

Prefeasibility Study: Organic Waste Treatment Systems from Marketplaces in Barranquilla, Colombia

Summary for Decision Makers

Methane is a greenhouse gas more than 80 times more potent than carbon dioxide in driving climate change, and accounts for nearly half a degree Celsius of warming to date (IPCC, 2021). Significant cuts in methane emissions will result in a slowing of global warming and could prevent 0.3 degrees Celsius of additional warming along with numerous public health and ecological benefits (UNEP and CCAC, 2021). The waste sector is the third largest source of human-driven methane emissions and presents one of the best opportunities for mitigation today (UNEP and CCAC, 2021). Barriers to implementation include a lack of information and data for identifying sources of methane, and access to best practices and evidence-based methane mitigation measures.

To help overcome these obstacles, RMI and Clean Air Task Force (CATF), with funding from the Global Methane Hub, launched the Waste Methane Assessment Platform (WasteMAP) in 2023 to provide an accessible online tool that highlights emissions, mitigation opportunities, and best practices to reduce solid waste methane emissions, providing a clear pathway for achieving the collective goals of the Global Methane Pledge and other national and subnational greenhouse gas reduction targets. As part of the WasteMAP program in Colombia, CATF and Ambire provided support to the Mayor's Office of Barranquilla in understanding waste methane mitigation opportunities for the municipality. Specifically, a detailed prefeasibility study aimed at evaluating the viability of a comprehensive organic waste treatment system for Barranquilla's marketplaces (i.e., Barranquillita, Playón, EPM, and Gran Bazar¹) was developed.

This *Summary for Decision Makers* provides a brief description of the results of the study, including the technical, economic, environmental, and social aspects of implementing an organic waste treatment system. This study will contribute to informed decision-making on organic collection and treatment at markets, and the design of effective strategies to address challenges related to organic waste while promoting overall environmental sustainability. Specifically, the study identifies a pathway for the implementation of the recommended waste treatment system and thus, mitigation of methane emissions. Municipality championship, operator involvement, and market buy-in will be fundamental in following the pathway recommended and moving beyond this prefeasibility assessment.

A comprehensive methodology was used in the evaluation of organic waste treatment viability, which included data collection, detailed analysis of information collected and available technologies, as well as a thorough analysis of the proposed project's financial viability and profitability. Data collection (consisting of stakeholder interviews, forms, and site visits) focused on operations, existing infrastructure, waste generation, and other relevant aspects to obtain a comprehensive understanding of the waste management dynamics in these specific locations. This data was used as the foundation for identifying appropriate

1 Gran Bazar is under construction but will host approximately 700-1,200 locals including those currently at Barranquillita, Playón, and EPM.

treatment technology; estimating product (e.g., compost, biogas) generation; and calculating costs and revenue under various scenarios. Note that more up-to-date and exhaustive data collection is required to properly design and estimate benefits from this project. As part of the methodology, results obtained were shared and discussed with key stakeholders to socialize potential project options.

Marketplaces in Barranquilla generate approximately 14 metric tons of organic waste per day,² which is currently sent to landfill but could be treated; however, it is important to improve existing waste separation practices to effectively facilitate treatment. In comparing available technologies for the treatment of organic waste, based on considerations such as space requirements, investment costs, ease of operation, and the ability to prevent unpleasant odors, results suggest that anaerobic digestion is more favorable than composting (see Table 1).

Table 1: Evaluation Criteria for Organic Waste Treatment Technologies

Parameter	Compost	Anaerobic Digestion
Technology costs		
Job creation		
Nutrient recycling		
Odor risk		
Vector risk		
Ease of operations		
Local technology vendors		
Return of investment for decentralized systems		
Market for products		
Space needs		

■ Most favorable ■ Intermediate ■ Least favorable

As such, the study delves into the financial long-term viability of an anaerobic digester and evaluates impacts of financing schemes, waste tariffs, and capital expense discounts (e.g., subsidies, strategic investments). Specifically, the study evaluated internal rate of return (IRR) and the net present value for the project and determined that by year 15 any financing scheme would be favorable. In addition, the report shows how any increase in tariff or reduction on capital would result in more attractive projects with project and investment IRRs exceeding what is generally considered acceptable for investment (i.e., 12%). This prefeasibility study demonstrates that treating market organic waste via anaerobic digestion is a viable option and would improve overall waste management for the municipality. Furthermore, other benefits to this project include a longer landfill lifetime, reduction of energy costs for market vendors, and mitigate 287 metric tons of CO₂e per year.

References

IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. In Press.

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² Daily organic waste generation is likely underestimated as sources evaluated did not consider generation from EPM market.