

THE BIG METHANE-CUTTING OPPORTUNITY THAT IMMEDIATELY HELPS VULNERABLE COMMUNITIES: ORGANIC WASTE

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The waste sector, and specifically organic waste, is one of the largest sources of methane emissions, which must be curbed in the near term to prevent irreversible climate tipping points. Communities see immediate health and safety benefits when they divert organic waste from dumpsites and could create new local economies around useful products made from organic waste. So what's missing? We need supportive policies and markets to make the business case for rapidly expanding organic waste treatment, especially across the Global South.



THE GLOBAL ORGANIC WASTE MANAGEMENT OPPORTUNITY

Methane is a greenhouse gas that is shorter-lived than carbon dioxide (CO₂), lasting only about a decade in the atmosphere. However, its global warming effects are over 80 times more potent in that shorter period.¹ Left unchecked, methane emissions could send climate change past a point of no return, triggering dangerous feedback loops.

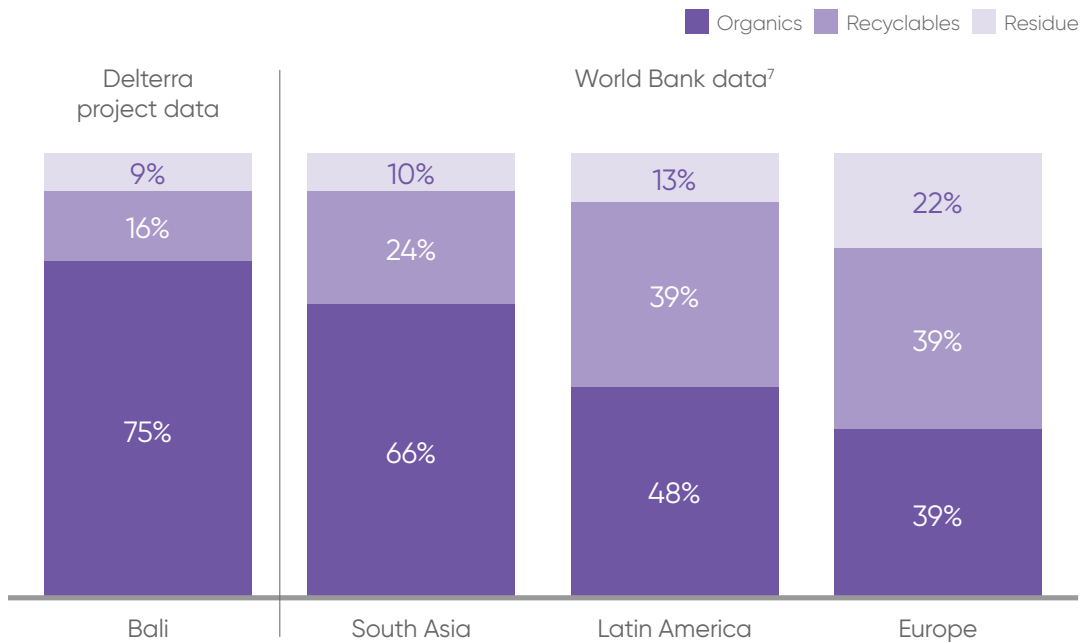
A seminal UN report published last year found that immediate reductions in methane emissions are the best, most effective measure to reduce near-term global warming and meet the Paris Agreement goal of limiting temperature rise to 1.5°C.² Over 100 countries have pledged to collectively reduce global methane emissions by 20% in 2030, compared with 2020 levels. That alone could prevent over 0.2°C of warming by 2050.³

After the agricultural and energy sectors, the waste sector is the third highest emitter of methane. Solid waste disposal and wastewater are responsible for 14–20% of global human-caused methane emissions, with solid waste management accounting for roughly half of that amount.⁴



The main culprit of the solid waste sector's methane emissions is organic waste. In many parts of the world, compostable materials such as food and garden waste make up over half of total municipal solid waste, sometimes as high as 80%.⁵ As all that buried organic waste breaks down anaerobically in landfills, and leachate forms from rainwater seeping through it, one ton of methane is released into the atmosphere approximately every second. Even when landfills are closed, they continue to emit methane for 25–30 years.⁶

SOLID WASTE COMPOSITION BY GEOGRAPHY



Unmanaged organic waste harms local communities as well as accelerating global warming.

Decaying organic material generates heat alongside methane gas, which can spark fires in dumpsites.⁸ These fires can then release toxic chemicals into the air, as well as cause cave-ins and landslides.⁹ Leachate, meanwhile, causes drinking water and soil contamination.¹⁰ And decomposing organics in dumpsites become breeding grounds for infectious diseases.¹¹

Fortunately, low-tech and proven solutions are readily available. Waste collection systems can keep organic waste separated from other waste at the source – and Delterra has demonstrated that investing in the necessary behavior change can achieve high-quality results cost-effectively.¹² Once collected as a separate stream, organic waste can be treated (locally or commercially) to produce useful products, such as compost for amending soil, animal feed, or even biogas to generate energy, all without releasing methane into the atmosphere or harmful leachate into local environments.

A HOLISTIC INVESTMENT IN HEALTHIER COMMUNITIES AND THE PLANET

Despite the clear opportunity, collection and treatment of organic waste remains rare throughout the world. In the Global South, where the harms of unmanaged organic waste are most acute, waste management funding predominantly goes toward mixed waste collection and landfilling. The problem is that separated organic waste collection and treatment are more complex to operate, with no clear economic incentive to do so – yet.

Governments, NGOs, and philanthropic funders can work together to create a more attractive business case for organic waste treatment. The following measures could greatly spur expansion of better organic waste management, especially in more vulnerable communities:





FOSTER USE OF ORGANIC WASTE TREATMENT PRODUCTS

Compost and mulch from household organic waste can help enrich soil, replacing some or all need for chemical fertilizers and pesticides. However, many local and national governments have promoted and subsidized chemical fertilizers over compost.¹³ Consequently, it is difficult to find off-takers for compost at scale.

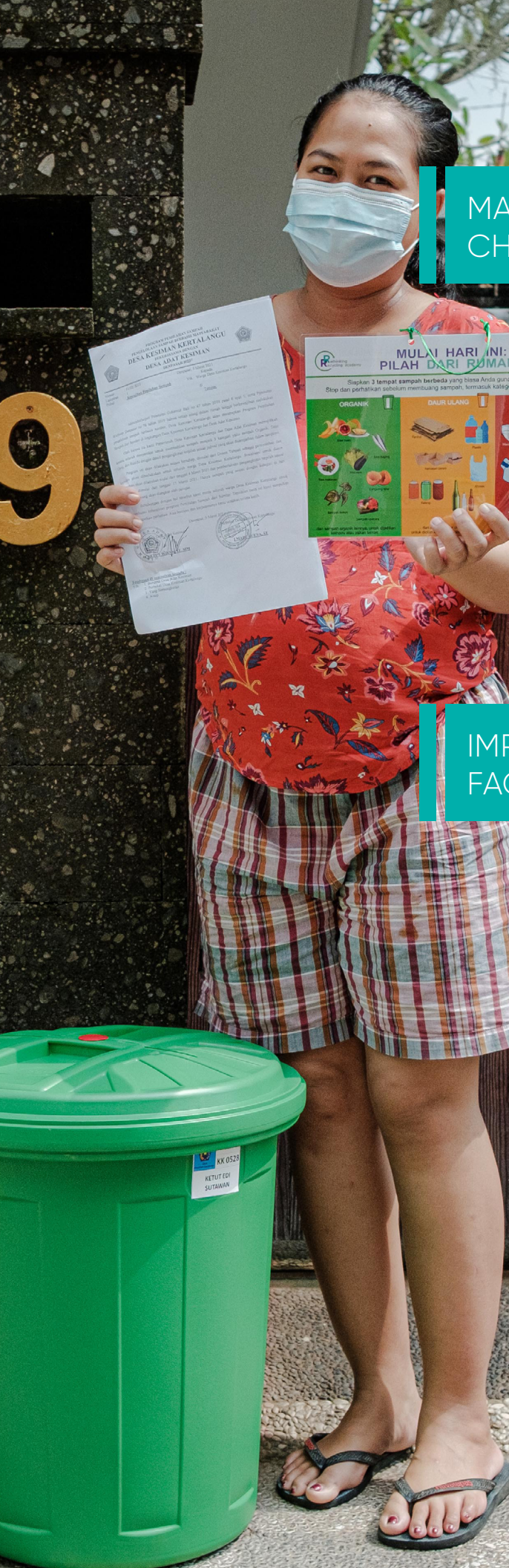
Marketing efforts could increase adoption by agricultural associations, horticultural companies, tree nurseries, and other businesses. Governments can go further and use policy to encourage, or even require, co-marketing and use of compost alongside chemical fertilizer. In Bangladesh, waste management organization Waste Concern has partnered with the national government to encourage the use of compost from municipal facilities in agriculture, through incentives such as exemptions from value-added tax and sales tax.¹⁴ In addition to cutting methane emissions from organic waste, increasing use of compost in agriculture improves soil health and reduces the need for chemical fertilizer, which in turn helps prevent harmful agricultural runoff. Governments could adjust subsidies for chemical fertilizer and compost to better reflect the ecological impacts of each.

Policy can also support adoption of more nascent, innovative products from organic waste treatment. Methane captured in biodigesters can be used to generate electricity rather than escaping to the atmosphere, and solids from biodigesters can also be used as fertilizer. Organic waste can also be fed to black soldier flies, which in turn can safely be used as animal feed for livestock without spreading pathogens.



CLOSE THE PROFITABILITY GAP

Sales of products like compost, biogas or animal feed seldom cover the total cost of treating organic waste. Additional revenue streams, as well as funding for capital costs such as land, facility construction and equipment, can provide greater financial stability and a stronger case for investment. The World Bank has documented a wide range of funding mechanisms as potential options to support organic waste treatment at scale, including programs by local and national governments, development banks and NGOs.¹⁵ Carbon credit markets could provide an additional revenue stream to support for organic waste treatment.¹⁶ Any mechanism for incentivizing methane emissions cuts in other sectors, such as agriculture and fossil fuel production, should also be made available for diverting organic waste into productive use. Whatever the system, the qualifying criteria will need to balance rigor of emissions reductions with accessibility to small-scale organic waste treatment operators in the Global South.



MAKE ORGANIC WASTE TREATMENT THE CHEAPER OPTION

On the disincentive side, increasing landfilling costs and penalizing illegal dumping can make treating organic waste more economically attractive versus the alternatives, once organic waste treatment solutions have proven viable. Good source separation of waste can also reduce the cost of organic waste treatment by minimizing contamination of the incoming supply. Local policies can mandate household and businesses to source separate their waste, and well-designed behavior change campaigns are a smart investment in establishing a high-quality supply of organic waste.

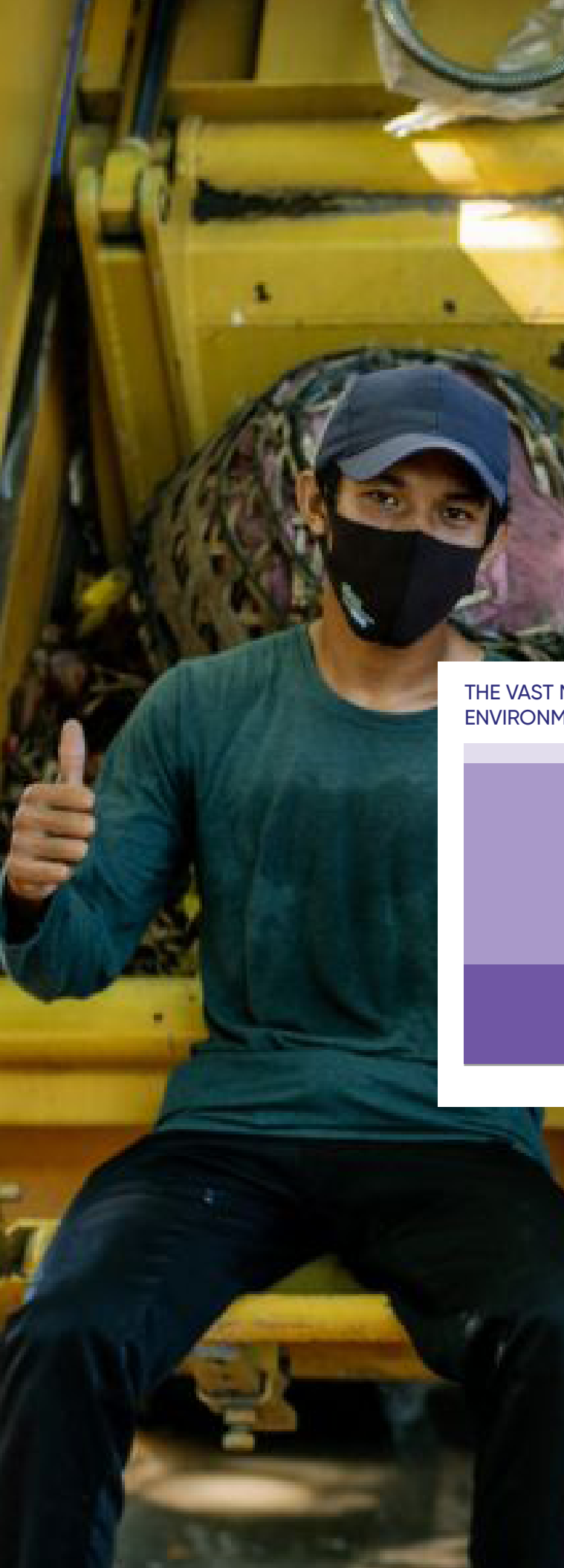
IMPROVE EFFICIENCY OF TREATMENT FACILITIES

To curb global methane emissions, many more treatment facilities will be needed to process the enormous volume of organic waste diverted from landfills and dumpsites. Given constraints on available space, they will also need to be optimized for efficient processing. Most organic treatment facilities in the global South today are small-scale, basic composting sites that take 8-12 weeks to process a batch of waste, and are limited in the types of organic material they can handle.

Close management can cut down the amount of space and time required for composting, as well as producing more high-quality compost product for market. Beyond compost, other solutions such as biodigesters and black soldier fly farming can operate in less space, while also producing fewer odors and higher-value products. However, they are also more expensive to build and require greater operational expertise to be successful. Programs to train new operators and provide technical support to these kinds of organic waste treatment businesses will be essential.

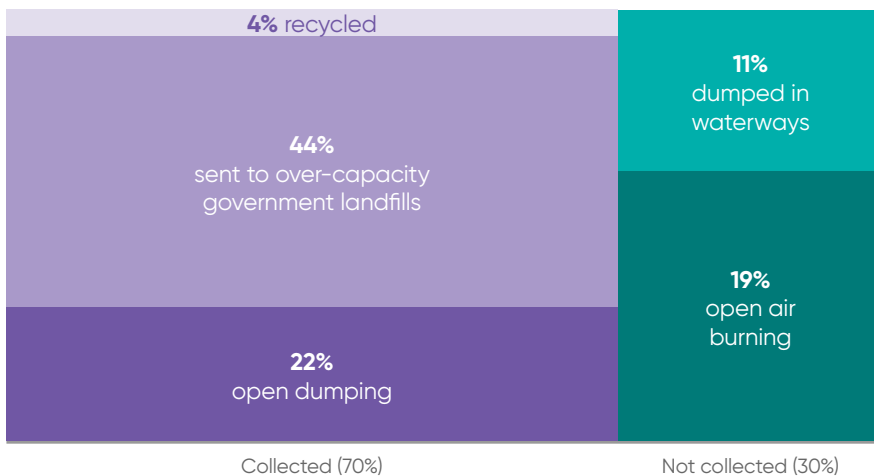
A photograph of two men sitting on a yellow metal bench in a recycling facility. The man on the left is wearing a dark green long-sleeved shirt, black pants, a grey baseball cap, and a black face mask. He is giving a thumbs-up gesture. The man on the right is wearing a grey long-sleeved shirt, bright green pants, and a light blue surgical face mask. He is also giving a thumbs-up gesture. The background shows a large pile of green organic waste and other recycling materials. The overall lighting is somewhat dim and has a greenish tint.

DELTERRA'S EXPERIENCE
RETHINKING RECYCLING BALI



In Bali, Indonesia, waste management is fragmented and decentralized, relying heavily on informal workers. Source separation and collection systems are almost non-existent, and illegal dumping and burning are commonplace. Based on Delterra's analysis, less than 4% of solid waste in Bali today is recycled or treated for productive use. Though an estimated 70% of solid waste is collected, it is usually sent to over-capacity government landfills or unmanaged informal landfills, with limited control, treatment, and cover. In 2019, an estimated 290,000 tons of organic waste was sent to the ten government landfills, becoming responsible for up to 30,000 tons of methane emissions.¹⁷

THE VAST MAJORITY OF BALI'S SOLID WASTE CAUSES ENVIRONMENTAL HARM

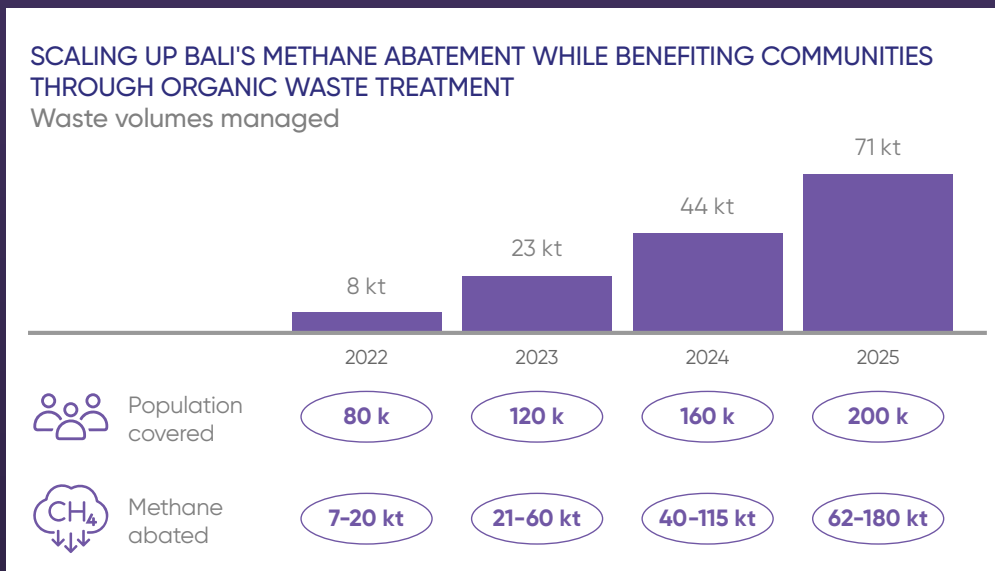


The market context for selling compost is difficult in Bali as well. Indonesia's national government, as well as local governments in Bali, have promoted and subsidized chemical fertilizers over compost, and Bali's soil is naturally fertile from volcanic activity. Even with government subsidies, the three dominant compost providers sell their product below the total cost of treating organic waste.

In this complex environment, Delterra's Rethinking Recycling program is still yielding promising results in curbing methane emissions from organic waste. The program works hand-in-hand with local communities to create integrated sustainable waste management systems, including financially sustainable organic waste treatment. Key elements from the Rethinking Recycling approach to organic waste include:

- Integration of informal waste collectors into an official local waste management service, which diverts a significant portion of organic waste from landfill
- Science-informed behavioral change campaigns to maximize source separation of organic waste
- Establishing or improving waste collection logistics and tracking of payments for collection service (e.g., by introducing an intuitive operational platform that tracks waste collection volumes and payments) leading to stabilized revenues for waste handlers
- Optimization of limited space for waste processing facilities, including use of space-efficient composting boxes and shredders
- Training and support for operational staff on effective compost management, resulting in higher throughput and quality of finished product
- Cultivation of new local buyers of compost, to ensure reliable offtake of compost product at fair prices

Together with other components of the waste management system, the resulting business model provides living wages and access to healthcare to all employees, and is on track to avert up to 180,000 tons of methane emissions by 2025.



Delterra's analyses and on-the-ground experience building organic waste treatment solutions suggest that, even in seemingly challenging settings in the Global South, it is possible to create financially sustainable, holistic waste management systems that divert organic waste into productive use. We have also witnessed firsthand how transforming waste management can uplift vulnerable communities and provide new livelihoods while creating a safer, healthier local environment.

It's clear how much more would be possible with a more supportive policy framework and more robust markets for the products of organic waste treatment. With curbing methane emissions now a global priority, and the urgency of addressing the harms of waste pollution in vulnerable communities, solutions for organic waste deserve a closer look, and bold action.



ENDNOTES

1. Methane is a powerful greenhouse gas with a 100-year global warming potential 28-34 times that of CO₂. Measured over a 20-year period, that ratio grows to 84-86 times. <https://unece.org/challenge#:~:text=Methane%20is%20a%20powerful%20greenhouse,are%20due%20to%20human%20activities>.
2. <https://www.unep.org/news-and-stories/press-release/global-assessment-urgent-steps-must-be-taken-reduce-methane>
3. <https://www.globalmethanepledge.org/>
4. https://www.mckinsey.com/~/_media/mckinsey/business%20functions/sustainability/our%20insights/curbing%20methane%20emissions%20how%20five%20industries%20can%20counter%20a%20major%20climate%20threat/curbing-methane-emissions-how-five-industries-can-counter-a-major-climate-threat-v4.pdf
5. https://www.c40knowledgehub.org/s/article/How-to-manage-food-and-organic-waste-in-Global-South-cities?language=en_US
6. https://ec.europa.eu/environment/nature/natura2000/index_en.htm
7. <https://openknowledge.worldbank.org/handle/10986/30317>
8. https://www.researchgate.net/publication/255179339_An_assessment_of_landfill_fires_and_their_potential_health_effects_-_A_case_study_of_a_municipal_solid_waste_landfill_in_Lagos_Nigeria
9. <https://www.livescience.com/58307-what-caused-ethiopia-garbage-landslide.html>
10. <https://pubmed.ncbi.nlm.nih.gov/24723123/>
11. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6979070/>
12. <https://delterra.org/latest/behavior-change-roi/>
13. <https://openknowledge.worldbank.org/bitstream/handle/10986/26286/113487-WP-compostingnoweb-24-PUBLIC.pdf?sequence=5>
14. Indonesian government's subsidy budget for chemical fertilizers is estimated to be Rp 34.3 trillion (USD 2,4 bn): <https://www.feb.ui.ac.id/en/blog/2021/11/08/circular-economy-and-fertilizer-subsidy/#:~:text=During%202019%2C%20domestic%20consumption%20of,budget%20reached%20Rp%2034.3%20trillion>
15. <https://openknowledge.worldbank.org/bitstream/handle/10986/26286/113487-WP-compostingnoweb-24-PUBLIC.pdf?sequence=5&isAllowed=y>
16. <https://openknowledge.worldbank.org/bitstream/handle/10986/26286/113487-WP-compostingnoweb-24-PUBLIC.pdf?sequence=5&isAllowed=y>
17. https://www.researchgate.net/publication/339216985_Municipal_solid_waste_material_flow_in_Bali_Province_Indonesia/link/5f5de755a6fdcc11640ee86c/download

