

LIFE BIOBEST

GUIDING THE MAINSTREAMING OF BEST BIO-WASTE RECYCLING
PRACTICES IN EUROPE

D3.4: Country Factsheets on the analysis of communication and engagement practices

WP3: Set of Guidelines

T3.4: Analysis of communication and engagement practices

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Public Report



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1 Document attributes

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1.1 Document Management Control Sheet

Table 1. Document Management Control Sheet

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1.2 Document Revision History

Table 2. Document Revision History

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0.1	15/09/23	1 st Draft	Document created as first version to be distributed	ZWE – Manon Jourdan
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0.4	29/04/24	4 th Draft	Peer reviewers' contributions in track changes and notes	ACR+ & ENT
0.5	16/05/24	3 rd Draft	Revision to include reviewers' contributions	ZWE – Manon Jourdan & Jack McQuibban
0.6	17/05/24	3 rd Draft	Final comments included and sent to project leader	ZWE – Manon Jourdan & Jack McQuibban
0.7	20/05/24	4 th Draft	Initial linguistic and format revision	ENT – Mike Stinavage & Gemma Nohales
0.8	29/05/24	5 th Draft	Revision to advance open issues and formatting	ZWE – Manon Jourdan & Nanna Cornelsen
0.9	30/05/24	Definitive/ Approved	Definitive and approved version to be submitted	ENT – Mike Stinavage & Gemma Nohales
1.0	20/06/24	Submitted	Submitted to Participant Portal in PDF	ENT – Gemma Nohales

1.3 Guideline overview

The primary objective of these factsheets is to highlight the significance of behavioural factors in enhancing engagement in effective bio-waste management models. It aims to showcase a range of different communication tools and strategies that cities and regions have introduced during the implementation of bio-waste separate collection. Each provides a unique perspective on how different communication techniques can be effectively used to support households and businesses successfully engage in effective bio-waste management models.

Drawing from interviews and data analyses across various local, regional, and national contexts, this document aims to present some of the best communication and engagement practices found in Europe that contribute to enhancing the quality (reducing the percentage of impurities) and quantity (increasing the percentage of the population participating) of bio-waste.

Comprising a series of ten factsheets, each drawn from various examples across the EU, this collection provides detailed case studies of successful communication and engagement interventions. These strategies are designed to promote the separate collection of bio-waste by both citizens and businesses. Each factsheet is an independent annex, available for consultation and download.

However, to enhance understanding of the main lessons learned from the different cases, an overview table describing the key aspects of each case is provided. This is followed by a section summarising the lessons learned and related recommendations, aimed at supporting the design and execution of effective communication interventions at the local level, thereby improving the performance of the bio-waste separate collection system.

The cases included in **Annex 1: List of Factsheets** span various contexts (urban, semi-urban, rural, touristic) and administrative levels (municipal, regional), to provide readers with strategies adaptable to different geographical and administrative environments.

1.4 Acronyms

Table 3. List of Acronyms

Acronym	Term
ARC	Catalan Waste Agency
BP	Best Practice(s)
BW	Bio-waste
D-t-D	Door-to-door
EPR	Extended Producer Responsibility
FW	Food waste
GW	Garden waste
Ho.Re.Ca.	Hotels, Restaurants and Cafeterias
KPI	Key Performance Indicator
KW	Kitchen Waste
L	Litre
MS	Member State(s)
MSW	Municipal Solid Waste
PAYT	Pay-as-you-throw
RFID	Radio-frequency identification
wk	week
yr	year

1.5 LIFE BIOBEST Project Summary

EU obligations on the selective collection of bio-waste came into force at the end of 2023, increasing the availability of source-separated bio-waste for composting and anaerobic digestion. To ensure the development of bio-waste management best practices and the production of quality compost and digestate for soil applications, while minimizing any negative effect and closing effectively the loop, a comprehensive analysis is required regarding bio-waste management strategies, instruments and management schemes and their results given that large disparities exist among experiences in the EU.

The LIFE BIOBEST project aims to identify and validate the current Best Practices (BP) and management instruments along the bio-waste management chain (from generation to treatment) that allow the production of quality compost and digestate and establish a series of reference Key Performance Indicators (KPI), based on the analysis of existing databases and experiences. In a policy brief about barriers and through interconnected co-creation meetings with relevant expert stakeholders of the sector, solutions will be provided to overcome the identified technical, regulatory, economic and environmental barriers to widely adopt the proposed BPs.

Four guidelines and a comprehensive EU-wide guide will be created, together with two decision-support tree guides for local and regional authorities to adapt bio-waste management models to their specific context, offering feasible BP and management instruments to promote efficient collection and subsequent recycling of bio-waste into quality compost and digestate.

By means of an analysis of the input materials, treatment practices, resulting compost and digestate quality, a proposal for premium European standards for biological waste entering composting and anaerobic digestion will be developed with the ultimate goal of promoting the certification of these materials and treatments, guaranteeing optimal management processes and a safe, beneficial return to the soil.

The outcomes of LIFE BIOBEST will promote a significant improvement of the collection and treatment systems, and consequently of the quantity and purity of the input material, reducing process rejects and favouring the conversion of bio-waste into high-quality compost and digestate.

The LIFE BIOBEST consortium is led by [Fundació ENT](#) (ENT) in partnership with [Consorzio Italiano Compostatori](#) (CIC), [ACR+](#) (Association of Cities and Regions for sustainable Resource management), [European Compost Network](#) (ECN) and [Zero Waste Europe](#) (ZWE). It is a 2.5-years LIFE Preparatory Project funded by the European Commission.

Project Total Eligible Costs: 1,664,600.07, Funding Rate: 90%, Maximum Grant Amount: €1,498,140.05.

1.6 LIFE BIOBEST Guidelines

In conjunction with the January 2024 EU separate collection mandate, the LIFE BIOBEST project investigates various facets of bio-waste management ranging from separate collection, implementation of recycling strategies, processing systems and related management options in order to create high-quality compost and digestate products.

To support upper-level authorities and decision makers in streamlining policy measures and lower-level authorities in implementing solutions, LIFE BIOBEST presents four bio-waste management guidelines. Together, these guidelines offer a strategic vision and practical approaches crucial to effective bio-waste management.

The goal is to provide guidance and support for optimising implementation of the EU obligation with evidence from high performing schemes and with the definition of performance indicators. This guidance may be applied to all the involved actors in the system to maximise the potential contribution of bio-waste to circular economy and related EU targets. Whether municipalities are in the initial stages of bio-waste implementation design or an advanced state of management, these guidelines provide a point of reference for policy and decision-makers, local authorities, waste haulers, recycling entities, and technical practitioners.

This work is crucial to promote the collection of large quantities of high-quality bio-waste in order to produce quality outputs such as compost, digestate, and biogas. Given the diversity of local contexts, these guidelines provide a comprehensive outlook on bio-waste management as well as existing Best Practices from a number of EU countries where management instruments are successfully applied.

The four LIFE BIOBEST guidelines are:

- **D3.1 Guideline on separate collection** provides an overview of the different bio-waste separate collection schemes and assesses the pros/cons. This guideline includes a set of Best Practices that focus on collection from households and other producers in various contexts.
- **D3.2 Guideline on governance and economic incentives** discusses the governance tools and economic instruments needed to improve management schemes. The guideline presents these instruments alongside examples of their application and includes an analysis of the economic viability of Best Practices in bio-waste management from separate collection to treatment.
- **D3.3 Guideline on quality compost and digestate** breaks down the treatment technologies and resources that support the production of compost and digestate. The guideline provides insights about the processing options, analysis of product characteristics, quality assurance systems as well as related EU legislation and the ECN quality assurance scheme.
- **D3.4 Factsheets on the analysis of best practices in communication and engagement from various countries** delves into the topic of public



communication and education. Public participation and awareness are key complementary issues to management schemes. This guideline includes an analysis of experiences from frontrunners and gives insight about impacts of communication activities.

The backbone of these guidelines is the empirical knowledge of the LIFE BIOBEST consortium and the successful experiences and instruments provided in each document. Taken individually or as one, these guidelines contain information key for institutions and stakeholders in the bio-waste value chain.

2 Introduction

Whilst bio-waste prevention programmes should be actively pursued by municipalities, it is inevitable that household food waste will be generated. Efficient separation, collection and recycling of bio-waste (including both kitchen waste and garden waste) is therefore a key element of an effective European waste management strategy. In compliance with the revised Waste Framework Directive (Directive 2018/851/EU, §10), Member States (MS) must implement separate bio-waste collection or recycling at the source by December 31, 2023. MS should therefore support the local implementation of well-performing bio-waste collection systems that go beyond just mere compliance with the EU regulation, as they offer significant environmental benefits, such as improving soil health and reducing the need for chemical fertilisers.

Well-designed communication interventions and engagement practices are crucial for improving the performance of bio-waste collection schemes. However, ensuring the successful implementation of such interventions can be challenging for local authorities. Several complementary factors play a part in the success of an information/awareness-raising campaign, including its timing and frequency, the language used, the content and visual design of communication materials, preferred distribution channels, and the presence of incentives or penalties. There is therefore significant room for improvement in these interventions beyond merely providing sorting instructions to users. Targeted enhancements in these areas could increase the quantity and quality of bio-waste collected.

By synthesising a wealth of successful practices from diverse EU contexts, this guideline seeks to equip policymakers and waste management authorities with adaptable tools to effectively promote bio-waste separate collection and enhance citizen's participation.

2.1 Diversity of contexts highlighted

Drawing from a rich tapestry of examples across the EU, this document will present ten factsheets which can be found in the appendix and downloaded independently. Each factsheet meticulously showcases examples of successful communication and engagement practices, cutting across different EU regions and offering insights from various contexts (urban, rural, touristic) and levels (municipal, regional, national). By presenting such a diverse array of practices, our aim is to provide adaptable and insightful strategies that can be tailored to different geographical and administrative contexts

2.2 Scope of the document

The following ten factsheets focus mainly on kitchen waste, as its separate collection presents challenges and requires a unique approach. Kitchen waste is generated daily by households and other large or commercial producers in significant volumes, presenting a risk of contamination with other materials (e.g. plastics) and can emit odours when not stored or managed correctly. Effectively changing habits related to the sorting of food

waste at source requires sustained and effective communication strategies, which must supplement the implementation of individualised and efficient collection systems, to deliver their full potential.

Such strategies encompass a spectrum of activities, including campaigns, informational tools and materials, awareness-raising initiatives, workshops, surveys and interviews, as well as various other impactful methods designed to foster behavioural change, promote bio-waste separation, and get feedback from the users (i.e. households, businesses and institutional activities) so as to address critical aspects and consider possible fine-tuning of the system.

2.3 The importance of well-designed communication and engagement practices

Incorporating insights from behavioural economics appears essential when crafting a communication intervention, as it examines how psychological, cognitive, and emotional factors shape decisions and behaviours.

Some studies within that field, have shown positive outcomes from information interventions crafted around social norms. "In economics, interventions based on social norms have proved to be effective in changing individuals' choices in laboratory studies and field 2 experiments" (Schultz et al., 2007; Sliwka, 2007; Shang and Croson, 2009).

For instance, descriptive social norms, such as "join your neighbours, recycle your food waste," has been shown to be very effective in promoting positive environmental behaviours compared to using normative injunctive messages like "protect the environment by sorting your food waste" (Nolan et al., 2008).

Some field research, such as the study conducted in [Hökarängen, Sweden](#) (presented in annex n°10), further supports the efficacy of communication and information interventions rooted in behavioural economics insights. This research highlights the effectiveness of well-informed communication strategies in promoting kitchen waste sorting among households, emphasizing the importance of leveraging behavioural insights in waste management initiatives.

2.4 Approach

The methodology employed by Zero Waste Europe with assistance provided by LIFE BIOBEST consortium partners and other parties, to create this guideline on communication and engagement best practices, followed a systematic approach that is described below:

- A set of transversal questions was prepared by Zero Waste Europe to help facilitate specialised data collection from the different cases studied. These questions covered both qualitative and quantitative aspects, such as key elements of the local context before the initiative begun, the key facts around the bio-waste



collection system, the communication activities implemented, as well as key data on the outcomes these actions had;

- For each of the case studies, the questionnaire was adapted to reflect the specifics of each case, before being shared with the key local actors involved;
- The data collected via the questionnaires was supplemented further by one-to-one online oral interviews held in some circumstances with the key stakeholders, to help extract further important bits of information and context, ensuring the factsheet truly reflected the local reality in each case study.

3 Overview table

Table 4. An overview of the factsheets produced as part of this publication

Region	Country / Region	Case	Scale	Type	Best Practices
Southern Europe	Italy	1. Parma	Municipal	Urban	<ul style="list-style-type: none"> Diversity of communication activities & resources supporting bio-waste collection Effective ways of engaging foreign residents and communities Effective community consultation and engagement methods
		2. Milan			
	Catalonia	3. ARC	Regional	<ul style="list-style-type: none"> Creative communication campaigns, visuals and resources to promote bio-waste sorting among local population Communication requirements for grants to local authorities. 	
		4. Pallar Sobirà	County	Rural & touristic	Communication activities & resources to promote community composting programme among households
Southeast Europe	Croatia	5. Krk	Municipal	Rural & touristic	Diversity of activities, resources and incentives to promote bio-waste sorting among the local population and tourists

Region	Country / Region	Case	Scale	Type	Best Practices
Central Europe	Slovakia	6. Bratislava	Municipal	Urban	City-wide communication pilot project to promote citizen participation in the newly introduced D-t-D bio-waste collection scheme
		7. Partizánske		Semi-urban	Communication pilot projects to promote household composting in single-unit homes and citizen participation in the new bio-waste collection system (D-t-D)
	Germany	8. Kreis Borken	District	Semi-Rural	Visual inspections, penalty system and targeted campaign to reduce impurity levels in bio-waste bin
Western Europe	Ireland	9. Sligo	Municipal	Semi-urban	Communication pilot project assessing the impact of specific educational and collection tools on the performance of the bio-waste collection system
Northern Europe	Sweden	10. Hökarängen	District	Urban	Field study on the effects of an information intervention, rooted in behavioural science, on improving households sorting behaviour

4 Lessons learned and recommendations

The objective of communication and engagement interventions targeting citizens is to enhance both the quantity of the bio-waste collected (measured in kilograms per inhabitant per year) and its quality (measured by the percentage of impurities in the bio-waste fraction).

Adhering to key elements regarding communications during both the design and implementation phases is essential to ensure the success of such interventions. Although each of the ten specific cases presents unique characteristics linked to their local context (this diversity was deliberately included to offer readers a comprehensive array of examples across various contextual condition), valuable lessons and general recommendations can be drawn for the design and implementation of a successful communication and engagement strategy, transferable to any particular context.

Firstly, while promoting environmentally sustainable behaviours like bio-waste sorting can pose significant challenges, particularly in urban settings, insights from behavioural economics can, and should, be effectively applied to the design of the collection schemes. These include some key learnings:

- As the [EAST framework](#) suggests "people are more likely to adopt behaviour changes that are '**Easy, Attractive, Social and Timely**'" (BIT, 2014) relying therefore on habitual or fast thinking to take decision. When applied to bio-waste management, this insight demonstrates the importance of user-friendliness and convenience in sorting schemes, turning "waste sorting habits more appealing in terms of individual gains (...) than the option of not sorting waste" (Thaler & Sunstein, 2008). The widespread free distribution of "CCC (Clean Comfortable Compact)" collection tools, such as paper or compostable plastic bags, as well as kitchen caddies or caddies, in most of the cases presented, addresses this need. The provision of these items has proven to be a prerequisite for the success of a bio-waste collection programme, often identified by citizens as a "must-have" to promote participation.
- Another important insight from the field of behavioural science is the concept of **loss aversion** which suggests that losses and disadvantages have greater impact on individual preferences than gains and advantages (Tversky, A. & Kahneman, D., 1991). Variable charging schemes as presented in various factsheets can leverage this cognitive bias to encourage desired behaviours. Such tools perform better when associated together with **incentives and rewards** to motivate participation and compliance with waste management regulations (ex: rebates for households practicing home composting or reductions in fees for households generating less waste via PAYT systems as further elaborated in the specific [LIFE BIOBEST D3.2 Guideline on governance and economic incentives](#)).
- When behaviours are showcased, or at least made available for others to review, then studies show this is an important trigger for making individuals change their behaviours. For example, if other members of a community can **see how an**



individual is behaving (e.g. via comparison tools or simply by the bins placed on a street) then this identification helps encourage citizens to do the right thing. For this topic, this is especially relevant when comparing door-to-door collection models, which provide individual identification, versus open street containers where people anonymously leave their waste.

- Finally, and significantly, one of the key concepts in this field is the effectiveness of messages crafted around **social norms** to influence one's behaviour (Nolan et al, 2008). Human actions are indeed largely influenced by our perceptions of the popularity of certain behaviours, increasing the likelihood of individual engagement if others also participate or if societal expectations endorse the behaviour. For instance, using a 'descriptive social norm,' which focuses on commonly performed behaviours (thereby incentivising such behaviour, has been effective in encouraging people to save energy or water. For example, Allcott (2011) noted that comparing one's electricity use to neighbours' averages led to a 2% decrease in consumption.

These insights are valuable for authorities which want to design effective communication interventions that use messages with descriptive social norms to promote proper sorting of bio-waste and boost citizen participation. When creating campaigns or specific informational tools like leaflets or flyers to encourage bio-waste sorting, local decision-makers should consider these factors. Certain formulations can indeed be more persuasive than others and deliver results in a cost-effective manner.

Furthermore, dedicated campaigns are essential to support the rollout of a scheme and promote participation among residents, as presented in most factsheets. Yet, as revealed in most of the cases, **one-time communications (e.g. a campaign) must be combined with regular or continuous interventions** (e.g. bin inspection by an eco-patrol) to maintain system performance over time, focus and engagement from the community after the initial implementation.

In simpler terms, **consistent communication efforts and tools** are key for achieving lasting positive outcomes. This emphasises the importance for local and regional authorities to allocate a dedicated portion of their annual waste management budget to the design and implementation of continuous communications. Examples from around Europe would advocate for at least 5-10% of waste budgets being dedicated for this activity. Establishing user-friendly apps or webpages with accessible information and updates should be utilised alongside more traditional information sources. Moreover, it's crucial to complement these initiatives with well-trained staff who can support citizens effectively and monitor the system's performance.

The success of a communication intervention greatly relies on its adaptability, **versatility and inclusivity**. Such strategies must consider the diversity of a community, whether language, age or other key factors. An exemplary practice ensuring high engagement across all population segments in a diverse city like **Milan**, which is home to many ethnic groups and students, was the translation of separate collection instruction flyers into more than 10 languages and their individual delivery.

Moreover, all cases highlighted in this document ensured the development of both digital and analogue resources suitable for **dissemination across multiple channels**, including media, websites, apps, and mailboxes. This approach aimed to reach the broadest possible audience, avoiding exclusive reliance on social media for crucial announcements. Visual elements such as images and infographics were incorporated to enhance comprehension and engagement with the information.

The implementation of regular consultation programmes with citizens or feedback systems (e.g. annual surveys) is a key component of a successful communication and engagement strategy. Indeed, one of the most common barriers preventing good bio-waste sorting is an ongoing lack of understanding or belief that the system is not working in the interest of citizens. This often stems from the absence of communication channels and transparency between local authorities and citizens. Meanwhile regular consultation with citizens can have the positive effect of capturing feedback on why citizens don't engage, so that messages and communication methods can be adapted to change behaviours for the better.

Some examples of what this looks like in practice are:

- **Engaging both economic actors** producing bio-waste **and the general public** in the design phase of the collection system can foster a greater sense of ownership and encourage active participation, as well as leading to better results by ensuring the system is best tailored to the local needs of the community;
- **Continually monitoring results** and **maintaining complete transparency** about the progress being made (for example by publishing this publicly online), as well as the challenges the municipality faces, can simultaneously reinforce trust in the system and lead to optimisations being made to the system through greater feedback from users;
- **Conducting regular surveys to assess citizens' opinions and concerns** can foster a desire to engage in the system. Additionally, it provides useful information about users' needs and expectations to improve further communication and informational materials. Importantly, it demonstrates that feedback is welcomed, acknowledged, and acted upon to improve the scheme whenever feasible. This approach can also showcase strong community support for the initiative, mitigating the impact of a vocal minority amplified by local media, which can otherwise raise concerns among decision-makers.

As noted in several of the cases mentioned in this report, successful city-wide programmes often begin with pilot projects in select neighbourhoods. Testing a new system with a much smaller group of households and businesses has proven to be effective, as it allows for greater levels of feedback & interaction between system provider and user, resulting in the end system (product) being much more tailored and therefore likely to succeed.

In other cities, these pilots have then been expanded gradually across the whole community, rather than instantly changing the system for the entire population overnight.

In each example, sufficient investment & time given to communications and feedback from the population has been key to the success of the pilot.

Finally, as observed in **Sligo** and **Kreis Borken**, effective education and awareness programmes conducted by local authorities in close collaboration with local waste collectors, is key to the success of the intervention, particularly in reliable data collection. Regular meetings between the local authority and waste collection companies should be conducted before and during programme implementation to ensure alignment with the operational realities of the collection service.

Waste collectors can indeed play a pivotal role in communication activities – for example by conducting inspections and rejecting any non-compliant bins or bags, or through face-to-face interactions with users that can provide useful support to answer immediate questions on the doorstep. As a result, this can enhance the effectiveness and efficiency of the waste management systems.

Table 5. Summary table of the main lessons-learned

Lesson	Analysis
<p>The convenience of the collection system is key</p>	<p>Well-designed communication and engagement interventions must be complemented by a convenient collection scheme to truly foster citizen participation. The "hardware" components (such as the design of the scheme and its user-friendliness) and the "software" components (such as communication and education) are therefore highly complementary.</p> <p>Regarding the hardware aspect, essential tools like collection kits, including kitchen caddies and compostable bags, can be provided and regularly replenished by the municipality. These tools have proven to be highly efficient, as they make "doing the right thing" easier for users than not separating waste at all.</p>
<p>Use behavioural science learnings to your advantage</p>	<p>Many important lessons can be drawn from behavioural science studies to improve the persuasiveness of the communication tools designed to influence positively user's behaviours. For example, the notion that individuals often prefer avoiding losses over receiving equivalent gains, or that visualising one's behaviour for others to see nudges people into actions that are deemed the social norm.</p> <p>In this respect, it is essential that local authorities, before designing a potential campaign, investigate the factors that may influence citizens' understanding of and participation in bio-waste sorting, in order to better understand the barriers to and motivations behind greater engagement.</p>



Lesson	Analysis
<p>Adapt your communications to the specifics of the community</p>	<p>The success of a communication intervention greatly relies on its adaptability, versatility and inclusivity. Such strategies must consider the diversity of a community, whether language, age or other key factors such as digital literacy, in order to reach all population segments.</p> <p>The language used must be kept simple. It is important to always communicate from a user perspective.</p>
<p>Ongoing consultation with citizens</p>	<p>Pre-consultations, ongoing in-person meetings and online surveys are all useful tools to keep citizens engaged and to ensure feedback is collected that can help create the right collection systems and/or improve what is in place.</p> <p>Transparency about the results obtained helps to increase user confidence in the system and their willingness to sort their waste.</p>
<p>Frequent & meaningful</p>	<p>One-time communications (e.g. a campaign) must be combined with regular or continuous interventions (e.g. bin inspection by an eco-patrol) to maintain system performance over time, focus and engagement from the community after the initial implementation.</p>
<p>Start small & gradually roll-out the new system</p>	<p>Begin with pilot projects in smaller areas of the municipality to test the communications method and new system, before gradually scaling up across the rest of the city.</p>
<p>Partnerships</p>	<p>Close collaboration with waste companies before and throughout, ranging from conducting inspections on sorted materials to data collection.</p>

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Annex 1: List of Factsheets

- N°1 – Country Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Italy: Focus on Parma
- N°2 – Country Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Italy: Focus on Milan
- N°3 – Country Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Spain: Communication strategies of the Waste Agency of Catalonia
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N°1: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Italy: Focus on Parma

Italy has a long-standing track record in separate collection of bio-waste, whose obligation was anticipated by the national government to 1 January 2022. While collection of kitchen waste is common in small Italian municipalities, the country also hosts a few remarkable examples of separation of kitchen waste in big cities such as Parma. Parma's door-to-door (D-t-D) waste management system stands out as a prime example of how proficient communication strategies support the achievement of good results.

Utilising a range of communication channels, Parma ensured accessibility and understanding of the key pieces of information across its population. Creative approaches like video clips and school contests further enhanced awareness and participation. Incentives such as variable charging schemes and rebates further reinforced positive behaviours, making Parma's waste management programme a model for other regions seeking to implement a successful separate collection of bio-waste.

PARMA

Population (inhab.)	Density (inhab./km ²)	Type
198,292 (2020)	760	Urban

Background elements

Parma adopted D-t-D collection, including separation of kitchen waste, throughout 2012-2013. This was followed in 2015 by the introduction of a PAYT scheme, which was designed based on the number of set-outs of residual waste - how many times a household puts out the residual waste bin per year. The scheme has, ever since, made Parma into one of top performers in recycling among cities of a similar size across Italy and Europe.

Parma is host to many domestic and international students, as well as immigrant workers, which necessitates communication with foreign communities, in the case of waste collection services just as in any other angle of the municipal services.

Bio-waste collection model

The system involves D-t-D collection of kitchen waste, utilising either caddies or 2-wheeled bins depending on the building type. Detached houses typically use caddies, while high-rise buildings accommodating many households use bins. At home, residents employ vented kitchen caddies and compostable bags to initially collect and store kitchen waste. Once these bags are full, they are placed into larger caddies or bins, which are then set out at the D-t-D on designated weekly collection days.

In line with most Italian waste management programmes, garden waste is not mixed with kitchen waste. Instead, it has its own separate collection scheme, which involves large road containers or Municipal Recycling Centres.

Regarding the hardware aspect of the system, essential tools (collection kits) required for participation in the scheme are provided and regularly replenished by the municipality. For bio-waste, this includes an annual supply of compostable bags provided free of charge to residents. Additionally, vented kitchen caddies and wheeled bins are supplied at no cost.



Image 1. Vented kitchen caddy (right hand) and (inside it) compostable bags used for collection of kitchen waste; tagged caddies (centre) and tagged bags (left) adopted to collect residual waste, under a variable charging scheme (PAYT; the delivery of one bag/bucket is detected through receivers and displayed on the square tool).

Best Practices description

1. Population and stakeholder engagement

One fundamental change brought in by the new scheme was shifting from “bring systems” (based on large road containers) towards D-t-D collection. Various activities involving stakeholders and the population were conducted to maintain

high levels of commitment and address any issues, before, during and after the implementation of the D-t-D scheme.

- Initially, **25 public meetings** were organised across different neighbourhoods, with participants including members of local associations, schools, foreigners, and condominium administrators.
- A **dedicated programme targeted local businesses**, including monthly meetings on D-t-D collection effectiveness. Feedback from these meetings, such as concerns raised by bars and restaurants in the city centre about limited space, led to adjustments by the waste management company IREN, including increased bio-waste collection frequency.
- **Ongoing consultation programmes** with citizens and businesses were facilitated by appointed waste officers (*informatori*) during the delivery of new tools, such as the recent replacement of initial used bags for residual waste with caddies in the city centre.



Image 2. Front page of the booklet for foreigners.

Source: Parma [website](#)

2. Awareness-raising activities and challenges

Outreach and communication were deemed essential for the scheme's effectiveness, with communication/education regarded as the "software" complementing the "hardware" of the system. The involvement of city officials, local associations, and testimonials, including the mayor and deputy mayor, emphasised the importance of behavioural change. Transitioning from "bring systems" to D-t-D collection required dedicated communication efforts, such as the creative video, [the funeral of the last road container](#), involving prominent sport clubs and associations.



Image 3. Screenshot from video clip “the funeral of the last road container”.

Source: YouTube [video](#)

According to local decision-makers, one of the most effective awareness-raising initiatives was the project targeting all schools of Parma, titled "[Rifiuti? Risorse!](#)" (which may be translated to “waste? nope, resources!”). Which was carried out in cooperation with a local association of citizens, and all the students’ population starting from kindergarten to universities were involved in a contest, which awarded every year the best performance, at various educational levels, in separating waste, across all schools/universities in the city.

Addressing turnover in the population, particularly due to immigrant workers and university students (which are roughly 10% of the total population), required targeted actions, such as producing multilingual materials and prioritising digital communication channels alongside traditional methods:

- Given the “digital native” nature of students, a particular attention was paid to digital communication (social media, dedicated apps and internet portal), besides the traditional ones (tv, press, letter from the mayor, flyers, canvassing, above all during the delivery of tools, temporary and permanent info points, contact centre).
- On its [website](#) the city provides all needed information to households and businesses. The site includes links to the following:
 - A **practical guide to separate collection**, which includes all basic instructions, various channels (e.g. toll-free telephone numbers, dedicated apps and websites, information desks, and related contact details) to get more info from the city or the waste management company.
 - A **booklet for foreigners**, titled Separate Collection Speaks All Languages, with **basic instructions in 6 different languages** (besides Italian) and references to other channels to get more details.

3. Participation and economic benefits

Participation in the scheme, which is stipulated as mandatory by the municipal waste regulation, also brings economic benefits for the participating households and businesses. The adoption of a variable charging scheme (PAYT) based on the number of set-outs of residual waste, implies savings for those who separate most and by default generate less residual waste. Furthermore, an additional rebate of 12% is granted to households who practice home composting.

4. Impact & outcomes

The combined effect of the scheme's implementation and educational programmes resulted in a reduction in waste generation and increased separate collection levels, positioning Parma as a reference for cities of similar size.

Key results

<p>Change in participation</p>	<p>The scheme was rolled out to cover 100% of the population and large producers (e.g. hotels, restaurants and catering businesses – Ho.Re.Ca. – greengroceries, bakeries, etc.). The reduced collection rounds for residual waste and introduction of a PAYT scheme, made the participation rate near 100% (apart from households practising home composting)</p>
<p>MSW separate collection rate</p>	<p>Notable progression over the years:</p> <ul style="list-style-type: none"> • 2011 - 46% • 2015 - 71% (following the full implementation of D-t-D collection) • 2021 - reached 82% (with the combined implementation of D-t-D collection and PAYT systems)
<p>MSW generation per capita (2022)</p>	<p>562 kg/inhab./yr A reduction of 4.42% compared to 2011, before implementation of D-t-D and PAYT, which was 588 kg/inhab./yr</p>
<p>Residual waste generation per capita (2022)</p>	<p>106.23 kg/inhab./yr</p>
<p>Bio-waste collection per capita (food waste only)</p>	<p>97.43 kg/inhab./yr</p>



<p>Impurities in bio-waste (% of weight)</p>	<p>3.2% impurities (in kitchen waste) (source: compositional analysis performed by CIC)</p>
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Lessons-learned

- **Stakeholder engagement** in a variety of activities throughout system deployment is essential. Organising public meetings and dialogue with local associations, schools, businesses and officials ensures a high level of commitment and enables critical issues to be dealt with quickly, thereby boosting confidence in the system.
- Moreover, **establishing regular consultation programmes** with citizens and businesses facilitates ongoing feedback collection and problem-solving. Dedicated waste officers can for example engage with households and businesses, address concerns, and gather insights for continuous improvement.
- **Tailored communication** to diverse audience groups is necessary, especially in culturally diverse cities like Parma. Providing information in multiple languages and addressing specific needs, such as those of immigrant workers and international students, helps ensure inclusivity and effectiveness of communication efforts.
- **Providing accessible and comprehensive information through various channels** is important to guarantee meaningful understanding and participation of all population segments. Utilising websites, practical guides, booklets in multiple languages, and digital platforms ensures information accessibility to diverse audiences.
- **Employing creative and engaging communication methods can enhance awareness and participation.** Initiatives such as video clips, contests in schools, and community events make waste management schemes more relatable and encourage active involvement.
- **Implementing incentives and rewards** is a complementary instrument to motivate participation and compliance with waste management regulations, such as the PAYT charge and the rebate of 12% granted to households practicing home composting.

N°2: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Italy: Focus on Milan

The bio-waste management system implemented in Milan serves as a pioneering model for urban areas worldwide, highlighting the critical role of effective communication strategies. Through targeted outreach efforts and digital tools such as the "PuliAmo" app, the programme ensures active community involvement and engagement. Emphasising the importance of clear communication, Milan's approach has not only achieved high levels of participation and satisfaction among residents but has also inspired similar initiatives globally.

MILAN

Population (inhab.)	Density (inhab./km ²)	Type
1,372,000 (2023)	7,551	Urban

Background elements

The proper management of food waste, separated at source, is a key element of Milan's [Food Policy for Sustainability](#). While separation of bio waste from the Ho.Re.Ca. sector and other large producers (e.g. green groceries, butchers) was rolled out in 1995, collection of bio-waste from households was introduced in 2012 through a D-t-D system, using 120 L containers and vented kitchen caddies with biodegradable bags. The presence of a dedicated space in each building proved to be fundamental to having a well-working, user-friendly (and therefore) high performing system also in high-rise buildings (where 85% of Milan's population resides).



Image 1. A typical "waste room" with various receptacles for collection of different waste fractions. The brown bin on the right-hand side is dedicated to kitchen waste.

AMSA's (public waste management company) management services reach 100% of all users within the boundaries of the MSW collection service, i.e. households, local businesses and open markets. The scheme captures approximately 140,000 tonnes per year of kitchen waste. Collected bio-waste is processed at AMSA's anaerobic digestion site, with a capacity of 100,000 tonnes per year, followed by composting to produce over 20,000 tonnes of compost annually, along with 8 million cubic meters of bio-methane.

Bio-waste collection model

Kitchen waste is collected through a dedicated D-t-D collection scheme, while large quantities of garden waste are delivered to municipal recycling centres located throughout the city.

Households receive a welcome kit upon activating new waste service accounts, which includes vented kitchen caddies (10 litres), EN 13432-certified compostable bags, and, if necessary, a bin for newly constructed buildings. Initially, a starter kit containing 52 bags was provided to cover six months of collection, but now residents can purchase compostable bags from various retailers, following the ban on conventional plastic shopping bags enacted in Italy in 2016. Damaged bins are replaced by AMSA as part of routine assistance, and a bin washing service is available upon request for a fee.



Image 2. The typical "starter kit", including the vented kitchen caddy (10 L) with a roll of compostable bags (right hand side) and (left) the wheeled bin (120 L) for the building – proportions are modified. *Umido* on the sticker translates wet waste, which is the common definition for kitchen waste in Italy.

Once the compostable bags are full, they are either transferred into larger caddies for single homes or taken downstairs to dedicated wheeled bins, each with a capacity of 120 litres. On average, one wheeled bin is shared by approximately a dozen households and

is placed in waste rooms or designated areas within the property. These bins are then placed outside the property on designated collection days, which vary depending on the neighbourhood. For large producers such as Ho.Re.Ca. and grocery stores organic, the collection frequency increases to six times per week.

Best Practices description

1. Outreach and raising citizen's awareness

The scheme's success hinges on its user-friendliness, which maximises participation. Factors contributing to this include specific collection tools such as user-friendly compostable-bags and a higher collection frequency compared to residual waste, making it convenient for customers to separate bio-waste. However, its effectiveness also relies heavily on ongoing communication and awareness-raising efforts to ensure that users understand and align their behaviours with the operation of the scheme:

- **Clear instructions were provided along with the delivery of the starter kits**, which preceded the scheme's rollout. This rollout occurred in four subsequent enlargement stages, spanning from November 2012 to June 2014, with each stage covering approximately 350,000 people. Due to the dynamic nature of the population, characterised by frequent movement in and out of the city, providing instructions to new inhabitants has been crucial for the scheme's success.
- The main communication channels and tools used are digital (social media), and traditional (flyers, billboard advertising, mail, posters).
- AMSA faces challenges in engaging the younger generation and involving foreign communities. Effective communication tools therefore include **multilingual advertising and posters**. For example, during the initial stages, AMSA translated separate collection **instructions into 10 different languages**, resulting in 180,000 individual deliveries to residents from foreign communities, fostering a sense of belonging and increasing their engagement in waste management practices.
- Given the complexity and size of the city, a key role is also played by a **dedicated app**, named "PuliAmo" which is a catchy play on words in Italian. In 2022, the app was used on average by some 3,000 users/month. The app provides all the needed information for citizens, with regards to:
 - the collection calendar in each area;
 - additional services, such as where the nearest municipal recycling centre is;
 - an inventory of "what goes where": instructions for how to separate various materials.



Image 3. A flyer providing instructions on compostable bags (left) and the booklets translated in 10 different languages with front adapted to portray users in the most appealing way for the different targeted communities (right).

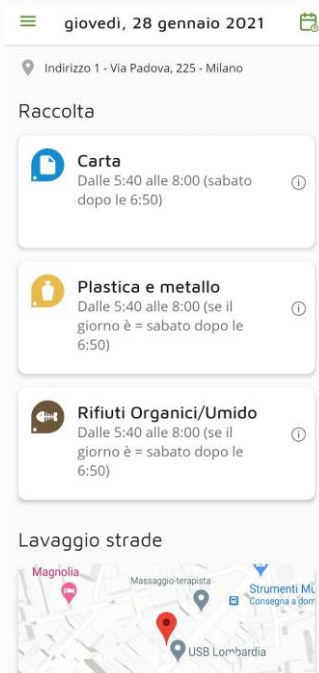


Image 4. Screenshots from the PuliAmo app – calendar of collection in the neighbourhood.



Image 5. Screenshots from the PuliAmo app instructions for separation of various items.



2. Stakeholder involvement process, impact and feedback

Citizens, businesses and institutional activities (e.g. schools) are involved in a consultation process through a customer satisfaction analysis which is run on a regular basis to get their feedback on the scheme, so as to assess the need for future improvements. There are also other contact channels that allow AMSA to monitor customer's feedback, such as focus groups, the "Puliamo" app, websites and meetings.

The customer satisfaction analysis done in 2023 included a poll (interviews over the phone) from some 40,000 people across the 40 different neighbourhoods, including foreign communities. The [survey results](#) revealed a high level of satisfaction with waste management services, with **95% of respondents reporting feeling "satisfied."**

AMSA employs around **30 waste inspectors** responsible for assessing the quality of various waste fractions, including residual waste, placed outside properties on collection days. The fact that bags for residual waste were changed to transparent ones allowed these control inspections to be easier, whilst also making more citizens aware of their waste generation.

These employees have the authority to issue fines to condominiums (which can range from 200 to 1,200 EUR) if the separated materials do not meet the required standards, or if recyclables/compostables are found in residual waste. Despite an average of 40,000 fines issued annually, which may seem significant, it is relatively minimal compared to the size of Milan's population, the number of homes and businesses, the five waste fractions collected, and the frequency of collections. This underscores the importance of "peer pressure" within the community, where established residents play a role in educating and monitoring newcomers and less committed individuals, ensuring adherence to waste separation guidelines.

3. Ripple effect and dissemination

Milan's scheme has been widely recognised as groundbreaking due to its scale and performance. This visibility has sparked similar initiatives in other cities served by the [A2A group](#) (to which AMSA belongs), such as Bergamo and Brescia, as well as in densely populated municipalities in the Greater Milan metropolitan area, which totals approximately 8 million people. Moreover, Milan's programme has inspired cities worldwide to explore and implement kitchen waste collection initiatives, even in challenging contexts. Milan has hosted numerous delegations from around the globe.

Key results

Change in participation	The scheme was rolled out to cover 100% of the population and large producers. The reduced collection rounds for residual waste and include transparent bags for inspection, made the participation rate near 100%
MSW separate collection rate (2022)	62%
Residual waste generation per capita (2022)	177 kg/inhab./yr
Bio-waste collection per capita (2022)	101 kg/inhab./yr (This refers to kitchen waste only; 70% coming from households, 30% from businesses)
Impurities in bio-waste (% of weight) (2022)	5% (This refers to kitchen waste only)
Bio-waste in residual waste (% of weight) (2019)	11.1% (Compositional analysis reveals that the separate collection scheme captures around 87% of the city's total kitchen waste)

Lessons-learned

- It is crucial, particularly in a large city, to **actively engage diverse ethnic communities through targeted initiatives and communication**. At a minimum this should be having information available in the relevant different languages, but it should also result in the delivery of communications tailored to each community (e.g. different sites or platforms that are most popular with different ethnic communities).
- **Fostering a sense of collective responsibility among households and businesses is essential for ensuring compliance** with waste separation practices. The consolidation of "peer pressure" encourages individuals to adhere to guidelines and contributes to the overall success of waste management efforts. Such a mechanism is triggered by the measures taken, both in the so-called "hardware" section (design of scheme, user-friendliness) and the software one (communication, education).
- In D-t-D collection systems like those in Milan, residents are directly responsible for emptying their kitchen caddies into the bio-waste bin located in the



condominium waste room for collection. Failure to sort waste properly may result in fines or penalties imposed by local authorities, **fostering greater accountability and compliance with the system** compared to bring schemes or open street containers.

- **Reduced frequency for residual waste and transparent bags makes it more convenient to separate bio-waste**, as it nudges citizens to separate their bio-waste more effectively so that they can avoid the nuisances of storing food waste for longer durations;
- A **multi-level targeted and far-reaching communication programme makes it the social norm to take part in the scheme** and therefore encourages proper separation of bio-waste.

N°3: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Spain: Communication strategies of the Catalan Waste Agency

Catalonia has been at the forefront of bio-waste management since 1993. The "[Law 6/1993, de 15 de juliol, reguladora dels residus](#)" mandated bio-waste separation in municipalities with over 5,000 inhabitants. Later, "Law 9/2008, of 10th July," amending "Law 6/1993 of 15th July," extended this requirement to all towns and villages across Catalonia.

At regional level, the Waste Agency of Catalonia (*Agència de Residus de Catalunya* (ARC)) plays a central role in supervising, promoting and improving bio-waste collection across the 940 Catalan municipalities. Communication and information activities play an important, if not crucial, role in promoting source separation of bio-waste, an importance well understood and strongly supported by the activities of ARC's communications department.

For years, the agency has been promoting greater public understanding of and participation in bio-waste sorting and management. This has been through large-scale communication campaigns, a variety of awareness-raising tools, and innovatively, grants regulations that make all financial assistance to municipalities conditional on the implementation of communication activities for the general public and commercial actors (larger businesses). ARC's expertise in this field is now well established, and a source of inspiration for other regional administrative bodies.

WASTE AGENCY OF CATALONIA

Population	Density (inhab./km ²)
7,901,963 (2023)	246.1

Background elements

At the regional level, ARC oversees the rollout of bio-waste collection by municipalities, authorises and finances bio-waste treatment facilities, and promotes the implementation and improvement of separate bio-waste collection through annual grants, using their own budgets and revenues generated by the landfill tax.

Over the years, ARC has demonstrated its considerable expertise in communications and the importance attached to it. A dedicated department is responsible for designing annual communication campaigns and activities. Bio-waste is one of the central themes

often addressed, through specific or general campaigns and actions, promoting the correct separation and management of all waste fractions.

Bio-waste collection model

In Catalonia, most municipalities collect bio-waste separately, with around 350 collecting it D-t-D and about 70 utilising bio-waste containers with user identification. Nearly 100% of the population has access to bio-waste services, comprising a 95% collection service and 5% self-composting. Only a handful of very small villages lack collection or composting services. Other municipalities manage bio-waste through open containers or home and community composting, the latter especially in small and rural areas. In urban and tourist-heavy areas, there's often a separate collection system for commercial bio-waste, typically D-t-D. Additionally, some medium to large businesses may opt for private companies to collect their commercial bio-waste directly. In 2023, 409,857 tonnes of separately collected bio-waste were valorised in Catalonia's treatment facilities through composting, anaerobic digestion and anaerobic digestion with composting as a second phase treatment.

Best Practices description

1. Requirements for communication activities conditioning the attribution of grants to local authorities

The development of communication campaigns and engagement activities is a clear requirement of ARC's grant policy. These include communication campaigns, training information actions for households and large generators, and communication materials production. To be eligible for funding, the communication and information campaign envisioned by municipalities must include the following key elements:

- **Environmental benefits:** Emphasise the positive impact of separate bio-waste collection on the environment, highlighting reduced landfill waste and greenhouse gas emissions.
- **Service guidelines:** Clearly outline how to properly use the separate bio-waste collection service, including collection methods and any associated costs.
- **Economic aspects:** Provide information on the economic aspects of bio-waste management, such as collection fees, refunds, transportation, treatment costs, and the value of recycled products.
- **Complete management cycle:** Present a comprehensive overview of the waste management process, from generation to product utilisation, including the possibility for the public to visit recycling facilities.

- **Product origin:** Highlight the origin and good quality from compost produced with separately collected bio-waste, which is particularly relevant for gardeners and the agricultural sector.

To facilitate their implementation and shorten the design phase, the ARC has developed **customisable information and dissemination templates with content that can be used and adapted by each entity or administration** with the aim of to make the information more specific, facilitate the work of local entities and to adapt the contents to local realities.

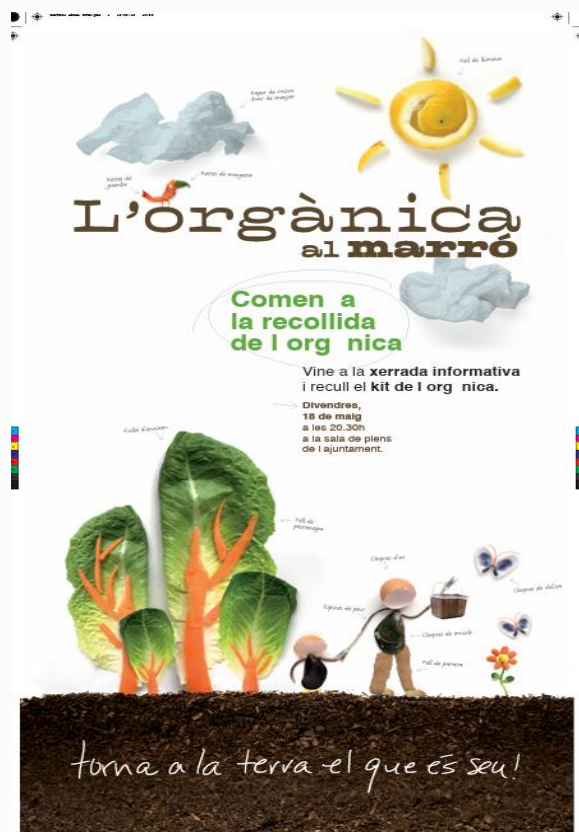


Image 1. Customisable poster for bio-waste collection.

Source: ARC [website](#)

2. Regular promotion of bio-waste separate collection and composting through communication campaigns and the dissemination of information materials

While early communication campaigns targeting bio-waste collection focused on how to sort the organic fraction and what could be collected, over the years the ARC has slowly moved from the "how" and "what" to the "why", with a strong emphasis on the bio-waste cycle. This narrative shift occurred because it was recognised that to boost intrinsic motivation, individuals require a clear understanding of why they should adapt their habits and participate in the separate collection service. The significant environmental impact of separate

waste collection means that when people are informed about its benefits and the final use of the treatment's outputs, their participation levels rise accordingly.

- The campaign, *Si l'orgànica va al marró bé! Si no hi va, no ve* (If the organic waste goes to brown bin, that's great! If not, it does not come to recycling/compost production), is a great example of this narrative shift. Funded entirely by ARC with a budget of approximately €1.3 million, the campaign ran its first edition between December 2017 and January 2018 and its second edition during four non-consecutive weeks from July 23 to August 6 and September 3 to 18, 2018. It aimed to address the stagnant rates of bio-waste separate collection. Despite organic waste constituting around 34% of total waste generated in 2017, the separate collection rate remained at only 30%. The ARC objective was to recover 60% of bio-waste by 2020.
- Maintaining high-quality bio-waste is crucial for effective recovery processes, reducing management costs, machinery wear, and ensuring the quality of compost obtained from treatment. Its core message highlighted therefore the importance of separating food waste and small garden waste - such as leaves, grass or branches - emphasising the cycle of organic matter and highlighting its potential for recovery by conversion into compost or biogas. It consisted of a series of posters displayed in public spaces, radio and television spots, videos and images with key messages for social media. All the materials created can be viewed and downloaded in high resolution on the ARC's website.



Image 2. "Thanks to the natural compost obtained from the recycling of bio-waste, we avoid the use of chemical fertilisers"



Image 3. "Bio-waste, properly valorised, contributes to reducing the carbon footprint of each individual"

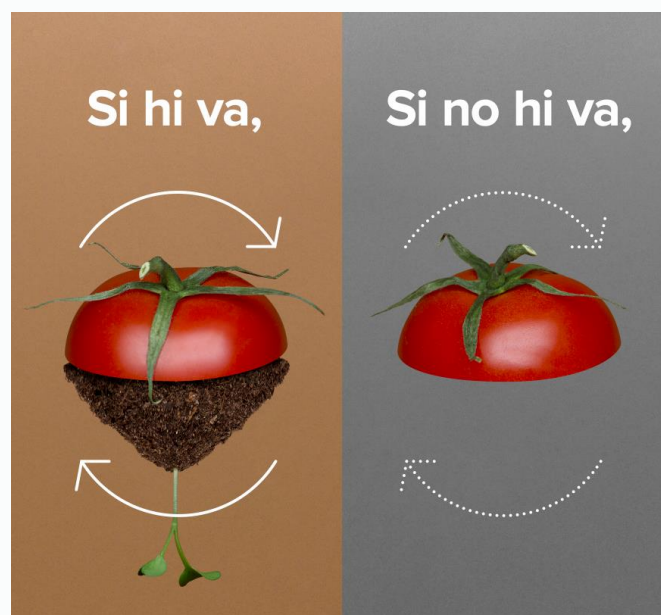


Image 4. Poster showing the bio-waste cycle, from waste to compost, when properly sorted. The platform "RESIDU, ON VAS".

Source: ARC [website](#)

- The ARC provides educational material to explain and clarify the different stages of the bio-waste cycle, from production to recycling. For example, a series of brochures titled *El cicle de la matèria orgànica* ("the cycle of organic matter") was developed in 4 languages and distributed online. These publications were valuable for their transparency regarding the rationale behind the separate collection of bio-waste. The different stages of the cycle and their aspects were highlighted through various leaflets, including didactic explanations, tips, key data, and visual elements:
 - Understanding the organic fraction: its collection, recycling methods, and reasons for doing so,
 - Explanation of different bio-waste collection systems and their operations,
 - The significance of self-composting and guidance on getting started,
 - Operations of a composting plant,
 - Operations of an Anaerobic Digestion plant and
 - Understanding compost, its benefits, and practical applications.



Image 5. Publication on the different stages of the organic fraction cycle.

Source: ARC [website](https://www.arc.cat/)

It's worth mentioning that an annual major campaign is held at the end of each year by the ARC, starting in December and continuing into the following months. This campaign is a collaborative effort between the Government of Catalonia (*Generalitat de Catalunya*) and the producer responsibility organizations, aiming to encourage proper sorting of all waste fractions, including organic waste - even though the latter is not covered by an EPR - which results from an agreement between the ARC and the producer responsibility organisations, which manage the EPR scheme.

Lessons-learned

- By funding communication activities at local level together with projects to implement and improve bio-waste separate collection and **requiring comprehensive communication plans as a condition of receiving the funding**, regional authorities can ensure that local entities actively engage in outreach efforts aimed at educating and involving the public in bio-waste management practices.
- By **highlighting the positive outcomes and impact resulting from bio-waste sorting and treatment**, intrinsic motivation among individuals can be boosted, leading to increased participation levels. Indeed, providing educational materials that explain the rationale behind bio-waste management practices fosters understanding and buy-in from the public. Brochures and publications that detail the stages of the bio-waste cycle, recycling methods, and the significance of composting empower individuals to make informed decisions and take meaningful actions.



- **Implementing communication campaigns that utilise various channels**, including public spaces, radio, television, social media, and online platforms, ensures broader reach and engagement.
- **Providing communication and educational materials in multiple languages, accessible formats and customisable final designs**, helps facilitate the work of local entities when implementing communications actions standardising the messages and the understanding and participation among diverse audience groups.
- **Incorporating visual elements**, such as images, infographics, and videos, enhances the effectiveness of communication materials. For example, visual representations of the bio-waste cycle and composting processes help clarify complex concepts and reinforce key messages, making them more memorable and engaging for the audience.

N°4: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Spain: Promotional Interventions for Community Composting in Pallars Sobirà

Nestled in northeastern Catalonia, the Pallars Sobirà region is characterised by its mountainous landscape and low population density, presenting unique challenges in waste management, exacerbated by seasonal fluctuations driven by tourism. Beginning in 2006, public authorities initiated a few community composting points, gradually expanding the programme alongside a D-t-D collection system for kitchen waste launched in 2015.

To encourage participation in composting initiatives, punctual and regular awareness-raising strategies have been implemented. Additionally, campaigns promoting community composting have been organised, featuring educational events and the distribution of locally produced compost. These dedicated communication and information activities position Pallars Sobirà as an exemplary case for municipalities seeking to effectively promote community composting among their citizens.

PALLARS SOBIRÀ		
Population	Density (inhab./km²)	Type
7,427 (2023)	5.6	Rural and isolated
Background elements		
<p>The Pallars Sobirà region, situated in the province of Lleida, Spain, spans 1,378 km² and is characterised by its mountainous terrain, making access challenging. Formed by 15 municipalities and 135 villages scattered along the Noguera Pallaresa river, the population of the region is concentrated in the valley bottoms, notably in Sort, the capital of the region (with 2,244 residents), Rialp (with 667 residents), and Esterrri d'Àneu (with 874 residents).</p> <p>It's noteworthy that the region's low population density, the lowest among all Catalonia's counties, significantly influences its labour market dynamics. It is a tourist region so waste generation is affected by second homes and the seasonal population that increases both in the winter months (mountain and ski activities) and in the summer months, too.</p>		

Bio-waste collection model

In Pallars Sobirà, bio-waste management involves both community composting and D-t-D collection systems. Communication activities to promote these two types of system account for 2-4% of the waste department budget of the county council.

Community composting began with a pilot test in 2006 and has gradually expanded its implementation, with today seeing more than 60 composters in use and only a couple of villages remaining to implement it. Community composting is implemented in the small mountain villages. The bio-waste gathered from various community composting areas is managed directly on-site, with the resulting compost distributed to residents.



Image 1. Community Composters next to a bring point.

Source: Pallars Sobirà [website](#)

- **D-t-D collection of kitchen waste** started in 2015 in the urban areas of the valley area (25 villages) and bio-waste is collected three times a week. It's important to note that collection frequencies of the different waste fractions for commercial activities, including bio-waste, depend on the period of high or low tourist intensity. This variability depends mainly on tourist pressure from skiing and summer sports. The bio-waste collected through the D-t-D system is processed at Sort's composting facility (small-scale facility of 750 tonnes/yr). This facility is equipped with aerated composting technology in silos.

Best Practices description

To promote community composting among its residents, Pallar Sobirà has implemented a range of awareness-raising and information strategies tailored to different segments of the population that have been disseminated through various channels.

1. **Punctual activities supporting the implementation of community composting points**

Each time a new community composting point is set up in a village of the region, specific awareness-raising activities have been implemented to inform residents and encourage their participation, including:

- **Teaser leaflets** distributed across the area prior to the installation of community composting to inform the residents;
- **Information letters** sent out, detailing the dates scheduled for the environmental educators to visit each area;
- **Neighbourhood meetings** were organised during the gradual implementation process to address queries and bolster understanding of the most optimal composting techniques;
- Online and face-to-face **training sessions on community composting** were organised for the residents.



Image 2. Community Composter with informative poster.

Source: Pallars Sobirà [website](#)



Image 3. Technical staff managing the composter.

Source: Pallars Sobirà [website](#)

2. Regular activities:

Specific activities were organised on an ongoing basis to support the deployment and continued proper use of the community composters. These include:

- **Specialised technical staff** (currently one full-time dedicated person) manage the various community composting sites, to maintain the health of the compost and warn of potential problems;
- A **manual about community composting** was created and disseminated locally;
- **Kitchen caddies and compostable bags** are distributed to all citizens covered by D-t-D bio-waste collection or with access to community composters, to encourage the sorting of bio-waste at home using clean, easy-to-use equipment. They are distributed at the beginning of the setting-up of a new

community composting site but can also be requested directly at the city council for free.

- A **telephone hotline** was set up for citizens who need assistance from the city council.

3. Awareness-raising campaigns:

- In 2021, a campaign to promote community composting was organised to raise the profile of this practice among citizens:
 - A team of environmental educators visited all the households in the towns with community composting points and explained how to make good use of composters;
 - The campaign culminated on February 19, 2022, with a celebration at the Sort composting plant, featuring a training session on community composting and family-friendly activities.
 - An [explanatory video](#) demonstrating the process of community composting was produced and disseminated across multiple platforms, including websites, Instagram, WhatsApp, etc.



Image 4. Schoolchildren visiting the composting facility.

- A complementary campaign included the **distribution of locally produced compost**, branded as "Compost Pallars Sobirà," along with awareness-raising activities.
 - The council's municipal waste collection service distributed a total of **80 tonnes of "Compost Pallars Sobirà"** from the Sort composting plant to all 15 municipalities within the county.

- Additionally, **compost was provided to local campsites** and both **virtual and in-person guidance** on its proper utilisation were offered.
- **Roll-ups and vinyl tents featuring the "Compost Pallars Sobirà" logo** were created and showcased at various regional markets, municipal events, and county council gatherings.
- **Activities showcasing the bio-waste cycle** following a fork-to-farm approach were conducted, which received subsidies under the Circular Economy Projects Grant from the Catalan Waste Agency in 2017.
- **Guided tours of the Sort composting plant** were organised, with educational materials being created to help illustrate how compost was being distributed locally, and labelled compost sachets were prepared for distribution during plant visits.

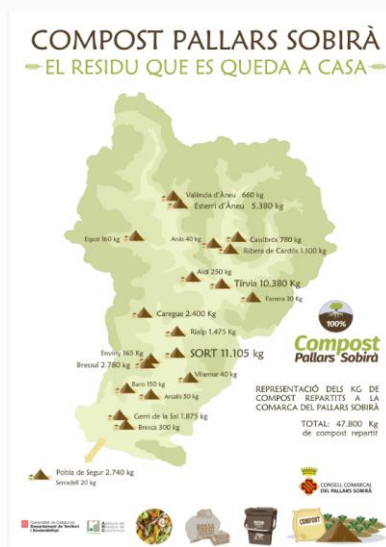


Image 5. Poster about compost distributed within each village



Image 6. The cycle of bio-waste in the county



Image 7. Compost bags for distribution, labelled "Compost Pallars Sobirà" with information on gardening applications.

Key results

Change in participation	Data analysis revealed an increase in participation and improvement in engagement levels. Following this trend, the need for installing new community composters in several towns became apparent after a few months.
MSW separate collection rate	60%
MSW generation per capita (2022)	658 kg/inhab./yr
Residual waste generation per capita (2022)	262 kg/inhab./yr
Bio-waste collection per capita (2022)	88 kg/inhab./yr bio-waste separately collected 26 kg/inhab./yr bio-waste treated in community composting

<p>Tonnes of compost produced</p>	<p>The community composters process between 170 and 185 tonnes of organic matter per year, producing around 10 tonnes of compost.</p> <p>There was a 4.5% increase in the amount of organic material composted since the programme began.</p>
<p>Impurities in bio-waste (% of weight)</p>	<p>2%</p>

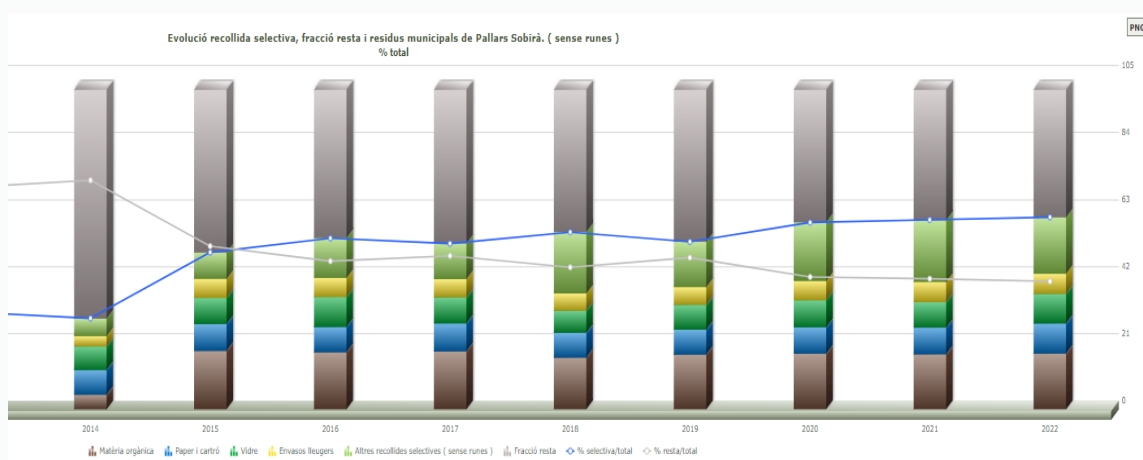


Image 8. Evolution of waste collection in Pallars Sobirà from 2014 to 2022 - showing the bio-waste collected locally after the D-t-D scheme implemented in mid-2015 and the subsequent reduction in residual waste.

Lessons learned

- **Users need to see the results of their action to adhere to the system.**
- D-t-D surveys and **direct engagement** with users are essential for raising awareness and providing clear explanations about the composting process.
- Including **master composters** to follow the composting process and resolve issues as they arise.
- Distributing the compost produced **allows users to see the tangible results of their participation**, reinforcing their understanding and trust in the system and, ultimately, their involvement.

N°5: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Communication Initiatives in a Tourist Hotspot - Krk Island

Krk, celebrated as one of Croatia's top tourist hotspots, has recently embraced a zero waste initiative, positioning itself as an official candidate for [Zero Waste City Certification](#). The island has embarked on significant efforts to enhance its waste prevention and management strategies, particularly focusing on bio-waste, supported by a robust communication strategy. The island's public waste management company, *Ponikve Krk - Eko Otok Krk*, consistently invests in specialised communication tools and awareness-raising initiatives to encourage proper kitchen waste sorting among both residents and visitors. Furthermore, the company hosts compost distribution events and provides compost for purchase, contributing to a notable 41% increase in bio-waste collection between 2013 and 2023.

Krk Island		
Population	Density (inhab./km ²)	Type
<p>20,019 permanent residents.</p> <p>An average of 145,000 extra individuals reach the island per day during peak tourist seasons</p>	44	Touristic, rural island with a few small towns
Background elements		
<p>On Krk Island, waste management is overseen by the public company Ponikve Krk - Eko Otok Krk, which is jointly owned by the island's seven municipalities. Historically, a significant portion of the island's waste was improperly handled and ended up in open landfill. In 2005, authorities took steps to rectify this situation by implementing separate waste collection for five key waste streams (bio waste, paper, plastic, glass, and residual waste) involving the installation of approximately 1,400 street bins across the island, situated no more than 50 to 70 meters from residential areas. Also, designated "recycling spots" were established to facilitate collection of other types of waste, including electronic and electrical equipment, furniture, textiles, wood, green waste, and hazardous materials.</p>		

Bio-waste collection model

In 2014, a major change was made to the waste collection system to improve the separate collection rate. Waste fractions started being collected D-t-D in residential buildings, supplemented by the introduction of additional 'eco-islands' for the five key fractions throughout the island. These were additional points on the island where citizens and tourists could bring their separated waste, to help manage the extra volumes and provide more options for sorting.

The implementation of this new system occurred in two phases. The first phase, spanning from 2014 to 2016, ensured that all households were equipped with a 23-litre brown bin for bio-waste and a 35-litre green bin for residual waste. Phase 2 until 2020 involved providing all households with additional bins: yellow for plastic and metal, blue for paper and cardboard, and grey for glass, each with a capacity of 120 litres.

Following the new collection system's introduction, a range of communication tools, economic incentives and awareness-raising activities were developed to improve the sorting of waste locally, among permanent residents and tourists.

At present, the Treskavac composting plant processes kitchen waste, green waste from parks and households, converting around 8,306 tonnes of bio-waste into compost annually (data from 2023).

Best Practices description

[Ponikve Krk – Eko Otok Krk](#) continuously invests in various activities and communication tools to improve waste management locally:

1. Tailored outreach initiatives and tools to promote proper waste sorting:

- The launch of the D-t-D separate collection system was communicated extensively through local radio stations, newspapers and social media platforms.
- Every household was distributed with **free bins for waste sorting**, which included a small 25-litre caddy for bio-waste, a **poster available in four different languages** containing key information on how to sort properly, and a calendar detailing the collection days for each fraction.
- A key aspect of the system's success, ensuring higher compliance, is the establishment of an **eco-patrol** composed of seven green educators. The patrol serves an educational role locally, helping promote proper waste sorting behaviours. Each day, patrol members tour the island, inspecting the content of various fraction bins outside households. They help the users with advice and information on the D-t-D waste collection system. Equipped with radio frequency identification (RFID) chips, each bin can be

identified using a reader, enabling the patrol to determine ownership. Upon identifying sorting errors, they compile a list of the incorrect items and can offer tips to those responsible. A new initiative is currently being tested to enable eco-patrollers to report sorting errors, with photo evidence and the possibility of issuing fines.



Image 1. An eco-patroller scans a bio-waste caddy and checks its content in front of a residence.

- Each year, over **50,000 leaflets, translated into 8 languages**, are distributed to apartments, agencies, camping sites, and hotels, offering detailed guidance on waste separation practices on the island.



Image 2. 25 L caddy for kitchen waste and 35 L caddy for mixed waste.



Image 3. Leaflet translated into 8 languages with waste sorting tips for each fraction.

- An **annual campaign** is organised to promote proper sorting behaviour and encourage citizen engagement with the waste management system, focusing on a specific fraction each year. Typically held twice each year, **child-focused activities** take place in the spring, followed by broader public communications in early fall. In 2019 this campaign was focused on bio-waste.
- **Permanent educational activities are organised for kindergartens and schools, tourists and daily visitors.** One notable initiative involved repurposing a shipping container into an "ecological one", installed at

strategic locations in crowded areas, addressing issues such as plastic pollution in the sea.



Image 4. Example of a public exhibition to raise awareness about the problem of marine plastic pollution

2. Community engagement: Annual compost giveaway event and sale

- Every year, between February and March, before the peak season, *Ponikve Krk - Eko Otok Krk* organises a **compost distribution campaign** at the Treskavac composting plant. They distribute over 7,000 80-litre plastic bags filled with compost as part of this campaign. Citizens can take a tour of the plant and receive explanations about the composting process. This initiative is part of a strategy to educate the community about composting and raise awareness about the importance of proper bio-waste management, aiming to encourage participation in the system. The company claims that every year citizen participation in the event increases.



Image 5. Leaflet with the dates of the 2024 compost distribution campaign



- **Large 1.2 m³ compost bags**, known as jumbo sacks, are also **available for purchase** by individuals and can be ordered and delivered at any time of the year for approximately 50 euros each.
- **Bulk purchasing of compost** is available, with the price set at 33 euros for 1 m³.

Key results

MSW separate collection rate (2022)	53.3%
Residual waste generation per capita (2019)	235 kg/inhab./yr
Bio-waste collection per capita (2023)	27.6 kg/inhab./yr

Lessons Learned

- Providing households and tourists with **free educational materials**, such as sorting bins, multilingual posters, and calendars detailing collection days, **facilitates greater compliance with waste sorting guidelines**. Moreover, organising annual campaigns and events focused on specific waste fractions, along with permanent educational activities for different public (schools, tourists, and residents) encourages ongoing commitment to the system.
- **Having a dedicated team**, such as an eco-patrol, to educate and assist residents in proper waste sorting behaviours, coupled with the use of technology like RFID chips for bin identification, help ensure consistent monitoring and smooth compliance with sorting rules.
- Initiatives such as **compost distribution campaigns, treatment facility tours and compost purchase options** enable community members to see and benefit directly from the results of separate bio-waste collection, encouraging ongoing participation and support.

N°6: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Slovakia: Focus on Bratislava

Starting in January 2021, Slovakia mandated separate kitchen waste collection in municipalities. Bratislava, along with other Slovak cities, received an exemption from waste management regulations due to its use of an incineration plant instead of landfills, granting them additional time to comply. Although Bratislava was initially slated to start these obligations in 2023, it began pilot projects in 2021 and continued into 2022 to ensure compliance with the deadline for bio-waste collection by January 1, 2023.

In 2022, Bratislava successfully implemented D-t-D collection of kitchen waste across all 17 districts, attributed to a phased communication strategy that began with a pilot project in October 2021 and progressively expanded to all districts from March to December 2022, demonstrating the effectiveness of a well-planned approach focused on engaging citizens.

BRATISLAVA		
Population (inhab.)	Density (inhab./km²)	Type
476,922 (2022)	1,297	Urban
Background elements		
<p>According to the obligation for municipalities under the new law, the city of Bratislava was mandated to implement kitchen waste collection starting from January 1, 2023. Recognising the need for a well-organised and user-friendly system, the city opted for a phased approach involving its districts, hence the decision to initiate the first stage in October 2021. The primary goal of introducing kitchen waste separate collection in Bratislava was to reduce, ideally eliminate bio-waste from residual waste, which at the time represented 20–25% of its volume. When combined with garden waste, kitchen and garden waste comprised up to 45% of the total residual waste.</p>		
Bio-waste collection model		
<p>By 2022, the city had successfully implemented D-t-D collection of kitchen waste in all 17 urban districts, involving over 140,000 households, a mixture of apartment buildings and single-unit households.</p> <p>Residents in apartment blocks were each provided with compostable bags, along with a 10-litre vented kitchen caddy to sort their kitchen waste. The process then required</p>		

them to deposit their separated food waste into appropriately labelled 120-litre or 240-litre brown collection bins that were for the whole building. Similarly, residents in single unit houses followed the same waste separation practice, but instead were provided with a 20-litre brown caddy for collection.



Image 1. Illustration of the bio-waste collection system in Bratislava city.

Source: Presentation Martina Gaislova, JRK, Brussels 2022

Kitchen waste is treated with an initial anaerobic digestion technology followed by a composting process and a final carbonisation step. The end result is a biochar substrate used in agriculture.

Garden waste is gathered from households in 240-litre brown bins and collected seasonally only, from March to November, with collections occurring once every two weeks.

Best Practices description

1. Pilot project in Lamač

In autumn 2021, a pilot project for the separate collection of kitchen waste was launched in the city district of Lamač, Bratislava's smallest neighbourhood. Before issuing brown bins and vented kitchen caddies to every household, residents received a flyer notifying them about the upcoming distribution of these collection tools.

Social media and local media (newspapers and radio) were utilised for communication purposes, and as an integral component of project preparation, an assessment of residents' readiness for change was conducted through a survey. The survey gathered opinions from participants, reflecting their perspectives as follows:

- 38% - we can't wait for the brown bin
- 31% - we have our own composter at home
- 20% - I am involved in community composting

- 9% – we do not separate bio-waste
- 2% – we want community composting – we are on the waiting list.

Trained staff distributed the kitchen caddies and a roll of compostable bags to households in single-unit houses. For those in apartment blocks, the distribution took place through designated collection points.



Image 2. Distribution points
Source: Zenzo



Image 3. Door-to-door distribution
Source: Zenzo

More than half a year after the launch of the pilot, a waste analysis aimed to assess waste sorting efficiency and to analyse other key factors, such as the proper use of composting bags, was conducted by a team consisting of members from the associations [OZ Zenzo](#) and [OZ Priatelja Zeme – SPZ](#), as well as the employees from the waste management municipal company [OLO](#), and the capital's environmental department.

Predominantly, residents opted for the compostable bags provided by the city, with a minority using non-compostable plastic bags. Results from the pilot showed contamination levels (impurities) were notably low, registering at 0.57% in apartment buildings and 0.25% in family houses. The positive outcomes were attributed to the practice of proper bags, the use of vented kitchen caddies, and the frequency of waste collection.

2. Implementation in other areas of the city

In other areas of the city, the distribution campaign of collection tools was coordinated through designated collection points strategically located in areas with high concentrations of people. Also, distribution points were established during weekends at street markets, festivals, and various events and in front of some supermarkets on Saturdays.

Much like the approach in the city district of Lamač, only trained staff were entrusted with the distribution of the starter kit, comprising a flyer, vented caddy, and

compostable bags, or optionally, a 20-litre caddy. They were responsible for providing explanations about the purpose and usage of the collection tools. Residents were required to acknowledge the receipt of the starter kit by signing at the distribution point, ensuring their visit and access to essential information.



Image 4. Vented kitchen caddy and 20-litre caddy

With the distribution campaign, significant investments were made to widely disseminate information across various channels about the launch of the kitchen separate collection system. This included:

- The distribution of **customised leaflets for each district**, produced by OLO, containing a detailed collection schedule, sorting rules, information on the correct use of the collection tool and the functioning of the collection system, highlighting the difference between the collection of kitchen waste and garden waste.
- **Regular updates on the city and OLO websites** with information on the collection system.
- **Coordination of communications** between each municipal district and the communication team from OLO.
- Preparation of **communication plan for all districts of the city on how best to communicate with citizens**, which was then to be adapted to different neighbourhoods (e.g. different collection days/times).
- **Media coverage** through articles in the press, podcasts, local and national TV, and city lights.
- **Educational videos** explaining the benefits of the kitchen waste collection system, the use of collection tools, and sorting instructions – featuring city technicians and elected officials, such as Mayor Matúš Vallo.
- **Videos** on public transport to raise awareness.



Image 5. First page of the information leaflet

ČO PATRÍ A NEPATRÍ DO KOMPOSTOVATELNÝCH VRECIEK NA KUCHYNSKÝ BIOODPAD?



Image 6. Sorting rules “What does and does not belong in compostable bags for kitchen waste?”

Key results

Residual waste generation per capita (2022)	209 kg/inhab./yr A decrease of nearly 6,000 tonnes (6%) compared to 2021
Bio-waste collection per capita (2022)	14 kg/inhab./yr Totals grew throughout the year as implementation spread across the city from March to December 2022.
Impurities in bio-waste (% of weight) (2022)	2.5%. The largest representation of non-degradable waste was plastic.

Lessons-learned

- Human resources challenges:** One of the major obstacles identified was the shortage of trained and well-informed people able to support the initiative and its communication campaign. This underlines the crucial role of recruiting knowledgeable staff or building the capabilities of existing ones, so that they can effectively support and deliver the key communications related to the programme's objectives.



- **Communication gaps:** Another notable issue was the insufficient year-round communication efforts, leading to a waning focus after the initial implementation phase. To sustain community engagement, **continuous communication throughout the year is imperative**. Additionally, the exclusive use of social media to announce the second round of compostable bag distribution created a communication gap, excluding citizens not active on these platforms. The resulting lack of awareness hindered kitchen waste separation efforts. Recognising and openly addressing initial mistakes, such as communication lapses leading to odour complaints, is vital. Transparent communication is crucial to prevent negative impacts on citizen involvement and maintain community support for the municipality's objectives on waste reduction.

N°7: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Slovakia: Focus on Partizánske

Partizánske is situated in the southern part of the Trenčiansky kraj region of Slovakia. It is divided into nine districts, with 2,217 individual households and 6,605 apartment blocks. In 2014, the city initiated a programme for home composting in individual households. By 2021, they expanded this by introducing a D-t-D collection system specifically for kitchen waste for apartment buildings. In both cases, local authorities conducted pilot projects to test the effectiveness of these collection schemes before implementing them on a larger scale. Outreach efforts were consistently carried out, including the distribution of collection tools. These activities were deemed crucial to the success of the collection scheme, both in terms of the quantity and quality of kitchen waste separately collected.

PARTIZÁNSKE		
Population	Density (inhab./km ²)	Type
20,871	935.5	Town, Rural
Bio-waste collection and treatment model		
<ul style="list-style-type: none"> • Partizánske opted not to set up a separate waste collection for garden and kitchen waste in single-unit houses. Instead, since 2014 it has encouraged home composting by providing households with composters in various sizes (290 to 800 litres). Additionally, seasonal collections gather branches from tree and bush trimming in spring and autumn. • In 2021, the municipality introduced a bi-weekly D-t-D collection service for kitchen waste in apartment buildings. Each household receives a 10-litre kitchen waste caddy with a roll of 25 compostable bags. When disposing of kitchen waste, individuals receive an empty compostable bag in exchange. If additional bags are needed, a written request can be left on a slip near the collection caddy on the assigned day. Workers will then deliver the requested compostable bags at the next collection. During this process, the bag contents are inspected, and a picture of the QR identification code on each caddy is emptied. Bags with impurities are not collected. • Additionally, households have the option to bring unlimited amounts of garden waste to the municipal collection centre, accessible six days a week. 		



Image 1. Breakdown of bio-waste collection by type of housing in Partizánske

Average production of municipal waste (2022)	<ul style="list-style-type: none"> 8,191.5 tonnes/yr 391 kg /inhab./yr (116 kg less than the national average)
Average production of residual waste (2022)	205 kg /inhab./yr
Municipal waste separate collection rate (2022)	39.2% (0.5 percentage point higher than the national average of 38.7 %)

Best Practices description

1. Home composting pilot

In 2014, the municipality initiated a pilot project aimed at promoting home composting within the Nájovce district, specifically targeting 445 residents across 136 households. The primary focus was to encourage households living in single-unit houses to actively engage in composting their kitchen and garden waste. The overarching goal of this year-long pilot was to assess the effectiveness of various communication strategies in influencing the residents' behaviour regarding bio-waste management. Before starting the pilot project, the municipality conducted a **survey on household bio-waste management in houses**, comprising two parts:

- A. **Questionnaire:** Trained campaigners spoke with each household in a designated area, filling out a questionnaire to gauge their thoughts and knowledge about composting.
- B. **Residual waste analysis** to ascertain the amount of bio-waste disposed of in these bins. This analysis helped determine the proportion of bio-waste in the overall residual waste stream.

The pilot project encompassed the implementation of the following activities:

- **The city offered interested households a composter**, and a set of **informative materials and articles** detailing effective composting techniques and the proper use of compost.
- **Public workshops on home composting** were conducted, where attendance by at least one household member was a requirement to receive a composter.
- **A D-t-D campaign** to encourage people to compost, provide practical help with composting, monitor residents' opinions, record their feedback and provide them with additional information material.
- **A bio-waste free bin competition** to motivate households not to throw compostable bio-waste in their bins for residual waste. 13 inspections were carried out and the winner received a garden waste shredder.
- **A final survey** consisting of a questionnaire and an analysis of residual waste.



Images 2 and 3. Flyers about home composting distributed to individual households

Based on the successful pilot project, the city of Partizánske has gradually expanded its home composting programme to other parts of the city.

Key results from the pilot

<p>Quantity of bio-waste in residual waste</p>	<p>The quantity of bio-waste in residual waste was reduced to 28% (it was 53% before the project).</p> <p>The amount of residual waste per capita was reduced by 57 kg/inhab./yr, just over 25%.</p>
<p>Good sorting behaviour</p>	<p>75% of households did not dispose of any bio-waste in residual waste (4% before the pilot project).</p> <p>85% of households stated that they do not burn any bio-waste (20% before the project).</p>



Non composting households	The % of households that do not compost their bio-waste at all has fallen to less than 8% (30% before the pilot project).
Use of effective composting practice	The % of households using suitable composting bins increased to 93% (27% before the pilot project).

Based on the successful pilot project, the city of Partizánske has gradually expanded its home composting programme to other parts of the city:

Key results from the programme expansion (Sep 2023)

% of households practicing home composting	By September 2023, 92.3% of households across Partizánske living in single-unit homes were home composting.
Residual waste generation per capita	Compared to 2016, the reduction in residual waste produced by households in 2022 was: <ul style="list-style-type: none"> • 30 kg for all residents. • 119 kg for those living in single-unit individual houses.
Bio-waste in residual waste	A recent analysis of residual waste in 2023 discovered that, on average, households are still discarding approximately 35 kg per person of kitchen waste and 50kg per person of garden waste within the residual waste. This accounts for roughly 40% of the total potential bio-waste that could be used for composting.

Further details from the expansion of the pilot programme include:

- Approximately 1,991 composters (290, 700, or 800 litres) were distributed to about 89.91% of individual households.
- 40 free home composting workshops, educating 2,096 city residents on its significance and proper techniques, have been conducted.
- Personal visits to 813 households have been carried out.
- Informative leaflets covering composting practices, myths, food waste tips, and garden use have been consistently distributed since the project's start.

- 8 analyses of randomly selected residual waste bins were shared through local media outlets.
- Articles and programmes highlighting the home composting method, its activities, successes, and effective methods were featured on both local media and the city's website.

2. D-t-D kitchen waste collection system pilot

In the pursuit of finding the most effective kitchen waste collection system for Partizánske, comprehensive field surveys were conducted to understand the conditions under which residents would be most inclined to participate. The surveys revealed that factors such as distance to collection bins, cleanliness, odours, presence of insects, and mold influenced people's willingness to sort their kitchen waste.

Before implementing kitchen waste separate collection across the entire city, a pilot programme was executed in the Šípok housing estate. This trial involved 8 blocks of flats with 12 households in each. Each household was provided with an introduction to the system and a starter-pack including a 10-litre kitchen caddy, a roll of compostable bags and a leaflet. The trial spanned a month, from April 19 to May 13, 2021, with kitchen waste collection done twice a week.

Based on the results obtained, the pilot project validated the effectiveness of the collection system and provided useful information for local authorities. Outreach activities were conducted sequentially in various parts of the city, alongside the distribution of collection tools.

Households had access to information and collection tools through four methods:

- **Direct distribution at individual block entrances of the apartment buildings.** Residents were informed beforehand about the scheduled distribution time. The distribution team comprised of three workers:
 - An informant explained the collection system and its advantages to households, providing a demonstration on how to utilise the collection tools.
 - A registration officer scanned the unique QR code on each caddy, associating it with the respective household.
 - A technical support distributed the starter packs, and each household representative signed to confirm receipt of the pack.
- **Distribution centres were temporarily set up** for 2-3 hours at predetermined **publicly accessible locations** within housing estates. These centres were established after the initial direct distribution, and residents were informed in advance about the time and location.



- The **municipal office provided access to collection tools throughout the year**, five days per week.
- **Additional distribution occurred continuously when new blocks of flats were constructed in the city.** The distribution was carried out at the entrances of these new buildings.
- An information campaign was conducted in parallel, emphasising various aspects:
 - Nature of kitchen waste and how to avoid odours, mold and pests
 - Compostable bag storage and use
 - Caddy and compostable bag usage
 - Collection process
 - Date and location for collection

Additional **outreach activities** during the campaign included:

- **Information leaflets** about the collection system, along with the necessary tools, were distributed.
- **Posters** were displayed at the entrances of each block of flats, indicating when the collection would commence in specific districts.
- **Articles** related to the pilot programme, the introduction of the collection initiative, and the initial results were published in the local weekly TEMPO.
- **Reports** were broadcast on Municipal Television Partizánske (MTP), offering televised discussions on kitchen bio-waste collection.
- **Workshops** were conducted for school children and participants in summer camps.
- A **dedicated subpage** on the website was established, providing comprehensive information about household kitchen waste collection.

Summary of key results

Bio-waste collection per capita (2022)

In 2022,. 371,41 tonnes of kitchen waste were collected:

- An average of 17.80 kg/inhab./yr
- Residents in blocks of flats contributed an average of 25.97 kg/inhab./yr

Those who had been distributed kitchen caddies averaged 43.88 kg per capita.

Impurities in bio-waste (% of weight)	0.07% average
Bio-waste in residual waste (% of weight) 2022	43 kg/inhab./yr from households living in apartment buildings.

In the municipal budget for 2024, slightly more than 1% of the overall waste management budget is allocated specifically to support communication and education activities.

Lessons-learned

- The pilot project in Partizánske demonstrated the **effectiveness of tailored communication strategies in promoting home composting**. By conducting surveys, offering workshops, and organising door-to-door campaigns, the municipality successfully educated residents on composting techniques and encouraged their active participation.
- The communication efforts in Partizánske utilised **various channels to engage and inform residents**, including direct distribution, distribution centres and online platforms. This multi-channel approach ensured widespread outreach and accessibility to information, enhancing community engagement in waste management initiatives.
- The implementation of a pilot programme for D-t-D kitchen waste collection involved **comprehensive field surveys to understand residents' preferences and concerns**. By collecting data on household participation, waste weight, duration of collection, and cleanliness, the municipality made informed decisions to optimise the collection system and address residents' needs effectively.

N°8: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Ireland: National Pilot Scheme in Sligo for Brown Bins

Between July 2014 and March 2015, Sligo County Council coordinated a pilot scheme for the Brown Bin Programme in Sligo city. The aim of the trial was to assess the impact that a range of educational and collection tools, such as the use of brown bin waste management advisors and the provision of kitchen caddies to households, can have on the performance of the bio-waste separate collection system, in terms of participation rate, quantity and quality. The Sligo pilot project verified tangible benefits in correctly utilising the food waste bin and pinpointed practical steps that could be valuable for adoption in other towns.

SLIGO CITY		
Population	Density (inhab./km ²)	Type
20,608 (2022)	2,000	Urban, coastal seaport
Background elements		
<p>The Irish “European Union (Household Food Waste and Bio-waste) Regulations Act 2015”, introduced in April 2013, aims to encourage the separation and recovery of household kitchen waste in Ireland, requiring households to separate their kitchen waste. Despite their introduction, national statistics and research done by the Composting and Anaerobic Digestion Association of Ireland (Cré) have not seen the desired increase in the amount of kitchen-waste collected. Additionally, a growing trend of growing contamination in brown bins, especially with plastics, was observed. To address these issues and meet regulatory requirements, Sligo County Council implemented The Sligo County Council Waste Management Byelaws 2013, regulating household and commercial waste storage and collection. In Sligo, 18 areas were designated as “third-bin Areas,” providing an additional brown bin specifically for kitchen waste alongside regular waste and recycling bins.</p> <p>Following the implementation of the byelaws, Sligo County Council adopted and coordinated a Brown Bin pilot in Sligo City between July 2014 and March 2015 – which aimed to assess which educational and collection tools had the greatest effect on improving the capture and quality of separately collected kitchen waste in the brown bin. The project was funded by the County Council, the Department of Communications, Climate Action and the Environment, Cré and Novamont.</p>		

The pilot project focused on around 8,000 households in the town of Sligo. These households were divided into three distinct zones (A, B and C), delineated according to waste collection routes (see figure 1)



Image 1. Map of Sligo with areas division

- Within Area A, a total of 2,300 households were equipped with solid side kitchen (refer to Figure 2) caddies, roll of compostable bags, teaser leaflet and an informational leaflet. 70% received an awareness talk.
- Within Area B, 33% of the occupied households received an awareness talk (due to time constraints). 100% receive a teaser leaflet.
- Within Area C, 3,480 households were provided with vented kitchen caddies (refer to Figure 3), roll of compostable bags, teaser leaflet and an Information leaflet. 70% received an awareness talk.



Image 2. Solid sided caddy.



Image 3. Vented caddy.

The awareness-raising work carried out included the following components:

- **A waste characterisation study:** data collection regarding the quantity of kitchen waste in the residual waste bin, recycling bin, and brown bin, along with assessing contamination levels within it. This analysis took place before and after the awareness campaign to assess the pilot's impact.
- **A bin presentation survey** with collection of data on the number and type of waste bins presented by households, including their respective weights, on designated Dt-D collection days for each waste collector and waste stream in each area. This analysis took place before and after the awareness campaign to assess the pilot's impact.
- **A teaser leaflet on how to use the Brown bin** was delivered a few weeks before the awareness campaign started.
- **An information leaflet**, created by the national programme www.brownbins.ie, distributed to every household in Sligo City, customised with specific local contact details for Sligo residents.
- **A launch event** was conducted at the Institute of Technology Sligo's car park on a Saturday when the farmers market was taking place, including free compost give-away to the public.
- **Provision of collection tools:**
 - A 7-litre kitchen caddy (vented- or solid sided) with a sticker on it explaining what types of food waste can go into the caddy.
 - A roll of compostable bags.
- **The hiring of three interns as Waste Management Advisors**, who undertook the operational roles in the project, including:
 - Developing communication tools;
 - Providing D-t-D advice to 6,000 households in Sligo City;
 - Conduction of household surveys;
 - Bin presentation survey;
- **Media coverage:** Publications in local newspapers and radio interviews.



Key results	
Brown bin presentation	<p>Before the awareness work, only 37% of the households which were signed up to a brown bin service, were using it. After the awareness initiative, the recorded presentation increased to 70% with the greatest increase being recorded in Area A.</p> <p>The number of households presenting their brown bins on collection days increased significantly in all areas:</p> <ul style="list-style-type: none"> ● In Area A it increased from 359 households to 1,235. ● In Area B it increased from 267 to 353 households. ● In Area C it increased from 884 to 1,293.
Change in participation	<ul style="list-style-type: none"> ● 25% in all areas ● +51% in Area A ● +8% in Area B ● +16% in Area C <p>On average, participation doubled in Areas A and C, which received awareness information and collection tools, compared with those which did not.</p>
Bio-waste collection	<ul style="list-style-type: none"> ● 2.55 kg/household/wk in Area A = +1.93 kg/household/wk ● 1.06 kg/household/wk in Area B = +0.49 kg/household/wk ● 2.24 kg/household/wk in Area C = +1.05 kg/household/wk <p>The rate of kitchen waste capture doubled on average in Areas A and C - where residents received awareness-raising information and collection tools (Areas A and C) compared with those who did not (Area B).</p>

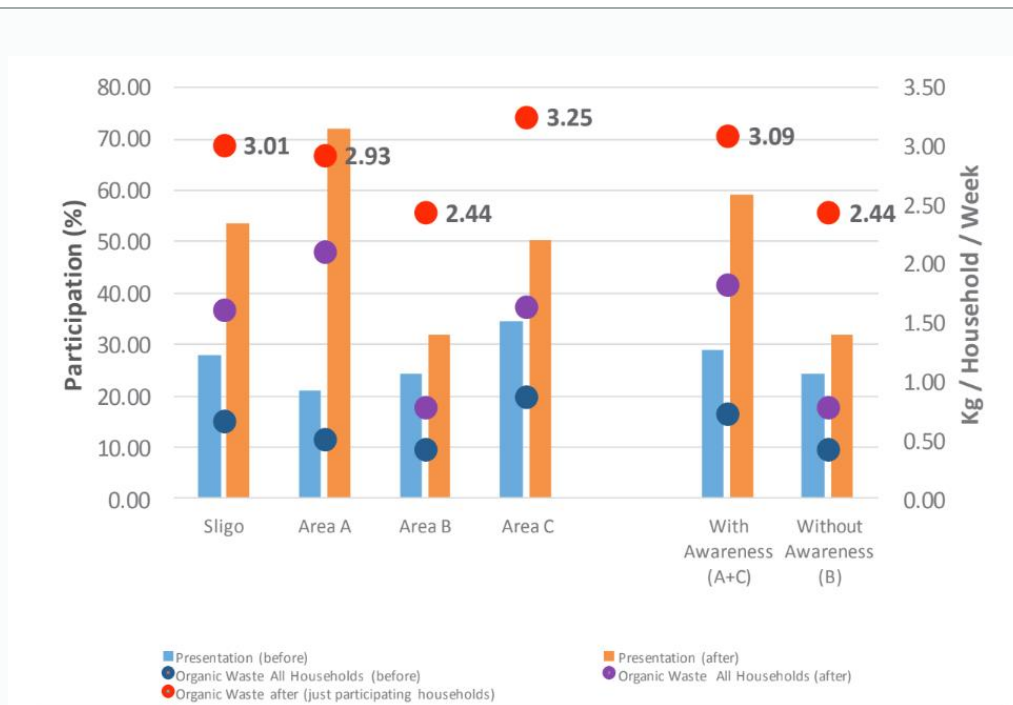


Figure 1. Overall impact of awareness in Sligo, by Area and awareness type.

Impurities in bio-waste (% of weight)

- On average per week, prior to the awareness programme, every brown bin presented in Sligo contained 0.49 kg of contamination (17% of contamination)
- The level of impurities in the brown bins dropped to an average of 2.5% in all areas after the trial (-86%)
- Decreased from 23% to 1% in Area A (-96%)
- Decreased from 20% to 6% in Area B (-70%)
- Decreased from 14% to 3% in Area C (-79%)

It's worth noting that at the start of the project, Area A had the highest level of contamination. Areas that received awareness-raising information and collection tools (Areas A and C) presented the lowest amount of contamination in comparison with those who did not (Area B).

A year later after the project was finished; Area A was investigated, and it was determined that the contamination level was still at a low level of 3%.

	Area A		Area B		Area C	
Brown Bin	Before	After	Before	After	Before	After
Plastics contamination	8	1	7	4	8	2
Total contamination	23	1	20	6	14	3
Dry-recycling Bin						
Organic waste	4	4	3	7	5	5
Total contamination	17	24	28	32	28	20
Residual Bin						
Organic waste	41	35	39	28	36	26

Table 1. Levels of contamination and organic waste in the three bins in each Area.

Bio-waste in residual waste (% of weight)

- Reduction in the quantity of kitchen waste in residual waste from 39% to 29%.
- -6% in Area A after the trial
- -11% in Area B after the trial
- -10% in Area C after the trial

Lessons-learned

The face-to-face awareness-raising discussions conducted by trainees in all areas before the pilot implementation highlighted several key findings:

- Many households were found to be unaware of what items should be placed in the brown bin, indicating a need for clearer guidelines and education.
- 25-litre bins were perceived as too heavy for the elderly when filled. Additionally, some individuals considered them too small.

Despite these initial concerns, the post-pilot survey in Sligo town indicated that, on average, 78% of households found the kitchen caddy distributed very useful. Such results suggest that providing households with a 7-litre kitchen caddy, along with a roll of compostable bags and information leaflets, could lead to a significant increase in both the quantity and quality of separately collected food waste. These insights from the pre-pilot discussions and post-pilot survey emphasise the importance of addressing community concerns and tailoring the waste collection approach to meet the specific needs and preferences of residents. In comparison, awareness-raising talks provided in people's homes by council technicians appeared to be the option with the least impact on food-waste separate collection.



Which of the following most encouraged you to recycle food waste using the brown bin?

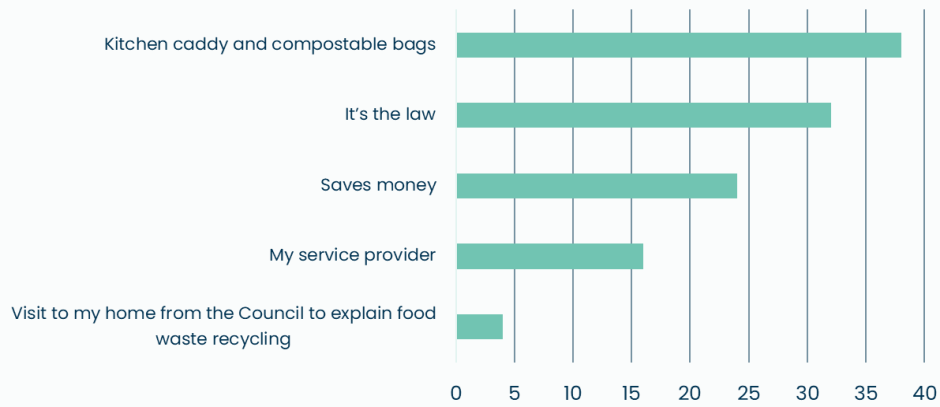


Figure 2. Results from an online survey emailed by a waste collector to their customers in Sligo City.

N°9: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Germany: Bio-waste bin visual inspection campaign in Kreis Borken

In recent years, the Borken district authorities (Kreis Borken) initiated a pilot project in collaboration with the waste management company and waste advisory services from district municipalities. The primary objective of this project was to decrease impurities in the bio-waste bin through regular visual inspections and a communication campaign. The initiative successfully promoted proper sorting of bio-waste, which ultimately minimized the contamination of bio-waste with plastics and other pollutants. Encouraged by the positive results of the pilot project, which led to up to 90% reduction in the impurity content of the organic fraction, local authorities and the waste management company have decided to continue inspecting bio-waste bins throughout 2024, with the aim of achieving 100% population coverage by the end of the year.

KREIS BORKEN		
Population	Density (inhab./km²)	Type
37,900	267	Rural to semi-urban settlement structure
Background elements		
<p>In Borken, approximately 1.3% of the waste management budget is generally allocated for communication and educational activities (as indicated in the 2023–2024 economic planning).</p> <p>In 2019, Borken district authorities, in collaboration with the waste management company and waste advisory services from the district municipalities, launched a pilot project with the primary goal to reduce impurities in the bio-waste bin through regular visual inspections and a communication campaign, promoting active citizen participation and proper bio-waste sorting, ultimately minimising contamination.</p> <p>A wide range of communication tools have been developed to mitigate the risk posed by the contamination of bio-waste including plastic bags, coffee capsules, nappies as well as compostable bags, as this represents a significant technical and economic burden leading to higher operating costs and affecting the quality of the compost produced. Further concerns arose regarding the possibility of batch rejection due to compliance issues with revised bio waste regulations. There was also a heightened worry</p>		

about introducing microplastics into the environment due to the improper disposal and processing of bio waste containing plastic contaminants.

Bio-waste collection model

Borken is a German district located in North Rhine-Westphalia on the border with the Netherlands. The district comprises 17 municipalities, with a mix of smaller villages and towns.

Separate collection of bio-waste started in 1995 in Borken, involving the use of "Biotonnen" (bio waste bins) distributed to households by the municipality or contracted third parties. Over 90% of the district residents are provided with these dedicated bins meant for collecting kitchen and garden waste together (the remaining 10% have opted for home composting). Bio-waste collection occurs on a regular schedule, typically every two weeks. Additionally, residents have the option to use the *Grüngut* system for garden and park waste, by bringing these materials to designated drop-off points, during the respective opening hours.

The bio waste separately collected is then handled at the composting plant operated by the district-owned waste management company, [Entsorgungsgesellschaft Westmünsterland](#), which facilitates the production of compost and biogas.

Best Practices description

The **bio-waste bin inspection initiative** across the Borken District involved several aspects and steps:

- **Bin inspectors** were hired for the project to oversee these inspections.
- **Inspections** were conducted **across all municipalities** from the district and every neighbourhood;
- Organisation of **inspections at two-week intervals**, with different stages of progress ("yellow" inspection, "red" inspection, follow-up inspection);
- **Yellow and red bin tags** were used, displaying notices regarding improper waste disposal along with sorting instructions;
- **Red-marked bio bins were not emptied**, and citizens were encouraged to re-sort their waste before the next collection;
- **A geo-based app** was used by the district administration for detecting and localising repeated sorting errors in bio bins;
- **Documentation**, including images, was **stored in a cloud database** for record-keeping purposes;
- **Real-time information** was provided to responsible officials within municipal administrations **for effective complaint management**;

- Plans were made to enhance bin inspections through **detection systems in collection vehicles.**



Image 1. Bin inspection.

Das gehört in die Biotonne

Aus der Küche:

- Gemüsereste, Salatreste, Obst (auch von Südfrüchten)
- Speisereste, gekocht und roh
- Fisch-, Fleisch-, Lebensmittelreste (auch verderben)
- Kaffeersatz, Tee, zerreibbare Kaffeefilter und Teebeutel
- Brotreste, Backwaren, sonstige Mehlprodukte
- Milchprodukte (nicht flüssig)
- Nuss-, Eierschalen
- Topf-, Schnittblumen (ohne Topf, Bindedraht o.ä.)

Aus dem Garten:

- Rasenschnitt, Baum-, Strauch- und Heckenschnitt
- Laub/Nadeln, Ernterückstände, Fallobst
- Blumen- und Pflanzenreste
- kranken Pflanzen, Unkraut und Moos

Sonstiges:

- Kleintierstreu (nur Späne, Sand), Stroh

Für die Hygiene der Biotonne sind zum Sammeln und Einwickeln feuchter Bioabfälle erlaubt:

- Küchenkrepp, Papiersammeltüten
- Zeitungspapier (kein Hochglanzpapier)

Das gehört nicht in die Biotonne

Plastikartikel:

- verpackte Lebensmittel
- Abfallbeutel, Plastiktüten
- Kaffee-/Teekapseln
- Hundekotbeutel
- Frischhaltefolie

Kompostierbare Kunststoffe:

- Bioabfallbeutel
- Bioeinweggeschirr und -schalen, Bioeinwegbesteck

Hygieneartikel:

- Windeln, Binden, Tampons, Kosmetikartikel

Mineralien:

- Bauschutt, Bodenaushub, Straßenkehrrecht, Steine

Restmüll:

- Staubsaugerbeutel, Gummi, Asche, Wachs, Zigarettenstummel, Tapeten, Pizzakartons, Korken

Flüssigkeiten:

- Speiseöl, Frittierfett

Aluminium, -folie:

- Kaffee-, Expressokapseln

Glas:

- Gläser mit Lebensmittelresten, Arzneifläschchen

Verpackungen:

- aus Kunststoff, Metall, Verbundstoff

Die aufgeführten Listen stellen nur einen Auszug dar. Bei Unsicherheiten zur Sortierung melden Sie sich gerne bei uns! **Tipps zur Abfalltrennung finden Sie auch unter www.egw.de**

Image 2. Yellow Tag regarding improper waste disposal along with sorting instructions.

Das können Sie besser!

Ihre Biotonne wurde heute, am _____ überprüft.
Leider enthielt sie **folgende Störstoffe**, die nicht hineingehören:

Müllbeutel aus Plastik, Plastiktüten, kompostierbare Folienbeutel, Kotbeutel, Kaffee kapseln

Nicht kompostierbare Abfälle (z.B. Verpackungen, Kunststoff, Metall, Glas, Windeln, Zigaretten)

Ihre Störstoffe verunreinigen unseren Kompost!

In den kommenden Wochen werden wir weitere Kontrollen durchführen. Sollte die Biotonne dann wieder Störstoffe enthalten, wird die Tonne nicht geleert.

Informationen rund um Abfall erhalten Sie hier:

Sie können für die Sammlung von Bioabfällen Papiertüten oder Zeitungspapier nutzen. Aber **niemals Kunststoffbeutel!**

Image 3. Yellow Tag regarding improper waste disposal along with sorting instructions - "You can do better!"

Das gehört in die Biotonne

Aus der Küche:

- Gemüsereste, Salatreste, Obst (auch von Südfrüchten)
- Speisereste, gekocht und roh
- Fisch-, Fleisch-, Lebensmittelreste (auch verdorben)
- Kaffeesatz, Tee, zerreibare Kaffeefilter und Teebeutel
- Brotrreste, Backwaren, sonstige Mehlprodukte
- Milchprodukte (nicht flüssig)
- Nuss-, Eierschalen
- Topf-, Schnittblumen (ohne Topf, Bindedraht o.ä.)

Aus dem Garten:

- Rasenschnitt, Baum-, Strauch- und Heckenschnitt
- Laub/Nadeln, Ernterückstände, Fallobst
- Blumen- und Pflanzenreste
- kranke Pflanzen, Unkraut und Moos

Sonstiges:

- Kleintierstreu (nur Späne, Sand), Stroh

Für die Hygiene der Biotonne sind zum Sammeln und Einwickeln feuchter Bioabfälle erlaubt:

- Küchenkrepp, Papiersammeltüten
- Zeitungspapier (kein Hochglanzpapier)

Das gehört nicht in die Biotonne

Plastikartikel:

- verpackte Lebensmittel
- Abfallbeutel, Plastiktüten
- Kaffee-/Teekapseln
- Hundekotbeutel
- Frischhaltefolie

Kompostierbare Kunststoffe:

- Bioabfallbeutel
- Bioeinweggeschirr und -schalen, Bioeinwegbesteck

Hygieneartikel:

- Windeln, Binden, Tampons, Kosmetikartikel

Mineralien:

- Bauschutt, Bodenaushub, Straßenkehricht, Steine

Restmüll:

- Staubsaugerbeutel, Gummi, Asche, Wachs, Zigarettenstummel, Tapeten, Pizzakartons, Korken

Flüssigkeiten:

- Speiseöl, Frittierfett

Aluminium, -folie:

- Kaffee-, Expressokapseln

Glas:

- Gläser mit Lebensmittelresten, Arzneifläschchen

Verpackungen:

- aus Kunststoff, Metall, Verbundstoff

Die aufgeführten Listen stellen nur einen Auszug dar. Bei Unsicherheiten zur Sortierung melden Sie sich gerne bei uns! **Tipps zur Abfalltrennung finden Sie auch unter www.egw.de**

Image 4. Red Tag regarding improper waste disposal along with sorting instructions.

IHRE BIOTONNE KONNTE NICHT GELEERT WERDEN.

Ihre Biotonne wurde heute, am _____ überprüft. Leider enthielt sie **folgende Störstoffe**, die nicht hineingehören:

Müllbeutel aus Plastik, Plastiktüten, kompostierbare Folienbeutel, Kotbeutel, Kaffee kapseln

Nicht kompostierbare Abfälle (z.B. Verpackungen, Kunststoff, Metall, Glas, Windeln, Zigaretten)

Ihre Störstoffe verunreinigen unseren Kompost!
Deshalb wurde diese Biotonne nicht geleert. Bitte entfernen Sie die Störstoffe, damit die Biotonne bei der nächsten Abfuhr geleert werden kann.

Informationen rund um Abfall erhalten Sie hier:

Sie können für die Sammlung von Bioabfällen Papiertüten oder Zeitungspapier nutzen. Aber **niemals Kunststoffbeutel!**

Image 5. Red Tag regarding improper waste disposal along with sorting instructions – "Your bio-waste bin could not be emptied".

A diverse range of awareness-raising activities have been conducted in parallel:

- Promoting **paper bags** as a tool to make the system clean, user-friendly, and maximise participation and captures
- **Campaign against plastic in bio waste bins:** Local authorities engaged in the [#wirfuerbio](#) – *Kein Plastik in die Biotonne* (zero plastic in the brown bin) – campaign and participated in the regional network of waste management in Westphalia to discourage the use of plastic bags for bio waste collection while encouraging proper waste sorting.
- Participation in a **nationwide campaign for bio-waste bin inspection**, with television and radio coverage, and press articles.
- **Compost action days with awareness programme:** Compost action days at the recycling centre were conducted in order to raise awareness of the problem of plastic impurities found in the bio bins.
- **Awareness through extracurricular learning for schools and daycare centres:** Educational programmes for school classes and daycare centres were offered, lending out special "waste kits," conducting workshops on bio waste, and organising tours of the bio-waste composting facility.



Image 6. Workshop during the European Week for Waste Prevention.

Promotional activities were carried out to inform citizens about the upcoming bio-waste garbage can inspections, using a wide variety of channels:

- **Mailing campaigns** were conducted around 2 to 3 weeks ahead of the initial bin inspections. These mailings included a paper bag for the bio-waste bin, flyers containing sorting guidelines available in 12 languages (e.g "What does and does not go in the bio-waste bin?"), and stickers discouraging plastic disposal in the bio bin.
- **Banners** promoting the #wirfuerbio campaign were displayed in public areas.
- The municipalities issued **press releases** to inform the public about the upcoming inspections.
- **Notifications** were sent through the **waste management app** ([ABFALL APP WESTMÜNSTERLAND](#)), alerting users about the impending inspections, offering quick access to collection schedules, guides on waste and recyclables, overview of disposal locations with routing functions, etc.
- **Information** regarding the inspections was shared on **social media platforms** such as Instagram and Facebook.
- **Flyers** were distributed at locations such as town halls to further inform and engage the public.

	Inspections will continue in 2024, and 100% coverage will be achieved by the end of the year.
Bio-waste collection per capita	198 kg/inhab./yr (which represents 41% of the total amount of household waste generated). Increase of +35 kg/inhab./yr in the volume of collected bio-waste by extending the collection interval from 2 to 4 weeks.
Impurities in bio-waste (% of weight)	2% impurity content after the project implementation in all municipalities. Before the introduction of the bio waste bin controls, the level of impurity was 4%.
Bio-waste in residual waste (% of weight)	20% of residual waste is bio-waste.

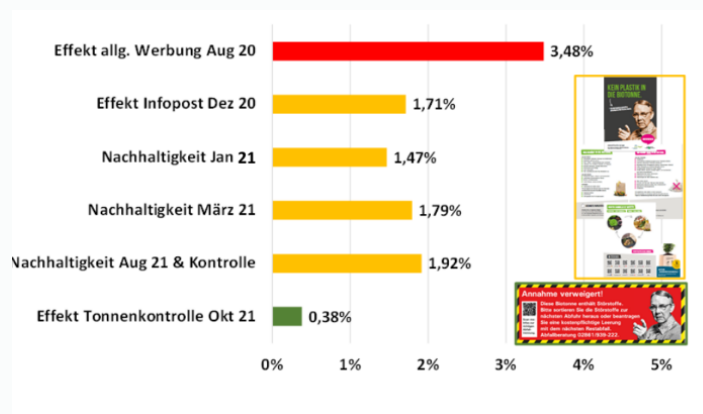


Figure 1. Impact of mailing campaign and bin inspection on the reduction of impurity levels in the bio-waste fraction (this result reflects the effects of each communication tool used in the pilot area).

Lessons-learned

- The **use of yellow and red waste tags along with sorting instructions** proved to be extremely **effective in reducing impurity levels**.
- **Educational tools and incentives** (workshops, mailing campaigns) complement and **reinforce the effect of penalties** for incorrect filling.
- The **district-wide consensus** among all municipalities for the execution of bio-waste bin inspections by the district-owned waste management company contributed to **enhance the campaign's effectiveness**.



- **Cell phone apps facilitate the documentation and follow-up inspection of bio-waste bins.**
- **The effect of the inspections and mailing campaigns tends to decrease over time**, which proves that repeated communication and control measures are necessary to keep contamination levels consistently low.

N° 10: Factsheet on Exemplary Communication and Engagement Strategies for bio-waste collection | Sweden: Lessons from behavioural economics in Hökarängen, Stockholm

From January 1, 2015, to December 31, 2016, a group of three behavioural science researchers studied the effect of an information leaflet on the behaviour of residents regarding sorting their kitchen waste in the Hökarängen district of Stockholm. The leaflet, based on behavioural knowledge and distributed to households in a specific focus group, led to a reduction in the residual waste and an increase in the sorting of food waste compared with a control group.

This case study is noteworthy for demonstrating the effectiveness of personalised communication strategies in encouraging environmentally friendly behaviour. Key lessons include the importance of understanding target-groups' needs and barriers, harnessing behavioural knowledge and testing strategies on a small scale before implementing them.

HÖKARÄNGEN	
Population	Type
10,304 (2021)	Urban neighbourhood
Background elements	
<p>Hökarängen is a city district in southern Stockholm, Sweden. Most households in Hökarängen lacked the means to separate their kitchen-waste until Stockholmshem, the largest housing company in Stockholm, initiated a project in 2014.</p> <p>This project aimed to provide residents with stationary sorting stations outside apartment complexes to facilitate kitchen waste sorting, aligning with Swedish environmental policy goals. However, despite informational efforts by Stockholmshem, only a few households were sorting their food waste each year after the pilot began.</p> <p>In response to these unsatisfactory results, Stockholmshem collaborated with researchers specialising in behavioural science – Noah Linder, Therese Lindahl, and Sara Borgström. Together, they developed an information leaflet rooted in insights from nudging and community-based social marketing to promote kitchen waste sorting.</p> <p>The effect of this leaflet on citizens' participation in the system was then evaluated over two years using a difference-in-difference analysis, a statistical technique used to</p>	

estimate the causal effect of a treatment or intervention by comparing the changes in outcomes over time between a group that received the treatment and a control group that did not, with a treatment and control group.

Best Practices description

When crafting the information leaflet, the researchers focused on theories from environmental psychology and behavioural economics. They identified and followed **four key phases crucial for effectively promoting pro-environmental behaviours**, defined as any human behaviour that benefits the environment or minimises harm:

- 1. Identification of the behaviour to be changed:** The researchers, in collaboration with Stockholmshem, decided to focus on promoting the behaviour of kitchen waste sorting.
- 2. Examination of the main factors underlying this behaviour:** A pilot study was conducted to learn about the area and uncover internal and external barriers for the residents to sort their kitchen waste and to estimate roughly who was already doing so. The pilot study was carried out in two phases:
 - **The first part of this task** involved visiting and learning about the research area through **surveys** distributed to 92 households in the research area (20%). The targeted households were provided with information about bio-waste and asked to answer a few questions about their habits. The following barriers were identified:
 - Lack of information;
 - Difficulty distinguishing between kitchen waste and mixed waste bins;
 - Lack of trust in the efficiency of the system;
 - Inconvenience of sorting kitchen-waste at home;
 - Need for compostable bags;
 - Laziness;
 - Language barrier to understand the information sent out;
 - Unpleasant odours from kitchen waste sorting stations during summer;
 - Difficulty in opening the sorting station (requiring a key).
 - The second part of this phase involved an analysis of kitchen and household mixed waste data to decide how to divide the area into a control- and a treatment group.



Once the barriers had been identified, a literature review was done to identify suitable tools for addressing them.

3. Begin the implementation of actions to change behaviour:

Based on the barriers and behavioural insight tools identified in step 2, a **three-page long information leaflet** was created to address them, including:

- The front page (see figure below), tailored to target the initial barriers of the lack of information and difficulty in distinguishing between the bins, was carefully designed. The subtitle of the information leaflet uses a descriptive social norm to encourage kitchen-waste sorting.
- **Straightforward and relatable messages** such as (translated) “If all households in Hökarängen would sort their food waste it would be enough biofuel to support 15 garbage trucks for a year” were incorporated, so to be easily understood and more likely to be remembered.
- The information shared in the leaflet was framed to align with **community injunctive norms**, emphasising statements like “People in Hökarängen believe recycling food waste is the right thing to do.” These were coupled with **descriptive norms** like “Join your neighbours (...) recycle your food waste”. This approach underscored both the community’s moral stance and the collective action of neighbours, reinforcing the persuasive effect of the message.
- To overcome the challenges of laziness and the inconvenience associated with sorting kitchen waste at home, as well as fulfilling households expressed need for compostable bags, **two paper compostable bags were included in the envelope along with the leaflet**. Additionally, a picture of a kitchen caddy installed in a kitchen was added to the leaflet, demonstrating its compact size, along with information on where to obtain such containers and paper bags for free.



Image 1. Picture of the front page of the information leaflet (translated from Swedish) taken by one of the authors of the study.

Source: Picture taken from Linder, N., Lindahl, T., & Borgström, S. (2018). Using Behavioural Insights to Promote Food Waste Recycling in Urban Households—Evidence from a Longitudinal Field Experiment. *Frontiers in Psychology*, 9, Article 352. <https://doi.org/10.3389/fpsyg.2018.00352>

4. Evaluation of the effects of implementation

The implementation of the communication strategy was experimented on a small scale at first, before rolling out to the rest of the district. Such a strategy was adopted to avoid expensive failures in case of unexpected results.

A treatment and control group were therefore established (see figure below), each corresponding to a specific zone within the district. All houses located within the treatment group area (264 households) received the information leaflet, while the remaining 210 households in the control group received no information. It's noteworthy to mention that the experiment was conducted without the residents being informed, aiming to minimise any potential influence on the results. A difference-in-difference analyses was used to evaluate the effects of the intervention and its effectiveness in promoting kitchen waste sorting among the residents from the treatment group. Data from the 9 sorting stations in the research area, within both groups, were collected before and after implementation, over a 2-year period, and compared accordingly.



Image 2. Satellite picture of the research area. The blue area represents the treatment group. The red area represents the control group. The red and blue stars show where the sorting stations are located.

Source: Google, Kartdata. Picture taken from Linder, N., Lindahl, T., & Borgström, S. (2018). Using Behavioural Insights to Promote Food Waste Recycling in Urban Households—Evidence From a Longitudinal Field Experiment. *Frontiers in Psychology*, 9, Article 352. <https://doi.org/10.3389/fpsyg.2018.00352>

Methodology:

- Data collected from January 1st, 2015, to December 31st, 2016 (two years) - from 9 sorting stations in the whole research area (5 in control group, 4 in treatment group).
- Waste weighed and reported by waste collection vehicles during each collection.
- Kitchen waste was measured every second week on average - for 373 kitchen waste collection rounds analysed.
- Household waste collected more frequently - total of 756 collections

Key results

Residual waste collected (in the treatment group compared to the control group)

The average amount of residual waste collected was 53.42 kg more in the treatment group compared to the control group before the leaflet was distributed.

After the leaflet was sent out - an average of 185.01 kg less household waste was



	collected in the treatment group compared to the control group.
Food waste collected (in the treatment group compared to the control group)	Before the intervention, the treatment group produced 19.64 kg more food waste on average per station, compared to the control group, and after the intervention, this difference increased to 31.96 kg.

This suggests that the intervention has had the desired effect on both increasing the amount of food waste collected and reducing residual waste in the treatment group compared to the control group.

Lessons-learned

- **Identifying the target audience’s needs, preferences, and barriers** is a crucial step in developing any effective communication strategy. The messages and activities designed can therefore be better adapted to meet the needs of the audience and their specific concerns.
- **Drawing from insights from behavioural science**, such as social norms and descriptive norms, can enhance the effectiveness of communication activities.
- **Starting with small-scale implementation** allows for testing and refining communication strategies before full-scale rollout. This iterative approach can help identify what works best for engaging the target audience.



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