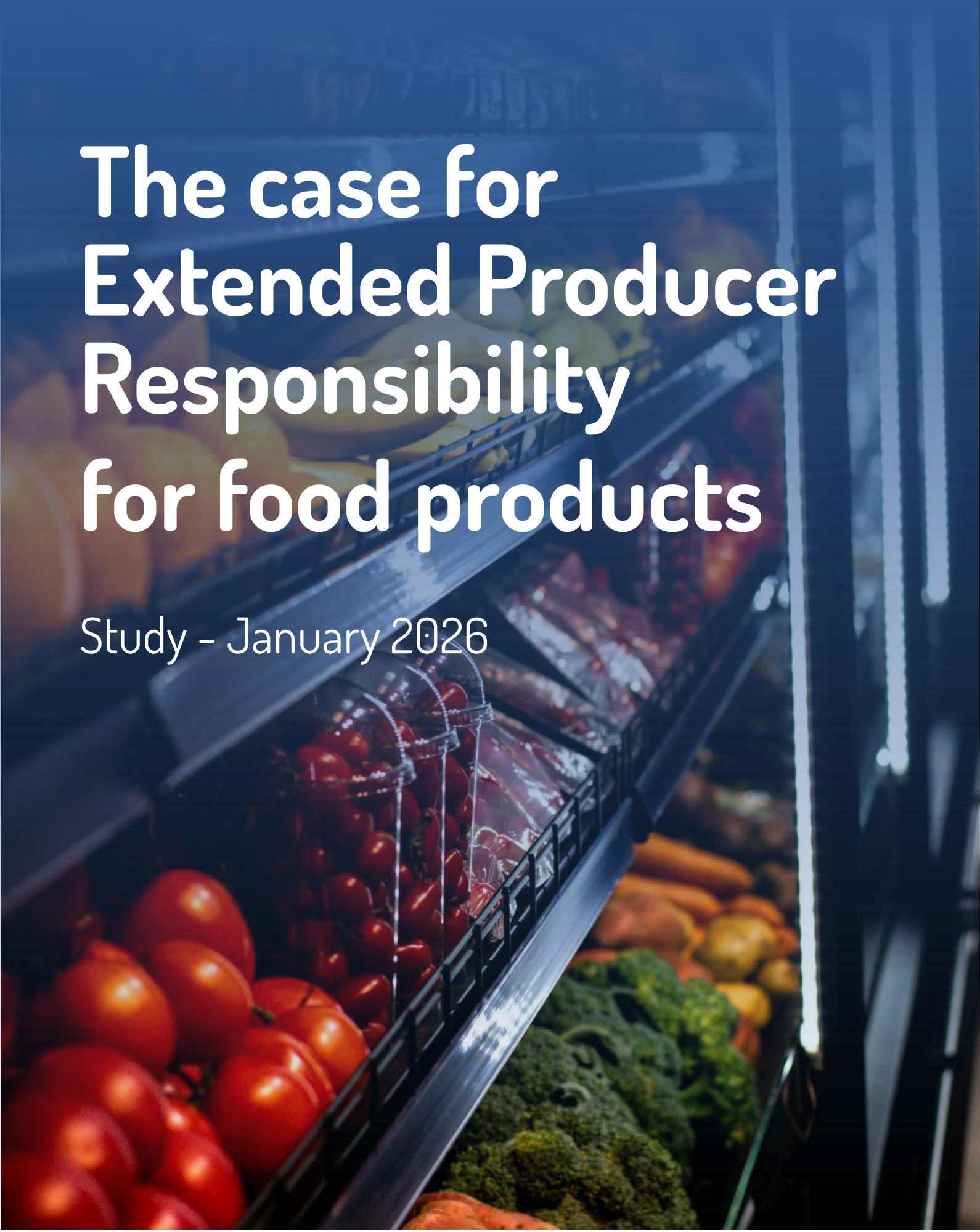
The case for Extended Producer Responsibility for food products

Study - January 2026



Bio-based Industries Consortium

ZERO WASTE EUROPE

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1. Executive summary

The European Union faces a critical resource efficiency challenge: food waste represents 8-10% of global greenhouse gas emissions while EU citizens generate 129kg of food waste per year. Despite the 2024 EU mandate requiring separate collection of bio-waste, only 26% of kitchen waste is successfully captured, with current food waste collection at just 15.1 million tonnes annually—far below the theoretical potential of 60 million tonnes.

The EU has established legally binding food waste reduction targets for 2030: 30% reduction per capita at household/retail/restaurant levels and 10% reduction at the manufacturing level. However, implementation faces significant economic and operational barriers, as municipalities lack (financial) incentives to establish prevention and separate collection schemes, and the overhead costs deter local authorities from adopting necessary measures.

Could Extended Producer Responsibility for Food Products (EPRFP) be a solution?

This study analyses how implementing EPRFP could address food waste prevention and collection challenges. Unlike traditional waste management funding for bio-waste that relies entirely on public authorities and taxpayers, EPRFP would shift partial financial and operational responsibility to actors who can significantly influence consumer behaviour and waste generation patterns.

Scope and coverage

Products included: All solid food products likely to end up in bio-waste collection and used cooking oils.

Actors responsible: Those placing products on the market:

- Wholesalers
- Retailers (for sales of their own white label products)
- Importers

Financial framework

The study analyses potential cost coverage models and suggests that, in order to align and work towards the food waste prevention and separate collection legal obligations, a comprehensive coverage is preferable. This

cost coverage would include: prevention programs, food redistribution schemes, consumer education, and innovation research necessary to meet the food waste targets, as well as responsibility for the separate collection and treatment of bio-waste.

The advantages of EPRFP would be:

Environmental impact: Millions of tonnes of food waste diverted from landfills and incinerators, reduced methane and CO_2 emissions, and soil regeneration.

Economic efficiency: Shifts costs from municipalities to producers, creates prevention incentives, and increases the cost-efficiency of collection systems.

Innovation driver: Stimulates food waste reduction technologies and circular food systems by using Extended Producer Responsibility (EPR) fees to finance research and innovation in food waste prevention, as well as supply feedstock for biomaterials.

Job creation: New employment in food waste prevention, collection and waste management sectors.

The challenges and mitigation of implementing EPRFP would be:

Cost pass-through: Fees would likely be passed on to consumers. However, consumers already pay waste management costs via local taxes. Therefore, EPRFP would reorganise and optimise payment flows, rather than creating new costs.

Administrative complexity and inconsistencies: Lack of consistent application across the EU, leading to disparities in the implementation by EU Member States. This could be addressed through clear definitions, robust enforcement, transparent governance structures and building on existing data.

Implementation strategy

In order to implement EPRFP, and based on the proposals by the EU BIOBEST project, the study argues that setting a food waste target within the residual waste stream is the best way forward. The EPRFP would therefore have the goal of financing the means to meet the food waste prevention and collection target.

Conclusion

EPRFP is an economic instrument worth considering to address the EU's food waste crisis by creating dedicated funding streams for prevention and collection activities while aligning financial responsibility with actors who have significant influence over waste generation. The system could support achievement of the 2030 food waste reduction targets while advancing the EU's circular economy and bioeconomy strategies.

2. Introduction

The EU is a resource poor continent with a vibrant food industry, despite having increasingly degraded soils. Resource efficiency has been a priority for the EU for decades, but the fact is that the EU continues to waste food at alarming rates, whilst failing to capture food waste to reintroduce the nutrients and materials into the production cycle.

The ongoing multiple crises make action in the field of resource efficiency more urgent than ever, and organising the way the EU manages its biomaterials is key to the EU's resilience and strategic autonomy.

The EU's biomaterials include wood, paper, natural fibres, agricultural biomass, bio-waste, industrial organic byproducts, etc. This study focuses on bio-waste, or organic waste, which refers to biodegradable materials such as food scraps, kitchen waste, and garden waste from households, restaurants, and food processing plants. This type of waste can undergo biological decomposition and has a high potential to be prevented and/or recycled, to produce high-quality compost for use as a soil improver, as well as feedstock for biomaterials.

The Waste Framework Directive defines bio-waste as the **biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants**.

Given the latest legislative developments in the field of food waste prevention, collection and treatment, the importance that the bioeconomy plays in the future of the EU[1] and the lack of economic incentives in this field, this study explores the possibility of using EPR as a way to finance prevention, collection and treatment of bio-waste in the EU.

[1] "Bioeconomy Strategy." 2018. European Commission. environment.ec.europa.eu/strategy/bioeconomy-strategy_en

3. The importance of fighting food waste

3.1. Impact of food waste and legal framework

Preventing food waste has huge environmental, social, and economic benefits. European citizens generate on average 130kg of food waste per capita.[2] Households generate over half of the food waste (53%). About 9% of the waste (12 kg per inhabitant) comes from primary food production such as farming, and 18% (23 kg per inhabitant) comes from the processing and manufacturing sector.

Restaurants and food services account for 12% of the food waste (15 kg per inhabitant), and retail and food distribution for another 8% (10 kg per inhabitant).

Food waste is responsible for 8-10% of global greenhouse gas (GHG)[3] emissions and uses an estimated 28% of the world's agricultural land.[4] This land could otherwise enhance food security, nature restoration and biodiversity. To meet its 2030 climate goal[5] of a 55% reduction, the EU must double its pace in reducing greenhouse gas emissions, and food waste reduction plays a key role as it represents approximately 15% of the total GHG footprint of the EU's food system.[6]

The UN Sustainable Development Goals (SDG 12.3 – Responsible Consumption and Production) state: "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses."

[2] "Food waste in Europe: facts, EU policies and 2030 targets." 2025. European Parliament www.europarl.europa.eu/pdfs/news/expert/2024/3/story/20240318STO19401/20240318STO19401_en.pdf

[3] "Special Report on Climate Change and Land." 2019. United Nation's Intergovernmental Panel on Climate Change (IPCC). www.ipcc.ch/srccl

[4] FAO Knowledge Repository. 2025. Food and Agricultural Organization of the United Nations (FAO). www.openknowledge.fao.org

[5] "EU Climate Advisory Board: Focus on Immediate Implementation and Continued Action to Achieve EU Climate Goals." 2024. European Scientific Advisory Board on Climate Change. climate-advisory-board.europa.eu/news/eu-climate-advisory-board-focus-on-immediate-implementation-and-continued-action-to-achieve-eu-climate-goals

[6] "Transforming Europe's Food System — Assessing the EU Policy Mix." 2023. Europea Environmental Agency (EEA). www.eea.europa.eu/en/analysis/publications/transforming-europes-food-system

However, given the voluntary nature of SDGs, the EU has included food waste prevention targets in the 2025 revision of the Waste Framework Directive. If implemented, this would mean that the EU would have legally binding food waste reduction targets for all Member States. These targets will be (applied in comparison to the amount generated as an annual average between 2021 and 2023):

- 30% reduction per capita at the household, retail, and restaurant levels by 31 December 2030;
- 10% reduction at the manufacturing level by 31 December 2030.

Some EU Member States actually have higher targets and ambitions than this, aligning themselves with the UN's Sustainable Development Goals of a 50% reduction in food waste by 2030.

3.2. Economic incentives to reduce food waste

According to the policy recommendations of the EU-funded project FUSIONS (Food Use for Social Innovation by Optimising waste preventioN Strategies):
"The most significant barrier identified within the FUSIONS Feasibility Studies concerns the way to achieve a sustainable financing of socially innovative projects."[7]

There are several economic incentives that can be used to incentivise the reduction of food waste.

Tax incentives

Food donation tax benefits

- **Tax credits for food donation**: 60% in France, 35% in Spain, and proposed 20% in Italy (from corporate income tax based on donated food value)
- **VAT exemption on donated food**: Eliminating VAT requirements when food is donated to charitable organisations (abandoning VAT rather than valuing at zero)
- **Tax deductions**: Treating food donations as deductible tax expenses to reduce taxable income

[7] "Food Use for Social Innovation by Optimising waste prevention Strategies" 2021. CORDIS. European Commission. cordis.europa.eu/project/id/311972

Product-level tax incentives

- **Minimal VAT on healthier foods**: Reduced VAT on fruit, vegetables, legumes, and nuts to make healthier, less waste-prone foods more affordable
- **Reduced taxes on circular activities**: Lower taxes on labour dedicated to circular economy activities

True-Cost Pricing

- **Externality-based pricing**: Reflecting environmental impact and waste generation in food prices so that unsustainable products become relatively more expensive

Subsidies and grants

Business and innovation support

- **Subsidies for**:
    - Surplus food donation activities
    - Collecting leftover crops from fields, orchards, and gardens after the commercial or main harvest has been completed
    - Knowledge exchange and cooperation between food chain operators
    - Food waste prevention and reduction projects
    - Development of new food waste reduction technologies
    - Creating enabling environments for social innovation projects
    - Food waste reduction technologies for businesses
    - Equipment and machinery for charities (transport, food preservation)

Infrastructure and systems

- **Financial support for**:
    - Shops offering food in bulk, reducing packaging-driven waste
    - Local and organic farming practices to shorten supply chains and reduce waste
    - Separate collection and treatment infrastructure development

Public procurement and institutional measures

- **Green Public Procurement (GPP) criteria**: Including food waste prevention requirements in public tenders for food and catering services
- **Public procurement rules**: For canteens, schools and institutions to prioritise waste reduction and better storage
- **Support for local farming**: Helping shorten supply chains and reduce waste through procurement policies
- **Fine or ban supermarkets from throwing away or destroying unsold food**. Supermarkets with a floor area exceeding X square meters are required to establish donation agreements with charities[8]

Redistribution and donation incentives

Mandatory and voluntary schemes

- **EU-wide food donation schemes**: Encouraging food business operators to distribute unsold edible food to charities
- **Mandatory or incentivised redistribution**: Surplus food redirected rather than wasted (with enabling legislation)
- **Food bank support**: VAT harmonisation and fiscal incentives across Member States

Community Initiatives

- **Community fridges and sharing initiatives**: Financial or logistical backing for local food sharing programs
- **Food surplus social innovation networks**: Support for projects connecting donors with recipients

Waste management incentives

Pay-As-You-Throw (PAYT) schemes

- **Volume-based charging**: Households and businesses pay proportionally to the amount of mixed waste (and potentially bio-waste) they generate

[8] Loi Garot, 2016, France.

- **Local refund schemes**: Or higher disposal fees for residual waste to discourage wasting edible food
- **Cost reduction incentive**: Lower payments motivate waste prevention and alternative food use (donation, recipes)

Extended Producer Responsibility (EPR)

- **Producer/retailer responsibility**: Shifting part of the financial responsibility for food waste back onto producers and retailers in the supply chain

Some of these economic incentives are already in place, and some others will need to be enacted in order to ensure that the Member States meet the food waste reduction targets. So far, the little funding to reduce food waste has come almost entirely from public authorities, and a certain level of corresponsibility with food producers can be justified. EPR for food products has not yet received much attention, but given the new legally binding food waste prevention targets, it can play a key role in funding measures to achieve them.

4. The importance of bio-waste separate collection

4.1. Why separately collecting bio-waste is the cornerstone of EU municipal solid waste management

The separate collection of waste is a precondition for high-quality recycling and preparation for reuse. It also prevents hazardous substances from contaminating other waste streams, as well as communities and the environment.

Bio-waste represents the largest stream of municipal waste (30-40%) and is a cross-cutting driver with ramifications in many sectors, such as soil health, emissions, agriculture, fertilisers, etc. The EC has classed between 60 and 70% of EU soils as unhealthy. The EC has committed to reversing this tendency and improving the level of organic matter in the soil by returning compost and digestate from bio-waste.

In December 2025, the EU published its Bioeconomy Strategy,[9] which aims to boost innovation and support European companies in making a success of the green transition.

Besides the importance of bio-waste as a resource to replenish the EU's soils and source new biomaterials, it also has the potential to optimise the separate collection of other waste streams. The more food waste is collected separately, the less putrescible material will be left in other waste streams, thereby increasing the quality and improving the economics of material recovery and reducing potential methane emissions. Food waste, due to its putrescibility, is the fraction that requires the most frequent collection, especially in warmer climates or seasons. If there is no efficient collection of food waste in place, the food waste will end up mixed with other waste streams, contaminating them and forcing a more frequent collection of all waste. More

[9] "Commission Presents New Bioeconomy Strategy to Drive Green Growth, Competitiveness and Resilience across Europe." 2025. European Commission ec.europa.eu/commission/presscorner/detail/en/ip_25_2819

trucks, more emissions, more costs. On the opposite side, if there is effective collection of food waste, it is possible to reduce the frequency of collection of other waste streams, such as packaging or residual waste, thereby reducing the collection rounds and optimising the costs of the whole system.

With this in mind, the revision of Waste Framework Directive (WFD) of 2018 introduced the obligation to source separate bio-waste, which came into force at the start of 2024.

4.2. The situation concerning separate collection of food waste in the EU

More than a year after the EU mandate to separately collect bio-waste took effect (§ 22 the WFD), only a few EU regions and Member States are achieving both high quality and large quantities of separately collected and recycled bio-waste. In many areas, bio-waste management is still in its infancy.

Despite numerous EU policy drivers, bio-waste remains an untapped resource for recycling. Notably, food waste represents only 29% of the bio-waste collected separately on average, and just 26% of all kitchen waste generated in the EU is successfully collected. With optimised collection schemes in place, up to 51 million tonnes could be captured, revealing a current shortfall of nearly 35 million tonnes/year.[10]

The 2nd EU Early Warning Report showed the presence of very different levels of implementation and generally low outcomes in terms of bio-waste capture (especially food waste). Only 9 of 27 Member States are on track to meet 2025 recycling targets, with the Southern and Eastern Member States especially lagging behind.

In the EU27+, current capture of food waste is 15,112,788 tonnes per year, below 26% of the theoretical potential, estimated at 60,034,681 tonnes.[11]

[10] "Bio-Waste Generation in the EU: Current Capture Levels and Future Potential - 2nd Edition". zerowasteeurope.eu/library/bio-waste-generation-in-the-eu-current-capture-levels-and-future-potential-second-edition

[11] The capture number is a theoretical one because every type of collection aims at maximising capture, but will never reach 100%. The report defines a target capture level, the 'operational potential', of around 85% of the theoretical potential, so as to calculate how much food waste, currently left in mixed waste, may actually still be recovered.

4.3. Why is the collection of food waste not happening at scale?

The EU-funded LIFE BIOBEST[12] project did a thorough analysis of all the barriers that are hampering the separate collection of bio-waste from becoming mainstream in Europe. The barriers are of four types: economic, legal/administrative, organisational and technical.

Table 1 - Categorisation of barriers to mainstreaming bio-waste in Europe[13]

Categorisation	Barrier - Collection (C), treatment (T), use of outputs (U) and quality (Q)
Economic	Lack of financial incentive for local authorities to separately collect bio-waste (C) No market or market incentive for compost, digestate or biogas (U) Insufficient resources/finances (C & T) Bio-waste collection is more expensive than residual waste collection (C) Improper/lack of guidance on use of EU funds and taxonomy (C) Lack of financial incentives for the citizen (PAYT, discounts, etc.) (C) Lack of resources to build or outfit waste treatment facilities for bio-waste (T) Non-binding policy or lack of enforced legal obligations to reach minimum standards (C & T)
Legal/ administrative	EU targets not cascaded to national/regional/municipal government (C & T) Inadequate appraisal of best practice options in policy design (C & T) Lack of local, regional, or national strategy for the separate collection of bio-waste (C) Environmental and/or agricultural policies and management protocols lack synergies (T)

[12] The LIFE BIOBEST project. 2024-2025. LIFE BIOBEST. www.lifebiobest.eu
[13] "LIFE BIOBEST - Guiding the mainstreaming of best bio-waste recycling practices in Europe." 2024. LIFE BIOBEST. zerowasteeurope.eu/wp-content/uploads/2024/02/240214_LIFE-BIOBEST_WP5_D5.2_PolicyBriefBarriers_submitted_web.pdf

Categorisation	Barrier - Collection (C), treatment (T), use of outputs (U) and quality (Q)
	Lack of or inefficient penalties for non-compliance (C) Lack of interest/support from decision-makers/elected representatives (C & T) Lack of synchronisation across public and private entities in charge of collection and treatment (C & T)
Organisational	Lack of economic scale efficiency schemes to develop cooperative management (C & T) Poor institutional organisation and limited capacity to implement legislation (C & T) Institutions lack clarity regarding mandatory separate collection (C) Lack of effective communication/educational campaigns (C) Insufficient data monitoring systems to track implementation, performance and evolution (C & T)
Technical	Lack of effective data tracking mechanisms for the implementation, evolution, and objective achievements (C & T) Distrust from the public regarding the performance of the separate collection system (C)

The economic barriers prove to be key in making the separate collection and proper treatment of bio-waste a reality. Indeed, despite the obligation to source separate bio-waste, the overhead and operational costs deter local authorities from adopting measures needed to implement durable and high-performance bio-waste separate collection schemes, public outreach and treatment.

In cases of limited resources/finances, politicians and public administrators are not motivated to increase fees to implement updates or modifications to bio-waste management.

If the economic component is not adequately resolved, local governments are unlikely to take even preliminary steps towards the institution of bio-waste collection and treatment. Without proper economic strategies for bio-waste separate collection models and treatment facilities, EU objectives and mandates will not be reached.

5. The case for EPR for food products

EPR for Food Products (EPRFP) could be a way to both finance the collection of food waste, as well as food waste prevention activities, and play a key role in meeting the EU obligations when it comes to food waste prevention and food waste collection, whilst empowering the EU's bioeconomy.

5.1. Why explore EPR for food products?

Based on the barriers to the expansion of separate collection of bio-waste, the LIFE BIOBEST project identified the following policy recommendations:[14]

1. Close the gaps in and advance the regulatory framework
2. Promote and align economic incentives and funding
3. Extend the network of expert stakeholders across all levels of governance
4. Improve technical know-how and validation of best practices
5. Increase communication, public education and awareness, and
6. Implement efficient and individualised models (that identify the user and allow control of the collected material) and monitor performance.

The project then identified a number of calls to action for every policy recommendation. Options such as disposal taxes, with priority given to those earmarked to make bio-waste collection more economically viable, have been widely explored and are functioning in some places with good results.

One of the calls to action to "Promote economic instruments that realign incentives, making bio-waste management more cost-effective",[15] was to "**study the necessity and applicability of EPR for food products".** Despite the decades of experience in EPR systems and legislation in the EU, there is little literature on using this tool on food products. In the EU, only Greece is considering such a scheme for the HORECA sector.

[14] "LIFE BIOBEST - Guiding the mainstreaming of best bio-waste recycling practices in Europe." 2024. LIFE BIOBEST. zerowasteeurope.eu/wp-content/uploads/2024/02/240214_LIFE-BIOBEST_WP5_D5.2_PolicyBriefBarriers_submitted_web.pdf

[15] "LIFE BIOBEST: Comprehensive guidance for effective bio-waste management in the EU." 2025. LIFE BIOBEST. zerowasteeurope.eu/library/comprehensive-guidance-for-effective-bio-waste-management-in-the-eu

Setting up EPRFP would allow for funding to be generated for municipalities to finance activities to fight food waste and finance the separate collection of food waste, but would also come with many other implications. A non-exhaustive list of advantages and disadvantages of setting up an EPRFP would be:

Table 2 - Advantages and disadvantages of setting EPRFP

Dimension	Advantages	Disadvantages
Polluter pays principle	A.1. Internalises the environmental and social costs of food waste (methane emissions, landfill costs) into food prices.	D.1. Risk of burdening producers when much waste occurs at household level, outside of their control.
Prevention potential	A.2. Creates incentives for producers to redesign products, adjust portion sizes, improve labelling and donate surplus food. A.3. Provides funding for food waste prevention which is instrumental to achieve the food waste prevention targets.	D.2. May encourage unwanted practices (e.g. over-packaging or ultra-processing to extend shelf life). D.3. Undermining food donation: An EPR fee used only to fund food waste treatment could make it financially and logistically easier for producers to send edible surplus food to the waste management stream, rather than through complex food donation networks.
Financing waste management	A.4. Provides stable funding for separate collection, composting, biomaterials production and anaerobic digestion of food waste.	D.4. Could duplicate existing municipal systems → risk of double charging taxpayers and businesses. D.5.If only financing waste management and not food waste prevention, it could invert the waste hierarchy: By creating a stable funding stream for recycling/treatment (a lower priority), EPR risks "locking in" investment at the bottom of the food hierarchy, discouraging more beneficial prevention and redistribution efforts upstream.

Dimension	Advantages	Disadvantages
System efficiency	A.5. Shifts costs away from municipalities and taxpayers, ensuring producers share financial responsibility. A.6. Increases the value of dry recyclables (which will not be soiled with food waste). A.7. Potential reduction of waste treatment costs - thanks to reducing landfill and incineration expenses.	D.6. Complex to administer: hard to monitor, track and attribute food waste volumes to specific producers. D.7. Difficult to harmonise at national level. D.8. Increased internal destruction and opacity: If the EPR fee is perceived as a tax or penalty on waste volume, producers may be incentivised to under-declare or dispose of food waste through unmonitored means (e.g. internal destruction) to avoid costs, leading to poor data quality and reduced transparency.
Market development	A.8. Could stimulate innovation in food waste reduction technologies and circular food systems increasing competitiveness of the European food sector. A.9. The surging amounts of separately collected bio-waste would increase the amount of feedstock biomaterials supplied to European companies. A.10. The surging amounts of separately collected bio-waste would create the volumes necessary for a European compost market.	D.9. Compliance costs may hit small and medium producers hardest, leading to consolidation of large players. D.10. Potential free-riding effect for food producers outside the EU unless proper traceability is in place.
Social impact	A.11. Raises awareness that food waste has a cost, indirectly influencing consumption patterns. A.12. Creation of jobs in the collection and waste management of food waste.	D.11. Costs likely passed on to consumers → higher food prices, hitting low-income households disproportionately.

Dimension	Advantages	Disadvantages
Environmental impact	A.13. Millions of tons of waste diverted from landfills and incinerators into prevention and recycling. A.14. Reduction in methane and CO_2 emissions from disposing of food waste and reduction in upstream energy, chemicals and emissions if food waste is effectively prevented. A.15. Regeneration of depleted soils with compost.	D.12. Focus on food waste reduction might lead to more use of packaging (however, the environmental impact of food waste is almost always higher than that of packaging).

The transformative power of EPRFP has the potential to bring about many benefits, but also comes with some challenges. It is the role of good policy and implementation to secure and amplify the advantages and address the disadvantages. This is the basis for the next chapter.

5.2. How would the introduction of EPR for food products work?

Any successful EPR system needs clear rules, fair financing, robust enforcement, and integration with existing waste systems, while ideally driving upstream change in product design and consumption.

However, every waste stream has features which are specific and define the characteristics of the given EPR. For instance, product design for end of life is arguably less relevant for an EPR on food products than on packaging, given the fact that virtually all food is biodegradable.

In this section, we will look into the different aspects of a potential EPRFP.

5.2.1. Scope and coverage

- **Scope of products covered**

When it comes to which food products should be included in the EPRFP scheme, one can adopt two approaches depending on whether we use a food waste prevention lens or a food waste management lens.

From a food[16] waste prevention lens, it would make sense to apply EPR to all the food produced that is placed in the market, whereas from a waste management perspective, it makes sense to target any food product that is likely to end up in the bio-waste bin. For reasons related to feasibility, we opt for setting the scope depending on the physical state of the product and its likely waste management pathway. As a consequence, drinks and other liquid foods, such as sauces, creams and any liquid or semiliquid dairy product (plant or animal-based), would not, in principle, be included in the EPR system since these are products which are not part of bio-waste separate collection.
The exception for this rule would be for Used Cooking Oils (UCO) which are classified as bio-waste in the WFD – different from waste oils coming from lubricants and other more industrial oils. Given the high environmental impact when not properly disposed of, and the fact that all Member States are obliged to separately collect UCO, and that some EU countries are already mandating EPR, including UCO under the EPR mandate obligation would be favourable, even if they are collected via a different system. It is important to note that UCO have a high market value, and hence they are normally collected from the HORECA sector without need for EPR, but for households and other "smaller producers of UCO" an EPR system would provide an incentive for more cooked oil undergoing regeneration processes and avoiding water contamination in sewage systems.

A comprehensive coverage of food products, which goes deeper into the liquid and semiliquid food categories would be worth analysing, but this is not considered in this study.

[16] For the definition of 'food', see Article 2 of Regulation (EC) No 178/2002: 'For the purposes of this Regulation, "food" (or "foodstuff") means any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans. "Food" includes drink, chewing gum and any substance, including water, intentionally incorporated into the food during its manufacture, preparation or treatment. It includes water after the point of compliance as defined in Article 6 of Directive 98/83/EC and without prejudice to the requirements of Directives 80/778/EEC and 98/83/EC.categories,'

Table 3 – EPRFP Products Scope – Included and excluded items

Category	Included in EPRFP	Excluded from EPRFP	Rationale
Fruit & Vegetables	Fresh fruits, vegetables, salads, herbs	-	Solid food waste that enters bio-waste collection
Baked goods and grains	Bread, pastries, cereals, pasta, rice, flour-based products, flour	-	Solid food waste commonly found in bio-waste streams
Meat and fish (animal-based, cultured and plant-based)	All solid meat products, fish, poultry, processed meats, cultured meat, plant-based meat alternatives[17]	-	Solid organic matter suitable for bio-waste collection
Dairy products and alternatives	Cheeses, ice-creams	Milk, liquid yogurt, cream, yoghourts, liquid dairy alternatives	Only solid components enter bio-waste; liquids go to wastewater
Prepared food	Ready-to-eat meals, sandwiches, solid prepared dishes, takeaway food	-	Solid organic matter suitable for bio-waste collection
Snacks, seeds, nuts, and confectionery	Cookies, chips, chocolate, nuts, solid snack foods, seeds	-	Solid food products that become bio-waste
Beverages	Powders, seeds and drink precursors (coffee, beans, tea sachets, etc.)	All beverages sold in liquid state (juices, soft drinks, alcoholic drinks, coffee, tea)	Liquids not part of separate bio-waste collection.

[17] Some systems for separate collection of bio-waste request households to place meat and fish residues and even cooked food in the residual waste bin which contradicts the European obligation to source separate bio-waste. EPRFP should cover these items even if they end up in the residual bin.

Category	Included in EPRFP	Excluded from EPRFP	Rationale
Condiments and sauces	Solid condiments, spice mixes	Liquid sauces, vinegars, liquid condiments	Only solid forms enter bio-waste collection
Oils	(Cooked or uncooked) vegetable oils, butter, margarine	-	High environmental impact if improperly disposed of and many stated already mandating take-backs schemes and EPR
Eggs	Whole eggs, egg-based solid products	-	Shells and contents enter bio-waste stream
Preserved foods	Canned foods, (solid content), pickled items, solid baby foods, finger foods	Liquid content of canned goods, liquid baby formulas and foods	Solid components relevant for bio-waste

- **Scope of actors responsible for covering the system**

Currently, **municipalities and taxpayers largely subsidise food waste treatment, while food producers profit from sales revenues regardless of eventual waste generation**.

Households, retailers and cafes, hotels and restaurants currently pay the full cost of collection of bio-waste (either via separate collection and recycling or as mixed collection and disposal) via waste and/or municipal taxes.

Whilst the goal of the instrument is to potentially organise the funding for the collection and treatment of all bio-waste, the "producer responsibility" principle would automatically address two distinct categories of "producers" with different levels of responsibility, one for garden waste and one for food waste.

Garden waste: For garden waste, the citizen is clearly the producer since the garden trimmings are "produced" on their property, which is where the use part of the life-cycle takes place. In this case, for the end of life that happens outside the home, it makes sense that it is paid by the citizen.

Food waste: Food waste occurs at multiple points: farms, processors, retailers, restaurants and households. The majority of the life of the food product is before the product reaches the consumer. Even if consumers

physically waste food, producers and retailers create the structural conditions (design, distribution, labelling, marketing) that drive waste. Making them responsible under an EPR scheme aligns with the **polluter pays principle** (A.1.), provides **funding** for food waste prevention and treatment (A.3. & A.4.), and creates **incentives for systemic prevention** (A.2.) upstream.

However, it is essential that the EPR system determines the scope of products and responsibility for producers to make it operational. Given the fact that farms and processors' waste is collected and managed outside the municipal collection schemes, it is justifiable to exclude them from the scope of the EPR obligation and hence circumscribe it to the wholesalers and importers that place the food product on the market.[18]

The tendency in Europe is that retailers, restaurants and cafes pay a fee to municipal or private waste operators for collection of the food waste they generate. The obligation in the WFD of 2018 to separately collect bio-waste includes commercial entities, such as restaurants and retailers. Hence, if EU laws are enforced, this should become the norm relatively soon. For instance, in Germany, restaurants must sort bio-waste separately; municipalities charge commercial fees for organic waste collection. In France, since 2016, large food waste producers (including restaurants above a certain size) have been obliged to sort and arrange collection for food waste, and fees are paid to authorised collectors. In Italy, restaurants are subject to local waste tariffs (TARI), which include specific rates for organic/food waste. In Slovenia, a law from 2010 mandates that all kitchen food waste from the hospitality sector (including not only restaurants, but also schools, hospitals, etc.) is to be managed by licensed operators. Nevertheless, it is important to note that the only EPRFP under consideration in Europe at the time of writing is an EPRFP on the HORECA sector in Greece. Therefore, it might make sense to leave the door open for HORECA to be included in the EPRFP, but if well-organised, the producer responsibility would be higher up in the supply chain.

When it comes to food waste, so far, the responsibility lies with the last "user" of the product before it becomes waste. However, following the same logic as the one used for other waste streams, such as packaging or electronic goods, one can argue that there is a level of responsibility at the producer/importer, wholesaler and retail level. These are where design and marketing encourage certain consumer behaviours, such as over-purchase or influencing consumers with problematic labelling ("best before" vs "use by"), and since they shape how food reaches consumers, they are best placed to prevent waste in the first place.

If wholesale distributors and importers bear prevention and waste management costs (A.2.), they will have more incentives to donate or redirect surplus food, rather than letting it spoil, and to redesign products and rethink distribution to reduce overproduction.

Therefore, when it comes to the scope of EPRFP, the responsibility would be organised as follows:

[18] Placing on the market is defined under Ecodesign as 'making a product available on the Union market for the first time with a view to its distribution or use within the Union, whether for reward or free of charge and irrespective of the selling technique'. See "What Does It Mean 'Placing a Product on the Union Market'?" 2023. European Commission. energy-efficient-products.ec.europa.eu/faqs-0/what-does-it-mean-placing-product-union-market_en

Table 4 - EPRFP - corresponsibility framework

Actor/Sector	Responsibility scope	Rationale	Implementation notes
Wholesalers	Full EPR responsibility for food waste from products sold	They have the bulk of the responsibility for placing products in the market	Capture the majority of market
Importers	Full EPR responsibility for food waste from products sold	Together with wholesalers, they place most food products in the market	Captures what is not sold by wholesalers
Retail	Full EPR responsibility for food waste from own "white label" products sold Excluded from responsibility for food products from other brands.	Retail acts as a wholesaler when it comes to selling its own brands	Together with wholesalers and importers, retail represents most of the solid food placed in the market
HORECA	Excluded. Already responsible under WFD 2018 obligation but could be made corresponsible with food producers	Must separately collect bio-waste generated on-premises and pay collection fees; food waste reduction targets apply at restaurant level	EPR will share burden between HORECA and food producers
Direct sale from small-scale producer to consumer	Excluded from EPR responsibility	Limited scale and different distribution model	Supports local food systems and direct sales

Actor/Sector	Responsibility scope	Rationale	Implementation notes
Households/citizens	Excluded and continue paying for garden waste collection and non-solid food waste collection via municipal taxes	Garden waste is produced and managed at the household level – clear producer responsibility	Maintains the current system for garden trimmings and not solid food
Food producers and processors	Excluded from municipal EPR scope	Waste managed outside municipal collection systems through private arrangements	Different waste streams require a separate management approach

Extended Producer Responsibility (EPR) for food products: payment responsibility flowcharts

These flowcharts illustrate who pays EPR fees at different stages of the food supply chain, ensuring no double charging while maintaining the polluter pays principle.

Scenario 1: Small producer → Direct to consumer

Small-scale producer selling directly to consumers (e.g. farmer's market, farm shop)

Small producer
Excluded from EPR

Consumer
Excluded from EPR

Scenario 2: Big producer → Wholesaler → Retail → Consumer

Large producer sells to wholesaler who distributes to supermarket chains

Big producer
Excluded from EPR

€ Wholesaler
Pays EPR fee

Retail
No fee (not own brand)

Consumer
Excluded from EPR

Scenario 3: Retail own brand → Consumer

Supermarket selling their own private label products

€ Retail (own brand)
Pays EPR fee (acts as wholesale)

Consumer
Excluded from EPR

Scenario 4: Importer → Retail/online platform → Consumer

Imported foods sold through large retailers or online platforms

€ Importer
Pays EPR fee

Retail/Online platform
No fee (not own brand)

Consumer
Excluded from EPR

Scenario 5: Retail (own brand→ Small retail → Consumer

Corner shop selling mix of wholesaler products and small farmer products

€ Retail (own brand)
Pays EPR fee (acts as wholesale)

Small retail/corner shop
Protected from EPR

Consumer
Excluded from EPR

Scenario 6: Wholesaler → HORECA → Consumer

Hotels, cafes, restaurants (HORECA) purchasing from wholesalers

€ Wholesaler
Pays EPR fee

HORECA
Pays collection fees

Consumer
Excluded from EPR

- **Geographic scope**

Given the generally perishable nature of the products subject to the EPR and the fact that producers generally organise their distribution at a regional or national level, it makes sense that the EPRFP is designed at national level.

5.2.2. Financing mechanism – scope and financial coverage levels

5.2.2.1. Scope of cost coverage

When designing the cost coverage of the EPRFP it is important to define whether the scheme will address only collection and recycling, or also prevention and litter cleanup.

Depending on this consideration, two types of cost-coverage models appear:

Option 1: "traditional" core services coverage

The core services coverage would include:

- **Collection** of separately sorted food waste proportional to what they place on the market (POM) according to the scope of financial responsibility as described in the next chapter.
- **Recycling/Treatment** (composting, processing into biomaterials and anaerobic digestion) proportional to what they place on the market and corresponds to their financial responsibility.
- Basic monitoring and reporting
- Information and public awareness

Option 2: Comprehensive coverage

Given the significant influence of covered actors on consumer behaviour and food waste generation, the comprehensive approach includes (always proportional costs to the POM):

- **Collection and recycling** (as above), including decentralised bio-waste infrastructure
- **Food waste prevention programmes**
    - Social meal initiatives
    - Food bank support
    - Redistribution and social inclusion

    - Consumer education campaigns
- **Monitoring and enforcement**
- **Research and innovation** in waste reduction technologies
- **Litter cleanup, street bins and public spaces cleanup** linked with the cost coverage methodology from the Single-use Plastic Directive

Thanks to the application of the obligation to separately collect bio-waste from the WFD, dine-in restaurants are already obliged to sort and sometimes pay for the bio-waste they produce; however, this creates a competitive disadvantage vs sellers of takeaway food, who are not responsible for the food waste of their restaurant once the customer walks out with the meal. Indeed, the current system incentivises takeaway consumption *vis-à-vis* dine-in because restaurants already pay the waste management fees for the food waste produced in-house, but anything that is sold for takeaway consumption escapes the system. Considering the growing tendency to consume food on the go, and the high probability that a considerable fraction of take-away food that is not consumed might end up in street bins which are the more costly to manage and the least likely to get recycled, one can argue that it makes sense to include litter, street bins and public spaces cleanup as part of the costs to be covered by EPRFP.[19]

The comprehensive coverage (option 2) is the preferable option in terms of cost internalisation and environmental impact, from both an operational and legal standpoint, since it addresses both prevention and collection. However, comprehensive coverage would also be the most expensive for wholesalers, importers and retail selling their white label products.

5.2.2.2. Level of financial coverage

The level of financial coverage defines how much of the total costs defined in 5.2.2.1. the concerned actors are mandated to cover.

When deciding on the scope of financial coverage, it is important to note that art 8a of WFD defining the general minimum requirements for EPR schemes, notes that *(i) in the case of extended producer responsibility schemes established to attain waste management targets and objectives established under legislative acts of the Union, the producers of products bear at least 80 % of the necessary costs (art 8a)4(i));*

For the case of food products, it makes sense that the actors are responsible for covering prevention and collection costs of all the food waste involved in 5.2.2.1. Currently, the information available is insufficient to provide a concrete assessment of the financial coverage. If we assume that 75% of food products are solid food (vs 25% liquid) and that 70% of food placed on the market is via wholesalers, importers, and retailers'

[19] Currently the most optimised systems of separate bio-waste collection in Europe, such as Contarina in the Veneto region, find around 5% of food waste in street bins, whereas a study in Austria estimates 16% of the content of street bins is food waste. In terms of unit weight, the following data may help: in a pioneer city with separate collection of organics such as Milan, which captures around 90% of bio-waste, the total MSW collected through street bins is some 42,000 t/y, or 30kg per inhabitant and year, and compositional analysis showed percentages of food waste in it ranging from 4 to 18%, hence from 1.2 to 5.4 kg per inhabitant and year.

own brands the corresponsibility would be of around 50% covered by EPR and 50% covered by citizens and HORECA via waste taxes.

Considering that the targeted players play a predominant role in influencing consumer behaviour, which would reduce food waste in the retail and, ultimately, household level, it is reasonable that the scope of EPRFP includes food waste prevention and the costs of managing street bins outside the separate collection scheme.

5.2.3. Legal and institutional framework and governance

The legal and institutional framework, as well as the governance of the EPR, can follow the general approach used for other waste streams. Any good EPR system should include clear:

- **Definitions:** The EPR system should set very clear definitions which reduce the uncertainty in terms of responsibilities and obligations. For instance, the current definition of food waste covers *any substance or product intended to be, or reasonably expected to be, ingested by humans.* For this EPR, we propose excluding liquids and semiliquids from the obligation for producers.
- **Legal basis:** Strong legislation is needed to define producer obligations and ensure enforceability. The legal basis should make it very clear that the system is **compulsory** for all the concerned actors and provide clarity as to the level of responsibility.
- **Targets:** In order to guide the efforts of the funders for the prevention and management of bio-waste, (citizens via waste or city taxes and wholesalers, importers and retailers own brands) it is important to link the EPR fees to the attainment of EU food waste prevention targets, as well as introducing targets for food waste capture (in the form of bio-waste found in residual waste).
- **Governance and transparency:** Based on experience with other waste streams, it is important to define a governance and producer responsibility organisation (PRO) that is both efficient and inclusive. It should be transparent enough for retailers to trust the system, public authorities to enforce it, and recyclers to be paid fairly.
- **Roles and responsibilities:** There should be a clear division between producers, municipalities, waste operators, the informal sector, regulators and consumers. In addition, clear definitions of the financial and operational responsibility of every actor in the system are needed.
- **Monitoring, reporting and enforcement:** the EPR system should define the monitoring, reporting and enforcement guidelines, with penalties for non-compliance and mechanisms to resolve disputes.
- **EU harmonisation:** Harmonised EPR criteria at the EU level in terms of definitions, target setting and monitoring, reporting and enforcement are highly recommended to simplify systems, lower administrative costs, and improve performance.

6. How to introduce EPRFP

Given the importance of separately collecting bio-waste for the European bioeconomy and CE strategies, it is key to closely monitor the progress on the obligation to source-separate bio-waste as stipulated in the WFD.

Since many countries, and particularly municipalities and regions, blame the lack of implementation of bio-waste separate collection schemes on the costs associated with setting up and running them, and given the fact that EPRFP would address this issue, one may argue that a viable way forward can be to set targets for bio-waste in residual waste.

The EU BIOBEST project argues that a bio-waste target within the residual waste stream is the best way forward because it incentivises waste prevention and efficient resource use, adhering to the top of the waste hierarchy. By setting a specific target for this waste stream, it promotes a shift from disposal to prevention, as it is more environmentally and economically sound to avoid bio-waste in the first place rather than dealing with it as a residual waste problem. This approach encourages innovation in food production, supply chains, and consumer habits to reduce waste at the source, which is the most preferred strategy.

However, EU legislation contains cases of targets that were never met, and this has raised valid criticism as to the usefulness of such tools. Indeed, targets on their own do not deliver the desired changes unless they are accompanied by the right legislative tools and incentives.

Given the fact that the purpose of EPRFP is precisely to finance bio-waste prevention and separate collection of bio-waste, it is justifiable to set such a target. In fact, in the absence of a target for bio-waste in residual waste, the hypothetical implementation of an EPRFP would be incomplete because it would lack the performance metric that the EPRFP is designed to deliver. It is common practice that EPR systems/PROs have to achieve certain targets, e.g. for packaging recycling.

7. Final considerations

When preparing the study, some pertinent questions were posed which are worth exploring:

Would EPR on food waste make food more expensive?

Not necessarily. The costs of waste management are already paid by citizens via taxes, and the EPR system would only reorganise the flow of money. Indeed, like in other waste streams covered by EPR, those placing the product in the market can pass the cost to retailers and eventually to consumers who, instead of paying the waste tax, would be paying the bio-waste management via the EPR fee. Experiences from other EPR schemes show that the fee added a minimal amount to the price of the end product.

However, evidence from other waste streams is unequivocal that the streams with the highest collection rates are those covered by EPR systems. Hence, even if the costs are passed on to consumers, making the producers responsible for organising and/or financing the collection is a more effective way to increase waste capture.

Why EPR on food products and not on food waste?

Because it is easier to calculate and to implement, since there is a good quantity and quality of data available on the separate collection of MSW and bio-waste. There are already some economic incentives in place (such as Pay-As-You-Throw systems) which could be exploited to penalise food waste generation. However, placing the responsibility on producers for what they place in the market is a more solid way to create financing instruments that go beyond local authorities.

Is EPRFP duplicating the role of pay-as-you-throw?

Pay-as-you-throw (PAYT) is an economic instrument that local authorities set up in order to encourage households and/or producers/retailers to reduce waste generation. PAYT is normally applied to the mixed waste fraction and, much less often, to kitchen waste. Although there could be some overlap between PAYT and EPRFP, they fulfil different but complementary roles. PAYT is an incentive for households, whereas EPRFP would be an incentive for producers. PAYT is a local tax, but EPRFP operates at a supralocal level and would allow for money to be organised at a national level, thereby financing prevention measures, as well as waste infrastructure at a supramunicipal level.

Why EPR and not a tax or levy?

Given the potential complexity of the implementation of an EPR system on food products, one could consider whether a tax or a levy on B2C and B2B would be an easier tool to implement. In favour of taxes and levies is the fact that they are more straightforward to implement than EPR systems. On the downside, the taxes and levies are more arbitrary, hence not necessarily linked to cost coverage that is at the core of

EPR (art 8a WFD). Moreover, the capacity of the EU to mandate taxes is very limited to the figure of "own resources", which means that the revenues go to the general EU budget, and they are not earmarked for covering the costs of prevention and/or waste management. Leaving aside cost coverage of waste management, a tax or a levy could be used as an incentive to reduce food waste, but, different from EPR, it would translate into a direct price increase of food, which will be more politically difficult to justify.

8. Conclusion

The EU has a challenge with food waste prevention, collection and treatment and an opportunity to boost the production of compost, biomaterials and biogas. Both activities lack dedicated funding. Whilst it represents an opportunity to raise the funding needed to set up and run food waste prevention and separate collection schemes, EPRFP has not yet been sufficiently considered.

From a perspective of fairness in producer responsibility, there is a clear case for some actors to take responsibility for the waste they place in the market, and this study identifies them as being big food wholesalers, importers and retailers for their own brands. Given their responsibility in the generation of food waste and the potential to act on it if the price incentives were there, they represent a good reason to enact EPRFP throughout the EU, linked to delivering on new targets of food waste generation and food waste collection.

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Zero Waste Europe (ZWE) is the European network of communities, local leaders, experts, and change agents working towards a better use of resources and the elimination of waste in our society. We advocate for sustainable systems; for the redesign of our relationship with resources; and for a global shift towards environmental justice, accelerating a just transition towards zero waste for the benefit of people and the planet.
www.zerowasteeurope.eu

BIC is Europe's leading industry association, putting circularity, innovation and sustainability at the heart of the European bioeconomy and the private partner in the €2 billion public-private partnership with the European Commission - the Circular Bio-based Europe Joint Undertaking (CBE JU). • BIC's membership includes 300+ industry members covering the whole value chain, from primary production to the market, across multiple and diverse sectors including agriculture & agri-food, aquaculture & marine, chemicals and materials, including bio-based fibres and bioplastics, forest and forest-based sectors, market sectors, technology providers and waste management and treatment. BIC also has over 200 Associate Members representing academia, research organisations, trade associations, etc. BIC's mission is to build new circular bio-based value chains and to create a favourable business and policy climate to accelerate market uptake.
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