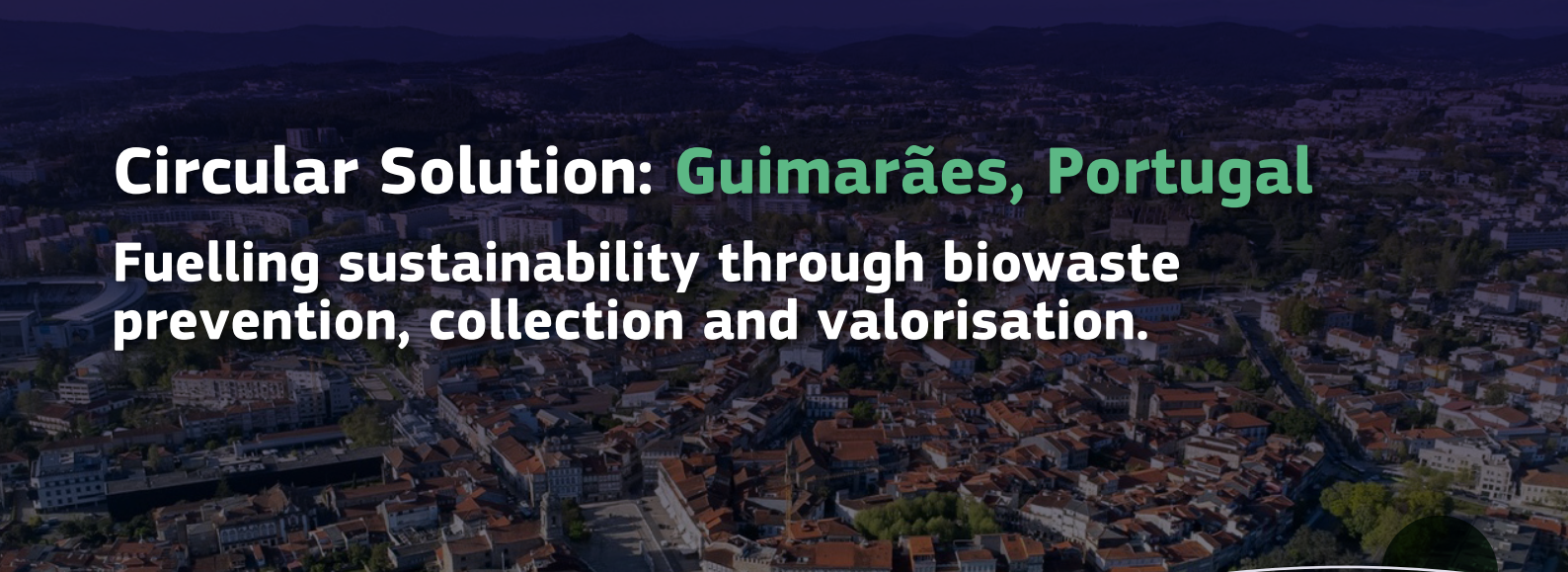
# Circular Solution: Guimarães, Portugal

## Fuelling sustainability through biowaste prevention, collection and valorisation.



### Size:

**156 830**
**inhabitants**

### GDP:

Less developed region

### Geographical information:

Southern Europe

### Urban-rural predominance:

Intermediate

### Sectors:

- Circular resource management
- Bioeconomy
- Food

### Time frame:

January 2023 – September 2025

### Circular strategies:

- rethink
- regenerate
- reduce
- reuse
- recover

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### More information:

Guimarães | Circular Cities and Regions Initiative

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## Key facts and figures

Between
**January 2022** and **August 2025**

# 19 489 tonnes

of biowaste were directly diverted from landfill and **converted into compost.**

In the same period,
the municipality avoided

# €568 404.90

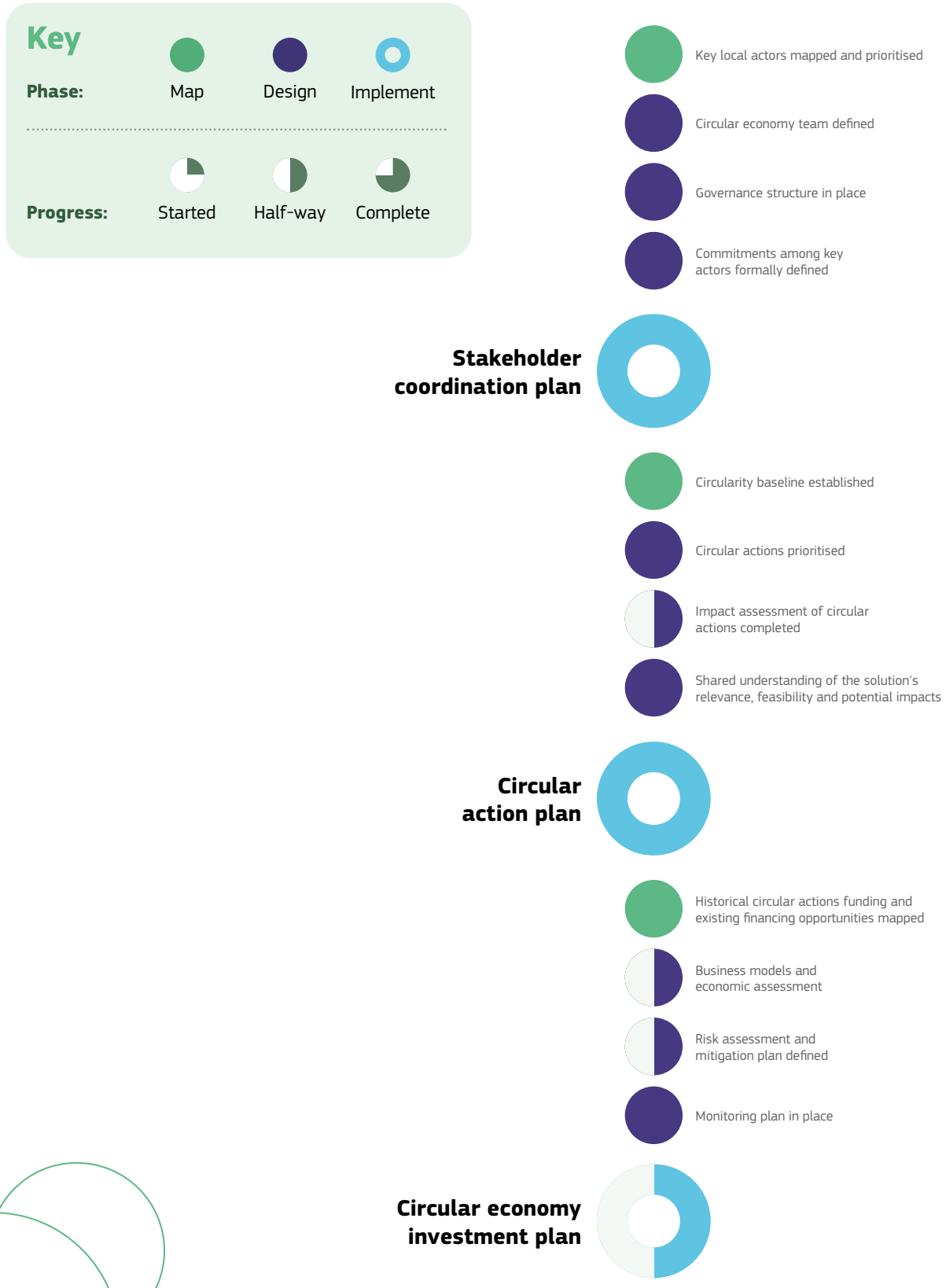
in landfill tariff costs.

## Solution overview

Guimarães is on a mission to make waste management more sustainable through the gradual introduction of a system for separate biowaste collection. This effort is a part of the BioWaste Action Plan, which is integrated into the RRRCICLO strategy, a circular economy roadmap. It targets various sources of biowaste, ranging from households and restaurants to schools, hospitals, parks and local farms. The pilot does not just collect waste; it transforms waste into valuable resources through initiatives like home or community composting, organic fertiliser production, and even converting waste into energy. Guimarães is also taking proactive steps to spread awareness about the importance of preventing food waste among public schools, universities and citizens.

## CCRI Methodology Step Completion Status:

The CCRI Methodology is a guidance tool for policy and decision-makers in local and regional government. It describes key activities and milestones in the successful development of a Circular Solution, divided into three phases – Map, Design, and Implement. The visual checklist provides an at-a-glance view of how Guimaraes circular solution is progressing towards these outputs.



# Background and objectives

## Policy context:

Guimarães' circular and climate strategies are deeply interconnected. The RRRCICLO programme (2021) drives this shift through sectoral plans promoting reduction, reuse, recycling, and recovery, supported by its Biowaste Management Plan 2030, which establishes a municipal network for organic waste collection and promotes home and community composting. PAPERSU Guimarães 2030 complements this by translating Portugal's national waste strategy into local measures, aiming to achieve comprehensive biowaste collection across the entire population by 2028. These efforts align with the city's Climate City Contract under the EU's "100 Climate-Neutral and Smart Cities" mission, which integrates circularity into carbon-neutrality goals. The Guimarães Climate Pact further mobilizes citizens and institutions for collective decarbonisation, while the Municipal Climate Action Plan operationalises these ambitions through complete organic waste valorisation and circular value chain development.

## Problem:

The municipality of Guimarães has been intrinsically motivated to advance the integration of circular economy principles across sectors as a means to reduce environmental impact and foster sustainable resource use. To tackle the challenge of organic waste management, it has been working since 2021 on introducing mandatory separate biowaste collection, already reaching 38,5% of the population in early 2023 – well ahead of the EU's 1 January 2024 deadline. This effort is also driven by the city's broader ambition to use circular economy as a key tool for achieving climate neutrality and creating economic opportunities.

## Objectives:

- To establish a separate collection system of bio-waste at the source with an expected increase to 60% by the end of 2026, aligning with the current Biowaste Municipal Strategy.
- To explore and identify most appropriate pathways for biowaste valorisation, reinforcing its role in soil health improvement and circular practices.
- To enhance public awareness and stakeholder engagement by strengthening programs with key groups (e.g., hotels, restaurants and catering (HoReCa) and schools), fostering collaborations with local businesses and industries, and promoting sustainable agricultural practices among farmers.

# Stakeholders

## Solution Leader(s):

Public Authorities | Research & Academia

**The City Council of Guimarães, as public administration, leads the implementation, supported by the Landscape Laboratory as co-lead from academia.**

## Supported by:

Private Sector | Civil Society & NGOs | Funding & Advisory Bodies

Vitrus Ambiente, the municipal waste company, provides bins for separate biowaste collection, while Resinorte, a multi-municipal company, manages the selective collection, sorting, valorisation, and disposal of biowaste.

The HoReCA sector and households actively participate in biowaste collection, food waste prevention, reuse programmes, and pilot initiatives. Households also compost individually or collectively. Likewise, schools, universities, and sports facilities participate in biowaste collection and composting, while being engaged in food waste prevention and reuse efforts.

NGOs such as ReFood, Zero, Quercus, and Ave Associations contribute to defining biowaste valorisation pathways, alongside technological organisations including CVR – Centre for Waste Valorisation, the 3B's Research Group, and The Fibrenamics Association.

Finally, CETENMA, through the CCRI External Expert Support Scheme, developed the Material Flow Analysis for agricultural biowaste in Guimarães and provided recommendations for potential local valorisation pathways.

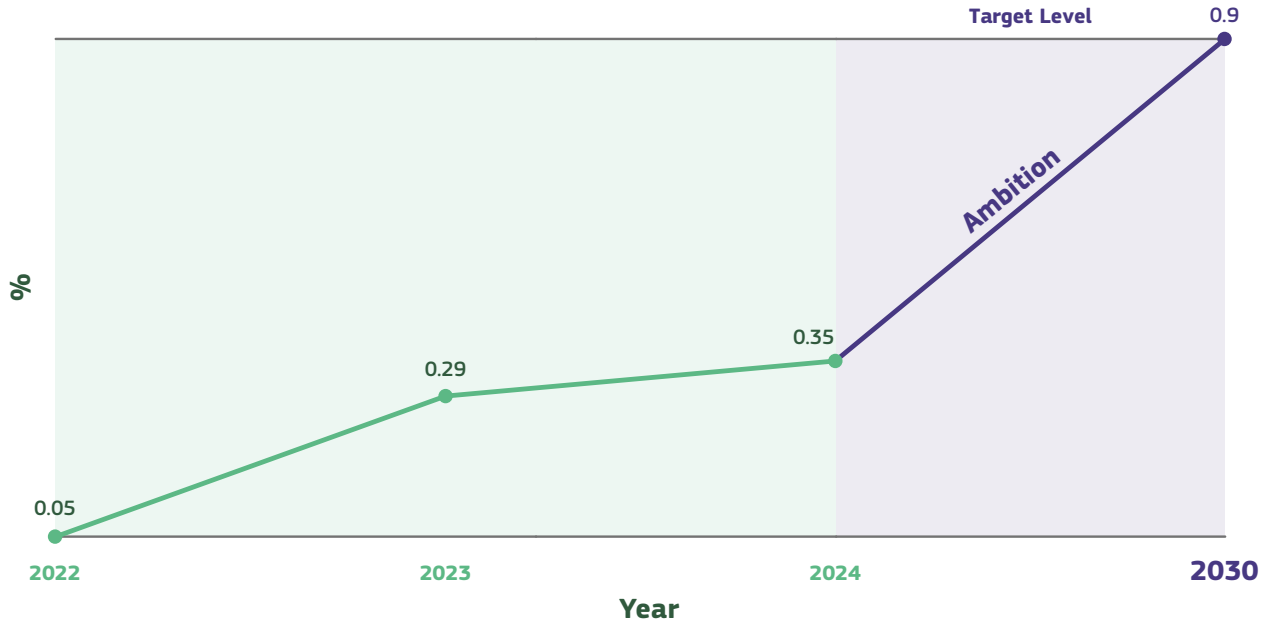
# Results and Impact

Guimarães has advanced the Biowaste Action Plan (within RRRCICLO) through a structured three-phase rollout across households, HoReCa, schools, hospitals, and public areas – successfully expanding separate biowaste collection to cover **40% of the population by 2023 and 48% by 2024**, and positioning the municipality on track to reach **60% by 2026** and full coverage by 2028, in line with the Biowaste Municipal Strategy.

With support from the CCRI, the city has strengthened biowaste valorisation by mapping agricultural waste flows and identifying new circular pathways that have potential to lead to a development of high value bio-based products. Existing valorisation routes (home and community composting, organic fertiliser production, and energy recovery from green waste) continue to expand.

Public engagement has also grown through education programmes (e.g., 360.come), HoReCa initiatives (Ecobox), and partnerships with schools, businesses, and farmers, fostering shared responsibility and accelerating Guimarães' transition toward a circular, zero-waste city.

## Figure 1: Bio-waste collected through Guimaraes' system, as a percentage of total produced



## Main results and impacts

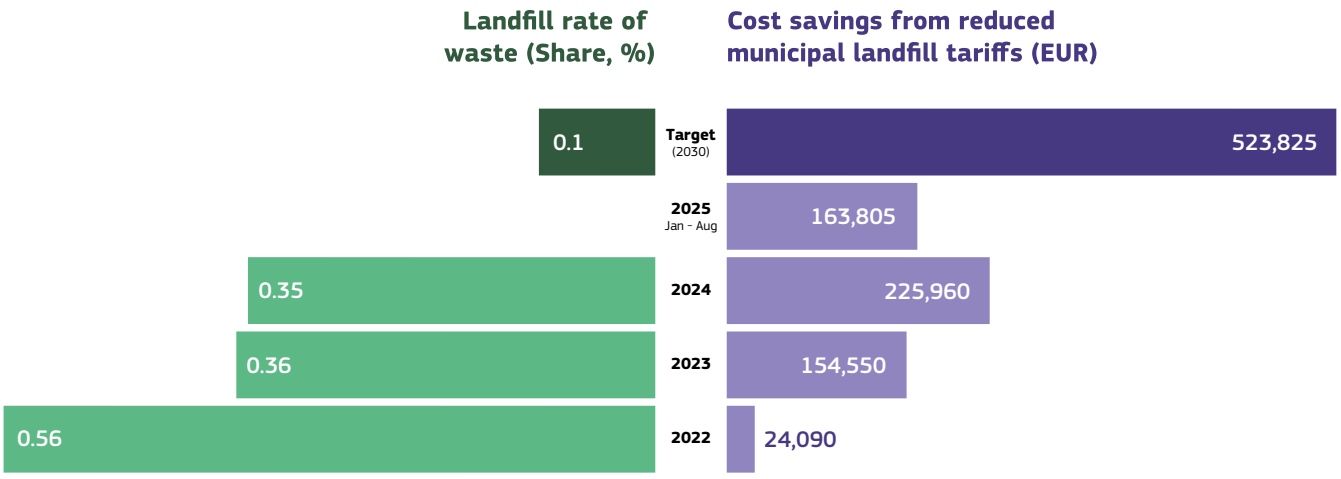
The main result is the increase in the separate collection rate of biowaste, measured as the ratio between the amount of biowaste collected and the total amount of biowaste produced annually (estimated at 21 643 tonnes). **This rate reached 35% in 2024** (See figure1).

A significant environmental achievement has been the substantial reduction in landfill use, evidenced by key impacts. **The decreasing landfill rate of waste** - that is, the ratio between the amount of waste sent to landfill and the total amount of urban waste generated - reflects the municipality's progress toward more sustainable waste management.

This environmental improvement directly translates into a **reduction in municipal expenses**, as less waste sent to landfill results in lower payments of landfill tariff. As of August 2025, savings for the year had already reached €163 804.90. (See figure2)

This positive trend is reinforced by the growing amount of biowaste diverted from landfill and **converted into compost**, increasing from 1 095 tonnes in 2022 to 6 182 tonnes in 2023, and reaching 7 532 tonnes in 2024, with 4 680 tonnes already recorded by August 2025. The municipality aims to achieve 20 953 tonnes by 2030.

### Figure 2: Impacts of increased separate bio-waste collection




Awareness-raising activities also generated notable results. From 2022 to 2024, 728 awareness-raising actions and campaigns were carried out, involving 1 416 participants. A total of 41 schools took part in environmental education projects, and 1 838 children were reached through pedagogical activities. An example of a waste reduction scheme implemented in this period in Guimarães is the Ecobox initiative, where restaurants offer customers free sustainable containers to take home leftovers and reduce food waste. To date, 19 restaurants have joined and 11 000 Ecoboxes have been delivered. At the policy level, Guimarães integrated a total of 2 legislative incentives in this period: Pay-as-you-throw (PAYT) scheme and Save-as-you-recycle (SAYR) scheme.

## Market readiness/business model:

A business model in this context would centre on the valorisation of waste, turning what is regarded as an environmental and economic burden into a valuable product and revenue opportunity. Several business model approaches could be envisioned. For example, one option is the conversion of biowaste into organic fertiliser through mechanical-biological treatment and composting. The resulting fertiliser is then commercialised and distributed to both large-scale farms and local farmers. The revenue is collected by RESINORTE, the multi-municipal company, which receives the fertiliser free of charge, commercialises it, and retains the annual profit.

## Success story

In Guimarães, the City Council is setting a benchmark in biowaste management by applying a clear, phased methodology that ensures steady yet ambitious progress. Through a structured 3-phase approach (covering 40% of the population by 2023, 48% by 2024, and full coverage by 2028), the municipality is rapidly rolling out separate biowaste collection across households, schools, HoReCa, and even the agricultural sector.

This methodology enables Guimarães to act progressively, while maintaining a remarkable pace of achievement. Already, compost from households and green waste is being reused locally, organic fertiliser is valorised for agriculture, and energy recovery from waste is heating schools. By combining prevention, valorisation, and awareness-raising campaigns, the city is transforming waste into high-value resources while engaging citizens and businesses alike.

# Challenges and Lessons Learnt

## Enablers to implementation

- **Political:** The Municipality of Guimarães views the transition from a linear to a circular economy as key to decarbonisation and operating within planetary boundaries. To this end, it developed the RRRCICLO circular economy strategy, which prioritises biowaste through the principles of refuse, rethink, reduce, reuse, repair, recycle, and recover.
- **Governance:** The Guimarães 2030 Governance Ecosystem links the City Council, academia, citizens, and private businesses. A municipal-led task force integrates innovation, waste and resources, citizen awareness, and mobilisation. Within this framework, a bioeconomy focus group highlights circular waste management technologies, especially for biowaste.

## Barriers to implementation

- **Social:** Variations in socio-demographic characteristics and waste generation habits across different area typologies create disparities in biowaste collection and increase its complexity.
- **Technical:** The diffuse territory and mixed land uses lead to challenges in optimising collection routes, timing, and adapting solutions for both urban and rural contexts.
- **Legal:** Insufficient legislation and regulations to incentivise circular practices, such as rewarding citizens or fostering private sector adoption, create barriers to wider implementation.
- **Economic:** Insufficient support for the private sector in developing innovative circular products, combined with the absence of regulations encouraging the adoption of circular principles, results in a limited supply of circular products available for municipal procurement.

## Lessons learnt

- In Guimarães, the political diversity across 48 parishes initially made it difficult to secure broad support and define an effective biowaste collection strategy. Establishing annual meetings with parish councils proved essential for building alignment, sharing progress, and addressing operational challenges. Complementing this with training, communication materials for citizens, pilot schemes in selected parishes, and operational support created stronger collaboration and smoother rollout. This experience shows that **structured dialogue and tangible support tools are critical to foster collaboration and ensure effective implementation in politically fragmented contexts**.
- In Guimarães, a key challenge was the lack of citizen awareness and engagement, making it necessary to continuously develop strategies that reach all 156 830 inhabitants. The municipality responded with recurring communication campaigns (via social media, notice boards, and public transport), targeted household booklets with reminders for correct practices, and direct outreach to residents with underused composting containers. In parallel, educational programs in schools, initiatives in disadvantaged areas, local workshops on home and community composting, and continuous collaboration with local farmers to share and map best practices were introduced. This demonstrates that **sustained, diversified, and tailored communication, adapted to different population groups, is essential to mobilise citizens and secure their active participation throughout all stages of the separate biowaste collection roll-out**.
- In Guimarães, the diffuse territory with diverse land uses and socio-demographic profiles created variations in biowaste generation, practices, and complex collection routes. This challenge was addressed through a tailored collection approach adapted to each area's specific characteristics, optimising efficiency and adaptability. By considering factors such as street dimensions, building types, and local context, the municipality was able to determine whether proximity collection points or door-to-door collection were more suitable. The experience shows that **flexible, context-specific collection strategies are essential when operating in heterogeneous urban and territorial settings**.
- Mapping the agricultural sector, mobilising farmers, and identifying suitable valorisation pathways for organic waste proved a significant challenge in Guimarães. The 360.come project addressed this by mapping local farmers and developing a visualisation platform to start to engage stakeholders. Building on this, supported through the CCRI External Expert Scheme, Guimarães carried out a material-flow analysis to assess crops, production volumes, residue management practices, and opportunities for valorisation in local industries. The experience highlights that **combining data-driven analysis with stakeholder engagement is key to unlocking circular approaches in the agricultural sector**. Ongoing activities continue to strengthen farmer involvement and support with identifying best valorisation routes.

# Tips for replication

## What to replicate?

1. The methodology developed and applied for the roll-out of separate biowaste collection across all parishes (with the integrated application of PAYT and SAYR incentive schemes).
2. The methodology for raising awareness and engaging different population groups.

## Who can replicate this?

Regional and local authorities with established waste systems, especially in areas of diffuse, mixed urban-rural, or diverse land use patterns.

## What ingredients are needed to replicate it?

- **Clear governance and coordination:** Define a clear governance structure to coordinate responsibilities between local authorities, waste operators, and community stakeholders. Establish clear roles, accountability, and monitoring mechanisms early.
- **Regulatory and policy alignment:** Ensure alignment with relevant national and EU regulations and adapt local bylaws where needed.
- **Solid financing framework, at minimum for the pilot stage:** Secure investment in waste collection infrastructure, logistics, and communication campaigns required for the initial roll-out phase. Continue mobilising funding progressively, in parallel with implementation activities.
- **Local adaptation and engagement:** Develop context-specific collection strategies based on local waste streams, territorial characteristics, and socio-demographic profiles. Design inclusive awareness and engagement campaigns to foster participation and trust across diverse communities.