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Consumer Protection and Greenwashing Behind Circular Narratives in the Agri-food Sector

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Abstract

The transition towards a circular economy has become a central objective of European agri-food policies, encouraging the recovery and valorization of food by-products through innovative solutions such as upcycling. While these practices contribute to reducing food loss and waste and promoting more resource-efficient production systems, they also create new challenges for consumer protection. In particular, the increasing use of sustainability-related marketing messages raises concerns regarding the accuracy, substantiation and transparency of environmental claims associated with circular products. This chapter examines the relationship between circular economy narratives and greenwashing in the agri-food sector from an interdisciplinary perspective, combining insights from agricultural economics and European consumer law. It first outlines the role of food loss, food waste and by-products within the circular economy framework, highlighting the growing importance of upcycled foods as a strategy for resource valorization. The analysis then explores how environmental claims referring to waste reduction, recovered ingredients and circular production practices may

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mislead consumers when they are vague, unsubstantiated or presented without adequate evidentiary support. The chapter further analyses the EU legal framework governing unfair commercial practices, with particular attention to the Unfair Commercial Practices Directive and the recent Directive (EU) 2024/825 on empowering consumers for the green transition. By discussing existing regulatory gaps and emerging enforcement challenges, the chapter argues that greater legal clarity and more transparent communication are essential to support consumer trust and ensure that circular economy initiatives deliver genuine environmental value rather than becoming merely persuasive marketing narratives.

9.1 Introduction

The agri-food sector sits at the intersection between environmental ambition and consumer vulnerability. Agriculture is currently the fifth largest sector for greenhouse gas emissions in the European Union, accounting for 11% of total emissions (European Parliament, 2024). When not conducted through sustainable practices, such as organic farming, it contributes to soil and water pollution, as well as biodiversity loss. Today, the circular economy is considered the new paradigm that should lead to the green and sustainable transition of the agri-food system. This objective is increasingly reflected in EU policy strategies, including the 2020 Farm to Fork strategy, where reducing food waste and losses are two of the European Union's transition towards a circular economy by 2050 (European Parliament, 2025).

The circular economy can be defined in various ways, but it is best understood through a holistic approach encompassing all stages of a product's lifecycle, from design to consumption of the finished product (Ellen MacArthur Foundation, 2019). Reducing this model as merely recovering supply chain would therefore be overly restrictive. Rather, circularity is waste. Instead, it needs to be firmly rooted within the entire production system, from mind to table (Chiaraluce et al., 2021). Waste prevention, recovery and valorisation nevertheless remain among its most prominent dimensions, particularly given the persistence of the linear take-make-use-dispose model that continues to underpin much of the global economy and results in significant resource losses. Therefore, understanding how to recover and reuse what traditional industry discards is fundamental. In the agri-food sector progress in waste treatment and valorization depends on investments in infrastructure, operational improvements, policy updates, and behavioral changes (Aramyan et al., 2021). More broadly, the transition towards circular food supply chains requires a comprehensive redesign from a holistic and

multidisciplinary perspective (Ciccullo et al., 2021) and collaboration among various stakeholders to promote the use of waste as a valuable resource. Key elements for this transition include smart and sustainable design, a circular process approach, industrial symbiosis, innovation, and sustainable technologies, all aimed at preserving, restoring, and regenerating natural resources and supporting the development of are all important parts of creating a new economic model (Berardi et al., 2021; Vlajic et al., 2021; Schumpeter, 1983).

Against this background, this chapter examines circular economy narratives in the agri-food sector, with particular attention to food waste, by-products and upcycled food. The authors bring together two areas that have so far largely developed in parallel, i.e., the debate on circularity in food systems and the consumer-law scrutiny of environmental claims. The chapter shows how circularity, once translated into commercial communication, raises distinct consumer protection concerns, particularly where claims concerning waste reduction, recovery or upcycled ingredients may convey broader environmental benefits than those that can be substantiated. After providing an overview of greenwashing and its specific relevance to the food sector, the chapter situates food waste and upcycling within the EU circular-economy framework, identifies the main forms of potentially misleading circularity claims, and examines the consumer law rules applicable to them, with particular emphasis on the UCPD and Directive (EU) 2024/825.

The chapter is structured as follows. Section 9.2 provides an overview of greenwashing and considers its specific relevance to the food sector. Section 9.3 situates food waste, by-products and upcycling within the broader circular-economy framework, while Section 9.4 identifies the main forms of greenwashing that may arise in connection with food-waste reduction and circularity claims. Section 9.5 examines the EU consumer-law framework applicable to such practices, focusing on the Unfair Commercial Practices Directive and the amendments introduced by Directive (EU) 2024/825. Section 9.6 then considers the emerging enforcement landscape, including the relevance of enforcement concerning analogous circularity claims for the future scrutiny of upcycled-food claims. Section 9.7 concludes by drawing out the main regulatory and consumer-protection implications.

9.2 The Phenomenon of Greenwashing: An Overview

Sustainability has become a powerful marketing asset across virtually all sectors. Firms increasingly seek to present themselves as ‘climate-conscious’, ‘ecofriendly’ or ‘sustainable’, responding to growing demand from consumers, investors and regulators for environmentally responsible products and

practices. This proliferation of environmental claims has, however, been accompanied by mounting concerns about their accuracy and credibility. Civil society organizations, competitors and public authorities have increasingly alleged that such claims are exaggerated, selective or outright misleading – a phenomenon commonly referred to as 'greenwashing'. Greenwashing may be understood as the practice of advancing sustainability claims, today commonly referred to as 'green claims' and, under EU Consumer law, more specifically as 'environmental claims', that promise far more than the material reality of production processes is capable of delivering. Notably, 'green' should not be understood as designating only what pertains to nature or environmental protection. Rather, it has become a linguistic shortcut for a wide spectrum of sustainability narratives. The concept of 'environmental claim'category is intentionally broad, and has become a linguistic shortcut for a wide spectrum of sustainability narratives. An environmental this breadth is precisely what makes it both attractive and prob-lematic: a green claim may refer to climate performance, but just as easily to packaging, water use, food waste reduction, compostability, upcycling, or any other element associated with environmental responsibility.

What renders greenwashing possible is therefore not only the ambiguity of the vocabulary but the fact that green claims operate primarily as narrative devices. They may evoke participation in broader collective ecological project, a gesture of responsibility towards the planet, an ethically attuned form of consumption. This symbolic dimension, far more than the informational content of the claim, that gives green claims their persuasive force. And it is precisely this persuasive force, when not supported by substantive environmental performance, that lies at the core of greenwashing. From a business perspective, greenwashing exploits the reputational and competitive benefits of appearing sustainable, without undertaking the corresponding costly or structural changes in production, supply chains or corporate strategy. From a regulatory and consumer-protection perspective, it distorts market choices, undermines trust in genuinely sustainable products and erodes the effectiveness of environmental policy.

Crucially, from the consumer's standpoint, the accuracy of environmental claims is often difficult, if not impossible, to verify independently, since they often concern credence attributes. For example, the consumer cannot independently measure carbon footprints, assess supply-chain impacts, or evaluate the environmental relevance of using an 'upcycled' ingredient. This, in turn, creates an epistemic asymmetry, where corporate narrative becomes the primary source of truth. Greenwashing, therefore, arises from the intersection between the elasticity of sustainability language, its symbolic and moral charge, and the consumer's limited ability to scrutinize the claims being made.

Greenwashing is typically associated with climate-related communication, the phenomenon is much broader, and recent case law illustrates its systemic relevance. A growing body of case law and administrative practice allows us to distinguish at least three broad categories of greenwashing disputes. The first concerns corporate climate commitments. A significant number of large companies now advertise long-term commitments to achieve 'net zero' greenhouse gas emissions, often by 2040 or 2050, and participate in international initiatives (e.g., Race to Zero or the Science Based Targets initiative). These commitments serve not only as internal governance tools but also as external signaling devices aimed at investors, consumers and regulators. Litigation in this area typically questions the credibility and transparency of such commitments. Claimants argue that corporate climate strategies rely on unrealistic assumptions, unproven technologies, or extensive use of carbon offsets, while the company simultaneously continues to expand carbon-intensive operations. The second and numerically most significant category concerns the environmental attributes of products and services. Cases in this group challenge the way particular products, packaging or services are presented as 'climate-neutral', 'sustainable' or otherwise environmentally "superior". As green claims proliferate, courts and regulators increasingly scrutinize whether the advertised benefits genuinely correspond to the underlying environmental performance. The third category involves climate risk deception. These cases seek to hold fossil fuel companies accountable for downplaying the impacts of climate change, for instance by obscuring or minimizing the climate-related risks they knew their products would cause. Across different jurisdictions, such claims rely on a variety of legal bases, including tort law, consumer protection and securities regulation, and are gradually shaping the contours of responsibility for misleading climate-related communication.

Although greenwashing has been widely examined in sectors such as fashion, cosmetics and energy (Brydges et al., 2022; Munir & Mohan, 2022; Sailer et al., 2022; Montero-Navarro et al., 2021), comparatively less attention has been devoted to the food sector. This is striking, given that food is not merely a commodity but it is closely intertwined with concerns relating to nutrition, health, ethics, trust and lifestyle.

9.3 Food Waste in the Context of Circular Economy

Considering the entire agri-food supply chain, one of its most critical challenges is the generation of substantial quantities of waste. Every year, approximately one third of all food produced globally is lost or wasted (FAO, 2025). Such losses entail not only the disposal of edible products

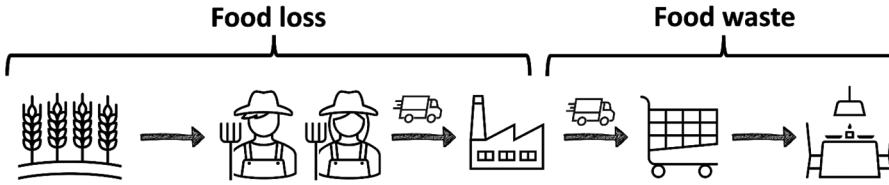

Figure 9.1 Food loss and waste in the agri-food supply chain. Source: authors' elaboration

but also the waste of the resources required for their production, i.e. water, land, energy, labor and capital. At EU level, the scale of the phenomenon is equally alarming. In 2023, approximately 58.2 million tonnes of food waste were generated in the EU, corresponding to around 130 kg per inhabitant. Households accounted for 53% of the total, followed by the manufacture of food products and beverages (19%), restaurants and food services (11%), primary production (10%), and retail and other food distribution (8%) (Eurostat, 2025). At global level, 13.3% of food produced was lost between harvest and retail in 2023, while the latest global estimate of food waste indicates that 1.05 billion tonnes of food were wasted at retail, food-service and household level in 2022, corresponding to 19% of the food available to consumers. Reducing these losses would substantially contribute to climate mitigation, help reduce malnutrition and food insecurity, and lower both production and consumption costs. Environmental and economic repercussions are significant. Food loss and waste together account for an estimated 8–10% of global greenhouse gas emissions and generate economic losses of approximately US $1 trillion annually. These inefficiencies, however, coexist with stark nutritional inequalities: 645 million people faced hunger in 2025, corresponding to 7.8% of the global population (FAO, IFAD, UNICEF, WFP & WHO, 2026). Meanwhile, food demand is projected to increase by 30–62% by 2050, driven by demographic growth, urbanization, dietary shifts, and land-use pressures (Nadeau & Koebele, 2023; Thorsen et al., 2022; Shafiee-Jood & Cai, 2016).

Given these conditions, reducing food losses and waste is not merely desirable but strategically essential for the transition towards a circular agri-food system. In this respect, it is useful to clarify the distinction between food loss and food waste. According to the FAO, the distinction primarily depends on the stage of the supply chain at which the loss occurs (Figure 9.1). Food loss refers to reductions in edible food mass occurring during the early stages of the supply chain, namely, production, post-harvest handling, and processing. Food waste, by contrast, concerns losses occurring at the later stages, that is, retail and consumption (Gustavsson et al., 2011).

From a regulatory perspective, the EU does not yet have a comprehensive instrument specifically governing food waste as a specific category. Instead, the topic is addressed through broader food-law and waste-management legislation. A first relevant instrument is Regulation (EC) No 178/2002, whose Article 2 defines 'food', while also delineating the notion of organic waste, including biodegradable kitchen and food waste generated by households, catering and retail establishments, and similar waste from food-industry operations. Importantly, neither this Regulation nor other EU food law instruments offer a definition that captures waste arising from the primary agricultural sector. This exclusion is relevant for the legal delimitation of food waste, since materials discarded before harvesting fall outside the definition of 'food' incorporated into the Waste Framework Directive. It should, however, be distinguished from the FAO concept of food loss, which covers losses occurring from harvest, slaughter or catch up to, but excluding, the retail level.

A second key EU instrument is Directive 2008/98/EC ('Waste Framework Directive'), which establishes measures aimed at protecting the environment and human health by preventing or reducing the adverse impacts of waste generation and management, while also reducing the overall impacts of resource use and improving resource efficiency. Article 3(1) defines 'waste' as 'any substance or object which the holder discards or intends or is required to discard'. Article 3(1) further defines 'bio waste' as including food and kitchen waste from households, offices, restaurants, wholesalers, canteens, caterers and retail premises, as well as comparable waste from food-processing plants (Article 3(4)), and 'food waste' as all food, as defined in Article 2 of Regulation (EC) No 178/2002, that has become waste (Article 3(4a)).

More recently, Directive (EU) 2025/1892 amended the Waste Framework Directive by strengthening the EU framework on food waste prevention. In particular, it requires Member States to take the necessary measures to achieve, by 31 December 2030, a 10% reduction in food waste generated in processing and manufacturing and a 30% per-capita reduction, jointly, in retail and other food distribution, restaurants and food services, and households, compared with the annual average generated between 2021 and 2023.

At its core, therefore, the legal concept of waste remains linked to the act or intention of discarding a substance or object. Such an understanding appears, at least prima facie, to sit uneasily with circular-economy strategies, particularly in the agri-food sector, where revalorisation of secondary materials is central to sustainability objectives. Yet the Directive offers legal mechanisms that enable reconciliation with circular-economy principles.

Article 5 introduces the category of by-products, referring to substances or objects resulting from a production process whose primary aim is not their manufacture. Four cumulative conditions must be satisfied: i) further use must be certain; (ii) the substance must be usable without processing beyond normal industrial practice; (iii) it must be produced as an integral part of the production process; and (iv) its further use must be lawful. Examples of agri-food materials that may qualify as by-products include bran, peels, seeds, and whey.

Conversely, Article 6 provides a separate mechanism through which waste that has undergone recycling or another recovery operation may cease to be waste. This status is conditional on the waste being intended for specific purposes, having a market or demand, meeting technical requirements and relevant legislation, and not causing overall adverse environmental or health impacts. In functional terms, the regulatory architecture thus permits materials that would otherwise be discarded either to remain outside the legal category of waste as by-products or, where they have already become waste, subsequently to cease to be waste following recovery. The two categories should therefore be distinguished: by-product status prevents a material from becoming waste in the first place, whereas end-of-waste status applies to material that has already become waste.

A further key provision is Article 4, which establishes the 'waste hierarchy,' later adapted to the food waste context by Papargyropoulou et al. (2014) to the agri-food context. The hierarchy identifies five levels of waste management: prevention, preparation for reuse, recycling, other forms of recovery, and disposal.

The primary objective is to prevent food waste at every stage of the supply chain. Prevention offers financial advantages by reducing waste management and surplus food disposal costs, as well as environmental benefits by conserving finite resources and mitigating pollution, thus facilitating a circular economy model. If prevention is not feasible, surplus food that remains suitable for human consumption should, where possible, be redistributed for human consumption. Other possible uses include animal feed, followed by recycling and nutrient recovery, including composting. Another option is energy recovery through the generation of biogas or biomethane. The least favorable method is disposal, including landfilling, used to handle the residual percentage of unavoidable waste once all other alternatives have been exhausted (Chiaraluce et al., 2023).

More recently, upcycling has emerged as an innovative strategy in the agri-food sector and one that differs conceptually and practically from traditional recycling. Upcycling refers to the transformation of by-products or

other secondary materials into new, higher-value food products, such as beverages, snacks, or functional. In contrast to conventional recycling, which typically yields outputs of equal or lesser value, upcycling increases the overall value of the material (Aschemann-Witzel et al., 2023; Moshtaghian et al., 2021).

Although the Waste Framework Directive does not regulate upcycling as such, this practice holds considerable potential for reducing agri-food waste, fostering innovation, creating additional value. Illustrative examples include pasta enriched with spent grain (Chetrariu & Dabija, 2021; Nocente et al., 2021), biscuits made from sunflower seed flour (Grasso & Asioli, 2020), the use of melon scraps as snacks or beverages (Silva et al., 2020), and pizza enriched with cauliflower flour (Chiaraluce et al., 2024). However, the use of by-products or other secondary materials in new food products also raises several challenges, including technological stability (Hasan et al., 2024; Olsen et al., 2014), costs (Taghian Dinani & Van Der Goot, 2023), consumer acceptance (Lu et al., 2024), safety (Socas-Rodríguez et al., 2021), and advertising through green-environmental claims (Cela et al., 2024). This last aspect, in particular, may create a risk of greenwashing where environmental claims overstate, misrepresent or insufficiently substantiate the sustainability benefits associated with upcycled products.

9.4 Food Waste Greenwashing Practices

In the agri-food sector, and particularly in relation to food waste, greenwashing practices are steadily gaining ground. Related claims circulating in the market may be broadly grouped into three categories: generic environmental claims, claims concerning recovery and waste, and claims concerning by-products and recovered ingredients. The first category, which extends beyond the circular economy, includes ‘eco-friendly’ business practices and ‘sustainable and concrete choices.’ These claims are among the most prevalent in the market, including the agri-food sector, and often contribute to greenwashing due to their vagueness. They may create a misleading impression of environmental responsibility and generate the so-called ‘halo effect.’ Secondly, in the realm of recovery and waste, we encounter other generic claims which include ‘zero waste,’ ‘no food waste,’ and ‘from waste to value.’ In this case, there is a risk of misleading consumers by appealing to concerns or guilt surrounding food waste through unquantified and vague statements, hereby distorting perceptions of the actual environmental impact. The use of generic or high-sounding expressions may therefore confuse the average consumer and expose companies to the risk of greenwashing. This,

in turn, may undermine efforts to promote the circular economy by misleading consumers and diverting attention from genuinely sustainable practices. Lastly, most recent claims regarding upcycling, (e.g., 'upcycled ingredients' or 'using food by-products'), are still applied inconsistently in the absence of a harmonised EU legal definition of 'upcycled food' and specific substantiation criteria for such claims. These claims often merely indicate the use of an ingredient that must be already identified in the mandatory list of ingredients, without necessarily conveying additional information about its environmental benefits. Regulation (EU) No. 1169/2011 also requires the quantitative indication of an ingredient in specific circumstances, including where it is emphasised on the labelling or is essential to characterise the food. Moreover, the mere claim that an ingredient is 'upcycled' does not in itself clarify the real environmental benefits of resulting from a recovered ingredient. In this sense, the circular economy is currently portrayed as an attractive narrative rather than providing substantial scientific information.

9.5 EU legal framework addressing greenwashing in B2C commercial practices

Several EU legal instruments are relevant to the regulation of greenwashing and, more specifically, to sustainability and circularity claims in the agri-food sector. A key legal framework is Directive (EC) 2005/29 (the 'Unfair Commercial Practices Directive' - UCPD), which has recently been amended by the Directive (EU) 2024/825 empowering consumers for the green transition ('Empowering Consumers Directive' or ECGTD), adopted in February 2024 as part of the European Green Deal.

9.5.1 The Unfair Commercial Practices Directive (UCPD)

The UCPD is, alongside the Unfair Contract Terms Directive and the Consumer Rights Directive, one of the core instruments of the EU consumer law acquis. It constitutes the main EU instrument governing business-to-consumer commercial practices. The Directive's purpose is set out in Article 1, which states that it aims to ensure 'the proper functioning of the internal market' and a 'high level of consumer protection.' It therefore stands at the intersection of two fundamental objectives of EU law: market integration and consumer protection.

Article 3 defines the scope of the UCPD, providing that it applies to 'unfair business-to-consumer commercial practices, as laid down in Article 5, before, during and after a commercial transaction in relation to a product'. The Directive's scope of application is notoriously broad. It extends to the

entire commercial process, including both pre-contractual and post-contractual conduct, so long as the conduct takes place within business-to-consumer relations. In other words, the Directive does not require an actual purchase for its application. A practice may fall under its provisions even before a contract is concluded (e.g., when a consumer enters a shop or accesses a website in response to a promotional offer) or after its conclusion, as in cases involving non-delivery of goods or inadequate customer service, provided that the conduct remains connected to the transaction. The UCPD introduces a general prohibition for any commercial practice that is contrary to good faith and professional diligence and 'it materially distorts or is likely to materially distort the economic behavior with regard to the product of the average consumer whom it reaches or to whom it is addressed, or of the average member of the group when a commercial practice is directed to a particular group of consumers' (UCPD, Article 5(2) lett. b).

Importantly, Professional diligence represents an objective standard of behaviour and does not depend on the trader's intention (*ignorantia legis non excusat*). This general prohibition is further specified through the categories of misleading and aggressive practices and through a blacklist of practices that are always prohibited. Of particular relevance to greenwashing are misleading practices, which may take the form of either actions or omissions. A misleading action contains false information or is likely to deceive the average consumer, even where the information is factually correct, provided that it causes or is likely to cause the consumer to take a transactional decision that they would not otherwise have taken. The practice must concern material information, including, for example, the main characteristics of the product.

A misleading omission, by contrast, occurs where material information that the average consumer needs to make an informed transactional decision is omitted, hidden, or provided in an unclear, unintelligible, ambiguous or untimely manner. This provision is also closely connected with mandatory disclosure requirements, since information requirements established by EU law in relation to commercial communication are regarded as material under Article 7(5). These provisions provide the general legal basis against which misleading environmental claims have traditionally been assessed under the UCPD.

9.5.2 Directive (EU) 2024/825 as regards empowering consumers for the green transition through better protection against unfair practices and through better information (ECGTD)

The ECGTD Directive (EU) 2024/825 places environmental and circularity claims more explicitly within the scope of EU consumer protection law.

Adopted on 28 February 2024, it amends the UCPD and the Consumer Rights Directive (CRD) with the broader objective of supporting consumers in the green transition. In particular, the Directive responds to the increasing use of sustainability-related marketing by seeking to make environmental information more reliable and to reduce the scope for misleading environmental and circularity claims. The ECGTD introduces for the first time a definition of 'environmental claim' and makes a number of targeted changes to the rules on misleading commercial practices (i.e., Articles 6-7 UCPD and its blacklist). Article 6(1)(b) now expressly includes 'environmental or social characteristics' and 'circularity aspects, such as durability, reparability and recyclability' among the non-exhaustive list of main product characteristics in relation to which consumers must not be misled. These notions, however, remain framed in relatively broad terms. Environmental characteristics encompass environmental aspects, impacts and performance, while circularity aspects are illustrated through a limited list of examples. This open-ended formulation increases the flexibility of the provision, but may also give rise to questions concerning legal certainty and coherence with other areas of EU legislation.

A significant amendment is in Article 6(2)(d) UCPD, which brings environmental claims concerning 'future environmental performance' where the ECGTD specifies the conditions under which they may be considered misleading under the UCPD. Typical examples include commitments such as 'climate-neutral by 2030' or 'carbon-neutral by 2050'. Such claims must be supported by clear, objective, publicly available and verifiable commitments, which must form part of a detailed implementation plan containing measurable and time-bound targets. The plan must also be regularly reviewed by an independent third-party expert, whose findings are made available to consumers. The provision is particularly relevant where traders advertise environmental results that have not yet been achieved. It therefore strengthens the evidentiary basis required for businesses to communicate future sustainability objectives while keeping such claims within the general UCPD framework on misleading commercial practices.

The ECGTD also significantly expands the Annex I blacklist by adding a number of environmentally relevant practices that are considered unfair in all circumstances. Of particular relevance to greenwashing are several prohibitions targeting widespread marketing practices. Generic environmental claims, such as 'environmentally friendly', 'eco-friendly', 'green', 'nature's friend', 'climate friendly', 'biodegradable' or 'bio-based', will therefore be prohibited under the amended rules unless the trader can demonstrate 'recognised excellent environmental performance' relevant to the claim.

Moreover, traders cannot attribute environmental superiority to an entire product or business where the claim in fact concerns only a specific aspect of the product or a limited activity of the trader.

The blacklist also addresses claims specifically related to the circular economy, particularly in relation to durability and early obsolescence. These include, for example, misleading practices concerning software updates and product repairability, thereby bringing circularity considerations more explicitly within the UCPD framework.

9.6 Enforcement

To date, there appears to be no reported enforcement action or judicial decision to have specifically addressed misleading environmental claims concerning the use of upcycled ingredients or by-products in food products. Scholars and policy documents increasingly underscore the risk of greenwashing associated with circular economy narratives in the food sector (Sciortino et al., 2025; Yeter et al., 2025; Falkenberg et al., 2023), particularly concerning ambiguous or unsubstantiated references to 'upcycled,' 'reused,' or 'recovered' ingredients. However, specific administrative enforcement practice or judicial guidance concerning upcycled-food claims has yet to emerge. The lack of enforcement should not be understood as indicating that such claims fall outside consumer protection law. Rather, it may reflect the relatively novelty of upcycled foods, the absence of a harmonised EU definition of 'upcycled food', and uncertainty concerning the criteria and evidence required to substantiate such claims. However, relevant insights can be drawn from similar cases in the agri-food and beverage market concerning misleading circular economy claims, especially in relation to packaging. One relevant example of private litigation is the lawsuit that ClientEarth[1] filed against Nestlé in Poland. The case concerned bottled water with labels like 'I am 100% recycled' and 'I am made from another bottle' which ClientEarth (https://www.clientearth.org/latest/press-office/nestle-poland-sued-for-greenwashing/) alleges create a misleading impression of environmental circularity. The main point of the complaint is that the messages suggest a degree of circularity that, according to the claimant, the recycling infrastructure and the bottles' actual lifecycle did not support. Although the proceedings do not concern upcycled ingredients and no judicial determination should be inferred from the allegations, they illustrate that claims presenting circularity in broad or categorical

[1] https://www.clientearth.org/latest/press-office/nestle-poland-sued-for-greenwashing/

terms may mislead consumers where the underlying processes do not actually deliver the environmental benefits conveyed by those claims. A hypothetical scenario illustrates how upcycled food claims could raise consumer protection concerns. For example, a snack that is advertised as 'made from food waste' or 'saving the planet through upcycled ingredients' might only use a small amount of the by-product ingredient in the final product, while providing no information about its actual environmental benefit. The product's packaging may use images and claims to highlight circularity, but provide little information on the amount of upcycled content, the environmental impact of the production process, or how it compares to other products. In this case, the consumer may perceive the product as more environmentally friendly than it really is and to base their decision to buy it on an incomplete and possibly misleading picture of its environmental qualities. This is particularly relevant as the market for upcycled food expands. Companies can currently frame their sustainability narratives with considerable latitude, as there is no agreed-upon legal definition of 'upcycled food' or standardized requirements for proving circular claims. This gives companies considerable freedom in how they present the sustainability benefits of upcycled products, even where the actual environmental benefits are unclear. As circularity claims become more prevalent in the market, they are likely to attract increasing regulatory attention. Therefore, the absence of enforcement cases concerning upcycled foods does not indicate the irrelevance of the rules. Rather, it may reflect an emerging area in the evolving governance circular economy. From a consumer protection perspective, clear regulatory guidance on circular food claims appears essential to prevent deceptive practices from becoming entrenched in the market.

9.7 Conclusion

The circular economy in the agri-food sector is not just an environmental strategy but also an economic and social opportunity. However, greenwashing represents a concrete threat because it undermines consumer trust and hinders the authentic ecological transition. In this sense, effective regulation is essential to protect consumers and promote transparent practices by companies. In this framework, consumers can be an active part of the transition if they are informed and aware. Policymakers should provide greater regulatory clarity on how developments in the circular economy fit within the existing waste framework. More clarity should be provided regarding the recovery and reuse of by-products, and the legal meaning and conditions of 'upcycling' should be clarified within the existing framework on waste, by-products and circularity. Furthermore, strengthening consumer protection policies, such

as the UCPD, as amendend by the ECGTD, would support more informed consumers' choice, building trust in brands and fostering fair competition in the market. To foster the idea of clear and understandable consumer information about the circular economy in the agri-food sector, the key areas of action include promoting transparency, countering generic or unsubstantiated language, ensuring that sustainability claims are supported by measurable evidence and appropriate indicators, enhancing consumers' education and environmental literacy, supporting credible certification schemes, and promoting collaboration among businesses, regulators, researchers and consumer organisations.

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