

# Prefeasibility Study: Organic Waste Treatment System for the Bazurto Market in Cartagena, 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 identifying sources of methane, as well as 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 Cartagena 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 in Cartagena's Bazurto market was developed.

This *Summary for Decision Makers* provides a brief description of the results of the study, including 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 an organic waste treatment project at the Bazurto market, 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 treatment technology; estimating product (e.g., compost, biogas) generation; and calculating costs and revenue under various scenarios.<sup>1</sup> As part of the methodology, results obtained were shared and discussed with key stakeholders to socialize potential project options.

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<sup>1</sup> Note that more up-to-date and exhaustive data collection is required to properly design and estimate benefits from this project.

Cartagena's Bazarto market comprises an area of 40,000 square meters and generates approximately 31.4 metric tons of organic waste per day.<sup>2</sup> Merchants unload their waste via wheelbarrows, bags, boxes, or bins at a location identified as "The Ramp" from where it is collected twice daily by the waste management company, Veolia, and transported to the Loma de Los Cocos landfill, roughly 27 kilometers from the market. There is no system for the classification and separation of organic waste at the Bazarto Market.

This study compares treatment via composting and anaerobic digestion considering the data collected and their known advantages and disadvantages, (see Table 1). Considering space requirements, investment costs, ease of operation, and the ability to prevent unpleasant odors, results suggest that anaerobic digestion via use of a biodigester is more favorable than composting.

**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 8 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 more than doubling 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 466 metric tons of CO<sub>2</sub>e 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.

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

<sup>2</sup> Estimate provided by the Mayor's Office.