a densely populated area, can effectively establish a high performing organic waste management system. In Milan, 95kgs of organics is collected per person each year, just above 80% of all organic waste generated.
- Salacea, Romania. Salacea provides a brilliant example of what impact can be had in a small space of time by implementing the right measures. Salacea is a small, rural municipality that in just 3 months, through installing a door-to-door separate collection model of organics, with a big investment in community

education, achieved very impressive results - going from 1% to 61% separate collection of municipal waste and also reducing waste sent to landfill by 40%.
- Partizanske (Slovakia). Partizanske is a town of 22,000 with a mix of multi-apartment buildings and single-family households. The municipality invested heavily in a new model to increase both composting and separate collection of food waste, supplemented by a vast awareness raising programme. This resulted in residual waste being reduced by 57 kgs per person within a year through more organics being composted, at home and at a central plant.

Barriers and challenges: key lessons learnt from current climate finance trends

1. **Existing climate finance for waste methane abatement is insufficient**

Compared to other sectors, the waste sector remains significantly underfunded, despite its substantial potential for methane abatement—estimated at 22 Mt annually by 2030, the second highest among the top three methane emitting sectors: fossil fuels, waste, and AFOLU (agriculture, forestry, and other land use). The waste sector accounted for 45% of methane abatement finance (USD 6.1bn), driven mainly by wastewater management and solid-waste to energy investment. This marked a drop of over USD 1 billion from 2019/20 and significantly behind the USD 20.4 billion needed per year until 2030.[70]

Waste management is an essential public service and it is the duty of every government to make it possible. Funds must be allocated responsibly, serving the needs and interests of the public, including waste pickers and waste workers as front liners in waste management, especially in the Global South.

2. **Current climate finance for waste methane reduction is invested in the wrong interventions**

Research by the Climate Policy Initiative (CPI) in its *Landscape of Methane Abatement Finance* (2023) reveals a stark imbalance in funding within the waste sector.

An overwhelming 99% of methane abatement finance—amounting to USD 4.08 billion—is allocated to waste-to-energy incinerators, where commercial viability at scale is established.[66] However, this viability is only feasible when significant public subsidy schemes are in place. In contrast, a mere 1% (USD 22 million) supports organic waste management. Additionally, 54% of waste sector finance originates from the private sector, largely driven by investments in incineration technologies.

[70] Climate Policy Initiative: Landscape of Methane Abatement Finance, 2023. Available at: https://www.climatepolicyinitiative.org/publication/landscape-of-methane-abatement-finance-2023/

This skewed distribution is a harmful trend that raises concerns about missed opportunities for more sustainable and inclusive waste solutions, particularly in organic waste recovery. Waste-to-energy incinerators are large net CO_2 contributors to the atmosphere, so reducing landfill methane emissions through this industrial technology comes at the cost of increasing overall CO_2 emissions, in addition to harmful pollutants and further negative impact for livelihoods and local economies.

Waste incineration is [the most expensive] and [the most carbon-intensive technology] with [the least job creation potential] that moves countries away from their climate target. Waste incineration has failed in many places such as [the U.S]. and [Europe]. There has been a strong push from local communities and waste picker groups around the world against waste incineration as it harms people's well-being and livelihoods.

3. Misalignment in MDB climate finance undermines the waste hierarchy and Paris alignment

There is a growing concern that current climate finance practices by Multilateral Development Banks (MDBs) are inconsistent with their own Paris Alignment guidance and risk undermining progress on climate and waste goals. On the one hand, the Joint MDB Methodological Principles for Assessment of Paris Agreement Alignment (June 2023) encourage MDBs to finance projects that follow the waste hierarchy, such as: separate waste collection (for reuse and recycling), composting and anaerobic digestion of biowaste, material recovery, and landfill gas recovery from closed sites. These are listed under the *Universally Aligned List of Activities* and are recognized as essential for sustainable, low-emission waste management.

However, on the other hand, the same MDB framework permits financing for waste-to-energy (WTE) incineration, Refuse-Derived Fuel (RDF), and Solid Recovered Fuel (SRF) under the Common Principles for Climate Mitigation Finance Tracking (December 2023), as long as such activities are included in countries' NDCs or Long-Term Strategies. This creates a major loophole: activities that contradict the waste hierarchy—such as incineration—are still financed and counted as climate mitigation, regardless of their long-term environmental and social harms.

This policy contradiction results in most government-to-government and multilateral climate finance undermining its own principles and the core tenets of sustainable waste management. It also risks locking countries into capital-intensive, polluting technologies that are misaligned with circular economy goals, exclude informal waste workers, and often divert resources from more cost-effective and inclusive solutions like zero waste systems and decentralized composting.

MDBs must resolve this inconsistency by strictly aligning all financed activities with the waste hierarchy and ensuring that Paris-aligned finance prioritizes upstream solutions, community-based models, and interventions that deliver equitable climate and development co-benefits.

4. **Investments prioritise financial profitability over co-benefits**

Financiers often assess business models based on financial performance—primarily a project's income generation and, in the case of climate financiers, its greenhouse gas mitigation potential. However, waste management, as a vital public service, offers far more than emissions reductions and cleanliness. It delivers a wide range of co-benefits, including job creation, environmental improvement, and better public health outcomes.

When zero waste is adopted as a comprehensive solution to the waste and climate crises, these benefits expand significantly. Zero waste strategies foster decentralized systems that strengthen democratic participation, promote transparency through local community involvement, and advance race and gender inclusivity. They also enhance soil and food quality, boost local economies, and generate numerous additional social and environmental gains. Given the breadth and depth of these impacts, these outcomes should not merely be considered co-benefits, but rather core benefits—central to the value and justification of zero waste approaches.

5. **Finance instruments and sources are inaccessible for implementors**

While there is widespread support for the implementation of waste projects, access to finance remains a significant barrier for those at the frontlines of delivery—particularly waste workers, waste pickers, and local community groups engaged in waste management. Existing financing instruments and mechanisms often involve complex administrative and legal requirements that are poorly suited to the realities and capacities of local implementers.

Large financial institutions and investors typically prioritize centralized, capital-intensive projects, which are rarely accessible to grassroots actors. As a result, funding often flows to multinational corporations that lack both meaningful ties to, and accountability within, local communities. Meanwhile, development finance is frequently channeled through national governments and financial intermediaries, with limited trickle-down to the local level—further marginalizing the very groups who are critical to achieving waste management and climate goals on the ground.

6. **Waste management operational costs: the big elephant in the room**

Most financing programs tend to focus on covering capital costs for large infrastructure projects. However, once these facilities—such as landfills and incinerators—are built, cities are often left to shoulder the operational costs for decades, sometimes up to 20 years. These operational expenditures are typically much higher than the initial capital costs and are far more challenging to sustain over time. As noted in the World Bank's *What a Waste 2.0* report, operational costs can account for at least 70% of the total budget required for waste management.

For instance, waste collection alone typically represents 60–70% of total system costs across collection and disposal operations. Market-based approaches that rely on the value of recovered materials consistently fall short in covering the full costs of running waste management systems. Without ongoing and reliable funding, these systems risk breakdowns, leading to waste leakage into the environment and even higher future costs.

In summary, current financing mechanisms and instruments are not fit-for-purpose—especially when it comes to covering the long-term operational costs necessary for sustainable and effective waste management.

7. **Exclusion and pollution impacts on communities**

Waste management financing has largely overlooked the inclusion of local communities and the informal sector—particularly in emerging markets and developing economies—despite the fact that these groups are often both impacted by and actively involved in the implementation of climate-related waste solutions.

Globally, millions of people earn a living by collecting, sorting, recycling, and selling discarded materials. In many cities, particularly where formal waste services are lacking, waste pickers provide the only functioning system for municipal solid waste collection and recycling. Their work yields significant public benefits, including high recycling rates, improved public health and safety, and contributions to local economies and environmental sustainability.

Yet, despite growing recognition of their contributions in some areas, waste pickers and other informal workers continue to face systemic exclusion. They often endure poor working and living conditions, low social status shaped by factors such as occupation, race, caste, and gender, and receive minimal institutional support. Moreover, the increasing privatization of waste management systems frequently displaces these workers and undermines their livelihood

Moving forward: enabler for scaling up in low income and decentralized contexts

Key findings from recent research conducted by Climate Policy Institute[71] highlight the significant potential for scaling up waste methane reduction interventions, particularly in decentralized and low-income contexts. The research was conducted in Indonesia and Brazil. The findings emphasize that decentralized waste management models—including community groups in Indonesia, waste picker cooperatives, and home composting initiatives in Brazil—demonstrate promising cost efficiency compared to more centralized approaches.

Among the various operator types analyzed, decentralized models consistently showed competitive performance based on the levelized cost of waste management

[71] Report to be published the week of Jun 9th, 2025. Embargoed copy available upon request.

(LCOW)—defined as the total investment and operational costs over the facility's lifetime (20 years), divided by the total volume of waste treated over that period. Despite having the lowest operating margins, community-based and informal operators often matched or outperformed centralized systems in terms of LCOW.

This efficiency stems from several structural advantages. Capital expenditure (CAPEX)—especially on fixed assets such as land—constitutes the majority of total asset value (accounting for 89% in Indonesian cases and 58% in Brazil). While this presents a significant barrier to entry for industrial-scale waste management operators, it is less of an obstacle for decentralized solutions like home composting, which typically require lower upfront investments and leverage existing community infrastructure.

In the light of these findings, climate finance instruments and mechanisms in the waste sector —particularly for methane mitigation—must be inclusive, accessible, and efficient. Current financing models are not fit-for-purpose and must evolve to reflect the realities of decentralized implementation and the central role of local actors.

Here are key recommendations for inclusive and effective climate finance to enable just, equitable, and sustained climate action in the waste sector:

1. Design climate finance to support local implementation without indebtedness

- Concessional finance mechanisms with reduced transaction costs must be created to support local and community-led waste initiatives.
- Financing must be structured to avoid creating debt burdens while ensuring long-term operational sustainability of waste management systems.
- Funding should be predictable, continuous, and flexible to support both capital and operational costs—especially in the Global South.

2. Align climate finance with the waste hierarchy

- Financiers and recipient countries alike must ensure waste sector investments follow the waste hierarchy: prioritizing prevention, reduction, reuse, and recycling over disposal and incineration.
- Emphasis should be placed on upstream solutions—particularly organic waste management—to achieve cost savings, emission reductions, and co-benefits for health, environment, and livelihoods.

3. Center Local Communities and Informal Workers

- Waste pickers, waste workers, and community groups must be placed at the center of climate finance design, implementation, and monitoring.
- Financial mechanisms should include specific requirements for social inclusion in the design and implementation of waste management systems led by local governments. These mechanisms should prioritize a just transition for waste

pickers and waste workers, while building on existing waste recovery programs to ensure continuity, equity, and effectiveness.
- As neither the public nor private sector alone can meet all waste management needs, governments must lead and coordinate inclusive, multi-stakeholder partnerships, including the informal sector and grassroots initiatives.
- The design of public policies, particularly in relation to financial mechanisms, should be strengthened through transparent and consultative processes involving civil society. Such an approach fosters a sense of ownership among citizens, promotes the inclusion of proven and successful models, and enhances public engagement in policy implementation. Moreover, it supports greater accountability and contributes to the long-term sustainability of these policies.

4. Broaden Success Indicators Beyond GHG Reductions

- Climate finance must expand its definition of success to include social, environmental, and economic co-benefits.
- Projects should be assessed not only on emission mitigation but also on outcomes such as job creation, community health improvements, soil quality, gender and racial equity, and resilience-building.

5. Implement Robust Monitoring and Evaluation Frameworks

- Measurable, transparent indicators must be developed to track both climate and development impacts of funded waste projects.
- These should include budget savings from upstream interventions (e.g., organic waste prevention and composting), and assess performance on equity, inclusion, and long-term system sustainability.
- Both public and private sector-led projects should be subject to independent, participatory monitoring and evaluation.
- International financial mechanisms should be designed to support waste management systems until they become fully operational and their ongoing costs are internalized or otherwise sustainably addressed. This approach helps prevent the abandonment of initial investments due to the absence of a robust and realistic operations plan