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INSTITUTIONAL CAPACITY IN LOCAL WASTE
MANAGEMENT INITIATIVES:

A COMPARATIVE STUDY OF GHENT (BELGIUM) AND
SURABAYA (INDONESIA)

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Abstract

Urban solid waste governance research has often examined the city-level waste system and paid less attention to what local initiatives do and how institutional capacity is structured to sustain them across different governance contexts. This thesis asks how and which local institutional capacities matter for waste governance by analysing how institutional capacity is configured across six successful local waste governance initiatives in Ghent, Belgium, and Surabaya, Indonesia, and identifying which capacity patterns are shared across both governance contexts and which are context-dependent. This thesis analyses six successful local waste governance initiatives: three in Ghent, Belgium, such as PAYT/Diftar, Recycling Parks 2.0, and FoodSavers, and three in Surabaya, Indonesia, such as Waste Banks, TPS3R, and Garda Pangan. Using the Most Different System Design, this study applies a six-dimensional analytical framework adapted from the USAID SCIL, based on structured documentary analysis: policy and legal framework; organisational coordination and service delivery; financial and resource management; human resources and capacity building; communication and public awareness; and monitoring and evaluation.

The study finds that all three Ghent initiatives present all six institutional capacity dimensions, reflecting a formal governance environment in which full-dimensional capacity is produced through the binding regulatory requirements that apply to any initiative operating within the Flemish waste governance system. The findings show that while formal institutional infrastructure is important for certain capacity dimensions, informal institutions such as social and relational networks can also sustain other dimensions of capacity across different governance contexts. This study contributes to institutional capacity research by operationalising capacity as a configurational, multi-dimensional analytical framework at the initiative level. Limitations stem from reliance on documentary evidence, which future research could address by incorporating interview-based methods and additional city cases.

Keywords: institutional capacity, local policies, waste management, urban governance, Ghent, Surabaya

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List of Abbreviations

3R	Reduce, Reuse, Recycle
4R	Reduce, Reuse, Recycle, Recover
ANPR	Automatic Number Plate Recognition
APBD	Anggaran Pendapatan dan Belanja Daerah (Regional Budget)
BSF	Black Soldier Fly
BSI	Bank Sampah Induk (Main Waste Bank)
BSIS	Bank Sampah Induk Surabaya (Surabaya Main Waste Bank)
BSU	Bank Sampah Unit (Waste Bank Unit)
CE	Circular Economy
CSR	Corporate Social Responsibility
Diftar	Gedifferentieerde Tarieven (Differentiated Tariffs)
DKI	Daerah Khusus Ibukota (Special Capital Region / Jakarta)
DLH	Dinas Lingkungan Hidup (Department of Environment)
EU	European Union
FLW	Food Loss and Waste
GFT	Groente, Fruit en Tuinafval (Organic Waste: Vegetables, Fruit, Garden)
GIS	Geographic Information System
HERW!N	Flemish Network of Social Circular Enterprises
ICMA	International City/County Management Association
IKZ	Interne KwaliteitsZorg (Internal Quality Management)
IRS	Informal Recycling Sector
IVAGO	Intercommunale Vereniging voor Afvalstoffeninzameling en -behandeling voor Gent en Omstreken
Jakstrada	Kebijakan dan Strategi Daerah (Regional Waste Management Strategy)
Jakstranas	Kebijakan dan Strategi Nasional (National Waste Management Policy and Strategy)
KIE	Komunikasi, Edukasi, Informasi (Communication, Education, Information)

KPI	Key Performance Indicator
KSH	Kader Surabaya Hebat (Great Surabaya Cadres)
M&E	Monitoring and Evaluation
MBG	Makan Bergizi Gratis (Free Nutritious Meal / National School Feeding Programme)
MDSD	Most Different System Design
MOB	Mobiliteitscel (Mobility Cell)
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
OCMW	Openbaar Centrum voor Maatschappelijk Welzijn (Public Centre for Social Welfare)
OVAM	Openbare Vlaamse Afvalstoffenmaatschappij (Public Waste Agency of Flanders)
PAYT	Pay-As-You-Throw
PDAM	Perusahaan Daerah Air Minum (Regional Drinking Water Company)
Perda	Peraturan Daerah (Regional Regulation)
Permen LHK	Peraturan Menteri Lingkungan Hidup dan Kehutanan (Minister of Environment and Forestry Regulation)
Permen PU	Peraturan Menteri Pekerjaan Umum (Minister of Public Works Regulation)
Perpres	Peraturan Presiden (Presidential Regulation)
Perwali	Peraturan Walikota (Mayor Regulation)
PKK	Pemberdayaan dan Kesejahteraan Keluarga (Family Welfare Movement)
PMD	Plastic Packaging, Metal Packaging, and Drinking Cartons
PP	Peraturan Pemerintah (Government Regulation)
PT PLN	Perusahaan Listrik Negara (State-Owned Electricity Company)
REPAiR	Resource Management in Peri-urban Areas (EU research project)
RP 2.0	Recycling Parks 2.0
RPerpres	Rancangan Peraturan Presiden (Draft Presidential Regulation)
ROSI	Route Optimisation System (IVAGO)

SAP	Systems, Applications, and Products in Data Processing (software platform)
SBP	Stop Boros Pangan (Stop Food Waste)
SCIL	Solid Waste Capacity Index for Local Governments
Sibasam	Sistem Informasi Bank Sampah (Waste Bank Information System)
SIPSN	Sistem Informasi Pengelolaan Sampah Nasional (National Waste Management Information System)
SOP	Standard Operating Procedure
TPA	Tempat Pembuangan Akhir (Final Disposal Site / Landfill)
TPS	Tempat Pembuangan Sementara (Temporary Waste Disposal Site)
TPS3R	Tempat Pengolahan Sampah Reduce, Reuse, Recycle (3R Waste Processing Facility)
USAID	United States Agency for International Development
UU	Undang-Undang (National Law)
VLAREMA	Vlaams Reglement betreffende het duurzaam beheer van Materiaalkringlopen en Afvalstoffen (Flemish Regulation on Sustainable Management of Material Cycles and Waste)
VVSG	Vlaamse Vereniging van Steden en Gemeenten (Association of Flemish Cities and Municipalities)
WH	Waste Hierarchy
WtE	Waste-to-Energy

Introduction

Municipal solid waste management has emerged as one of the most pressing policy challenges of the twenty-first century. In this thesis, municipal waste refers to waste collected by or on behalf of municipal authorities and managed through the municipal system, consisting mainly of household waste, as well as similar waste from shops, offices, and public institutions (Eurostat, n.d.).¹ Cities worldwide generate over 2.1 billion tonnes of municipal waste annually, a volume projected to double by 2050 due to rapid urbanisation and rising consumption.² This is why waste management is not simply a logistical issue, as it requires institutional capacity at every level of governance, especially at the local level, to implement it. In recent years, urban waste governance has increasingly been related to the concept of circular economy (CE), as defined by Kirchherr et al. (2017), an economic system that replaces the ‘end-of-life’ concept with the 4R framework of Reducing, Reusing, Recycling, and Recovering materials throughout production, distribution, and consumption. At the city level, the circular economy principles are also reflected in practical initiatives such as waste segregation, recycling systems, food recovery efforts, and community involvement in resource management. How cities embed these principles into local practice varies, and that variation is what interests this research.

This research uses the Global North and the Global South as analytical categories to capture structural differences in governance environments. Kowalski (2020) defines the Global North, primarily in Europe and North America, as the developed countries characterised by a high level of income, technological advancement, well-developed infrastructure, and macroeconomic and political stability, while the Global South, primarily in Asia, Latin America, and Africa, is the developing countries with generally low income and various structural problems.³ In waste governance in the Global North, the focus tends to shift towards circularity, particularly on waste prevention within already functioning systems.⁴ The

¹ Eurostat, “Municipal Waste,” accessed June 30, 2026, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Municipal_waste.

² World Bank, “How the World Bank Is Tackling the Growing Global Waste Crisis,” World Bank Blogs, May 16, 2025, <https://blogs.worldbank.org/en/sustainablecities/how-the-world-bank-is-tackling-the-growing-global-waste-crisis>.

³ Arkadiusz Kowalski, *Global South-Global North Differences* (2020), 1–12, https://doi.org/10.1007/978-3-319-69625-6_68-1.

⁴ European Environment Agency, *Accelerating the Circular Economy in Europe: State and Outlook 2024* (European Environment Agency, 2024), <https://doi.org/10.2800/055236>.

challenges in the Global South centre on building systemic institutional, technological, and socioeconomic capacities to manage waste at scale.⁵

However, despite international mandates on environmental issues, nearly 25% of global municipal waste remains uncollected, and over one-third is openly dumped, reflecting limitations in the institutional framework and the enabling environment, particularly in low- and middle-income countries.⁶ The surge in municipal waste is not merely about the volume generated but also about the local institutional capacity to manage, treat, and recover resources efficiently, which varies with factors such as the social and economic situation, population density, and levels of commercial and industrial activity.⁷

A number of studies have discussed the importance of institutional capacity for environmental and waste governance; however, comparatively less attention has been paid to how different institutional capacities are configured across initiatives operating in contrasting governance contexts.⁸ This study addresses this gap by comparing three waste governance initiatives in Ghent (Belgium) and three in Surabaya (Indonesia). The six initiatives investigated are PAYT/Diftar, Recycling Parks 2.0, and *Gent en Garde* (FoodSavers) in Ghent; and Waste Banks, TPS3R, and Garda Pangan in Surabaya. These initiatives were selected based on their documented success as local waste governance interventions and on their functional comparability within the Reduce, Reuse, Recycle, Recover (4R) framework.

These two cities have achieved documented recognition in waste governance within their respective contexts, despite fundamentally different institutional environments. Ghent (Flanders) has been seen as Europe's best waste management system with a high waste diversion rate and coordinated regional policies that align with local programs.⁹ Surabaya is recognised nationally by the Indonesian Ministry of Environment as it received the Best City award in Waste Management in 2026, with a score of 74,92.¹⁰ Surabaya has also received the

⁵ Camila Sasahara et al., "Municipal Solid Waste Governance: Development and Application of an Index Embodying the Global South Context," *Frontiers in Sustainability* 5 (2024), <https://doi.org/10.3389/frsus.2024.1409418>.

⁶ World Bank, "How the World Bank Is Tackling the Growing Global Waste Crisis."

⁷ Ismaila Rimi Abubakar et al., "Environmental Sustainability Impacts of Solid Waste Management Practices in the Global South," *International Journal of Environmental Research and Public Health* 19, no. 19 (2022): 12717, <https://doi.org/10.3390/ijerph191912717>.

⁸ Abubakar et al., "Environmental Sustainability Impacts of Solid Waste Management Practices in the Global South."

⁹ Cecilia Allen, "Flanders, Belgium: Europe's Best Recycling and Prevention Program," Global Alliance for Incinerator Alternatives, 2012, <https://www.no-burn.org/wp-content/uploads/ZW-Flanders.pdf>.

¹⁰

Adipura Kencana award in 2019 and 2022, which is given to cities that maintain their cleanliness and urban environmental management.¹¹ These two cities were selected using the Most Different System Design (MDSD) logic, as they differ fundamentally in governance structures, regulatory environments, and economic conditions, yet both sustain local waste governance initiatives in their respective settings.

Domorenok et al. (2021) define institutional capacity as “a set of formal and informal rules, norms, procedures, as well as values, beliefs, knowledge, and skills, enabling the reconciliation of composite policy goals, harmonisation of multiple policy instruments, and coordination of relevant policy actors.”¹² This study draws on this definition and applies a six-dimensional analytical framework adapted from the USAID Solid Waste Capacity Index for Local Governments (SCIL): the policy and legal framework, organisational coordination and service delivery, financial and resource management, human resources and capacity building, communication and public awareness, and monitoring and evaluation. This framework is used to map which dimensions of institutional capacity are present across the six initiatives. This research employs a qualitative, document-based case study method to compare six initiatives, with three in each city. Each initiative is assessed against six dimensions of institutional capacity based on qualitative coding.¹³

The contextual differences make Ghent and Surabaya suitable and promising cases for discussing how institutional capacity is configured across different governance systems. Rather than assuming equivalence in scale or institutional similarity, the selection is based on their documented capacity to sustain waste governance initiatives and to effectively implement waste management programmes. The central objective of this thesis is to understand how and which local institutional capacities matter for waste governance by answering the following research questions: *‘How is institutional capacity configured across successful waste*

¹¹ Nur Azizah, “Governing Garbage: Solid Waste Management Reform in Surabaya,” in *Governing Urban Indonesia*, ed. Amalinda Savirani and Edward Aspinall, Books and Monographs (ISEAS–Yusof Ishak Institute, 2024), <https://www.cambridge.org/core/books/governing-urban-indonesia/governing-garbage-solid-waste-management-reform-in-surabaya/F234CBA86FC4B9BAF5DA6CF6E2A1A3EC>.

¹² Ekaterina Domorenok et al., “Introduction: Policy Integration and Institutional Capacity: Theoretical, Conceptual and Empirical Challenges,” *Policy and Society* 40, no. 1 (2021): 1–18, <https://doi.org/10.1080/14494035.2021.1902058>.

¹³ Alexander George and Andrew Bennett, “Chapter 3: The Method of Structured, Focused Comparison,” in *Case Studies and Theory Development: The Method of Structured, Focused Comparison* (2005), <https://indiachinainstitute.org/wp-content/uploads/2017/05/4C-How-to-Do-Case-Studies-George-Bennett-2005.pdf>.

governance initiatives in Ghent (Belgium) and Surabaya (Indonesia)?’ and ‘ Which capacity patterns are shared across both governance contexts and which are context-dependent?’”

This thesis argues that institutional capacity in waste governance is best understood as a configuration of complementary dimensions rather than as the presence of individual capacities in isolation. It suggests that some dimensions appear consistently across initiatives regardless of the governance context, while others vary with the institutional conditions in which they are embedded.

This thesis is structured as follows: Chapter I reviews the state of the art of institutional capacities for waste management. Chapter II presents the analytical framework and research design. Chapter III provides the contextual background on waste governance for both cities. Chapter IV presents the comparative analysis of the six initiatives across the six dimensions. Chapter V discusses the findings and identifies the configuration patterns. Chapter VI concludes with contributions, limitations, and recommendations for future research.

Chapter I: State of the art: institutional capacities for municipal waste management

Municipal solid waste management (MSWM) has increasingly been recognised as a complex urban governance challenge rather than purely a technical issue. Understanding why governance matters in waste studies and how it differs across contexts is necessary to fully grasp the interconnected debates in the literature. This chapter reviews three interconnected issues in the literature that together support the analytical approach developed in this thesis. First, studies of municipal solid waste management, as scholars such as Gutberlet (2021) argue, show that waste management is not only about technical services such as trucks and landfills, but also about governance arrangements, social inclusion, and the role of grassroots networks. Second, comparative research on urban governance highlights that Global North and Global South contexts differ structurally, producing different institutional conditions under which local waste initiatives are designed and implemented. Third, studies of institutional capacity in waste governance have analytical limitations, as they have tended to focus on individual capacity elements or performance outcomes in isolation, with less attention to how different dimensions of capacity are configured within and across waste initiatives, which limits the ability to explain how institutional capacity as a whole support or constrains governance functions in different contexts. Taken together, these debates point to a common analytical gap. The shift from technical management to governance shows that institutional arrangements and actor relations are central to how waste governance works. The Global North-South differences further show that these arrangements take different forms depending on the governance context, meaning that institutional capacity cannot be analysed as a fixed or universal set of conditions. Yet, existing studies on institutional capacity have not sufficiently examined how different capacity dimensions combine into configurations across different governance settings, and this is the gap that the analytical approach this thesis addresses.

1.1. Waste Generation and Management as an Urban Governance Problem

Annually, cities across the globe produce over 2 billion tonnes of municipal solid waste (MSW), reflecting unsustainable consumption and production patterns that directly affect

community health, environmental quality, and the climate.¹⁴ Waste does not have a uniform category as it can be classified by material, type, source, or hazard level. Its composition varies across urban contexts because waste generation depends on several factors, including population, consumption patterns, household behaviours, and local economic conditions, meaning that waste governance needs to be understood in the context of local challenges as a whole.¹⁵ The waste governance literature has responded to this complexity by shifting from a state-centric model towards a multi-actor framework. This is evidenced by the World Bank (1992), which initially defined governance as “the manner in which power is exercised in the management of a country’s economic and social resources for development.”¹⁶ Although state-level analysis affects how regions or localities manage waste, this state-centric view is shifting as scholars have begun to recognise the role and involvement of non-state actors, such as the private sector, non-governmental organisations, and communities, especially when formal institutions are fragmented or inadequate to deliver optimal waste management.¹⁷ This emphasises the importance of the involvement and cooperation of various stakeholders in waste management, especially in implementing waste governance initiatives at the local level. Cited from the UN Habitat report, McCarney’s (1996) defines urban governance as “the relationship between civil society and the state, between rulers and ruled, the government and the governed.”¹⁸ This relational framing is relevant in contexts characterised by formal capacity gaps and the reliance on community-based organisations. North (1990) provides the institutional explanation for this dynamic, arguing that local coordination and communication can be sustained through informal constraints, such as uncoded norms, shared routines, and trust-based practices, without immediately requiring a formal regulatory infrastructure.

In this context, waste management and waste governance are often conflated in policy and academic discussions, but they have distinct analytical meanings. Waste management mainly addresses the operational and technical dimension of the waste system, including waste collection, transportation, processing, treatment, recycling, and disposal, which in the

¹⁴ United Nations Environment Programme and International Solid Waste Association, *Global Waste Management Outlook 2024: Beyond an Age of Waste – Turning Rubbish into a Resource* (n.d.), <https://doi.org/https://doi.org/10.59117/20.500.11822/44939>.

¹⁵ United Nations Environment Programme and International Solid Waste Association, *Global Waste Management Outlook 2024: Beyond an Age of Waste – Turning Rubbish into a Resource*.

¹⁶ The World Bank, *Governance: The World Bank’s Experience* (Washington DC, 1994), Institutional Bank for Reconstruction and Development.

¹⁷ The World Bank, *Governance: The World Bank’s Experience*.

¹⁸ United Nations Human Settlements Programme (UN HABITAT), *The State of Asian Cities 2010/11* (2010), <http://www.rrojasdatabank.info/citiesasia1011.pdf>.

European context is guided by the European Waste Framework Directive (2008/98/EC), which guides the waste hierarchy and principles such as the polluter-pays principle, duty of care, and universal service coverage.¹⁹ While waste governance is a broader concept than operational delivery, it consists of institutional framework, power relations, roles and interests, participation, and accountability mechanisms that shape how the system functions.²⁰ As Gutberlet (2021) argues, waste governance specifically “takes an inter-sectoral approach to waste management with a focus on policies and regulations, as well as institutional arrangements that limit how decisions are made, who participates in the deliberation and how work is carried out.”²¹ This means that the analytical focus shifts from a narrow assessment of a city’s physical infrastructure to an analysis of the institutional configurations that enable or constrain its performance.

The distinction has implications, as technical inventions tend to fail without institutional alignment. For example, Indonesia’s waste-to-energy projects²² have been implemented poorly, not because the technology is unavailable, but because of persistent gaps in local administrative capacity, waste-supply guarantees, and land acquisition.²³ On the other hand, Surabaya’s waste bank network has expanded to over 290 units as of 2023 and operates within a community-based framework, suggesting that the governance framework aligns with social practices and that support can achieve impacts that top-down technical mandates may not deliver.²⁴ In an operational context, actor inclusion is also important, especially since informal waste pickers and micro-small enterprises estimate that they recover around 20-50% of recyclable materials in developing countries.²⁵ Altogether, these institutional and relational dimensions suggest that institutional capacity is an important explanatory variable not only for

¹⁹ International Energy Agency, “EU Waste Framework Directive – Policies,” IEA, IEA, 2025, <https://www.iea.org/policies/24849-eu-waste-framework-directive>.

²⁰ United Nations Environment Programme, *Global Waste Management Outlook*, 2016, 125–202, <https://doi.org/10.18356/4cc6a5e5-en>.

²¹ Jutta Gutberlet et al., “Participatory Solid Waste Governance and the Role of Social and Solidarity Economy: Experiences from São Paulo, Brazil,” *Detritus* 13 (2020): 167–80, <https://doi.org/https://doi.org/10.31025/2611-4135/2020.14024>.

²² Indonesia's waste-to-energy projects (*Pengelolaan Sampah menjadi Energi Listrik*, PSEL) are facilities that convert urban municipal waste into electricity, as mandated by Presidential Regulation No.35/2018. Only two facilities have become operational, one of which is the Benowo plant in Surabaya. (Draps and Trevanion, 2025)

²³ Frederic Draps and Dan Trevanion, “Accelerating Waste-to-Energy in Indonesia: PR 109/2025’s Impact and Challenges,” Ashurst, October 29, 2025, <https://www.ashurst.com/en/insights/accelerating-waste-to-energy-in-indonesia-presidential-regulation-109-2025/>.

²⁴ Novia Korniaty Solikha et al., *Bank Sampah and Waste Management in Urban Surabaya, Indonesia*, 6, no. 1 (2024): 78–82.

²⁵ David C. Wilson et al., “Role of Informal Sector Recycling in Waste Management in Developing Countries,” *Habitat International*, Solid Waste Management as if People Matter, vol. 30, no. 4 (2006): 797–808, <https://doi.org/10.1016/j.habitatint.2005.09.005>.

investment in technology but also for the combinations of regulations, actors, resources, and practices that enable the implementation of sustainable waste management.

1.2. Global North versus Global South divergence and dominant policy paradigms

The literature suggests that local waste policies and governance are related to the broader national and supranational policy paradigms that define what is considered feasible and appropriate, and which actors should be prioritised. A critical divergence exists between regulatory integration in the Global North and the decentralisation of the livelihood-driven model often found in the Global South. These aspects create distinct ‘rules of the game’ that influence how waste governance is framed, resourced, and evaluated.²⁶ The main difference lies in the integration of the regulatory model: the decentralised, community-based model is characteristic of the Global South, whereas the centralised, regulatory-integration model is characteristic of the Global North, reflecting different institutional structural contexts within which local capacity operates. It is important to understand this difference in the normative framework, including the unwritten rules and social values that shape how waste itself is conceptualised.

Since the 1970s, the “waste hierarchy (WH)” principle, which prioritises waste reduction, reuse, recycling, and recovery over disposal, has served as a global blueprint for waste management efforts. However, countries operationalise these standards differently: the Global North has made the WH legally binding, while the Global South views it as an aspirational framework, with actual practice largely at the disposal of those at the end of the hierarchy due to resource constraints and limited institutional capacity.²⁷ Still, no country fully complies with the WH and circular economy model, as the Global North countries have broadly failed at waste reduction and have high incineration rates, while the Global South countries have widely engaged in open dumping and have excluded important informal actors from formal systems.²⁸ This non-compliance, although shown differently, further complicated the North-South divide as a simple development issue.

²⁶ Rivke Jaffe and Martijn Koster, “The Myth of Formality in the Global North: Informality-as-Innovation in Dutch Governance,” *International Journal of Urban and Regional Research* 43, no. 3 (2019): 563–68, <https://doi.org/10.1111/1468-2427.12706>.

²⁷ Florence Barbara Awino and Sabine E. Apitz, “Solid Waste Management in the Context of the Waste Hierarchy and Circular Economy Frameworks: An International Critical Review,” *Integrated Environmental Assessment and Management* 20, no. 1 (2024): 11–12, <https://doi.org/10.1002/ieam.4774>.

²⁸ Awino and Apitz, “Solid Waste Management in the Context of the Waste Hierarchy and Circular Economy Frameworks,” 15.

On the one hand, in the European context, waste governance is shaped by a multi-level legal framework, with supranational directives that establish binding principles, which are translated into national, regional, and local regulations. The EU Waste Framework Directive 2008/98/EC established the core principles for waste policy, including the waste hierarchy, the polluter-pays-principle, and extended producer responsibility. This directive was amended in 2018 and further revised in 2025 through Directive (EU) 2025/1892, which entered into force in October 2025 and introduced, among other measures, a binding food waste reduction target and mandatory extended producer responsibility for textiles. As a result, these principles now constitute legally enforceable obligations for all EU Member States.²⁹

These obligations are compliance matters, under which cities such as Ghent must prepare local waste management plans (Local Materials Plans) that align with Flemish regional waste-management and prevention programmes. In this regard, Campitelli and Schebek (2020) show that waste governance increasingly relies on benchmarking systems, performance indicators, and standardised assessment frameworks that require coordination across multiple stakeholders.³⁰ This emphasises the measurable outcomes, multi-level governance, and technological standardisation in the European context.

On the other hand, Indonesia has a different waste governance framework. Under the decentralisation framework established during the post-1998 Reformation Period, Law No. 23/2014 on Regional Government devolves substantial administrative responsibilities to municipal governments, enabling local adaptation to national policy targets. The foundational legal framework for waste management in Indonesia is Law No. 18/2008 on Waste Management, while Presidential Regulation No. 97/2017 (*Jakstranas*) establishes the national targets of 30% waste reduction and 70% waste handling by 2025.³¹ However, *Jakstranas* primarily serves as a strategic policy framework rather than a strictly compliance-based mechanism, allowing municipalities' discretion in implementation through local regulatory

²⁹ International Energy Agency, “EU Waste Framework Directive – Policies”; Directive (EU) 2025/1892 of the European Parliament and of the Council of 10 September 2025 Amending Directive 2008/98/EC on Waste, EP, CONSIL (2025), <http://data.europa.eu/eli/dir/2025/1892/oj>.

³⁰ Alessio Campitelli and Liselotte Schebek, “How Is the Performance of Waste Management Systems Assessed Globally? A Systematic Review,” *Journal of Cleaner Production* 272 (2020): 122986, <https://doi.org/10.1016/j.jclepro.2020.122986>.

³¹ Center for Regulation Policy and Governance, “Jakstranas: Indonesia’s National Waste Management Roadmap 2017-2025,” 2025, <https://crpg.info/jakstranas-indonesias-national-waste-management-roadmap-2017-2025/>.

strategies and policies (*Jakstrada*). This is why municipalities can create a strategy based on their local context, and general waste governance frequently treats waste management as a socio-economic and community mobilisation effort, as evidenced by the waste banks system, environmental cadre networks, and civil society support for implementation.

One of the main differences in typical low- and middle-income countries is the informal recycling sector (IRS), including the informal micro-enterprise recycling and reuse system, which tends to be market-driven, with income derived solely from selling recovered material, and could save 20% or more of waste management expenses in cities.³² However, despite around 0.5 of urban populations in developing countries being part of the IRS, they are still excluded from the formal governance structure due to concerns about public health, child labour, and untaxed activities.³³ Another difference is in terms of technology transfer, as the Global North often has the availability of advanced waste management technologies, while the Global South, with limited financial resources, tends to import technologies and regulatory models that are poorly suited to the local waste compositions, climate conditions, and institutional capacities; thus, the donor-funded system tends to result in operational failures.³⁴ This shows not only a technical mismatch but also a governance mismatch: when waste management solutions are imported without adaptations to local needs and conditions, they displace locally appropriate approaches and innovation and may reduce the efficiency of informal sectors already operating under local conditions.

These differences are important to note because, first, they indicate that institutional capacity cannot be assessed using a single universal standard, as what may be seen as strong capacity in Ghent's formal integrated framework and compliance-oriented within the multi-level governance may be structurally unavailable in Surabaya's decentralised, community-based system, and vice versa. Second, as Calderon Marquez et al. (2021) argue, the governance transition from the Global North to the Global South frequently fails when the transition is implemented without considering the local practices, values, and functionality of IRS, especially when treating informality as a deficit/weakness rather than a structural feature,

³² Wilson et al., "Role of Informal Sector Recycling in Waste Management in Developing Countries."

³³ Wilson et al., "Role of Informal Sector Recycling in Waste Management in Developing Countries."

³⁴ Awino and Apitz, "Solid Waste Management in the Context of the Waste Hierarchy and Circular Economy Frameworks," 19–20.

which will misinterpret the capacity context in the Global South.³⁵ Finally, these differences raise questions of whether sustained waste governance can emerge from multiple institutional configurations.

1.3. Institutional Capacity

Institutional capacity in urban governance and waste management research is seen as a condition for effective policy-making; however, there is no unique definition or analytical approach to how to capture it. Studies have identified legal framework, inter-organisational coordination, financial arrangements, and community participation as significant factors, but tend to analyse them separately rather than explaining how they combine and interact to sustain specific functions over time. This is also what Domorenok et al. (2021) have observed: that existing literature has used institutional capacity in an evocative rather than an analytical way, and gives little attention to the linkage between its different dimensions, formal rules and procedures, informal norms and routine, values, and knowledge.³⁶ Guerrero et al. (2013), in their multi-method analysis of waste management in developing countries, find that solid waste management depends not on technological solutions alone but on the interaction among technical, environmental, financial, socio-cultural, institutional, and political-legal factors.³⁷ They find that these factors have significant variation in performance, underscoring the need for a framework that examines how multiple dimensions interact within a specific governance context. The comparative institutional literature provides a useful theoretical reference. Hall and Soskice (2001), who studied varieties of capitalism, argue that formal institutions are often a necessary precondition to achieve relevant equilibrium in the context of coordination; however, formal institutions alone are rarely sufficient to guarantee coordination outcomes, and there is an importance of informal rules and understanding to secure equilibrium in many strategic interactions of the political economy.³⁸ They also found that different institutional configurations can produce equivalent levels of economic performance, and that the result depends on the internal complementarity among a configuration's elements rather than on its

³⁵ Ana Julieth Calderón Márquez, "Leaving No One behind – Building Inclusive Circular Economies in the Global South," *Societal Impacts* 7 (2026): 100174, <https://doi.org/10.1016/j.socimp.2026.100174>.

³⁶ Ekaterina Domorenok et al., "Policy Integration, Policy Design and Administrative Capacities. Evidence from EU Cohesion Policy," *Policy and Society* 40, no. 1 (2021): 58–78, <https://doi.org/10.1080/14494035.2021.1930697>.

³⁷ Lilliana Abarca Guerrero et al., "Solid Waste Management Challenges for Cities in Developing Countries," *Waste Management* 33, no. 1 (2013): 220–32, <https://doi.org/10.1016/j.wasman.2012.09.008>.

³⁸ Peter A. Hall and David Soskice, *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage* (Oxford University Press, 2001), 12, <http://digamo.free.fr/hallsosk.pdf>.

similarity to any external standard.³⁹ This is relevant for the comparative waste governance initiatives in Surabaya and Ghent as they operate in structurally different governance environments.

Altogether, these literatures establish the analytical need for this study: the shift from technical to a broader governance framing in waste management identifies institutional capacities as the explanatory variable of successful performance, though the Global North-Global South context differences can be reasonably expected to challenge any universal standards. Extant studies provide a limited knowledge on this matter, which encourage me to test a configurational, initiative-level approach that is illustrated in detail in Chapter II.

1.4. Literature Gap

There are interconnected limitations in the existing studies on waste governance here. First is the difference in the unit of analysis, where the comparative research has been analysed at the city or national level, using aggregators to assess governance quality across contexts. While this is useful for cross-national comparison, it does not discuss how institutional capacity is organised and implemented within specific waste governance initiatives, especially across different urban contexts. Second, it relates to the qualitative case study, which tends to treat significant factors in isolation rather than explaining how they interact and combine to sustain operations or initiatives, a pattern also evident in waste governance research. This is similar to what Domorenok et al. (2021) observe: the institutional capacity literature is usually applied to account for outcomes rather than being unpacked as an organising framework, and it is not yet operationalised in a testable way. Third, the case study approach has not analysed whether institutional capacity can be organised through different combinations of dimensions across governance contexts, and whether some dimensions are present regardless of context, while others depend on the institutional infrastructure that a specific governance environment provides to varying degrees. This is demonstrated by Guerrero et al. (2013), who show that the enabling factors for waste governance varied significantly across cities, yet do not explain how these factors combine differently across governance contexts to produce equivalent outcomes. This thesis addresses these limitations by treating institutional capacity dimensions as a multi-dimensional analytical framework and applying it comparatively across six waste governance

³⁹ Hall and Soskice, *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, 15–21.

initiatives in the Global North and the Global South contexts. The analysis in this thesis, therefore, does not seek to determine which city initiatives possess greater institutional capacity but rather which dimensions matter and what the patterns show on how waste governance is sustained in the Global North and the Global South.

Chapter II: Analytical Framework and Research Design

Based on the institutional capacity literature reviewed in Chapter I, this chapter operationalises institutional capacity as the analytical framework for this study. The conceptual insights from the literature translate into the six dimensions that are applied comparatively across waste governance initiatives in the different governance contexts. It treats institutional capacity as a relational, multi-dimensional concept, operationalising it through six dimensions adapted from the United States Agency for International Development Solid Waste Capacity Index for Local Governments (USAID SCIL), and concludes with the research design, including case selection, data collection, and analytical methods. Instead of measuring waste performance, this research focuses on how multiple dimensions of institutional capacity are organised and function within each initiative and how these combinations differ across different waste governance contexts.

2.1. Institutional Capacity in Local Waste Governance:

Douglass North (1990) defines institutions as “*the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction*” (p. 3). On the one hand, formal institutions are considered codified rules such as political (and judicial) rules, contracts which contain the provisions of specific agreements, official procedures, while on the other hand, informal institutions are the uncoded rules, including the norms, conventions, routines, and shared practices shaping behaviour without legal force.⁴⁰ The framework is useful for waste governance research, as waste management institutions are not only about the official legal framework with assigned responsibilities and targets, but also about routines and shared practices for collecting, sorting, processing, and monitoring waste. This means that regulations alone are insufficient to analyse waste governance, as they are often reshaped by the informal, everyday habits of the people who implement them. In the comparative study of Ghent and Surabaya, the interaction between formal and informal institutions shapes how institutional capacities are organised and enacted in practice; this distinction is used to analyse the dimensions of institutional capacity throughout the thesis.

⁴⁰ Douglass C. North, *Institutions, Institutional Change, and Economic Performance*, First (Cambridge University Press, 1990), 3, http://episteme.pbworks.com/f/8.%20Institutions_Institutional_Change_and_Economic_Performance.pdf; North, *Institutions, Institutional Change, and Economic Performance*.

Grindle and Hilderbrand (1995), in their studies, find that organisational culture, including a shared sense of mission, professional norms, problem-solving orientation, and management style, is a stronger predictor of performance than structures, rules, and resources.⁴¹ Their studies across six developing countries show that some organisations performed well despite resource constraints due to strong organisational cultural compensation for material limitations, while others with adequate resources still failed to perform. Furthermore, they find that capacity depends on the interplay among five dimensions: the action environment, the institutional context of the public sector, the task network, the organisation, and the human resources. A constraint at a broader level can undermine interventions at a narrower level; for example, improving human resources does not produce results if the organisational or institutional context is more constraining. At the same time, Grindle and Hilderbrand (1995) find that some organisations can function despite resource constraints precisely because organisational culture can compensate for material and structural limitations. This means that capacity is not the sum of individual attributes but the product of how dimensions interact in a specific context. In this regard, this thesis views institutional capacity as a multi-dimensional and relational concept. However, since the research design relies on documentary evidence, the analysis assesses whether each capacity is present across initiatives and in which combinations, rather than evaluating the depth or quality of each dimension or the performance outcomes it produces.

Domorenok et al. (2021a), who studied policy integration, define institutional capacity as “a set of formal and informal rules, norms, procedures, as well as values, beliefs, knowledge and skills, enabling the reconciliation of composite policy goals, harmonisation of multiple policy instruments and coordination of relevant policy actors.”⁴² In the same literature, it is proposed that institutional capacity should be treated as a multi-dimensional concept organised across systemic, organisational, and individual levels, with each level having both formal and informal components that must be considered in combination rather than in isolation, as no single dimension is sufficient to explain governance outcomes. In a related study, Domorenok et al. (2021b) compare the implementations of sustainable development in Scotland and Veneto, which are both administrative regions that have a range of capacity

⁴¹ Merilee S. Grindle and Mary E. Hilderbrand, “Building Sustainable Capacity in the Public Sector: What Can Be Done?,” *Public Administration and Development* 15, no. 5 (1995): 441–63, <https://doi.org/10.1002/pad.4230150502>.

⁴² Domorenok et al., “Introduction.”

building to enhance integrated strategy found that the same formal capacity can function differently across contexts, which relates to the strategic motivations of the public servant and political salience of the policy rather than just the presence of appropriate structure.⁴³ Bringing these concepts together, this thesis defines institutional capacity as the ability of local actors and organisations to perform the tasks required to implement and sustain waste management initiatives. Institutional capacity is understood not only as the presence of resources, but also as the way rules, organisations, human skills, and practices combine to support waste governance initiatives. This study treats institutional capacity as a relational concept, which is what matters, not only whether other individual dimensions are present, but how they combine and operate within a specific governance context.

2.2 Operationalising Institutional Capacity: A Six-Dimensional Framework

The dimensions this study assesses for institutional capacity reflect the multi-dimensional structure of solid waste governance in comparative studies. Guerrero et al. (2013), who carried out a cross-national study across twenty-two developing countries, identified legal, institutional, financial, technical, and socio-cultural factors as the main enabling factors affecting whether a solid waste management system functions well, and demonstrated that weakness in any one dimension undermines system performance despite the technical input.⁴⁴ Additionally, Wilson et al. (2015) developed the Wasteaware benchmark indicator, built on the earlier UN-Habitat report *Solid Waste Management in the World's Cities*. Wilson et al. (2015) tested the Wasteaware benchmark indicators in cities in both the Global North and the Global South. These indicators organise solid waste governance into two overlapping 'triangles,' consisting of three physical components, such as collection, recycling, and disposal, and three governance dimensions, such as inclusivity, financial sustainability, and sound institutions or proactive policies.⁴⁵ Based on this framework, Wilson et al. (2015) argue that technological improvements alone are insufficient and that efforts to improve waste management systems are likely to fail if governance dimensions are not adequately addressed. The USAID Solid Waste

⁴³ Domorenok et al., "Policy Integration, Policy Design and Administrative Capacities. Evidence from EU Cohesion Policy."

⁴⁴ Guerrero et al., "Solid Waste Management Challenges for Cities in Developing Countries."

⁴⁵ David C. Wilson et al., "'Wasteaware' Benchmark Indicators for Integrated Sustainable Waste Management in Cities," *Waste Management* 35 (January 2015): 329–42, <https://doi.org/10.1016/j.wasman.2014.10.006>.

Capacity Index for Local Governments (SCIL) operationalised these same dimensions as measurable capacity indicators at the municipal level.⁴⁶

The USAID SCIL was selected because its dimensions are observable in documentary evidence, aligning with this study's qualitative document analysis method, and because it has been applied in Makassar and other Indonesian cities, as well as in another country, as part of the USAID Clean Cities, Blue Ocean programme. The SCIL assessment identifies capacity gaps across the legal, institutional, financial, technical, and community participation dimensions of solid waste management.⁴⁷

Based on insights from existing studies on institutional capacity reviewed above, three modifications were made to adapt the tool from municipal self-assessment to the comparative analysis conducted in this thesis. More specifically, the Planning dimension was excluded, as it serves as a precondition for the selected initiatives rather than a distinguishing variable among them; Service Delivery was reconceptualised as Organisational Coordination to shift the focus from outputs to institutional arrangements, including role assignment and actor coordination. Lastly, a Monitoring and Evaluation dimension was added because the institutional capacity literature views learning and performance review as an organisational capacity component different from operational delivery, drawing on Lusthaus et al. (2002), who differentiate programme-level and organisational-level monitoring and evaluation, where organisational-level monitoring analyses why and how results were or were not achieved to generate lessons to improve future performance.⁴⁸ This dimension is needed to identify if initiatives use feedback to sustain themselves, which is central to the institutional capacity applied in this study. The six dimensions are analytically distinct but potentially interrelated and may combine in different ways across initiatives.

- a. *Policy and Legal Framework* assess the structural and legal foundation of the local waste management initiative. It examines whether the initiative is grounded in legal

⁴⁶ Lori Scozzafava, "SOLID WASTE CAPACITY INDEX FOR LOCAL GOVERNMENTS (SCIL) Assessment Implementation Guide," 2022, <https://decfinder.devme.ai/urban-links/usaaid-scil-implementation-guide-for-local-governments/>.

⁴⁷ Tetra Tech, "Clean Cities, Blue Ocean (CCBO)," Technical proposal, Tetra Tech, 2023, https://devjobsindo.org/wp-content/uploads/jobmonster/2022-40-Request-for-Proposal-RFP_Trash-Collection-Efficiency_final.pdf.

⁴⁸ Charles Lusthaus et al., *Organizational Assessment: A Framework for Improving Performance* (Inter-American Development Bank (IDB), 2002), 75, 81, <https://publications.iadb.org/publications/english/document/Organizational-Assessment-A-Framework-for-Improving-Performance.pdf>.

- mandates, regulatory instruments, or an official policy framework that explicitly legitimises it. This dimension is evidenced by legal mandates or regulatory instruments
- b. *Organisational Coordination and Service Delivery* assess the organisation, coordination, and delivery of waste services within the local system, reflecting on how responsibilities are assigned among actors and on how they are coordinated in their operationalisation.⁴⁹ This dimension is evidenced by documented role allocations, contracts, operational procedures, and interdepartmental or interorganisational agreements at the initiative level, and the variation in how these arrangements are implemented across individual facilities is discussed in the case descriptions.⁵⁰
 - c. *Financial and Resources Management* assess the mobilisation and the management of financial and material resources to sustain the initiative over time. It is evidenced by a dedicated budget allocation, identifiable public or institutional funding streams, and documented rules or routines for allocating or using that resource, as reflected in available reporting or documents.
 - d. *Human Resources and Capacity Building* assess the human capital and knowledge systems necessary to maintain service quality and to operationalise the initiative. It is evidenced by officially designated personnel roles to support operational functions, structured recruitment processes, and documented training and professional development programs for capacity building among internal organisational actors (inward) and workforce members, including staff and volunteers.
 - e. *Communication and Public Awareness* assesses how local institutions engage citizens, community groups, and civil society actors in the initiative's planning and implementation (outward). Limited community involvement is a major barrier to sustained waste governance; thus, institutional capacity needs to be visible to the public. A documented outreach strategy and approach, public information campaigns, and reporting evidence on operational activities.
 - f. *Monitoring and Evaluation* assess whether an initiative is embedded in a structured system for tracking its activities and outputs over time. In this framework, the dimension is evidenced by the presence of performance indicators, a data-tracking or

⁴⁹ US AID, *USAID SCIL Program: Local Government Solid Waste Capacity Survey (Service Delivery)* - DECfinder, 2005, <https://decfinder.devme.ai/urban-links/usaaid-scil-program-local-government-solid-waste-capacity-survey-service-delivery/>.

⁵⁰ USAID, "Advancing Climate Change Mitigation Goals Through Improved Solid Waste Management," 2023, https://s3.eu-west-1.amazonaws.com/logcluster-web-prod-files/public/2024-01/Final_CCBO_Climate-Change_508.pdf.

reporting system, and monitoring data that is periodically aggregated and reviewed, as well as formal reports, evaluations, or planning documents.

These six dimensions serve as an analytical lens for assessing institutional capacity across the initiatives under examination. The six dimensions are operationalised through a set of indicators, summarised in the table below, which form the basis for the binary coding applied across all six initiatives.

Table 1 Six Dimensions and Indicators

Dimension	What it assesses	Indicators
D1 - Policy & Legal Framework	Institutional and legal foundation of the initiative	Formal legal or policy basis regulating the initiative
D2 - Organisational Coordination	Coordination of actors and organisation of service delivery	Tasks, functions, and role assignments; operational procedures; inter-organisational arrangements; collaboration with community and informal actors
D3 - Financial & Resource Management	Mobilisation and organisation of financial and material resources	Budget allocations; funding streams; cost-recovery mechanisms; documented rules or routines for allocating and using financial resources
D4 - Human Resources & Capacity Building	Human capital and knowledge development	Designated staffing structure with designated roles and responsibilities; training programmes; technical guidance
D5 - Communication & Public Awareness	Public engagement and stakeholder communication	Outreach strategies; awareness campaigns;
D6 - Monitoring & Evaluation	Monitoring systems and periodic performance review	Performance indicators exist, data-tracking or reporting mechanism

Questions for Structured Comparison

The following questions aim to capture whether specific institutional capacities are present in the six initiatives under examination. They do not constitute measures of initiative performance, but they serve as analytical markers for mapping the comparative profiles of initiatives' institutional capacity configurations.

1. Policy and Legal Framework

1. Q1: Is there an official legal or policy basis that authorises, recognises, or clearly grounds this initiative within the relevant governance system?
2. Q2: Is there evidence that the initiative complies with or is formally aligned with a higher-level legal instrument, such as national law or regional regulation?

2. Organisational Coordination and Service Delivery

1. Q3: Are the established coordination mechanisms between departments, community actors, private actors, or informal waste stakeholders in place?
2. Q4: Are the roles and responsibilities of actors involved in the initiative clearly delineated in operational documents?

3. Financial and Resource Management

1. Q5: Is there a specific, identifiable budget allocation or an ongoing, established funding source for the initiative?
2. Q6: Does the initiative have documented rules or routines for managing and allocating financial resources?

4. Human Resources and Capacity Building

1. Q7: Are there assigned staff groups or particular personnel roles officially designated to oversee and implement this initiative?
2. Q8: Is there evidence of ongoing training sessions, technical workshops, etc., for the actors directly involved in the operational initiatives?

5. Communication and Public Awareness

1. Q9: Does the initiative actively engage with the public or relevant community actors through outreach, campaigns, meetings, or participation channels?

2. Q10: Does the initiative make its goals, procedures, and performance information accessible?

6. Monitoring and Evaluation

1. Q11: Are there any formal performance indicators, data-tracking mechanisms, or reporting formats established for the operational activities in the initiative?
2. Q12: Is there documented evidence that monitoring data about the initiative are presented in formal reports or evaluations?

Research Method and Data

This research adopts a qualitative case study method to analyse how institutional capacity is configured across local waste governance initiatives. The case study approach is used as it allows detailed analysis of institutional arrangements within their governance settings, capturing the contextual conditions that shape how capacity dimensions function in practice. As Yin (2018) argues, case study methodology is appropriate for research questions concerned with understanding the mechanisms and conditions through which particular outcomes emerge, rather than those seeking to establish frequency or distribution across larger populations.⁵¹

The Most Different System Design (MDSD) is used here for case-selection, in which the two cities differ fundamentally in their socio-economic conditions, formal governance structures, and legal environments, yet both have established and sustained waste governance initiatives within their respective contexts.⁵² This comparison enables examination of whether similar or different configurations of institutional capacity emerge across contrasting governance settings. To carry out this comparison systematically, this research applies the method of structured, focused comparison as defined by George and Bennett (2005), in which each initiative is examined using the same set of theoretically grounded questions.⁵³ This method ensures that data collection is standardised across all six initiatives and that the findings can be

⁵¹ Robert K. Yin, "Case Study Research and Applications: Design and Methods," SAGE Publications, 2018, https://opac.atmaluhur.ac.id/uploaded_files/temporary/DigitalCollection/YTE3NDlmYTY0ZjE2MDA5ODE4NGI1Y2FhMjdkMjRmYW5kMDA2MTVhOQ==.pdf.

⁵² Adam Przeworski and Henry Teune, *The Logic of Comparative Social Inquiry* (University of Minnesota, 1970), <https://dn790000.ca.archive.org/0/items/in.ernet.dli.2015.138830/2015.138830.The-Logic-Of-Comparative-Social-Inquiry.pdf>.

⁵³ George and Bennett, "Chapter 3: The Method of Structured, Focused Comparison."

analysed and compared systematically across cases, despite substantial differences in governance contexts.

Unit of Analysis

The primary unit of analysis is the individual waste governance initiative, with six initiatives selected across the two cities, three in each city. The research focuses on the years between 2019 and 2025, as this period captures the institutional arrangements and operations of local waste governance in both cities while remaining recent enough to reflect current practice. In Ghent, it includes the recent policy and organisational documents relating to the three initiatives. In Surabaya, it covers the main regulation and program documents governing the three initiatives. The initiatives were selected based on two criteria: the functional coverage of the 4R framework (reduce, reuse, recycle, recover) and documented operational continuity and external recognition within their respective cities. Selecting initiatives across different functional areas aims to provide a balanced comparative basis, enabling assessment of how institutional capacity is structured across different types of circular waste practice rather than within a single operational category.

Table 2 Local Waste Governance Initiatives in Ghent and Surabaya

These are the local waste governance initiatives in Ghent and Surabaya.

Focus	Ghent	Surabaya
Economic incentives	Pay-As-You-Throw (PAYT/Diftar): ⁵⁴ (since 1998), managed by IVAGO, a differentiated tariff system linked to household waste charges to the volume and weight of residual waste generated, creating a financial incentive for source-based waste sorting.	Waste Banks: ⁵⁵ (since the early 2000s): community-based initiative, with residents depositing recyclable materials and receiving savings credits, with informal recycling networks involved in the collection system.

⁵⁴ Collectors, “Gent (BE) » Collectors,” *Gent (BE)*, 2020, <https://www.collectors2020.eu/wcs-ppw/gent-be/>.

⁵⁵ Dyah Wijayanti and Sri Suryani, “Waste Bank as Community-Based Environmental Governance: A Lesson Learned from Surabaya,” *Procedia - Social and Behavioral Sciences* 184 (May 2015), <https://doi.org/10.1016/j.sbspro.2015.05.077>.

Infrastructure	Recycling parks 2.0: ⁵⁶ managed by IVAGO, six recycling parks were renovated between 2022 and 2023, and a structured program to transform recycling parks into circular economy hubs with differentiated tariff zones.	TPS3R, or 3R Waste Processing Facility (Tempat Pengolahan 3R), is a waste management site for reduce, reuse, and recycle, implemented at the community level by the local government to sort and process waste, reduce organic waste, and support community-based recycling. ⁵⁷
Circular rescue	<i>Gent en Garde</i> food-rescue system (FoodSavers, <i>Sociale Kruideniers Gent, Rabot op je Bord</i>): ⁵⁸ Since 2017, the City's Public Centre for Social Welfare (OCMW) has implemented a <i>Gent en Garde</i> strategy, using a professional logistics platform (FoodSavers) to collect surplus food from partners and redistribute it to social organisations, <i>Sociale Kruideniers Gent</i> and <i>Rabot op je Bord</i> .	Garda Pangan: ⁵⁹ Operational since 2017, a social and eco-enterprise to collect surplus food from food sector partners and the hospitality sector for redistribution to pre-welfare communities.

⁵⁶ IVAGO, "Recyclageparken," IVAGO, accessed May 5, 2026, <https://www.ivago.be/nl/particulier/recyclageparken>.

⁵⁷ TPS3R Surabaya comprises 12 DLH-managed facilities; individual sites are used as documentary evidence for network-level coding.

⁵⁸ Urban Sustainability Exchange, "Ghent En Garde," Urban Sustainability Exchange, accessed February 9, 2026, <https://use.metropolis.org/case-studies/ghent-en-garde#casestudydetail>.

⁵⁹ Amanda Bahraini, "Meet Garda Pangan: Food Bank from Surabaya," *Artikel Dan Berita Pengelolaan Sampah Dari Waste4Change*, October 21, 2019, <https://waste4change.com/blog/meet-garda-pangan-food-bank-from-surabaya/>.

Data collection

This research uses desk-based document analysis as the primary data collection method, using three source categories that capture both the formal institutional governance framework of each initiative and its operational functions.

- a) Category A: Policy and legal framework: documents such as EU directives, Flemish waste regulations, IVAGO policy documents, Indonesian Law, Mayoral regulations (*Perwali*), and regional development plans. These documents are important evidence of formal mandates, regulatory requirements, and legal proof of how each initiative operates.
- b) Category B: Official operational reports, such as municipal sustainability reports, evaluations specific to initiatives, and internal organisational documents. These are necessary as evidence of how institutional capacity is reflected in reporting structures, budgeting instruments, performance management, and operational procedures.
- c) Category C: Secondary empirical research: documents including peer-reviewed academic literature, policy research publications, independent field investigations, and report evaluations from other organisations. These provide external validation and evaluation of how initiatives function in practice beyond the official narrative, capturing the operational realities that formal documents may be unable to provide.

Triangulation in both contexts is achieved by combining at least two source categories for each capacity dimension, with the categories varying across cities. Additionally, for an initiative that operates across multiple facilities, dimensions are coded as present when there is a formal mechanism at the initiative level and at least some evidence that it is applied in practice, while variations in implementation across facilities are then discussed in the case description.

Analytical procedure: theory-driven categorisation

Each chosen initiative is assessed against the six dimensions of institutional capacity using the same set of analytical questions, which follow the logic of structured, focused comparison. For each dimension, they will be assessed to determine whether sufficient documentary evidence exists that the dimension is functionally present and embedded within the initiative. To ensure consistency among the six cases, the research uses a binary presence/absence marker to code whether each institutional capacity dimension is evidence in the available documents. The coding is summarised in Table 3.

Table 3 Binary coding

Code	Meaning
1 (presence)	The dimension is clearly evidenced as functionally present in the available materials, with supporting evidence appearing in at least two source categories
0 (absence)	The dimension is absent, unclear, or not sufficiently evidenced.

This approach does not provide a quantitative assessment of intensity; rather, it serves as a systematic, categorical procedure to ensure uniform threshold mapping across initiatives. The use of dichotomous values 1 (for presence) and 0 (for absence) reflects whether documentary evidence of an established capacity mechanism exists and can be identified in the sources, rather than measuring the quality of that mechanism. Additionally, a score of 0 (absence) does not necessarily imply the absolute absence of specific capacity; rather, it indicates the absence of a verifiable mechanism within the available sources. Beyond the coding, the analysis returns to the underlying documents for each initiative to describe what the documented presence or absence of each capacity dimension looks like in practice, in order to analyse and evaluate the arrangement or configuration of the institutional dimensions.

Chapter III:

Waste Governance Contexts in Ghent and Surabaya

This chapter provides the contextual background for the two cities through which institutional capacity is analysed. As the two cities were selected using the Most Different System Design logic, they differ fundamentally in their regulatory structures and governance environments, yet both have established waste governance initiatives that have sustained operational continuity in their respective contexts. This chapter provides an overview of the institutional, legal, financial, and organisational settings of waste governance in Ghent (Belgium) and Surabaya (Indonesia), as representative of Global North and Global South urban contexts. This outlines the governance framework within which the six initiatives operate. Presenting both cities in a single chapter allows us to trace contextual differences, which are reasonably expected to affect the institutional capacity configurations examined in the next chapter.

3.1 Institutional Context of Waste Governance in Ghent, Belgium

Ghent, located in Belgium's Flemish (Flanders) Region, is the third-largest city in Belgium, with a population of approximately 274,000 as of 2025.⁶⁰ Regional policy in the European context is structurally aligned with the European Union as a supranational organisation, which produces rules and directives, including the European Union (EU) Waste Framework Directive, that establish mandatory targets and principles for waste prevention and management in the EU and must be incorporated into its Member States' national legal frameworks.⁶¹ Although the EU Directive is not directly applicable to its citizens, it binds its Member States within a certain time limit.⁶² In Belgium, a federation country with three regions, each of which is responsible for implementing the EU Directive within its own territory; in this case, Ghent is in the Flemish/Flanders region.

As one of the most advanced urban waste governance systems in Europe, Ghent's waste governance is operating within the broader Flemish waste and materials management

⁶⁰ Gent, "Dashboard - Bevolking - Binnenstad (Gent)," 2025, <https://gent.buurtmonitor.be/mosaic/dashboard/bevolking>.

⁶¹ International Energy Agency, "EU Waste Framework Directive – Policies."

⁶² European Commission, "Transposition of Directives," accessed May 26, 2026, <https://ec.europa.eu/implementing-eu-law/transposition-directives/en>.

framework, which has shifted from a disposal-oriented system to a circular economy model that prioritises prevention, reuse, recycling, and sustainable resource utilisation.⁶³ Flanders is also renowned for its recycling rates and policy consistency, supported by a defined coordination mechanism among regional authorities, municipalities, intermunicipal bodies, the private sector, and citizens.⁶⁴ This section provides an overview of Ghent's waste governance, including the institutional structure, legal framework, and financial instruments.

Institutional and governance settings

Waste governance in Ghent has a multi-level institutional framework that connects European Union waste legislation, Flemish regional coordination, municipal responsibility, and intermunicipal service delivery, indicating that the broader Flemish approach operates through collaboration among multiple actors. At the regional level, the Public Waste Agency of Flanders (*Openbare Vlaamse Afvalstoffenmaatschappij/OVAM*) is responsible for Flemish waste and materials policy, including planning, implementing, and monitoring key regional frameworks in Flanders to support the transition toward a more circular Flanders.⁶⁵ OVAM operationalises this through instruments, including the Materials Decree and the 'Circular Flanders' hub which connects multiple stakeholders such as the governments, private sector, and civil society.

In the Flemish framework, the regional strategy is also shaped by the Association of Flemish Cities and Municipalities (VVSG) and its specialised waste network, Interafval, the partner of VVSG, all Flemish intermunicipal waste associations, and local authorities for local waste policy, where Interafval has an advisor, advocate, and network organisation roles in the Flemish region.⁶⁶ Still, the day-to-day operational activities related to household waste remain the municipal responsibility. In Ghent, the local operationalisation of waste management is carried out by IVAGO, the intermunicipal waste company for Ghent and Destelbergen, which is responsible for waste sorting, collection, public cleaning, and other waste-related services.⁶⁷ This means that Ghent's waste governance is delivered not only by the municipal

⁶³ Collectors, "Gent (BE) » Collectors."

⁶⁴ Arianne Acke et al., "A Multi-Stakeholder and Interdisciplinary Approach to Waste Management and Circular Economy: The Case of Flanders and Ghent, Belgium," *European Spatial Research and Policy* 27 (December 2020): 43–57, <https://doi.org/10.18778/1231-1952.27.2.04>.

⁶⁵ OVAM, "OVAM Uncovered Brochure," OVAM, 2025, <https://ovam-english.vlaanderen.be/our-organization>.

⁶⁶ Interafval, "About Interafval," accessed May 26, 2026, <https://www.interafval.be/>.

⁶⁷ Stad Gent, "Waste Management," accessed May 4, 2026, <https://stad.gent/en/expats-ghent/waste-management>.

administration but also through IVAGO, which entails broader coordination among policy actors and the localised waste management organisation.

Legal and policy framework

Waste management in Ghent is organised within three multi-level frameworks: European Union (EU) legislation, Flemish regional policy, and local implementation. At the European level, the Waste Framework Directive establishes the foundational principles of waste governance across all EU Member States, including the waste hierarchy, separate collection, the polluter-pays principle, waste management and prevention plans, and extended producer responsibility.⁶⁸ At the regional level, EU waste directives are transposed into several layers of regional legislation. In Flanders, this process was still ongoing in early October 2020. One key instrument is the Materials Decree (2012), which embedded sustainable materials management and directly implements the European Waste Framework Directive (EC) 2008/98, replacing the Waste Directive of 1981.⁶⁹ There was also VLAREMA (*Vlaams reglement betreffende het duurzaam beheer van materiaalkringlopen en afvalstoffen*), the Flemish Regulation on the Sustainable Management of Material Cycles and Waste, which replaced VLAREMA and established detailed regulations on special waste streams, raw materials, separate collection, and registration obligations, among others.⁷⁰

To implement these measures, Flanders has charged landfill and incineration taxes since 2007, to ensure that landfilling is more expensive than incineration and incineration than recycling, and raised them by 50% in 2015, applying the polluter-pays principle. These measures then led to bans on landfilling and incineration for household and industrial waste. Afterwards, the Local Materials Plan 2023-2030 operationalises this framework for prevention efforts and an implementation plan for household and commercial waste in Flanders.⁷¹ In accordance with these frameworks, the municipal government has legal responsibility for household waste management but remains subject to Flemish targets and reporting obligations.

⁶⁸ International Energy Agency, “EU Waste Framework Directive – Policies.”

⁶⁹ European Environmental Bureau, “#NoTimeToWaste Member States Delaying The Inevitable Targets,” n.d., 11, https://eeb.org/wp-content/uploads/2020/11/Member-States-delay-meeting-inevitable-targets_report.pdf.

⁷⁰ OVAM, “Waste and Materials,” OVAM, accessed May 17, 2026, <https://ovam-english.vlaanderen.be/waste-and-materials>.

⁷¹ OVAM, *Local Materials Plan: Implementation Plan for Municipal Waste 2023-2030* (n.d.), <https://ovam-english.vlaanderen.be/waste-materials>.

Economic instruments

Building on the legal framework, economic instruments translate the polluter-pays principle into direct household-level incentives. EU Waste Framework Directive Article 14 states “...the cost of waste management, including the necessary infrastructure and its operation, shall be borne by the original waste producer or by the current or previous waste holders,” and OVAM operationalises this principle with the extended producer responsibility and waste-related fee in Flemish material management.⁷² This principle is implemented at the city level through Ghent’s Pay-As-You-Throw (PAYT) system, in which residents pay based on the amount of residual waste they dispose of, using required waste bags or containers and weight-based tariffs. However, other recyclable waste streams, such as paper, cardboard, glass, and textiles, are collected free of charge.⁷³ This pricing structure is designed to encourage waste prevention, provide financial incentives, and promote sorting waste by category.

Operational management and the role of citizens

Waste management operations in Ghent are delivered by IVAGO, the intermunicipal company that serves both Ghent and Destelbergen, and is responsible for household waste collection, the operation of six recycling parks, and waste services for private clinics. In terms of citizens' behaviour, this is also integrated into the communication and enforcement mechanism: when waste is not collected, IVAGO notifies residents by placing a label on a container or at paper collection points, indicating the reason for non-collection. This practice links sorting errors directly to corrective household actions, positioning residents’ participation and responsibility as part of local waste management.⁷⁴ Furthermore, fines will be enforced, including a 250-euro fine if there is evidence of illegal dumping.⁷⁵ At the Flemish level, OVAM's Waste Monitoring Report shows that Ghent has a total of 6,621 tonnes of waste (0.97 kg per person), with 73.4% removed by street-cleaning workers, 17.2% by volunteers, and 9.4% by specialised vehicles.⁷⁶ This illustrates a broader role of civic participation in the waste management efforts. Ghent also has multi-stakeholder cooperation. For instance, the REPAiR project examines Ghent-Destelbergen through a living-lab approach that brings together waste operators, researchers,

⁷² International Energy Agency, “EU Waste Framework Directive – Policies”; OVAM, “Waste and Materials.”

⁷³ ACR+, “Good Practice Flanders: PAYT,” 2014, https://www.acrplus.org/media/origin/images/project/R4R/Good_Practices/GP_OVAM_PAYT.pdf.

⁷⁴ IVAGO, “How to Present Your Domestic Waste in Gent,” 2022, https://www.ivago.be/sites/default/files/inline-files/IVAGO_HUISVUILBROCHURE_2021_A5_ENG_ALG_V5.pdf.

⁷⁵ IVAGO, “How to Present Your Domestic Waste in Gent.”

⁷⁶ ACR+, “OVAM | New Report on Waste Control in Flanders 2023,” January 14, 2025, <https://www.acrplus.org/en/news/ovam-new-report-on-waste-control-in-flanders-2023-4691>.

the private sector, and community organisations to address waste and material challenges, demonstrating the need for sustained multi-stakeholder collaboration.⁷⁷

Strategic orientation toward prevention and circular economy

Ghent's waste governance system operates under the broader Flemish regulatory framework, with IVAGO as the intermunicipal organisation responsible for implementing local operational waste management practices. Municipalities and intermunicipal authorities enact regional policy through local collection systems, recycling parks 2.0, and pricing mechanisms such as pay-as-you-throw (PAYT). This section explains three initiatives: the differentiated waste tariff system known as Pay-As-You-Throw (PAYT) or Diftar; the food waste reduction programme, FoodSavers, which operates within the *Gent en Garde* strategy; and Recycling Parks 2.0, which, together with these initiatives, reflects Ghent's approach to waste governance.

3.2 Institutional Context of Waste Governance in Surabaya, Indonesia

Surabaya, the capital city of East Java and the second-largest city in Indonesia, has a population of around 3 million people and produces approximately 1.800 tonnes of municipal solid waste daily. As an urban area in a lower-middle-income country context, Surabaya has governance issues that differ significantly from those of Ghent, including urban growth, constrained fiscal resources, fragmented institutional coordination, and a strong reliance on community-based entities to fill gaps in the provision of formal services.⁷⁸ However, Surabaya has established a nationally recognised framework for good waste governance that combines formal municipal administration with community-based networks such as waste banks and food waste initiatives. Waste management in Surabaya is officially managed by the *Dinas Lingkungan Hidup* (DLH), the city's Department of Environment, which operates under both national and regional environmental laws. The city of Surabaya manages approximately 1.800 tons of waste daily through formal facilities, including waste-sorting and processing stations (TPS3R) as part of its waste management efforts.⁷⁹

⁷⁷ Acke et al., "A Multi-Stakeholder and Interdisciplinary Approach to Waste Management and Circular Economy."

⁷⁸ Waste4Change, "Studi Kasus Indore dan Surabaya: Menakar Relevansi Transformasi Tata Kelola Sampah bagi Kota-kota di Indonesia," Waste4Change, 2025, <https://waste4change.com/id/research/case-study-of-indore-and-surabaya-assessing-the-relevance-of-waste-management-transformation-for-indonesian-cities>.

⁷⁹ Pemerintah Kota Surabaya, "Olah Sampah Organik Jadi Pupuk, DLH Surabaya Hemat Biaya Angkutan Rp6,73 Miliar per Tahun," 2026, <https://www.surabaya.go.id/id/berita/24672/olah-sampah-organik-jadi-pupuk-dlh-surabaya-hemat-biaya-angkutan-rp-6-73-miliar-per-tahun>.

Institutional and governance settings

Surabaya's approach to waste management is shaped by its status as a densely populated, lower-middle-income urban area. Organic waste dominated the city's waste stream, and community engagement is the key driver of behavior change and of waste governance as a whole. At the national level, the National Policy and Strategy on the Management of Household Waste and Waste Similar to Household Waste (*Kebijakan dan Strategi Nasional Pengelolaan Sampah Rumah Tangga dan Sampah Sejenis Sampah Rumah Tangga/Jakstranas*), which was established under the Presidential Regulation No. 97/2017, is the national roadmap for managing domestic waste with a shift in mindset of waste collection and dumping to source-based management, and sets two major goals: waste reduction by 30% and 70% of waste managed by 2025.⁸⁰ To achieve these directives at the local level, regions and cities draft their own versions, known as the Regional Waste Management Strategy (*Kebijakan dan Strategi Daerah/Jakstrada*), which adapt to their local contexts. Surabaya's strategy mainly focuses on diverting organic waste, which accounts for more than 60% of the city's waste generation. As for dry recyclables, Surabaya, as part of its circular efforts, has a waste bank system that sorts recyclable waste and transports it to waste collectors (*lapak/pengepul*) or recycling facilities. Civil society also plays an active role in coordination and communication within Surabaya's waste governance system, especially at the neighborhood level, where informal actors are also involved. This contrasts with Ghent, where operational-level waste governance is managed by IVAGO.

Legal and policy framework

Waste governance in Surabaya is based on a multilevel legal system comprising national laws, provincial regulations, and local laws. At the national level, Law No.18/2008 on Waste Management serves as the principal legal instrument, outlining the waste management hierarchy, designating local governments as primarily responsible for household waste management, and imposing requirements for waste reduction and handling.⁸¹ This law is implemented through Government Regulation (*Peraturan Pemerintah/PP*) No. 81/2012, which specifies technical standards for municipal-level waste management and processing.⁸² At the

⁸⁰ Center for Regulation Policy and Governance, "Jakstranas."

⁸¹ "UU No. 18 Tahun 2008," Database Peraturan, accessed May 12, 2026, <http://peraturan.bpk.go.id/Details/39067/uu-no-18-tahun-2008>.

⁸² Badan Pembinaan dan Pengembangan Hukum Pemeriksaan Keuangan Negara, "PP No. 81 Tahun 2012," Database Peraturan, accessed May 11, 2026, <http://peraturan.bpk.go.id/Details/5295/pp-no-81-tahun-2012>.

local level, Surabaya has an extensive regulatory framework for waste management, including Surabaya City Regulation No. 5/2014 on waste management and cleanliness, which establishes guidelines for waste collection and sorting, as well as cleanliness standards throughout the city. These regulations translate national obligations into rules that can be enforced locally. Although Law 18/2008 also mentions penalties, Surabaya's local regulation no. 5/2014 mentions social incentives and increasing community involvement.

Economic instruments

Compared to other big cities in Indonesia. Surabaya is allocated a considerably high budget for its waste management framework, which accounts for around 3-4% of its total annual city expenditure, totalling IDR462 billion (€22.23 million).⁸³ This amount is primarily used for operational costs, including waste collection and transportation, as well as the tipping fee at the Benowo Landfill, indicating that the budget is sufficient for operationalisation but not necessarily for expansion or capacity improvement, and let alone for stronger prevention programmes. Aside from the budget, Surabaya, in its financial waste management instrument, has a stream of funds from corporate social responsibility (CSR) contributions and community payments through service fees, which the rates are varied for residential, commercial, and industrial areas.⁸⁴ This means that Surabaya's economic model is characterised by public-private partnerships and social incentives. For example, a public-private partnership is in place for the Benowo Landfill, a Waste-to-Energy facility, allowing access to high-tech disposal infrastructure.⁸⁵ The retribution fees help cover service delivery, though they remain relatively small compared to actual operational costs. Furthermore, community-based organisations and civil society groups support the financial mechanism through waste bank savings programs and fee-for-service agreements with private entities, highlighting funding strategies to address the shortcomings of formal fiscal resources.

⁸³ Waste4Change, "Studi Kasus Indore dan Surabaya."

⁸⁴ Aulia Ulfah Farahdiba et al., "Food Waste Flows for Energy Recovery: A Material Flow Analysis Approach in Urban Cities of Indonesia (Study Case: Surabaya City)," *Joint Journal of Novel Carbon Resource Sciences & Green Asia Strategy* 11, no. 03 (2024): 2728–41.

⁸⁵ Aisha Adriyanti et al., "Analisis Kerjasama Pemerintah Kota Surabaya Dan PT. Sumber Organik Dalam Implementasi PLTSA Benowo," *Triwikrama: Jurnal Ilmu Sosial* 8, no. 12 (2025): 1–10, <https://doi.org/10.9963/wxsc4803>.

Operational management and the role of citizens

For the operational organisation of its waste governance, Surabaya does not rely solely on its municipal government but on a combination of formal institutions and community-based activities that complement one another. The Department of Environment (DLH), which has a facilitator, coordinator, and monitor role, is also in charge of managing waste from the sorting and processing facilities, as well as waste residue, to the landfill. This whole process involves the daily, street-level collection by neighborhood unit leaders, who coordinate waste management and neighborhood-level initiatives.⁸⁶ One of the key distinct aspects of Surabaya's waste governance is the environmental cadres (*kader lingkungan*) network, which, as of 2025, comprises more than 29,000 community volunteers, primarily women associated with *the PKK (family welfare movement)*, a national family welfare and homemakers' organisation.⁸⁷ Environmental cadres' role is crucial, as they are the 'ambassador' for waste management in their communities and help raise awareness by disseminating information on composting, waste classification, and household cleanliness.⁸⁸ This public awareness strategy connects the government and citizens, encouraging Surabaya's citizens to actively participate in waste management efforts and initiatives. Residual waste that cannot be recovered will be transported to the Benowo Landfill, where a waste-to-energy facility serves as the final stage of the waste management chain.

⁸⁶ Farahdiba et al., "Food Waste Flows for Energy Recovery: A Material Flow Analysis Approach in Urban Cities of Indonesia (Study Case: Surabaya City)."

⁸⁷ Pemerintah Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah Kota Surabaya," Action Plan Surabaya, Pemerintah Kota Surabaya, 2025, <https://jdih.surabaya.go.id/uploads/peraturan/2025kepwali3578100-3-3-3-210-436-1-2-2025.pdf>.

⁸⁸ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026," Regulation, Wali Kota Surabaya, 2025, <https://jdih.surabaya.go.id/uploads/peraturan/2025kepwali3578100-3-3-3-210-436-1-2-2025.pdf>.

Chapter IV: Comparing Local Waste Initiatives in Ghent and Surabaya

This chapter maps the institutional capacity of six waste governance initiatives across Ghent and Surabaya against the six dimensions established in Chapter II and provides justification for the scoring and binary coding in the Annex. Two summary tables present the capacity profiles for the three Ghent initiatives and three Surabaya initiatives respectively, with configuration observations closing each city's section.

4.1 PAYT (Ghent)

Ghent was one of the first cities in Flanders to adopt Pay-As-You-Throw (PAYT), starting with the prepaid-bag pilot programmes in the late 1980s and later implementing a differentiated charging system, combined with residual-waste pricing and incentives for separate waste collection.⁸⁹ PAYT initiative in Ghent, locally known as Diftar or Differentiated Tariffs (*Gedifferentieerde Tarieven*), implements a pricing system based on the volume and weight of residual waste collected.⁹⁰ This initiative is part of a more comprehensive waste-reduction strategy led by IVAGO, where instead of using a uniform household charge, it ties a portion of the expenses directly to the volume of residual waste each household produces, providing a financial incentive for residents to sort their waste more diligently and minimise unnecessary disposal. This system does not operate alone; it is part of a broader collection framework supported by public outreach, employee readiness, and ongoing supervision, all of which are essential to the operation of a variable pricing model. The idea of this policy is to make the waste producer more conscious and financially responsible for the collection and treatment of the waste she/he produced.⁹¹

Policy and legal framework

Under the operationalisation of IVAGO, the PAYT system in Ghent is implemented within a multi-layered legal hierarchy, where the European Waste Framework Directive

⁸⁹ Lan Li, "How Can Unit Pricing Be Employed and Improve Municipal Waste Management in Shanghai?" (Lund University, 2020), <https://lup.lub.lu.se/student-papers/record/9026151/file/9026152.pdf>.

⁹⁰ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," IVAGO, 2025, https://www.ivago.be/sites/default/files/media/files/2025-04/Evaluatieverslag%20IVAGO%202019-2024_0.pdf.

⁹¹ ACR+, "Good Practice Flanders: PAYT."

(2008/98/EC) defines concepts and principles that have been translated into national legislation and have shaped Flemish waste management since the 1980s.⁹² The Flemish policy framework integrates the polluter-pays principle, the materials hierarchy, municipal implementation, and intermunicipal waste governance into its waste management.⁹³ At the regional level, the *Lokaal Materialenplan 2023-2030*, or the Flemish Local Materials Plan 2023-2030, mandates binding macro-level goals to reduce residual waste to the Flemish average of 100kg per capita by 2030.⁹⁴ Noting the structural demographic differences among municipalities, the Flemish government translated this regional baseline into differentiated municipal targets, setting an initial baseline threshold of 135 kg per capita for Ghent by 2030. However, factoring in the regional policy adjustment for specific waste categories, IVAGO formally operates under an adjusted localised target of 148 kg per capita.⁹⁵ This long-term reduction path represents a highly structured contraction from Ghent's historical 2022 milestone target of 174 kg per capita. This path underscores the city's early compliance with the statutory 1 January 2027 milestones set by VLAREMA 9, the latest amendment to the Flemish Regulation on the Sustainable Management of Material Cycles and Waste. Thus, Ghent's formal integration of this reflects institutional commitment to deploying local policy instruments, such as the PAYT framework, to operationalise and achieve the regional circular economy target within its urban context.

OVAM, the Flemish Public Waste Agency, which regulates and monitors compliance with waste reduction goals, has postponed the mandatory individual weighing and billing of business waste containers plan, which was supposed to take effect from 1 January 2026 to 1 January 2027; in this regard, IVAGO reported that they were preparing their trucks with weighing systems.⁹⁶ This illustrates IVAGO's active engagement and efforts to adapt to policy improvements and to align its operational practices with the legal framework. Environmental legislation in Flanders is also regulated by the Flemish Government's

⁹² IVAGO, "Policy Note 2020-2025," n.d., <https://www.ivago.be/sites/default/files/inline-files/Beleidsnota%20IVAGO%202020-2025%20%281%29.pdf>.

⁹³ OVAM, "Waste and Materials."

⁹⁴ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 9.

⁹⁵ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 9.

⁹⁶ IVAGO, "Activity Report 2025," n.d., 33, <https://www.ivago.be/sites/default/files/media/files/2026-05/Activiteitenverslag%202025.pdf>.

Materialendecreet (Decree on Materials) and the VLAREMA, a 2012 Flemish Government Decree on the sustainable management of the material cycle and waste.⁹⁷ Since 2012, the regional regulation has used a standardised household waste tariff across Flanders, requiring local authorities to keep charges within the defined minimum and maximum threshold. The minimum tariff maintains the basic financial incentive for residents who sort their waste at source, while the maximum tariff prevents the tariff from rising so high that households are tempted to dispose of waste in the neighbouring municipality instead.⁹⁸ The vertical alignment between Flemish regulation and local implementation reflects the formal and legal unity in Ghent's waste management. Ghent has adopted retribution regulation in 2019, making waste chargeable from the first kilograms, and based on the Annual Report of IVAGO (2023), the 2023 retribution has been increased as well to comply with OVAM's binding requirements to make bulk waste chargeable, and an annual tariff indexation every year on 1 January since 1 January 2025.⁹⁹

Organisational Coordination and Service Delivery

The organisational coordination of waste management in Ghent is largely handled by IVAGO, which collects residual waste, plastics, metals, glass, and paper and cardboard throughout the city and classifies them into three zones, each with its own approach.¹⁰⁰ There are three approaches: for instance, in Zone C, waste is collected in containers; in Zone Z, in bags; and in Zone S, at a sorting point with six amenity sites where citizens can discard their waste.¹⁰¹ These three differentiated zones are crucial not only for operational design but also as an indicator of IVAGO's coordination capacity, as it must simultaneously maintain distinct collection logistics, tariff structures, and even infrastructure types within the same city. This also reflects that IVAGO, as the intermunicipal organisation, has been able to build a centrally managed coordination scheme that can differentiate across zones according to local collection needs,

⁹⁷ Valipacademy, *Flemish Legislative Framework*, n.d., <https://valipac.academy/en/modules/gaining-a-better-understanding-of-the-legislation/belgian-legislative-framework/flemish-legislative-framework/>.

⁹⁸ Valipacademy, *Flemish Legislative Framework*.

⁹⁹ IVAGO, "Activity Report 2025."

¹⁰⁰ Collectors, "Gent (BE) » Collectors."

¹⁰¹ Collectors, "Gent (BE) » Collectors," 2.

infrastructure, and operational-level service delivery arrangements. Additionally, in a study about PAYT in the Flemish region of Belgium, Gellynck, Jacobsen & Verhelst (2011) found that, as PAYT functions as part of a broader waste management system, in which collection frequency and infrastructure for organic waste were significantly related to pricing incentives, these could affect the residual waste outcomes.¹⁰²

In practice, the PAYT model in Ghent is therefore managed through the interplay of zoned collection logistics, tariff regulations, and IVAGO's operational management, rather than solely through pricing. The report also highlights coordination achieved through the mobility cell (MOB), a mobility task force, and integrated safety consultations with the police, fire department, and mobility company to ensure operational access and safety.¹⁰³ IVAGO's role as the sole intermunicipal waste operator for both Ghent and Destelbergen is clearly defined, and the report specifically outlines the distinct roles of staff members, including the waste steward and expert in waste prevention and awareness.¹⁰⁴

IVAGO also has a digital system in its internal system to connect the billing and the operational delivery, including software such as the Geographic Information System (GIS)-based software for mapping the geographical data to map out their area of operations and building the VertiGIS Studio Application to optimise the collection trucks and road sweepers' rounds.¹⁰⁵ IVAGO is also using the SAP platform for its underground containers at the sorting points, which integrates billing data from household collections and even recycling parks into a single *IVAGO-rekening* (IVAGO-account) per citizen.¹⁰⁶ Not only the *MijnIVAGO* (MyIVAGO)¹⁰⁷ platform, which links to the Difitar monitoring database and enables real-time individual tracking, but in May 2025, IVAGO launched the ROSI route optimisation system, which coordinates all vehicle movements and

¹⁰² X. Gellynck et al., *Identifying the Key Factors in Increasing Recycling and Reducing Residual Household Waste: A Case Study of the Flemish Region of Belgium* - PubMed, 92, no. 10 (2011), <https://pubmed.ncbi.nlm.nih.gov/21704444/>.

¹⁰³ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 45, 46.

¹⁰⁴ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 78.

¹⁰⁵ VertiGIS, "IVAGO in Ghent Keeps Waste Bins in Sync with VertiGIS Integrator between SAP and GIS - VertiGIS," 2025, <https://www.vertigis.com/customers/ivago-in-ghent-keeps-waste-bins-in-sync-with-vertigis-integrator-between-sap-and-gis/>.

¹⁰⁶ IVAGO, *IVAGO-Annual Report 2023* (n.d.), 79, <https://www.ivago.be/sites/default/files/media/files/2024-04/Jaarverslag%202023.pdf>.

¹⁰⁷ {Citation}

collection schedules. The drivers have also completed training on using the software.¹⁰⁸ The use of a new digital system, along with documented training for its users, means that IVAGO has not only invested in the technology but also in the human capacity to actually use the software, proving that formal operational improvement in IVAGO goes hand in hand with its efforts in human resource and capacity building, managed altogether. This reflects that coordination within IVAGO also involves internal stakeholders. For external coordination, IVAGO is actively coordinating with partner organisations, including Recupel, which manages its own collection stream, to optimise the preparation for reuse and recycling, and the management of hazardous waste.¹⁰⁹ This external coordination is important for its logistical functions, as coordination with a specialised stream manager like Recupel can improve service quality and support resource efficiency within the organisational coordination mechanism, rather than managing all waste streams internally.

Financial and Resources Management

PAYT can operate continuously through a cost-recovery mechanism, a behaviour-based incentive instrument, and a financially self-sustaining operational system. The financial model, supported by the Flemish government, combines fixed municipal waste taxes with variable PAYT charges, based on the principle that those who sort are rewarded and those who pollute pay a fee.¹¹⁰ Although fees remained stable from 2002 to 2022, a compulsory annual 2% increase was introduced in 2023 to support long-term financial sustainability.¹¹¹ For instance, the fee for a 240L residual waste container reached €9.21 in 2024, higher than the €3.68 for the same volume of GFT (organic) waste, creating different financial incentives for source separation.¹¹² In addition, total revenue from commercial waste remained above €5 million in 2025 despite a €427,322 decline from 2024 (actual: €5,004,792 vs. target: €5,114,000). This reflects reduced residual waste

¹⁰⁸ IVAGO, “Activity Report 2025,” 24.

¹⁰⁹ IVAGO, “Beleidsdocumenten (Evaluation Report 2019-2024),” 16.

¹¹⁰ Daniel Card and Jean-Pierre Schweitzer, “Pay-As-You-Throw Schemes in the Benelux Countries,” Institute European Environmental Policy, 2022, <https://ieep.eu/wp-content/uploads/2022/12/BE-NL-LU-PAYT-final.pdf>.

¹¹¹ OVAM, “OVAM Main Policy Principles,” accessed May 21, 2026, <https://ovam-english.vlaanderen.be/ovam-english-policy-principles>.

¹¹² IVAGO, “Beleidsdocumenten (Evaluation Report 2019-2024),” 149.

tonnage, which is the intended policy outcome rather than a financial failure.¹¹³ This view is worth noting because many financial management frameworks treat revenue decline as a performance problem or a financial loss, whereas in this PAYT system, the behavioural change supports a better environmental purpose. At the same time, this calls for a different approach to reviewing PAYT's financial sustainability, as the decline in waste revenue should be interpreted as a behavioural indicator, rather than a fiscal one.

An investment in PAYT infrastructure was made in 2025 with the purchase of trucks equipped with weighing systems, as it prepares for the OVAM 2027 deadline, which plans to implement individual weighing systems; the first operational test is scheduled for 2026.¹¹⁴ This shows that the PAYT system has already been planned and budgeted for its infrastructure development. In its financial reporting, IVAGO has documented its statutory income statement in its annual and evaluation reports, presenting the formal budget and the actual table with a brief explanation as a transparency measure.

On a social element, IVAGO has been sending compensation to around 30,758 beneficiary households¹¹⁵ as a cost offset funded through the IVAGO budget, although this number was reduced in 2026 due to the Flemish government's decision to double the levy on residual waste processing from €16 to €32 per tonne.¹¹⁶ The reduction in social compensation is a direct result of how changes in the regional financial framework can affect social equity at the local-level program, and this decision, with no local power, illustrates the vulnerability of financial management and political decisions at the higher governance level. At the same time, however, around 72% of participants in the 2020 bag exchange initiative were eligible for a social allowance, demonstrating a financial system that protects vulnerable groups while still implementing the polluter-pays principle.¹¹⁷

¹¹³ IVAGO, "Activity Report 2025," 34.

¹¹⁴ IVAGO, "Activity Report 2025," 33.

¹¹⁵ IVAGO, *IVAGO- Annual Report 2023*, 79.

¹¹⁶ Giuseppe de vita, "Ghent Raises IVAGO Waste Rates, 15 % Residual & 7 % Other," 2025, <https://brusselsmorning.com/ghent-raises-ivago-waste-rates15-residual-7-other/83891/>.

¹¹⁷ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 37.

Human Resources and Capacity Building

IVAGO has a structured and formally organised human resources system for PAYT delivery because it employs professionals, including the waste steward (*afvalsteward*) and the expert in waste prevention and awareness (*expert afvalpreventie en sensibilisatie*), to provide guidance and support to residents in using the fee-based system.¹¹⁸ IVAGO's back-office *Burgers* (citizen) teams¹¹⁹ support the administration of account changes, container interventions, and park access cards, reflecting IVAGO's specialisation in waste management and services. IVAGO has an institutional quality management program, including the annual 'Waste Team Week (*Week van het Afvalteam*) for safety awareness and ISO 9001:2015 certification to provide a quality management framework.¹²⁰ There was also an internal training on home composting in 2024 to support staff training and capacity building.¹²¹ Using its ROSI system, the training for its drivers was also conducted to develop operational capacity for waste collection.¹²² A fivefold increase in non-conformity registrations, from 526 to 2,631 between 2024 and 2025, required temporary staff to manage the administrative surge. The response shown here reveals the difference between formal capacity, which is the structured professional workforce with defined roles and capacity, and operational capacity, where the organisation was not initially positioned to react to sudden changes in the administrative workload. However, in the human resources and capacity-building dimension, this shows that capacity planning was sometimes not anticipatory, as the regulatory change in this case triggered an unforeseen surge, yet it remains meaningful for assessing institutional preparedness.

Communication and Public Awareness

The communication and public awareness strategy in Ghent's PAYT system is designed to support a behavioural instrument rather than just a passive informational channel. One of the approaches is the *Minder restafval* (less residual waste) campaign, implemented from 2019 to 2024, which actively engages residents and motivates them to sort waste at source.¹²³ IVAGO also used multilingual brochures, school-based awareness initiatives,

¹¹⁸ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 4.

¹¹⁹ IVAGO, *IVAGO- Annual Report 2023*, 60.

¹²⁰ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 8.

¹²¹ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 18.

¹²² IVAGO, "Activity Report 2025," 24.

¹²³ IVAGO, *IVAGO- Annual Report 2023*, 65.

city guards who explained sorting rules, repair-and-reuse support, and the IVAGO *Wijzer* communication channel.¹²⁴ The IVAGO-GUIDE (*IVAGOWIJZER*) published 17 thematic editions between 2020 and 2024, as well as targeted blogs and social media engagement focused on the sorting and recycling campaign, which, in January 2024, was dedicated to mandatory organic waste.¹²⁵ This illustrates that acceptance of the PAYT strategy is higher among residents with prior experience of this system, and that the communication campaign is crucial for building familiarity over time.¹²⁶ This is worth noting, as if familiarity drives acceptance, then communication is not only for information delivery but also for a long-term behaviour-change process in the community. This reflects the importance of communication strategy, including campaigns, which are designed as one-time information-sharing interventions and therefore produce different outcomes than long-term approaches. The *Minder restafval* (less residual waste) campaigns carried out between 2019 and 2024 sought to promote behavioural change, and the duration of the campaign provides evidence of institutional commitment to maintaining engagement.

Public access to information is primarily achieved through the Waste Meter (*Afvalmeter*) on the MijnIVAGO portal.¹²⁷ Introduced in 2020, this tool provides residents with direct access to their individual waste data and enables them to compare it with neighbourhood averages.¹²⁸ Transparency is evident in the annual Sustainability Report (*Duurzaamheidsrapport*), which provides a comprehensive account of the organisation's waste management outcomes. With these instruments, PAYT's financial incentives are complemented by ongoing, accessible guidance for residents. IVAGO has also distributed four newsletters per year for its business clients, informing them of non-conformity requirements, transparent bag rules, and any regulatory updates and changes, including to help clients avoid *Gemeentelijke Administratieve Sancties* (GAS) administrative fines for violations of waste disposal; and the use of personalised letters to around 30,758

¹²⁴ Li, "How Can Unit Pricing Be Employed and Improve Municipal Waste Management in Shanghai?"

¹²⁵ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 10–12.

¹²⁶ Card and Schweitzer, "Pay-As-You-Throw Schemes in the Benelux Countries."

¹²⁷ IVAGO, "Aanmelden," IVAGO, accessed May 18, 2026, <https://www.ivago.be/nl/particulier/user/login>.

¹²⁸ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 11.

entitled households for the social welfare supplement annually.¹²⁹ For household clients, IVAGO uses the Afvalmeter (Wastemeter) on the MijnIVAGO (MyIVAGO) portal, introduced in 2020, to provide residents with direct access to their waste data.¹³⁰ In addition, IVAGO publishes tariff and performance information via the Brochure, including a container-by-container reference table for all waste types and their tariff groups, as well as free visit entitlements and the cost of an access card.¹³¹ The public can access the IVAGO-account balance through their own online account, with 35.9% of 88,071 invoices sent digitally in 2023, exceeding the formal 30% target.¹³² One limitation remains: although the performance data is officially shared with the General Assembly, there is no public dashboard that allows residents or businesses to see the waste system's performance. However, rather than a direct weakness, this can be seen as a way for IVAGO to adapt how it shares information with different clients, tailoring its approach to audiences whose information formats may also vary by purpose.

Monitoring and Evaluation

IVAGO's monitoring and evaluation strategies are formally structured and adaptive, combining quarterly operational KPIs with long-term outcome indicators. This recorded data is used not only for reporting but also for operational learning and policy improvement. The Board table (*Boordtabel*) dashboard can track all main key performance indicators (KPI). By the conclusion of the evaluation reporting cycle (based on the 2025 Activity Report), these detailed tracking mechanisms demonstrated high performance parameters across key waste data: residual household waste fell to 32,340 tonnes (against a 33,500 target), the business waste dropped to 11,057 tonnes (against the target of 12,000), organic waste reached 11,563 tonnes (against a target of 12,500), plastic packaging, metal packaging, and drinking cartons (PMD) stood at 7,595 tonnes (against an 8,000 target), and glass volume stabilised at 6,701 (against a 7,700 target).¹³³ Importantly, the primary long-term outcome indicator, residual waste per resident, decreased from 179.6 kg to 140.8 kg over the 2019-2024 period, indicating that Ghent

¹²⁹ IVAGO, "Activity Report 2025," 33; IVAGO, *IVAGO- Annual Report 2023*, 80.

¹³⁰ "Ivago: Integrated Drupal-Platform," Dropsolid Digital Experience Company, accessed May 21, 2026, <https://dropsolid.com/en/our-work/ivago>.

¹³¹ IVAGO, "Recyclage Park- Gent," n.d., https://www.ivago.be/sites/default/files/media/files/2024-07/Ivago_Brochure_recyclagepark_Gent_2024%20%281%29.pdf.

¹³² IVAGO, *IVAGO- Annual Report 2023*, 80.

¹³³ IVAGO, "Activity Report 2025," 37–38.

had already surpassed its local 2030 target of 148 kg per resident by 6 years ahead of schedule.¹³⁴

The external accountability mechanism reinforces this internal evaluative capacity by enabling OVAM to publish its annual municipal solid waste data and subsidy eligibility, which serves as an independent verification layer for IVAGO's localised datasets.¹³⁵ IVAGO is also using its monitoring data for adaptive purposes, as evidenced by its response to the surge in non-conformities, which expanded from 526 to 2,631, directly influencing the decision to develop a mobile app for operational teams.¹³⁶ The improvement in residual waste has been linked to sorting behaviour through non-conformity controls and continued efforts to meet the *Lokaal Materialenplan* target of 30% less business residual waste, reflecting the use of data to inform the policy goals' strategic direction. Additionally, periodic tariff adjustments and modifications to collection rules between 2019 and 2024 were explicitly informed by the data, ensuring that the PAYT system evolved in response to actual performance outcomes.¹³⁷ This approach is crucial as the monitoring data directly informs policy adjustments. This evaluative capacity is further strengthened by integrating social data, such as tracking the uptake of social allowances during policy transitions, to ensure that the monitoring framework captures both environmental efficiency and social equity.

Although research on Ghent's PAYT system is limited, broader academic literature on PAYT suggests that weight-based charging mechanisms tend to create stronger incentives for waste sorting than simple volume-based fees, providing Flemish regulators with a rationale to shift towards weight-based billing for business residual waste under the VLAREMA 9.¹³⁸ The evaluation of Ghent's PAYT/Diftar system appears to be based primarily on comparative evidence from other PAYT systems and on institutional monitoring data from IVAGO and the Flemish authorities.

¹³⁴ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 21.

¹³⁵ OVAM, "Annual Report 2025 OVAM," Vlaanderen.be, 2026, <https://www.vlaanderen.be/publicaties/jaarverslag-ovam>.

¹³⁶ IVAGO, "Activity Report 2025."

¹³⁷ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 34–37.

¹³⁸ Aino Ukkonen and Olli Sahimaa, "Weight-Based Pay-as-You-Throw Pricing Model: Encouraging Sorting in Households through Waste Fees," *Waste Management* 135 (November 2021): 372–80, <https://doi.org/10.1016/j.wasman.2021.09.011>.

4.2 Recycling Parks 2.0 (Ghent)

Ghent's recycling parks are also a key part of the city's waste management, where, during the 2019-2024 policy period, they underwent a major restructuring under the Recycling Parks 2.0 (*Recyclageparken* 2.0) programme, transforming the sites into circular-economy hubs. Driven by the Flemish Waste Management Act (VLAREMA), with the requirement to introduce a payment system for bulky waste, aligning with the polluter-pays principle. The restructuring aimed to improve the quality of sorted materials, enhance the visitors' experience, and discourage the flow of waste from neighbouring areas. Although the renovations were planned to be completed by April 2020, the project was postponed due to the COVID-19 pandemic, rising energy prices, and a staff shortage.¹³⁹ Despite these obstacles, the renovated parks in Ghent and Destelbergen reopened in 2023, proving that this programme demonstrates the city's capacity to maintain essential services while adapting its infrastructure to unexpected challenges.

Policy and Legal Framework

Recycling Parks 2.0 is established within a multi-level governance framework, with VLAREMA as the primary regulatory instrument. VLAREMA mandates that bulky waste be charged from the first kilogram and that an increasing number of waste streams be collected separately at recycling parks.¹⁴⁰ Based on the VLAREMA 8 and VLAREMA 9 updates in 2021 and 2024, which further strengthened the intermunicipal operator's compliance obligations, and on IVAGO's annual report, these confirm that the renovation was carried out in compliance with Flemish regulation. At the supranational level, the European Union (EU) Waste Framework Directive reiterates this framework by setting recycling targets of 55%, 60%, and 65% for collected municipal waste by 2025, 2030, and 2035, respectively, with recycling parks serving as key waste-collection infrastructure. Beyond the formal regulatory framework, IVAGO maintains both ISO 9001:2015 and ISO 14001:2015 certifications for the Waste-to-Energy Centre until 2030,

¹³⁹ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 6.

¹⁴⁰ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 29.

reflecting formally embedded quality and management practices that support the implementation of waste management policies.¹⁴¹

At the local level, Ghent formally adopted the retribution regulation to charge for waste from the first kilogram in 2019, making it the city's instrument for implementing VLAREMA's pricing requirement. Similar to the PAYT, the *Lokaal Materialenplan* also serves as the basis for legally binding residual waste reduction, with recycling parks essential to the waste collection infrastructure. IVAGO's internal policy document 2020-2025 introduces recycling parks 2.0 as a delivery mechanism, Goals 1 (for less waste) and Goals 2 (pure material), where the goals of asbestos-free Flanders have also become the direct policy basis for some recycling park services, with IVAGO receiving an OVAM subsidy for the asbestos collection, confirming that parks are formally embedded and funded under the policy framework.¹⁴² The legal framework of recycling park 2.0 is not just about the formal existence but also on how IVAGO translates it into a measurable local commitment, including on the three strategic targets established, responding to the legal-binding requirements, such as the renovation all six parks to align with OVAM's mandate, organise at least 10 pop-up recycling parks every years, and increase asbestos collection by 10% compared to 2018.¹⁴³ In addition, the Flemish government set standards requiring 90% of the population to live within 5 kilometres of a recycling park, thereby defining the physical scope of waste operations.¹⁴⁴

Organisational Coordination and Service Delivery

IVAGO managed the recycling parks 2.0 renovation as the sole project lead and was responsible for coordinating operations across all six parks under a central service structure that included planning, routing management, and alignment with urban development, through a bi-weekly meeting with *Interne KwaliteitsZorg* (IKZ), the coordination management framework within the municipal project.¹⁴⁵ A phased closure schedule was adopted in 2023 to minimise disruption: *Destelbergen* (April–May); *Proeftuinstraat* and *Gaardeniersweg* (August–September); *Drongen* and *Gentbrugge*

¹⁴¹ IVAGO, "Activity Report 2025," 30.

¹⁴² IVAGO, *IVAGO- Annual Report 2023*, 5; IVAGO, "Activity Report 2025," 7.

¹⁴³ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)."

¹⁴⁴ OVAM, "Waste and Materials."

¹⁴⁵ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 46.

(October–November); and *Oostakker* (October–December). While the renovation was postponed, the project remained within the planned budget, demonstrating IVAGO's project management capacity to adapt to challenges and avoid further delays. Recycle Parks 2.0 (RP 2) has also developed an internal task force, the mobility cell (MOB), which managed the operational access and safety measures in alignment with the broader organisational structure, where the information and technology (IT) department built the SAP-integrated financial back-end and managed the system integration with the national population register.¹⁴⁶

Recycling Park 2.0 introduced a new substantially restructuring in its service delivery where each park has paid and non-paid zones within four tariff groups and one free zone; green colour (free for paper, glass, metal), red colour (for bulky waste), orange (for construction materials), yellow colour (for garden waste and wood, free up to a limit), and grey (asbestos, free up to a limit).¹⁴⁷ Recycling park attendants (*parkwachters*) are equipped with tablets to operate the barrier gates, manage the weigh-bridge assignments, and assign waste to the correct material streams. At one of the recycling parks, Proeftuinstraat, the reception area was reorganised into two separate desks, one for private residents and the other for suppliers, formalising service delivery and enabling the service to run more efficiently for visitors. Research on waste collection schemes in Flanders finds that the amount of separately collected plastic varies significantly across separation systems, suggesting that how recycling parks organise waste sorting can affect material recovery volumes.¹⁴⁸ For external coordination, RP 2.0 has partner organisations with which it has cooperation agreements, including second-hand shops (*kringwinkels*) such as Ateljee and Open Plaats, to promote the reuse of goods and reduce waste.¹⁴⁹

For the community level, RP 2.0 coordinates with multiple partners for operational programs, such as the pop-up recycling parks, where the waste stewards (*afvalsteward*)

¹⁴⁶ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)."

¹⁴⁷ "Recycling Park of the Future Is Now Also a Reality in Ghent," IVAGO, 2023, <https://www.ivago.be/nl/particulier/nieuws/recyclagepark-van-de-toekomst-nu-ook-gent-een-feit>.

¹⁴⁸ R. Jacobsen et al., "Increasing the Quantity of Separated Post-Consumer Plastics for Reducing Combustible Household Waste: The Case of Rigid Plastics in Flanders," *Waste Management* 78 (August 2018): 708–16, <https://doi.org/10.1016/j.wasman.2018.06.025>.

¹⁴⁹ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 51.

raise awareness to the public about sorting, reuse, and recycling; while the second-hand shops collect the reusable materials, reflecting a multi-actor coordination operating at the service delivery level.¹⁵⁰ Around 10 new volunteer guardians (*glasbol meters en peters*) were recruited in 2025 to help gather data on glass collection points near the parks, demonstrating community coordination that is not only about formal service delivery but also about civil society involvement. Despite strong operational coordination, the formal documentation of roles and responsibilities remains fragmented across multiple sources.

Financial and Resources Management

The financial structure of Recycling Parks 2.0 is similar to PAYT, which is based on the polluter-pays principle and implemented through a differentiated tariff system that links waste disposal costs to the type and volume of waste. The impact of the financial reform is significant and measurable: retribution revenue from the parks increased from around €273,694 in 2022 to €902,896 in 2024 (an increase of approximately 230%), while business user revenue rose from €68,588 to €122,424 (an increase of 79%), and the average payment per visit for Ghent residents was around €13.13.¹⁵¹ An investment was made in 2023 for physical park renovation and SAP software integration, totalling around €9.8 million, with an additional exceptional cost of €192,000 to switch the Diftar (PAYT) system to SAP for recycling park billing.¹⁵² Another investment was made in 2025 with the installation of solar panels at multiple recycling parks to achieve energy self-sufficiency and reduce operational costs.¹⁵³ Not only is the investment planned, but the report also notes budgetary constraints in its decision not to implement Automatic Number Plate Recognition (ANPR), prioritising optimisation at the reception desk, and signals that park infrastructure is subject to the formal budget allocation process.

Although the retribution revenue grew significantly, reflecting both higher tariff rates and behavioural change, with people generating recyclable and reusable material that is charged differently, the total waste deposited fell by 36%, from 38.5 to 24 tonnes, showing that the PAYT system is achieving its goals: reducing waste rather than

¹⁵⁰ IVAGO, “Activity Report 2025,” 7.

¹⁵¹ IVAGO, “Beleidsdocumenten (Evaluation Report 2019-2024),” 47–48.

¹⁵² IVAGO, *IVAGO- Annual Report 2023*, 118.

¹⁵³ IVAGO, “Activity Report 2025,” 24.

maximising revenue.¹⁵⁴ The fee structure interacts with individual behaviour to create stronger incentives for sorting than volume-only approaches do.¹⁵⁵ Similar to PAYT, financial reporting is documented in IVAGO's statutory income statement, including budget and actual expense tables, while the capital subsidies from the City of Ghent are documented as a key financial input.¹⁵⁶ As IVAGO maintains ISO 9001 and ISO 14001 certification, these require documented financial and operational management systems. As an important addition, the financial structure at IVAGO includes a social equity component, where IVAGO and the City of Ghent maintain a social compensation system for households with limited financial means, with around 31,869 households eligible.¹⁵⁷ This approach is consistent with the broader Flemish approach to balance the polluter-pays principle with social protection for vulnerable households.

Human Resources and Capacity Building

The renovation of RP 2.0 required sustained investment in its human capital across multiple organisational levels; for instance, in 2024, IVAGO conducted 4,783 hours of formal training for all IVAGO staff, covering retraining on the new sorting rules, the operations of the renovated recycling parks, and the associated digital systems.¹⁵⁸ In 2023, the Operations (OPS) department recorded 2,443 training hours, the largest share of the organisation's total of 3,982 hours, covering the implementation of new processes at recycling parks (invoeren van nieuwe processen - *recyclageparken*) and soft skills, including customer communication, for the park supervisors.¹⁵⁹ All park supervisors received training on the new system and customer communication skills, while the back-office staff received training in SAP-specific billing, and the Information Technology (IT) teams provided hypercare support at each park opening.

During the RP 2.0 implementation, staffing roles were defined clearly at different levels, including the introduction of new mobile park supervisor with the three existing employees promoted; and in 2023, IVAGO hired 44 new staff, including those who ran

¹⁵⁴ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)."

¹⁵⁵ Ukkonen and Sahimaa, "Weight-Based Pay-as-You-Throw Pricing Model."

¹⁵⁶ IVAGO, "Activity Report 2025," 36.

¹⁵⁷ IVAGO, *IVAGO- Annual Report 2023*, 80.

¹⁵⁸ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 108.

¹⁵⁹ IVAGO, *IVAGO- Annual Report 2023*, 111.

the RP 2.0 public campaign, and the Waste Team Week (*Week van het Afvalteam*) as the way to promote waste awareness and staff engagement to maintain ongoing staff development.¹⁶⁰ Following the tariff reform, IVAGO recorded a sharp increase in visitor aggression toward park attendants, from 70 to 198 cases in 2022 to 2024. IVAGO introduced a dedicated training module on managing aggression for park attendants and implemented consistent team assignments to ensure residents interact with familiar staff. This is also worth noting because the policy change affected not only users financially but also working conditions, especially those of frontline staff. The dissatisfied resident, due to the new charger or stricter access rules, expresses this towards the staff, turning these issues into a work safety issue as well. However, IVAGO introduced a training model on this specific issue, showing an adaptive human resources response to safety problems through a staff-supported intervention.

Communication and Public Awareness

The communication strategy is considered the core part of the RP 2.0 reform, as it recognises that the implementation of the tariff-based system would depend on residents' understanding, awareness, and acceptance of the new rules. During the renovation period, the campaign program produced several outputs, including the informational letters to all residents of Ghent, a new park guide (a brochure), animated videos, merchandise, a dedicated website with the route-planning tools per park, opening events at two parks at Destelbergen and Proeftuinstraat, and social media engagement. The renovation of the recycling park was also framed to make recycling easier for residents, including the extended opening hours information, simplified tariff for bulky waste starting from the first kilogram, and the creation of paid and free sections at the parks, aiming to change residents' behaviour to sort waste and use the parks more.¹⁶¹

Public engagement by RP 2.0 also took several innovative forms, including the nineteen pop-up recycling parks organised in 2025 with around 97 visits per location and around 32.8 kg waste collected per visitor, which is nearly 10 kg more per visitor than in 2024.

¹⁶⁰ IVAGO, *IVAGO- Annual Report 2023*, 110, 108.

¹⁶¹ VRT NWS, "Ivago Vernieuwt al Haar Containerparken in Gent En Destelbergen: 'We Gaan Voor Het Recyclagepark 2.0,'" VRTNWS, 2022, <https://www.vrt.be/vrtnws/nl/2022/02/16/recyclageparken-gent-en-destelbergen-worden-helemaal-vernieuwd/>.

A school visit campaign delivered 36 tours with the waste stewards and 5 workshops for non-Dutch speakers, low-income residents, and newcomers, reflecting the communication strategy aimed at reaching a wider range of populations.¹⁶² RP 2.0 also expanded its digital engagement, including via IVAGOWIJZER, IVAGO's resident magazine, which produced 17 thematic editions between 2020 and 2024, focusing on sorting and recycling to guide citizens on how to sort correctly under the new system.¹⁶³ Communication screens were also installed throughout IVAGO facilities, including recycling parks, to provide visitors with more information about waste sorting.¹⁶⁴ Digital reach has expanded significantly: in 2025, the Recycle App grew by approximately 17.28% to 49,210 users; the digital newsletter reached more than 20,000 subscribers; and Instagram engagement rose by 44.93%.¹⁶⁵

The public can access performance and information about RP 2.0 in several ways, including the brochure, which is a comprehensive public document covering the entry requirements, tariff groups, sorting rules, visit flow, and all 39 types of waste.¹⁶⁶ The public can access the annual report on IVAGO's website and via the MijnIVAGO (MyIVAGO) portal's *Afvalmeter* (Wastemeter), which enables residents to monitor their personal waste data.¹⁶⁷ These communication approaches not only disseminate information but also incentivize participation, raise public awareness, and promote behavioral change.

Monitoring and Evaluation

Monitoring in RP 2.0 has been integrated into its governance framework, including through formal performance tracking in IVAGO's statutory reporting systems. Through IVAGO's annual reports, the Board table in 2025, for example, included data specific to park key performance indicators tracked quarterly, including the total of material delivered to recycling parks decreased from 32,371 tonnes in 2023 to 24,181 tonnes in 2025 (approximately 25%); total park visits of 240,000; unique visitors to mobile

¹⁶² IVAGO, *IVAGO- Annual Report 2023*, 66.

¹⁶³ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 34.

¹⁶⁴ IVAGO, "Beleidsdocumenten (Evaluation Report 2019-2024)," 127.

¹⁶⁵ IVAGO, "Activity Report 2025," 4.

¹⁶⁶ IVAGO, "Recyclage Park- Gent," 35–38.

¹⁶⁷ Dropsolid Digital Experience Company, "Ivago."

recycling parks (1,835 vs target of 1,250).¹⁶⁸ The adaptive use of monitoring data is evident throughout the evaluation and annual report: the 2024 decline in park visits and waste per visitor was noted, and in 2025, the recovery was documented and analysed, confirming that year-on-year trends are interpreted and used to inform adaptive measures rather than just passive reporting. The six-month evaluation of glass collection was used to inform the 2026 actions, and the cost-efficiency study of the pop-up recycling parks planned for 2026 also used data on visitor numbers, waste collection volumes, and the operational costs of the 2025 implementation.¹⁶⁹ At the operational level, monitoring could enable continuous evaluation and improvement of approaches and strategies.

4.3 *Gent en Garde/FoodSavers (Ghent)*

Gent en Garde is the City of Ghent's urban food strategy, launched in 2013 as a participatory urban food policy to achieve a more sustainable, inclusive food system with less food waste. In its original formulation, the strategy was guided by a multi-sector Food Policy Council comprising local policymakers, agricultural and farming unions, civil society and non-governmental organisations, social economy and cultural spaces, and academic institutions, all of which could advocate on food policy issues. The goals included a shorter, more visible food chain, more sustainable food production and consumption, greater social added value for food initiatives, reduced food waste, and optimal reuse of food waste as raw materials.¹⁷⁰

Later, the city of Ghent reformatted the strategy to three objectives: a short, sustainable food chain; sustainable food for everyone; and no food waste.¹⁷¹ Within this policy framework, FoodSavers Ghent, *Sociale Kruidenier Gent*, and *Rabot op je Bord* support the operational roles. FoodSavers Ghent, launched in 2017, is the logistics platform responsible for collecting food surpluses from the wholesale market, retailers, and other suppliers, and redistributing them to social organisations, including food banks, social

¹⁶⁸ IVAGO, "Activity Report 2025," 37–38.

¹⁶⁹ IVAGO, "Activity Report 2025," 7.

¹⁷⁰ K. Verbeke, "En Garde Food Policy in GENT, Belgium," *European Journal of Public Health* 27 (2017), <https://doi.org/10.1093/eurpub/ckx187.808>.

¹⁷¹ Mieke Hullebroeck, "Objective of the Ghent Food Strategy," *Gent en Garde*, 2023, https://stad.gent/sites/default/files/media/documents/20230404_PU_GeG%20Voedselraad%20brochure_EN_finaal.pdf.

restaurants, and social supermarkets.¹⁷² Ghent Social Grocery (*Sociale Kruideniers Gent*) is a social grocery outlet that sells food and basic goods at reduced prices (30% cheaper than the lowest market price, and fruits and vegetables are 70% cheaper than the market price) for vulnerable people, including those with low income, while also offering products at affordable prices to support the organisation's work.¹⁷³ To access this social rate, people with limited income need to follow procedures, including a social assessment conducted by the public (including the Public Centre for Social Welfare (OCMW Gent) and non-profit welfare organisations in Ghent, and obtain a referral. *Rabot on your plate* (*Rabot op je Bord*) is a community-based surplus-food processing project where volunteers and local residents transform surplus food into dishes such as soups, jams, and stews, which are sold through the social grocery.¹⁷⁴

These initiatives have their own functions but are connected with Ghent's wider food policy and food-rescue system. While FoodSavers handles bulk collection and redistribution, *Sociale Kruideniers* provides affordable access to food and basic products, and *Rabot op je Bord* processes the food surpluses into longer-lasting prepared foods. This analysis, therefore, treats Ghent's food-rescue system as a coordinated framework of municipal and civil society actors that aligns with *Gent en Garde's* food policy framework.

Policy and Legal Framework

The *Gent en Garde* food-rescue strategy is an formally structured, multi-level governance framework comprising formal approval, subsidy agreements, and stakeholder coordination mechanisms within a broader food-governance structure. At the local level, FoodSavers is within the *Gent en Garde* food strategy, specifically Strategic Objective 3 of no food waste and Operational of use of food surpluses, contributing directly to the waste-reduction agenda by recovering surplus food and redistributing it to partners such as the social organisations; while initiatives such as *Sociale Kruideniers Gent* and *Rabot*

¹⁷² Milan Urban Food Policy Pact, "MPA 2018 Awarded City," 2018, <https://www.milanurbanfoodpolicypact.org/wp-content/uploads/2021/01/Foodsavers-Ghent-MPA2018.pdf>.

¹⁷³ SAAMO, *Sociale Kruidenier Rabot*, 2021, <https://www.saamo.be/gent/rabot-blaissantvest/model/sociale-kruidenier-rabot/>.

¹⁷⁴ SAAMO, *Rabot Op Je Bord*, 2021, 221, <https://www.saamo.be/gent/rabot-blaissantvest/project/rabot-op-je-bord/>.

op je Bord link the redistribution logic to support more access to food, affordability, and even processing surplus food into longer-lasting food products. Between 2013 and 2025, the city of Ghent focused on creating a local and sustainable food system in collaboration with the Food Policy Council, as well as organisations, citizens, and the private sector.¹⁷⁵ Participatory and inclusive approaches are implemented in Ghent's urban food system.

According to Metropolis USE, FoodSavers originated from a bottom-up idea that was later adopted and developed by the City of Ghent and is now implemented as a regular policy, continuing to be managed by a stakeholder steering group.¹⁷⁶ In addition, FoodSavers was operationalised through formal political approval in December 2016, when the Council of the Welfare Service officially approved the allocation of a dedicated budget, thereby providing municipal legitimacy and financial support.¹⁷⁷ The *Gent en Garde* strategy has been continuously supported across multiple electoral cycles since its 2013 launch, suggesting that political commitment to the food-rescue framework is institutionally integrated into the city's long-term governance priorities. Another example of local institutional support can be seen in the Ghent Municipal Council Decision passed in January 2023, which agreed to the subsidy agreement with *Sociale Kruideniers Gent* and *Rabot op je Bord* for 2023-2025 and explicitly recognised these initiatives in the *Gent en Garde* food strategy.¹⁷⁸ This framework indicates that the food-rescue system has been extended with formal instruments and funding mechanisms to support sustainable food goals.

At the regional level, Ghent's food rescue system is linked to the Flemish Government's Action Plan on Circular Food Loss and Biomass Flows 2021-2025, which was approved in 2023, aiming to reduce food losses by 30% by 2025 and prioritising food redistribution for human consumption as the intervention in the food-waste hierarchy.¹⁷⁹ This regional

¹⁷⁵ Stad Gent, "Sustainable Food," accessed May 23, 2026, <https://stad.gent/en/city-governance-organisation/city-policy/ghents-climate-actions/sustainable-food>.

¹⁷⁶ Urban Sustainability Exchange, "Ghent En Garde."

¹⁷⁷ Milan Urban Food Policy Pact, "MPA 2018 Awarded City," 2.

¹⁷⁸ Flanders, "2023_GR_00076 - Subsidy Agreement Operation Social Grocery Store and Rabot on Your Plate - Operating Years 2023 - 2025 - Approval | Local Decision," accessed May 14, 2026, <https://lokaalbeslist.vlaanderen.be/agendapunten/efc1ddca-4122-54bd-89ff-bd0717a4edc3>.

¹⁷⁹ OVAM, "Action Plan Circular Food Loss and Biomass (Residual) Flows 2021-2025," 2021, 8-9, <https://ovam-english.vlaanderen.be/action-plan-for-circular-food-loss-and-biomass-residual-flows-2021-2025>.

framework is highly relevant because FoodSavers is linked to the wider Flemish food-loss governance through the HERW!N, a Flemish network of social circular enterprise, which is involved in *De Kostwinner*, the Flemish collaboration for a good-loss action plan.¹⁸⁰ This indicates that FoodSavers is relevant not only at the local level in Ghent but also to the Flemish effort to reduce food loss.

At the supranational level, Ghent's food policy and food-rescue system are shaped by both binding and non-binding instruments. For example, the legally binding instruments are closely aligned with the EU Waste Directive's waste hierarchy, which prioritises prevention, reuse, and recovery over waste disposal. While leaving it to member states to apply the regulation in their own contexts, the EU Directive itself does not directly govern FoodSavers, *Sociale Kruidenier Gent*, or *Rabot op je Bord* as individual local initiatives. Still, it provides the legally binding framework for the national and regional policy, which is then translated into the local-level food waste governance. Ghent's political commitment is also evident in its signing of the Milan Urban Food Policy Pact in 2015 and its receipt of the UN Global Climate Action Award in 2019, as Ghent was among the first cities in the world to develop sustainable local food governance.¹⁸¹

Organisational Coordination and Service Delivery

FoodSavers Ghent has a structured collaboration among all stakeholders, including the City of Ghent's climate and environmental department as the institutional actor; the Public Centre for Social Welfare (OCMW Gent), which coordinates the project at an operational level; while companies and retailers function as food suppliers. As mentioned before, FoodSavers is a platform that collects food surpluses, including from supermarkets and auctions, and delivers them to social organisations in Ghent. Milan Pact Awards (2018)¹⁸² explains the institutional division of roles of those involved; the City of Ghent as the policy and institutional actors, OCMW as the project coordinator of FoodSavers operationally, food-sectors partners (including supermarkets such as

¹⁸⁰ ILVO, "Flemish Partners Join Hands to Fight Food Loss under a New Name: De Kostwinners (the Breadwinners) - ILVO Vlaanderen," ILVO, accessed May 11, 2026, <https://ilvo.vlaanderen.be/en/news/flemish-partners-join-hands-to-fight-food-loss-under-a-new-name-de-kostwinners>.

¹⁸¹ UNFCCC, "Winners of the 2019 UN Global Climate Action Awards Announced," 2019, <https://unfccc.int/news/winners-of-the-2019-un-global-climate-action-awards-announced>.

¹⁸² Milan Urban Food Policy Pact, "MPA 2018 Awarded City."

Delhaize, Aldi, Lidl, etc.) who provide surplus food, FoodSavers staff who manage the collection until the delivery, and then the social organisation who will be involved in the final distribution for people in need.

The City of Ghent created *Gent en Garde* Food Policy Council as a participatory body consisting of 25 members from associations, agriculture, academic institutions, and commerce to oversee and issue recommendations on new or existing project ideas, discuss the city's strategic vision, and also act as the ambassador for sustainable food production and consumption in the city.¹⁸³ Within this Food Policy Council, a core team was made to refine the *Gent en Garde* goals into concrete operational goals, where they met and reported to the wider Food Policy Council for feedback.

For the operational procedure, FoodSavers uses “collect, order, distribute,” in which food collected on a given day is quality-checked, sorted, and registered using handheld scanners and a real-time digital dashboard, then delivered to recipient organisations the following morning via refrigerated vehicles.¹⁸⁴ While delivering food, they will also collect new food from donors and store it at the headquarters, where a sorter will check its quality. These procedures ensure that the redistribution process is traceable within the system. On the donor side, FoodSavers classifies donors into supermarkets (small volumes but high variety), depots (large volumes, but less variety), and wholesale auctions (providing seasonal fruits and vegetables), and this donor variety is necessary as a large number of organisations receive food through FoodSavers, and different recipient organisations have different needs. For this, contractual agreements with all donor parties are essential to ensure a reliable supply. For example, in March 2017, the network had 24 retailers, one wholesale market, two distribution centres, one organic farm, and one company, redistributing to 58 social organisations, including food banks, social restaurants, and social supermarkets.¹⁸⁵

¹⁸³ Gent, “From Strategic to Operational Goals for the GENT EN GARDE FOOD POLICY: Recommendations of the Food Policy Council,” RUAF Urban Agriculture and Food System, 2019, <https://ruaf.org/assets/2019/11/Gent-en-Garde.pdf>.

¹⁸⁴ Stad Gent, “FoodSavers Ghent More than Food,” 2019, 2, <https://stad.gent/sites/default/files/media/documents/Foodsavers%20handleiding%20ENG.pdf>.

¹⁸⁵ Milan Urban Food Policy Pact, “MPA 2018 Awarded City.”

At the community level, the food redistribution system is organised through social organisations, rather than direct municipal distribution. As a logistic actor, FoodSavers redistributes food to social organisations in Ghent, such as food banks, social restaurants, and supermarkets, including the *Sociale Kruideneiers Gent* and *Rabot op je bord*. *Sociale Kruideneiers Gent* delivers the social distribution layer through both fixed and mobile grocery points. The subsidy agreement mandates that, at mobile grocery points, at least 50% of products must come from FoodSavers and be distributed free of charge, thereby formalising the supply relationship between the logistics platform and the downstream distribution network.¹⁸⁶ Meanwhile, *Rabot op je bord*, operating within the same non-profit organisation, enhances social cohesion in the neighbourhood by turning surplus food into products such as soups, jams, and other products which are then sold at low prices.¹⁸⁷ These flows do not replace FoodSavers' logistics role, but reflect how surplus food can be used for broader community benefit and to enhance food access and sustainable food goals.

Before launching FoodSavers, in its early effort of food waste management, the City of Ghent, in the social welfare department, developed a logistics platform with a thorough discussion and research in 2014 with the social organisations, interested retailers, and researchers, which later developed into a political agreement in 2016 and logistics preparations, which expanded its scale in 2017.¹⁸⁸ In its early implementation, FoodSavers reported redistributing 300.34 tonnes of food, comprising 64,395 items from 24 retailers, one wholesale market, and other suppliers, which were sent to 58 local social organisations and social restaurants for people in need. The organisational strength of FoodSavers lies in the coordination and cooperation among local actors, including policymakers and social organisations, which has resulted in broader engagement with people in need.

¹⁸⁶ Stad Gent, “OCMW van Gent En Sociale Kruideniers 2023-2025,” Stad Gent and OCMW Gent, 2025, <https://ebesluitvorming.gent.be/document/63bfe11350111671a91a7cb2;jsessionid=6117BB1A5F2A70B5300AA12AA0D7AC87>.

¹⁸⁷ SAAMO, *Rabot Op Je Bord*.

¹⁸⁸ Milan Urban Food Policy Pact, “MPA 2018 Awarded City.”

Financial and Resources Management

The financial structure of FoodSavers Ghent has interconnected levels, each with different funding sources: the strategic food-policy level, the FoodSavers logistics platform, and downstream social distribution initiatives such as *Sociale Kruideneiers Gent* and *Rabot op je bord*. This system is primarily supported by public and publicly linked resources that support the operational system of the food-rescue strategy. This is because the initiative prioritises social access and the capacity to redistribute rather than cost recovery.

At the strategic level, *Gent en Garde* food policy has a total annual budget of €220,000, of which approximately €85,000 is allocated for food governance, and the Food Policy Council, where around €60,000 is for the Food Policy Council's budget, and the rest is allocated for the facilitators' fee, events, or communications purposes.¹⁸⁹ This budget is not for FoodSavers' logistics budget but is part of Ghent's wider food policy objectives. For FoodSavers specifically, in 2017 and 2018, it reported costs of €401,831.04 and €546,564.57, respectively, totalling €948,395.81 across the first two years of its implementation.¹⁹⁰ For its operational services, FoodSaver lists "Keep the service free" as a lesson learned, as a number of small food-distribution organisations lack the financial means to contribute and would withdraw if payment becomes mandatory; this decision is taken as these smaller organisations are able to reach target groups that would otherwise remain under the radar.¹⁹¹ This decision limits direct cost recovery while still maintaining its goal of social reach.

At the operational distribution level, the *Sociale Kruideneiers Gent* and *Rabot op je bord* have a separate subsidy agreement, as according to the 2023-2025 subsidy agreement, around €46,504.59 for *Sociale Kruideneiers* operations overall, with €23,252.30 pro-rated for 2023 (reflecting partial-year coverage), and €22,312.02 for *Rabot op je Bord*.¹⁹² Both amounts are indexed annually at +1.42% in 2024, and +1.34% in 2025, and the payment

¹⁸⁹ Urban Sustainability Exchange, "Ghent En Garde."

¹⁹⁰ Stad Gent, "FoodSavers Ghent More than Food," 7.

¹⁹¹ Stad Gent, "FoodSavers Ghent More than Food," 4.

¹⁹² Stad Gent, "OCMW van Gent En Sociale Kruideneiers 2023-2025."

for this subsidy is on a 90/10 basis, with 90% paid at the start of the year and the remaining 10% paid after the submission and approval of the annual activity and financial report.

Human Resources and Capacity Building

A key institutional element of FoodSavers Ghent is its social employment model, in which the operational logistics workforce comprises individuals who have been long-term unemployed and face difficulties entering the labour market but are trained in high-demand logistics skills. This reflects the social side of FoodSavers' initiative, as it is not only about food waste intervention and food access mechanisms but also supports social employment. FoodSavers had an initial target of employing 10-12 people, which was substantially exceeded, with 19 people from long-term unemployment employed after just 10 months of operation.¹⁹³ During the 2017-2018 period, around 25 people were employed through FoodSavers. For its operations, FoodSavers uses a custom electronic agenda, handheld product scanners, and a real-time dashboard for instant checks of food flows by category and data on recipient organisations. Given the involvement of technology in its operations, staff received training on software and the digital dashboard, which, at the same time, made one full-time administrative position redundant while enhancing operational efficiency.¹⁹⁴ Alongside this, the operational handbook addresses human resource challenges, including 30% employee turnover due to the physical demands of logistics work, language barriers, and difficulties adapting to working conditions.¹⁹⁵ This raises concerns in the context of the human resources dimension, noting that the individuals employed face pre-existing labour market barriers; the turnover rate reflects the structural cost of pursuing social employment objectives alongside operational ones.

At the downstream distribution level, the subsidiary agreement for *Rabot op je Bord* mandates an active volunteer group of at least 15 individuals, intentionally selected to represent diverse ages, origins, cooking skills, and social backgrounds. The agreement obliges volunteers to participate at all operational levels, from food preparation to sales and policy strategy, making *Rabot op je Bord* a participatory project rather than a

¹⁹³ Milan Urban Food Policy Pact, "MPA 2018 Awarded City," 1.

¹⁹⁴ Stad Gent, "FoodSavers Ghent More than Food," 17.

¹⁹⁵ Stad Gent, "FoodSavers Ghent More than Food," 4.

conventional service delivery model.¹⁹⁶ For *Sociale Kruidenier's* operations, annual reports must detail the number of volunteers at fixed and mobile points, as well as the social employment trajectories achieved within each operation.¹⁹⁷ Looking at these requirements in the subsidy reporting framework, the system balances civic and social human-resource capacity for formal monitoring, rather than treating volunteers as informal actors who supplement paid staffing.

Communication and Public Awareness

The communication approach in the *Gent en Garde* food policy strategy operates at the strategic and operational levels, not only in whether communication activities exist, but also in how they are structured to support public participation and institutional coordination. At the strategic level, the Food Policy Council acts as a public ambassador for Ghent's food vision and strategic priorities and promotes sustainable food production and consumption with external stakeholders.¹⁹⁸ The City of Ghent's website also provides information on FoodSavers' operational activities, including data on food surpluses and redistribution processes, to inform the public, potential donors, recipient organisations, and external partners. Not only that, but FoodSavers has also received external institutional recognition as it has been promoted and recognised by the Magarini and Porreca European Commission report for FIT4FOOD2030, as one of eight European best practices in urban food system transformation under the circularity and food waste category.¹⁹⁹

Communication is also implemented at the operational level, as partners, including social organisations and all donor relationships, are legally required to submit weekly reports on how many people in poverty used the donated food.²⁰⁰ This effort is important for a structured accountability channel between the platform and its beneficiary network. In addition, the subsidy agreement requires *Sociale Kruideniers Gent* to acknowledge the City of Ghent and OCMW as subsidising authorities in all publications and external

¹⁹⁶ Stad Gent, "OCMW van Gent En Sociale Kruideniers 2023-2025," 4.

¹⁹⁷ Stad Gent, "OCMW van Gent En Sociale Kruideniers 2023-2025," 3.

¹⁹⁸ Hullebroeck, "Objective of the Ghent Food Strategy," 5.

¹⁹⁹ Andrea Magarini and Elisa Porreca, "European Cities Leading in Urban Food Systems Transformation: Connecting Milan & FOOD 203," 2019, <https://fit4food2030.eu/wp-content/uploads/2019/10/European-cities-leading-in-urban-food-systems-transformation.pdf>.

²⁰⁰ Stad Gent, "FoodSavers Ghent More than Food," 17.

activities, to ensure formal communication and public accountability.²⁰¹ However, there is limited documentation of public awareness activities beyond the partner network, as the shared documents provide more information on reporting and subsidy agreements than on public engagement.

Monitoring and Evaluation

FoodSavers has been required to produce a formal performance evaluation since its operations phase started, which, within its ten months of the operation, it substantially exceeded all targets, such as 300.34 tonnes of food redistributed against a target of 100 tonnes; a CO₂ emissions reduced by 762 tonnes against a target of 254 tonnes; 19 people from long-term unemployment employed against a target of 10–12; and 58 recipient organisations engaged against a target of 20.²⁰² By the end of 2018, FoodSavers had redistributed around 628,290 kg of food, saved 1,657 tonnes of CO₂, and processed 356,150 portions, reaching 38,000 people in poverty. Over the two years, 947.86 tonnes were imported and 921.22 tonnes redistributed, with a waste rate of only 2.81 per cent.²⁰³ These numbers indicate that FoodSavers has met and exceeded its stated targets.

The city of Ghent also reported that between 2017 and mid-2022, FoodSavers redistributed over 3,450 tonnes of food surpluses, equivalent to 1,763,716 meals or food parcels, to more than 36,000 Ghent residents in poverty through around 68 social organisations.²⁰⁴ Ghent reports that by the end of 2020, the project had reduced carbon dioxide emissions by 6,038 tonnes, demonstrating that FoodSavers' environmental impact has contributed to these reductions.²⁰⁵ A report in 2023 stated that FoodSavers have saved and redistributed around 726 tonnes of food.²⁰⁶ Another report stated that in 2023, FoodSavers collected 723 tonnes of food, and the *Sociale kruideniers* have helped 25% more Ghent residents access more affordable foods and basic products.²⁰⁷

²⁰¹ Stad Gent, "OCMW van Gent En Sociale Kruideniers 2023-2025," 7.

²⁰² Milan Urban Food Policy Pact, "MPA 2018 Awarded City," 1, 3.

²⁰³ Stad Gent, "FoodSavers Ghent More than Food," 3, 6–7.

²⁰⁴ Stad Gent, "Foodsavers Gent laat geen eten verloren gaan," accessed May 14, 2026, <https://stad.gent/nl/werken-ondernemen/werken/werken-regio-gent/sociale-economie-gent/dienstenbedrijf-sociale-economie/foodsavers-gent-laat-geen-eten-verloren-gaan>.

²⁰⁵ Stad Gent, "Foodsavers Gent laat geen eten verloren gaan."

²⁰⁶ Stad Gent, "Welzijn En Samenleving Jaaroverzicht 2023," n.d., https://stad.gent/sites/default/files/media/documents/Welzijn%20en%20Samenleving_jaaroverzicht%2023.pdf.

²⁰⁷ Stad Gent, "Armoedebeleidsplan 2020-2025: Evaluatie 2023," 2024, <https://stad.gent/sites/default/files/media/documents/presentatie%20Evaluatie%20ABP%202023.pdf>.

FoodSavers remained active, supporting Ghent’s food policy program as well as the social-economy aims within it. A report on FoodSavers is not available for FoodSavers itself, but mainly in the City of Ghent report.

Institutional Capacity Profile: Ghent Initiatives

Table 4.1 Binary Scoring Matrix: Institutional Capacity Across Three Initiatives in Ghent

The table below shows the binary coding results for the three Ghent initiatives across the six institutional capacity dimensions, where 1 indicates the dimension is evidenced as present, and 0 indicates absence or insufficient evidence in the available sources. The coding is based on twelve structured comparison questions (Q1-Q12),²⁰⁸ grouped under the six dimensions.

Dimension	Question	PAYT (Diftar)	Recycling Parks 2.0	<i>Gent en Garde</i> (FoodSavers)
D1 Policy, Legal Framework & Leadership (Score 1/1/1)	Q1	1	1	1
	Q2	1	1	1
D2 Organisational Coordination & Service Delivery (Score 1/1/1)	Q3	1	1	1
	Q4	1	1	1
D3 Financial & Resource Management (Score 1/1/1)	Q5	1	1	1
	Q6	1	1	1
D4 Human Resources & Capacity Building (Score 1/1/1)	Q7	1	1	1
	Q8	1	1	1
	Q9	1	1	1

²⁰⁸ Binary coding was based on twelve structured comparison questions that examined, for each initiative, the existence of a policy or legal mandate; coordination mechanisms and role assignments; budget allocation and financial management routines; designated staffing and training or capacity-building activities; public outreach, communication, and accessibility of information; and the presence and use of monitoring indicators, data-tracking, and reporting procedures.

D5 Communication & Public Awareness (Score 1/1/1)	Q10	1	1	1
D6 Monitoring & Evaluation (Score 1/1/1)	Q11	1	1	1
	Q12	1	1	1
Total Initiative Score		6/6	6/6	6/6

Note: Dimension scores are presented as (PAYT (Diftar) / Recycling Parks 2.0 / Gent en Garde (FoodSavers))

Ghent's Capacity Configuration

Taken together, Ghent's total score of 6/6 for three initiatives indicates that its governance environment can translate formal mandates into distinct operational pathways. The institutional capacity dimensions are achieved through different structural mechanisms: PAYT, as a tariff system, and RP 2.0, as an infrastructure, share the same regulatory framework but operate under different instruments, while FoodSavers achieve capacity through a political framework and contractual multi-coordination. However, the uniform dimensional profile does not indicate that the three initiatives are operationally identical; rather, as the within-case analysis shows, the same dimension is achieved through different mechanisms that depend on the initiative's context and needs.

4.4 Waste Banks (Surabaya)

Waste Banks (*bank sampah*) are community-based initiatives that began in response to waste-generation challenges in the city and promote waste collection, sorting, education, and recycling. The main goals of waste banks are education and the sorting of inorganic waste for economic value; thus, they combine waste management with environmental, social, and economic aspects, as well as behavioural change in the community.²⁰⁹ In Surabaya, the initiative started as *the Bina Mandiri* Waste Bank Unit during the 2010-2016 period, then became the Surabaya Main Waste Bank (*Bank Sampah Induk Surabaya, BSIS*) in 2016, and obtained legal status as a foundation called *Yayasan Bina Bhakti Lingkungan* in 2017, which then became a cooperative legal entity, *Koperasi Jasa*

²⁰⁹ Plastic Smart Cities, "Tps3r Dan Bank Sampah: Bukan Pesaing, Tapi Mitra Strategis," 2025, <https://plasticsmartcities.wwf.id/feature/article/tps3r-dan-bank-sampah-bukan-pesaing-tapi-mitra-strategis>.

Bank Sampah Induk Surabaya, in 2023.²¹⁰ Surabaya Main Waste Bank (BSIS) reported that it has assisted around 512 waste bank units, 279 schools, and 161 companies.²¹¹

In 2023, the city of Surabaya, through its Environmental Agency, supported and formalised BSIS as the main coordinating body for the waste-bank units. As of 2023, the municipality of Surabaya reported that BSIS has assisted around 254 waste-bank units, consisting of 116 waste-bank units in neighborhoods or villages, 118 waste-bank units in schools, and 20 waste-bank units in institutional offices, and has gathered around 70 tonnes of waste per month.²¹² This transformation of community initiative into a formal municipal coordination framework shows that community-based waste management can be formally incorporated into municipal coordination frameworks. The waste bank initiatives are also part of municipal circular economy strategies, as they involve numerous actors, including public and local policymakers, to promote reduce, reuse, recycle behaviour.

Legal and Policy Framework

Waste bank initiatives in Surabaya operate across several legal frameworks, including waste management and its operationalisation, providing a strong formal foundation for the initiative. At the national level, Indonesian Law (*Undang-Undang*) No.18/2008 on waste management serves as the fundamental law, marking a shift from a collect-and-dispose model to a more integrated approach to waste reduction, while also assigning local governments responsibilities for household waste management and encouraging source-based recycling.²¹³ This goal is directly operationalised through the Minister of Environment and Forestry Regulation (*Peraturan Menteri Lingkungan Hidup dan Kehutanan/Permen LHK*) No. 14/2021, which replaces the earlier 2012 regulation, which provides the details and a legally binding national framework as it sets the management,

²¹⁰ Bank Sampah Induk Surabaya (BSIS), *Tentang Kami – Bank Sampah Induk Surabaya*, n.d., accessed May 15, 2026, <https://banksampahinduksurabaya.id/tentang-kami-new/>.

²¹¹ Bank Sampah Induk Surabaya (BSIS), *Tentang Kami – Bank Sampah Induk Surabaya*.

²¹² Pemerintah Kota Surabaya, “Wali Kota Eri Cahyadi Resmikan Bank Sampah Induk Surabaya, Target Penjualan Sampah Kering 150 Ton Perbulan,” Pemerintah Kota Surabaya, 2023, <https://www.surabaya.go.id/id/berita/10222/wali-kota-eri-cahyadi-resmikan-bank-sampah-induk-surabaya-target-penjualan-sampah-kering-150-ton-perbulan>.

²¹³ Database Peraturan, “UU No. 18 Tahun 2008.”

requirements, partnerships, and incentive structure for implementing waste banks.²¹⁴ *Permen LHK* defines a waste bank as a facility managing waste under the 3R principles, reduce, reuse, recycle, which at the same time becomes the instrument for supporting and promoting behavior change, community education, and the implementation of the circular economy, and may be managed by the community, business entity, or local government. The operational framework for waste banks emphasises treating collected waste as an economic resource to maximise its utility and value, reflecting the circular economy concept in national regulation, which should be adapted to the regional level, showing that this initiative is legally recognised.

At the municipal level, Surabaya City Regional Regulation (*Peraturan Daerah/Perda*) No.1/2019 amends Regulation No.5/2014 concerning Waste Management and Cleanliness, which serves as the legal foundation for Surabaya's waste management system, prioritising the 'Reduce, Reuse, and Recycle' (3R) principle at the household level.²¹⁵ Specifically in Chapter I Article 10, the regulation explains that the 3R concept should be done through waste banks; in which the local government should expand waste banks, assist and support in technical needs, provide training, monitor and evaluate the end results of the waste banks, and assist in the marketing of 3R. Article 15 of the same regulation requires that waste be sorted into at least five categories, which is crucial for the operation of the waste bank, as pre-sorted recyclable waste is needed rather than mixed waste. Legal basis is important here to minimise uncertainty for local actors and to provide proof of the clear alignment of the local initiative with the higher legal hierarchy. Based on this, the community-based initiatives have a recognised governance structure that is important to the program's sustainability, although this does not always translate to full support in the operational framework that waste banks might need.

²¹⁴ "Permen LHK No. 14 Tahun 2021," Database Peraturan | JDIH BPK, accessed May 24, 2026, <http://peraturan.bpk.go.id/Details/233754/permen-lhk-no-14->.

²¹⁵ "Peraturan Daerah Kota PERDA Nomor 1 Tahun 2019 Tentang Perubahan Atas Peraturan Daerah Kota Surabaya Nomor 5 Tahun 2014 Tentang Pengelolaan Sampah Dan Kebersihan Di Kota Surabaya," n.d., accessed May 24, 2026, https://jdih.surabaya.go.id/uploads/peraturan/perda_785.pdf#toolbar=0.

Additionally, under the tenure of previous Mayor Tri Rismaharini, the city has developed its reputation as a national and regional reference for urban waste governance.²¹⁶ This legacy has been maintained under the current Mayor, Eri Cahyadi, who also formalised this program by establishing Rumah Bank Sampah, or House of Waste Bank, thereby demonstrating the city's continued political support and commitment to collaborating with citizens to strengthen the implementation of the circular economy at the community level.²¹⁷

Organisational Coordination and Service Delivery

Surabaya's waste bank network is organised through several layers which connect the Department of Environment (DLH) as the municipal coordinator and capacity builder, supporting the training, community engagement, and institutional coordination; the main waste bank (BSIS), waste bank unit (BSU), which also collaborate with household residents, private sectors, etc. DLH Surabaya is also responsible for coordinating broader waste-flow management in Surabaya, including collection, sorting at integrated waste facilities, transportation, and final disposal at the Benowo landfill (*Tempat Pembuangan Akhir/TPA Benowo*). Based on *Permen LHK* No.14.2021, waste bank facilities are divided into two categories: the Main Waste Bank (Bank Sampah Induk/BSI) and Waste Bank Units (Bank Sampah Unit/BSU), which have different capacities and scopes. BSI acts as the main operational hub and coordinator, collector for BSU, household, or commercial areas, and usually operates at a larger, more formal level at the city/regency level, while BSU operates at the neighbourhood or community scale and serves as the local collection point for households or local businesses, to collect, sort, and promote household participation.²¹⁸ This shows that coordination among waste banks is not only horizontal across actors but also vertical across organisational levels, and this design aims to establish a coordinated service delivery chain. This is confirmed, as Adawiah et al. (2024) explain, waste banks are not a single organisation, as their operationalisation

²¹⁶ Pemerintah Kota Surabaya, "Jadi Pemateri Di Perancis, Wali Kota Risma Ungkap Fakta Di Balik Keberhasilan Surabaya Kelola Sampah," 2019, <https://surabaya.go.id/id/berita/51184/jadi-pemateri-di-perancis-wali-kota-risma-ungkap-fakta-di-balik-keberhasilan-surabaya-kelola-sampah>.

²¹⁷ Pemerintah Kota Surabaya, "Wali Kota Eri Resmikan Bank Sampah Dan Rumah Cacing Puspa Mandiri, Jadi Percontohan Kampung Pancasila," 2025, <https://www.surabaya.go.id/id/berita/24239/wali-kota-eri-resmikan-bank-sampah-dan-rumah-cacing-puspa-mandiri-jadi-percontohan-kampung-pancasila>.

²¹⁸ "Peraturan Daerah Kota PERDA Nomor 1 Tahun 2019 Tentang Perubahan Atas Peraturan Daerah Kota Surabaya Nomor 5 Tahun 2014 Tentang Pengelolaan Sampah Dan Kebersihan Di Kota Surabaya," n.d.

requires coordination among multiple sectors.²¹⁹ According to the city's waste management system data for 2024, Surabaya's household waste sector is the largest source of waste, accounting for 85.2% of total waste generation, underscoring the importance of source-based management in the city's approach.²²⁰ Regarding the actors and roles involved specifically in waste banks, *Permen LHK* 14/2021 specifies the detailed role division and responsibilities of the structural organisation across BSU and BSI, including the director, general manager, finance, etc., each with its own task descriptions.²²¹ In addition, a 2023 publication in Jawa Pos reported that BSIS receives waste from 162 active waste banks, processes around 70-80 tons per month, and manages 55 waste categories.²²² Surabaya's 2025 report shows that the city supports three BSIs, including BSI Surabaya (BSIS), BSI Berkah Sukomanunggal, and 670 waste bank units.²²³

For the operational waste management, below is the overview of the waste banks flow:

²¹⁹ Wardatul Adawiah et al., "Leadership, Innovation and Community Participation Pillar of Institutionalization in Bank Sampah Induk Surabaya," *Journal of Social Dynamics and Governance* 1, no. 2 (2014): 111–19.

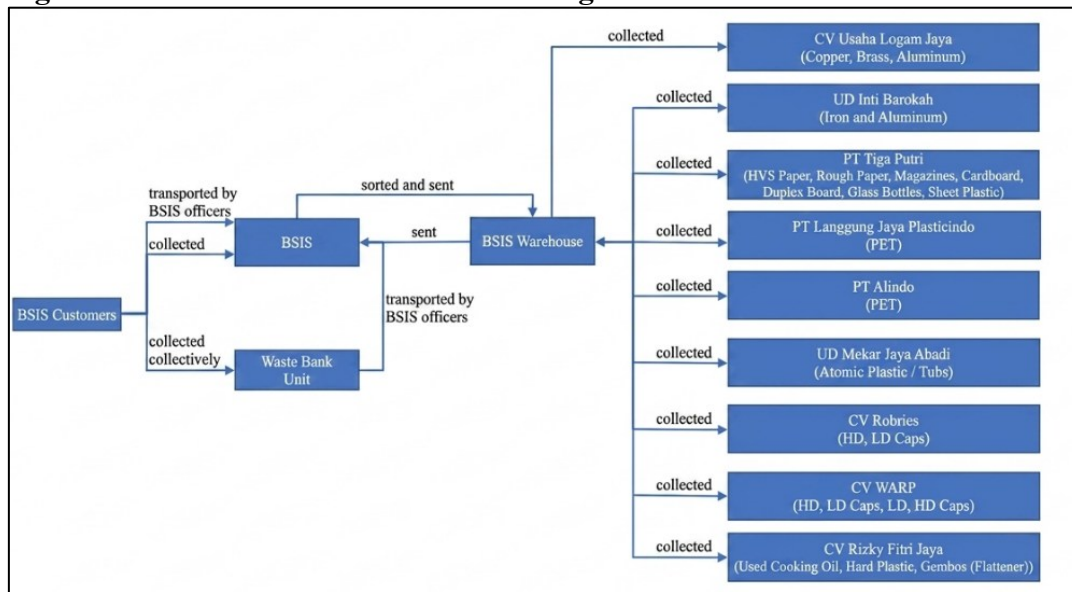
²²⁰ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026."

²²¹ Database Peraturan | JDIH BPK, "Permen LHK No. 14 Tahun 2021."

²²² Dhimas Ginanjar, "Melihat Operasional Bank Sampah Induk Surabaya Yang Tampung 55 Kategori Sampah," Jawa Pos, Jawa Pos, 2023, <https://www.jawapos.com/features/2309190074/melihat-operasional-bank-sampah-induk-surabaya-yang-tampung-55-kategori-sampah>.

²²³ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026."

Figure 4.1. Flow of Domestic Waste Management with Waste Bank



Source: Widyati (2022, p.45)

The waste bank system operates through five steps: collecting, sorting, exchanging, managing, and transporting.²²⁴ While organic waste is composted, the inorganic waste is sorted by material type and sold to third-party waste collectors or recycling companies. As the coordinator, BSIS built a network and connected to at least external recycling partners, including CV Usaha Logam Jaya (for metal waste), PT Tiga Putri (for paper and glass waste), PT Langgeng Jaya Plasticindo (Polyethylene Terephthalate/Plastic), and CV WARP (High Density/Low Density plastics).²²⁵ These partnerships show the formally documented coordination network involving BSIS, BSUs, and the private sector.

Based on Figure 4.1, the flow begins at the household level, where residents/customers, also called clients/customers, sort waste by type, such as plastics, paper, metals, and glass. This sorting procedure is crucial, as clean, sorted waste materials will have higher economic value and are easier to process in the recycling industry. Second, deposit and weighing residents need to bring their sorted waste to the waste bank location on

²²⁴ Ade Imas Agusningtyas et al., "Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City," n.d., <https://doi.org/https://doi.org/10.17758/EAP.U0517220>.

²²⁵ Sarah Widyati et al., "Efektivitas Dan Efisiensi Bank Sampah Induk Surabaya," *Planning for Urban Region and Environment* 11, no. 2 (2022), <https://purejournal.ub.ac.id/index.php/pure/article/view/232>.

designated days. Here, staff will weigh each category of waste, a process similar to the one used for depositing.²²⁶ Third, recording and value conversion, where waste turns into money: the weight of the waste is converted to Rupiah value at the current market price and recorded in the customer's savings books. Fourth, the collection and advanced sorting at the facility, usually at BSIS, where waste is collected from dozens or hundreds of customers, is performed by temporary staff, who will perform advanced sorting, where the plastic bottles with labels or caps will be removed, to increase the quality and the material purity before selling it to the industry. Fifth, the distribution to the recycling industry: once waste reached a certain volume or weight, the sorted waste was sold to larger collectors or directly to recycling factories. This is the phase in which plastic bottles and other materials are processed into products such as plastic pellets or brand-new bottles. For distribution, BSIS owns one pick-up truck and five *tossa* (three-wheeled motorized carts) vehicles; only three *tossa* support the operational work.²²⁷ This process reflects the circular-economy functions of the waste bank, as the sorted waste is not treated as discarded material but as an economic resource that re-enters the production chain. The waste bank system here also reveals that it depends not only on public participation but also on other stakeholders, such as collectors, recyclers, and market actors, who can turn this waste into recovered materials.

Both formal and practical coordination are crucial to the operationalisation of waste banks in Surabaya, as the system is supported by the national, regional, and legal frameworks, and the Surabaya action plan roadmap 2025-2026 also prioritises accelerating waste management as the city's policy agenda focus. In its organisational structure, BSIS has a differentiated structure including the director, marketing, finance, customer service, warehouse administration, field collection, etc. In practice, the system is indeed highly dependent on several things, such as residents' willingness to sort and collect their waste, BSU managers' capacity to maintain local records and collection routine, BSIS' capacity to coordinate sales and quality control, and also on the DLH's role in coordinating and

²²⁶ Plastic Smart Cities - WWF, "Alur Proses Bank Sampah: Mengubah Pola Pikir Masyarakat: Sampahmu, Tanggung Jawabmu - Plasticmartcities," 2025, <https://plasticmartcities.wwf.id/feature/article/alur-proses-bank-sampah-mengubah-pola-pikir-masyarakat-sampahmu-tanggung-jawabmu>.

²²⁷ Elis Viranda et al., "Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya," *Jurnal Penelitian Administrasi Publik* 4, no. 4 (2024), <https://aksiologi.org/index.php/praja/article/view/1603>.

facilitating the waste bank network into the broader municipal waste system. Wijayanti (2014) describes waste banks as a form of community-based environmental governance in which waste is treated as an economic commodity and a savings instrument, with public participation, government involvement, and private-sector collaboration in waste management.²²⁸ Within these waste banks, however, some function well, with documented economic benefits for their clients, while others face stagnation or are non-functional due to limited equipment and management capacity.²²⁹ The differences in practical operationalisation among waste banks indicate inconsistencies and challenges across them.

Financial and Resources Management

The financial structure of the waste bank programme in Surabaya is a combination of community-generated revenue, formal partnerships with the private sector, and occasional public funding, showing variation yet remaining relatively self-sustaining. The main revenue model is based on waste transactions: when the sorted, recyclable waste deposited by residents/clients is weighed and valued at market rates, the earnings will be credited to individual savings accounts (*buku tabungan*). *Permen LHK* No.14/2021 sets out the standard revenue-sharing scheme, under which 85% of waste sales are allocated to customer deposits, and 15% goes to the operational costs of the waste banks.²³⁰ The allocation of customers' economic incentives is important, as research finds that around 52.5% of BSIS customers said their participation is driven by economic motivation.²³¹ While daily operational costs use this buffer transactional mechanism, the regional public funding is the macro-level source for the structural network growth, where Surabaya allocates around 3% of its regional budget (*Anggaran Pendapatan dan Belanja Daerah/APBD*) for broader waste management efforts, which is used for essential equipment support, including BSU's expansion with a target of 10 annually, collection

²²⁸ Dyah Retno Wijayanti and Sri Suryani, "Waste Bank as Community-Based Environmental Governance: A Lesson Learned from Surabaya," *Procedia - Social and Behavioral Sciences*, REFLECTIONS ON CREATIVITY: PUBLIC ENGAGEMENT AND THE MAKING OF PLACE, vol. 184 (May 2015): 171–79, <https://doi.org/10.1016/j.sbspro.2015.05.077>.

²²⁹ Viktorius Dala et al., "Implementation of Regional Regulation No. 1 of 2019 on Waste Management and Cleanliness in the City of Surabaya, Indonesia," *Jurnal Ilmu Sosial Dan Ilmu Politik (JISIP)* 14, no. 3 (2025): 505–19, <https://doi.org/10.33366/jisip.v14i3.3470>.

²³⁰ Database Peraturan | JDIH BPK, "Permen LHK No. 14 Tahun 2021."

²³¹ Agusningtyas et al., "Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City," 18.

carts and composting bins, and also localised sorting facilities.²³² In 2025, Surabaya reported allocating around IDR462 billion, or €22,3 million, from the municipal budget, including around IDR120 billion for tipping fees at the Benowo landfill and other operational costs.²³³ Another financial source is CSR-based funding.

The financial source at the BSIS level comes from the sustainability funding strengthened by a formal public-private partnership, where BSIS, since 2012, has maintained a Corporate Social Responsibility (CSR)-based cooperation agreement with PT PLN (Persero) *Unit Induk Distribusi* (UID) East Java, a regional subsidiary of Indonesia's state-owned electricity company, providing a documented partnership for the funding stream.²³⁴ On another legal basis, *Permen LHK* No.14/2021, in Article 17, states that the government may provide incentives through awards, recognition, publication, and training for well-performing banks, indicating the government's resource support within its regulatory framework. Additionally, at the operational level, BSUs are typically covered by deducting 10% from transaction income or by a predetermined community agreement, with funds primarily allocated to operational supplies during collection sessions.²³⁵ Labour is mainly provided by volunteers or compensated with a small allowance from the operating fund, showing more of a community goodwill effort. At the same time, this shows that financial condition can affect the maintenance of waste transportation infrastructure. However, across these revenue sources, the available documents do not describe a formalised procedure for reporting waste-bank income and expenditure to DLH or any other public authority, as the financial information remains limited of internal savings booklets, transaction records, and general APBD budget lines.

At the localised unit BSUs, revenue comes exclusively from the sale of recyclable items, with customers receiving around IDR25 to IDR42,000 per kilogram, or up to €2 per kilogram, depending on the material type, where savings are either withdrawn or

²³² Wali Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026.”

²³³ Waste4Change, “Studi Kasus Indore dan Surabaya.”

²³⁴ Widyati et al., “Efektivitas Dan Efisiensi Bank Sampah Induk Surabaya,” 45.

²³⁵ Afif Faiq Muhamad et al., *Questionnaire Survey to Clarify Current Situation of Waste Banks in Surabaya, Indonesia*, 2021, https://nws.stage.ac/3rincs2021/docs/abstracts/B-3_041_Afif_Faiq_Muhamad-210219.pdf.

deposited for future use.²³⁶ The average annual deposit per customer varies widely, with an average of around Rp178,000; however, financial reporting at the unit level relies on a simple savings booklet that records waste type, weight, and monetary value rather than a formal financial statement, making detailed facility-level income and expenditure data unavailable in the sources used.²³⁷ This results in a financial management analysis limited to the documented allocation rules and funding management rather than to a comprehensive system-wide reporting mechanism.

Human Resources and Capacity Building

Human resources in the Surabaya waste bank system are characterised by a dual structure, with a volunteer-dominated model at the unit level and a formalised employment model at the BSIS. According to *Permen LHK* No.14.2021, it standardises a minimum four-function organisational structure applicable to both BSIS and BSU, comprising a Director, General Manager, Production Manager, and Finance Manager, with other divisions supporting sorting, collection, storage, and outreach.²³⁸ While BSI Production Managers are responsible for sorting, collection, storage, and waste processing, BSU Production Managers are only responsible for sorting, collection, and/or storage to avoid operational overlap and ensure the smooth functioning of BSU. For personnel competency, *Permen LHK* No. 14/2021 requires all positions from the Director to division managers to hold at minimum a secondary school education and to have completed waste bank training, with the production manager specifically required to have knowledge and understanding of the waste sorting, collection, storage, and processing procedures.

At the unit level, managers are usually selected through community processes or voluntary initiatives, with around 67% selected for their ability and social skills and 33% volunteering independently; most are motivated by environmental concerns, while others are motivated by a willingness to spend their leisure time.²³⁹ Waste banks generally

²³⁶ Muhamad et al., *Questionnaire Survey to Clarify Current Situation of Waste Banks in Surabaya, Indonesia*.

²³⁷ Agusningtyas et al., "Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City."

²³⁸ Database Peraturan | JDIH BPK, "Permen LHK No. 14 Tahun 2021."

²³⁹ Agusningtyas et al., "Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City."

employ from three to 22 individuals, mostly men.²⁴⁰ Additionally, the lack of financial incentives is consistently identified as a barrier to recruitment and retention, given that the tasks are time-consuming and operationally complex and that compensation is inadequate.²⁴¹ Although many unit-level managers do the job voluntarily, municipalities support them with equipment and facilities that indirectly facilitate their activities and reduce the operational burden that would otherwise fall on unpaid labour.²⁴² However, the volunteer-based system at the unit level is structurally fragile, as Addinsyah and Warmadewanthi (2020) identify a shortage of individuals as one of the main causes of inactive waste banks in Surabaya, and management failure, which shows varied and inconsistent technical competence across waste bank units.²⁴³ At the BSIS level, staffing is more formally structured; as of 2023, BSIS employs 16 permanent staff members, one newly recruited staff member, and three staff members in training, with recruitment prioritising low-income communities to support social inclusion objectives.²⁴⁴ Staff in operational roles such as directors, public relations officers, tellers, and treasurers receive a monthly salary ranging from IDR1.5-2 million (approximately €98), along with additional meal allowances.²⁴⁵

Capacity building is facilitated in several ways, with *Permen LHK* No.14/2021 stating that managers must participate in waste bank training sessions and that the General Manager is responsible for delivering 3R education and outreach at least once every three months.²⁴⁶ The Surabaya Environmental Office (DLH) also supports capacity building by providing recycling workshops, sorting training, and marketing assistance for recycled products.²⁴⁷ On the other hand, BSIS operationalises capacity building by providing free

²⁴⁰ Muhamad et al., *Questionnaire Survey to Clarify Current Situation of Waste Banks in Surabaya, Indonesia*.

²⁴¹ Agusningtyas et al., “Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City.”

²⁴² Solikha et al., *Bank Sampah and Waste Management in Urban Surabaya, Indonesia*, 80.

²⁴³ Amar Addinsyah and I. Warmadewanthi, “Material Flow Analysis of Plastic Waste and Paper Waste from Waste Banks in Surabaya,” *American Journal of Environmental Protection* 9 (September 2020): 102, <https://doi.org/10.11648/j.ajep.20200905.11>.

²⁴⁴ Viranda et al., “Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya.”

²⁴⁵ Solikha et al., *Bank Sampah and Waste Management in Urban Surabaya, Indonesia*.

²⁴⁶ Database Peraturan | JDIH BPK, “Permen LHK No. 14 Tahun 2021.”

²⁴⁷ Eka Maidhatul Jannah and Sri Wibawani, “Policy Implementation of Waste Management at Bintang Mangrove Waste Bank, Surabaya City,” *Journal of Public Representative and Society Provision* 5, no. 3 (2025): 876–90, <https://doi.org/10.55885/jprsp.v5i3.675>.

training and operational support to unit-level waste banks, especially for environmental cadres (*kader lingkungan*), including guidance sessions, sorting instruction, and free operational equipment, such as digital scales.²⁴⁸ There is also a structured training programme for community members at schools, aimed at raising awareness among environmental cadres to sustain the programme. Despite these, the reach and standardisation mechanism across these efforts remains uneven.

Communication and Public Awareness

Communication engagement in the Surabaya waste bank system is highly related to active participation as depositing customers. As briefly mentioned before, economic incentives are a driver of engagement, as evidenced by findings that over half of Surabaya's waste bank customers cited economic benefit, rather than environmental and legal obligations, as their main motivation for participating in waste banks.²⁴⁹ The communication strategy is also implemented through institutional and community changes, where at the inter-organisational level, Surabaya Environmental Office (DLH) maintains active communication with waste bank units via routine meetings, both online and offline, WhatsApp group coordination with affiliated banks, environmental cadres, and participation in the national Waste Bank Association (*Asosiasi Bank Sampah*).²⁵⁰ This shows a communication and public awareness approach that coordinated not only among waste banks and residents but also across institutional actors. *Permen LHK* No.14/2021 further mandates that waste banks publicly inform residents of waste type classifications and price lists in customer service areas, conduct a 3R education session at least once per quarter, and maintain the customer savings book as a record of residents' participation.²⁵¹ For this purpose, the Sibasam application is one of the means by which residents can access information on waste categories and pricing.

Furthermore, BSIS is engaged in public outreach through social media and direct community engagement, engages youth through environmental education, and submits

²⁴⁸ Solikha et al., *Bank Sampah and Waste Management in Urban Surabaya, Indonesia*, 80.

²⁴⁹ Agusningtyas et al., "Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City."

²⁵⁰ Viranda et al., "Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya," 198.

²⁵¹ Database Peraturan | JDIH BPK, "Permen LHK No. 14 Tahun 2021."

periodic performance reports to DLH as part of its operational and performance accountability.²⁵² BSIS implements Waste Management Partnership (*Mitra Pengelolaan Sampah*) and Waste Donation (*Donasi Sampah*) to increase waste value and to help people in need, while the Waste Pickup program (*Jemput Sampah*), where BSIS staff collect pre-sorted waste from customers directly, is an active accessibility mechanism to reduce barriers for residents/customers who are unable to transport their waste themselves.²⁵³

At the city level, Surabaya conducts several approaches in its environmental strategy that enable greater community engagement. One of them is through a network of 29,453 Great Surabaya Cadres (*Kader Surabaya Hebat/KSH*), responsible for direct door-to-door socialisation on waste sorting and management at the city, village, or neighborhood level, as well as an environmental competition in which 1,300 neighborhoods participate.²⁵⁴ DLH has used social media to maintain active digital outreach through Instagram, TikTok, and YouTube, producing content on waste management and development, targeting households, industries, private sectors, malls, educators, and government institutions.²⁵⁵ DLH Surabaya focuses on building environmental awareness from early education through university and supports the implementation of waste management in educational institutions, including the Eco Campus and Eco religious institutions programmes. Apart from these, the Green and Clean annual competition, administered in partnership with Unilever Indonesia since 2005, has used participation in waste banks as a visible evaluation criterion to raise environmental awareness.²⁵⁶ Radio programmes such as *Bintang Warga*, a community talk show, have also been used to build trust between the government and residents and to serve as regular channels for communicating on waste management issues, with the involvement of community

²⁵² Viranda et al., “Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya.”

²⁵³ Viranda et al., “Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya.”

²⁵⁴ Wali Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026,” 16.

²⁵⁵ Wali Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026,” 20.

²⁵⁶ Agusningtyas et al., “Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City,” 22.

leaders, professionals, and civil servants.²⁵⁷ Moreover, the *Zero Waste Village* programme, with 160 active villages as of 2025 and targeting 500, serves as the community-level behavioural change mechanism within the neighbourhood governance structure. At the unit level, Bintang Mangrove Waste Bank also conducts a weekly River School educational programme for children from the Gunung Anyar Tambak area to promote sorting skills and environmental awareness.²⁵⁸

Despite these efforts, limitations remain: Addinsyah & Warmadewanthi (2020) found that only 47.7% of residents in Surabaya practice waste sorting, indicating that communication and public awareness efforts have not yet led to major behavioural changes or adaptation. This also confirms that Surabaya's city revealed that source-based waste reduction only reached 7.43%, a significant gap from the 35.29% target set by the regulation in 2018. Although waste management performance is available through the national system, Surabaya's 2025-2026 reports, and Sibasam, public transparency remains limited at the operational level, as detailed operational data are not publicly available, and unit-level outputs and implementation are less open to the general public as well.

Monitoring and Evaluation

Surabaya's waste bank system operates within a multi-level monitoring arrangement that links national regulation, municipal information systems, and local record-keeping. At the policy level, *Permen LHK* No.14/2021 mandates that waste bank managers, as government partners, submit performance reports to the relevant government authorities at least every six months, using a standardised reporting format, on the structure, facility condition, waste quantities, and customer participation.²⁵⁹ This establishes a formal expectation that waste bank activities are documented and periodically reviewed by government agencies. In practice, monitoring for Waste Bank is also carried out through digital platforms, direct site visits, and an enforcement mechanism, with the Sibasam (Waste Bank Information System/*Sistem Informasi Bank Sampah*) used to track waste

²⁵⁷ D. R. Wijayanti and Suryani, "Waste Bank as Community-Based Environmental Governance," 177.

²⁵⁸ Jannah and Wibawani, "Policy Implementation of Waste Management at Bintang Mangrove Waste Bank, Surabaya City," 858.

²⁵⁹ Database Peraturan | JDIH BPK, "Permen LHK No. 14 Tahun 2021."

volumes, customer numbers, and transaction data across the BSU's network; the SIPSN (*Sistem Informasi Pengelolaan Sampah Nasional*), a national-level information system through which BSIS data is used for the national waste management statistics.²⁶⁰ Surabaya reports on current indicators for total managed waste, waste-bank coverage, and compiled quantitative performance data. Surabaya also invests in infrastructure for monitoring, using GPS trackers on the collection vehicles and cameras at the integrated waste management point, along with a *Tim Yustisi* enforcement team to issue administrative sanctions and a reporting channel, including the *Wargaku* application, the web Media Centre, and Call Centre 112 for public reporting.²⁶¹ In 2022, BSIS managed approximately 427,820 kg of waste; as of 2026, it manages 50-60 tonnes of waste per month, with a target of selling 150 tonnes of inorganic waste per month.²⁶² BSIS also submits its periodic performance report to DLH as part of its operational accountability, and Surabaya's total number of registered waste banks grew to 655 units by 2024, up from 345 in 2020.²⁶³ At the unit level, monitoring data are recorded in an individual customer savings booklet and internal records, and the available documents provided limited insight into how these monitoring results are used to adjust practices within individual waste banks.

4.5 TPS3R (Surabaya)

TPS3R (*Tempat Pengolahan Sampah Reduce, Reuse, Recycle*) is Surabaya's main community-scale waste management infrastructure. As of 2025, it operates 12 TPS3R units across the city's districts and is managed by the city's Environmental Agency (DLH Surabaya).²⁶⁴ TPS3R facilities are more structured and on a larger scale than Waste Banks and are distributed across different districts, aiming to process both organic and

²⁶⁰ Viranda et al., "Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya."

²⁶¹ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026," 23.

²⁶² Widya Chandrawati, "Mengintip Peran Bank Sampah Induk Surabaya," Antara News, 2026, <https://jatim.antaranews.com/berita/1064412/mengintip-peran-bank-sampah-induk-surabaya>; Admin Web, *Surabaya Punya Bank Sampah Induk Tingkat Kota, Targetkan 150 Ton Sampah Kering Terjual Tiap Bulan – Bank Sampah Induk Surabaya*, 2024, <https://banksampahinduksurabaya.id/2025/07/11/surabaya-punya-bank-sampah-induk-tingkat-kota-targetkan-150-ton-sampah-kering-terjual-tiap-bulan/>.

²⁶³ Dala et al., "Implementation of Regional Regulation No. 1 of 2019 on Waste Management and Cleanliness in the City of Surabaya, Indonesia," 506.

²⁶⁴ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026."

inorganic waste and to minimise the volume of waste going to the landfill. TPS3R facilities receive waste from household and commercial producers, sort it through the conveyor belt system, process organic waste through the composting and Black Soldier Fly (BSF) cultivation, and send the recoverable inorganic waste to private collectors (*pengepul*), while the waste residue is transported to the landfill, TPA Benowo landfill.²⁶⁵ This chapter treats TPS3R as a city-level waste-reduction effort as a system rather than as isolated facility units, but individual TPS3R facilities are also used as examples or references for operational practice.

Policy and Legal Framework

The TPS3R initiative has a coherent, vertically integrated legal framework at multiple levels, comprising national legislation, presidential regulations, ministerial guidelines, regional regulations, and mayoral decisions. At the national level, Indonesian Law (*Undang-Undang*) No.18/2008 on Waste Management is the legal foundation for community-based waste reduction, including through TPS3R, establishing the legal responsibilities of regional and local governments for waste management, and shifting to a more integrated 3R (reduce, reuse, and recycle) approach.²⁶⁶ The Minister of Public Works and Housing (*Peraturan Menteri Pekerjaan Umum/Permen PU*) No.03/2013 formally defines TPS3R as a community-based waste management facility focusing on waste reduction, reuse, and recycling; and at the same time, it also sets the operational standards that the facility must not exceed 30% of total waste handled.²⁶⁷ This regulation is significant as TPS3R is not only legally recognised but also subject to a measurable national performance standard, which not all community-based waste management systems have. The President Regulation (*Peraturan Presiden/Perpres*) No.97/2017 also sets the national waste management targets for 2025 at 30% waste reduction and 70% handling for household and household-like waste, which TPS3R has identified as targets for its delivery instruments.

²⁶⁵ Pemerintah Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah Kota Surabaya.”

²⁶⁶ Database Peraturan, “UU No. 18 Tahun 2008.”

²⁶⁷ Reza Fadhilah Mukhtar et al., “Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City,” *Journal of Geodesy and Geomatics* 19, no. 3 (2024): 544.

At the municipal level, Surabaya's TPS3R is based on Surabaya City Regional Regulation No.1/2019 (amended by Regional Regulation No.5/2014), which mandates that Surabaya City develop waste treatment infrastructure as part of its obligations for cleanliness and waste governance.²⁶⁸ The Mayor Regulation No.64/2018 is important as it formally integrates TPS3R as part of Surabaya's formal municipal waste governance structure, not only as a physical waste facility, and it also defines TPS3R as a community-based facility responsible for waste collection, sorting, reuse, and recycling activities. In relation to the Regional Policy and Strategy (*Kebijakan dan Strategi Daerah/Jakstrada*), Mayors are authorised to provide facilities, conduct monitoring and evaluations, etc., suggesting that TPS3R is a systemic component of Surabaya's waste management strategy. Surabaya's strategic roadmap states that while the 12 existing TPS3R facilities will remain operational at their current combined capacity of 72.6 tonnes per day, a new integrated waste processing site will be supplemented, with a capacity of 150 tonnes per day.²⁶⁹

The TPS3R initiative is legally authorised, aligned with the higher-level instrument, and politically supported at the city level, providing a legal basis to ensure its operational continuity. Despite the legal support, however, at the operational level, for instance, one of the TPS3R, TPS3R Gunung Anyar, produces a residual rate of 48.7%, which is nearly 20% higher than the legal threshold, indicating that, at this facility, the documented rate exceeds the level set in the TPS3R guideline, so compliance with the formal implementation varies across facilities.²⁷⁰

Organisational Coordination and Service Delivery

The organisational coordination system of TPS3R is based on inter-agency coordination and multisector collaboration among DLH, neighborhood collectors, facility workers, private buyers, and community organisations, etc., each with its own role. At the system level, TPS3R facilities are integrated with the 191 TPS (Temporary Waste Disposal Site)

²⁶⁸ “Peraturan Daerah Kota PERDA Nomor 1 Tahun 2019 Tentang Perubahan Atas Peraturan Daerah Kota Surabaya Nomor 5 Tahun 2014 Tentang Pengelolaan Sampah Dan Kebersihan Di Kota Surabaya,” n.d., accessed May 25, 2026, https://jdih.surabaya.go.id/uploads/peraturan/perda_785.pdf#toolbar=0.

²⁶⁹ Wali Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026.”

²⁷⁰ Mukhtar et al., “Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City.”

units, which are transit points for residents' waste (usually mixed waste), with 27 compost houses and landfills in Landfill (*Tempat Pembuangan Akhir/TPA*) Benowo, creating an infrastructure where waste flows from households to transfer points to treatment facilities and to the final disposal.²⁷¹ Benowo Landfill is one of the largest landfills in Indonesia and the first waste-to-energy (WtE) facility in Indonesia.

In 2024, Benowo Landfill received an average of 1,536.74 tonnes of waste per day, of which only 1,000 tonnes could be processed through the Gasification Power Plant; the rest was landfilled using sanitary landfill methods.²⁷² Surabaya in 2024-2025, in cooperation with the private sector, PT. Sumber Organik, built in a Pyrolysis facility, a process of breaking down materials at high temperatures into oil for fuel, targeting an initial 700 tonnes per day, with a target of 2,000 tonnes per day.²⁷³ This reflects a direct response to support the landfill's longevity, as all TPS3R are under DLH authority, with the agency managing the waste management infrastructure, standardising equipment, and producing annual performance data.²⁷⁴ Based on data published by the city of Surabaya, in 2024, ten operational TPS3R facilities in total received 48.71 tonnes of waste per day, where 25.83 tonnes were processed and generated 22.88 tonnes of waste residue; with the individual facility contributing around 11.85 tonnes received by Super Depo Sutorejo, one of the TPS3R, to the 1.63 tonnes handled by another TPS3R facility, Pemilahan Bratang.²⁷⁵ Due to differences in facilities' capacities, larger facilities, such as Super Depo Sutorejo and TPS3R Tambak Osowilangun, should coordinate on complex waste-material flows rather than smaller facilities.

Moreover, at the operational facility level, the flow involves the neighbourhood-level waste collectors (*pengepul*) who transport waste manually from individual

²⁷¹ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026," 2, 11.

²⁷² Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026," 18.

²⁷³ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026," 18.

²⁷⁴ Aida Fatimah et al., "Efforts to Reduce Carbon Emissions from TPS3R and Rumah Kompos Facilities: Case Study in Surabaya," *IOP Conference Series: Earth and Environmental Science* 1307, no. 1 (2024): 3, <https://doi.org/10.1088/1755-1315/1307/1/012011>.

²⁷⁵ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026."

neighbourhood units on a daily basis, such as at TPS3R Tenggilis in District Tenggilis Mejoyo, who have 14 to 24 neighbourhoods per day from the Tenggilis Mejoyo and Kendangsari sub-districts, with around 5,047 kg of waste per day, and comprising 65.789% organic and 12.15% plastic.²⁷⁶ Once delivered, waste is weighed before being processed at the conveyor sorting line. The sorted recyclables are collected by the waste collector (*pengepul*) about twice a month, while the compost is distributed to city parks and for cultivating BSF maggots, which are directed to city agencies.²⁷⁷ This coordination flow reflects a network among multiple actors that supports the operational waste management flow.

At the system level, DLH defines formal roles for TPS3R management and facility staff within the municipal waste-management hierarchy. For example, TPS3R Jambangan has a formal organisational structure with a documented, allocated role, while TPS3R Tenggilis does not fulfil the organisational structure sub-aspect under its institutional aspect of the national standard, showing differences across facilities.²⁷⁸ In contrast, Super Depo Sutorejo, established through a collaboration between Surabaya and Kitakyushu, Japan, is the highest-performing facility in Surabaya's TPS3R, processing 2332.277 tonnes of waste per year.²⁷⁹ However, while the operational network in many facilities has standard equipment, including conveyor belts and organic shredders, under uniform DLH-capacity baselines, this physical standardisation has not yet translated into consistent operational implementation.

²⁷⁶ Muhammad Ulum et al., "Pengelolaan Sampah Di Tempat Pengolahan Sampah Reduce, Reuse, Dan Recycle (TPS 3R) Tenggilis, Kota Surabaya," *Envirous* 5, no. 2 (2025): 33–34, <https://doi.org/10.33005/envirous.v5i2.340>.

²⁷⁷ Mukhtar et al., "Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City."

²⁷⁸ Adellia Zanati Putri and Yayok Suryo Purnomo, "Evaluasi Sistem Pengelolaan Sampah TPS 3R Jambangan Dan TPS 3R Tenggilis Berdasarkan 5 Aspek," *Envirous* 3, no. 2 (2023), <https://doi.org/10.33005/envirous.v3i2.19>.

²⁷⁹ Fatimah et al., "Efforts to Reduce Carbon Emissions from TPS3R and Rumah Kompos Facilities," 4; Ariel Zahrotha Devrea Agustine et al., "Dari Sakura Ke Suroboyo: Sinergi Sister City Dalam Upaya Pengelolaan Lingkungan Yang Berkelanjutan," *JURNAL MEDIA AKADEMIK (JMA)* 3, no. 6 (2025), <https://jurnal.mediaakademik.com/index.php/jma/article/download/2012/1647/5759>.

Financial and Resource Management

The financial structure of TPS3R is characterised by a strong dependence on the municipal budget (*Anggaran Pendapatan dan Belanja Daerah/APBD*) and limited evidence of self-sustaining funding arrangements at the facility level. The financial capacity is assessed not only by the availability of funding but also by the accountability of resource flows. Funding for TPS3R operational activities is primarily integrated into Surabaya's formal fiscal framework through municipal regulations on waste service fees and local taxes. At the facility level, research on TPS3R Jambangan and TPS3R Tenggilis is funded by the municipal budget.²⁸⁰ The same study notes the existence of a waste fee (*iuran sampah*) mechanism but does not specify whether these revenues directly support TPS3R operations. This dependency is embedded within Surabaya's regulatory framework, as mentioned in the Surabaya Waste Management Roadmap (2025), which identifies several regulations on waste financing and retribution, including Mayor Regulation No.63/2014 on waste-service retribution collection procedures and Regional Regulation No.7/2023 on local taxes and retribution. Furthermore, under Mayor Regulation No. 64/2018, the implementation of the regional strategy is mandated to be supported through the regional budget and other legally funded resources. These indicate strong fiscal legitimacy, as waste-management financing is structurally incorporated into the municipal planning and budgeting legal system.

On the budget itself, Surabaya allocates around 3% of its regional budget for waste management programmes for 2025-2026, prioritising TPS3R optimisations, development of the Integrated Waste Processing Site (*Tempat Pengolahan Sampah Terpadu/TPST*), and facility rehabilitation to improve the implementation of waste management infrastructure. This direct municipal budget allocation minimises the risk of the program being discontinued. Apart from the municipal budgeting, there are some additional funding streams from the private sector through CSR contributions. The CSR's contributions included the installation of water infrastructure at TPS3R facilities, funded by the Regional Drinking Water Company (*Perusahaan Daerah Air Minum/PDAM*) Surya Sembada; maggot-cultivation infrastructure from Bank Rakyat Indonesia; waste

²⁸⁰ Putri and Purnomo, "Evaluasi Sistem Pengelolaan Sampah TPS 3R Jambangan Dan TPS 3R Tenggilis Berdasarkan 5 Aspek," 79.

bins from PT Groen Indonesia; etc.²⁸¹ International support is also evident through initiatives with Japan, including TPS3R and composting facilities, which further strengthen the facilities' infrastructure and resources.

Some facilities, including Super Depo Sutorejo, have developed limited internal income-generation mechanisms, derived from weekly sales revenue to recycling collectors for pressed inorganic plastic waste, which then adds to operational cash flows; ten per cent of plastic waste revenue is allocated to minor machine repair, and some is distributed as additional incentives to sorting staff.²⁸² The government is also investing in expanding TPS3R capacity to reduce landfill dependency, with an IDR30 billion budget proposal in the 2025 regional budget to upgrade machinery at TPS3R Tambak Osowilangun, increasing the projected capacity from around 10 tonnes per day to 150 tonnes per day.²⁸³ This investment reflects the financial plan of TPS3R expansion, where every tonnes diverted from Benowo reduces the tipping fee of IDR232,000 per tonne, or around IDR120 billion per year, and transportation costs, which account for up to 50% of total waste management expenditures.²⁸⁴ These arrangement show that the resource flows for TPS3R are formally embedded in the municipal budgeting system and that some facilities have agreed on internal rules in using operational income, although publicly available documents provide limited detail on systematic financial reporting at individual TPS3R facilities.

Human Resource and Capacity Building

Human resources management in the TPS3R initiative in Surabaya is generally structured around formal staffing at the facility level due to the DLH standardised regulation; however, a gap exists between staff deployment and their operational competence. This is important because having staff who can perform their roles affects the sustainability

²⁸¹ Wali Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026,” 14.

²⁸² Dhea Kusuma and Sri Wibawani, “Strategi Pengelolaan Sampah Di Super Depo Sutorejo Kota Surabaya,” *NeoRespublica : Jurnal Ilmu Pemerintahan* 5 (2024): 936, <https://doi.org/10.52423/neores.v5i2.276>.

²⁸³ Dimas Mahendra, “Anggaran Rp 30 Miliar Digelontorkan, TPS 3R Osowilangun Bakal Jadi Andalan Baru Surabaya Kurangi Sampah,” 2025, <https://radarsurabaya.jawapos.com/surabaya/2508200056/anggaran-rp-30-miliar-digelontorkan-tps-3r-osowilangun-bakal-jadi-andalan-baru-surabaya-kurangi-sampah>.

²⁸⁴ Waste4Change, “Studi Kasus Indore dan Surabaya,” 31.

and implementation of TPS3R at the local level. All TPS3R facilities have designated operational staff; for example, at TPS3R Gunung Anyar, 15 workers support waste sorting, composting, and residue management.²⁸⁵ DLH, which standardises equipment for waste management, also utilised standardised daily operating times for conveyor belts, organic shredders, and hydraulic pressers to establish the baseline technical and emissions profiles for the facilities. When actual waste-processing volumes fall short of this fixed infrastructure capacity, the uniform physical assets are left underutilised.²⁸⁶

Similar to waste banks, as a whole waste governance effort, Surabaya has 29,453 environmental cadres to reach the community level for socialising waste management; and TPS3R Super Depo Sutorejo has the Standard Operating Procedure (SOP) framework for waste processing at its facilities, from weighing to sorting, pressing, shredding, and transfer, designed to prevent machine damage and ensure operational continuity.²⁸⁷ Human resources and capacity building are also formally recognised as strategic priorities under *Perwali* No. 64/2018, which identifies them as strategic priorities in municipal waste management, including training programs, technical guidance, and advocacy activities, indicating a broader municipal capacity-building mechanism for the TPS3R operational workforce. Despite the standardisation of municipal equipment in Surabaya's waste management network, there are significant variations in the operations. This is evident from Fatimah (2024), who finds that TPS3R Tambak Osowilangun achieves an optimal baseline emission factor of 0.210 tonnes CO₂eq/tonne of waste, while Pemilahan Bratang lags significantly at 0.289 tonnes CO₂eq/tonne of waste.²⁸⁸ This is because equipment parameters and active daily hours are uniform under DLH management. Fatimah (2024) attributes this divergence directly to the capacity underutilisation, demonstrating that underperforming facilities simply fail to process a sufficient volume of waste relative to their fixed infrastructure profiles. This shows that there are fundamental management and capacity issues, and that the local workforce at the lower-

²⁸⁵ Mukhtar et al., "Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City," 546.

²⁸⁶ Fatimah et al., "Efforts to Reduce Carbon Emissions from TPS3R and Rumah Kompos Facilities."

²⁸⁷ Wali Kota Surabaya, "Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026"; Kusuma and Wibawani, "Strategi Pengelolaan Sampah Di Super Depo Sutorejo Kota Surabaya," 938.

²⁸⁸ Fatimah et al., "Efforts to Reduce Carbon Emissions from TPS3R and Rumah Kompos Facilities."

performing facilities faces barriers to coordinating and maintaining optimal waste-input processing loads relative to their fixed technical infrastructure.

This operational inefficiency aligns with the structural governance gaps identified by Putri and Purnomo (2023) in their evaluation of the TPS3R, as they find that while facilities like TPS3R Jambangan have maintained a formal operational network, TPS3R Tenggilis lacks a defined organisational structure, causing community-level workers to operate without clear regulatory alignment.²⁸⁹ These findings show that while Surabaya has distributed physical equipment, it cannot support the ground-level human resource structures and specialised operational training required to achieve the network performance.

Communication and Public Awareness

TPS3R's communication and public awareness strategy functions are embedded in Surabaya's broader waste governance framework. Mayor Regulation (*Perwali*) No. 64/2018 recognises the importance of communication, education, and information (*komunikasi, edukasi, informasi/KIE*) in strengthening community participation, including through neighbourhood-based recycling activities, education campaigns, and environmental training, including on initiatives such as TPS3R, waste banks, and compost houses.²⁹⁰ Surabaya has actively conducted public outreach through social media engagement and activities and initiatives, including the Zero Waste Village campaign and school competitions. At the facility level, Super Depo Sutorejo's supervisory staff stated that residents of Surabaya can freely request compost produced at Compost House Wonorejo, thereby serving as a communication mechanism that connects TPS3R processing outputs back to the community.²⁹¹

At some TPS3R facilities, empirical studies document these communication arrangements in practice. Zanati (2023) finds that at TPS3R Jambangan and Tenggilis,

²⁸⁹ Putri and Purnomo, "Evaluasi Sistem Pengelolaan Sampah TPS 3R Jambangan Dan TPS 3R Tenggilis Berdasarkan 5 Aspek."

²⁹⁰ Pemerintah Kota Surabaya, "Peraturan Walikota Surabaya Nomor 64 Tahun 2018 Tentang Kebijakan Dan Strategi Pengelolaan Sampah Rumah Tangga Dan Sampah Sejenis Sampah Rumah Tangga," n.d., <https://jdih.surabaya.go.id/peraturan/download/3495>.

²⁹¹ Kusuma and Wibawani, "Strategi Pengelolaan Sampah Di Super Depo Sutorejo Kota Surabaya."

DLH and facility managers provide debriefings and periodic meetings with waste workers and community representatives, while also noting that not all residents report receiving direct instruction on sorting.²⁹² Research at TPS3R Gunung Anyar reports that a large number of residents in the service area have good knowledge of 3R principles and express positive attitudes towards TPS3R, indicating that information about waste sorting and facility functions has reached households, even though only a smaller proportion actively participates as users.²⁹³ This shows a difference of attitude and participation that is related to awareness and behavioural change in reality. This documented evidence shows that TPS3R has structured communication networks and mechanisms, including regulatory KIE mandates, DLH-led training and coordination, and facility-level outreach, although the coverage of communication activities varies across TPS3R locations.

Monitoring and Evaluation

TPS3R has a formal monitoring framework combining national reporting requirements, municipal indicators, and facility-level data collection. TPS3R waste flows and reduction data are reported through the national system information on the waste management platform (*Sistem Informasi Pengelolaan Sampah Nasional/SIPSN*), in which the Mayor Regulation (*Perwali*) No.64/2018 established six quantitative indicators, half of which directly govern TPS3R outcomes, focusing on material recycling rates, facility handling volume, and waste reduction sent to landfills, which serve as the basis for the accountability relations between DLH and the municipal government.²⁹⁴ At the city level, Surabaya has broader waste management systems that monitor implementation through location tracking of waste transport vehicles, with around 31 branches of cleanliness supervision for 31 districts/villages. The published report from the City of Surabaya provides the facility-by-facility data of waste processed and residue generated, differentiated by waste categories, including organic, paper, plastic, and other recyclable waste, which is updated manually in official planning documents, providing monitoring

²⁹² Putri and Purnomo, “Evaluasi Sistem Pengelolaan Sampah TPS 3R Jambangan Dan TPS 3R Tenggilis Berdasarkan 5 Aspek.”

²⁹³ Mukhtar et al., “Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City.”

²⁹⁴ Fatimah et al., “Efforts to Reduce Carbon Emissions from TPS3R and Rumah Kompos Facilities.”

data.²⁹⁵ Empirical studies at individual TPS3R facilities show that TPS3R Gunung Anyar reports waste reduction and residue ratios relative to the 30 per cent residual guideline, indicating how monitoring data can identify facilities that operate within or above the expected residual range.²⁹⁶ These sources indicate that the TPS3R monitoring system exists where data on waste quantities and processing are routinely collected, compiled into municipal and national information systems, and reviewed in planning documents, even though the available materials provide less detail on how specific monitoring findings are translated into further actions or decisions at each individual TPS3R facility.

4.6 Garda Pangan (Surabaya)

Garda Pangan, founded in 2017 by Eva Bachtiar and Dedhy Trunoyudho, is an independent civil society group addressing food loss and waste in Surabaya and Malang, East Java.²⁹⁷ For context, between 2000 and 2019, Indonesia produced between 115 and 184 kg of food loss and waste per capita annually, making it the largest contributor to food loss and waste in Southeast Asia and one of the highest in the world, with the majority of them occurs at the consumption stage from rice and vegetable, and which in quantities enough to feed between 29 and 47 per cent of Indonesia's population.²⁹⁸ For the city level, as of 2026, Surabaya generates approximately 1,800 tonnes of solid waste per day, with food and organic waste as the largest category, although there is no disaggregated city-level data on food waste specifically from sectors such as hospitality, catering, and the food sector that has been published by the local environment department (DLH).²⁹⁹ Garda Pangan does not operate as a conventional non-governmental organisation (NGO); it adopts a socio-perineurial model that integrates food rescue,

²⁹⁵ Wali Kota Surabaya, “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026,” 10.

²⁹⁶ Mukhtar et al., “Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City.”

²⁹⁷ Garda Pangan, *Program*, n.d., accessed May 15, 2026, <https://gardapangan.org/program/>.

²⁹⁸ Waste4Change et al., *Laporan Kajian Food Loss and Waste Di Indonesia Dalam Rangka Mendukung Penerapan Ekonomi Sirkular Dan Pembangunan Rendah Karbon* (Kementerian Perencanaan Pembangunan Nasional/ BAPPENAS, 2021), 6, <https://lcdi-indonesia.id/wp-content/uploads/2021/06/Report-Kajian-FLW-FINAL-4.pdf>.

²⁹⁹ Pemerintah Kota Surabaya, “Olah Sampah Organik Jadi Pupuk, DLH Surabaya Hemat Biaya Angkutan Rp6,73 Miliar per Tahun.”

organic waste processing, and civic education, aligned with the principles of the circular food system.³⁰⁰

Policy and Legal Framework

Garda Pangan operates without a specific local regulation that explicitly mandates or authorises its activities, which structurally distinguishes it from a more formally integrated municipal initiative, yet it functions within a supportive multi-level policy framework of legitimacy. At the national level, several laws provide an indirect legal basis for food rescue programs like Garda Pangan, including on broader waste management, the President Regulation No.97/2017, which primarily concerns waste management and promotes the 3R principle of reduce, reuse, and recycle, is also related to the food rescue program, as it reduces food waste and aligns with the national waste reduction targets. Indonesian Law No. 18/2012 on Food, which addresses the principles of food equity and access, particularly for those experiencing food and nutrition insecurity, is also relevant to the food rescue programme.³⁰¹ At the city level, two local regulations such as the Surabaya Mayor Regulation No.60/2019 on the Food Provision (*Permakanan*) Programme, which mandates the Surabaya city government through its Social Affairs Office (*Dinas Sosial*) to provide food for residents in need, including the elderly, people with disabilities, and poor neglected children; and on the Mayor Regulation No.77/2025 creates government-mandated food distribution system for these groups of people, related to Garda Pangan's programme.³⁰² As Garda Pangan operates in Surabaya's neighbourhoods and redistributes food to the same beneficiary group as the city's programme, it functions as a civil society movement that complements the government's food provision mandate, filling operational gaps that the formal government alone cannot address.

³⁰⁰ Nur Faroh Afidah et al., "Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu," *Journal of Islamic Economics Development and Innovation (JIEDI)* 2, no. 3 (2022): 16.

³⁰¹ Badan Pembinaan dan Pengembangan Hukum Pemeriksaan Keuangan Negara, "UU No. 18 Tahun 2012," Database Peraturan, accessed May 26, 2026, <http://peraturan.bpk.go.id/Details/39100>.

³⁰² "Peraturan Walikota PERWALI Nomor 60 Tahun 2019 Tentang Pedoman Pelaksanaan Pemberian Permakanan Di Kota Surabaya," n.d., accessed May 26, 2026, https://jdih.surabaya.go.id/uploads/peraturan/3652_perwali_60-2019.pdf#toolbar=0; "Peraturan Walikota PERWALI Nomor 77 Tahun 2025 Tentang Pedoman Pemberian Permakanan Bagi Lanjut Usia Tunggal Keluarga Miskin Di Kota Surabaya," n.d., accessed May 26, 2026, <https://jdih.surabaya.go.id/uploads/peraturan/2025perwali3578077.pdf#toolbar=0>.

Garda Pangan has several programs, including food rescue from businesses and events; on-farm gleaning (collection of harvests from farms with low economic value but still edible); food waste awareness campaigns; and food waste policy advocacy, which includes active coordination with government authorities as they develop food waste-related regulations.³⁰³ This positioning of Garda Pangan as both an operational actor and a policy entrepreneur in food waste initiatives is crucial as it reflects Garda Pangan's organisational strategy to maintain its institutional legitimacy through policy engagement despite no legal mandate, functioning as a service provider as well as an actor to reshape the regulatory environment in food redistribution issues. In addition to the political support, this is evidenced by the Coordinating Minister for Food (Menko Pangan), Zulfikli Hasan, who visited a Garda Pangan site in Surabaya and observed the BSF maggot bioconversion process for the national *Makan Bergizi Gratis* (MBG) school feeding programme.³⁰⁴ Although this high-level political endorsement is not regulatory, it is significant for Garda Pangan's operations, providing national visibility for a government programme and increasing awareness of future food waste policy development.³⁰⁵ Despite this, Garda Pangan's co-founder identifies a governance gap: current legislation focuses mainly on waste sorting rather than on upstream food loss prevention or redistribution, and the government's role in food waste governance remains limited.³⁰⁶ The CIPS Policy Brief explains this structurally, as food rescue concerns still lack a national regulatory basis, and the current 29 local government circular letters addressing the food loss and waste (FLW) are non-binding voluntary commitments, which suggest the responsibility to the private sector and community organisations rather than a legal integration into a formal governance framework to strengthen the food loss

³⁰³ Yusnarida Eka Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*, 5, no. 2 (2022): 49, <https://journal.uir.ac.id/index.php/jdis/article/view/14609>.

³⁰⁴ Adhi Dwi Setiawan and Icha Rastika, "Kunjungi SPPG Di Surabaya, Zulhas Cerita Soal Garda Pangan Olah Sampah MBG Dengan Maggot," 2025, <https://surabaya.kompas.com/read/2025/08/21/172431478/kunjungi-sppg-di-surabaya-zulhas-cerita-soal-garda-pangan-olah-sampah-mbg>.

³⁰⁵ Badan Pangan Nasional, *Laporan Kinerja Direktorat Kewaspadaan Pangan 2025* (2026), 115, https://esakip.badanpangan.go.id/dok/pk/dok_2026151775701593.pdf.

³⁰⁶ Masyarakat Jurnalis Lingkungan Indonesia, "Dedhy Trunoyudho: Kontribusi Menjaga Lingkungan Dan Mengatasi Kerawanan Pangan | SIEJ - Masyarakat Jurnalis Lingkungan Indonesia," Masyarakat Jurnalis Lingkungan Indonesia (SIEJ), 2022, <https://siej.or.id/id/envirotalk/dedhy-trunoyudho-kontribusi-menjaga-lingkungan-dan-mengatasi-kerawanan-pangan>.

initiative.³⁰⁷ Fortunately, this issue is currently being raised by the National Food Agency, which proposed food rescue and is now at the Draft Presidential Regulation (*Rancangan Peraturan Presiden/RPerpres*) on Food Rescue, which was officially included in the Presidential Regulation Drafting Programme for 206 through Presidential Decree No.38/2025 dated 22 December 2025, reflecting that national-level legal formalisation of food rescue is in active progression.³⁰⁸ This also means that the food rescue effort, the current Garda Pangan operational initiative, is in a transitional regulatory environment that is still progressing. Garda Pangan has achieved the normative and political legitimacy without yet having regulatory embedding, showing that this civil society initiative is functionally ahead of a formal governance framework and is significant for the food loss and rescue effort.

Organisational Coordination and Service Delivery

Garda Pangan positions itself as a ‘one-stop food loss and waste solution’, operating across two interconnected service streams: food rescue for human consumption and organic waste processing for non-human use via Black Soldier Fly (BSF) maggot bioconversion.³⁰⁹ The food rescue starts with volunteers collecting surplus food from restaurants, hotels, bakeries, catering businesses, supermarkets, farms, events, weddings, and individual donors, sorting it for safety, and distributing it to pre-welfare communities.³¹⁰ Food sorting and checking processes are conducted using the standardised operational procedure (SOP) of Garda Pangan, which includes checking expiry dates, ingredient information, and food security checks based on physical appearance, aroma, and random food testing; food will be packed with hygiene protocols and transported and redistributed to the pre-welfare communities' recipients. This process

³⁰⁷ Rasya Athalla Aaron and Ibnu Budiman, “Scaling up Food Loss and Waste Reduction Programs in Indonesia,” CIPS | Think Tank, Center for Indonesian Policy Studies, 2025, <https://repository.cips-indonesia.org/media/publications/591937-scaling-up-food-loss-and-waste-reduction-4323bf76.pdf>.

³⁰⁸ Badan Pangan Nasional, *Laporan Kinerja Direktorat Kewaspadaan Pangan* 2025, 20.

³⁰⁹ Azwa Safrina and Icha Rastika, “Dari Sisa Makanan Jadi Harapan: Garda Pangan Selamatkan Pangan untuk Warga Pra-sejahtera,” KOMPAS.com, November 10, 2025, <https://surabaya.kompas.com/read/2025/11/10/231840978/dari-sisa-makanan-jadi-harapan-garda-pangan-selamatkan-pangan-untuk-warga>.

³¹⁰ Bagus Indra Setiawan and Mohammad Insan Romadhan, “Perencanaan Komunikasi Garda Pangan Sebagai Organisasi Non Profit Dalam Menjalin Kerja Sama Dengan Mitra,” *Sintesa* 2, no. 02 (2023): 39–40, <https://doi.org/10.30996/sintesa.v2i02.8890>.

is important to ensure quality of service delivery in the food rescue cycle, with safety protocols from preparation and delivery through to the recipients.

The operational scale and geographical outreach of the food rescue initiative have grown since 2017. Early operational data showed that around 428 kg of food was donated to 755 pre-welfare residents across 13 named village distribution points in November 2021, including Kampung Apel, Kampung Bambu, and Kampung Cherry, reflecting a geographically structured distribution network from the early stages of operations.³¹¹ By February 2022, there were around 367,266 food portions distributed, 99 tonnes of food waste saved, and 25,764 beneficiaries reached across 155 direct beneficiary locations from poor villages, settlements, economy flats, orphanages, social care institutions, street-child shelters, and patient family shelters.³¹² By November 2025, Garda Pangan conducted food distribution four days per week and reached approximately 50 to 60 households per day across 205 villages, with distribution points that rotated every two to three months to prevent welfare dependency.³¹³ This rotation is an intentional governance design to foster organisational and social awareness among pre-welfare communities, thereby distinguishing Garda Pangan's operational model from those of food charities. Garda Pangan has built partnerships, including with Apkrindo Jatim and the East Java Restaurant and Café Entrepreneurs Association, both in the food industry, and has extended its reach to 155 beneficiary locations and more than 367,000 portion of food redistributed.³¹⁴ As of February 2022, the corporate partners documented include Nestle, Nutrifood, Carica Bakery, Igor's Bakery, and Gyubab Kebab, among others, reflecting a wide range of food donors supporting the food rescue initiative.³¹⁵

The coordination network also extends upstream through a gleaning programme, an effort to collect and buy excess or leftover commodities such as grain, fruits, or other farmers'

³¹¹ Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*, 53.

³¹² Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*, 54.

³¹³ Safrina and Rastika, "Dari Sisa Makanan Jadi Harapan."

³¹⁴ Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*, 53.

³¹⁵ Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*.

crops that are not as economically profitable to harvest, in areas such as Malang, to reduce food loss at the production stage.³¹⁶ In November 2021, Garda Pangan volunteers harvested 1.5 tonnes of white mustard in Batu, Malang, donating 100 kg to a flood-disaster community kitchen in the area and processing the rest into kimchi, a Korean-style fermented radish, which was then sold commercially and distributed.³¹⁷ For downstream coordination, as mentioned before, Garda Pangan collaborates with the national MBG school feeding program, in which it manages organic food waste through maggot bioconversion, reflecting operational coordination between the government and community-based initiatives to support food rescue. These diverse coordination efforts span upstream and downstream and represent Garda Pangan's broader strategy to reduce food loss and waste (FLW). Worth noting is that most of Garda Pangan's coordinated efforts rely on the sustained engagement of voluntary partners and relational capital related to the initiatives, which may create vulnerability in its operational activities; partnerships are still able to support the initiative.

Financial and Resource Management

Garda Pangan's financial model is a hybrid social enterprise structure that combines multiple revenue streams to sustain operations without relying on public budgets, demonstrating that community-based initiatives can be financially sustainable without direct funding from public institutions. However, the government provides operational support to Garda Pangan, including vehicles for redistributing food to pre-welfare communities.³¹⁸ The main revenue mechanism comes from the paid cooperation scheme with the hospitality industry, in which Garda Pangan offers food waste management services to restaurants, hotels, and catering businesses on a fee-for-service basis, thereby generating income to support operational activities.³¹⁹ This mechanism is significant not just for revenue flow but also for how it shifts businesses from passive food donors to paying clients with a contractual service relationship, thereby creating a more financially stable basis than voluntary donation alone.

³¹⁶ Afidah et al., "Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu."

³¹⁷ Afidah et al., "Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu."

³¹⁸ Badan Pangan Nasional, *Laporan Kinerja Direktorat Kewaspadaan Pangan 2025*, 115.

³¹⁹ Masyarakat Jurnalis Lingkungan Indonesia, "Dedhy Trunoyudho: Kontribusi Menjaga Lingkungan Dan Mengatasi Kerawanan Pangan | SIEJ - Masyarakat Jurnalis Lingkungan Indonesia."

Through the BSF maggot bioconversion programme, operated under the Maggot Garda Pangan brand and based in Sidoarjo, East Java, it processes organic waste which cannot be consumed by humans and transforms it into animal feed and organic fertiliser, creating a downstream revenue opportunity from materials that would otherwise be residual waste.³²⁰ Additional financing stream is through *infak and sedekah*, a voluntary charitable contribution and almsgiving rooted in Islamic philanthropic practice, and also crowdfunding via the *KitaBisa* website, Company Social Responsibilities (CSR) contributions from partner companies, and commercial activity through Lumbung Alum, which produces cold-pressed juice from gleaned farm surplus.³²¹ These wide-ranging revenue streams are indeed necessary to support operational costs, as stated by its founder, Eva Bachtiar, who acknowledged that a social organisation that lacks management capacity and sustainable funding will not be able to maintain its operations and thus needs commercial and fee-for-service models as additional revenue streams.³²² The crowdfunding mechanism via the *KitaBisa* website is also crucial, for example, in 2021, when apple farmers in Batu, Malang faced price instability, Garda Pangan initiated a ‘Buy for Donation’ campaign, to invite the public contribution to participate in purchasing apples at above-market prices, which were later sent to be donated to pre-welfare communities.³²³ Not only that, but Garda Pangan also offers research and consultation services related to food loss and waste, food banks, bioconversion maggot, etc., which also serve as a financial stream to support Garda Pangan’s objective in relation to food rescue. This move is a significant strategy, as it not only addresses food loss at the production stage but also raises public engagement and support, while maintaining Garda Pangan's operational activity to redistribute food to pre-welfare families and to support policy advocacy on food-rescue-related issues.

³²⁰ Setiawan and Rastika, “Kunjungi SPPG Di Surabaya, Zulhas Cerita Soal Garda Pangan Olah Sampah MBG Dengan Maggot.”

³²¹ Hafiz Minhajuel and Tika Widiastuti, “ALMS and Infaq Management Model at Food Bank,” *Jurnal Ekonomi Syariah Teori Dan Terapan* 8, no. 3 (2021): 354–62, <https://doi.org/10.20473/vol8iss20213pp354-362>; Afidah et al., “Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu.”

³²² Afidah et al., “Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu,” 25.

³²³ Afidah et al., “Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu,” 25.

Human Resources and Capacity Building

Garda Pangan's human resources are built on a small core team of paid specialists, supported by a structured two-tier volunteer network that differentiates by function and capacity. The internal team is organised by functional specialisations, including food collection logistics, sorting operations, technology utilisation, and community engagement, indicating a professional-based organisational structure rather than a purely volunteer-driven model.³²⁴ The volunteer teams are classified into two categories: the core volunteers (*relawan inti*), who hold higher-commitment roles and understand the standard operating procedure (SOP) of Garda Pangan, including co-leadership of food rescue and gleaning operations; and public volunteers (*relawan publik*), who participate in specific single-day activities for food rescue and gleaning by registering online at the website or social media, with no specialised experience needed and additional funds for transportation costs for food rescue and gleaning activities.³²⁵ As of 2023, Garda Pangan has around 30 core volunteers and around 1,200 registered daily volunteers who support operations. Volunteer opportunities published on social media and the website are consistently filled shortly after they open, and the organisation has reportedly never experienced a volunteer shortage since it began operations.³²⁶ This reflects high volunteer participation in supporting the food rescue initiative, which relates to environmental, economic, and social impacts.

These volunteers are also exposed to training and preparation in the operational procedures; before a food rescue activity, core volunteers deliver briefings, first, at the Garda Pangan office, about information on the donations, distribution logistics, equipment needed, and norms; second, at the beneficiary location for a final confirmation and update volunteers on any last-minute changes.³²⁷ Instructions, especially on

³²⁴ Masyarakat Jurnalis Lingkungan Indonesia, "Dedhy Trunoyudho: Kontribusi Menjaga Lingkungan Dan Mengatasi Kerawanan Pangan | SIEJ - Masyarakat Jurnalis Lingkungan Indonesia."

³²⁵ Afidah et al., "Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu," 23.

³²⁶ Setiawan and Romadhan, "Perencanaan Komunikasi Garda Pangan Sebagai Organisasi Non Profit Dalam Menjalani Kerja Sama Dengan Mitra," 37; Louisa Vanessa Shania and Edelweis Putri Prima, "Strategi Public Relations Garda Pangan dalam Mensukseskan Pelaksanaan Program Food Rescue," *DIGICOM: Jurnal Komunikasi dan Media* 4, no. 3 (2024): 206, <https://doi.org/10.37826/digicom.v4i3.819>.

³²⁷ Setiawan and Romadhan, "Perencanaan Komunikasi Garda Pangan Sebagai Organisasi Non Profit Dalam Menjalani Kerja Sama Dengan Mitra."

standardised food safety protocols such as SOPs, are disseminated through physical documents and digital PDFs via WhatsApp coordination groups, covering preparation, food-safety packaging, transport, and distribution procedures.³²⁸

Communication and Public Awareness

The approach and strategy of communication and public awareness of the Garda Pangan are mostly through an informal communication plan. Shania and Prima (2024), through interviews with the founder, Eva Bachtiar, and the public relations teams, confirm that Garda Pangan intentionally avoids formal, rigid public information to prioritize authentic content, especially to avoid approaches that exploit poverty or rely on emotional impact; and this has received positive reviews from partners due to the authenticity quality of Garda Pangan's social media presence.³²⁹ Garda Pangan's public relations through its publication, events, news, community involvement, lobbying, etc., is identified by Shania and Prima (2024) as a Two-Way Symmetrical model, which focuses on open dialogue, transparency, and mutual adjustment between the organisation and its public target, rather than a one-way persuasion.³³⁰

Instead of formal institutional campaigns, Garda Pangan's communication approach uses multiple channels, including social media, public events, and network storytelling. Garda Pangan maintains an active digital presence across its main Instagram account (@gardapangan), a dedicated waste management account focused on BSF maggot bioconversion (@maggot_gardapangan), TikTok, and its official website (www.gardapangan.org). Garda Pangan used Instagram to publish its activity documentation, monthly distribution report, food awareness campaign, volunteers' stories, and daily food rescue activities, tagging its partner organisations; it also communicated through the email newsletters sent to its subscribers, building marketing and community awareness.³³¹ Garda Pangan also has its own research team, as it

³²⁸ Setiawan and Romadhan, "Perencanaan Komunikasi Garda Pangan Sebagai Organisasi Non Profit Dalam Menjalani Kerja Sama Dengan Mitra."

³²⁹ Shania and Prima, "Strategi Public Relations Garda Pangan dalam Mensukseskan Pelaksanaan Program Food Rescue," 205.

³³⁰ Shania and Prima, "Strategi Public Relations Garda Pangan dalam Mensukseskan Pelaksanaan Program Food Rescue."

³³¹ Setiawan and Romadhan, "Perencanaan Komunikasi Garda Pangan Sebagai Organisasi Non Profit Dalam Menjalani Kerja Sama Dengan Mitra."

publishes food-rescue issues, including a policy brief, and disseminates information, signalling a knowledge-production function and serving as an information source for food waste governance and efforts.³³² Garda Pangan has also participated in public events, such as Car Free Day (CFD), as primary mechanisms for direct public engagement.³³³ It also collaborates with universities and the community to share information and programmes, including training in maggot farming and organic waste management.³³⁴ These approaches are crucial in Indonesia, as they engage youth and people of all ages in raising awareness of food rescue.

Beyond digital presence, the founder, Eva Bachtiar, has actively represented Garda Pangan at various public seminars, environmental webinars, and the Focus Group Discussion on the ASEAN Socio-Cultural Community Blueprint 2023, where she presented Garda Pangan's operational data on regional food security and sustainability.³³⁵ As briefly mentioned before, the visit of Coordinating Minister for Food (*Menko Pangan*), Zulfikli Hasan, has enhanced Garda Pangan's institutional visibility. The organisation has also conducted a survey of 321 respondents to identify gaps in public knowledge on food waste reduction, using the findings to inform awareness and education activities.³³⁶ This multi-level communication strategy and internal research are significant communication approaches and capacities for Garda Pangan to increase community engagement and policy advocacy.

Monitoring and Evaluation

Garda Pangan monitors its operational performance through monthly public reporting, partner-directed impact documentation, and engagement with national-scale policy data. At the operational level, Garda Pangan also monitor the activity by visiting the location,

³³² Garda Pangan, "Food Bank Surabaya & Malang (@gardapangan)," June 4, 2025, <https://www.instagram.com/gardapangan/>.

³³³ Garda Pangan, *Program*.

³³⁴ Universitas Airlangga, "Gandeng Garda Pangan, Mahasiswa UNAIR Tekan Volume Sampah Raci Tengah," 2026, <https://unair.ac.id/gandeng-garda-pangan-mahasiswa-unair-tekan-volume-sampah-raci-tengah/>.

³³⁵ Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*, 49–53.

³³⁶ Garda Pangan, *Program*.

for instance, for the gleaning programme to check on the information and verify the farm conditions directly.³³⁷

Through its Instagram account, Garda Pangan published a monthly report on its operational activities, including the number of food portions donated, the weight of food saved in kilograms, beneficiaries reached, distribution locations, food waste processed for animal feed, and the approximate CO₂-equivalent emissions prevented. By July 2024, the monthly report posted by Garda Pangan, cited in CIPS Policy Brief, recorded that there were approximately 5,236 food portions donated, 677 kg of food waste saved, 2,751 beneficiaries reached in Surabaya, and 27.35 tonnes of food waste converted into animal feed across marginalised urban pockets. According to the institutional records, this diversion is credited with preventing 27.35 kg of CO₂-equivalent emissions.³³⁸ While this emission reduction metric reflects specific localised accounting boundaries or transportation-focused calculations rather than full-life-cycle methane avoidance, the operational output aligns with national waste goals. Garda Pangan also produced a monthly participation certificate for its corporate partners, informing them of the social and environmental impact their support has enabled through the food rescue activities. For example, in November 2021, PT Peduli Lingkungan recorded around 932 kg of food saved, 428 kg donated to 755 pre-welfare beneficiaries across 13 distribution locations, and 24,000 kg CO₂-equivalent emissions prevented.³³⁹ The reports are useful not only for Garda Pangan to monitor the outputs of the food rescue programmes, but also for public transparency.³⁴⁰

The outcomes of Garda Pangan's operational activities have been documented in multiple independent sources, particularly in academic articles, indicating that the operational continuity and scale expansion of its initiative are significant, even without self-reported outputs, as the public can view the general idea of the operational activity. For example, the CIPS Policy Brief, which draws on Garda Pangan's monthly Instagram reports as

³³⁷ Afidah et al., "Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu."

³³⁸ Aaron and Budiman, "Scaling up Food Loss and Waste Reduction Programs in Indonesia."

³³⁹ Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*, 53.

³⁴⁰ Nizmi et al., *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*.

primary evidence in its analysis, confirms that the monitoring and evaluation output is substantial enough to serve as secondary data for external policy research.³⁴¹ These internal reports are published regularly through its social media for impact disclosures; however, they are not subject to a formal audit, and systematic public reporting of performance metrics through a standardised annual impact report is not documented in available sources. Garda Pangan has cited macro-level data in its public advocacy. Based on its internal analysis, the potential food waste from the national school lunch program could reach 1.1 to 1.4 million tonnes per year, resulting in economic losses of around Rp213 trillion and Rp551 trillion per year.³⁴² Although monitoring data is generated and can be used externally, it is still not formally managed into standardised indicators and documented review processes, which then need to be developed for a further tracking and monitoring database. At the same time, this is also a structural constraint that even at the national-level is just published, as the National Food Agency confirm a development of a platform for a self-reporting called “Stop Boros Pangan” or “Stop Food Waste;” which can be access at [Gerakan Stop Boros Pangan \(SBP\)](#) in which food rescue program can report their activities directly there to a national monitoring systems.³⁴³ Noting that this was just published in late 2025, its operation and use still need adjustment and greater public promotion to encourage all to use it.

Institutional Capacity Profile: Surabaya Initiatives

Table 4.2 Binary Scoring Matrix: Institutional Capacity Across Three Initiatives in Surabaya

The table below shows the binary coding results for the three Surabaya initiatives across the six institutional capacity dimensions, where 1 indicates the dimension is evidenced as present, and 0 indicates absence or insufficient evidence in the available sources. The coding is based on twelve structured comparison questions (Q1-Q12),³⁴⁴ grouped under the six dimensions.

³⁴¹ Aaron and Budiman, “Scaling up Food Loss and Waste Reduction Programs in Indonesia.”

³⁴² Setiawan and Rastika, “Kunjungi SPPG Di Surabaya, Zulhas Cerita Soal Garda Pangan Olah Sampah MBG Dengan Maggot.”

³⁴³ Badan Pangan Nasional, *Laporan Kinerja Direktorat Kewaspadaan Pangan 2025*, 93–97.

³⁴⁴ Binary coding was based on twelve structured comparison questions that examined, for each initiative, the existence of a policy or legal mandate; coordination mechanisms and role assignments; budget allocation and financial management routines; designated staffing and training or capacity-building

Dimension	Question	Waste Banks	TPS3R	Garda Pangan
D1 Policy, Legal Framework & Leadership (Score 1/1/0)	Q1	1	1	0
	Q2	1	1	1
D2 Organisational Coordination & Service Delivery (Score 1/1/1)	Q3	1	1	1
	Q4	1	1	1
D3 Financial & Resource Management (Score 1/1/0)	Q5	1	1	1
	Q6	1	1	0
D4 Human Resources & Capacity Building (Score 1/0/1)	Q7	1	1	1
	Q8	1	0	1
D5 Communication & Public Awareness (Score 1/1/1)	Q9	1	1	1
	Q10	1	1	1
D6 Monitoring & Evaluation (Score 1/1/0)	Q11	1	1	1
	Q12	1	1	0
Total Initiative Score		6/6	5/6	3/6

Note: Dimension scores are presented as (Waste Banks / TPS3R / Garda Pangan)

Institutional Capacity Configurations across Surabaya's Initiatives

The three initiatives adopted in Surabaya have achieved 6/6, 5/6, and 3/6 score respectively. The Waste Banks (6/6) is a community-based initiative that has been formalised, has legal recognition, municipal support, and market-based revenue structures. Waste Banks combine APBD-backed infrastructure with a documented revenue-sharing mechanism to sustain their day-to-day operations through waste transactions rather than relying solely on public budgets. TPS3R (5/6) represents the counterintuitive finding that, as a formally mandated government-managed infrastructure system it has a different organisation as it has legal and coordination institutional capacity dimensions at the system level, which coexist with documented gaps in human resources

activities; public outreach, communication, and accessibility of information; and the presence and use of monitoring indicators, data-tracking, and reporting procedures.

and capacity building at the facility level. One significant finding is that the formal training mandate in *Perwali* No. 64/2018 is not translating into operational delivery, as residents at multiple facilities reported receiving no instruction despite active participation. This signals that being government-managed does not automatically produce stronger institutional capacity, and that a formal mandate without operational follow-through across the facility level represents a governance vulnerability. Finally, Garda Pangan (3/5) demonstrates that operational continuity and institutional governance structures can develop and be sustained without formal legal authorisation, without dedicated public budgetary dependency, and without a regulatory accountability mechanism, yet it has still built its own internal governance structures, diversified its financial model, and established practical legitimacy through its impact and political visibility. At the same time, it shows that there are limitations to what document-based assessment can capture about a civil society organisation, rather than the limits of what it can do in practice. Altogether, the three initiatives show that Surabaya's waste governance system is sustained through three structurally different initiatives that together has multiple functional waste governance, which are the community-based sorting, government-managed infrastructure processing, and civil society food rescue, with each coherent within its own institutional logic.

Chapter V: Findings and Discussion

This chapter summarises the findings of the initiative-level mapping presented in Chapter IV to a nuanced comparison, identifying and discussing whether and how institutional capacity dimensions vary across all cases regardless of contextual differences.

5.1 Institutional Capacity Patterns Across Both Cities

The binary scoring produces the following cross-city profile:

Table 5.1 Institutional Capacity Across the Six Initiatives

Initiatives		D1	D2	D3	D4	D5	D6	Total
Ghent	PAYT/Diftar	1	1	1	1	1	1	6/6
	Recycling Parks 2.0	1	1	1	1	1	1	6/6
	<i>Gent en Garde</i> /FoodSavers	1	1	1	1	1	1	6/6
Surabaya	Waste Banks	1	1	1	1	1	1	6/6
	TPS3R	1	1	1	0	1	1	5/6
	Garda Pangan	0	1	0	1	1	0	3/6

The six dimensions: D1: Policy and Legal Framework, D2: Organisational Coordination and Service Delivery, D3: Financial and Resource Management, D4: Human Resources and Capacity Building, D5: Communication and Public Awareness, D6: Monitoring and Evaluation.

Table 5.1 presents the binary scoring results across all six initiatives. Reading across each row shows the dimensional profile of a single initiative, while reading down each column shows whether a given dimension is present across initiatives regardless of governance context. Three patterns emerge here. First, all three Ghent initiatives, PAYT/Diftar, Recycling Parks 2.0, and the *Gent en Garde* food-rescue system, score 6/6 with no variation at the dimension level. Second, the three Surabaya initiatives have distinct profiles: Waste Banks scores 6/6, TPS3R scores 5/6, and Garda Pangan scores 3/6, showing the dimensional profile varies by initiative type within the same city. Third, reading down the columns, there are two dimensions, D2, organisational coordination and service delivery, and D5, communication and public awareness, that are present across all six initiatives in both cities, while the other four dimensions (D1, D3, D4, D6) show variation and are absent in at least one Surabaya initiative. These patterns directly address the research questions in this thesis. On how institutional

capacity is configured: Ghent's three initiatives are configured through full dimensional presence achieved through different institutional mechanisms, while Surabaya's three initiatives are configured through three structurally distinct profiles, each related to a different institutional type: a formalised community network, a government-managed infrastructure system, and a civil society enterprise. On which patterns are shared and which are context-dependent, the organisational coordination and service delivery, and communication and public awareness are shared across all six initiatives, while the policy and legal framework, financial and resource management, human resources and capacity building, and monitoring and evaluation vary depending on the institutional type and the formal infrastructure each governance environment provides. This pattern should not be interpreted to mean that Ghent's initiatives have higher-quality governance than Surabaya's, as both cities' initiatives were selected because they have sustained operational continuity. The comparison instead shows how institutional capacity is configured differently to sustain that continuity, which is what the research question asks.

The comparison reveals a pattern of configurational differences. Ghent has uniform full profiles across all three initiatives, which is shaped by its structured legal environment. Ghent's governance environment reveals that local waste governance initiatives must have legal authorisation, financial accountability, capacity building, and adaptive monitoring as standard features of all operational activities. This pattern can be explained by Grindle and Hilderbrand (1995) who argue that capacity is shaped by five nested dimensions, such as the action environment (the political, social, and economic context within which organisations operate), the public sector institutional context (the rules, norms, structures governing the public sector), the task network (relations among organisations sharing a task), organisations (internal culture, structure, management), human resources (individual skills, knowledge, or motivations of people within the organisation). Where the article argues that constraints at a broader level can undermine interventions at a narrower level, capacity operates, but when the broader governance environment is well-resourced and formally structured, it functions as the enabling condition that reduces constraint at the narrower level.

Ghent's institutional capacity profile is also consistent with Domorenok et al. (2021a), who argue that administrative or institutional capacity must be understood relationally as a combination of elements rather than as a checklist of individual attributes. These relational characteristics are most visible at the question level, where the evidence behind each score

reveals how capacity is structured rather than simply confirming its presence. The patterns found in Ghent's three initiatives also reflect North's (1990) distinction between formal and informal institutions. In Ghent, formal institutions are evident in regulatory mandates, the legal framework, and contractual accountability mechanisms, which play a major role in generating institutional capacity. At the same time, informal dimensions are visible, for example in the integration of volunteer labour into the FoodSavers operational model. Together, these dynamics produce a governance environment in which formal institutional infrastructures accommodate structurally different initiatives: OVAM-managed PAYT, public–civil society participation, and food redistribution logistics, while still delivering full dimensional capacity across all three initiatives. This suggests that Ghent's institutional environment functions as an enabling condition: participation in the regulatory waste governance system presupposes that initiatives meet all dimensional requirements, which in turn shapes which initiatives operate visibly within formal governance structures

.
On the other hand, Surabaya produced a differentiated profile of 6/6, 5/6, and 3/6, revealing a pattern distinct from Ghent's uniform institutional capacity. It indicates an uneven distribution of institutional capacity across the examined dimensions, depending on the initiative types, actors involved, and the municipal role. The patterns reflect three structurally distinct initiative types: a formalised community network, a government-managed infrastructure system, and a civil society enterprise, each operating within its own institutional arrangements and contributing differently to Surabaya's waste governance system. In Surabaya, formal institutional infrastructure is configured differently across initiative types: for Waste Banks, all six dimensions are documented as present; the TPS3R has legal and coordination dimensions present, but the human resources dimensions are not documented at the facility level; and for Garda Pangan's food rescue activities, it does not have legal, financial, and monitoring dimensions formally documented as available. North (1990) provides a lens, arguing that where formal institutions are absent or unevenly developed, informal constraints such as shared norms, cultural codes of conduct, or trust-based networks can maintain and perform certain governance functions, although they cannot substitute for formal rules. The three initiatives represent three structurally distinct configurations, each of which is consistent with the institutional conditions available and necessary for its type. Therefore, a lack of certain institutional capacity components was compensated for by additional shared norms, community practices, and trust-based networks.

Dimensions present at all initiatives: D2 (organisational coordination and service delivery) and D5 (communication and public awareness)

There are two common dimensions across all six initiatives in both cities: D2, organisational coordination and service delivery, and D5, communication and public awareness. Within the six initiatives examined in this study, these two dimensions hold as relevant regardless of governance context, available resources, or the degree of formal regulatory integration, as they are present whether the institutional mechanism is formal, as in IVAGO's structured zoning system, or informal, as in Garda Pangan's volunteer-coordinated network. This does not imply that coordination and communication are universally necessary for any waste governance initiative to function, but it indicates that, across the structurally different cases examined here, these two dimensions were consistently achievable through either formal or informal institutional means, while the remaining four dimensions were not. For example, in the Garda Pangan initiative, which has no formal legal authorisation, no documented financial accountability records, and no formal documentation of the monitoring review cycle, but still has the organisational coordination and service delivery mechanism for its basic operational activity. Garda Pangan's coordination networks from the upstream, which is the gleaning partnership with the farmers, midstream with the corporate food donors, and downstream for the food redistribution to numerous villages and beneficiary locations, are managed through organisational trust, volunteer engagement, and coordination groups using social media. This coordination mechanism works for Garda Pangan's operational activities because the roles are defined and known, the actors coordinate and engage, and the network can sustain these activities, even without the formal infrastructure that other dimensions may require. This reveals that in this initiative, coordination can be sustained without a formal legal, financial, or monitoring infrastructure. If coordination required formal legal authorisation or a public budget within this framework, Garda Pangan would have been absent from the organisational coordination and service delivery dimension, but the available evidence shows that it coordinates volunteers, partners, and beneficiaries through informal, network-based arrangements to support its operational activities.

On the other hand, IVAGO operates an SAP-integrated three-zone collection management system with a formal role delegation across departments. Surabaya's Waste Banks also operate through a formally mandated two-tier system that connects BSU collection points to BSIS coordination and private recycling partners, with coordination embedded in national regulation

and supplemented by informal networks to support its operational activities. Both initiatives have structurally distinct mechanisms: one relies on formal regulatory infrastructure, while the other relies on community practices and market relationships. Coordination is present across all six initiatives because it is achievable through the means available to any functioning initiative, whether formal or informal; an initiative without some form of coordination would struggle to operate, as it lacks a delivery mechanism. A similar pattern applies to the dimensions of communication and public awareness: Ghent's PAYT/Diftar operates a five-year institutional behavioural campaign with personalised digital feedback; Waste Bank has 29,45 cadre networks with quarterly regulatory education mandates; and Garda Pangan has a monthly Instagram report for public information and awareness. The three initiatives meet the communication and public awareness dimension threshold, as they maintain a public presence, actively engage the actors involved in the initiatives' activities, and do not require a specific institutional form. The universal dimensions across all initiative patterns here can be interpreted through the perspective of Domorenok et al. (2021), who argue that institutional capacity is relational, emphasising interactions among actors that can be built through formal and informal means.

The finding is also consistent with the empirical result of Guerrero et al. (2013) who use Principal Component Analysis across waste governance system in developing countries and found that an awareness component, including household separation behaviour, awareness campaigns, citizen participations, has role, approximately 44.4% of total household waste separation implementation; and a separate component, including on coordination and cooperation mechanism of the service users and providers, leaders' interest in waste management, central government support, related to the variance in collection, transfer, and waste service delivery. These two components are closely related to the two common dimensions found in all initiatives compared in this study: organisational coordination and service delivery, and communication and public awareness. Meaning that if awareness and coordination are the dimensions that consistently matter in different settings, this means that these dimensions are most likely to be present regardless of formal institutional context, as the waste governance initiatives tend to develop formal or informal means to sustain the function in their daily operations. The universal or common dimensions found in this study provide comparable evidence from the Global North-Global South comparison. For methodological notes, these two dimensions were operationalised using a threshold that accepts informal evidence, including relational networks, social media presence, and community engagement,

which could be sufficient to score 1 (present). This follows the theoretical arguments that institutional capacity is a relational dimension that can also be sustained through formal and institutional arrangements. The universality of these two dimensions should therefore be interpreted as a finding about how relational aspects of institutional capacity are produced within this operationalisation, rather than as a claim that they are universally present in any possible measurement scheme.

Context-Dependent Dimensions: D1, D3, D4, and D6

There are four other dimensions, such as policy and legal framework, financial and resource management, human resources and capacity building, and monitoring and evaluation, which are all present in Ghent's local waste initiatives but vary across Surabaya's. Their variation is not due to a single dimension but to the interaction among the governance environment, the institutional type of each initiative, and the formal infrastructure available in each context. The patterns can be explained with the Grindle and Hilderbrand (1995) argument that constraints at a broader level of governance can undermine the intervention at the narrower level, and that improving human resources or training does not lead to the intended result if the organisational context, resource structures, or the institutional conditions required to apply the training into consistent operational practice are more constraining. The pattern in Surabaya's initiatives reflects both the institutional type of each initiative and the presence or absence of formal governance arrangements and other mechanisms.

Looking at the four context-dependent dimensions, each capture how initiatives are embedded in wider governance arrangements. As far as legal authorisation is concerned, it requires an explicit legal mandate or regulatory instrument that recognises the initiative, thereby making informal operation difficult. For instance, in Ghent, this is a standard condition of regulatory participation because all three initiatives are based on the binding Flemish instrument that legally authorises and requires their operation. In Surabaya, regulatory recognition is not available for all initiatives because the national regulation on food rescue initiatives is still under active development. By contrast, regulatory frameworks for Waste Banks and TPS3R are established through national legislation and ministerial regulation, respectively.

The financial and resource management dimension also needs documented financial accountability reporting, which, in Ghent's initiatives, is produced as a routine institutional requirement because IVAGO reports the financial report for the initiatives. For FoodSavers, the city documents and reports the detailed annual costs for the logistics platform, and these expenditures are integrated into OCMW and municipal reporting, which provide the formal accountability framework for the initiative's use of public resources. Furthermore, on the downstream distribution, the *Sociale Kruideniers Gent* and *Rabot op je Bord* have separate subsidy agreements that require annual activity and financial reports. In Surabaya, financial management of government-managed initiatives is integrated into the municipal budget and reported vertically through DLH, rather than through facility-level financial statements. For TPS3R and Waste Banks, this means that formal allocation and use of public funds are documented at the initiative and municipal levels, while detailed facility-level financial reporting is not available due to limited resources. For Garda Pangan, who manages different revenue streams without publicly accessible or formally documented arrangements that specify how resources are allocated and used.

For the human resource and capacity-building dimension, there needs to be defined roles and organised opportunities within the delivery mechanisms. In Ghent, IVAGO has an ISO 9001-certified quality management system and formally documented training programmes. In Surabaya, regulations mandate training delivery for both Waste Banks and TPS3R initiatives, but the mandate translates differently: Waste Banks have structured training through BSIS, whereas at TPS3R the mandate has not produced consistent facility-level training delivery, as documented by Zanati (2023), who finds that residents at multiple facilities reported receiving no instruction on waste sorting at the community level.

For the monitoring and evaluation dimensions, there is a need for evidence of a data tracking system and for monitoring data to be aggregated and presented in formal reports or evaluation documents. In Ghent, all three initiatives have documented links between monitoring data and its use in subsequent decisions, including tariff adjustments informed by waste data in PAYT. In Surabaya, system-level monitoring data on Waste Banks and TPS3R are recorded through national and municipal platforms and presented in formal planning and reporting documents, though the quality and consistency of facility-level data for TPS3R vary. For Garda Pangan, the monthly operational data is generated and published through social media; however, no evidence of a formal internal review or evaluation cycle is documented in accessible sources.

These findings are consistent with Guerrero et al. (2013), who find that the enabling factors for solid waste governance, including the legal, financial, institutional, and socio-cultural dimensions, can vary significantly across cities and that no single factor alone can determine whether a system functions. This study broadens those findings by showing that it is not only the factors that vary but also the combinations in which they appear and how those combinations reflect the formal institutional infrastructure each governance environment provides. These four context-dependent dimensions also vary from the common dimensions, the organisational coordination and service delivery, and communication and public awareness dimensions structurally because, as North's (1990) argues, the distinction of formal and informal institutions provides the explanatory perspectives that the uncoded or informal institutions such as the norms or shared routines, are relational and can perform some governance function but still cannot substitute the codified rules and official procedures that governance environment provide to some extent. The four context-dependent dimensions, on the other hand, depend more directly on the availability of formal institutional infrastructure in a given context.

For example, the TPS3R initiative has no consistently documented human resources and capacity-building dimension. Fatimah (2024) attributes the differences among TPS3R facilities to the workforce, noting that staff do not consistently operate the available machinery according to its intended procedures. The TPS3R pattern can be viewed in Grindle and Hilderbrand (1995), as TPS3R demonstrates their finding that a constraint at a broader level can undermine the interventions at narrower levels through the human resource capacity dimension. The system-level legal mandate and the city-level coordination are present and formally documented; the legal framework exists; however, in the absence of consistently delivered training and clear operational routines, the intended use of machinery and sorting procedures is not uniformly implemented at the facility level. This is evident from Fatimah (2024), who attributes it to capacity underutilisation rather than equipment differences, meaning that the system-level mandate cannot compensate for the lack of facility-level training delivery, yet even with this, the TPS3R is still able to function.

For Garda Pangan, there are three dimensions that are absent: the policy and legal framework, financial and resource management, and monitoring and evaluation. Despite this, the initiative, which has been active since 2017, continues to operate functionally and has expanded its

distribution network and gained national-level recognition. The policy and legal framework are coded as absent, as the food rescue program does not yet have a specific formal regulatory mandate or basis at either the national or municipal level. For the financial and resource management dimension, it is coded as absent, as there are no available sources of any report or financial accountability. Finally, the monitoring and evaluation dimension is also absent: while the monthly Instagram report provides information and a record of its activities, it is not accompanied by a documented internal review or evaluation cycle or report, as needed, to meet the threshold for this dimension. However, despite these absences, it shows that Garda Pangan is able to sustain and operate outside the formal legal framework, financial or public funding framework, and the monitoring structures. Drawing on Grindle and Hilderbrand's (1995) findings that organisational culture can also function despite resource constraints, as it is able to compensate for the structural limitation. In this condition, Garda Pangan's operational activity has this pattern in its civil society type initiative, as it has thousands of registered core and public volunteers who support the initiatives with no to little financial compensation, but the slot for volunteers consistently filled, revealing that the initiative can sustain through with the social norms, network-based activities rather than through formal incentives structures and accountability mechanism that other dimension require. However, what Garda Pangan shows is not that the formal dimensions are unnecessary in general, but that a civil society initiative can function where it depends on sustained voluntary participation, and that the informal institutional mechanism can sustain itself even in the absence of formal institutions. Again, this dimensional absence is not about the absence itself but whether the absent dimensions support the governance functions the initiative most depends on.

Global North-Global South Local Institutional Capacity Comparisons

The cross-city comparison shows a structural difference not only in the number of dimensions present but also in how institutional capacity is configured within each initiative's context. In Ghent, the initiatives operate within the formal multi-level governance framework, showing a uniform full profile across all six dimensions, reflecting a regulatory, financial, and accountability governance environment that specifies requirements for policy, resources, training, communication, and monitoring as standard conditions of operations. Although they share the same dimensional profile, their operational mechanisms vary by initiative type. For example, PAYT and RP 2.0 are legally obligated to operate under VLAREMA, and their financial and monitoring capacity follows from that obligation. While FoodSavers operates under a different mechanism, which is a formal political process started from the community-

based initiative, all still have a complete dimensional profile in Ghent's governance system but different institutional designs.

On the other hand, in Surabaya, institutional capacity is not generated by the governance environment as a default condition, as each initiative has its own structures. The three initiatives have different configuration patterns: Waste Banks combine community-based practices with formal national and municipal recognition and have all six dimensions present; TPS3R has municipal mandates, with the legal and coordination dimensions documented at the system level but lacks evidence of human resources training at the facility level. This shows that even with formal mandates, an initiative does not automatically have all institutional capacity dimensions, particularly when the governance environment does not provide consistent training and human resources development across facilities; Garda Pangan represents the civil society initiative that operates ahead of the regulatory environment conditions, where it has a coordination and communication mechanism, without a specific legal basis, formal financial accountability, or a documented monitoring and evaluation review. In Surabaya, the institutional capacity is distributed unevenly across initiatives, depending on how each is connected to existing formal arrangements and informal networks. These differences in institutional capacity dimensions matter because, when we look at Surabaya's dimensions through Ghent's standards, the absence of dimensions is often seen as a lack of capacity, even when the initiatives still manage to perform their key governance function in that context. However, in Surabaya's context, the 3/6 profile of Garda Pangan represents a configuration that sustains a citywide food rescue network even without formal legal, financial, or monitoring institutional resources within the initiative. Therefore, the perspective here is not whether all six dimensions are formally present, but whether the particular configurations of present and absent dimensions are sufficient and which ones matter for the governance functions that an initiative performs in its specific settings.

5.2 Strengths and limitations of the study

This study has some strengths. First, applying a common analytical framework across six structurally different initiatives in two different governance contexts enables comparison that single case studies are unable to discuss, as this framework results in a comparable dimensional profile while at the same time describing how each dimension is achieved or implemented in practice, addressing the comparability and the context that comparative governance research

does. Second, the use of the most different system design for the case selection results in a shared pattern, which in this case is the presence of both organisational coordination and service delivery and communication, and public awareness dimensions, reflecting that these dimensions can be sustained through multiple institutional patterns rather than just tied to a single type of governance environment. Third, Garda Pangan, a civil society-based initiative operating without formal legal authorisation, strengthens the study's ability to distinguish which dimensions depend more on formal institutional infrastructure and which can be sustained through informal means. Garda Pangan lacks the documented legal, financial, and monitoring capacity that the other five initiatives have, to varying degrees, so its profile serves as an illustrative case. Any dimension that still scores "present" for Garda Pangan despite this absence appears achievable without formal regulatory backing, whereas dimensions that score "absent" seem to depend on infrastructure it does not have. This contrast would not be visible if all six initiatives in the study operated under formal legal mandates.

However, there are also several limitations to this study. First, this analysis relies primarily on documentary source evidence. Although this approach can compare across initiatives and governance contexts, it is not sufficient to fully capture the informal and relational practices that contribute to the dimensions or operationalisation of the initiatives. Aspects such as organisational culture and shared norms play an important role in governance but are often difficult to observe through documentary sources alone, especially for initiatives that heavily rely on a community network, which may appear less institutional than they are in reality. Second, the binary coding framework can identify the presence or absence of each institutional capacity dimension but cannot differentiate the degree of each dimension. Especially in a different context, a dimension coded as present in one initiative may be substantially more developed or embedded than in the same dimension in another initiative and thus should be interpreted through qualitative analysis as well. Third, the cross-sectional analysis for the period examined cannot fully capture whether the initiatives evolve, develop, or adapt during or in other periods; thus, a longer analysis would be helpful for broader analytical needs. Fourth, the study is limited to two cities and six initiatives selected for theoretical comparison rather than representativeness, and the findings describe institutional capacity configurations in these specific cases, not how common these configurations are across other cities or governance contexts. Finally, the evidentiary standards applied to multi-facility initiatives, such as TPS3R and Waste Banks, are structurally different from Ghent's single-operator model. For initiatives operating multiple facilities, dimensions are coded as present when a

formal mechanism exists at the initiative level and at least some evidence of application in practice is documented, while the facility-level variation is discussed in the case description.

5.3 Implications for Waste Governance Practice and Capacity Assessment

The findings have several implications for how institutional capacity is assessed in waste governance practice, especially for municipal authorities designing capacity-building strategies and for researchers developing comparative assessment tools. First, the two universal dimensions- organisational coordination and service delivery, and communication and public awareness- show that, in both cities, every initiative maintains coordination and communication capacities, regardless of differences in their governance arrangement. Both the formal coordination structure and the informal network-based arrangement in Ghent and Surabaya can sustain these functions. Capacity assessments that focus only on formal institutions may therefore overlook the relational coordination and communication practices present across all six initiatives in this study, even though these practices can support their operational activities.

Second, the differentiated profile in Surabaya's initiative suggests that a uniform institutional capacity profile can misinterpret initiatives; for example, a government-managed initiative such as TPS3R, a community-formalised network like Waste Banks, and a civil society enterprise like Garda Pangan have different needs that depend on the type of institution. Third, the TPS3R profile shows that system-level legal and coordination capacity does not automatically translate into consistent human resource capacity at the facility level. Although the formal training mandate exists in *Perwali* No.64/2018, available evidence does not show consistent delivery of training or operational routines across TPS3R; thus, the human resources and capacity-building dimension remains absent for this initiative. Fourth, the Garda Pangan profile shows that civil society waste governance initiatives operate without a direct legal and policy framework, but ahead of the regulatory environment, and this is not visible in their operational outputs.

Chapter VI: Conclusion

This thesis asked how institutional capacity is configured across six successful local waste governance initiatives in Ghent, Belgium, and Surabaya, Indonesia, and which capacity patterns are shared across both governance contexts and which are context-dependent. The main objective was to understand how and which local institutional capacities matter for waste governance by mapping which of the six dimensions are present and absent across initiatives, within and across two different governance environments. The unit of analysis in this study has been each local waste governance initiative, and it has applied a six-dimensional framework using presence-absence binary coding based on documentary evidence. The six dimensions were: policy and legal framework, organisational coordination and service delivery, financial and resource management, human resources and capacity building, communication and public awareness, and monitoring and evaluation.

The study found three asymmetric configuration patterns. In Ghent, all three initiatives, PAYT/Diftar, Recycling Parks 2.0, and *Gent en Garde*/FoodSavers, score present across all six dimensions. This uniform profile in Ghent shows that it has a governance environment in which formal regulatory infrastructure, including the binding Flemish waste reduction targets and IVAGO's intermunicipal mandate, serves as the enabling condition that results in documented capacity across all dimensions, making routine participation in regulatory processes a feature of governance in Ghent. However, even though all initiatives in Ghent have a uniform profile, this does not mean that they are identical in their mechanism, as for example PAYT and Recycling Parks 2 have full-dimension capacity mainly due to the regulatory compulsion and the tariff-based instruments that are binding to Ghent's governance context in its multi-level governance conditions. FoodSavers has the full-dimensional capacity through the integration of a political approach into the municipal welfare structure. The finding for Ghent is that its institutional functions as an enabling condition set a threshold that initiatives that participate in waste governance are expected to meet all dimensional requirements as a condition of that participation

In Surabaya, there are three profiles: Waste Banks at 6/6, TPS3R at 5/6, and Garda Pangan at 3/6, reflecting different institutional types. Waste Banks gained formal recognition, moving from neighbourhood initiatives to a nationally regulated community-based system with municipal formalisation, with all six dimensions documented as present through a combination

of national regulation, municipal policy, and community-level practices. TPS3R, as a government-managed infrastructure system, has the legal, coordination, financial, communication, and monitoring dimensions that are present at the system level, but the human resources and capacity-building dimension is absent because the formal training mandate in Mayor Regulation No.64/2018 has not been formally documented and has consistent training and operational routines across TPS3R facilities. Lastly, Garda Pangan is a civil-society-based food rescue initiative operating ahead of a dedicated legal framework and has organizational coordination, human resources, and communication dimensions present through the internal SOPs, volunteer structures, and outreach practice to support its operational activities, even without a specific legal mandate, formal financial documentation or monitoring review cycle documented the 3/6 profile shows what can be verified based on documents found for initiative without direct formal regulatory authorisation and budgetary documentation.

In the cross-city pattern, there are two dimensions present in all initiatives: organisational coordination and service delivery, and communication and public awareness, regardless of governance context, institutional type, or degree of formal integration. These relational dimensions can be sustained through formal mechanisms such as IVAGO's management system and municipal strategies, and through informal mechanisms such as volunteer coordination networks or social media-based communication, which do not depend on a particular institutional form. The other four dimensions, which are the policy and legal framework, financial and resource management, human resources and capacity building, and monitoring and evaluation, vary across Surabaya's initiatives and depend more directly on the formal institutional infrastructure made available by the government environment. Taken together, these patterns answer the research question by showing how institutional capacity is configured through different combinations of the six dimensions within the local governance initiatives in Ghent and Surabaya, and that organisational coordination and communication are shared across both governance contexts, while the other four dimensions are context-dependent, specifically in Surabaya's initiatives.

Contributions to existing studies

The findings correlate with some existing research, first, on Domorenok et al. (2021), who argue that institutional capacity has been used evocatively rather than analytically in governance research, and it needs to be operationalised as structured analytical instruments. This study responds to this by using a twelve-question binary coding framework that produces

and maps the presence and absence of specific capacity profiles within initiatives. The result operationalises what Domorenok et al. describe as a combination of formal and informal rules, norms, procedures, and practices that makes it not just for descriptive use. Guerrero et al. (2013), using their principal comparative analysis of waste systems in developing countries, found that awareness and coordination components account for a significant share of variance in waste separation and service delivery in different settings. The findings of this research are also related to this, as two dimensions are present across all six initiatives in both governance contexts, not just in developing countries but also in the Global North context. The two shared dimensions indicate that they can be achieved through both informal and formal institutions, which helps explain why they can be achieved regardless of formal governance contexts.

Furthermore, Grindle and Hilderbrand (1995) find that constraints at the broader governance level can undermine capacity at the organisational or local level, and that organisational culture and informal practices can compensate for the absence of formal resources. This can be seen in TPS3R, where system-level legal and coordination arrangements are present, but there is a lack of consistent formal training and operational routines at the facility level, resulting in unclear human resources dimensions. Garda Pangan illustrates the second: despite the absence of documented formal legal, financial, and monitoring structures, the initiative sustains its operations through volunteer commitment, shared norms, and relational networks, showing how informal institutional mechanisms can, within limits, substitute for formal institutions.

Based on these, this study contributes to existing research. First, it operationalises institutional capacity as a configurational, multi-dimensional framework at the initiative level, addressing the unit-of-analysis gap in waste governance studies that focus on the national or city level. Second, it identifies the formal-informal institutional dimensions, in which coordination and communication are context-flexible and can be achieved through multiple institutional types and patterns, whereas other dimensions, such as legal frameworks, financial evidence, training systems, and monitoring activities, depend more directly on the formal structure of governance environments. Third, it shows that an absent dimension does not have the same operational significance in all cases, as what matters is whether the absence of specific dimensions undermines essential governance functions and the initiatives that depend on them, a distinction that aggregate scoring alone is unable to capture. For example, the absence of legal or financial dimensions has different implications for a government-managed infrastructure initiative than for a civil society initiative that does not rely on a legal mandate or public funding.

Future research recommendations

Future research recommendations follow from the study's findings and limitations. First, on the primary data collection, which can be obtained through interviews and observations with the community coordinators, managers, policy makers, and volunteers, which would make it possible to analyse and identify more of the informal and relational governance practices that documentary analysis can only infer indirectly, especially those related to the organisational culture, operational activities, trust relations, and coordination mechanisms. Second, using the comparative design with additional city pairs, including in regions where community-based and civil society have central roles in waste governance, can test and verify more on whether the relational and structural dimensions, especially the dimensions present in all initiatives held across a wider range of governance environments. Fourth, graded scoring within each dimensions, while the six-dimensional structure allow comparison on how each capacity is formally integrated in different initiatives, however addressing the limitation that a dimension scored 'present' in all the contexts may be much more embedded than the same score in another, and as the binary coding unable to identify the strength or degree of how much each dimensions relate to the institutional capacity in the initiative.

This thesis starts with the observation that comparative waste governance research has paid limited attention to how institutional capacity is configured within specific initiatives across contrasting governance contexts. The findings show that institutional capacity is not just a checklist of attributes that are either present or absent in isolation, but the combination of interacting dimensions that patterns reflect the governance contexts or environment in which initiatives are operated. Ghent and Surabaya sustain waste governance through different institutional arrangements, where Ghent has a formal regulatory environment that produces a multidimensional capacity for all initiatives, while Surabaya has a mix of a formalised community network, government infrastructure, and a civil society initiative that operates even without policy and legal framework mandates. What dimensions are present matters, and what is not present also matters, because the same combination of dimensions can mean different things and be applied differently depending on the type of initiative. Lastly, understanding institutional capacity as a configuration across dimensions is important, as it shows that local waste governance initiatives differ and can sustain themselves, without assuming a single institutional model that all systems must follow.

Bibliography

- Aaron, Rasya Athalla, and Ibnu Budiman. "Scaling up Food Loss and Waste Reduction Programs in Indonesia." CIPS | Think Tank, Center for Indonesian Policy Studies, 2025. <https://repository.cips-indonesia.org/media/publications/591937-scaling-up-food-loss-and-waste-reduction-4323bf76.pdf>.
- Abubakar, Ismaila Rimi, Khandoker M. Maniruzzaman, Umar Lawal Dano, et al. "Environmental Sustainability Impacts of Solid Waste Management Practices in the Global South." *International Journal of Environmental Research and Public Health* 19, no. 19 (2022): 12717. <https://doi.org/10.3390/ijerph191912717>.
- Acke, Arianne, Sue Ellen Taelman, and Jo Dewulf. "A Multi-Stakeholder and Interdisciplinary Approach to Waste Management and Circular Economy: The Case of Flanders and Ghent, Belgium." *European Spatial Research and Policy* 27 (December 2020): 43–57. <https://doi.org/10.18778/1231-1952.27.2.04>.
- ACR+. "Good Practice Flanders: PAYT." 2014. https://www.acrplus.org/media/origin/images/project/R4R/Good_Practices/GP_OVAM_PAYT.pdf.
- ACR+. "OVAM | New Report on Waste Control in Flanders 2023." January 14, 2025. <https://www.acrplus.org/en/news/ovam-new-report-on-waste-control-in-flanders-2023-4691>.
- Adawiah, Wardatul, Eufasia Kartika Hanindraputri, and Muhammad Abid Kamalsyah. "Leadership, Innovation and Community Participation Pillar of Institutionalization in Bank Sampah Induk Surabaya." *Journal of Social Dynamics and Governance* 1, no. 2 (2014): 111–19.
- Addinsyah, Amar, and I. Warmadewanthi. "Material Flow Analysis of Plastic Waste and Paper Waste from Waste Banks in Surabaya." *American Journal of Environmental Protection* 9 (September 2020): 102. <https://doi.org/10.11648/j.ajep.20200905.11>.
- Adriyanti, Aisha, Arshinta Rochmatul Laili, and Aviatul Rofikasari. "Analisis Kerjasama Pemerintah Kota Surabaya Dan PT. Sumber Organik Dalam Implementasi PLTSA Benowo." *Triwikrama: Jurnal Ilmu Sosial* 8, no. 12 (2025): 1–10. <https://doi.org/10.9963/wxsc4803>.
- Afidah, Nur Faroh, Rahmad Hakim, and Arif Luqman Hakim. "Strategi Sociopreneur Garda Pangan Dalam Perekonomian Petani Apel Dan Sawi Di Kota Batu." *Journal of Islamic Economics Development and Innovation (JIEDI)* 2, no. 3 (2022): 016–026.
- Agusningtyas, Ade Imas, Helmya Hilda Putri Fatima, Edo Dwi Praptono, and Tria Ali Fahrudin. "Waste Bank As A Waste Management To Establishing Independent Citizen Towards Surabaya Eco-City." n.d. <https://doi.org/https://doi.org/10.17758/EAP.U0517220>.
- Agustine, Ariel Zahrotha Devrea, Lylen Eka Trysnio, and Nabila Rosa Aliefia. "Dari Sakura Ke Suroboyo: Sinergi Sister City Dalam Upaya Pengelolaan Lingkungan Yang Berkelanjutan." *JURNAL MEDIA AKADEMIK (JMA)* 3, no. 6 (2025). <https://jurnal.mediaakademik.com/index.php/jma/article/download/2012/1647/5759>.

Allen, Cecilia. “Flanders, Belgium: Europe’s Best Recycling and Prevention Program.” Global Alliance for Incinerator Alternatives, 2012. <https://www.no-burn.org/wp-content/uploads/ZW-Flanders.pdf>.

Awino, Florence Barbara, and Sabine E. Apitz. “Solid Waste Management in the Context of the Waste Hierarchy and Circular Economy Frameworks: An International Critical Review.” *Integrated Environmental Assessment and Management* 20, no. 1 (2024): 9–35. <https://doi.org/10.1002/ieam.4774>.

Azizah, Nur. “Governing Garbage: Solid Waste Management Reform in Surabaya.” In *Governing Urban Indonesia*, edited by Amalinda Savirani and Edward Aspinall. Books and Monographs. ISEAS–Yusof Ishak Institute, 2024. <https://www.cambridge.org/core/books/governing-urban-indonesia/governing-garbage-solid-waste-management-reform-in-surabaya/F234CBA86FC4B9BAF5DA6CF6E2A1A3EC>.

Badan Pangan Nasional. *Laporan Kinerja Direktorat Kewaspadaan Pangan 2025*. 2026. https://esakip.badanpangan.go.id/dok/pk/dok_2026151775701593.pdf.

Badan Pembinaan dan Pengembangan Hukum Pemeriksaan Keuangan Negara. “PP No. 81 Tahun 2012.” Database Peraturan. Accessed May 11, 2026. <http://peraturan.bpk.go.id/Details/5295/pp-no-81-tahun-2012>.

Badan Pembinaan dan Pengembangan Hukum Pemeriksaan Keuangan Negara. “UU No. 18 Tahun 2012.” Database Peraturan. Accessed May 26, 2026. <http://peraturan.bpk.go.id/Details/39100>.

Bahraini, Amanda. “Meet Garda Pangan: Food Bank from Surabaya.” *Artikel Dan Berita Pengelolaan Sampah Dari Waste4Change*, October 21, 2019. <https://waste4change.com/blog/meet-garda-pangan-food-bank-from-surabaya/>.

Bank Sampah Induk Surabaya (BSIS). *Tentang Kami – Bank Sampah Induk Surabaya*. n.d. Accessed May 15, 2026. <https://banksampahinduksurabaya.id/tentang-kami-new/>.

Calderón Márquez, Ana Julieth. “Leaving No One behind – Building Inclusive Circular Economies in the Global South.” *Societal Impacts* 7 (2026): 100174. <https://doi.org/10.1016/j.socimp.2026.100174>.

Campitelli, Alessio, and Liselotte Schebek. “How Is the Performance of Waste Management Systems Assessed Globally? A Systematic Review.” *Journal of Cleaner Production* 272 (2020): 122986. <https://doi.org/10.1016/j.jclepro.2020.122986>.

Card, Daniel, and Jean-Pierre Schweitzer. “Pay-As-You-Throw Schemes in the Benelux Countries.” Institute European Environmental Policy, 2022. <https://ieep.eu/wp-content/uploads/2022/12/BE-NL-LU-PAYT-final.pdf>.

Center for Regulation Policy and Governance. “Jakstranas: Indonesia’s National Waste Management Roadmap 2017-2025.” 2025. <https://crpg.info/jakstranas-indonesias-national-waste-management-roadmap-2017-2025/>.

Chandrawati, Widya. “Mengintip Peran Bank Sampah Induk Surabaya.” Antara News, 2026. <https://jatim.antaranews.com/berita/1064412/mengintip-peran-bank-sampah-induk-surabaya>.

Collectors. “Gent (BE) » Collectors.” *Gent (BE)*, 2020. <https://www.collectors2020.eu/wcs-ppw/gent-be/>.

Dala, Viktorius, Willy Hardianto, Annisa Purwatiningsih, and Rina Wulandari. “Implementation of Regional Regulation No. 1 of 2019 on Waste Management and Cleanliness in the City of Surabaya, Indonesia.” *Jurnal Ilmu Sosial Dan Ilmu Politik (JISIP)* 14, no. 3 (2025): 505–19. <https://doi.org/10.33366/jisip.v14i3.3470>.

Database Peraturan. “UU No. 18 Tahun 2008.” Accessed May 12, 2026. <http://peraturan.bpk.go.id/Details/39067/uu-no-18-tahun-2008>.

Database Peraturan | JDIH BPK. “Permen LHK No. 14 Tahun 2021.” Accessed May 24, 2026. <http://peraturan.bpk.go.id/Details/233754/permen-lhk-no-14->.

Directive (EU) 2025/1892 of the European Parliament and of the Council of 10 September 2025 Amending Directive 2008/98/EC on Waste, EP, CONSIL (2025). <http://data.europa.eu/eli/dir/2025/1892/oj>.

Domorenok, Ekaterina, Paolo Graziano, and Laura Polverari. “Introduction: Policy Integration and Institutional Capacity: Theoretical, Conceptual and Empirical Challenges.” *Policy and Society* 40, no. 1 (2021): 1–18. <https://doi.org/10.1080/14494035.2021.1902058>.

Domorenok, Ekaterina, Paolo Graziano, and Laura Polverari. “Policy Integration, Policy Design and Administrative Capacities. Evidence from EU Cohesion Policy.” *Policy and Society* 40, no. 1 (2021): 58–78. <https://doi.org/10.1080/14494035.2021.1930697>.

Draps, Frederic, and Dan Trevanion. “Accelerating Waste-to-Energy in Indonesia: PR 109/2025’s Impact and Challenges.” Ashurst, October 29, 2025. <https://www.ashurst.com/en/insights/accelerating-waste-to-energy-in-indonesia-presidential-regulation-109-2025/>.

Dropsolid Digital Experience Company. “Ivago: Integrated Drupal-Platform.” Accessed May 21, 2026. <https://dropsolid.com/en/our-work/ivago>.

European Commission. “Transposition of Directives.” Accessed May 26, 2026. <https://ec.europa.eu/implementing-eu-law/transposition-directives/en>.

European Environment Agency. *Accelerating the Circular Economy in Europe: State and Outlook 2024*. European Environment Agency, 2024. <https://doi.org/10.2800/055236>.

European Environmental Bureau. “#NoTimeToWaste Member States Delaying The Inevitable Targets.” n.d. https://eeb.org/wp-content/uploads/2020/11/Member-States-delay-meeting-inevitable-targets_report.pdf.

Eurostat. “Municipal Waste.” Accessed June 30, 2026. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Municipal_waste.

Farahdiba, Aulia Ulfah, Yunus Franciscus, Adhi Yuniarto, and Joni Hermana. “Food Waste Flows for Energy Recovery: A Material Flow Analysis Approach in Urban Cities of Indonesia (Study Case: Surabaya City).” *Joint Journal of Novel Carbon Resource Sciences & Green Asia Strategy* 11, no. 03 (2024): 2728–41.

Fatimah, Aida, Abdu Fadli Assomadi, Arry Febrianto, and Joni Hermana. "Efforts to Reduce Carbon Emissions from TPS3R and Rumah Kompos Facilities: Case Study in Surabaya." *IOP Conference Series: Earth and Environmental Science* 1307, no. 1 (2024): 012011. <https://doi.org/10.1088/1755-1315/1307/1/012011>.

Flanders. "2023_GR_00076 - Subsidy Agreement Operation Social Grocery Store and Rabot on Your Plate - Operating Years 2023 - 2025 - Approval | Local Decision." Accessed May 14, 2026. <https://lokaalbeslist.vlaanderen.be/agendapunten/efc1ddca-4122-54bd-89ff-bd0717a4edc3>.

Garda Pangan. "Food Bank Surabaya & Malang (@gardapangan)." June 4, 2025. <https://www.instagram.com/gardapangan/>.

Garda Pangan. *Program*. n.d. Accessed May 15, 2026. <https://gardapangan.org/program/>.

Gellynck, X., R. Jacobsen, and P. Verhelst. *Identifying the Key Factors in Increasing Recycling and Reducing Residual Household Waste: A Case Study of the Flemish Region of Belgium* - *PubMed*. 92, no. 10 (2011). <https://pubmed.ncbi.nlm.nih.gov/21704444/>.

Gent. "Dashboard - Bevolking - Binnenstad (Gent)." 2025. <https://gent.buurtmonitor.be/mosaic/dashboard/bevolking>.

Gent. "From Strategic to Operational Goals for the GENT EN GARDE FOOD POLICY: Recommendations of the Food Policy Council." RUAF Urban Agriculture and Food System, 2019. <https://ruaf.org/assets/2019/11/Gent-en-Garde.pdf>.

George, Alexander, and Andrew Bennett. "Chapter 3: The Method of Structured, Focused Comparison." In *Case Studies and Theory Development: The Method of Structured, Focused Comparison*. 2005. <https://indiachinainstitute.org/wp-content/uploads/2017/05/4C-How-to-Do-Case-Studies-George-Bennett-2005.pdf>.

Ginanjari, Dhimas. "Melihat Operasional Bank Sampah Induk Surabaya Yang Tampung 55 Kategori Sampah." Jawa Pos, Jawa Pos, 2023. <https://www.jawapos.com/features/2309190074/melihat-operasional-bank-sampah-induk-surabaya-yang-tampung-55-kategori-sampah>.

Grindle, Merilee S., and Mary E. Hilderbrand. "Building Sustainable Capacity in the Public Sector: What Can Be Done?" *Public Administration and Development* 15, no. 5 (1995): 441–63. <https://doi.org/10.1002/pad.4230150502>.

Guerrero, Lilliana Abarca, Ger Maas, and William Hogland. "Solid Waste Management Challenges for Cities in Developing Countries." *Waste Management* 33, no. 1 (2013): 220–32. <https://doi.org/10.1016/j.wasman.2012.09.008>.

Gutberlet, Jutta, Gina Rizpah Besen, and Leandro Pereira Morais. "Participatory Solid Waste Governance and the Role of Social and Solidarity Economy: Experiences from São Paulo, Brazil." *Detritus* 13 (2020): 167–80. <https://doi.org/https://doi.org/10.31025/2611-4135/2020.14024>.

Hall, Peter A., and David Soskice. *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford University Press, 2001. <http://digamo.free.fr/hallsosk.pdf>.

Hullebroeck, Mieke. “Objective of the Ghent Food Strategy.” Gent en Garde, 2023. https://stad.gent/sites/default/files/media/documents/20230404_PU_GeG%20Voedselraad%20brochure_EN_finaal.pdf.

ILVO. “Flemish Partners Join Hands to Fight Food Loss under a New Name: De Kostwinners (the Breadwinners) - ILVO Vlaanderen.” ILVO. Accessed May 11, 2026. <https://ilvo.vlaanderen.be/en/news/flemish-partners-join-hands-to-fight-food-loss-under-a-new-name-de-kostwinners>.

Interafval. “About Interafval.” Accessed May 26, 2026. <https://www.interafval.be/>.

International Energy Agency. “EU Waste Framework Directive – Policies.” IEA, IEA, 2025. <https://www.iea.org/policies/24849-eu-waste-framework-directive>.

IVAGO. “Aanmelden.” IVAGO. Accessed May 18, 2026. <https://www.ivago.be/nl/particulier/user/login>.

IVAGO. “Activity Report 2025.” n.d. <https://www.ivago.be/sites/default/files/media/files/2026-05/Activiteitenverslag%202025.pdf>.

IVAGO. “Beleidsdocumenten (Evaluation Report 2019-2024).” IVAGO, 2025. https://www.ivago.be/sites/default/files/media/files/2025-04/Evaluatieverslag%20IVAGO%202019-2024_0.pdf.

IVAGO. “How to Present Your Domestic Waste in Gent.” 2022. https://www.ivago.be/sites/default/files/inline-files/IVAGO_HUISVUILBROCHURE_2021_A5_ENG_ALG_V5.pdf.

IVAGO. *IVAGO- Annual Report 2023.* n.d. <https://www.ivago.be/sites/default/files/media/files/2024-04/Jaarverslag%202023.pdf>.

IVAGO. “Policy Note 2020-2025.” n.d. <https://www.ivago.be/sites/default/files/inline-files/Beleidsnota%20IVAGO%202020-2025%20%281%29.pdf>.

IVAGO. “Recyclage Park- Gent.” n.d. https://www.ivago.be/sites/default/files/media/files/2024-07/Ivago_Brochure_recyclagepark_Gent_2024%20%281%29.pdf.

IVAGO. “Recyclageparken.” IVAGO. Accessed May 5, 2026. <https://www.ivago.be/nl/particulier/recyclageparken>.

IVAGO. “Recycling Park of the Future Is Now Also a Reality in Ghent.” 2023. <https://www.ivago.be/nl/particulier/nieuws/recyclagepark-van-de-toekomst-nu-ook-gent-een-feit>.

Jacobsen, R., G. Willeghems, X. Gellynck, and J. Buysse. “Increasing the Quantity of Separated Post-Consumer Plastics for Reducing Combustible Household Waste: The Case of Rigid Plastics in Flanders.” *Waste Management* 78 (August 2018): 708–16. <https://doi.org/10.1016/j.wasman.2018.06.025>.

Jaffe, Rivke, and Martijn Koster. "The Myth of Formality in the Global North: Informality-as-Innovation in Dutch Governance." *International Journal of Urban and Regional Research* 43, no. 3 (2019): 563–68. <https://doi.org/10.1111/1468-2427.12706>.

Jannah, Eka Maidhatul, and Sri Wibawani. "Policy Implementation of Waste Management at Bintang Mangrove Waste Bank, Surabaya City." *Journal of Public Representative and Society Provision* 5, no. 3 (2025): 876–90. <https://doi.org/10.55885/jprsp.v5i3.675>.

Kowalski, Arkadiusz. *Global South-Global North Differences*. 2020. https://doi.org/10.1007/978-3-319-69625-6_68-1.

Kusuma, Dhea, and Sri Wibawani. "Strategi Pengelolaan Sampah Di Super Depo Sutorejo Kota Surabaya." *NeoRespublica: Jurnal Ilmu Pemerintahan* 5 (2024): 929–41. <https://doi.org/10.52423/neores.v5i2.276>.

Li, Lan. "How Can Unit Pricing Be Employed and Improve Municipal Waste Management in Shanghai?" Lund University, 2020. <https://lup.lub.lu.se/student-papers/record/9026151/file/9026152.pdf>.

Lusthaus, Charles, Marie-Hélène Adrien, Gary Anderson, Fred Carden, and George Plinio Montalván. *Organizational Assessment: A Framework for Improving Performance*. Inter-American Development Bank (IDB), 2002. <https://publications.iadb.org/publications/english/document/Organizational-Assessment-A-Framework-for-Improving-Performance.pdf>.

Magarini, Andrea, and Elisa Porreca. "European Cities Leading in Urban Food Systems Transformation: Connecting Milan & FOOD 203." 2019. <https://fit4food2030.eu/wp-content/uploads/2019/10/European-cities-leading-in-urban-food-systems-transformation.pdf>.

Mahendra, Dimas. "Anggaran Rp 30 Miliar Digelontorkan, TPS 3R Osowilangun Bakal Jadi Andalan Baru Surabaya Kurangi Sampah." 2025. <https://radarsurabaya.jawapos.com/surabaya/2508200056/anggaran-rp-30-miliar-digelontorkan-tps-3r-osowilangun-bakal-jadi-andalan-baru-surabaya-kurangi-sampah>.

Masyarakat Jurnalis Lingkungan Indonesia. "Dedhy Trunoyudho: Kontribusi Menjaga Lingkungan Dan Mengatasi Kerawanan Pangan | SIEJ - Masyarakat Jurnalis Lingkungan Indonesia." Masyarakat Jurnalis Lingkungan Indonesia (SIEJ), 2022. <https://siej.or.id/id/envirotalk/dedhy-trunoyudho-kontribusi-menjaga-lingkungan-dan-mengatasi-kerawanan-pangan>.

Milan Urban Food Policy Pact. "MPA 2018 Awarded City." 2018. <https://www.milanurbanfoodpolicypact.org/wp-content/uploads/2021/01/Foodsavers-Ghent-MPA2018.pdf>.

Minhajuel, Hafiz and Tika Widiastuti. "ALMS and Infaq Management Model at Food Bank." *Jurnal Ekonomi Syariah Teori Dan Terapan* 8, no. 3 (2021): 354–62. <https://doi.org/10.20473/vol8iss20213pp354-362>.

Muhamad, Afif Faiq, Kazuei Ishii, Masahiro Sato, and Satoru Ochiai. *Questionnaire Survey to Clarify Current Situation of Waste Banks in Surabaya, Indonesia*. 2021. https://nws.stage.ac/3rincs2021/docs/abstracts/B-3_041_Afif_Faiq_Muhamad-210219.pdf.

Mukhtar, Reza Fadhillah, Susi Wilujeng, and Welly Herumurti. “Kajian Pengurangan Sampah Pada TPS3R Kecamatan Gunung Anyar, Kota Surabaya Assessment of Municipal Solid Waste Reduction in Community-Based Reduction Facility District of Gunung Anyar Surabaya City.” *Journal of Geodesy and Geomatics* 19, no. 3 (2024): 543–52.

Nizmi, Yusnarida Eka, Yessi Olivia, Umi Oktyari Retnaningsih, Nur Laila Meilani, Amy Jesscia, and Iqbal. *Food Waste Dan Tantangan Keberlanjutan Konsumsi Dan Produksi Pangan Dalam Kerangka ASEAN Socio Cultural Community Blueprint 2025*. 5, no. 2 (2022). <https://journal.uir.ac.id/index.php/jdis/article/view/14609>.

North, Douglass C. *Institutions, Institutional Change, and Economic Performance*. First. Cambridge University Press, 1990. http://epistemh.pbworks.com/f/8.%20Institutions__Institutional_Change_and_Economic_Performance.pdf.

NWS, VRT. “Ivago Vernieuwt al Haar Containerparken in Gent En Destelbergen: ‘We Gaan Voor Het Recyclagepark 2.0.’” VRTNWS, 2022. <https://www.vrt.be/vrtnws/nl/2022/02/16/recyclageparken-gent-en-destelbergen-worden-helemaal-vernieuwd/>.

OVAM. “Action Plan Circular Food Loss and Biomass (Residual) Flows 2021-2025.” 2021. <https://ovam-english.vlaanderen.be/action-plan-for-circular-food-loss-and-biomass-residual-flows-2021-2025>.

OVAM. “Annual Report 2025 OVAM.” Vlaanderen.be, 2026. <https://www.vlaanderen.be/publicaties/jaarverslag-ovam>.

OVAM. *Local Materials Plan: Implementation Plan for Municipal Waste 2023-2030*. n.d. <https://ovam-english.vlaanderen.be/waste-materials>.

OVAM. “OVAM Main Policy Principles.” Accessed May 21, 2026. <https://ovam-english.vlaanderen.be/ovam-english-policy-principles>.

OVAM. “OVAM Uncovered Brochure.” OVAM, 2025. <https://ovam-english.vlaanderen.be/our-organization>.

OVAM. “Waste and Materials.” OVAM. Accessed May 17, 2026. <https://ovam-english.vlaanderen.be/waste-and-materials>.

Pemerintah Kota Surabaya. “Jadi Pemateri Di Perancis, Wali Kota Risma Ungkap Fakta Di Balik Keberhasilan Surabaya Kelola Sampah.” 2019. <https://surabaya.go.id/id/berita/51184/jadi-pemateri-di-perancis-wali-kota-risma-ungkap-fakta-di-balik-keberhasilan-surabaya-kelola-sampah>.

Pemerintah Kota Surabaya. “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah Kota Surabaya.” Action Plan Surabaya. Pemerintah Kota Surabaya, 2025.

<https://jdih.surabaya.go.id/uploads/peraturan/2025kepwali3578100-3-3-3-210-436-1-2-2025.pdf>.

Pemerintah Kota Surabaya. “Olah Sampah Organik Jadi Pupuk, DLH Surabaya Hemat Biaya Angkutan Rp6,73 Miliar per Tahun.” 2026. <https://www.surabaya.go.id/id/berita/24672/olah-sampah-organik-jadi-pupuk-dlh-surabaya-hemat-biaya-angkutan-rp-6-73-miliar-per-tahun>.

Pemerintah Kota Surabaya. “Peraturan Walikota Surabaya Nomor 64 Tahun 2018 Tentang Kebijakan Dan Strategi Pengelolaan Sampah Rumah Tangga Dan Sampah Sejenis Sampah Rumah Tangga.” n.d. <https://jdih.surabaya.go.id/peraturan/download/3495>.

Pemerintah Kota Surabaya. “Wali Kota Eri Cahyadi Resmikan Bank Sampah Induk Surabaya, Target Penjualan Sampah Kering 150 Ton Perbulan.” Pemerintah Kota Surabaya, 2023. <https://www.surabaya.go.id/id/berita/10222/wali-kota-eri-cahyadi-resmikan-bank-sampah-induk-surabaya-target-penjualan-sampah-kering-150-ton-perbulan>.

Pemerintah Kota Surabaya. “Wali Kota Eri Resmikan Bank Sampah Dan Rumah Cacing Puspa Mandiri, Jadi Percontohan Kampung Pancasila.” 2025. <https://www.surabaya.go.id/id/berita/24239/wali-kota-eri-resmikan-bank-sampah-dan-rumah-cacing-puspa-mandiri-jadi-percontohan-kampung-pancasila>.

“Peraturan Daerah Kota PERDA Nomor 1 Tahun 2019 Tentang Perubahan Atas Peraturan Daerah Kota Surabaya Nomor 5 Tahun 2014 Tentang Pengelolaan Sampah Dan Kebersihan Di Kota Surabaya.” n.d. Accessed May 24, 2026. https://jdih.surabaya.go.id/uploads/peraturan/perda_785.pdf#toolbar=0.

“Peraturan Daerah Kota PERDA Nomor 1 Tahun 2019 Tentang Perubahan Atas Peraturan Daerah Kota Surabaya Nomor 5 Tahun 2014 Tentang Pengelolaan Sampah Dan Kebersihan Di Kota Surabaya.” n.d. Accessed May 25, 2026. https://jdih.surabaya.go.id/uploads/peraturan/perda_785.pdf#toolbar=0.

“Peraturan Walikota PERWALI Nomor 60 Tahun 2019 Tentang Pedoman Pelaksanaan Pemberian Permakanan Di Kota Surabaya.” n.d. Accessed May 26, 2026. https://jdih.surabaya.go.id/uploads/peraturan/3652_perwali_60-2019.pdf#toolbar=0.

“Peraturan Walikota PERWALI Nomor 77 Tahun 2025 Tentang Pedoman Pemberian Permakanan Bagi Lanjut Usia Tunggal Keluarga Miskin Di Kota Surabaya.” n.d. Accessed May 26, 2026. <https://jdih.surabaya.go.id/uploads/peraturan/2025perwali3578077.pdf#toolbar=0>.

Plastic Smart Cities. “Tps3r Dan Bank Sampah: Bukan Pesaing, Tapi Mitra Strategis.” 2025. <https://plasticsmartcities.wwf.id/feature/article/tps3r-dan-bank-sampah-bukan-pesaing-tapi-mitra-strategis>.

Plastic Smart Cities - WWF. “Alur Proses Bank Sampah: Mengubah Pola Pikir Masyarakat: Sampahmu, Tanggung Jawabmu - Plasticsmartcities.” 2025. <https://plasticsmartcities.wwf.id/feature/article/alur-proses-bank-sampah-mengubah-pola-pikir-masyarakat-sampahmu-tanggung-jawabmu>.

- Przeworski, Adam, and Henry Teune. *The Logic of Comparative Social Inquiry*. University of Minnesota, 1970. <https://dn790000.ca.archive.org/0/items/in.ernet.dli.2015.138830/2015.138830.The-Logic-Of-Comparative-Social-Inquiry.pdf>.
- Putri, Adellia Zanati, and Yayok Suryo Purnomo. “Evaluasi Sistem Pengelolaan Sampah TPS 3R Jambangan Dan TPS 3R Tenggilis Berdasarkan 5 Aspek.” *Envirous* 3, no. 2 (2023). <https://doi.org/10.33005/envirous.v3i2.19>.
- SAAMO. *Rabot Op Je Bord*. 2021. 221. <https://www.saamo.be/gent/rabot-blaisantvest/project/rabot-op-je-bord/>.
- SAAMO. *Sociale Kruidenier Rabot*. 2021. <https://www.saamo.be/gent/rabot-blaisantvest/model/sociale-kruidenier-rabot/>.
- Safrina, Azwa, and Icha Rastika. “Dari Sisa Makanan Jadi Harapan: Garda Pangan Selamatkan Pangan untuk Warga Pra-sejahtera.” KOMPAS.com, November 10, 2025. <https://surabaya.kompas.com/read/2025/11/10/231840978/dari-sisa-makanan-jadi-harapan-garda-pangan-selamatkan-pangan-untuk-warga>.
- Sasahara, Camila, Leticia Stevanato Rodrigues, Tiago Balieiro Cetrulo, et al. “Municipal Solid Waste Governance: Development and Application of an Index Embodying the Global South Context.” *Frontiers in Sustainability* 5 (2024). <https://doi.org/10.3389/frsus.2024.1409418>.
- Scozzafava, Lori. “SOLID WASTE CAPACITY INDEX FOR LOCAL GOVERNMENTS (SCIL) Assessment Implementation Guide.” 2022. <https://decfinder.devme.ai/urban-links/usaids-scil-implementation-guide-for-local-governments/>.
- Setiawan, Adhi Dwi, and Icha Rastika. “Kunjungi SPPG Di Surabaya, Zulhas Cerita Soal Garda Pangan Olah Sampah MBG Dengan Maggot.” 2025. <https://surabaya.kompas.com/read/2025/08/21/172431478/kunjungi-sppg-di-surabaya-zulhas-cerita-soal-garda-pangan-olah-sampah-mbg>.
- Setiawan, Bagus Indra, and Mohammad Insan Romadhan. “Perencanaan Komunikasi Garda Pangan Sebagai Organisasi Non Profit Dalam Menjalin Kerja Sama Dengan Mitra.” *Sintesa* 2, no. 02 (2023): 32–46. <https://doi.org/10.30996/sintesa.v2i02.8890>.
- Shania, Louisa Vanessa, and Edelweis Putri Prima. “Strategi Public Relations Garda Pangan dalam Mensukseskan Pelaksanaan Program Food Rescue.” *DIGICOM: Jurnal Komunikasi dan Media* 4, no. 3 (2024): 195–211. <https://doi.org/10.37826/digicom.v4i3.819>.
- Solikha, Novia Korniaty, Nawiyanto, Dwi Haryanto, and Hadi Sampurna. *Bank Sampah and Waste Management in Urban Surabaya, Indonesia*. 6, no. 1 (2024): 78–82.
- Stad Gent. “Armoedebeleidsplan 2020-2025: Evaluatie 2023.” 2024. <https://stad.gent/sites/default/files/media/documents/presentatie%20Evaluatie%20ABP%202023.pdf>.
- Stad Gent. “Foodsavers Gent laat geen eten verloren gaan.” Accessed May 14, 2026. <https://stad.gent/nl/werken-ondernemen/werken/werken-regio-gent/sociale-economie-gent/dienstenbedrijf-sociale-economie/foodsavers-gent-laat-geen-eten-verloren-gaan>.

- Stad Gent. “FoodSavers Ghent More than Food.” 2019. <https://stad.gent/sites/default/files/media/documents/Foodsavers%20handleiding%20ENG.pdf>.
- Stad Gent. “OCMW van Gent En Sociale Kruideniers 2023-2025.” Stad Gent and OCMW Gent, 2025. <https://ebesluitvorming.gent.be/document/63bfe11350111671a91a7cb2;jsessionid=6117BB1A5F2A70B5300AA12AA0D7AC87>.
- Stad Gent. “Sustainable Food.” Accessed May 23, 2026. <https://stad.gent/en/city-governance-organisation/city-policy/ghents-climate-actions/sustainable-food>.
- Stad Gent. “Waste Management.” Accessed May 4, 2026. <https://stad.gent/en/expats-ghent/waste-management>.
- Stad Gent. “Welzijn En Samenleving Jaaroverzicht 2023.” n.d. https://stad.gent/sites/default/files/media/documents/Welzijn%20en%20Samenleving_jaaroverzicht%202023.pdf.
- Tetra Tech. “Clean Cities, Blue Ocean (CCBO).” Technical proposal. Tetra Tech, 2023. https://devjobsindo.org/wp-content/uploads/jobmonster/2022-40-Request-for-Proposal-RFP_Trash-Collection-Efficiency_final.pdf.
- The World Bank. *Governance: The World Bank’s Experience*. Washington DC, 1994. Institutional Bank for Reconstruction and Development.
- Ukkonen, Aino, and Olli Sahimaa. “Weight-Based Pay-as-You-Throw Pricing Model: Encouraging Sorting in Households through Waste Fees.” *Waste Management* 135 (November 2021): 372–80. <https://doi.org/10.1016/j.wasman.2021.09.011>.
- Ulum, Muhammad, Arneisya Ardina, Shinfī Auvaria, and Sulistiya Nengse. “Pengelolaan Sampah Di Tempat Pengolahan Sampah Reduce, Reuse, Dan Recycle (TPS 3R) Tenggilis, Kota Surabaya.” *Enviroous* 5, no. 2 (2025): 33–38. <https://doi.org/10.33005/enviroous.v5i2.340>.
- UNFCCC. “Winners of the 2019 UN Global Climate Action Awards Announced.” 2019. <https://unfccc.int/news/winners-of-the-2019-un-global-climate-action-awards-announced>.
- United Nations Environment Programme. *Global Waste Management Outlook*. 2016, 125–202. <https://doi.org/10.18356/4cc6a5e5-en>.
- United Nations Environment Programme and International Solid Waste Association. *Global Waste Management Outlook 2024: Beyond an Age of Waste – Turning Rubbish into a Resource*. n.d. <https://doi.org/https://doi.org/10.59117/20.500.11822/44939>.
- United Nations Human Settlements Programme (UN HABITAT). *The State of Asian Cities 2010/11*. 2010. <http://www.rrojasdatabank.info/citiesasia1011.pdf>.
- Universitas Airlangga. “Gandeng Garda Pangan, Mahasiswa UNAIR Tekan Volume Sampah Raci Tengah.” 2026. <https://unair.ac.id/gandeng-garda-pangan-mahasiswa-unair-tekan-volume-sampah-raci-tengah/>.

Urban Sustainability Exchange. “Ghent En Garde.” Urban Sustainability Exchange. Accessed February 9, 2026. <https://use.metropolis.org/case-studies/ghent-en-garde#casestudydetail>.

US AID. *USAID SCIL Program: Local Government Solid Waste Capacity Survey (Service Delivery) - DECfinder*. 2005. <https://decfinder.devme.ai/urban-links/usaaid-scil-program-local-government-solid-waste-capacity-survey-service-delivery/>.

USAID. “Advancing Climate Change Mitigation Goals Through Improved Solid Waste Management.” 2023. https://s3.eu-west-1.amazonaws.com/logcluster-web-prod-files/public/2024-01/Final_CCBO_Climate-Change_508.pdf.

Valipacademy. *Flemish Legislative Framework*. n.d. <https://valipac.academy/en/modules/gaining-a-better-understanding-of-the-legislation/belgian-legislative-framework/flemish-legislative-framework/>.

Verbeke, K. “En Garde Food Policy in GENT, Belgium.” *European Journal of Public Health* 27 (2017). <https://doi.org/10.1093/eurpub/ckx187.808>.

VertiGIS. “IVAGO in Ghent Keeps Waste Bins in Sync with VertiGIS Integrator between SAP and GIS - VertiGIS.” 2025. <https://www.vertigis.com/customers/ivago-in-ghent-keeps-waste-bins-in-sync-with-vertigis-integrator-between-sap-and-gis/>.

Viranda, Elis, Rachmawati Novaria, and Adi Soesiantoro. “Implementasi Kebijakan Pengelolaan Sampah Sebagai Upaya Penerapan Sustainable Development Goals (SDG) Di Kecamatan Mulyorejo Kota Surabaya.” *Jurnal Penelitian Administrasi Publik* 4, no. 4 (2024). <https://aksiologi.org/index.php/praja/article/view/1603>.

vita, Giuseppe de. “Ghent Raises IVAGO Waste Rates, 15 % Residual & 7 % Other.” 2025. <https://brusselsmorning.com/ghent-raises-ivago-waste-rates15-residual-7-other/83891/>.

Wali Kota Surabaya. “Keputusan Wali Kota Surabaya Tentang Peta Jalan (Roadmap) Rencana Aksi Akselerasi Penuntasan Pengelolaan Sampah 2025-2026.” Regulation. Wali Kota Surabaya, 2025. <https://jdih.surabaya.go.id/uploads/peraturan/2025kepwali3578100-3-3-3-210-436-1-2-2025.pdf>.

Waste4Change. “Studi Kasus Indore dan Surabaya: Menakar Relevansi Transformasi Tata Kelola Sampah bagi Kota-kota di Indonesia.” Waste4Change, 2025. <https://waste4change.com/id/research/case-study-of-indore-and-surabaya-assessing-the-relevance-of-waste-management-transformation-for-indonesian-cities>.

Waste4Change, World Resource Institute (WRI), and BAPPENAS. *Laporan Kajian Food Loss and Waste Di Indonesia Dalam Rangka Mendukung Penerapan Ekonomi Sirkular Dan Pembangunan Rendah Karbon*. Kementerian Perencanaan Pembangunan Nasional/ BAPPENAS, 2021. <https://lcdi-indonesia.id/wp-content/uploads/2021/06/Report-Kajian-FLW-FINAL-4.pdf>.

Web, Admin. *Surabaya Punya Bank Sampah Induk Tingkat Kota, Targetkan 150 Ton Sampah Kering Terjual Tiap Bulan – Bank Sampah Induk Surabaya*. 2024. <https://banksampahinduksurabaya.id/2025/07/11/surabaya-punya-bank-sampah-induk-tingkat-kota-targetkan-150-ton-sampah-kering-terjual-tiap-bulan/>.

Widyati, Sarah, Christia Meidiana, and Kartika Eka Sari. "Efektivitas Dan Efisiensi Bank Sampah Induk Surabaya." *Planning for Urban Region and Environment* 11, no. 2 (2022). <https://purejournal.ub.ac.id/index.php/pure/article/view/232>.

Wijayanti, Dyah Retno, and Sri Suryani. "Waste Bank as Community-Based Environmental Governance: A Lesson Learned from Surabaya." *Procedia - Social and Behavioral Sciences*, REFLECTIONS ON CREATIVITY: PUBLIC ENGAGEMENT AND THE MAKING OF PLACE, vol. 184 (May 2015): 171–79. <https://doi.org/10.1016/j.sbspro.2015.05.077>.

Wijayanti, Dyah, and Sri Suryani. "Waste Bank as Community-Based Environmental Governance: A Lesson Learned from Surabaya." *Procedia - Social and Behavioral Sciences* 184 (May 2015). <https://doi.org/10.1016/j.sbspro.2015.05.077>.

Wilson, David C., Ljiljana Rodic, Michael J. Cowing, et al. "'Wasteaware' Benchmark Indicators for Integrated Sustainable Waste Management in Cities." *Waste Management* 35 (January 2015): 329–42. <https://doi.org/10.1016/j.wasman.2014.10.006>.

Wilson, David C., Costas Velis, and Chris Cheeseman. "Role of Informal Sector Recycling in Waste Management in Developing Countries." *Habitat International*, Solid Waste Management as if People Matter, vol. 30, no. 4 (2006): 797–808. <https://doi.org/10.1016/j.habitatint.2005.09.005>.

World Bank. "How the World Bank Is Tackling the Growing Global Waste Crisis." World Bank Blogs, May 16, 2025. <https://blogs.worldbank.org/en/sustainablecities/how-the-world-bank-is-tackling-the-growing-global-waste-crisis>.

Yin, Robert K. "Case Study Research and Applications: Design and Methods." SAGE Publications, 2018. https://opac.atmaluhur.ac.id/uploaded_files/temporary/DigitalCollection/YTE3NDlmYTY0ZjE2MDA5ODE4NGI1Y2FhMjdkMjRmYW5kMDA2MTVhOQ==.pdf.

Annex: Scoring Justifications for Ghent and Surabaya

a. Ghent Scoring Justifications

PAYT/Diftar, Score: 6/6

D1— Policy and Legal Framework: Score 1

- a. Q1 (Score 1):** The operationalisation of the Pay-As-You-Throw (PAYT) framework is structurally integrated in a multi-level legal framework. At the local level, the city of Ghent enacted its retribution regulation in 2019, formally establishing a volumetric, weight-based waste-charging mechanism applicable from the first kilogram of waste disposed. The intermunicipality organisation, IVAGO, operates under the *Materiaaldecreet* and VLAREMA. These regional instruments set the standards for tariff structures by maintaining mandatory minimum and maximum thresholds across Flanders to preserve sorting incentives and prevent cross-municipal waste tourism. With this, the binding local retribution instrument, established through formal municipal legislative processes, becomes the official legal and policy foundation of PAYT within the broader regional governance system.
- b. Q2 (Score 1):** Empirical documentation also confirms the structural vertical alignment between local operational mechanisms and higher-level regional mandates, characterised by the contextual translation of the macro target to different urban contexts. IVAGO's annual report verifies the systematic compliance with binding directives issued by the Flemish Public Waste Agency (OVAM), illustrated by the technical adjustment of the weighing infrastructure to meet the deferred 1 January 2027 VLAREMA 9 mandate for business waste containers. Furthermore, while the regional *Lokaal Materialenplan 2023-2030* mandates a binding Flemish baseline to reduce residual waste to a regional average of 100 kg per capita, this framework distinguishes between municipal targets. Under this differentiated model, Ghent's statutory 2030 target was baseline-codified at 135 kg per capita, however, due to regional fraction adjustments, IVAGO officially operates under an adjusted localised target of 148 kg per capita, representing a reduction from its 2022 milestone target of 174 kg per capita. This target reduction reflects an active policy effort in municipality aligns with the Flemish reduction trajectories.
- c. Dimension synthesis:** Both questions are confirmed. The evaluation confirms compliance across both parameters. The PAYT/Diftar initiatives have explicit local legitimisation and maintain operational integration with the regional and supranational

framework. The institutional commitment is evidenced by the systematic indexing of tariffs since 2025 and the expansion of the scope of retribution to include bulk waste, in compliance with OVAM directives. While Ghent's absolute per capita residual target of 148 kg reflects its complex urban conditions relative to the broader Flemish average of 100 kg, the formal municipal adoption of the reduction illustrates proactive institutional leadership and a commitment to supporting the regional circular economy objectives.

D2— Organisational Coordination & Service Delivery

- a. **Q3 (Score 1):** Multi-level coordination within the PAYT operation is formalised throughout the spatial and inter-institutional mechanisms. Structurally, IVAGO manages a tri-centric zoning group (Zones C, S, and Z), which is required to implement differentiated collection logistics, specialised container/bag infrastructure, and a customised tariff schedule, all managed by a centralised operational framework. Inter-agency coordination is carried out by a dedicated mobility cell (MOB), which integrates the collection schedule and safety parameters with municipal departments, including local fire departments. Externally, these networks extend to statutory co-management agreements with specialised recovery bodies such as Recupel to separate hazardous and fractionated material flows. Moreover, the operationalisation of the ROSI route optimisation system in 2025 integrates real-time logistical sensors into vehicles, thereby supporting route efficiency across zones.
- b. **Q4 (Score 1):** Roles and responsibilities are clearly delineated through the formal operational documentation. IVAGO's annual report identifies dedicated specialised personnel, including the neighbourhood-level waste steward (*afvalsteward*), who is responsible for mitigating localised illicit dumping, and the expert in waste prevention and awareness (*expert afvalpreventie en sensibilisering*). These roles are supported by a specialised back-office customer support division, citizen (*Burger*) teams responsible for account changes, container intervention, and park access. IVAGO, as the sole intermunicipal waste operator for Ghent and Destelbergen, is formally documented, establishing unambiguous organisational jurisdiction.
- c. **Dimension synthesis:** Both questions are confirmed. Institutional coordination operates through an integrated, digitally supported governance model that links different operational zones, assigns staff roles, and coordinates with external partners.

D3— Financial & Resource Management

- a. **Q5 (Score 1):** PAYT operates with an identifiable and ongoing funding structure, with fixed municipal waste taxes and variable volume and weight-based charges. The Flemish regulatory framework sets minimum and maximum tariff thresholds within which IVAGO operates. Furthermore, a mandatory annual 2% tariff increase has been applied since 2023 to support long-term financial sustainability.
- b. **Q6 (Score 1):** Financial reporting protocols are documented in IVAGO's statutory income statement, which presents the formal budget and actual expenditure tables with explanations. Social compensation payments to approximately 30,758 beneficiary households are also tracked and reported. Capital expenditure is identified and budgeted through a formal planning process, evidenced by the 2025 investment in a high-equipped truck for the OVAM 2027 deadline.
- c. **Dimension synthesis:** Both questions are confirmed, where the PAYT's financial structure is formally self-sustaining through the cost-recovery mechanism and regulated tariff framework, with formal reporting for accountability purposes. One point to note is that declining waste revenue should be interpreted as a behavioural indicator of policy implementation.

D4— Human Resources & Capacity Building

- a. **Q7 (Score 1):** IVAGO has maintained formally designated personnel roles for PAYT delivery, including the waste stewards and the expert in waste prevention and awareness. The back-office citizen teams are also responsible for container interventions and administering account changes. The ISO 9001:2015 certification gives an institutional quality management framework within which staffing structures are formally documented and auditable.
- b. **Q8 (Score 1):** There are multiple training activities documented, including the ROSI system training for drivers, internal home composting training, and the annual Waste Team Week for safety awareness. Responsive measures in hiring temporary staff to manage the administrative surge associated with the 2025 non-conformity increase reveal the approach to human resource capacity, and a dedicated training module was conducted due to increased visitor aggression.
- c. **Dimension synthesis:** Both questions are confirmed, with human resources capacity formally structured and institutionally maintained through documented roles, ongoing training, and a quality management certificate. The reactive staffing response to the

2025 administrative surge reveals a limit in anticipatory capacity planning, but the formal capacity infrastructure itself is present and functioning.

D5— Communication & Public Awareness

- a. **Q9 (Score 1):** Public engagement is sustained, as the *Minder restafval* campaign ran from 2019 to 2024 continuously, meaning there is institutional commitment to sustain behavioral change in the community. Other instruments used include brochures, school-based awareness initiatives, the IVAGOWIJZER magazines, and quarterly newsletters for business clients that cover non-conformity requirements and regulatory updates.
- b. **Q10 (Score 1):** Information on operational performance is publicly available through multiple instruments, such as the *Afvalmeter* on the MijnIVAGO portal, which enables residents to monitor their waste data, and the annual Sustainability Report, which provides a comprehensive public account of waste management outcomes. Tariff information can also be downloaded with container-by-container reference tables. The absence of a public performance dashboard is acknowledged as a limitation.
- c. **Dimension synthesis:** Both questions are confirmed, evidenced by the formal, multi-channel, and structured communication capacity in PAYT. The *Afvalmeter* is the significant instrument that enables individual residents to translate system-level data into personal behavioural feedback.

D6— Monitoring & Evaluation

- a. **Q11 (Score 1):** Formal performance indicators are tracked quarterly through IVAGO's Boardtable dashboard, reporting the residual waste tonnage, business waste, organic waste, paper and metal, and glass, each with a documented target. The primary long-term outcome indicator, residual waste per resident, is tracked annually and shows a reduction from 179.6 kg in 2019 to 140.8 kg by 2024, indicating that Ghent has closely achieved its localised 2030 threshold of 148 kg per capita. This internal monitoring is further supported by an external validation through the OVAM's independent annual publication of solid waste data.
- b. **Q12 (Score 1):** Evaluative metrics are structurally linked to the policy formulation and operational pivots. Recurrent tariff modifications implemented between 2019 and 2024 were explicitly justified by empirical data on waste generation performance. The 2025

surge in non-conformity registrations also influenced the decision to develop a mobile app for operational teams in 2026. Social allowance data is integrated into the monitoring framework to assess equity alongside environmental performance, demonstrating that the M&E system captures multiple dimensions of governance outcomes rather than focusing solely on environmental metrics.

- c. **Dimension synthesis:** the monitoring and evaluation dimension is characterised by a high degree of structured formality, with multi-indicators and adaptive monitoring data used for operational decision and policy adjustment rather than just for compliance reporting. The integration of social equity and the environmental performance metric is a notable institutional strength.

Recycling Parks 2.0, Score: 6/6

D1— Policy and Legal Framework: Score 1

- a. **Q1 (Score 1):** Recycling Parks 2.0 (RP 2.0) is formally grounded in VLAREMA, which mandates that a bulky waste charge be imposed from the first kilogram and that an increasing number of waste streams, reaching 29 by 2024, be collected separately at recycling parks. Ghent adopted its retribution regulation in 2019 as the municipal instrument to implement VLAREMA's pricing requirement. The IVAGO's internal policy document 2020-2025 introduces RP 2.0 as a delivery instrument to support waste-reduction and pure-material goals, and IVAGO receives a subsidy for asbestos collection from OVAM, confirming that RP 2.0 is formally integrated and funded within the policy framework. Three targets, such as renovating all six parks, organising at least ten pop-up recycling parks annually, and increasing asbestos collection by 10% compared to 2018, have been translated into the local operational commitment.
- b. **Q2 (Score 1):** RP 2.0 is vertically aligned with multiple legal frameworks, including VLAREMA 8 and VLAREMA 9, which were updated in 2021 and 2024, respectively, which strengthen compliance obligations for internal municipal operators, and IVAGO, through its annual report, confirms that the renovations were carried out in direct response to these regulatory updates. With the EU Waste Framework Directive aligning waste recycling targets for collected municipal waste at 55%, 60%, and 65% by 2025, 2030, and 2035, respectively, recycling parks are identified as key collection infrastructure. The Flemish government set a 90% target for the population living

within 5 kilometers of a recycling park as a binding spatial planning obligation for the RP 2.0 operations.

- c. **Dimension synthesis:** Both questions are confirmed, as RP 2.0 is formally authorised across all governance levels, local, regional, and supranational, with the renovation program itself becoming a direct operational response to the legal framework, proving IVAGO's proactive compliance commitment.

D2— Organisational Coordination & Service Delivery

- a. **Q3 (Score 1):** Coordination mechanism across the RP 2.0 initiative was managed through several ways, including IVAGO functioning as sole project lead for the renovation, coordinating operations across all six parks through biweekly meetings with the internal quality management framework (IKZ). A phased closure was adopted in 2023 to minimise service disruption, and the project was completed within the planned budget. Internally, the mobility cell (MOB) managed operational access and safety, while the IT department built the software and system integration to support the initiative's operationalisation. Externally, RP 2.0 has partnerships and agreements with second-hand shops and coordinates with waste stewards to deliver pop-up recycling parks.
- b. **Q4 (Score 1):** Operational roles are documented through source documents, where part supervisors are equipped with tablets to operate barrier gates and manage weigh-bridge assignments. Back-office staff also received training, and IT teams were provided with hypercare support at each park opening. The reorganisation of *Proeftuinstraat's* reception area into separate desks for private residents and suppliers formalised service delivery roles at the site level.
- c. **Dimension synthesis:** Both questions are confirmed, where coordination in RP 2.0 is formally structured across internal departments, partner organisations, and community actors, and the documentation of roles is distributed through multiple reports.

D3— Financial & Resource Management

- a. **Q5 (Score 1):** RP 2.0 operates through a formally documented and measurable financial structure; revenue from the parks increased from approximately €273,694 in 2022 to €902,896 in 2024, a 230% increase, while business user revenue rose from €68,588 to €122,424. Approximately €9.8 million was invested in 2023 in physical park renovation

and software integration, with an additional €192,000 to transition the Diftar system to SAP for recycling park billing.

- b. Q6 (Score 1):** Financial reporting is also documented in IVAGO's statutory income statement, which presents the formal budget and the actual expenses. The decision not to implement automatic number plate recognition (ANPR) due to budget constraints is explicitly documented, confirming that infrastructure decisions are subject to a formal budget allocation process. Additionally, a social equity component, such as social compensation for approximately 31,869 eligible households is maintained in the financial structure.
- c. Dimension synthesis:** Both questions are confirmed, as the RP 2.0 financial structure is formally documented, expenses are also planned and reported, and the revenue growth between 2022 and 2024 reflects both tariff reform and measurable behavioural change, which is consistent with PAYT analysis, where the 36% decline in total waste deposited should be interpreted as evidence of policy implementation rather than operational limitation.

D4— Human Resources & Capacity Building

- a. Q7 (Score 1):** The RP 2.0 renovations required formally documented staffing investment across multiple organisational levels; for example, in 2024, IVAGO conducted about 4,783 hours of formal training for all staff on the new sorting rules, renovated park operations, and new digital systems adaptation training. In 2023, the Operations department recorded 2,443 training hours, which covered both new recycling park processes and soft skills, including customer communication for park supervisors.
- b. Q8 (Score 1):** Multiple training activities are evidence of ongoing capacity building beyond the initial renovation period. For instance, the annual Waste Team Week promotes ongoing staff development and safety awareness. Following the increase in visitor aggression cases from 70 to 198 between 2022 and 2024, IVAGO introduced a dedicated management training module for park attendants and implemented consistent team assignments to support its staff. This reveals an adaptive human resources response to a safety challenge rising directly from policy reform, demonstrating capacity building that is responsive to operational realities.

- c. **Dimension synthesis:** Both questions are confirmed, as human resources capacity in RP 2.0 is structured formally with documented staffing roles, formally structured training programmes and an adaptive response to operational challenges.

D5— Communication & Public Awareness

- a. **Q9 (Score 1):** Communication was treated as a core component of the RP 2.0 reform, where the implementation of the tariff-based system depended on residents' understanding and acceptance of the initiative. The campaign included the new park guide brochure, animated videos, a website with route-planning tools, opening events at two parks, and social media engagement. In 2025, nineteen pop-up recycling parks were organised, with around 97 visits per location and 32.8 kg of waste collected per visitor. A school visit campaign and workshop for non-Dutch speakers were also conducted to reach more residents.
- b. **Q10 (Score 1):** Procedural information is publicly accessible, including through a comprehensive brochure covering all 39 waste types, tariff groups, sorting rules, and free visit entitlements. Annual reports are published under IVAGO's annual report. The *MijnIVAGO Afvalmeter* enables residents to monitor personal waste data, including reach through the Recycle app and Instagram, with engagement rose by 44.93%.
- c. **Dimension synthesis:** Both questions are confirmed, where the communication capacity in RP 2.0 is formally planned, multi-channel, and oriented towards behavioural change. The target outreach to non-Dutch speakers also reflects the institution's strength in its communication strategy, helping reduce barriers for participants.

D6— Monitoring & Evaluation

- a. **Q11 (Score 1):** RP 2.0 is supported by a formal monitoring system integrated into IVGO's quarterly Boardtable reporting. The performance indicator covers both operational outputs and policy outcomes, including tonnage delivered to recycling parks, the number of park visits, residual waste generation, and the use of mobile recycling parks. Monitoring was also conducted beyond the parks themselves, with a six-month evaluation of glass collection points using data collected by volunteer guardians, indicating that performance tracking spans a wider collection network than just the recycling park infrastructure.

- b. **Q12 (Score 1):** Monitoring results are used to support operational and strategic decision-making. Annual reporting documents show a decline in recycling park visits and waste volume due to the introduction of the renewed tariff system, as well as a recovery in the number of visits. These trends are not just reported but also interpreted in relation to behavioural change and service performance. Monitoring data will also be used for the planned 2026 cost-efficient assessment of the mobile recycling park, which will be based on visitor numbers and operational costs from the 2025 implementation.
- c. **Dimension synthesis:** Both questions are confirmed with RP 2.0, which has a structured monitoring and evaluation system integrated in IVAGO's reporting framework. The inclusion of monitoring activities beyond the recycling park also indicates broader effort to understand management performance in the collection network.

FoodSavers, Score: 6/6

D1— Policy and Legal Framework: Score 1

- a. **Q1 (Score 1):** FoodSavers is formally based on Ghent's *Gent en Garde* food strategy, aiming for 'no food waste' and its operational goal of using food surpluses. This initiative has formal approval in December 2016 when the Council of the Welfare Service authorised a dedicated budget allocation for FoodSavers. In 2023, the Ghent Municipal Council also decided to formally recognise Sociale Kruideniers Gent and Rabot op je Bord within the *Gent en Garde* framework through a subsidy agreement for 2023-2025, indicating continued political support.
- b. **Q2 (Score 1):** The food rescue initiative is aligned with the regional and supranational instruments, where at the regional level, it is linked to the Flemish Government's Action Plan on Circular Food Loss and Biomass Flows 2021-2025, prioritising food redistribution for human consumption as the primary intervention in the food-waste hierarchy. FoodSavers also collaborates with organisations active in the broader Flemish social and circular economy sector, including HERW!N and De Kostwinner. At the supranational level, the initiative is also aligned with the principles of the waste hierarchy established by the European Union Waste Framework Directive to reduce waste, including food waste, and to promote the social use of surplus food.

- c. **Dimension synthesis:** Both questions are confirmed, as FoodSavers is formally authorised at the local level and also aligned with the regional and supranational legal framework. The initiative itself starts with a bottom-up idea and culminates in formally approved, budgeted municipal policies, reflecting initial leadership and Ghent's ability to absorb civil-society initiatives into formal governance structures.

D2— Organisational Coordination & Service Delivery

- a. **Q3 (Score 1):** FoodSavers operates through a formally structured multi-actor coordinated system, where the City of Ghent's climate and environmental department act as the institutional actor, OCMW Gent coordinates the project at the operational level; food-sector partners act as surplus food providers under contractual agreements; FoodSavers staff manage collection and delivery; and social organisations handle final distribution to people in need. The Food Policy Council, comprising members from association, agriculture, academia, and commerce, is a participatory governance body for strategic oversight and recommendation. The formal documentation also provides evidence of the contractual agreement with partners, and the subsidy agreement mandates that at least 50% of products at mobile grocery points come from FoodSavers, thereby integrating the logistics platform and distribution network.
- b. **Q4 (Score 1):** There is a documented division of roles across the formal agreement and the evaluation report, including for the Milan Pact Awards. The operational procedures for collection, ordering, and distribution are also described, along with a high-quality checking service delivery mechanism. The Food Policy Council is also tasked with refining strategic goals into operational objectives and reporting back to the wider Council.
- c. **Dimension synthesis:** Both questions are confirmed as the organisational coordination in FoodSavers is formally multi-layered with formal documentation at strategic, logistics, and distribution level. The contractual architecture linking donors, the platform, and the recipient organisation reflects a formal coordination structure that extends beyond the external network actors on whom the initiative depends for its operational functioning.

D3— Financial & Resource Management

- a. **Q5 (Score 1):** FoodSavers has identifiable and formally documented funding structures across multiple levels, including from the *Gent en Garde* food strategy, which has a

total annual budget of €220,000, of which approximately €85,000 is allocated for food governance activities including the Food Policy Council. Furthermore, FoodSavers' operational costs in its first two years were formally reported at €401,831 in 2017 and €546,564 in 2018. Additionally, the 2023-2025 subsidy agreement allocates approximately €46,504.59 to Sociale Kruideniers Gent and €22,312.02 to Rabot op je Bord, confirming that funding is formally structured and indexed rather than relying on an informal funding source.

- b. Q6 (Score 1):** Financial accountability for FoodSavers is evidenced by the formally reported operational costs across its first two years of implementation, with €401,831 in 2017 and €546,564 in 2018, and the formal budget allocation process initiated through the December 2016 Council of the Welfare Service approval. At the downstream distribution level, the 2023-2025 subsidy agreement governing *Sociale Kruideniers Gent* and *Rabot op je Bord* is on a 90/10 basis, with the 10% paid only after submission and approval of the annual activity report, creating a formal financial accountability mechanism across the food-rescue's supply redistribution layer.
- c. Dimension synthesis:** Both questions are confirmed, with FoodSavers' financial structure formally documented across multiple funding streams with its accountability mechanism.

D4— Human Resources & Capacity Building

- a. Q7 (Score 1):** FoodSavers has a structured workforce for supporting its operational activities, related to the social employment model, where logistics staff are recruited from individuals with barriers to entering the job market. At the distribution level, Rabot op je Bord mandates that active volunteer groups be selected with diverse backgrounds in age, region, and cooking skills to support inclusivity and formally structured volunteers' capacity.
- b. Q8 (Score 1):** Staff training is also documented for the digital tools used in operations, including the real-time dashboard for monitoring food flows and a custom electronic agenda. The introduction of these tools was accompanied by formal training to improve familiarity and operational efficiency. There was also a formal acknowledgment of the challenges, including a 30% employee turnover rate due to the physical demands of the work, language barriers, etc. The subsidy agreement for Rabot op je Bord has required volunteers to support all operational levels, from food preparation to policy and

strategy, reflecting capacity building as a formal contractual obligation rather than an informal aspiration.

- c. **Dimension synthesis:** Both questions are confirmed, where human resource capacity in FoodSavers is structured formally through a social employment model with training activities and volunteers' obligation in its operational redistribution of food.

D5— Communication & Public Awareness

- a. **Q9 (Score 1):** Communication within FoodSavers operates through both strategic and operational means, where at the strategic level, the Food Policy Council functions as a platform for dialogue among public authorities, civil society organisations, and the private sector, to help disseminate and promote Ghent's broader food policy objectives. The initiative has also received external visibility through its recognition as a European food practice in urban system transformation under the FIT4FOOD2030 programme. At the operational level, regular interaction among FoodSavers, donor organisations, and recipient organisations ensures coordination within the redistribution network.
- b. **Q10 (Score 1):** The city of Ghent's website publishes information on FoodSavers' operational activities, including data on food surpluses and the redistribution process, providing accessibility for public information for potential donors, recipient organisations, and external partners. The subsidy agreement formally requires Sociale Kruideniers Gent to acknowledge the City of Ghent and OCMW as subsidising authorities in all publications and external activities, formalising public accountability in the initiative's communications.
- c. **Dimension synthesis:** Both questions are confirmed although with a noted asymmetry because communication capacity in FoodSavers is formally structured at the strategic level through the Food Policy Council and the operational level through the contractual reporting obligation. There is a relative absence of documented public awareness, as FoodSavers is more about organisation-to-organisation activities, but this does not undermine the overall presence of formal communication capacity in the governance system.

D6— Monitoring & Evaluation

- a. **Q11 (Score 1):** FoodSavers has been subject to a formal performance evaluation requirement since its operational launch. The initiative has monitored multiple quantified indicators since its earliest month, including the total food distributed,

emissions reduced, people employed, and recipient organisations, all of which have exceeded its initial target.

- b. Q12 (Score 1):** Monitoring data is documented for informing operational management and institutional reporting. The real-time digital dashboard supports daily tracking of food flows by category and recipient organisation, enabling operational-level monitoring for management decisions. The subsidy payment scheme with 10% annual funding contingent on the submission and approval of the annual activity and financial report creates a formal institutional incentive to ensure that monitoring data are processed, reviewed, and used for accountability purposes.
- c. Dimension synthesis:** Both questions are confirmed, as FoodSavers's monitoring and evaluation system is formally structured around quantified targets, real-time operational tracking and accountability reporting.

b. Surabaya Scoring Justifications

Waste Banks, Score: 6/6

D1— Policy and Legal Framework: Score 1

- a. Q1 (Score 1):** Waste banks initiative in Surabaya has a formal multi-level legal basis: at the national level, Indonesian Law No.18/2008 on Waste Management, which aims for source-based recycling and assigns local governments formal responsibilities for household waste management. This is operationalised through Permen LHK No. 14/2021, which serves as the legally binding national framework that defines waste banks as facilities for managing waste based on the 3R principles, specifies their management requirements, and outlines incentive mechanisms. Similarly, at the municipal level, Surabaya City Regional Regulation No. 1/2019 mandates waste banks as the mechanism for implementing the 3R principles at the household level and requires the local government to expand, support, train, monitor, and assist in the marketing of waste bank outputs. Furthermore, the Surabaya Environmental Agency's formalisation of the Surabaya main waste bank (BSIS) as the coordinating body in 2023 and Mayor Eri's establishment of the House of Waste Bank (*Rumah Bank Sampah*) confirm the initiative's formal recognition within the municipal governance level.
- b. Q2 (Score 1):** The waste bank initiative is vertically aligned with the national, regional, and municipal legal frameworks, as mentioned previously. These regulations mandate sorting waste into at least 5 categories, requiring an operational waste bank model. The

legal hierarchy is coherent and integrated, with each level of regulation supporting the mandate of the regulation below it.

- c. **Dimension synthesis:** Both questions are confirmed, as the waste bank system in Surabaya is formally authorised at all governance levels with an integrated hierarchy linking national law through ministerial regulation to municipal instruments for its implementation. Political support is also evident across mayoral tenures, indicating institutional continuity. An important note, however, is that formal legal embedding at the system level does not translate into uniformity in operational support at the unit level, as waste bank units face equipment and management constraints.

D2— Organisational Coordination & Service Delivery

- a. **Q3 (Score 1):** The coordination mechanisms across the waste banks network are formalised, as the main waste bank (BSIS) and waste bank units (BSU), as defined in Permen LHK No.14/2021, has vertical coordination mechanism where the BSUs operate as community-level collection point and the BSIS acts as the city-level coordinator, aggregator, and quality controller who at the market coordination level has formalised partnership with at least four recycling companies, including CV Usaha Logam, reflecting the institutional downstream link between community-level sorting and the industrial recycling. DLH also coordinates actively with the network, both online and in the office, as well as with affiliated waste banks and environmental cadres. The operating system's flow is also described, connecting household depositors to industrial buyers.
- b. **Q4 (Score 1):** Roles and responsibilities are also defined within the legal framework, specifying a minimum four-function organisational structure for both BSI and BSU, including Director, General Manager, Production Manager, and Finance Manager, with differentiated role descriptions to avoid operational overlap. The 2023 formalisation of BSIS as the coordinating body for the city's waste bank network marks the formal recognition of its coordination role within broader municipal waste management. While the role is delineated, practical implementation across 670+ BSU networks is uneven.
- c. **Dimension synthesis:** Both questions are confirmed, as the organisational coordination in the waste bank system is formally designed and legally structured, with a link from city-level to community/neighbourhood-level and to the private recycling partners. However, the practical function of this coordination depends on factors that formal design may not guarantee, including residents' willingness to sort and managers at the

BSU level to maintain records, revealing a gap between the formal coordination system and operational consistency.

D3— Financial & Resource Management

- a. **Q5 (Score 1):** Waste bank system has a formally structured revenue model that is regulated under *Permen LHK* No.14/2021, which standardises the revenue-sharing mechanism, under which 85% of the waste sales revenue goes to the customer deposits while the 15% goes to operational costs, creating a self-financing logic at the transaction level. At the BSIS, external funding is provided through a formal cooperation agreement with PT PLN UID East Java for its CSR activities. At the municipal level, Surabaya allocates around 3% of its regional budget (APBD) to waste management efforts, including funding for BSU expansion, collection carts, and composting bins. The 2025 APBD is around IDR 462 billion, with additional funding from retribution fees and CSR-based funding.
- b. **Q6 (Score 1):** Financial reporting protocols exist at the BSIS level, with periodic performance reports submitted to LDH as a formal public-private partnership accountability mechanism, and the CSR agreement with the PT PLN documents a formal funding relationship with defined reporting obligations. At the national regulatory level, *Permen LHK* No. 14/2021 provides a reporting template that waste bank managers must submit to government authorities at least every 6 months, covering the structure, facility condition, waste quantities, and customer participation data. However, at the unit level, financial documentation still relies on individual customers' savings booklets rather than formal financial statements, making unit-level financial data largely inaccessible. This limitation, however, does not mean there are no formal financial protocols at the system level.
- c. **Dimension synthesis:** Both questions are confirmed at the system level, as the financial model is formally structured through a regulatory revenue-sharing mechanism, CSR partnership, and municipal budget allocation. The system's financial sustainability is partially dependent on the economic incentives provided to residents, with over half of BSIS customers citing economic benefits as their main motivation for participation, underscoring the revenue model's role as both a financial management tool and a behavioural instrument for the operational activities.

D4— Human Resources & Capacity Building

- a. **Q7 (Score 1):** Human resources capacity in waste banks is formally integrated in *Permen LHK* No.14/2021, mandating a minimum four-function staffing structure for both BSI and BSU with specific educational and training requirements for each position. As of 2023, BSIS formally employed approximately 16 permanent staff members across operational roles, including the director, teller, etc., with documented monthly salaries and meal allowances. Recruitment at BSIS prioritises low-income communities by integrating a social inclusion objective into the formal human resources model. At the unit level, the unit manager is typically selected through a community process, with about 67% chosen for their abilities and social skills.
- b. **Q8 (Score 1):** Capacity building is formalised at multiple levels; at the national level, *Permen LHK* No. 14/2021 requires managers to complete waste bank training and for the General Manager to deliver 3R education. DLH Surabaya supports capacity building through recycling workshops, sorting training, and marketing assistance for recycled products. BSIS operationalises capacity to the unit level by providing free training, sorting instruction, and operational equipment, particularly to the environmental cadres. The reach and standardisation of these efforts remain uneven, with many waste banks inactive due to capacity constraints.
- c. **Dimension synthesis:** Both questions are confirmed as human resources and capacity are formally structured at the regulatory, BSIS, and DLH levels, with documented training mandates, institutional employment at BSIS, and capacity-building programs reaching community units. The structural fragility of the volunteer-based model at the unit level, where inadequate financial incentives impede recruitment and retention, creates a gap between formal goals and operational sustainability.

D5— Communication & Public Awareness

- a. **Q9 (Score 1):** Public engagement in waste bank initiatives is conducted in multiple ways, formally mandated and operationally active at several levels, including *Permen LHK* No.14/2021, which requires waste banks to inform the waste type classification and price list in customer service areas, to conduct 3R education at least once per quarter, for more community engagement. At the city level, Surabaya has a network of 29,453 Great Surabaya Cadres to conduct door-to-door socialisation on waste sorting and management across neighbourhoods, villages, and districts. DLH also maintains

active digital outreach through social media, targeting households, industries, schools, and government institutions.

- b. Q10 (Score 1):** Public able to access information which is maintained formally through the Sibasam (Waste Bank Information System) application, in which residents can access information about waste categories and pricing; while through SIPSN, the national waste management information system, the public can access the aggregated BSIS data for national-level performance tracking. *Permen LHK* No.14.2021 mandates the publication of waste types or categories and price lists at each waste bank facility. BSIS submits periodic performance reports to DLH, and Surabaya's 2025-2026 roadmap for waste management can be accessed publicly; a limitation to note is that the detailed operational data at the unit level is not publicly accessible, with the unit-level output documented in individual savings booklets rather than databases, lowering transparency below the system level.
- c. Dimension synthesis:** Both questions are confirmed, as public awareness and communication in the waste bank system are formally mandated, multi-channelled, and supported by a large cadre network, which is also supported by digital tools. The analytical significance here is that, despite the outreach, only 47.7% of residents in Surabaya practice waste sorting, and source-based waste reduction reached only 7.43%, reflecting a gap between formal and multi-channel outreach that has not yet translated into the system-wide behavioural change the program needs.

D6— Monitoring & Evaluation

- a. Q11 (Score 1):** Formal monitoring is mandated in the legal and operational framework, as under *Permen LHK* No.14/2021, waste bank managers must send standardised progress reports every six months, presenting data on the facility conditions, waste quantities, and customer participation. The Sibasam platform is used to track waste volumes, customer numbers, and transaction data across the BSU network. At the same time, SIPSN integrates BSIS data into the national waste management information system, informing the local tracking and national benchmarking. Surabaya invests in additional monitoring infrastructure, including GPS tracking on collection vehicles, cameras at integrated waste management points, and an enforcement team. Surabaya also has public reporting channels, such as the Wargaku application, the Media Centre, and Call Centre 112. BSIS reported that they managed approximately 427,820 kg of

waste in 2022, rising to 50-60 tonnes per month as of 2026, against a target of 150 tonnes of inorganic waste per month.

- b. **Q12 (Score 1):** The Permen LHK No. 14/2021 monitoring data is formally required to inform local government evaluation and decision-making, serving as the basis for operational decisions and the continuity of formal partnerships. In practice, the city uses the data to map out network scaling, tracking growth from 345 active units in 2020 to around 655 by 2024, with an ongoing goal of adding 10 new BSUs annually. DLH also holds routine meetings and coordinates via WhatsApp with affiliated waste banks to provide operational feedback channels that support responsive management. However, a gap persists between policy goals and operational results, with source-based reduction remaining at 7.43% against a target of 35.29%.
- c. **Dimension synthesis:** Both questions are confirmed, with the waste bank monitoring system formally mandated, digitally supported, and integrated with the national-level tracking through SIPSN, with regulatory provision requiring evaluation results to inform management decisions. Uneven monitoring data is spread across networks, with system-level aggregates accessible and tracked, while the unit-level data remain in informal records.

TPS3R, Score: 5/6

D1— Policy and Legal Framework: Score 1

- a. **Q1 (Score 1):** TPS3R initiative is formally integrated in the legal framework; at the national level, Indonesian Law No.18/2008 establishes the legal foundation for community-based waste reduction and the shift towards an integrated 3R approach. The *Permen PU* No. 03/2013 defines the TPS3R as a community-based waste management facility that focuses on waste reduction, reuse, and recycling. It provides measurable national performance standards that require residual waste to not exceed 30% of total waste handled, thereby distinguishing TPS3R as a legally recognised facility with defined operational thresholds. At the municipal level, Mayor Regulation No. 64/2018 formally establishes the TPS3R not only as physical infrastructure but also as a component of Surabaya's formal municipal governance structures, with responsibilities for collection, sorting, reuse, and recycling activities. Regional Regulation No. 1/2019 also mandates the development of waste treatment infrastructure for Surabaya's cleanliness and waste governance obligations.

- b. **Q2 (Score 1):** Presidential Regulation No. 97/2017, with its 30% waste reduction and 70% waste handling target for household waste by 2025, in which TPS3R has formally identified these as its delivery target, providing a legal commitment to the national policy objectives and facility-level operational mandates. Surabaya's strategic roadmap treats the 12 existing TPS3R facilities as operational infrastructure aligned with these targets, while planning a supplementary integrated waste-processing site to expand capacity to 150 tonnes per day. The Regional Policy Strategy (*Jakstrada*) framework authorises Mayors to support these goals by providing facilities, conducting monitoring, overseeing the TPS3R in line with regional mandates, and confirming institutional alignment.
- c. **Dimension synthesis:** Both questions are confirmed, as TPS3R is authorised at all legal framework levels, including national, presidential, and municipal, with a clear vertical link of the national waste reduction target to facility-level operational performance standards. Things to note include the depth of formal legal authorisation relative to operational performance: for example, TPS3R Gunung Anyar produced a residual rate of 48.7%, nearly 20% above the mandated threshold, indicating that at this facility, the residual rate exceeds the guideline, so compliance with the performance standard is not equally achieved at all TPS3R facilities.

D2— Organisational Coordination & Service Delivery: Score 1

- a. **Q3 (Score 1):** TPS3R facilities have a formally structured waste management infrastructure network coordinated by the DLH Surabaya as the agency to manage waste. The system links 12 TPS3R with 191 Temporary Waste Disposal Sites, 27 compost houses, and the Benowo Landfill, forming a formal infrastructure chain from the household to transfer points, treatment facilities, and final disposal. At the facility level, coordination involves neighbourhood-level waste collectors, who, as informal workers, transport waste daily to TPS3R facilities, where it is weighed, processed by conveyor-based sorting lines, and prepared for distribution to recycling collectors or compost recipients. CSR contributions and international collaborations provide evidence of external coordination.
- b. **Q4 (Score 1):** Roles are formally assigned at the system level through the DLH's mandates, with Mayor Regulation No. 64/2018 defining the responsibilities and roles between the municipal government and facility operators. At the facility level, documented role differentiation varies: TPS3R Jambangan has a formally documented

organisational structure with allocated roles, whereas TPS3R Tenggilis is documented as lacking an authority structure at the unit level. Meanwhile, Super Depo Sutorejo has a documented Standard Operating Procedure framework that covers all stages of waste management, whereas the smaller facilities lack such a framework. This variation indicates that formal role delineation is confirmed at the system and leading-facility levels, but is inconsistent between them. Given the standardised equipment and operational expectations, the overall operation still shows inconsistency.

- c. **Dimension synthesis:** Both questions are confirmed, as the TPS3R's organisational coordination is formally structured through the DLH's management authority with infrastructure network and documented role differentiation at the system and leading-facility level.

D3— Financial & Resource Management: Score 1

- a. **Q5 (Score 1):** Funding for TPS3R is also formally integrated in the municipal budget structure within the same allocation of around 3% of its municipal budget, which is also used on TPS3R optimisation, facility rehabilitation, and the development of an Integrated Waste Processing Site. The 2025 regional budget includes a proposal of IDR30 billion to upgrade machinery at TPS3R Tambak Osowilangun, increasing capacity from 10 to a projected 150 tonnes per day. Mayor Regulation No. 64/2018 mandates that the implementation of the regional strategy be supported by the regional budget and legally available resources, providing formal fiscal legitimacy for TPS3R financing. CSR contribution is included as an additional funding stream.
- b. **Q6 (Score 1):** Not only municipal budget allocation, but TPS3R facilities also apply documented rules for managing operational income, as seen at Super Depo Sutorejo reports on recyclable sales used for internal operational fund, where 10 per cent of plastic scale revenue is allocated to minor machine repairs and additional incentives for sorting staff.
- c. **Dimension synthesis:** Both questions are confirmed. Q5 is confirmed as a formal budget allocation, with evidence and legal integration.

D4— Human Resources & Capacity Building: Score 0

- a. **Q7 (Score 1):** The formally designated operational staff are present across TPS3R facilities, where DLH Surabaya standards staffing requirements are part of the mandate for the facility management, and individual facilities have documented workforce

deployment, including TPS3R Gunung Anyar, for instance, which employs 15 workers with their roles and working hours. *Perwali No. 64/2018* identifies human resources and capacity building as strategic priorities in municipal waste management and formally integrates staff deployment into the city's governance framework. DLH has standardised operational equipment, providing a baseline that shapes staff roles and responsibilities across facilities.

- b. **Q8 (Score 0):** However, despite the formal mandate for training and capacity building in *Perwali No. 64/2018*, available evidence does not provide verification that these capacity-building activities are systematically delivered across the TPS3R network. This evidence shows that research documents significant variation in operational implementation across facilities, particularly in workforce operational competence.
- c. **Dimension synthesis:** Score 0. Q7 is confirmed with the formally designated staff at the TPS3R facilities, with DLH standardisation of staffing requirement and *Perwali No. 64/2018* formally recognising human resources as a strategic priority; however, Q8 is not confirmed as there is a gap in the available documentation in the delivery of training and capacity-building activities at multiple facilities, with documented inter-facility variation in operational competence.

D5— Communication & Public Awareness: Score 1

- a. **Q9 (Score 1):** TPS3R has a formally documented communication and public awareness strategy that is integrated in Surabaya's waste governance framework, under the *Perwali No. 64/2018*, which recognised communication, education, and information as essential for community participation in waste management, by conducting neighborhood-based recycling activities, environmental training and education campaign, at the city level, DLH has active outreach through the social media platform, and the Super Depo Sutorejo has engaged with community through the compost distribution channel for engagement effort.
- b. **Q10 (Score 1):** Performance data on TPS3R is publicly accessible at the system level through the SIPSN national platform, which tracks performance at national, regional, city, and facility levels, and through Surabaya's published facility-by-facility data on waste processed and residue generated, differentiated by waste category, which is accessible to the public. Limitations are acknowledged at the facility level, as operational data is not systematically published. During public awareness activities at TPS3R Jambangan and TPS3R Tenggilis, residents reported a lack of ongoing knowledge transfer.

- c. **Dimension synthesis:** Both questions are confirmed at the system level, through the communication and public awareness capacity in TPS3R, which is formally amended through the Perwali No. 64/2018, and actively implemented at the city level through the DLH's outreach programmes, visible through SIPSN and the official reporting documents. However, a gap in the formal communication infrastructure at the system level and documented limitations at individual facilities are found.

D6— Monitoring & Evaluation: Score 1

- a. **Q11 (Score 1):** Formal monitoring mechanism is documented at multiple levels, such as in the Mayor Regulation No. 64/2018, which established six quantitative performance indicators, and half of them govern TPS3R outcomes; and at the national level, SIPSN tracks TPS3R performance for the national waste data management infrastructure. Additional monitoring is Surabaya's facility-by-facility report, and the infrastructure includes GPS tracking of waste transport vehicles.
- b. **Q12 (Score 1):** Monitoring data is documented as informed and presented in formal documents. This is evidenced by Surabaya's roadmap data, which shows that the existing 12 TPS3R facilities have reached their combined capacity limit of 72.6 tonnes per day.
- c. **Dimension synthesis:** Both questions are confirmed, where the TPS3R's M&E system is formally structured, nationally integrated through SIPSN.

Garda Pangan, Score: 3/6

D1— Policy and Legal Framework: Score 0

- a. **Q1 (Score 0):** Garda Pangan operates without a formal recognition or a specific local regulation that explicitly mandates or formally authorises its activities within the Surabaya governance system. The initiative's function, however, is complementary with the Surabaya Mayor Regulation No.60/2019 on the Food Provision Program, aiming to provide food for residents in need, and with the Mayor Regulation No. 77/2025 on government-mandated food distribution, but Garda Pangan is not named, authorities, or formally embedded within these institutions. Its alignment is more functional than regulatory.
- b. **Q2 (Score 1):** Multiple policy instruments provide an indirect legal framework that supports Garda Pangan's activities without directly mandating them, including the

broader national law on waste management. Additionally, Indonesian Law No. 18/2012 on Food addresses issues of food equity and access for those experiencing food and nutrition insecurity, providing national-level normative grounding for food redistribution programs. Importantly, the Draft Presidential Regulation (RPerpres) on Food Rescue, which was formally included in the Presidential Regulation Drafting Programme for 2026 through Presidential Decree No. 38/2025, represents active progression toward national-level legal formalisation of the food rescue sector in which Garda Pangan operates. This suggests that the regulatory environment is transitional rather than definitively absent.

- c. **Dimension synthesis:** Score 0. Q1 is not confirmed as Garda Pangan lacks a specific legal or policy instrument that formally authorises its activities within the local governance system. Q2 is confirmed, as the initiative is functionally aligned with multiple national policy instruments and local regulations and operates in a transitional regulatory environment in which food rescue formalisation is actively underway. The 0-dimensional score reflects the absence of local regulatory authorisation, not the absence of policy relevance, and this distinction is important, as Garda Pangan has achieved normative and political support without yet obtaining legal authorisation.

D2— Organisational Coordination & Service Delivery, Score: 1

- a. **Q3 (Score 1):** Garda Pangan’s coordination network varies from upstream, midstream, and downstream actors in the food rescue cycle; including on the gleaming programs with farmers to recover food loss at the production stage; midstream, where it documents partnership with food industries and corporate donors as food surpluses suppliers; and downstream with the recipients of the food surpluses. The operational partnership with the national Free Nutritious Meal (*Makanan Bergizi Gratis*/MBG), through which Garda Pangan manages organic waste via BSF maggot bioconversion, links a community-based programme with a national government programme.
- b. **Q4 (Score 1):** Organizational structure is well-defined, consisting of a core paid team with functional specialists in food collection logistics, sorting operations, technology utilization, and community engagement, as well as volunteers, divided into two types: core volunteers and public volunteers. Food rescue has SOPs for inspecting food before redistribution, and these documented procedures define roles and the redistribution chain.

- c. **Dimension synthesis:** Both questions are confirmed, where Garda Pangan's operability is extensive with the farm-level food recovery to urban community distribution, and its internal roles are documented and differentiated clearly. One perspective to consider is the coordination network, which, according to Garda Pangan, is largely relational in character and builds on voluntary engagement, personal partnership, and informal trust relationships.

D3— Financial & Resource Management, Score: 0

- a. **Q5 (Score 1):** Garda Pangan operates through a formally diversified hybrid financial model combining multiple revenue streams to sustain its operation without reliance on public budget allocation. The primary revenue mechanism is a paid cooperation scheme with the hospitality industry, where restaurants, hotels, and catering businesses pay for food waste management service on a fee-for-service basis, a formally structured contractual revenue relationship that distinguishes paying clients from passive food donors and provides a more attractive financial base than donations alone. However, Garda Pangan, which has the BSF maggot bioconversion program, also generates downstream revenue from organic waste materials, other sources of documents include *infak and sedekah* (Islamic philanthropic contributions), crowdfunding via KitaBisa website, CSR contributions from partner companies, commercial activity through Lumbung Alum (cold-pressed juice from gleaned farm surplus), and research and consultation services on food loss and waste.
- b. **Q6 (Score 0):** While there are multiple streams documented, there is no available source to confirm the existence of formal financial reporting protocols, an expense tracking system, or a documented financial accountability mechanism. There is a corporate partner certificates document the social and environmental impact attributable to individual partners.
- c. **Dimension synthesis:** Score 0. Q5 is confirmed as Garda Pangan's hybrid financial model is formally diversified and operationally sustained through multiple documented revenue streams, reflecting a financial strategy appropriate to sustain its operation without public subsidy. Q6 is not confirmed as formal financial reporting, and accountability in financial issues is absent due to unavailable documentary evidence. This 0 score reflects a gap in formal financial documentation rather than financial incapacity, as Garda Pangan is able to sustain and grow its operations. The absence of formal financial reporting is a structural feature of a civil society that has not yet

adopted the institutional accountability mechanism associated with publicly funded or formally subsidized governance accounts, other than evidence of financial mismanagement.

D4— Human Resources & Capacity Building: Score 1

- a. **Q7 (Score 1):** Garda Pangan maintains a formally differentiated human resource structure comprising a small core team of paid specialists and a two-tiered volunteer network with clearly assigned roles, an internal team has functional roles, and there are purely volunteers, which are distinguished by two types, which are core volunteers who assume sustained, have higher commitment operational roles, while public volunteers focus more on those for specific single-day activities, which Garda Pangan has never experience shortage of volunteers.
- b. **Q8 (Score 1):** Training and capacity building activities are formally integrated in the operational cycle, where, before each food redistribution activity, core volunteers deliver briefings, and there is a standardized food safety protocol that is formally documented in the operations.
- c. **Dimension synthesis:** Both questions are confirmed, as human resources and capacity building in Garda Pangan are structured formally in documented role differentiation, pre-activity briefing protocols, standardised SOPs, and knowledge dissemination. One thing to discuss, relative to TPS3R, for instance, is that Garda Pangan's capacity-building system can function even without formal regulatory mandates, but rather due to internal governance and the organisation itself.

D5— Communication & Public Awareness: Score 1

- a. **Q9 (Score 1):** Garda Pangan's communication and public awareness strategy is operationally active and multi-channel, although informal in design. As documented, Garda Pangan avoids a formal communication approach in favour of authentic content to prioritise transparency and avoid exploitation of poverty narratives. Active channel communication is mainly through its social media account, official website, and email newsletter. Garda Pangan has also been active in public meetings and regional forums, sharing its experience at the Focus Group Discussion on the ASEAN Socio-Cultural Community Blueprint 2023, thereby providing international-level institutional visibility.

- b. Q10 (Score 1):** Garda Pangan makes its operational activities and performance data publicly accessible through its monthly Instagram report, which covers food portions donated, weight of food saved, beneficiaries reached, and distribution locations, among others. The corporate certificate further documents the social and environmental impact attributable to the individual partner, creating a systematic, transparent mechanism for the document. Even with this, the Policy Brief from CIPS confirms that the public output is of sufficient quality and consistency to serve as a credible secondary data source for external researchers. Additionally, Garda Pangan, who did a survey on the public's knowledge of food waste reduction, demonstrates that it uses a structured data collection for awareness and education activities.
- c. Dimension synthesis:** Both questions are confirmed, as communication and public awareness capacity in Garda Pangan is multi-channel, publicly transparent, and uses an open dialogue approach. The Garda Pangan's communication capacity is formally strong in terms of documentation and impact evidence, while remaining institutionally informal in its design. This combination of formal impact transparency and the absence of a formal institutional communication procedure reflect Garda Pangan's governance model.

D6— Monitoring & Evaluation: Score 0

- a. Q11 (Score 1):** Garda Pangan tracks operational performance through multiple mechanisms, including the monthly documentation of information on the food distribution, weight of food in kilograms, among others. The corporate partner certificate document tracks attributable impacts for individual donors on a monthly basis, serving as an accountability mechanism within the partnership network. Additionally, a field verification is conducted for the gleaning program to confirm information and assess farm conditions before the operation commences. By July 2024, monthly reports documented 5,236 food portions donated, 677 kg of food saved, and 2,751 beneficiaries reached.
- b. Q12 (Score 0):** Available evidence does not confirm that Garda Pangan's monitoring data is systematically reviewed or formally used to inform documented decision-making and adaptive management processes. Monthly documentation is published for public transparency and partner accountability, for instance, on the operational adaptive approach to the rotation of distribution points. No formal period review process,

documented data analysis, or structured annual evaluation report is evidenced in available sources.

- c. **Dimension synthesis:** Score 0. Q11 is confirmed: operational output tracking is consistently maintained and publicly accessible, at a level of detail that is regularly sufficient as credible secondary data for external policy research. Q12 is not confirmed because although the monthly Instagram publication consist of the operational reporting, however, they are not a formal institutional reports or evaluation documents but self-published updates. Furthermore, there is no evidence data reviewed as monitoring or evaluation effort.