BREADCRUMB

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DELIVERABLE 1.3

Inventory of Private & Public Food Marketing Standards in the European Union

BREADCRUMB

Project title	**BR**inging Evidence-b**A**se**D** food **C**hain solutions to prevent and **R**ed**U**ce food waste related to **M**arketing standards, and deliver climate and circularity co **B**enefits		
Project acronym	BREADCRUMB		
Call topic	HORIZON-CL6-2023-FARM2FORK-01		
Type of action	HORIZON-RIA		
Coordinator	EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW- EN VISSERIJONDERZOEK - EV ILVO		
Deliverable due date	31/10/2024		
Project number	101136701		
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URL	https://www.breadcrumb-project.eu		

D1.3 – INVENTORY OF PRIVATE & PUBLIC MARKETING STANDARDS IN EU27

Due date	**31/10/2024**	**Delivery date**	**31/10/2024**
Work package	WP1		
Responsible Author(s)	VLTN (Nika Palaguta, Paulina Szwed, Chantal den Broeder)		
Contributor(s)	VLTN (Nika Palaguta, Paulina Szwed, Chantal den Broeder) CREDA (Maria Saray Ramirez Rodriguez) OPPPB (Marta Felip Palaus) UCPH (Subash Rana, Mukti R. Chapagain, Bent Egberg Mikkelsen) ITC (Sasa Straus) AINIA (Maripaz Villaba Talens, Cristina Jodar, Laura Ripol) ANECOOP (Nicolas Juste, Maria Miranda Tarin) MENSANA (Sanja Korenika, Ines Kranjec) AVEC (Nadia Khaldoune, Federica Chiarella, Paul-Henri Lava, Pedro Peña) FEBEV (Michael Gore, Anne Heyvaert)		

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	FENAVIAN (Anneleen Vandewynckel, Anne-Christine Gouder) MC/MCH (Rita Silva) EV-ILVO (Anne Twarogowska, Capwell Forbang Echo, Rani Van Gompel, Sofie De Man) CSCP (Nora Brueggemann, Marcia Rottwitt) UNIBO (Matteo Vittuari, Caterina Rettore, Matteo Masotti) Zelena Tocka (Aleksandra Kocet) Vila Natura (Marko Slavic) Landbrug & Fodevarer (Jorgen Nyber Larsen) Lehmann Natur (Christina Marandi) Natura Nuova (Simone Prospero, Fabio Fenati)
Reviewer(s)	UCPH (Subash Rana, Mukti R. Chapagain, Bent Egberg Mikkelsen) CREDA (Djamel Rhamani)
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VERSION AND AMENDMENTS HISTORY

Version	Date (DD / MM /YYYY)	Created /Amended by	Changes
0.1	08/30/2024	VLTN (Nika Palaguta)	Content of Introduction and Methodology
0.2	10/02/2024	VLTN (Nika Palaguta, Paulina Szwed, Chantal den Broeder)	Content and styling of Inventory, Survey, Interview, Conclusion chapters
0.3	10/21/2024	UCPH CREDA	Internal Quality Review
0.4	10/28/2024	VLTN (Nika Palaguta, Paulina Szwed, Chantal den Broeder)	Incorporation of quality review comments.
1.0	30/10/2024	EV-ILVO (Capwell Forbang Echo)	Report structure and styling

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LIST OF ABBREVIATIONS

Abbreviation	Description
EC	European Commission
EU	European Union
UN	United Nations
FAO	Food and Agriculture Organization
FW	Food Waste
FMS	Food Marketing Standards
F&V	Fruits and Vegetables
PO	Producers Organization
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
TSG	Traditional Specialty Guaranteed
GDPR	General Data Protection Regulation
WP	Work Package
HORECA	Hotel, Restaurant and Café / Catering

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EXECUTIVE SUMMARY

This report is the third deliverable (D1.3) of work package 1 (WP1) within the BREADCRUMB project. The objectives of this report were to compile an inventory of private and public food marketing standards in the European Union, and to provide insights as to their origin and purpose. The inventory is primarily focused on the following five food commodity categories outlined in the project: (1) fruits & vegetables, (2) meat (poultry, bovine, pork), (3) fish, (4) eggs, and (5) cereals. The report is the output from task 1.3 (T1.3) that took place from April to October 2024. It consisted of three data collection stages: desktop research (for the inventory), a survey, and in-depth interviews. Each stage aimed to contribute to a deeper understanding about food marketing standards – their identification, purpose, and origin.

The report is accompanied by a series of **appendices** including the **inventory of food marketing standards** identified in the task. To facilitate utilization of this report the following is highlighted for stakeholders:

Introductory Chapter: The introductory chapter provides an overview of the BREADCRUMB project, followed by a description of the goals of the research conducted in task 1.3, and an overview of the task's general methodology (desktop research, survey, and interviews), and timeline.

Chapter 2: The second chapter is dedicated to the **inventory**, discussing the methodology utilized to identify standards, the risk and mitigation actions taken, and a thorough overview of the analysis results. Analysis of the inventory is provided from the following perspectives: public vs. private standards, per country, per food commodity category, and in relation to Regulation 1308/2013.

Chapter 3: The third chapter explores the results of the **survey.** The methodology for this phase of the research is provided, including the survey structure, the risk and mitigation measures, and analysis of the responses. Analysis is provided on the private and public standards identified, their geographic scope and supply chain stage, as well as their prevalence within each food commodity category.

Chapter 4: The fourth chapter in this deliverable focuses on the **in-depth interviews**. Similar to the previous two chapters, an overview is provided of the methodology, along with risks and mitigation actions taken, and an overview is provided about the **qualitative data** emerging from the interviews. While the focal point of the interviews was to obtain a better understanding about the origin and purpose of public and private standards, the analysis also discusses the challenges of implementation, what happens to food that does not meet standards' specifications, how suppliers are affected by standards, and the consumer dimension in relation to food marketing standards.

Chapter 5: The fifth chapter provides an overview of the **key findings** that have come out of the data collection efforts in task 1.3 – desktop research in relation to the inventory of food marketing standards, survey responses, and in-depth interviews. Where possible, a cross comparison of findings from all three sources of data is carried out. Readers who would prefer an immediate overview of the results of this task, are encouraged to go directly to the chapter Key Findings.

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Concluding Remarks and Next Steps: The final chapter provides concluding remarks, **placing the results of the research within the broader EU and international context**. The limitations of the study are noted, and an overview is provided about how the data can be used by other tasks and work packages in the project, as well as by external stakeholders.

The information provided in this deliverable is meant to complement European Union (EU) research initiatives in this field. It can be built upon as more knowledge about food marketing standards is accumulated over time, and can serve to provide information which can be actively utilized for any initiatives aimed at establishing and / or revising current food marketing standards.

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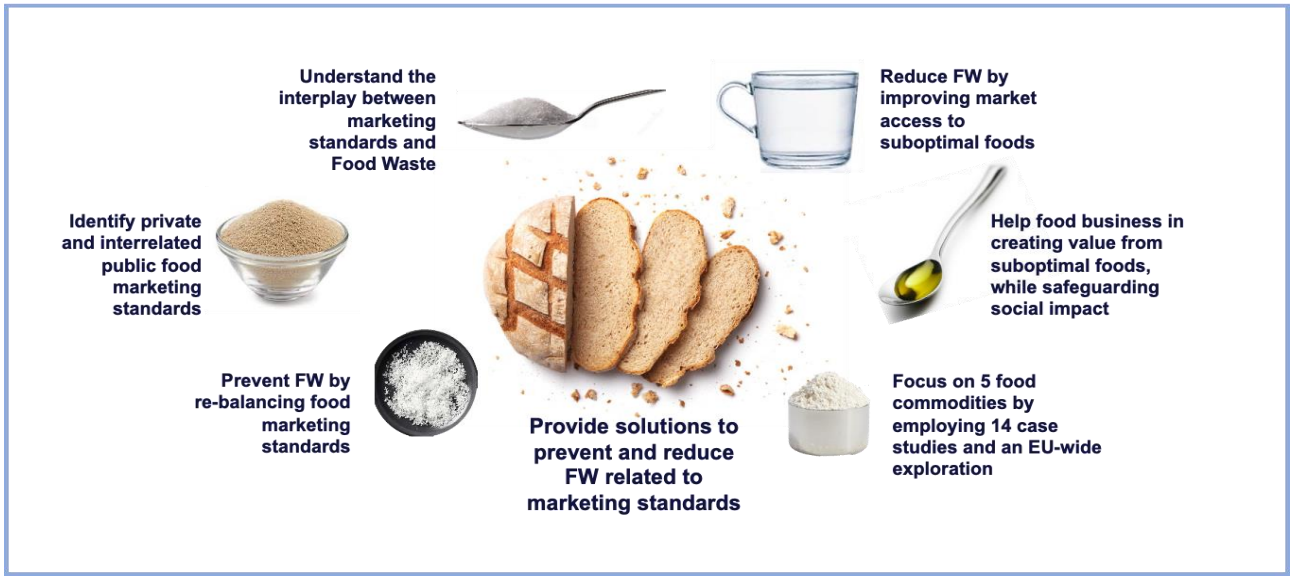
1. INTRODUCTION

1.1 BREADCRUMB Project Overview

The BREADCRUMB project aims to provide an empirical evidence-based understanding of the purpose and nature of food marketing standards, their impact on FW generation, and based on this evidence, propose interventions that strike a balance between reducing FW and the other objectives pursued by these standards. Furthermore, the project strives to improve market access for suboptimal foods by guiding food businesses to select appropriate marketing channels, and by fostering change in consumers' acceptance of suboptimal foods. All of this information will be structured into operational and policy guidance on how to prevent / reduce FW related to marketing standards.

More specifically, the Grant Agreement defines the following **procedure for the project:** "(i) establish a holistic view of marketing standards and identify those with key relevance to FW generation; (ii) create evidence-based estimates of FW generated as a consequence of marketing standards; (iii) provide solutions that alleviate the negative impacts of marketing standards on FW, based on a valid understanding of the underlying mechanisms of FW generation and trade-offs with other objectives (re-balancing marketing standards); (iv) enhance the business potential of "sub-optimal" foods; (v) inform and guide food businesses, consumers, owners of standards and policy regulators on how to prevent/reduce FW related to marketing standards".[1]

Figure 1: The BREADCRUMB project at a glance



[1] European Commission. (2023). "Grant Agreement Project BREADCRUMB." European Commission, European Research Executive Agency, (November), page 101 (electronic version).

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Source: BREADCRUMB Grant Agreement, Part B, page 101 (electronic version).

Moreover, the project intends to incorporate a **gender perspective** and **intersectional analysis** across the project. Both are pertinent to better understand the design and response to marketing standards affecting food choices, usage, and waste.

To verify the results, the project will employ various **validation** methods involving participants external to the project:

- External Advisory Board (4-5 individuals: researchers, practitioners with complementary expertise);
- Marketing Standards Interest Group (20-30 individuals: food businesses, civil society organisations, FW entrepreneurs, policy actors, and Joint Research Centre representatives);
- Specified consultation events, such as workshops, to widen the validation process with a larger group of diverse actors.

The research within the project has been approved by the COMESH **ethical committee** of the project's coordinator EV-ILVO.

1.2 Goals and Report Structure of Deliverable 1.3

This report is the third deliverable (D1.3) of work package 1, which took place from April to October 2024, within the BREADCRUMB project. The first objective of the task was to compile an inventory of private and public food marketing standards in the EU. The second objective was to obtain a better understanding about the origin and purpose of the standards.

The inventory provides key information about each food marketing standard including, but not limited to: the name of the standard, a brief description, categorization of the standard according to EU Regulation 1308/2013, the food commodity category, geographic scope, supply chain stage, if the standard is public or private, and where further information about the standard can be located online.

In terms of the standards included in the inventory, the research within the task has attempted to provide as comprehensive a list as possible, however with a focus on only the five main food commodity categories within the project: fruits and vegetables, meat (poultry, bovine, pork), fish, eggs and cereals. Additionally, the BREADCRUMB project does not focus per se on food safety standards i.e. the project takes the perspective that food safety cannot be compromised and therefore must be abided by before being able to come onto the market; there is no room for manoeuvre. The task also did not cover standards related specifically to import and export, but rather is focused on food products that are already within the EU.

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The following **definitions** were used throughout the task to ensure clarity not only among all partners within the BREADCRUMB project but also for further stages of the task which involved a survey and in-depth interviews.[2]

Food marketing standards: Obligatory rules or optional reserved terms aiming to address the expectations of consumers and to improve the economic conditions for the production and marketing as well as the quality of agricultural products. They establish rules regarding product characteristics and other requirements that must be met for products to circulate within in the EU market.

Private food marketing standards are defined as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

Public food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

Food waste is defined in accordance with the EC definition[1] as any food and its associated inedible parts (such as bones or fruit cores) that do not find their way to human consumption and rather become discarded. This can occur at all stages of the food supply chain, from farm to fork. In BREADCRUMB, if food products are returned to the land, utilised as animal feed, composted, subjected to anaerobic digestion, or left unharvested, they are considered food waste.

The work in task 1.3 was divided into 3 stages: desktop research, survey, and interviews.

1) Desktop Research (April – June 2024)
At this stage, partners conducted a study of the online sources to identify and categorise private and public food marketing standards found in academic and grey literature and official databases / collections of standards. The BREADCRUMB team also relied on project partners' expertise in specific commodity domains.

2) Survey (June – August 2024)
To enrich the desktop research results, the team also launched a survey targeting businesses / industries involved in the various stages of the food supply chain, at the EU and national member state level. The survey aimed to: (1) collect additional private and public standards established and / or adhered to in the EU; (2) solicit expert opinions on the interrelations between public and private standards, and their relationship with food waste; (3) acquire additional potential contacts for the interview phase of the task.

[2] A full list of definitions utilised in the research process is available in the appendices section under "Key Definitions".

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3) Interviews (June – September 2024)
While the surveys were designed to target a wide audience of experts to enrich the inventory, the interviews were aimed at going in-depth into the discussion with the experts on the origin, purpose, and effects of the standards.

The report starts with a description about the goals of the research conducted in task 1.3 and the general methodology applied (desktop research, surveys, interviews). It delves into the details of each data collection methodology, explaining the motivation and process. A summary of the analysis for each of the three stages of data collection is provided, as well as a "Key Findings" chapter providing where possible, a cross comparison of findings. The report finishes with the conclusions and next steps, and how the information may be utilised further within the project and externally.

1.3 Links with other BREADCRUMB work packages and tasks

This report centres on task 1.3, which presents the inventory of private & public food marketing standards in EU. Referred to hereafter as the "inventory", it is crucial to categorizing existing standards in the EU for the five food commodities, and building on that categorization to further understand the connections between public and private standards, as well as their relationship with food waste. The project focuses on the five food commodity categories: fruits and vegetables, meat, fish, eggs, and cereals. This is due to the expertise of the project's consortium partners, as well as evidence at the EU level that these commodity categories are subject to significant food waste along the supply chain.[3] The acquired understanding about food marketing standards obtained in task 1.3 will feed into task 1.4 (marketing standards and their relationship with food waste), which in turn will feed into other work packages within the project. More specifically, the results of work package 1 will also be utilised in subsequent work packages: (i) **WP 3** to help identify those standards which will be considered in the modelling task, and (ii) **WP 4** when determining which specific food product from each of the targeted five food commodities to focus on when looking to improve market access and business potential of foods that do not meet marketing standards, but are still safe to eat (i.e. suboptimal foods). The results of task 1.3 will also be shared with work package 2, to complement the quantitative work accomplished in **task 2.1** on food waste estimate levels.

Of note for the reader is that while all three data collection methods in task 1.3 (desktop research, survey, and interviews) provide insight on: (i) the relationship between public and private food marketing standards, and (ii) the relationship between these standards and food waste, both those topics ***are not covered in this deliverable***. Rather per the requirements outlined in the project's Grant Agreement, both topics will be addressed in task 1.4 of the first work package.[4]

[3] The following percentages have been cited at the EU level in terms of food waste along the value chain: fruits and vegetables (43%), meat (23%), fish (51%), eggs (29%), and cereals (20%). Please refer to:
Caldeira, C. et al. (2019). "Quantification of food waste per product group along the food supply chain in the European Union: A mass flow analysis." *Resources, Conservation & Recycling,* Volume 149, pp. 479-488.

[4] European Commission. (2023). "Grant Agreement Project BREADCRUMB." European Commission, European Research Executive Agency, (November), page 69 (electronic version).

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2. INVENTORY OF FOOD MARKETING STANDARDS

2.1 Objectives and Methodology

The first stage of task 1.3 focused on compiling an inventory of food marketing standards in the EU, which were identified via **desktop research**. During this stage, partners explored online sources to identify and categorise private and public food marketing standards found in academic and grey literature, official databases / collections of standards, and keyword searches in electronic databases, such as ScienceDirect, Google Scholar, Web of Science, Scopus. The research centred on the **five food commodity categories** that the project was addressing – i.e. the case studies on fruits and vegetables, meat, fish, cereals, and eggs. Partners were provided a "desktop research guidance" document by the task lead, which is available in the Appendices chapter of this deliverable (Appendix 8.2).

Per the requirements outlined in the Grant Agreement partners utilized a **standardized reporting template** to demonstrate and keep track of research results.[5] The Grant Agreement called for the collected information to include: (i) the specific food commodity; (ii) geographic scope (members state, EU level); (iii) type (public or private); (iii) category the standard falls into related to the classification within Regulation 1308/2013. Table 1 below provides a visual of the initial reporting template. As reserch progressed, additional information was added to the table to not only reflect the further requirements of the inventory noted in the Grant Agreement (i.e. quality, validity, consistency check, as well as indication of possible research and innovation hotspots), but to also reflect the information being obtained during research. Additional data points included in the inventory were: supply chain stage, general description of the standard, perceived link to food waste, and where possible, the on-line location of the standard. The full inventory of food marketing standards is available in Appendix 8.10.

Table 1: Initial Reporting Template for Desktop Research

Standard	**Commodity**	**Geographic Scope**	**Type**	**Reg 1308/2013**
- full name of standard	- specific commodity otherwise commodity category	- EU level - member state level	- public - private	- indicate which category (a-m)

Source: Author, based on requirements outlined in the project's Grant Agreement.

[5] European Commission. (2023). "Grant Agreement Project BREADCRUMB." European Commission, European Research Executive Agency, (November), page 69 (electronic version).

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2.2 Risks and Mitigation Measures

The BREADCRUMB research team identified the following risks and mitigation strategies during desktop research stage.

a) Risk: Incomplete Data
When collecting data on FMS across the EU for different food commodities, there was the risk that some standards would be missing (especially private ones), leading to gaps in the dataset. Some private standards can be missing due to private entities being unable to share such information (proprietary information) or a lack of publicly available information about the standard's existence.

Mitigation: While the project team recognised the privacy limitations and abided by them in order to collect as much information about private food marketing standards as possible, the desktop research was supplemented with survey and interview data collection to ensure multiple data sources.

b) Risk: Overrepresentation or underrepresentation of standards
With public food marketing standards being more accessible in the public domain, there was the risk of the inventory including many public food marketing standards and few private ones, while a core objective of the task was the identification and better understanding of private food marketing standards.

Mitigation: Task 1.3 narrowed the focus of the inventory to the five food commodity categories being addressed in the project - fruits and vegetables, cereals, meat, fish and eggs - so as not to be overloaded with public standards in food commodity categories not covered within the project. After the data was collected, the task lead conducted several data quality checks to remove duplicates, address missing information, and verify the accuracy of the records. The task lead continuously monitored the data collection process to identify and correct any imbalances, and all partners utilised a standardised reporting template to facilitate monitoring and quality checks. In total there were four revisions of the inventory over the course of task.

2.3 Analysis Methodology

The inventory data analysis consisted of the following three main steps.

1) **Inventory Quality Check:**
   - Cleaning the data to remove duplicates and standardise the naming.
   - Work together with the partners to fill in the information gaps and double-check the records.

2) **Summarizing the Data Collected:** Classify data in accordance with the following categories:
   - Number of private vs public standards.
   - Number of standards by country, on international and EU level.
   - Number of standards in accordance with the stages of the supply chain.
   - Number of standards per food commodity.

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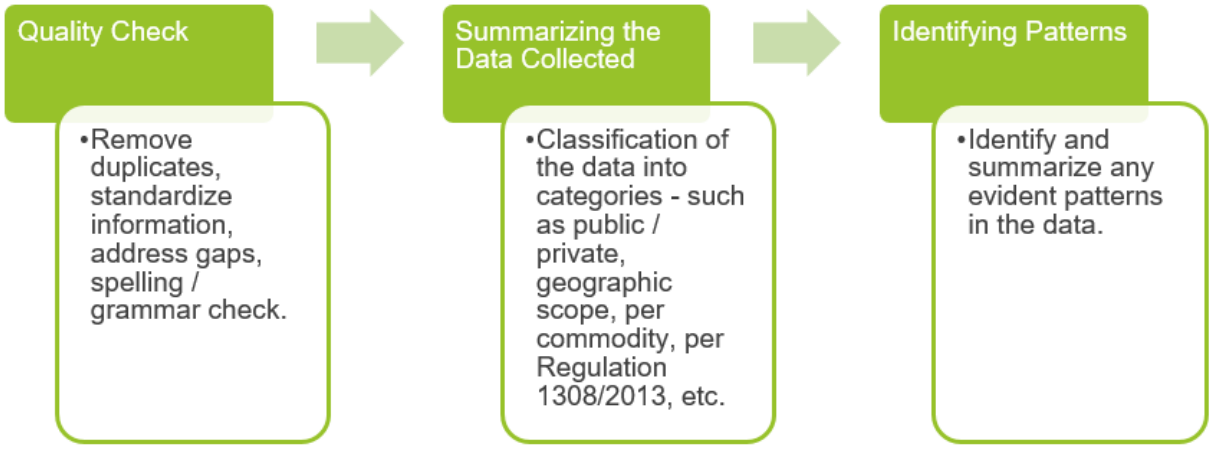
- Any other pertinent classifications made evident during analysis.

3) Identifying Patterns: Identifying and summarising any patterns evident regarding the standards by geographic scope, supply chain stage, food commodity, and, in particular, the private food marketing standards.

While the total number of standards before "cleaning" was over 1500, standards were removed for various reasons such as due to being duplicates, outside the scope of the project (related to other food commodity categories), or specific to import / export for example.

Figure 2: Analysis Methodology of the Inventory of Food Marketing Standards



Source: Author, based on analysis methodology of the inventory.

2.4 Findings and Analysis

2.4.1 Inventory overview

The **total** number of food marketing standards (FMS) in the inventory amounts to **1350**, with most standards **(1130) being applicable nationally** and **220** covering all EU countries (EU legislation and international standards). A total of **1203** standards (89.11%) in the Inventory are defined as **public**, and **147** (10.81%) as **private**. The number of **mandatory** (i.e. legally required) standards is **101**, and **1249** are **voluntary**.

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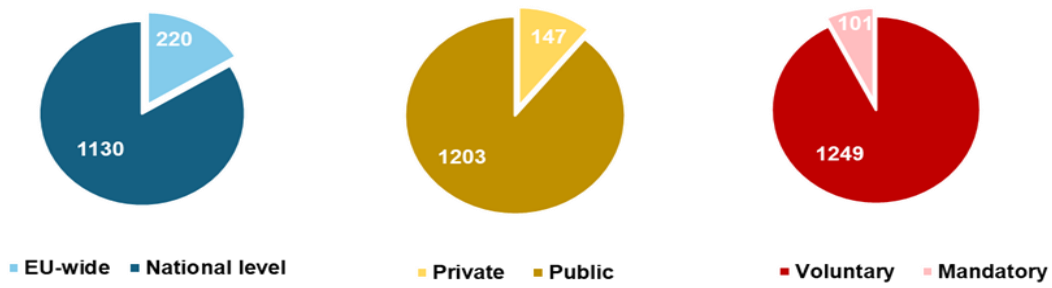
Figure 3: Number of FMS per Category[6]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

While there are many public standards, there are far less mandatory ones. The reason is because many of the international standards set by inter-governmental bodies (i.e. public) are technically voluntary. The Inventory also contains records of relevant EU-wide and international standards: 80 Codex Alimentarius standards, 28 standards created by OECD, 36 by UNECE, and 1 by OIE.

Figure 4: Number of EU-wide and International FMS by Origin

Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

Regarding the **country-level standards** coverage, the most number of standards were identified in **France** (**170,** plus 328 Label Rouge quality standards for various products). A significant number of

[6] The explanation here below applies to Figure 3, as well as to Figures 16-20.
EU-wide FMS: Standards applicable in all EU countries but not necessarily introduced by the EU bodies, usually, but not necessarily public, and not necessarily mandatory.
National level FMS: Standards applicable at the national member state level, but varies per member state.
Private FMS: Private food marketing standards are defined as not EU or national legislation but rather food marketing standards developed and operated by entities other than government bodies. They operate within the legal framework but are voluntary in nature.
Public FMS: Public food marketing standards are defined as standards established by government agencies or intergovernmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products to legally access the market.
Mandatory FMS: Standards that are legally required.
Voluntary FMS: Standards that are not legally required.

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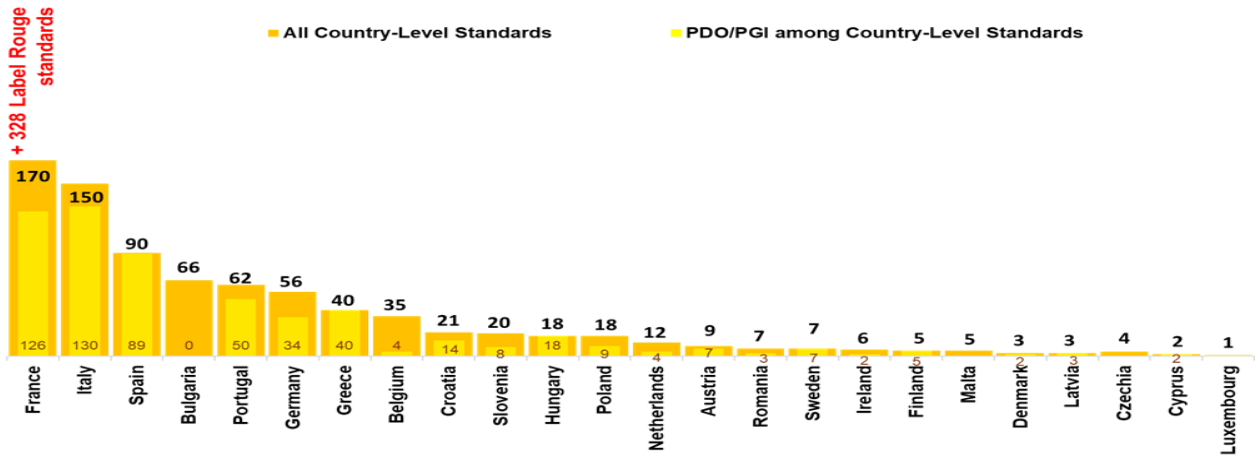
country-level standards were also found in **Italy (150), Spain (90), Bulgaria (66), Portugal (62), and Germany (56)**.[7]

Figure 5: Number of FMS at the National Level per Country[8]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

Fruits and vegetables were the food commodity category where the largest number of standards were identified: **639**. For **meat** it was **588** standards, with some of these standards being applicable to more than one meat commodity – i.e. 200 standards apply to bovine, 225 to pork, and 360 to poultry), and for **eggs, fish, and cereals** it was **105**, **176**, and **161**, respectively.

[7] The inventory identified food marketing standards in all but 3 EU member states (Estonia, Lithuania, and Slovakia).

[8] The total number of PDOs/ PGIs specific to countries is 557, but this does not include two pieces of EU legislation in regards to PDOs/PGIs also identified in the inventory:
- Regulation (EU) 1143/2024 of the European Parliament and of the Council of 11 April 2024 on geographical indications for wine, spirit drinks and agricultural products, as well as traditional specialities guaranteed and optional quality terms for agricultural products, amending Regulations (EU) No 1308/2013, (EU) 2019/787 and (EU) 2019/1753 and repealing Regulation (EU) No 1151/2012.
- Commission Implementing Regulation (EU) 2022/892 of 1 April 2022 amending Implementing Regulation (EU) No 668/2014 laying down rules for the application of Regulation (EU) No 1151/2012 of the European Parliament and of the Council on quality schemes for agricultural products and foodstuffs.

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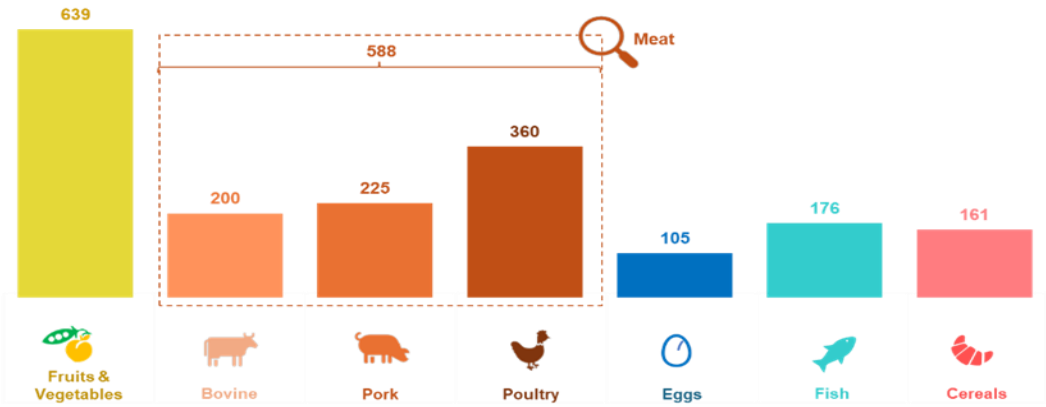
Figure 6: Number of FMS per Food Commodity Category[9]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

When looking at the inventory from the perspective of the supply chain stage, and noting that a single standard may be applicable across multiple stages of the supply chain, 1107 standards were applicable to primary production, **1132 to processing and manufacturing**, 542 to retail and other distribution, and 356 to food services.

Figure 7: Number of FMS per Supply Chain Stage[10]

Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

Analysing the inventory from the perspective of **Regulation 1308/2013**, category **J (place of farming and / or origin)** was the the most widely encountered category (635 standards in the inventory contain these requirements due to the inclusion of the PDO / PGI standards, in addition to other standards in that category), noting as well that a single standard could fall into more than one category of the regulation. Protected designations of origins (PDOs) and protected geographical indications (PGIs) protect the name of a product that comes from a specific region and follows a particular traditional production process. There were **no standards identified in relation to category H (coupage of must and wine)**.

[9] A food marketing standard can apply to more than one food commodity.

[10] A food marketing standard can apply to more than one supply chain stage.

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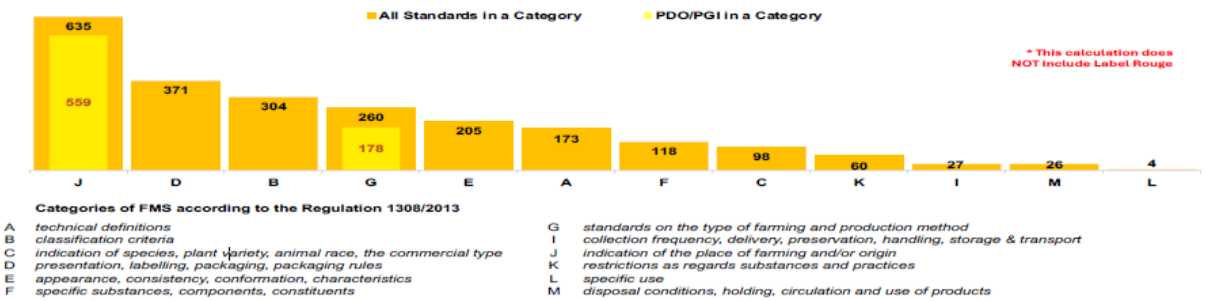
Other categories of standards frequently encountered include:

- category D (presentation, labelling, packaging, marking, year of harvesting) at 371;
- category B (classification criteria) at 304;
- category E (appearance, consistency, conformation) at 205;
- category A (technical definition) at 173;
- category F (specific substances used in production, components, constituents) at 118;
- category M (governing the disposal, the holding, circulation and use of products) at 26;
- category G (type of farming and production method) at 260;
- Category C (indication of species, plant variety, animal race, the commercial type), category K (restrictions as regards substances and practices), category I (collection frequency, delivery, preservation, handling, storage & transport) and category L (specific use) appear less frequently.

Figure 8: Number of FMS per Category in Regulation 1308/2013[11]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

2.4.2 Public and private standards

The Inventory contains **1203 public standards**. These standards include EU regulations (38), Codex Alimentarius standards (80) (mostly applicable to fruits and/or vegetables), UNECE and OECD standards (36 and 28, respectively), 1 international animal welfare standard, 1021 country-level public standards, and 559 Protected Designation of Origin (PDOs) / Protected Geographical Indication (PGIs).

[11] A food marketing standard can pertain to more than one category of Regulation 1308/2013.

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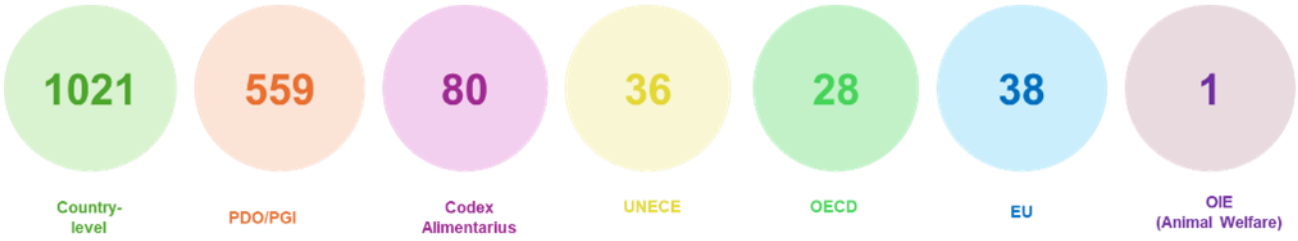
Figure 9: Number of Public FMS by Origin

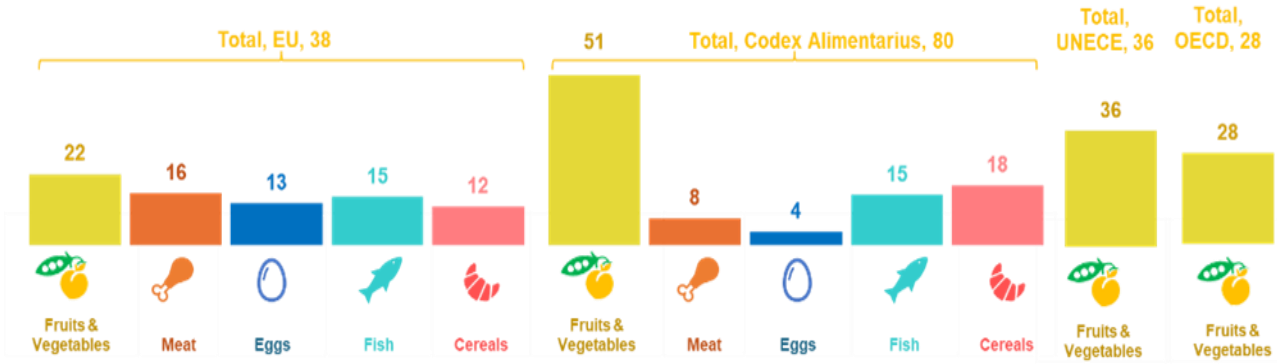


Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

Public food marketing standards can be **mandatory** like EU regulations and national legislation, **voluntary de-jure, but mandatory de-facto** like Codex Alimentarius, UNECE and OECD standards that constitute the foundation of international trade, and completely **voluntary** as PDO/PGI standards recognised in some EU countries. The latter include standards such as French quality standard Label Rouge, Antigaspillage Alimentaire (an anti-food waste label recognised by the French government) Nutri-Score (a nutritional label recognised by several EU countries), and Produit en Bretagne or Made in Poland (a nationally recognised label of regional or national origin).

While a single standard may be applicable to multiple commodities, for the food commodities covered by the public standards, **Codex Alimentarius** standards cover mostly fruits and/or vegetables (51 standards) fewer Codex standards apply to meat (8), eggs (4), fish (15) and cereals (18). **UNECE and OECD** standards apply to fruits and vegetables exclusively. Among the **EU standards**, 22 apply to fruits and vegetables, 16 to meat, 13 to eggs, 15 to fish, and 12 to cereals.

Figure 10: Number of Public EU and International FMS by Origin and per Food Commodity[12]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

The inventory also contains **147 private FMS**. Of all the private standards, 37 are international, and 110 are national. Private standards established at the **international and national level,** include examples such as the **Marine Stewardship Council (MSC) Chain of Custody Standard,** The **Global Seafood Alliance (GSA) Seafood Processing Standard (SPS), Global Red Meat Standard** or **GLOBAL G.A.P.** Integrated Farm Assurance Standards. These standards cover a wide

[12] A food marketing standard can apply to more than one food commodity.

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array of issues from general food safety quality to sustainable production. Overall, these standards help maintain consumer confidence by assuring the quality, origin and sustainability of products.

Many private standards emphasise sustainable practices, organic production, and animal welfare. In the meat sector for example, standards like the **Food Quality Assurance System (QAFP)** in Poland prohibit injecting meat with water or other substances, ensuring a natural product. In Belgium, the **Belbeef standard** for beef focuses on animal welfare, food safety, and traceability, consolidating standard quality requirements for consumers. Similarly, the **BePork** animal welfare standard goes beyond legal requirements for pork production, prioritising animal health, welfare, and sustainability across the supply chain. The Netherlands' **Better Life Quality** standard is dedicated to animal welfare, providing transparency about the conditions of animals to consumers. France's **'Agri-Ethique' and 'Bio Equitable En France'** standards focus on preserving biodiversity, promoting environmentally friendly production, and advocating for ethical agricultural practices. Standards for pork, such as **Pork of Weleer** with the **'Quality Supply Chain'** label sold in Carrefour, ensure environmentally sustainable production, using 100% natural, non-GMO animal feed.

For seafood, private standards like the **IFFO RS** (Marine Ingredients Organization) and the **Marin Trust Standard** emphasise sustainability in producing marine ingredients like fishmeal and fish oil, ensuring traceability throughout the supply chain. **The Global Seafood Alliance's Seafood Processing Standard (SPS)** certifies seafood processing plants based on responsible sourcing practices, while the **Marine Stewardship Council (MSC) Chain of Custody Standard** guarantees that certified seafood can be traced back to sustainable sources.

Some private standards are established to ensure superior product quality**,** focusing on **visual attributes, ripeness, firmness,** and other factors. For example, the Hoogstraten strawberries standard in Belgium categorises strawberries into four classes—GOLD, Double Extra (EE), Extra (E), and Extra Direct (ED), based mainly on external characteristics. Due to their lower firmness, the ED class allows for slightly softer strawberries, which are less suited for distant export markets. In many EU countries international standards like GLOBAL G.A.P. with the Integrated Farm Assurance (IFA) standard focusing on food safety, environmental respect, and traceability to ensure high-quality produce, are integrated into private standards at the national level.

Other private standards identified in the inventory emphasise **product origin**, helping to assure consumers about the provenance of their food. In France, standards like **Viandes et oeufs de France** focus on guaranteeing the local origin of meats and eggs. The certification highlights the geographical source, aligning with consumers' preferences for locally produced items. Standards such as **Donau Soja, Europe Soya, and Cereais do Alentejo in Portugal** emphasise European origin and sustainable production practices in the cereals sector.

2.4.3 Country-level analysis

Out of all the standards collected, **1130** are applicable at the **national level.** In all countries except Belgium, **public standards** in the inventory **constitute the majority**.

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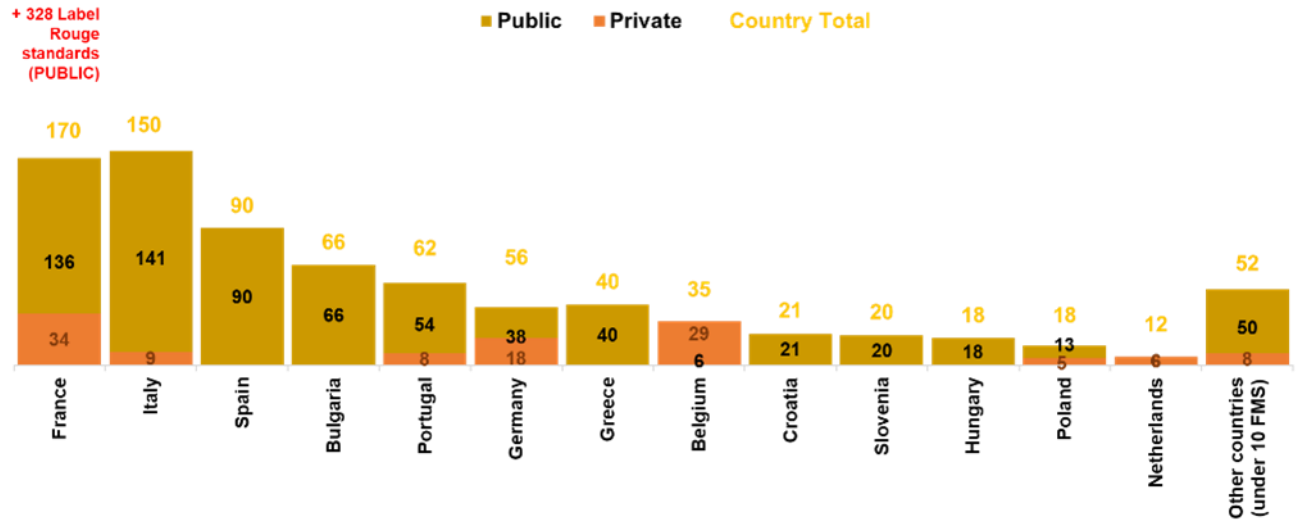
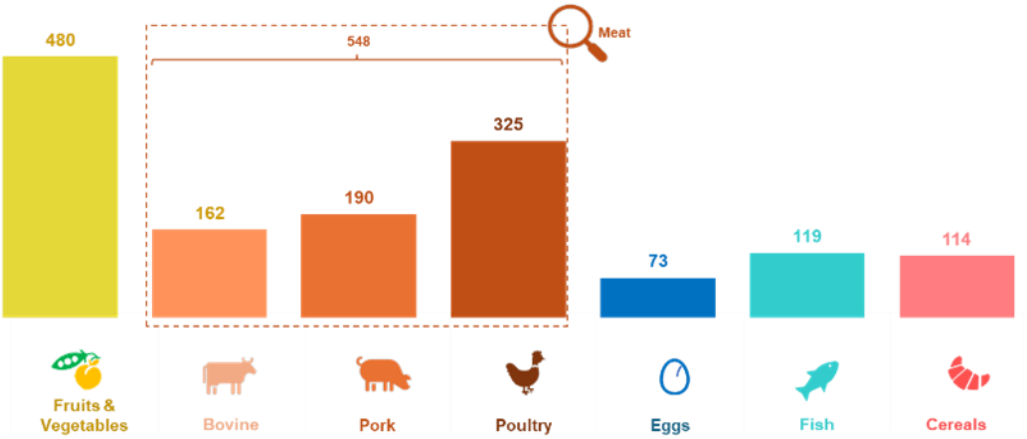
Figure 11: Number of Private and Public Country-Level FMS per Country



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

Of the total 1130 standards applied at the national level, **the majority (480)** pertained to **fruits and/or vegetables**, **548** to **meat** (with some of these standards being applicable to more than one meat commodity – i.e 162 standards apply to bovine 162, 190 to pork, and 325 to poultry), **73** to **eggs**, **119** to **fish and/or aquaculture**, and **114** to **cereals**.

Figure 12: Number of FMS at the National Level per Food Commodity[13]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

France and **Italy** account for the largest number of standards identified in the inventory, with 498 and 150 standards respectively, with a standard being able to be applicable to more than one food commodity category. For France the highest number of standards identified standards related to meat (368), while in Italy it was fruits and vegetables (107).

[13] A food marketing standard can apply to more than one food commodity.

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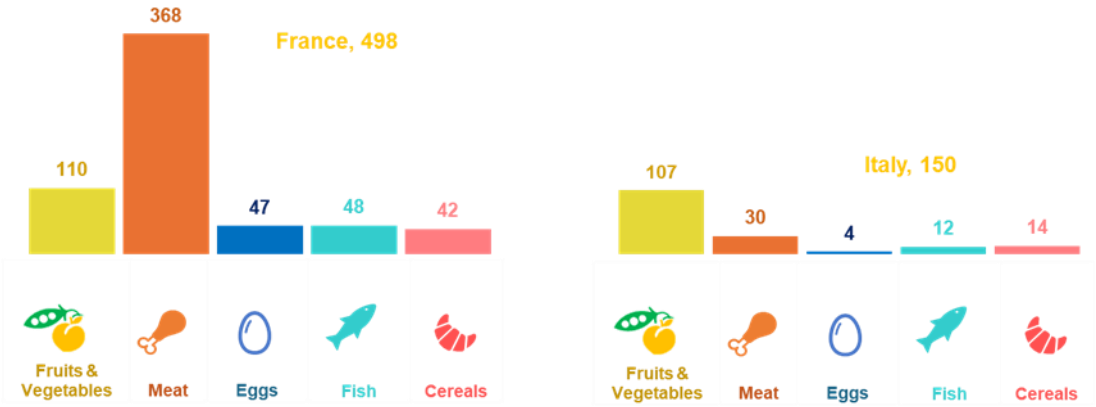
Figure 13: Number of National Level FMS applicable in France and Italy per Food Commodity[14]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

Among the standards in the inventory, those related to **certification and labelling** were identified most often in France**.** The core ones are **Label Rouge** (327 standards) and **PDO / PGI** (126 standards), which address origin. Label Rouge is a voluntary national certification standard created in 1965 by the instigation of French poultry producers. Today, Label Rouge covers meats, cheeses, and other dairy products, as well as fruits, vegetables, fish, and seafood, and stands for the supreme quality of a good. The Label Rouge is not a private label but an official quality seal awarded to a specific product on behalf of the French Ministry of Agriculture by the National Commission for Quality Seals of Agricultural and Food Products. Since this seal of quality does not distinguish an individual producer but a specific product, no company has the sole right to apply for the Label Rouge. Each product obtained from Label Rouge has its specifications, which are in particular documents ("cahier de charges").

Out of 126 **PDO / PGI** identified in France, 44 cover fruits and vegetables, 16 for bovine, 18 for pork (including ham), 41 for poultry, 6 for cereals and 1 for eggs. Out of the remaining standards identified, there are 3 more that certify the **French origin** of the products (Origine France Garantie, Viandes et oeufs de France, and Fruits & Légumes de France). **Bio, eco, and sustainable food certifications / labelling**, sometimes connected to the region of origin, account for another 20 standards identified in France. Also identified for France was 1 vegan (EVE Vegan®) and 1 nutrition (Nutri-Score) labelling / certification. In addition, many chain supermarkets also have their own bio / eco / sustainable food labels / brands. The brands frequently stress that the food under those labels originates in France.

Italy is second after France regarding the number of identified standards that are applied nationally, with 150 standards. **PDO/PGI** accounts for **130 standards**. Out of 11 **public standards**, 9 address product origin or traceability, and 2 cover labelling requirements. Out of the remaining **standards (private)** identified in Italy, they focus on safety and sanitary standards for bovine, residues in tofu, various sustainable production methods for several products, and the absence of GMOs in food.

[14] A food marketing standard can apply to more than one food commodity.

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For the remaining EU member state countries where food marketing standards were identified in the inventory, in each country the majority of identified standards were in relation to **fruits and vegetables**. However, as evident from Figures 14 and 15, in a few of those countries the largest number of standards identified pertained to other sectors. In particular, **Belgium** stands out with a much larger number of standards (26) having been identified in the **meat sector**, and **Bulgaria** with 33 standards identified in the **cereals sector**. In all countries there was a clear **majority of public rather than private** food marketing standards identified by project partners. Among the standards identified in each country, while there was variation, they covered issues relating food safety, classification, grading, traceability, origin, labelling, production methods (including animal welfare and environmental sustainability considerations), and quality of the product. In regards to quality, the standards often included topics such as size, colour, shape, freshness (especially for fruits and vegetables).

PDO / PGI standards were prominent in nearly each country covered in the inventory. These standards protect the name of a product that comes from a specific region and follows a production process that is directly linked to that geographic area – i.e. considered a traditional production method. The specifications within these standards are **stringent** and must be complied with in order to obtain the PDO or PGI label, and thus differentiate the product from other similar products on the market. Most of these PDO / PGI standards identified in the inventory fell under the **fruits and vegetables**, followed by the **meat and meat products** food commodity categories.

Figure 14: Number of FMS applicable in Portugal, Germany, Belgium, Poland, Netherlands and Austria per Food Commodity[15]

Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

[15] An individual standard may be applicable to several food commodity categories (i.e. fruits and vegetables, meat, eggs, fish, and cereals). For example, in the Netherlands 12 standards are evident, but an individual standard may cover multiple commodities.

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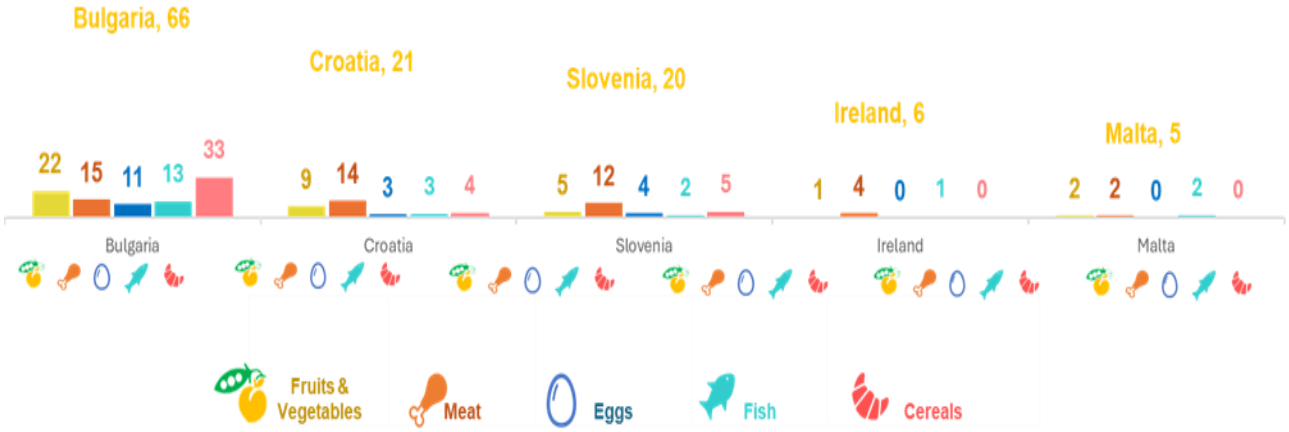
Figure 15: Number of FMS applicable in Bulgaria, Croatia, Slovenia, Ireland and Malta per Food Commodity[16]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

2.4.4 Food commodity-level analysis

All Food Commodities

The inventory contains EU standards focused on the quality of food, applicable to all food commodities. These standards are derived from regulations such as **Regulation (EU) No 1308/2013** which establishes a common organisation of the markets for agricultural products. Other key regulations addressing standards that need to be met, include but are not limited to:

- Regulation (EC) No 1924/2006 on nutrition and health claims made on foods
- Regulation (EU) 775/2018 on the provision of food information to consumers, as regards the rules for indicating the country of origin or place of provenance of the primary ingredient of a food
- Regulation (EU) No 1169/2011 focusing on labelling requirements for various food commodities and informing the consumers
- Regulation (EU) 848/2018 on organic production and labelling of organic products
- Regulation (EC) No 1829/2003 on genetically modified products
- Regulation (EC) No 396/2005 on residues of pesticides
- Regulation (EC) No 396/2005 on materials that come into contact with food
- Regulation (EU) 1143/2024 on geographical indications.

The inventory also contains relevant **national legislation** applicable to several food commodities. These legislations are usually extensions of the EU-level requirements and are **non-contradictory,** in that they do not contradict what is in EU-level specifications. Consequently, there is similarity across EU member states in the national legislation. For example, the rules on the general labelling of non-prepacked foods in Slovenia, regulations on markings or signs that determine the batch or lot

[16] An individual standard may be applicable to several food commodity categories (i.e. fruits and vegetables, meat, eggs, fish, and cereals). For example, in Malta 5 standards are evident, but an individual standard may cover multiple commodities.

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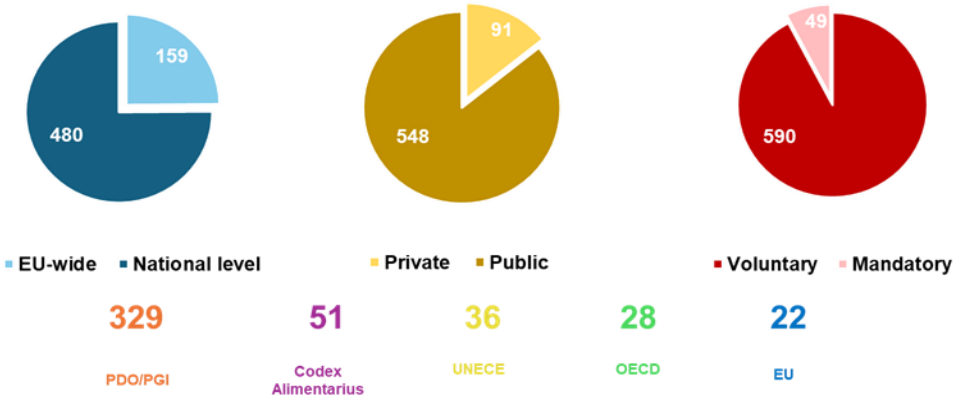
to which the food belongs in Croatia, and Code rural et de la pêche maritime are also part of the primary agricultural legislation in France. However there are regulations that apply only to some food commodities and account for the features that are particular to them.

Fruits and Vegetables

Standards applied to fruits and/or vegetables are the **largest group** in the inventory, covering **639 standards.** This includes EU-level, and international standards from UNECE, OECD, and Codex Alimentarius, as well as standards applicable at a national level, and private standards.

Figure 16: Number of FMS applicable to Fruits and Vegetables



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

The European Union's regulations for fruits and vegetables focus on ensuring **uniform** market standards, food safety, accurate consumer information, and sustainability. They mandate proper labelling, allergen disclosure, and nutritional content information while setting maximum residue levels for pesticides and contaminants to ensure safety. Most crucially, **Regulation (EU) No 543/2011** sets requirements concerning the appearance, consistency, conformation, maturity, and product characteristics of fruit and vegetable products, specifying the “class” a product falls into, depending on specific criteria. It also sets specific standards for marking, depending on the products. Some common requirements regarding the marking of the products are identification of the origin, identification of the packer and/or dispatcher, nature of produce, and commercial specifications (e.g., class and size). Delegated **Regulation (EU) 2429/2023** for certain processed fruit and vegetable products and the bananas sector mandates inclusion of the country of origin on the external packaging. It aligns EU regulations on certain processed fruit and vegetable products and the bananas sector with the objective of contributing to the Farm to Fork Strategy, in particular as regards increased information for consumers and reduction of food waste.

National legislation for fruits and vegetables **complements the EU legislation**. For example, Landbouwkwaliteitsregeling in the Netherlands ensures that agricultural products meet certain quality criteria, such as size, shape, colour, and freshness, before being marketed and sold to consumers. Similarly, in Italy the Country-of-Origin Labeling (COOL) enhances labelling requirements, while in Ireland, national legislation outlining the main requirements for the sale of potatoes in Ireland outlines the quality, grading and labelling requirements. While national legislation

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abides by and implements the required EU legislation, it **can also establish country-specific rules and build upon the EU norms**. For instance, in addition to the standard EU legislation on origin and traceability, France has various public regulations ensuring high-quality products (Label Rouge, Nutri-Score), origin and traceability (Origine France Garantie).

In addition to national legislation, **329** products within this category of food commodities are covered by public **PDO / PGI** origin standards in 19 EU countries, with examples such as Asparago Bianco di Bassano (Italy), Cebola da Madeira (Portugal), and Papas Antiguas de Canarias (Spain).

The **international public OECD** and **UNECE** standards for fruits and vegetables collected in the inventory aim to ensure consistent quality, safety, and fair trade in the global market. They generally require that products be intact, sound, clean, and free from pests, damage, abnormal external moisture, and any foreign smell or taste. Specific products adhere to additional standards regarding maturity, moisture content, and sizing.

Similarly, the **Codex Alimentarius** standards for fruits and vegetables developed by the Codex Alimentarius Commission set out minimum quality requirements, including size, shape, colour, firmness, and ripeness for various fresh produce such as apples, bananas, citrus fruits, tomatoes, and leafy greens. These standards also provide detailed guidelines for labelling, including the correct identification of the product, the country of origin, and information on allergens or other critical factors. In addition, Codex Alimentarius standards outline recommendations for packaging and storing fruits and vegetables to prevent contamination, physical damage, and spoilage.

Given the fragility of fruits and vegetables, the inventory highlights that additional requirements can be made on standards by downstream actors (i.e. actors in the supply chain receiving products or services) to ensure **quality** in terms of the size, shape, colour, ripeness, firmness, presence or absence of certain substances, and /or a requirement to follow particular international standards. Examples of such **private standards** are evident in many EU countries. For example, a private retailers' standard discovered in Austria implements strict visual quality rules for the produce farmers sell to the retailers and covers potatoes, onions, cabbage, leek, spring onions, carrots, radishes, and apples. Another example is evident in Belgium with the Hoogstraten strawberries standard. Hoogstraten strawberries are classified into 4 categories: GOLD, Double Extra (EE), Extra (E) and Extra Direct (ED), based almost entirely on the strawberries' external characteristics, with the only exception being classification ED, where slightly less firm strawberries are allowed, but therefore are less suitable for remote export destinations. Yet another example comes from Germany, where several private standards are established so that producers adhere to international standards such as that of GLOBAL G.A.P., with a cornerstone standard of GLOBAL G.A.P. for fruits and vegetables being the Integrated Farm Assurance (IFA), built on a holistic approach covering food safety, environmental respect (including biodiversity), animal welfare, workers' well-being, and traceability.

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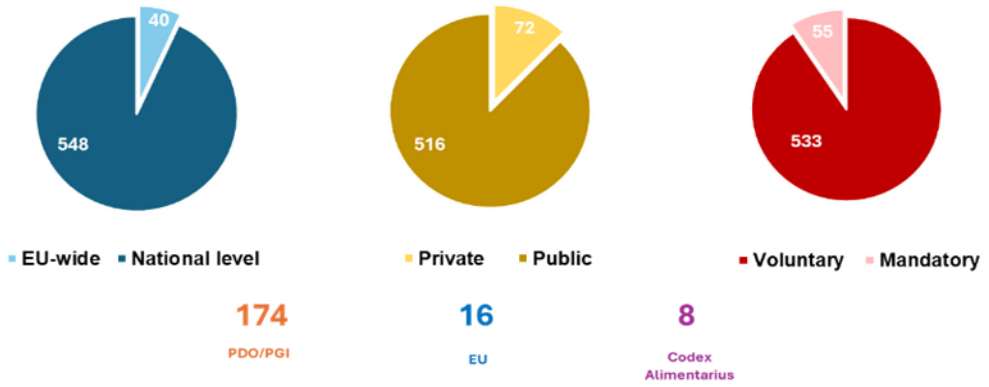
Meat

The inventory includes almost six hundred (**588) standards** applicable to **meat** and certain meat products (such as ham). This includes EU-level, and international standards from Codex Alimentarius, as well as standards applicable at a national level, and private standards.

Figure 17: Number of FMS applicable to Meat (Bovine, Pork, Poultry)



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

There are several **EU regulations** pertinent to the meat sector, such as, but not limited to Regulation (EC) No 853/2004, Regulation (EC) No 854/2004, Regulation (EU) No 653/2014, Regulation (EC) No 566/2008, Regulation No 1760/2000, Commission Regulation (EC) No 1825/2000 and Commission Regulation (EC) No 275/2007, which address **safety, quality,** and **transparency in production, marketing, and consumption** of meat and meat products. These regulations establish guidelines for labelling, traceability, and origin information. They also set maximum contaminant levels and define microbiological and hygiene practices for meat products. Additionally, measures are in place for labelling nutritional and health claims, ensuring that consumers receive accurate information about the meat they purchase. Standards also exist for the certification and labelling of products linked to specific geographical indications and origin of products and product parts.

Legislation at the EU **member state** level enacts these EU norms. For example, Regulation No. 10 of 26.04.2021 on the specific requirements for producing food of animal origin in slaughterhouses in Bulgaria outlines the specific standards and requirements for producing food of animal origin, including meat in slaughter facilities. It relies on EU legislation to provide details in the regulations regarding the construction and operation of slaughterhouses, including the necessary hygiene practices, the marking and identification of meat products, and the procedures for labelling and transportation. Another example is in Slovenia, where the mandatory “Regulation on the quality of meat of slaughtered livestock and game" utilized EU legislation to specify the process for cutting livestock carcasses into basic pieces, classifying the meat into quality categories, and marking these categories, including the marking of game meat. Other examples include Germany (Beef Labelling Act, Beef Labelling Regulation), Malta (Corned beef regulations), Italy (meat labelling and traceability and origin regulations). These regulations address the proper nutrition labelling, contamination control, and adherence to hygiene standards necessary to abide by the law and access the market.

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In addition to national legislation, **174** products within this category of food commodities are covered by public **PDO / PGI** origin standards in 20 EU countries, with examples such as Poulet du Bourbonnais (France), Carne dos Açores (Portugal), and Weideochse vom Limpurger Rind (Germany). In France, many nationally recognised official standards focus on the quality and origin of meat, meat products and parts as well (i.e. “Viandes et Oeufs de France”, “Label Rouge”, and “Origine France Garantie”).

Several examples of **public international** standards in the inventory, particularly **Codex Alimentarius** standards, **cover a wide range of issues and play a key role in the meat industry outlining guidelines for this food commodity category.** For instance, the **Standard for Corned Beef** sets guidelines for using uncured beef with specific curing ingredients, emphasising high-quality raw materials and commercial sterility. The **Standard for Cooked Cured Pork Shoulder** applies to cured pork products, detailing the required meat content, curing process, and labelling requirements for different product variations. The Standard for Cooked Cured Chopped Meat covers products made from coarsely chopped meat, including bovine, focusing on curing, permissible ingredients, and ensuring the product is safe and correctly-labelled. Or the example of the Standard for Luncheon Meat applies to finely chopped meat products, including beef and poultry, outlining essential composition, fat content, and curing processes, with strict guidelines for labelling and hygiene practices.

Private standards in the meat sector either **expand upon what the EU requires** or **introduce other elements** into the standards, such as **environmental concerns** and **animal welfare** considerations specific to the meat sector. For example, in Belgium, the Belbeef standard for bovine, the BePork Animal Welfare standard, and the Pork of Weleer with the “Quality Supply Chain” label are examples of standards with an intrinsic component dedicated to animal welfare. The Belbeef standard is a comprehensive certification system for Belgian beef, ensuring quality and safety throughout the production process. The standard adheres to the official legal requirements regarding food safety, traceability, and animal welfare and consolidates the common standards demanded by various customers. The BePork standard provides quality assurance for pork, goes beyond legal requirements at all supply chain stages, focusing on enhanced safety, an emphasis on animal health, welfare, and sustainability. The Pork of Weleer sold in Carrefour with the Quality Supply Chain label signifies that the pork is produced in an environmentally friendly manner, with animals fed 100% natural, non-GMO feed. In the Netherlands, a private standard, “Better Life Quality”, focuses on animal welfare and providing information on the condition of animals to the consumers. Standards such as “Agri-Ethique” and “Bio Equitable En France” in France significantly emphasise preserving biodiversity, environmentally friendly production, and ethical agriculture.

Eggs

The inventory contains **105 standards** applicable to **eggs**. This includes EU-level, and international standards from Codex Alimentarius, as well as standards applicable at a national level, and private standards. The egg sector in the EU is mostly covered by **EU regulations**, although a few **national**

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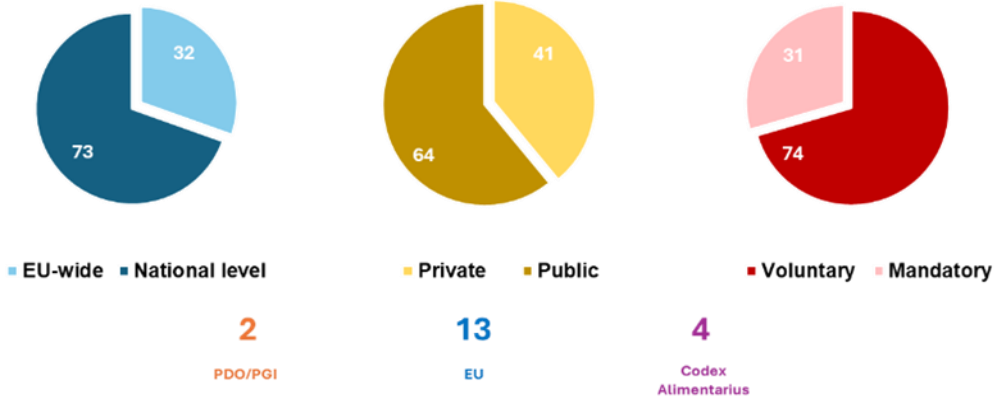
public standards focusing on **quality** and **origin,** and **private standards** also appear in the inventory.

Figure 18: Number of FMS applicable to Eggs



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

EU regulations, namely Commission Delegated Regulation (EU) 2464/2023, Commission Delegated Regulation (EU) 2465/2023, and Implementing Regulation (EU) 2466/2023 on marketing standards for eggs, focus on several key aspects to ensure **quality and traceability.** Eggs must be stamped with the producer code at the production site, with certain exceptions allowing stamping at the first packing centre if approved by the Member State. The labelling must accurately describe the production method, and eggs are classified based on specific quality criteria, including the condition of the air chamber, yolk visibility, egg white clarity, and the absence of foreign bodies or odours. Temperature control during transport and storage is strictly regulated, and packaging must protect the eggs from contamination and maintain their quality. Additionally, the regulations mandate detailed record-keeping and compliance checks to ensure traceability from production to sale.

In addition to the EU regulations in the egg sector, **complementary national member-state legislation** exists, enacting that put forth at the EU level. A mandatory Bulgarian regulation (Regulation No. 1 of 09.01.2008 on the requirements for trade in eggs) specifies the requirement for egg trade. The document establishes standards for the trade and handling of eggs, focusing on various aspects such as classification, marking, packaging, and labelling. It mandates that eggs be sorted and labelled according to freshness and quality, with clear distinctions between classes (e.g., Class A and Class B). The Regulation also specifies the requirements for marking eggs with the producer's code, packaging standards, and the labelling of transport packages.

In the inventory there also appear a few **national public standards** focusing on **quality** and **origin.** For example, in Poland, the label “Made in Poland” applied to various food products also covers eggs. This standard ensures that eggs bearing the label are produced entirely in Poland, with strict criteria for the origin of the raw materials and the production process. The label guarantees that at least 75% of the ingredients (excluding water) are of Polish origin and that the production, processing, and packaging occur in Poland. In Slovenia, a mandatory regulation (Regulation on egg quality) provides animal classification, marking, packaging, and labelling standards. Additionally, these standards set guidelines for storing and transporting eggs to maintain their quality and safety

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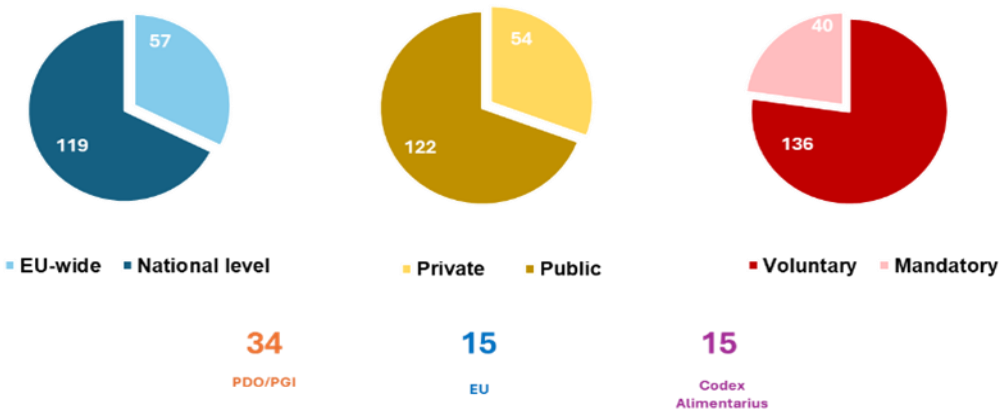
throughout the supply chain. The national legislation in this sector primarily focuses on ensuring that eggs marketed meet high-quality standards and provide clear information to consumers.

Private standards applying to eggs appear in standards originating mostly in France. These standards tend to cover not only eggs, but also other products, and usually focus on **origin** (i.e. Viandes et oeufs de France, Origine Corrèze) or **organic, sustainable production** (i.e. Bleu-Blanc-Coeur, Bio Sud Ouest France). Finally, a European sustainability label, "On the way to PlanetProof", guarantees that the products with this quality label comply with strict environmental criteria respecting nature, climate, and animals.

Fish

The inventory contains **176 standards** applicable to **fish and aquaculture**. This includes EU-level, and international standards from Codex Alimentarius, as well as standards applicable at a national level, and private standards.

Figure 19: Number of FMS applicable to Fish



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

At the **EU level, Regulation (EC) No 2406/1996** is one of the most critical ones in the fish sector, providing criteria for qualifying freshness and calibre of most marketed species. **Regulation No 1379/2013** formulates requirements for size classification criteria and species excluded from commercialisation. Catches below the minimum size (measured in length) must be discarded and cannot be commercialised. It also offers information on labelling, which is crucial to ensure the product's traceability. Council Regulation (EC) 43/2009, Council Regulation (EU) No 43/2012, and Council Regulation (EU) No 44/2012**,** are among the legislation focused on establishing catch limits for the respective year allocating quota for the Member States.

At the **national level**, a total of (119) standards were identified in the inventory for the fish sector, including legislation that essentially enacts EU requirements. Mandatory country-specific standards in Italy focus on the traceability, classification and storage of fish. In Portugal (Portaria No. 587/2006, Portaria No. 255/2022, and Decreto-Lei No. 134/2022) respectively establish the list of commercial names for fishery and aquaculture products, provide the minimum conservation reference sizes for

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species, protect marine ecosystems through technical measures and set the traceability and control system for consumer information requirements. Another example is evident in Malta. The national standard (Subsidiary legislation 449.25 fish) focuses on fish packing and processing.

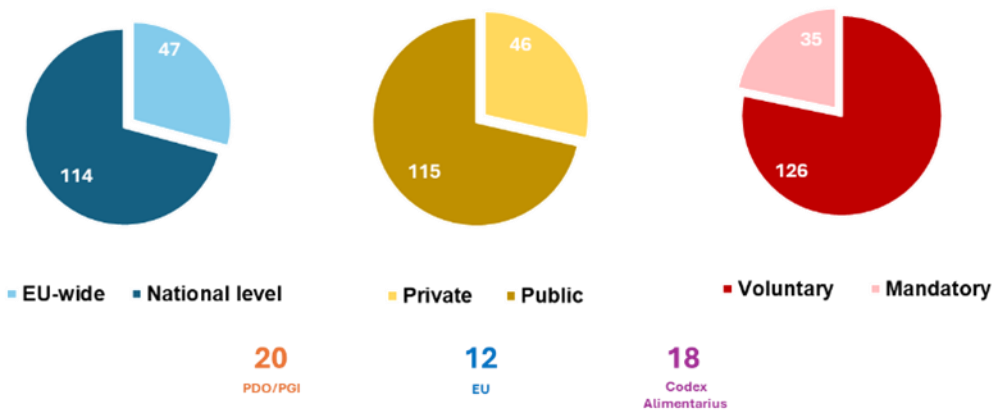
At the **international level**, the public standards for fish in the **Codex Alimentarius** concern various fish products, including salted, dried, smoked, canned, and quick-frozen fish. For **processed fish** (salted, dried, smoked), the standards cover preparation methods, the presence of certain substances and contaminants, and proper labelling. For **canned fish** such as salmon, tuna, sardines, and finfish, the standards dictate that the fish must be packed in hermetically sealed containers, free from decomposition and foreign matter, with strict guidelines on labelling and using certain substances. **Quick-frozen fish** products, including fillets and blocks, must be frozen to -18°C or colder to maintain quality. The standards address glazing practices, parasite detection, and proper labelling, ensuring the fish remains safe and high-quality during storage and transport.

Private standards for fish are issued by various **international organisations** focusing on **sustainability** and **traceability** in the seafood industry. These standards are often certified by independent, accredited bodies and align with international guidelines like those from the International Standards Organization (ISO) and the United Nations Food and Agriculture Organization (FAO). **The Marine Stewardship Council (MSC) Chain of Custody Standard** ensures that certified seafood can be traced back through the supply chain, maintaining separation from non-certified products. **The Seafood Processing Standard (SPS)**, developed by the Global Seafood Alliance (GSA), is specific to seafood processing plants and ensures responsible sourcing and the availability of certified products. The **IFFO RS and Marin Trust Standard** focus on certifying marine ingredients like fishmeal and fish oil, emphasising traceability and sustainability in their production.

Cereals

Standards applicable to **cereals** identified in the inventory, amount to **161 standards.** This includes EU-level, and international standards from Codex Alimentarius, as well as standards applicable at a national level, and private standards.

Figure 20: Number of FMS applicable to Cereals



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

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At the **EU level**, the inventory highlights several regulations outlining key standards for cereals in production, traceability, labelling, and packaging. **Regulation (EU) No 1169/2011** outlines the **labelling** requirements for food within the EU and mandates specific information such as the product name, ingredient list (including allergens such as gluten), nutritional information, expiration date, storage instructions, and country of origin**.** Another pertinent EU regulation for the cereal sector is **Regulation (EC) No 1935/2004** on **packaging** which can play a key role in maintaining the freshness of the cereal product and prevent contamination. This Regulation establishes rules applicable to materials and articles which, in their finished state: (a) are intended to be brought into contact with food; (b) are already in contact with food and were intended for that purpose; or (c) can reasonably be expected to be brought into contact with food or to transfer their constituents to food under normal or foreseeable conditions of use. The Regulation mandates that packaging materials do not transfer particular elements to food in quantities that may endanger health, change the food's composition, or negatively impact the taste and scent of the food. Other EU regulations affecting the cereal sector include **Regulation (EU) 2018/848** on **organic production and Regulation (EU) No 1151/2012** on **product origin**.

At the **national level**, there is evidence of **legislation dedicated explicitly to the cereal sector**, enacting EU requirements. For example, in Slovenia, the mandatory **"Regulation on the quality of cereal products"** and **"Regulation on the quality of fine bakery products"** focus on the conditions for minimum quality, classification and labelling of products from cereals and fine bakery products, respectively. Similarly, in Croatia, the mandatory "Regulation on cereals and cereal products" prescribes general requirements for cereals intended for the final consumer for immediate consumption and cereal products placed on the market. It outlines names, definitions, the type and quantity of ingredients and other substances used in production and processing, and labelling requirements. Italian Law No. 580 regulates the processing and marketing of cereals, farinaceous foods, bread, pasta, and yeast in Italy. It prohibits grinding damaged cereals for food but allows for industrial use under health authority checks. It also sets specific standards for the production, packaging, and labelling of wheat flour, durum wheat flour, bread, and pasta, with strict controls on compliance. The Italian country of origin labelling (COOL) regulation for rice and pasta focuses on product labelling and mandates an indication of the country of origin or place of provenance. In Bulgaria, 10 standards exist that cover the requirements for grain, 1 standard for rice, and 9 for wheat. These standards specify the essential quality and composition requirements, including moisture content, ash content, protein levels, acidity, and particle size, depending on the type of flour. A critical emphasis is placed on ensuring that all flours are produced from non-genetically modified cereals.

At the **international level**, the public standards for cereals and grains outlined in **Codex Alimentarius** guidelines focus on the safety, quality, and proper labelling of products intended for human consumption. These standards specify the acceptable levels of moisture content, contaminants such as heavy metals, pesticide residues, and mycotoxins, and the presence of extraneous matter. They also address the required nutritional content, such as protein and ash levels, and emphasise the importance of maintaining hygiene during processing and packaging to prevent contamination and assure the quality of the product. Additionally, the standards include detailed guidelines for packaging to ensure that the products are protected during storage and

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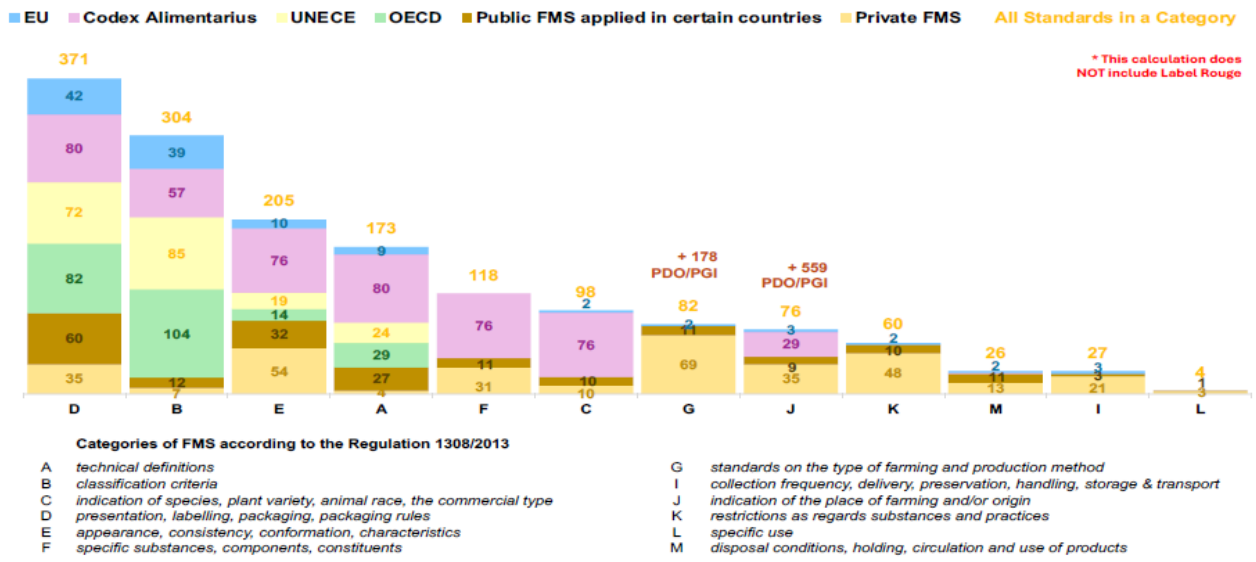
transport, as well as labelling requirements to provide accurate information for consumers. Methods for analysis and sampling are prescribed to verify compliance with these standards. These **comprehensive standards** apply across various cereals and grains, including wheat, maise, millet, sorghum, rice, oats, and quinoa, ensuring consistency in the marketplace.

In the inventory, **private standards** for cereals appear in several EU countries, including France, Italy, Belgium and Portugal, and there are 2 private standards for soy at the international level. These standards focus primarily on **sustainable production**, including **organic** production. Examples include GLOBAL G.A.P., “ProTerra standard”, "Sustainable Cereal and Oilseed", “Donau Soja”, “Europe Soya”, “Belgische Biogarantie”, “Flor de Peira”, and “Cereais do Alentejo”.

2.4.5 Categorisation of standards according to Regulation 1308/2013

When classifying the standards according to Regulation 1308/2013, specific categories of standards within the regulation appear more frequently than others. A single standard could fall into more than one category. No standards were identified in relation to category H (coupage of must and wine).

Figure 21: Number of FMS per Category in Regulation 1308/2013 and by Origin[17]



Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

When including PDO / PGI standards, **category J (place of farming and / or origin)** was the most encountered category with 635 standards (i.e. 76 in addition to the 559 PDO / PGI standards) as evident in Figure 21. However, if excluding the PDO / PGI standards, then category D appears the most often with 371 standards featured in the inventory. **Category D** refers to product marking,

[17] A food marketing standard can pertain more than one category of Regulation 1308/2013. Of the total 559 PDO/PGIs, 178 refer specifically to the type of farming and production method (category G), whereas all 559 of them refer to indication of the place of farming and / or origin (category J).

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labelling, presentation, and packaging. Marking and labelling are **important ways of direct communication with consumers**. Through this communication, consumers are informed about the type of product they are purchasing and its contents. Many **private standards** such as, for example, the Belbeef mentioned beforehand, Pêche Durable, Viandes et oeufs de France are examples of **using labelling to communicate their values and practices to the consumers**.

International standards, such as UNECE, OECD or Codex Alimentarius also mandate proper **identification and classification** of the products covering requirements in **category B** (classification criteria), **category E** (criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content), **category A** (the technical definitions) and **category C** (indication of species, plant variety, animal race, the commercial type). Over a hundred of these standards pertain to fruits and/or vegetables.

Many **private standards** also focus on the categories of FMS such as **category E** (criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content) and **category F** (specific substances used in production (i.e. quantitative content, purity, identification). For example, several private customer requirements in Germany and Portugal include additional requirements for the sizes, calibres, and weights of fruits and vegetables. The Pork Quality System (PQS) and Food Quality Assurance System (QAFP) in Poland impose additional requirements on meat colour, and standards such as Bio Cohérence and Agri Confiance require the producers to apply specific practices supporting biodiversity.

Another crucial category is the type of **farming and production method (category G**) that appears in 2 EU standards, 11 public standards applied in certain EU countries, and 69 private standards. These standards cover issues such as **organic farming, animal welfare** and **fair labour practices**. Private standards focusing on this aspect signal to consumers their compliance with the required organic agriculture practices and adherence to specific values. For instance, BePork provides additional guarantees on top of the legal requirements, assuring the focus on sustainability and animal health and welfare; while “Responsibly Fresh” signifies locally grown vegetables and fruits originating from Flandres and guarantees that production occurs according to the principles of integrated agriculture. “Fair Labour” defines labour standards that aim to improve working conditions in factories and on farms. These standards are also connected to the **category K** (restrictions as regards substances and practices) that can also incorporate standards covering specific types of farming as well as residues of chemicals (i.e. pesticides).

As stated above, **category J (place of farming and / or origin)** mostly appears in the **PDO / PGI** standards but is also related to fundamental **requirements of traceability** in the EU regulations and Codex Alimentarius. Some public and private standards incorporate the EU requirements or the international standards on traceability (i.e. The Belbeef Standard – traceability of beef product, Pêche Durable – traceability of fish batches). The **organic standards** and certifications also frequently refer to the origin of the produce to show that the producers complied with the organic standards of production (for example Biogarantie - the organic certification label in Belgium that guarantees that products adhered to organic farming standards, or Bio Cohérence which guarantees

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that the produce is “100% organic and 100% France from seed to plate").[18] Finally, there are types of **standards that specifically stress the national origin of the produce as a sign of product quality** (e.g. Viandes et oeufs de France guarantees that the products come from animals born, raised, slaughtered, cut and processed in France, or private supermarket standards such as Better for Nature & Farmer, Filiére Qualité implemented in Carrefour).

Category M (the conditions governing the disposal, the holding, circulation and use of products)**, category I** (collection frequency, delivery, preservation, handling, storage & transport) **and category L** (specific use) appear less frequently in the inventory.

Figure 22 shows that the frequency of categories from Regulation 1308/2013 appearing in the standards collected in the inventory is **not homogeneous** across the five food commodity categories, although **category D** is most prevalent among the identified standards.

Figure 22: Number of FMS per Category in Regulation 1308/213 and per Food Commodity

Fruits & Vegetables	Meat	Eggs	Fish	Cereals	Categories of FMS according to the Regulation 1308/2013
124	19	10	22	27	A *the technical definitions*
276	10	5	19	3	B *classification criteria*
57	13	7	23	25	C *indication of the species, plant variety or animal race or the commercial type*
290	69	44	56	63	D *presentation, labelling, packaging, marking, year of harvesting*
128	31	15	31	52	E *criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content*
75	35	24	38	41	F *specific substances used in production (i.e. quantitative content, purity, identification)*
50	52	36	46	40	G *the type of farming and production method*
15	20	14	18	12	I *the frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport*
56	34	26	28	23	J *the place of farming and/or origin*
35	42	28	28	36	K *restrictions as regards the use of certain substances and practices*
1	1	0	4	0	L *specific use*
14	14	11	16	13	M *the conditions governing the disposal, the holding, circulation and use of products.*

Source: Results of the inventory of food marketing standards within the BREADCRUMB project.

While **category D** (product marking, labelling, presentation, and packaging) appears most frequently for all food commodities, categories related to classification (**B** and **A**) and appearance (**E**) are more important for **fruits and/or vegetables. Category G** (farming and production method) is the second most identified category for meat, eggs and fish, while it is category **E** (components) for cereals. **Categories K** and **F** related to substances and practices are also important for all food commodities albeit for different reasons: while fruits and vegetables and cereals are restricted as to substances used (e.g. pesticides), practices (such as animal health and welfare) are more important for meat, fish, and egg production. Similarly, **category J** (origin) appears more important for meat, eggs, and fish, given the importance of traceability for this product related to health and safety considerations.

[18] Bio Cohérence: https://www.biocoherence.fr/

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3. SURVEY ON FOOD MARKETING STANDARDS

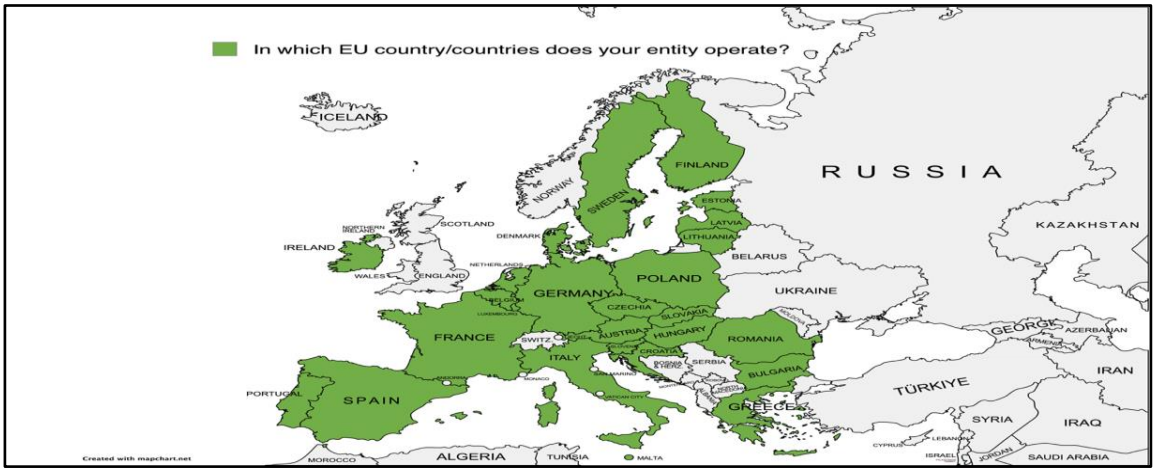
3.1 Objectives and Methodology

An expert survey was selected as a method of data collection for the following reasons: (1) it allowed for the collection of additional information on private and public FMS in the EU, thereby enriching the Inventory, (2) it also provided the opportunity to solicit expert opinions on the interrelations between public and private FMS, as well as their relations to FW, (3) it facilitated the acquisition of additional contacts in the food supply chain, and potential interviewees for the task. The survey was also a requirement stipulated in the Grant Agreement as one of the data collection methods for this task.[19] The final questionnaire was the result of a collaborative effort amongst the BREADCRUMB partners.

3.1.1 Distribution of the survey

The survey was distributed to food chain actors in **all EU member state countries**. Data collection in regards to survey responses took place between June to August 2024. Survey distribution was divided among project partners, who were also tasked with assisting in translating the questionnaire into local languages. The survey was eventually made available in the following **10 languages**: English, Dutch, Spanish, Italian, Polish, Slovenian, Portuguese, French, German, and Danish. It was distributed to a **cross-section actors in the food supply chain**, focusing on businesses / industries in primary production, processing & manufacturing, retail & distribution (including wholesale), and the food services sector. Respondents were from entities which were operational across all EU countries cumulatively. The focus was on the five commodities of the project: **fruits and vegetables, cereals, meat, fish, and eggs**, with respondents receiving invitations to complete the survey via their networks, or via email addresses found on the internet (i.e. in company directories).

Figure 23: Geographic Distribution of the Survey



Source: Author, based on geographic distribution of survey.

[19] European Commission. (2023). "Grant Agreement Project BREADCRUMB." European Commission, European Research Executive Agency, (November), page 68 (electronic version).

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3.1.2 Survey structure

Once having started the survey, respondents were asked to indicate the food commodities they work with, and the following options were provided:

- Fruits and/or Vegetables
- Meat (poultry, bovine, pork)
- Fish
- Eggs
- Cereals
- Restaurants / Food Services.

Subsequent questions centred on the level of operation of the entity (i.e. local - within a specific region or city), national (country level), international (but within the EU), or international (both within and outside the EU), and the supply chain stage of operations. The options included primary production, processing and manufacturing, retail and distribution (including wholesale), and restaurants / food services. Thereafter they were asked several open-ended questions in relation to the public and private standards adhered to by the entity.[20] At the end of the survey, those who agreed to be contacted for future research activities related to the BREADCRUMB project, were given the option to provide their contact details. A copy of the survey is available in Appendix 8.4.

3.1.3 Data Privacy

The responses were collected by the task lead using the Survey Monkey platform. A license in Survey Monkey was selected as it (1) ensured **data collection privacy** and (2) provided **additional technical possibilities** compared to the various free survey options (such as question logic / filters). The responses were collected from June to August 2024. Before the survey started, respondents were provided an information sheet about the project, and asked to complete a consent form in accordance with EU GDPR. The information sheet and consent form utilized in the survey are available in Appendix 8.3.

[20] The word “entity” was specifically selected to reflect all types of organizational and legal structures (e.g. organizations, associations, firms, businesses, etc.) Respondents were also asked questions about the interrelations between private and public FMS, as well as their connection to FW. However, these questions were aimed at gathering data for task 1.4 and will be detailed in the deliverable 1.4 report. This section focuses solely on the part of the survey that contributes to building the inventory of standards.

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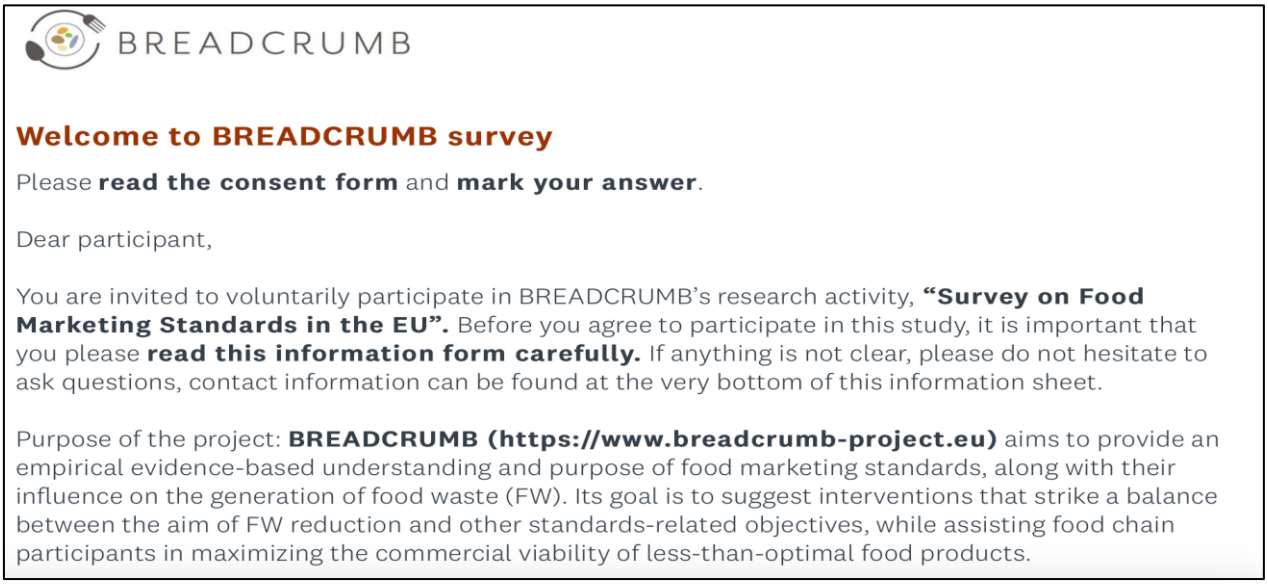
Figure 24: Screenshot of the first page of the Survey with an Explanation about the Project



Source: Screenshot of the survey on food marketing standards within the BREADCRUMB project.

3.1.4 Sample size

The **total sample size was equal to N=172** (respondents that opened the survey but did not necessarily complete all of it). Total number of respondents where the survey was completed was **N=106** (respondents that opened the survey and completed it). The final tally of food commodities covered in responses: fruits and vegetables (F&V) (59), meat (18), fish (25), cereals (10), eggs (14), restaurants & food services (i.e. HORECA sector covering multiple commodities) (1). Geographic regions covered in the responses include every EU member state, with a single entity responder able to operate in multiple countries.

Challenges

Of those who responded, 106 fully completed the survey, representing a completion rate of 61.63%. There are several factors that inevitably come into play when doing data collection of responses for a survey. One key factor is **survey fatigue**. Given that many businesses and individuals regularly receive multiple survey invitations, respondents may at a certain point be less inclined to participate. Another significant factor is **perceived relevance**. Although this survey focused on food marketing standards, which are critical to ensuring quality and safety in food supply chains, some businesses might not see a direct connection between the survey's content and their specific roles. For instance, some primary producers operating at the local level might feel that food marketing standards are more relevant to retailers or distributors rather than their activities. An absence of incentives (such as monetary rewards) may also limit response rates. The **timing of a survey** is also important. This survey was conducted during the summer months, when some businesses may be operating with reduced staff due to holidays or seasonal business cycles, limiting the availability of key personnel to respond. In some cases, the survey may thus be overlooked or delayed due to lower activity during this period.

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3.2 Risks and Mitigation Measures

The following risks and mitigation strategies were identified during the survey portion of the task:

a) Risk: Low Response Rate
The Grant Agreement refers to a target figure of 200 interviews / surveys to be conducted in task 1.3.[21] Due to the high number of respondents needed and the timing of the task (survey data collection took place over the summer months) it was a tough time to reach respondents in Europe.

Mitigation: The survey's design was developed to be clear and concise: introductory questions, commodity-specific questions, and final questions. The average time to complete the survey was estimated to be approximately 10-15 minutes. It was designed to be short and comprehensive to ensure ease of completion. To ensure that respondents did not miss the invitation to participate, the project team sent reminders (follow-up requests). The task lead encouraged project partners to distribute the survey as widely as possible across the EU member states. The task lead extended the deadline for the survey to mid-August 2024.

b) Risk: Contact Overlap and Survey Fatigue
While task 1.3 needed to contact entities to conduct the surveys, work package 2 of the project was conducted similar data collection work. There was the possibility that the efforts might have resulted in potential overlap and discouraged participation. If contacted frequently, potential participants may experience respondent fatigue, leading to lower engagement.

Mitigation: Potential contacts were carefully selected to ensure minimal overlap between BREADCRUMB work packages. The task lead initiated an Excel file on Teams, where data collection for task 1.3, task 2.1, and task 2.3 (i.e. which entities would be contacting) could be filled in, thereby hopefully mitigating overlap between tasks.

c) Risk: Response Bias
Given that the survey aimed to cover a significant number of varying entities in the EU, there was a risk that it would reach only a certain demographic or respondents with strong opinions on the topic.

Mitigation: To ensure broad coverage, several partners distributed the survey through various channels across the EU and throughout the supply chain. The task Lead provided partners with regular (weekly) updates on the number of responses collected overall and disaggregated the information, such as by supply chain stage, food commodity, etc., via e-mails and during work package 1 monthly meetings. The information sheet and the consent form stressed that participation in the survey was voluntary and highlighted the non-obligatory nature of participation. The survey did not require the provision of personal data (such as name, surname, country of residence, or employer), aiming to further encourage honest and unbiased responses.

[21] European Commission. (2023). "Grant Agreement Project BREADCRUMB." European Commission, European Research Executive Agency, (November), page 68 (electronic version).

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d) Risk: Privacy Concerns
While many experts might be willing to participate, they might be reluctant to disclose certain information, for example, naming the exact private FMS established by their employer, such as private companies.

Mitigation: The information sheet at the beginning of the survey communicated clearly how data was to be used, stored, and protected. Data obtained was anonymous, in that none of the survey questions asked the respondents to provide personal data in order to proceed. The only question that asked for personal details was located at the very end of the survey and was voluntary. The team used a paid secure Survey Monkey platform that ensures that the data will not be shared beyond the BREADCRUMB research project.

e) Risk: Misinterpretation of Questions
There was a risk that the respondents could misinterpret the meaning of FMS (private and public) and food waste (FW).

Mitigation: Definitions of private FMS, public FMS, and food waste, appeared above the relevant questions in the survey. The survey provided clear instructions and examples of how the answers should be completed, in order to mitigate misinterpretation by respondents.

f) Risk: Technical Issues
There was the possibility that technical difficulties could arise for respondents while completing the survey.

Mitigation: The BREADCRUMB team used the popular Survey Monkey platform to ensure the smooth operation of the survey. Survey Monkey also provides 24/7 technical support. The information sheet at the beginning of the survey provided the contact information of the project team's contact person should respondents have any questions.

3.3 Analysis Methodology

For analysis of the data, Excel software was used, among others the PIVOT tables.The survey data analysis consisted of the following several steps (including data cleaning and preparation):

- Compiling all responses to the survey.
- Translating all answers into English.
- Cleaning the dataset to remove duplicates, incomplete responses, and anomalies.
- Spelling and grammar check.
- Calculating the number of responses (complete, semi-complete, incomplete response).
- Following up with respondents (where necessary and possible – i.e. provided contact details) to obtain clarification about answers provided.
- Transformation of the dataset to be ready for analysis.

Any responses in the survey which specifically noted food marketing standards were integrated into the inventory.

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3.4 Analysis

3.4.1 Private and public food marketing standards

The respondents identified a total of **117 standards, with 62 being private and 55 public**. Some of the standards were mentioned by more than one respondent especially in regard to the public ones, which is not surprising as all actors need to adhere to EU (public) food regulations. Table 2 provides an overview of the number of public and private food marketing standards identified in the survey. Of note is that the responses varied in terms of how many responses were obtained per commodity category. Notably, in the sample the number of **private regulations for fruits and vegetables exceeded the public ones.** Keeping in mind that this is a small sample in light of the entire EU, the results could suggest that the mandatory regulations for fruits and vegetables represent only a small portion of the standards applicable to these commodities, indicating that private standards are more prevalent in this commodity category. In contrast, the situation is **reversed for some of the other commodities, in particular fish**, with respondents indicating that it is predominantly regulated by public standards, mainly referring to EU regulations. For the other commodities, the numbers of private and public standards identified were rather similar, reflecting a balance between the two types of standards.

Table 2: Private and Public Food Marketing Standards by Food Commodity[22]

Food Commodity	Private Standards	Public Standards
All (HORECA)	4	3
Cereals	2	4
Eggs	5	5
Fruits and Vegetables	36	25
Fish	5	10
Meat	10	8
Total Number of Standards	**62**	**55**

Source: Results of the survey on food marketing standards within the BREADCRUMB project.

All commodities were subject to **EU level and national member state public standards**, ensuring a baseline of quality and safety across whole EU. However, **meat** and **fish** also encountered more stringent **legally-mandated food safety standards** probably due to their processing complexity and health concerns. Public standards in the fruits and vegetables category often addressed **aesthetics**

[22] "HORECA" referring to food services sector component of the survey, which did not include a particular food commodity category, but rather all food commodities.

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(i.e. cosmetic standards), with descriptive terminology given by respondents such as “freshness”, “appearance” and “ripeness”, which was less prominent in meat and fish.

There was a similarity between **fruits and vegetables**, and **meat** when it came to identified private standards. Both commodity categories exhibited a wide range of **private standards**, including **quality** certifications and **animal welfare guidelines**. Fish standards meanwhile included commercial distribution and specific guild requirements, showing an emphasis on **sustainable practices** and **quality control**. Eggs had specific private certifications like KAT, while cereals had brand-specific quality requirements. Private standards in the HORECA sector focused on **local production** and quality attributes, stressing **taste** and **appearance**. Table 3 provides an overview of the key public and private food marketing standards identified in the survey for the five commodity categories being addressed in the project. The majority of responses did not indicate specific names of standards, but rather the broad objectives of the standards and therefore were more descriptive in nature.

Table 3: List of FMS obtained during the Survey per five Food Commodity Categories

Food Commodity	Private Standards	Public Standards
Meat	- Commercial distribution standards - Animal welfare standards - Quality of Sicherheit GmbH - Housing system labelling - Cut specifications (customer generated) - Tested Quality Hessen	- EU marketing standards - Regulation (EC) 853/2004 (hygiene) - Regulation (EC) 543/2008 (marketing of poultry meat) - Legal standards for food safety - Animal welfare labelling
Fish	- Fresh fish requirements - Fishermen’s Guilds - Ice requirements - Commercial distribution standards	- EU marketing Standards - Re-usable packaging - Sizing requirements
F&V	- GLOBAL G.A.P. plus IDA Module - Additional pesticide analyses required by traders - Cosmetic standards (aesthetic criteria for fruits and vegetables, colour, shape, size) - Quality, taste, freshness - Customer specifications - IFS food standards - Quality - Zero Waste standard - GRASP	- Uniform appearance and labelling in packaging - Pera Rocha do Portuguese (PDO) - Alcobaça apples (PGI) - EU Marketing Standards - Packaging - Traceability - IGP: PRODI (Integrated Production Mode) - DOP (Date of Production)

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	- BRC - ZERYA - Commercial distribution standards - Tesco Nature Choice - GGN standard	- Rules on the labelling of organic food - General food safety requirements at the member state level and EU level - Residue levels - Origin labelling - UNECE standards for citrus fruits - Integrated Production standards - HACCP - Standardization - Weight - Donations for social solidarity (Law No. 62/2021)
Eggs	- Certification BEA - KAT - Checked Quality Hessen	- EU Marketing Standards - Eco-Marketing standards for eggs
Cereals	- Cereais do Alentejo brand requirements - Quality	- EU Marketing Standards

Source: Results of the survey on food marketing standards within the BREADCRUMB project.

Regulatory Environment: Results demonstrated that the **meat and fish industries** were regulated with numerous standards to ensure food safety, sizing, and ethical treatment of animals. The results indicate that the meat and fish industries are governed by a comprehensive array of standards designed to ensure food safety, appropriate sizing, and the ethical treatment of animals. This regulatory framework is essential due to the inherent risks associated with these sectors, including a higher likelihood of contamination, shorter shelf life, and ethical considerations that reflect consumer sensitivity. **Fruits and vegetables**, while also heavily regulated, tended to have a broader range of private standards addressing **aesthetics** and **sustainability**. Eggs and cereals faced regulations mainly focused on quality and safety.

Consumer Focus: The standards for meat and fish are heavily influenced by consumer demand for safety and ethical sourcing. Standards identified in the survey for fruits and vegetables reflected preferences for appearance, freshness, taste, and sustainability practices.

The data obtained reveals that while all food commodities share common public standards, the specific private standards vary, influenced by the commodity's nature, production methods, and market dynamics. Meat and fish standards are more stringent due to health and safety concerns, while standards relating to fruits and vegetables emphasize visual and quality aspects. Eggs and cereals focus on quality assurance, reflecting their respective market requirements.

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3.4.2 Insights into standards per food commodity category

Meat

The meat industry focuses heavily on **animal welfare** and **quality control**, upheld through standards like animal welfare certifications and organizations such as the Society for the Promotion of Animal Welfare in Livestock Farming. Additionally, customer-specific requirements, such as cut specifications, highlight how market demands shape operational practices. Public standards, including EU regulations such as Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin, and Regulation (EC) 543/2008 laying down detailed rules for the application of Council Regulation (EC) No 1234/2007 as regards the marketing standards for poultry meat, ensure legal compliance by addressing safety and marketing aspects. Private standards complement these by promoting higher welfare and sustainability practices.

In the meat sector, private standards often cater to niche markets, focusing on ethical animal treatment, while public standards provide a foundational framework for safety and marketing. The combination of both ensures regulatory compliance and alignment with consumer trends toward **ethically produced**, high-quality products. Customer-imposed standards, such as cut specifications, dictate the characteristics of the supplied product. For instance, some retailers require that each pork tenderloin meets a minimum weight. Smaller cuts cannot be supplied and must be commercialized differently, often at a lower profit margin. Given that the industry is dealing with a natural product (i.e. pork in this case), variation in raw materials is inevitable. These standards are enforced by customers to ensure that the final product is visually appealing and desirable to consumers. Regarding stock management, many meat products have a very short shelf life requiring a guaranteed minimum shelf life for customers. This sometimes results in overstock that can no longer be delivered to the customer due to expiration concerns.

Fish

In fish production, private standards vary from Fishermen's Guilds, promoting traditional practices, to commercial-specific standards for product quality and packaging. Public standards, such packaging regulations, ensure consistency in product quality across the EU market, focusing on freshness and sustainability. The fish sector exhibits a **balance** between **maintaining local, traditional practices** and complying with strict public regulations that safeguard **freshness** and **sustainability.** Public standards ensure uniformity (such as in sizing), while private ones allow for product differentiation and adherence to specific customer demands.

Fruits and Vegetables

The fruits and vegetables sector is characterized by **numerous private standards**, such as IFS FOOD, and cosmetic criteria focused on appearance, shape, and size. These standards are largely driven by upstream actors and commercial and sustainability demands. For example, the Global G.A.P. V5.4 certification mandates several key points, including AF. 6.1.1 and 6.2.1, which cover waste and pollutant management, recycling, reuse, and the creation of a management plan. It also requires mass balance assessments to evaluate food waste and its destination. GLOBAL G.A.P. also includes a Risk Assessment on Social Practice (GRASP), which is an add-on to its Integrated Farm Assurance (IFA) standard for the evaluation of workers' well-being at farm level. It builds upon

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the core IFA principles and criteria related to workers' health and safety, covering topics such as labour and human rights, representation of workers, and the protection of children and young workers. Another private standard example are the BRC standards which covers issues such as food safety, packaging, storage and distribution, ethical trading, and manufacturing practices. Regarding public standards, the EU marketing standards guide the **labelling, traceability**, and **quality control**, particularly for processed and packaged goods, ensuring consumer protection and fair competition in the market. Public standards seem to act as a foundation, while private certifications like GLOBAL G.A.P build upon the public ones, and help differentiate the product.

Eggs

In the egg industry, private certifications like KAT and BEA play a significant role in meeting consumer expectations for organic and welfare-focused production methods, while the **foundational EU marketing standards** ensure consistent labelling and safety across all egg production, setting basic requirements for quality and traceability. The egg sector is a classic case where public standards provide a baseline for safety, while private standards like KAT enable differentiation in the market through higher welfare or organic certifications, catering to a growing consumer base focused on sustainability.

Cereals

Based on the sample results from the survey, private standards for cereals include regional certifications like Cereais do Alentejo, reflecting a trend toward **localized branding** and quality **specifications tailored to regions** or customer demands. EU-level marketing standards provide general safety and quality guidelines, ensuring uniformity across the European market. From the surey responses, in the cereals sector, private standards help build regional identities and cater to niche markets, while public standards ensure foundational quality and safety across all regions, supporting trade within the EU.

Summary

Across all commodities, private standards provide a **level of differentiation,** allowing companies to respond to market demands for quality, sustainability, and welfare. Public standards, on the other hand, seem to establish a baseline of safety and quality that supports market functioning and ensures consumer protection. **Private standards** frequently serve to meet the specific demands of **upstream actors,** at times going **beyond the foundational requirements** set by public standards. For example, in sectors like meat and F&V, customer-specific standards drive innovation in product quality, appearance, and traceability. In some commodities, like cereals, private standards are used to promote regional specialties, aligning with the growing consumer trend for local and unique products. This interplay of private and public standards across food commodities reflects the **diverse needs of the market,** ensuring both compliance with regulations and adaptability to evolving consumer preferences.

3.4.3 Private and public standards according to geographic scope

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Survey results revealed that the **F&V sector** has the **highest number** of **private standards** reported by international companies where consistency and quality across borders are crucial for trade. Also, entities working at the national level in this commodity sector reported numerous standards, suggesting rigorous requirements at the local level.

Table 4: Number of Private Standards according to Geographic Scope and Food Commodity

Food Commodity	At the national (i.e. country) level	Internationally (within and outside of the EU)	Internationally (within the EU)	Only locally within a specific region/city of a country	Total number of private standards
All (HORECA)	-	-	-	4	4
Cereals	2	-	-	-	2
Eggs	1	1	1	2	5
F&V	12	19	5	-	36
Fish	4	1	-	-	5
Meat	1	7	1	1	10
Total number of private standards	20	28	7	7	**62**

Source: Results of the survey on food marketing standards within the BREADCRUMB project.

The substantial presence of international private standards for the **meat sector** may indicate that meat products are subject to stringent global scrutiny, likely due to concerns about food safety, quality, and animal welfare. The existence of standards at the local level may cater to niche markets or specific consumer preferences but is relatively minimal. **Eggs** have a notable presence of standards at the **local level** (vs. theh rest of the levels). This could reflect regional variations in egg production practices and consumer preferences for local sourcing. The **fish** sector shows more standards when the company operates at the national level, indicating a prominent role for **local regulations** or certifications. Cereals have the lowest number of private standards and are only reported by companies at the national level.

The number of **private standards** reported by those who are working at the **international level** was **higher** (35 in total) **vs those at the national level** (20) and at the **local level** (7). It may indicate that private regulations are more pronounced at the global level than when the entity is working more on a national, regional, or local basis.

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Table 5: Number of Public Standards according to Geographic Scope and Food Commodity

Food Commodity	At the national (i.e. country) level	Internationally (within and outside of the EU)	Internationally (within the EU)	Only locally within a specific region/city of a country	Total number of public standards
All (HORECA)	-	-	-	3	3
Cereals	2	-	1	1	4
Eggs	1	1	1	2	5
F&V	13	10	1	1	25
Fish	6	1	-	3	10
Meat	1	5	1	1	8
Total number of public standards	23	17	4	11	**55**

Source: Results of the survey on food marketing standards within the BREADCRUMB project.

According to the survey results, for the **fruits and vegetables sector**, there were a **similar number of public standards** reported by **national entities** (13) **vs international** (11 in total). The situation is similar for every food commodity except fish and meat. The **fish sector** demonstrates a strong emphasis of **standards operating at the national level**. The presence of local standards indicates regional specificity in fish sourcing and marketing, catering to local consumption patterns and preferences. The number of public standards declared by those working with **meat** were reported mainly by **international level companies**, this could reflect the global nature of meat trade and the need for compliance with international food safety and quality standards.

Regardless of the type of food commodity, there was **no significant difference** in the number of public standards reported by **international companies** (21 in total) compared to those operating primarily at the **national level** (23). This contrasts with the situation for private standards. The findings suggest that public standards are widely adopted and show little variation between companies operating at different scales, while private standards may play a more significant role at the international level.

Based on the findings, several conclusions can be drawn regarding the application of private and public standards across different food commodities and geographical scopes. **International companies**, particularly in sectors like F&V and meat, **report significantly more private standards than national or local entities**. This suggests that private certifications are essential for meeting the demands of global markets, where consistency, quality, and compliance with diverse international requirements are critical. This is also due to the intensive competition at the

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international level, where companies have more competitors and therefore have to differentiate their products. There is **little variation in the number of public standards between national and international companies**, indicating that public regulations are mandatory and uniformly enforced. This highlights the foundational role of public standards in ensuring food safety, quality, and sustainability, regardless of geographical scope. Local producers, especially in the F&V sector, report fewer or no private standards, implying that their products are often integrated into larger supply chains. This suggests that local markets may have less rigorous requirements, or that local producers are not as engaged in formal certification processes. **Different food commodities exhibit unique patterns.** For instance, eggs show a presence of local standards, reflecting regional variations in production practices, while fish has significant national-level standards. Meat products, on the other hand, are more standardized at the international level due to global trade pressures and food safety concerns. Public standards ensure legal compliance, but private standards appear to be more important for companies operating in global markets, providing additional layers of quality assurance, sustainability, and market differentiation.

3.4.4 Private and public standards at different stages of a supply chain

The F&V sector leads primary production with 17 private standards identified in the survey responses, highlighting the importance of quality control at the initial stages of the supply chain, possibly due to the perishable nature of produce. The **fish, cereal** and **egg sectors** also reported private standards in primary production, indicating that standards are significant for ensuring the sustainability and quality of products from the start. The **meat sector** reported no private standards in primary production, but this was because the sample of survey respondents from the meat sector were not operating at this stage of the supply chain. There were however respondents in the meat sector working at the level of processing and manufacturing, where 8 private standards were identified. Other commodities, like F&V (3 standards) and eggs (2 standards), also had standards in this stage, albeit at a lower level.

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Table 6: Number of Private Standards by Supply Chain Stage and Food Commodity

Food Commodity	Primary Production	Processing & Manufacturing	Restaurants, Hotels, and/or Catering Services	Retail and Distribution (Wholesale)	Total Number of Private Standards
All (HORECA)	-	-	4	-	4
Cereals	2	-	-	-	2
Eggs	2	2	-	1	5
F&V	17	3	-	16	36
Fish	3	1	-	1	5
Meat	-	8	-	2	10
Total Number of Private Standards	**24**	**14**	**4**	**20**	**62**

Source: Results of the survey on food marketing standards within the BREADCRUMB project.

At the retail and distribution (including wholesale) stage, the **F&V** sector again led with 16 private standards. **Meat** (2 standards), **fish** (1 standard), and **eggs** (1 standard) identified a smaller number of private standards in retail, perhaps reflecting that they are more regulated at other levels of the supply chain such as primary production or processing.

Regarding **public standards** the **F&V** and **fish** sectors both report 8 public standards in **primary production**, and cereals (3 standards) and eggs (2 standards) reported 3 and 2 standards respectively at this stage. The **meat** sector dominates at the stage of **processing & manufacturing** with 6 public standards. Other commodities, including eggs (2 standards), F&V (2 standards), and fish (1 standard), report fewer public standards at this stage. The F&V sector once again leads with 15 public standards in **retail and distribution**, reflecting the high importance of maintaining public health, traceability, and food safety in the distribution of fresh produce. Other sectors, including meat (2 standards), eggs (1 standard), and fish (1 standard), report fewer public standards within this stage.

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Table 7: Number of Public Standards by Supply Chain Stage and Food Commodity

Food Commodity	Primary Production	Processing & Manufacturing	Restaurants, Hotels, and/or Catering Services	Retail and Distribution (Wholesale)	Total Number of Public Standards
All (HORECA)	-	-	3	-	3
Cereals	3	-	-	1	4
Eggs	2	2	-	1	5
F&V	8	2	-	15	25
Fish	8	1	-	1	10
Meat	-	6	-	2	8
Total Number of Public Standards	**21**	**11**	**3**	**20**	**55**

Source: Results of the survey on food marketing standards within the BREADCRUMB project.

The most interesting conclusion is that for the F&V sector, the survey captured very similar numbers of private standards for primary production (17) and retail and distribution (16). In contrast, regarding public standards, there are significantly more standards at the retail and distribution level (15) compared to primary production. This disparity suggests that while **private standards are consistently emphasized throughout the supply chain for F&V**, **public standards are particularly focused on ensuring safety and quality during the retail phase**, likely due to the direct interaction consumers have with these products and the heightened need for regulatory oversight to protect public health. This effect was observed **only for F&V.** When examining the stages of the supply chain, regardless of food commodities, it appears that there are similar amounts of standards at both the primary production and retail and distribution levels for both private and public standards.

3.4.5 Key conclusions from the survey analysis

There are a lot of private standards in place, especially for fruits and vegetables, which shows that companies are navigating a **complicated regulatory environment**. They have to deal with mandatory public standards as well as optional private ones that cater to market needs. Each food commodity sector - including meat, fish, fruits and vegetables, eggs, and cereals - has its own regulatory requirements. For example, results from the survey indicate that the fish sector is largely governed by strict public safety standards, while the meat sector must balance those with private ethical requirements such as animal welfare standards. The F&V sector is more influenced by private standards focused on quality, appearance, and sustainability.–International trade also plays a significant role. Based on the survey results, companies operating at the international and national levels need to comply with a wider range of standards, which highlights how the global market affects

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local practices. This trend shows the importance of aligning with international expectations to stay competitive. The widespread presence of private standards, especially in the F&V sector, suggests they are crucial for distinguishing products and ensuring quality - companies want to make more efforts to differentiate their products. This reliance on private standards indicates that public regulations alone may not meet what consumers, and the industry expect. Additionally, there's a notable difference in how standards are followed based on location, with international companies adhering to more private standards than local ones, reflecting the varying market pressures and consumer expectations in different regions. Lastly, the **multiplicity** of public and private standards, their **varied application based on commodity and supply chain stage**, demonstrates the complexity of the system, and the diverse nature of food standards and how they shape practices within the industry.

In conclusion, the interaction between public and private standards across food sectors represents a **dual system**: public standards provide the baseline compliance necessary for all markets, while private standards are used by international companies to address the more complex requirements of global trade and access niche markets. Understanding this dynamic is crucial and will be a primary focus of task 1.4, which aims to explore the relationship between public and private standards in greater detail.

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4. INTERVIEWS ON FOOD MARKETING STANDARDS

4.1 Objectives and Methodology

To complement the research and data obtained in the desktop research and survey, a total of **31 in-depth interviews** took place (in-person or virtually) between June and September 2024. In-depth interviews provide the opportunity to explore concepts and inter-relationships pertaining to food marketing standards, by delving into people's perspectives and experiences. The objectives of the interviews were to obtain information about the origin and purpose of both public and private food marketing standards, implementation challenges, the relationship between public and private standards, as much qualitative data as possible about how the standards affect actors throughout the supply chain, and any perceived links between food marketing standards and food waste. Project partners were given an Interview Protocol prepared by the task lead, providing guidance on how to prepare and conduct an in-depth interview, and this was complemented by a separate presentation on the same topic. The interview protocol is available in the Appendices section of this deliverable (Appendix 8.6).

The main targets of the interviews were **business / industry representatives** (marketing, sustainability, and management staff), across the supply chain stages of primary production, processing and manufacturing, retail and distribution (including wholesale), and food services. In the case of primary production, interviews also took place with farmers. Within these supply chain stages, the focus was on the five food commodities being addressed in the BREADCRUMB project's case studies, namely fruits and vegetables, cereals, meat, fish and eggs. Interviews took place with entities located in Germany, Italy, Portugal, Denmark, Spain, and Slovenia, as well as with two EU-level, one national (Germany), and one regional level (Catalunya) organization representing consumer interests.

The interviews were **semi-structured,** in that there was a clear level of structure in terms of there being specific questions and an order to them, but there was also a level of flexibility so that the conversation could deviate from the list of questions to obtain more in-depth information. One set of questions was tailored to **business / industry representatives** in the food sector, while a separate set of questions was drafted specifically for the interviews with **consumer representative entities.** The questions were reviewed during work package 1 monthly meetings (in May and June 2024) and circulated to partners afterwards for comments. Both sets of questions are available in the Appendices section of this deliverable (Appendix 8.7 and 8.8). While the questions were geared towards obtaining data for task 1.3 and task 1.4, to ensure synergy among the project's tasks and work packages, during the drafting, discussion, and circulation of the questions for comments, other tasks and work packages had the opportunity to include questions pertinent to their work.

4.2 Data Privacy

Each interviewee was given a **participant information sheet and a consent form** prior to the interview. They were given time to review the information and to ask any questions or raise concerns. Before conducting an interview, the signed consent form had to be obtained from the interviewee. Participants in the interviews were assured that in accordance to EU GDPR, only the project researchers would have access to the data collected during the study. Participants' identities would

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remain confidential, and all responses would be anonymized. Any personal information obtained would be stored securely and handled confidentially and not disclosed to anyone outside of the research team without the participant's explicit consent. The participant information sheet and consent form utilized in the interviews are available in the Appendices section of this deliverable (Appendix 8.5).

4.3 Risks and Mitigation Measures

There were several risks identified during the course of task 1.3, and consequently specific mitigation measures were put in place to address these risks.

a) Risk: The Grant Agreement called for task 1.3 to reach a target of **200 interviews / survey responses.**[23] In order to achieve this target number, it was estimated that approximately **30 interviews** would need to take place. Moreover, the task necessitated in-depth qualitative data to round out the information coming out of the inventory and survey results.

Mitigation: Work on developing the interview questions and identifying potential interviewees started early-on in the task timeline, with a first draft of the questions circulated to partners in late April. The questions were finalized by mid-June. At the same time an excel sheet was circulated among partners asking them to indicate their potential interviewees. In this manner project partners were provided as much time as possible to conduct the interviews and achieve the target number (30) for the task.

b) Risk: With the focus on business associations there was the risk of **excluding the consumer angle** within food marketing standards discussion. A discussion about food marketing standards is not complete if omitting the consumer dimension.

Mitigation: Potential interviews with consumer associations were identified, and questions were drafted within WP 1, with input from WP 3 and WP 4. Interviews were conducted with 4 consumer representative entities. Consumer organizations will also be invited to the workshop with external stakeholders to take place towards the end of WP 1, so that they can provide feedback / validate the hypotheses produced by task 1.4 on: the relationship between public and private food marketing standards, and standards' relationship with food waste.

c) Risk: The interviews could overlap with targeted respondents for other tasks, including the project's case studies which were also commencing data collection at the same time as task 1.3. Such overlap can create **"respondent fatigue"** (i.e. respondents having to respond to various requests from the BREADCRUMB projects at about the same time), and might also infringe upon vital contacts needed for another task in the project.

[23] European Commission. (2023). "Grant Agreement Project BREADCRUMB." European Commission, European Research Executive Agency, (November), page 68 (electronic version).

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Mitigation: An excel file was made available on Teams, where partners participating in on-going data collection for task 1.3 as well as other tasks (task 2.1 and task 2.3), were asked to please indicate which external entity might be contacted for data collection, and thereby hopefully mitigate overlap.

4.4 Analysis Methodology

Before conducting analysis of the interview results, coding in accordance with themes was established utilizing EU GDPR compliant software Quirkos.[24] The qualitative theme coding structure was based on the MOA model - motivations, opportunities, and abilities - to implement food marketing standards, as well as to address food waste. The top tier ("parent") themes were "motivation", "opportunity", "ability" and "relationship with food waste". During the coding process sub-themes within these top tier themes, as well as other themes – "public standards", "private standards", "connection between public and private", "entities establishing private standards", "standards for suppliers", "possible future issues" - were created utilizing the interview questions as guidance. The final coding template provided in Table 8 served as the basis for the analysis of the interviews. Drafting of the analysis incorporated triangulation of data utilizing more than just one source of information and complementing the interview data with literature review, quotes, and statistical information. Any discussions in the interviews which specifically noted a food marketing standards was integrated into the inventory.

Table 8: Coding Summary for Interviews

Quirk (Theme) Title	Parent	Total Codes
Public Standards		23
Private Standards		61
Connection between public and private		34
Entities establishing private standards		24
Standards for suppliers		38
Possible future issues		54
Relaxation of the standards		17
Economic, Environmental, Social factors	Motivation	51
Benefits of implementation (public and private)	Motivation	63
Relevance for consumers	Motivation	46
Trends in consumer behaviour	Motivation	29
Reasons to implement private standards	Motivation	41
Legal requirements	Motivation	30
Health scares	Motivation	12
Role of product aesthetics	Motivation	40
What is done with surplus food / food waste mitigation practices	Ability and Opportunity	76
Valorisation	Ability and Opportunity	27

[24] Quirkos homepage: https://www.quirkos.com

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Standard relationship with food waste	Relationship with food waste	65
Use by vs. Best by	Relationship with food waste	9
Implementation challenges	Relationship with food waste	35
Importance of addressing food waste	Relationship with food waste / Motivation	7
Experience of interviewee		59
TOTAL NUMBER OF CODES	841	
TOTAL NUMBER OF THEMES	26	

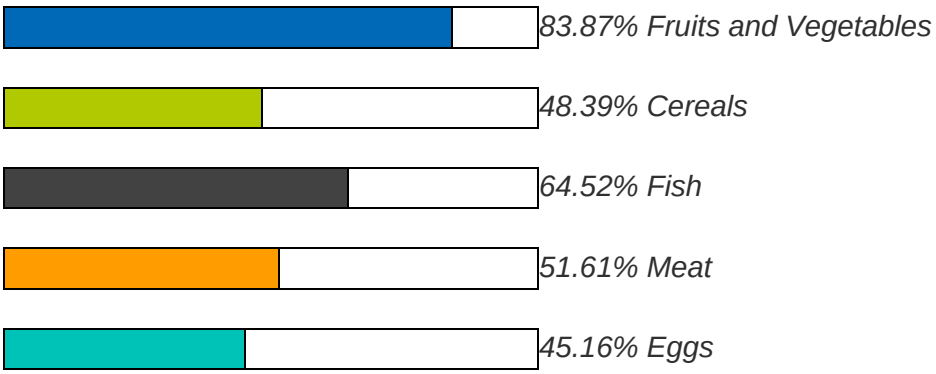
Source: Author, based on Quirkos coding.

4.5 Analysis

This section covers the analysis of 31 in-depth interviews conducted between June and September 2024 with a cross section of food supply chain actors – from primary production all the way to food services - as well as consumer representative entities. Interviews focused on five food commodity categories: fruits and vegetables, meat, fish, eggs and cereal. This analysis explores qualitative information obtained from interviewees about the origin and purpose of public and private food marketing standards, implementation challenges, how the standards affect actors throughout the supply chain, and examining what happens to food that does not achieve food marketing standard requirements. With one interview possibly covering more than one commodity and supply chain stage, Figures 25 and 26 provide an overview (by percentage) of how often food commodities and supply chain stages were covered in the 31 interviews.

Figure 25: Food Commodity Categories (interviews)

(more than 1 category can be covered in a single interview)



Source: Author, based on Quirkos coding.

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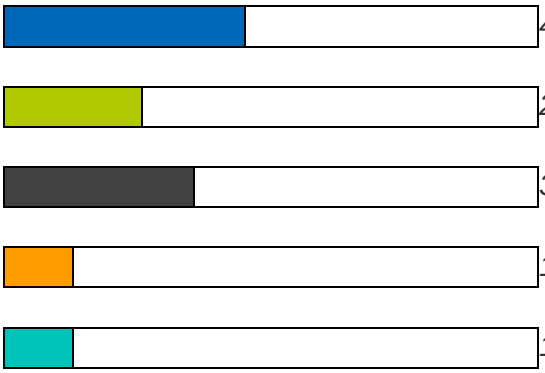
Figure 26: Supply Chain Stages and Consumer Entities (interviews)

(more than 1 stage can be covered in a single interview, with the exception of consumer entities)



45.16% Primary Production

25.81% Processing & Manufacturing

35.48% Retail and other distribution (including wholesale)

12.9% Food Services

12.9% Consumer entity

Source: Author, based on Quirkos coding.

All interviewees noted that the entities for which they worked had to comply with both public and private food marketing standards. The public standards being understood as standards implemented by government agencies that establish baseline (minimum) criteria for food products so that they are able to come onto the EU market. While private food marketing standards being defined as not EU or national legislation, but rather food marketing standards developed and operated by entities other than public government bodies. This can include individual companies, food manufacturers, non-governmental organisations, industry associations, farmers, and retailers. They operate within the legal framework, and while they can be vital and necessary in order to find actors along the supply chain with which to work, they are voluntary in nature.

4.5.1 Public food marketing standards

According to all of the interviewees, both **EU and national member state legislation,** including food marketing standards, were the **mandatory basic requirements** that food products had to adhere to in order to accede onto the market. While there were few pieces of public legislation mentioned specifically during the interviews, food safety, including the sanitary conditions of the food (i.e. contaminants) were highlighted in each of the interviews as a cornerstone of such legislation. Also included in the interview discussions about public standards was legislation pertaining to mandatory labelling and traceability to indicate not only composition of the product but also origin. The other group of public standards mentioned were those about production methods, such as with organic products. One interviewee noted, *"…the final consumer is guaranteed not only the information on the origin of the product, but also everything that has been controlled on it…"* (Interview 3). Understandably, the EU's General Food Law Regulation (Regulation No. 178/2002) was noted in several interviews, since it establishes an overarching framework for the development of food legislation at the EU and national levels, and introduces the European Food Safety Authority. "*Public (food) marketing standards are the foundation of business operations. If a company does not comply with the laws regarding the production of a specific product, it risks heavy fines or closure of business"* (Interview 20). It was clear from the interviews that the public food marketing standards simply had to be implemented because they were legal requirements necessary to ensure basic operation of the business endeavour.

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Several **international entities** were mentioned in the interviews, including the United Nations Economic Commission for Europe (UNECE) and the Codex Alimentarius Commission ("Codex"). The food marketing standards issued by these organizations cover a multitude of issues from color and texture to sanitary requirements. UNECE is an inter-governmental organization, comprised of 56 member countries across Europe, North America, and Asia.[25] Codex, established in 1963 by the Food and Agricultural Organization (FAO) of the United Nations and the World Health Organization (WHO), is also comprised of mainly member countries, however it is on a larger scale with 188 countries as members, and the European Union as a member.[26] Both UNECE and Codex also involve non-governmental organizations, professional associations, and experts in their work via observer status. The standards set by both entities refer to commercial quality standards for agricultural products. While technically voluntary in application by its members, both UNECE and Codex standards serve in many cases as a basis for European Commission and national EU member state legislation. The reason for this is because application of international standards into EU and national legislation has a benefit - it encourages more global uniformity which facilitates trade. **Public food marketing standards are in effect the foundation of business operations.**

4.5.2 Private food marketing standards

In regards to private food marketing standards, the discussion in the interviews shifted to the "quality" of the product referring mainly to the requirements that were coming from private entities, such as companies or associations. The results of the interviews revealed that food chain actors work to achieve product differentiation by addressing issues that are not, or to a limited degree, covered by public standards, and which they believe the consumer wants to see included in a product. They want achieve positive product differentiation and make the product more "value added" for the consumer.

The private standards were focused on ensuring a particular **quality of the product,** often related to **appearance** (size, colour) as well as additional features that set the product apart from the competition – in particular features about the **production processes.** Some interviewees pointed out that today consumers want to know more about where a food product is coming from and how it has been made. *"Consumers are increasingly conscious about what they are buying and don't want to be lied to or misled; they want to see the proof of where a product is coming from and how it has been formulated or produced. A key issue today is to demonstrate that you are responsibly treating resources. It is has to do with **reputation** and **customer trust"*** (Interview 15). According to interviewees, it is a benefit for the overall image of a product to provide information about production processes, including environmental and social concerns such as consideration given to respecting and maintaining biodiversity during production, employment conditions of those making the product, and how animals are treated during husbandry practices for example. For this reason, these environmental and social components are increasingly incorporated into private standards. They usually involve a certification awarded based on an audit or inspection by an independent third party.

[25] UNECE: https://unece.org/mission

[26] Codex Alimentarius Commission: https://www.fao.org/fao-who-codexalimentarius/about-codex/members/en/

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Examples of private standards given in the interviews include GRASP (workers' well-being), GGN (covering social and environmental responsibility and animal welfare values), Marine Stewardship Council (assessing if fishery is well-managed and sustainable in terms of the impacts on wild fish populations and their ecosystems). An example was provided by an interviewee operating in the fish sector. *"…bluefin tuna is a species that has always been a bit in the spotlight of environmental organizations and has had certain restrictions. One way in which we have been able to differentiate ourselves from companies that perhaps do not use the same practices, has been to obtain all the certifications…"* (Interview 3). Product differentiation was also achieved by making current production requirements of the product more stringent. One such example given was in regards to residue levels. *"…the maximum residue level regulation specifies how many milligrams of a particular active substance is allowed. This is our basic standard. But it also involves a private standard where some say the regulation allows for quantity x of the active substance, but we will allow 1/3 of that amount. The EU sets a requirement, but the private trade adds further specifications. Competition – that is the world we operate in"* (Interview 5). Yet several other examples provided in the interviews related to enhancing the appearance of the product, such as increasing the surface colour on apples from the legally binding (i.e. public sector standard) of 10 percent to 50 percent because it makes the apple more attractive for the consumer (Interview 5). Ultimately, obtaining **product differentiation** was a clear motivating factor for entities to implement private marketing standards.

Another issue that came to light via the interviews was the **economic benefits** that come with adhering to private marketing standards. While public standards represent the minimum required to access the market, the private ones allow for product differentiation which can lead to higher prices for the product. In this respect, private standards were seen to represent specific demands and an entity's ability to meet those demands demonstrated attention to not only the minimum basic requirements, but additional efforts (time, monetary investment, expertise) to obtain better and more demanding standards. This provides the possibility to request a higher unit price. As one interviewee noted, *"Respecting private marketing standards allows you to differentiate the product and build customer loyalty and obtain higher profit margins"* (Interview 20). However, higher profit margins are not guaranteed. The ability to adhere to certain standards can come at a cost, particularly in the primary production, and processing and manufacturing stages of the supply chain. At these stages, **increased production margins** to ensure that enough of the product meets all the standard's requirements is necessary and has to be carefully managed. But even with careful management some standards may not be consistently met, thus incurring a return of the product to the supplier. And while alternative markets can be found, the product does obtain a **downgrade in classification** (due to not meeting the standard) and this equates to financial loss. *"What we have often heard is that these standards also lead to financial losses, even if the farmers manage to establish alternative market channels. For example, because they get significantly less for the apple that goes into the juicer (valorisation efforts) than for the apple that ends up in the supermarket"* (Interview 8). However, the interviews did highlight that **there can be flexibility** as well in private standards, with some retailers adjusting their standards based on supply-demand and seasonality. For example, one retailer noted that for tomatoes it has specific requirements for colour in the summertime but in the wintertime that colour standard is lowered because they need to work with what is available at that time of the year (Interview 18).

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According to the results of the interviews, the private marketing standards are focused on facilitating product differentiation, by promoting particular production methods and enhancing the appearance of the product. And while they do require resources to implement, suppliers continue to do so because they need not only access to the market, but need to also have a steady client base, and if possible, to **differentiate their product among all the others on a competitive market. To achieve this, adherence to such private standards was seen as a necessity.**

4.5.3 Entities establishing private food marketing standards

The majority of interviewees (17 out of 31) stated that the actor who mostly establishes private food marketing standards is the **retailer.** The reason why retailers were often cited was due to their unique nexus position between supplier and consumer. Retailers were noted as having the most leverage, in particular, large food retailers that have a significant share in the market. In this respect, suppliers do not have a choice but to adhere to the standards if they want to be effectively active in that same market. Other interviewees also noted NGOs, international organizations, commodity specific associations, certifying companies, food service entities, and the everyday consumer as leaders in establishing private standards. One interviewee aptly pointed out that it also depends on supply and demand, in that if there is less supply, then the standard specifications simply cannot be more stringent than when there is ample supply (i.e. more to choose from on the market).

There were several interviewees (5) who questioned to what extent private standards put forth by retailers were in response to what consumers were demanding of a product. Private marketing standards of retailers were viewed as something discussed directly between the suppliers and those further downstream, with not much transparency for the rest of the actors in the chain. *"There is **lack of transparency,** especially when it comes to standards that the food retail trade itself issues. We do not know exactly why there usually are additional requirements, how they are dealt with (flexibility)"* (Interview 8). Or as another interviewee said, *"I often hear from retailers "that's what the consumer wants". I don't know whether that's what consumers really want or whether this could be a smokescreen argument"* (Interview 7). In fact one interviewee noted that those further upstream, particularly in primary production, do not per se differentiate between public and private standards, or who puts forth those standards, but rather simply adhere to what they know is necessary during production. *"For farmers I don't think that they even distinguish between public and private standards – they just know what they need to implement and do their best to do so"* (Interview 16). However, there was also evidence provided in the interviews that the creation and implementation of private marketing standards were **quite transparent**. This was particularly the case with NGOs where public consultations with all actors along the food supply chain were part of the basic process when establishing a new standard.

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4.5.4 Challenges of implementation

The predominant challenge highlighted when it came to implementation of the standards was that there is a **multiplicity of standards** that need to be **implemented at the same time.** Effective implementation requires resources (expertise, time, finances). Different markets – even within the same country – can be subject to various legislation, with both public and private standards needing to be taken into account. *"…you have to set up a quality management system, a control system…in addition to continuous quality control, you are also checked in the course of audits to see whether you are doing your job properly, whether the products are being produced well and standards are being met. Depending on the certification, these are sometimes very strict and there are costs involved…"* (Interview 7). Or as another participant noted that even within one company, it can differ per culture how the same product is marketed. Adhering to standards not only requires a good understanding about the standard itself, but effective communication and cooperation among stakeholders involved in the production – whether that be the primary production or processing and manufacturing stage.

Besides the large amount and simultaneity of standards that need to be adhered to, interviewees also highlighted a few specific standards which pose difficulties during implementation. Among them were standards pertaining to presentation of the product. Standards outlining the overall **presentation of a product** – such as size or colour - can be difficult to achieve not only for producers (i.e. the production margin might need to increase if the standards are specific with little room for manoeuvre), but also for actors further downstream such as retailers and wholesalers. By the time these stakeholders receive the food product, some **transport and storage** has taken place. Even if a product is shipped in the right condition (i.e. meeting the standard requirements), the longer the distance and time required for travel, the higher the risk that some physical damage might come to the product. *"Compliance with marketing standards of product presentation is the only one that does not directly depend on the activities of the company because it is due to the transport more difficult to control"* (Interview 20). In this respect, while retailers and wholesalers want to ensure the best quality product, thorough **supply chain mapping** is essential, and it is vital that it is shared among the actors in the supply chain for transparency and accountability (Villena and Gioia 2020; Soonieus et al. 2022; Nutburn 2019). Mapping, the process of documenting information about every actor and how they function in a supply chain, is important in helping to trace compliance with broader public sector regulation requirements as well as private standards, and provides valuable information in understanding how one actor interacts with another. It sheds light on where challenges exist, where improvements are needed, and what opportunities there are to strengthen the supply chain. The mapping exercise must be kept up to date, to reflect any changes in the chain, especially if there are new actors or policies.

Another challenge highlighted by interviewees was the **changing climatic conditions.** One interviewee noted, *"Having no more frosts means having Rhizoctonia in the soil for years. This fungal disease is recognizable on the potatotes as a skin defect…the marketing standards do not accept these defects"* (Interview 6). As noted in the interviews, certain crops are more sensitive than others to alterations in weather and temperature. The effects are variable depending on the food commodity and geographical location, but with changing climatic conditions, production quantity and quality become less predictable.

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4.5.5 Food not achieving standard specifications

The majority of interviewees (23 out of 31) indicated that products which do not fulfill the food marketing specifications are not automatically discarded, but instead a **conscious effort** is made within their entity to still **utilize these products.** A variety of activities were mentioned to utilize surplus food, among which the most popular was donation, followed by valorisation, and thereafter alternate market opportunities to sell the food.

Donating surplus food was mentioned the most times (10) in the interviews as a mechanism for addressing what should be done with food that does not meet the required food marketing standards. Such **donations** took place primarily in the primary production, retail and distribution, and food services stages of the supply chain. It was food that was given to charity organizations or food banks. In some cases, donation was a cornerstone of the entity's policy, such as noted in one of the interviews. *"We have actually made a policy that if we have a recall and there is any chance that this could be donated, it should be donated"* (Interview 30).

While donating surplus food was most often cited by interviewees, it was often accompanied by **valorization** efforts, which primarily involved fruits, vegetables, and fish. Valorization activities were mentioned by 9 of the interviewees. In the case of fish, it was made into feed, and in the case of fruits and vegetables they were processed into jams, juices, purees. When asked in the interview if valorization could be considered an option for the entity (i.e. if not already engaged in it), all interviewees, except for 2 of them, replied in the affirmative. The two interviewees who were not receptive to it noted that valorisation does come with challenges and **additional work, requiring resources**. When valorisation takes place, essentially another product is being created, which necessitates resources in terms of investment in knowledge, skills, and technology – when it comes to production as well as placing the product on the market. Necessary legislation and standards can vary region to region or country to country, including specific food marketing standards depending on the product, where it is made and sold. Valorisation can be a challenge, but it has a positive outcome of being able to actively prevent surplus food from becoming waste and if effectively managed, revenue is still garnered from the endeavour.

Another activity interviewees engaged in to address surplus food was searching for **alternative markets** - trying to connect with other partners in the food industry to sell the product. For example, an interview in relation to the fish sector noted that, depending on the type of fish, if it is two or three days old and not yet sold, efforts are made to sell it at a lower price. Due to not meeting the standard, the food is subsequently downgraded to another category, which directly affects how the product can be further utilized and its selling price. In the case of fruits and vegetables for example, by not meeting all the requirements within a standard, the produce would fall out of the top classification, such as class 1A mentioned in several interviews, and downgraded to a class 2 or 3 which entails a price reduction. An interviewee mentioned that finding alternative and less stringent markets is becoming increasingly difficult because *"everyone is becoming more demanding"* (in terms of requirements for a product). Such challenges led some entities (4) to note that they do not try to *"reinvent"* or *"resell"* the surplus food, but rather **return it to the supplier** (if working with suppliers), **compost** it, or in the case of one primary producer for fruits, **plough it back into the ground**. Several entities noted however that there are options to still **sell the food, albeit at a lower price.**

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The app 'Too Good To Go" was mentioned by 3 entities as part of their systematic strategy to sell surplus food, with a fourth entity referring also to *"online market platforms"* (Interview 21).

The interviews highlight that a variety of different efforts are taking place to utilize surplus food so that it does not become food waste. There is a systematic process that all food goes through when coming onto the market and there are options available so that surplus food can still be consumed. As one interviewee noted, *"We prepare the raw materials in such a way that the product meets the specifications wherever possible. All raw materials (produce) that do not make it into the sales packaging are sent to a second marketing stage. And that can be anything – industrial processing, peeling, puree, flakes…"* (Interview 6). While valorization as well as downgrading the product may come at a financial cost for the producer (i.e. compared to if the food was sold at the price related to the top classification within the standard), there is still some revenue made while avoiding potential food waste.

The importance of understanding and addressing food waste was evident in the interviews, with all but one interviewee noting its significance in the interview conversations. The motivation to address food waste did to an extent depend on the nature of an entity's work (such as being an environmental organization, charity, or food services company for example). And while there were a number of reasons (including environmental and social concerns) given to address food waste, there was one predominant underlying factor for all interviewees - the **economic repercussions** of food waste. This was evident across the supply chain actors, from primary producers, those involved in processing and manufacturing, retail and distribution, to food services. The majority of interviewees (24) represented commercial enterprises, which need to be economically sound in order to stay in existence. For example, one interviewee noted, *"Everything we throw away we have had to buy beforehand, so we're throwing money away"* (Interview 7). Putting it into context, a key objective of any commercial enterprise is to generate revenue so that at least there is coverage for the costs of business operations. Effective management of a supply chain, including the ability to address market shifts such as the emergence of **sustainability initiatives** (in this case preventing and mitigating food waste), not only achieves crucial environmental and **social benefits**, but also helps to ensure the longevity of a supply chain and the businesses operating within it. It is largely within this context that food waste was spoken of within the interviews when it came to representatives of commercial enterprises. There were also several entities represented within the interviews which were not commercial enterprises. These were entities such as food banks, environmental non-governmental organizations (NGOs), or consumer organizations. While they did not place as much emphasis on the economic repercussions of food waste, the issue was still evident. Examples include how the average household loses money spent on buying food if that food is not consumed but instead thrown away, or how businesses can save money while simultaneously lowering their carbon footprint by valorising surplus food (i.e. food that has become surplus because it does not meet a food marketing standard) rather than engaging in costly disposal requirements to bring food to landfills.[27] The interviews demonstrated that while economic factors generally predominate, the **supply chains are becoming increasingly complex** with more being requested by society at large from food supply

[27] The total amount of GHGs emitted throughout a product's lifecycle is also known as its carbon footprint (FAO 2015). Different commodities emit different levels of GHGs based on varying cultivation methods and how the product moves through the supply chain.

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chain actors - in particular commercial enterprises and in regards to sustainability. In this respect, entities are looking for innovative and economically viable avenues to utilize surplus food instead of having that food become food waste.

4.5.6 Possible effects of relaxing private food marketing standards

When asked what the effect might be of relaxing private standards, including what effect that might have on product quantities, the majority of respondents (17) noted that **the product quantity would increase.** Discussions in the interviews however focused not so much on whether there would be an increase or decrease of food, but rather on what the repercussions would be of having more food and less stringent standards – and it centred on the economic effects. A frequent concern raised by interviewees was that with more product on the market, the **overall price would generally drop**. Additionally, due to **less uniformity** among the products, it would be more difficult to agree upon and provide consistent pricing (albeit lower than if there were standards), thus **hindering fluid trade.** Difficulty to differentiate a product and subsequent **loss of that competitive edge** was also highlighted, with consumers possibly starting to question the product's quality. A concern was also raised about the additional resources that would be needed between companies and suppliers on what was being requested, with it being a disadvantage to spend more time on negotiating what products are needed. A representative from the food services sector noted that without such **additional communication** there was a *"risk of us getting the wrong product or too much product"* (Interview 31). Other answers to the question highlighted that there might be **less surplus food to redistribute.** So while the product quantity would increase, there might be less for the redistribution sector which relies on safe to eat surplus food to be redistributed to charity organizations. Less surplus food also would affect some in the retail sector who rely on such food to be sold for a reduced price on particular digital platforms and apps. While for primary producers it was noted in the interviews that perhaps there might be an opportunity to **lower over-production** – i.e. do not need to increase production margins to ensure that there is enough supply in case the necessary standards are not met in each individual item. For the smaller and medium-sized farmers the production costs might thus also go down as they could **sell a larger share of what they produce**. The answers to the question were thus varied and depended on where in the supply chain the respondent was active.

4.5.7 Suppliers

All of the interviewees who were representing entities that work directly with suppliers (19) said that they request from their suppliers adherence to food marketing standards. While 18 of those interviewees noted that the required standards were the **legally mandatory public standards,** and additional private standards, one of the interviewees highlighted that no private food marketing standards were being requested, only the public ones. Descriptions of the private standards mentioned in the interviews referred to **socially and environmentally sustainable practices**, as well as providing *"maximum quality guarantee"* for consumers (Interview 2). Interviewees referred to quality catalogues, technical sheets, and pictures of the intended food that were provided to suppliers to explain in as much detail as possible what was being expected of them.

The relationship between suppliers and downstream actors was described by interviewees as taking the form of direct dialogue between actors in order to **secure a unique selling point** on the market.

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Such dialogue is not held with only one supplier, but the interview results demonstrated that a company may look to more than one supplier to procure raw materials and / or component parts. *"As a supplier, you are not the only one - there is always the range of other companies that say we can also supply this"* (Interview 7). While for the downstream company there are advantages to working with **multiple suppliers** - such as increased capacity in quantity of production, or time savings - interviewees pointed out that it does also come with some risks. There is risk if a company's standards incorporate specific environmental and social factors and are working with multiple suppliers across several countries. Villena and Gioia (2020) discuss the prevalent challenges of sourcing, especially for processing and manufacturing, when dealing with not only Tier 1 but also Tier 2 and Tier 3 suppliers. The authors found that often there is *"no direct contractual relationship between a company and a lower-tier supplier (Tier 2 or 3)",* and consequently the Tier 2 and 3 suppliers are quite removed from the company (Villena and Gioia 2020: 88). Not having a direct relationship between the company and a lower-tier supplier has consequences – namely, the lower-tier supplier may not even know what the company's specific standards are, and if it knew, it may not have the resources to put them into practice. Or the supplier may be located in a country where certain standards (environmental and / or social such as workers' rights for example) are less prevalent. Conversely, by being removed from the more upstream suppliers, the company may not know who the exact suppliers are and what capabilities they have to comply with specific (private) standards. **More direct and personal relationships** with not only Tier 1 suppliers, but also those suppliers who are further upstream is paramount. This will ensure that to the best extent possible, raw material or component parts that are produced will not be sent back to the supplier or discarded because an aspect of a private standard has not been achieved.

In the interviews, respondents were asked to provide their opinion on the importance their entity places on environmental sustainability, social sustainability, and economic factors, especially if they were working with suppliers. The majority of interviewees viewed environmental and social sustainability as more important or on par with economic concerns. One interviewee noted that environmental and social sustainability efforts cannot be compared with each other. Rather all are important and relevant for the healthy functioning of any entity. Several interviewees highlighted how adherence to sustainability practices are intertwined with economic factors. Sustainability measures are incorporated to meet customer demand and increase sales, and sustainability practices, such as mitigating food waste, helps address economic losses since food waste means that money already spent on production is essentially lost. Environmental and social sustainability practices affect economic aspects of a business; it is no longer possible or effective to separate them. Nutburn (2019) highlights that addressing social and environmental concerns provides a range of benefits, including economic ones, such as improved continuity of supply, improvement of brand reputation, and the possibility for business opportunities. **Sustainability (including social, environmental) may in fact provide a competitive advantage and bring forth more economic returns.**

4.5.8 Consumers

A majority of the interviewees (19 out of 31) responded in the affirmative when asked if they thought food marketing standards were relevant for consumers. **Product safety, quality,** and **garnering the trust** of the customer were the main reasons provided as to why the standards were relevant. While the requirements to ensure food safety are essential requirements necessary to access the market,

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and consistently noted as an issue that could not be compromised, there was more discrepancy between interviewees in terms of **what encompassed "quality"**. The concept of "quality" included not only food safety, but also appearance (colour, shape, size) and to a lesser extent other organoleptic characteristics such as firmness, texture, smell, while only a few interviewees also included nutritional value within the concept. *"Consumers want produce that is of good quality and aspect – especially sight"* was indicative of the comments being made in the interviews when discussing "quality" (Interview 1). The reason why the quality of the product was key for many interviewees was because for them it directly affected the ability to gain the **loyalty of consumers**. As one interviewee noted, *"…we have to focus on the quality of the products that we are selling to create that (customer) loyalty…"* (Interview 18). These same interviewees believed **product aesthetics affected consumers' purchasing decisions**. Not only did aesthetically pleasing products capture consumers' attention, but they were also equated with a higher quality. Providing such quality products was highlighted by several interviewees as a mechanism for product differentiation in a competitive market. *"…in order to have a unique selling point on the market…our fresh counter is always the most beautiful and great and looks special"* (Interview 10). Commercial actors in the food supply chain need a consistent stream of customers to stay in existence, which can only be achieved if they are providing a trustworthy (i.e. quality) product, and for these interviewees such a product meant that it had to be as appealing as possible in terms of presentation.

There were 12 respondents who had more nuanced views about the relevance of the standards for consumers. For these respondents, the relevancy of the standard depended on the standard itself. Food safety standards were considered relevant, but when it came to the "quality" measures within a standard (i.e. appearance and other organoleptic factors), there was acknowledgement that consumers do focus on these factors when purchasing products, but such factors are essentially not relevant for consumers. *"Appearance seems to have become more important, overtaking what is actually really important – the **taste and nutritional value of the product**"* (Interview Consumer Entity EU number 1). Here the term "relevance" was referring to what else a product provides for the consumer besides merely a good appearance. Or as another interviewee noted, *"Fruit and vegetables that are slightly smaller or crooked, or have blemishes, are no less valuable than perfect ones"* (Interview 12).

Several of the interviewees (4) highlighted that most consumers are not even aware of the standards. It was argued that **consumers do not know these standards in detail**, but instead they are guided by what they see and what choice has been given to them. One of the interviewees aptly noted that humans tend to eat by first *"utilizing their eyes"* (Interview 17). When discussing the concept of "relevancy", the point was made that what is needed is clearer communication with consumers about what comprises a product beyond the aesthetics. *"…transparency, clear, concise information for the consumer to understand is important"* (Interview 25). While there was general consensus among interviewees that standards related to food safety were definitely relevant for consumers, there was some division regarding standards related solely to appearance. The majority of interviewees viewed those standards as relevant for the consumer because they help to ascertain a consistent level of quality of the product thereby gaining customers' trust and loyalty, while other interviewees viewed such standards as not relevant because they do not provide for the consumer holistic information about the product. World population growth is expected to rise to 8.5 billion by 2030, not to mention as well the 33 million in the EU experiencing food insecurity (OECD 2021: 24; Eurostat 2020). Taking

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these statistics into consideration, there is a real need **to reconsider what encompasses the "quality" of a product.** Food quality encompasses more than physical attributes.

4.5.9 Trends in consumer behaviour

Via the conversations with interviewees, several of them (7) noted that the past decade has seen a shift in food marketing standards, in large part attributed to meeting customer demands. Those demands take that form of wanting to know more about **where the food product is coming from (origin),** the **production process**, as well putting **environmental and social concerns** more to the forefront when it comes to food production.

In 2015 the United Nations launched the **Sustainable Development Goals (SDGs),** with the aim of member countries achieving the 17 goals by 2030 (United Nations 2022). The goals all have the objective of promoting a more sustainable world by addressing environmental, social, and economic factors such as reducing a product's carbon footprint, providing fair wages, and ensuring animal welfare in the supply chain process, to name a few examples. Sustainability affects food supply chains in that for a supply chain to not only survive, but to also thrive today and in the future, it is to a certain extent dependent on the context and environment in which it operates. Commercial actors in the food supply chain as well as consumers are aware of this, and consequently sustainable production has become a cornerstone of food production. As one interviewee noted, *"…standards in regard to sustainability of a product are being used to affect consumer choices and ultimately their behaviour, but it is a slow process"* (Interview 14). Organic production is a prime example of a conscientious shift to produce food that is more environmentally sustainable.

Some interviewees pointed out that today consumers want to know more about where a food product is coming from and how it has been made. *"Consumers are increasingly conscious about what they are buying and don't want to be lied to or misled; they want to see the proof of where a product is coming from and how it has been formulated or produced. Key issue today is to demonstrate that are responsibly treating resources. It is has to do with reputation and customer trust"* (Interview 15). In this respect, several interviewees noted past health scares in Europe as the driving impetus – in particular the outbreak of Bovine Spongiform Encephalopathy (BSE) in the late '90s. In 1997 an initiative started amongst European retailers - EurepGAP (Euro-Retailer Produce Work Group on Good Agricultural Practices). Becoming aware of growing consumer concerns about food safety with scares such as BSE, salmonella, and the Avian Flu, supermarkets in Europe created new quality, safety, and environmental standards for their suppliers of fruits and vegetables. They agreed to harmonize standards and procedures and developed an independent certification system for Good Agricultural Practices (GAP). These standards were cited by several interviewees as vital to adhere to in their daily operations. Although voluntary, they are essentially European-wide accepted criteria for production methods and definitely not solely in relation to food safety but have expanded over the past decades in scope to incorporate other requisite components such as animal welfare and responsible use of water. And while such standards have historically been operating with a business-to-business format (B2B), there is a shift to developing **business-to-consumer (B2C) standards** with a specific consumer orientation. The GGN label is an example of such a B2C standard. The label can be found in stores on fruit and vegetables, farmed seafood, flowers, and plants. It

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offers consumers a consistent and transparent way to recognize products that align with social and environmental responsibility, and animal welfare values.

According to the results of the interviews, while consumers are receptive to sustainability, at the same time they want to know more about the product that they are consuming. It has become increasingly complex. As one respondent noted, *"How a consumer views a product has become much more complex with sustainability, nutrition, allergens, environmental effects, aesthetics, place of origin of the food…"* all coming into play (Interview 14). A key example of complexity that emerged repeatedly in the interviews was that of **date labelling**. The terms "use by" and "best by" refer to when two dates are indicated on a food package, with "use by" meaning the date by which the actual product should be consumed, and "best by" referring to the time period during which the product is at optimal quality. Several interviewees (4) noted that such terminology is a cause of **confusion** for consumers, with the "best by" label often misinterpreted as no longer safe to eat, and thus food that could still be consumed is rather discarded. The overall difficulty with the "best-by" date is often defining in concrete terms what it entails in terms of the quality and safety of a product. One interviewee called upon consumers to not rely on the "best by" date and rather use their own best judgement with the "sight, smell and/or taste" test. However, this could only be done with low-risk food items – i.e. meat and fish necessitating more conservative measures to ensure food safety. The possibility of "smart labelling" in the form of colour indicators for example to indicate the "condition / freshness" of a product were raised during the interviews. The format of the date labelling on the food package was also highlighted as a cause for confusion by an interviewee. *"Sometimes when we see a product, many numbers appear excessively – the expiration dates, also with the date of production, and the batch number. That implies confusion that is not controlled by the consumer"* (Interview 25).

The two date-markings have ushered in a system of **"preferential consumption"** where those selling the product and those consuming it are given the option of knowing when a product is at its optimal stage for consumption. However, according to data from the interviews, there exists confusion about the two dates which can generate more food waste with products being unnecessarily discarded. In response to this dilemma, those interviewees who raised concerns about confusion, also noted that investment must be made by both the public and private sector to put forth clearer methods of indicating not only the lifespan of a product, but also what condition it is in during the different stages of that lifespan.

4.5.10 Key conclusions from the interviews analysis

The interview results demonstrate that public standards were an absolute must to adhere to in order to accede onto the market, and therefore they could not be compromised. Meanwhile economic factors played a dominant role in motivating entities to adhere to private standards. Private standards were viewed by interviewees as a mechanism to facilitate product differentiation, by demonstrating that additional, specific investments and efforts (when compared to public standards) had been made in order to create a product that was more "value-added" for the consumer. In this respect, interviewees highlighted that private standards were mandating more efforts be made to ensure sustainability, address social concerns during production processes, and enhance the aesthetics of a food product. There were a multiplicity of standards that had to be adhered to at the same time,

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which was highlighted as a challenge. Some of the factors incorporated into private standards were noted as not entirely necessary in terms of determining the overall “quality” of a product. One such example that came up repeatedly in the interviews were the stipulations in private standards for enhanced aesthetics (colour, size, shape). Several interviewees called for more tolerance for products that do not completely adhere to a standard’s aesthetic requirements or other more stringent demands that go beyond what is being asked for in public standards. To achieve this, more active, clear, and effective communication among food chain actors, including consumers, was noted by interviewees as paramount.

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5. KEY FINDINGS

This chapter provides an overview of the key findings that have come out of the data collection efforts in task 1.3 – desktop research in relation to the inventory of food marketing standards, survey responses, and in-depth interviews. Where possible, a cross comparison of findings from all three sources of data is carried out in this section.

5.1 Origin and Purpose of Public Food Marketing Standards

In order to accede onto the market, adherence to public food marketing standards is the absolute minimum requirement. Public standards being defined in the project as standards established by government agencies or inter-governmental bodies. These standards are often **mandatory baseline (minimum) criteria needed for food products in order to legally access the market.** These standards are evident not only at the EU level, but also the national member state, and inter-governmental levels with international organizations such as the Codex Alimentarius Commission being an example. These standards cover core issues that cannot be compromised on, such as those related to food safety (residue and contaminant levels, or traceability labelling), as well as uniformity of products in order to help facilitate trans-border trade. The research results demonstrated that public food marketing standards have to be implemented because they are the minimum legal requirements. Not abiding by them would risk not only fines, but possible closure of a business. The results of the research revealed that a total of 1203 public standards were identified.

Literature review, as well as results of the interviews demonstrated that standards established at the international level by inter-governmental (public) entities, often **serve as a basis for European Commission and national EU member state legislation** (Dawson 1995; Lange 2021; Boutrif 2003; Consumers International 2005). Application of inter-governmental standards into EU and national legislation has the benefit of encouraging more **global uniformity of products,** and thereby **facilitating trade.** "Codex Alimentarius standards do not represent legally binding norms, but serve as guidance for national food safety regulations ("soft law"). Nevertheless, one can argue that the biggest value of this "soft law" approach is that national experts of food law discuss these draft standards based on a scientific evaluation. The result of these exchanges usually finds its way also into national laws (at least as concerns definitions, the scientific considerations etc.) and may lead to a gradual harmonization of international food standards" (Lange 2021: 206-207). In fact, the General Principles of the Codex Alimentarius state that Codex Alimentarius is a collection of internationally adopted food standards aimed at protecting consumer health, establish definitions and requirements for food and their harmonization, and to facilitate trade (Codex Alimentarius Commission 2024).[28]

[28] Codex Alimentarius Commission: https://www.fao.org/fao-who-codexalimentarius/codex-texts/procedural-manual/sections/section1/section1-3/en/

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5.2 Origin and Purpose of Private Food Marketing Standards

Private food marketing standards are defined in the project as not EU or national legislation, but rather food marketing **standards developed and operated by entities other than public government bodies.** This can include for example individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework and can be vital to finding actors along the supply chain with which to work. The results of the research revealed that a total of 147 private standards were identified.

According to the interviews conducted and the inventory of food marketing standards compiled, the entities establishing and implementing private standards are **predominantly retailers.** A cohesive list of entities that establish private food marketing standards is available in the Appendices chapter (Appendix 8.9). This list is based on data obtained from interviews and the desktop research. Retailers were noted as having the most leverage, in particular large food retailers, due to their **significant share in the market**. In this respect, discussions in the interviews highlighted that food chain actors further upstream do not have a choice but to adhere to the standards if they want to be effectively active in the market. Rao et al. (2021) notes that the five biggest retailers control a sizable majority in the European market, and thereby able to exercise buying power and implement specific private standards on their suppliers (Rao et al. 2021: 744). Other entities, evident from both the inventory and the interview discussions, noted as leaders in establishing private standards were **NGOs, international organizations, and commodity specific associations.**

Although the issue did not emerge in the inventory or survey due to the nature of the data collection – i.e. the desktop research focused primarily on identifying standards and the survey did not have questions inquiring about which actor in the supply chain exerts the most influence in establishing standards - there were several interviewees who questioned to what extent the private standards put forth were done so in response to what consumers were demanding or if it was a **mechanism for those downstream in the supply chain (such as retailers) to solidify and augment their position in the marketplace.** Regarding retailers, the interviews highlighted that the standards of retailers were viewed as something discussed directly between the suppliers and those further downstream, with not much transparency for the rest of the actors in the chain. Increased **transparency** in regards to why and how the standards are established by retailers can be a key factor in understanding why the standard is necessary - particularly if it is a standard such as those identified in the inventory, survey, and interviews pertaining to seemingly less important qualities such as overall **aesthetics** of a product.

The most predominant reason why these private standards were created and adhered to came down to economic concerns and in particular, achieving **product differentiation**. Achieving such differentiation, demonstrated that additional, specific investments and efforts had been made in order to create a product that was more **"value-added"** for the consumer. This also provided the opportunity to request a **higher unit price.** Examples include the EKO organic certification label in the Netherlands, or the Nature Choice standard demonstrating adherence to environmentally sound and sustainable practices, implemented by a retailer. Results from the interviews highlighted that entities viewed product differentiation as a key factor in **improving reputation** and **gaining customer loyalty.**

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A mechanism utilized to differentiate a product from the rest of the competition was to hone in on society demands that more attention be given to **environmental and social sustainability measures in food production**. Research results highlighted the emergence of more B2C (business to consumer) standards such as the GGN label offering consumers a consistent and transparent way to recognize products that align with social and environmental responsibility, and animal welfare values. The list of standards noted in the survey responses and obtained via desktop research for the inventory, highlighted that social and environmental factors were more prevalent and seemingly important for consumers. It was also evident that sustainability affects food supply chains in that for a supply chain to not only survive, but rather to thrive, it is to a certain extent dependent on the context and environment in which it operates. Addressing social and environmental concerns provided a range of benefits, including economic ones, such as improved continuity of supply and brand reputation. Incorporating sustainable production methods and practices was a factor in providing a **competitive advantage** and bringing forth more economic returns.

Another manner that product differentiation was being put forth was via the **appearance** of the product. An example is Hoogstraten (Belgium) where based on external characteristics, strawberries are inspected and classified into 4 quality categories. The majority of interviewees believed **product aesthetics affected consumers' purchasing decisions,** since outward appearance as well as other organoleptic characteristics such as firmness, texture, smell, were equated with higher quality and thus a mechanism for product differentiation. As one interviewee noted *"…in order to have a unique selling point on the market…our fresh counter is always the most beautiful and great and looks special"* (Interview 10). The interview portion of data collection also revealed that there was ambivalence as to whether "appearance" factors were indeed a marker for **quality.** Several interviewees noted that appearance was not entirely necessary in terms of determining the overall "quality" of a product. These interviewees called for more tolerance for products that do not completely adhere to a standard's aesthetic requirements or other more stringent demands that go beyond what is being asked for in public standards. They called for a reconsideration of what encompasses the "quality" of a product, and that more than appearance should be taken into account. It was argued that consumers do not know these standards in detail, and consequently what is needed is **clear communication** with consumers about what comprises a product beyond aesthetics.

Standards relating to **packaging, storage, transport, and logistics,** have an effect on not only the appearance, but also the overall condition of the product, such as if it is irreparably damaged or its stage of ripeness in the case fresh produce. Even if a product is shipped in the right conditions (i.e. fully meeting standard requirements), the longer the distance and time required for travel, the higher the risk that some physical damage might come to the product. In this respect **shorter supply chains** were mentioned and preferred by some interviewees, and one example was given in the survey results in the food services sector. Not only was there less risk of damage, but shorter supply chains were also favoured in respect of being able to provide the freshest food possible, while promoting the origin of the product and supporting local industry. It also provided a chance to lower the product's carbon footprint (i.e. less greenhouse gas emissions due to less transport requirements).

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5.3 Multiplicity of Standards

Results from the inventory, survey, and interviews demonstrated that there are **multiple food marketing standards** that need to be **adhered to simultaneously** by actors in the supply chain. It is a complex system where different markets can subject the same food commodity to varying marketing standards. The multiplicity element also extends to what is incorporated into the standard. Research for this task demonstrated that a standard does not include just one factor, but rather multiple elements from appearance, to environmental and social considerations, to food safety elements such as traceability. Essentially, **all the factors must be achieved in order to adhere to one standard.**

The inventory, which included the results of standards identified in survey responses and interviews, put forth a total of 1350 standards, with 1130 applied at the national EU member state level, and 220 applied at the EU and international level. In addition to their **broad geographic scope,** standards fall into several **different classifications**, such as **public and private** standards. Of the total standards identified in the research, 1203 standards were defined as public (i.e. government agencies or inter-governmental bodies establishing often mandatory baseline (minimum) criteria for food products in order to accede onto the market), and 147 standards as private (i.e. developed and operated by entities other than government bodies, such as individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers.) Research results demonstrated that the public standards focus largely on the basics such as health and safety, while private standards often build upon the public ones, but as was evident from the interviews, can put into place additional requirements to enhance product differentiation and perceived food quality, while facilitating supply chain management. While both public and private standards operate within the legal framework, some are **mandatory** (i.e. legally-binding according to the government in order to access the market), and others are **voluntary** in nature. While private standards are essentially voluntary, in everyday business practices, upstream actors such as primary producers do not have a choice but to adhere to them if they want to be effectively active in the market and retain a consistent buyer or buyers. This can create implementation challenges for downstream actors as was evident in the results of the interviews. According to the inventory, the number of mandatory standards was 101, and 1249 were voluntary. This result highlighted a key point in that not all standards established by government bodies (i.e. public ones) are mandatory. In fact, many of the international standards, such as those established by intergovernmental bodies, are technically voluntary. However, they serve in many cases as a basis for European Commission and national EU member state legislation. The reason for this is because application of international standards into EU and national legislation has a benefit - it encourages more global uniformity which facilitates trade. Hence, while technically voluntary and not legally binding, international standards often become de facto mandatory.

The following combinations of public / private and mandatory / voluntary food standards emerged from the research:
i) **public-mandatory** (legally-binding) standards established by the EU and national member states;
ii) **public-voluntary** (not legally-binding) standards established by intergovernmental bodies; and
iii) **private-voluntary** (not legally-binding) standards established by private entities.

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There was also a **fourth combination identified: public-private-voluntary.** This is a partnership between government and non-government entities (NGOs, businesses, research institutes for example) to put forth standards that are technically voluntary. Examples in the research conducted include “DISCO”, a collaboration between the Dutch government, industry and NGOs to improve the livelihoods of current and future cocoa farming families. Another example is the Global Red Meat Standard Association (GRMS), a public-private collaboration focused on animal welfare, food safety and hygiene in factories that slaughter and handle meat / meat products, and is certified via an independent certification process.[29] While the public mandatory standards are technically the only ones that are legally-binding, the public-voluntary, private-voluntary, and public-private voluntary standards are influential and often incorporated into public-mandatory standards. Both private-voluntary and public-private voluntary standards also need to be implemented by food chain actors in order to effectively compete on the competitive market.

5.4 Standards in Accordance with Regulation 1308/2013[30]

Results of the research indicated that the largest number of standards identified applied to fruits and vegetables (639), followed by meat and meat products (588), fish (176), cereals (161) and eggs (105). Within these food commodity categories, there was adherence to both public and private food marketing standards, with **more public standards in place than private ones**. While the literature review demonstrates that substantial attention has been given to the varying effects of private marketing standards (Rao et al. 2020; Havinga 2017; Henson and Humphrey 2010; FAO 2010; Wolff and Scannell 2008), the research results of this task demonstrate that for each food commodity category, more public standards were in place. Subsequently, the content of public standards should not be forgotten. This is especially so since many international standards include factors such as acceptable colour, texture, and size, which have been indicated in this research as not only a challenge to implement, but not even entirely necessary. In each food commodity category there were also **more voluntary standards in place than mandatory ones.** This was particularly the case for fruits and vegetables and meat / meat products. The high number of voluntary standards identified in this research have come mainly from inter-governmental organizations at the international level establishing technically voluntary standards, but which become de-facto mandatory since they are often incorporated into EU and national legislation.

The standards identified in the inventory cover the categories of food marketing standards outlined in Regulation 1308/2013. The below provides some key points:

- **Category J (place of farming and / or origin)** was the most encountered category with 635 standards (i.e. 76 in addition to the 559 PDO / PGI standards). However, if excluding the PDO / PGI

[29] The independent certification process is based on ISO/IEC 17062: 2012 - Conformity assessment: Requirements for bodies certifying products, processes and services. https://www.iso.org/standard/46568.html

[30] Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007 (p. 714). https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1308

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standards, then **category D (presentation, labelling, packaging, marking, year of harvesting)** appears **most frequently** for **all food commodities**.

- International standards also mandate proper identification and classification of products, covering requirements in categories B (classification criteria such as for size and weight), E (appearance, consistency, conformation, product characteristics, and the percentage of water content), A (technical definitions), and C (indication of species, plant variety, animal race, and commercial type).

- Categories related to **classification and appearance (A, B, E)** appeared more frequently for **fruits and / or vegetables** than for other commodity categories.

- **Category G** (type of farming and production method) was the second most evident category for **meat, eggs, and fish**. In the case of **cereals**, it was **category E** (appearance, consistency, conformation, product characteristics, and the percentage of water content).

- **Categories K and F related to restrictions on substances and practices** (such as pesticides for example) were also prominently evident for all food commodities.

- **Category J (place of farming and / or origin),** with the exception of products covered by PDO / PGI, appeared more often in the standards identified for **meat, eggs, and fish** than other food commodity categories. This may indicate a more pressing need in these commodity categories due to their perishability and risk for diseases such as salmonella - to ensure traceability in the supply chain.

- The **majority of private standards** identified belonged to **category F** (specific substances used in production) and **category G** (type of farming and production method). These standards indicated a clear **alignment with environmental sustainability and social concerns**, addressing issues such as organic farming, animal welfare, and fair labour practices.

5.5 Power Imbalance and not achieving Specifications of Food Marketing Standards

The research results highlighted that implementing numerous food marketing standards was a challenge for food chain actors. Effective implementation required resources in the form of expertise, time, and finances, which some actors - in particular those without a large share in the marketplace (i.e. small and medium-sized enterprises) - did not have. Among the more challenging standards named were those in relation to appearance of the product. Standards outlining the overall aesthetics of a product – such as size or colour – could at times be difficult to achieve for producers, depending on the amount of resources at their disposal. Some interviewees pointed towards a **power imbalance in the food supply chain,** wherein downstream actors are able to disproportionately influence which standards need to be adhered to by upstream actors in the chain. The **"retail-primary producer" dynamic** was given as an example in the interviews. However, there was also evidence provided in the interviews of the creation of private marketing standards being **transparent** and including a **cross-section of supply chain actors** in the standard development process. This was particularly the case with NGOs where public consultations with all actors along the food supply

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chain were part of the basic process when establishing a new standard. The interview results also demonstrated that there can be **flexibility** in private standards, with some downstream actors adjusting their standards based on supply-demand and seasonality. Difficulty with implementing standards did lead to surplus food (i.e. food that is safe to eat for humans, but does not meet food marketing standards). Products which did not fulfill the marketing specifications were not automatically discarded, but instead efforts were made to still utilize the food. A variety of activities were mentioned to utilize surplus food, among which the most popular was **donation,** followed by **valorisation,** and thereafter alternate market opportunities to sell the food, albeit at a lower price. The app 'Too Good To Go" was mentioned by 3 entities as part of their systematic strategy to sell surplus food.

5.6 The Complex Nature of Food Marketing Standards

There are numerous public and private food marketing standards in place, at not only the international, EU, and member state levels, but also different supply chain stages, as well as per food commodity category. Food chain actors must navigate a **complicated regulatory environment** catering to market needs. Public standards put forth the minimum criteria necessary for a food commodity. The incorporation of international standards into EU and national member state legislation highlights the importance of aligning with international expectations in order to be competitive. Meanwhile, private standards tend to build upon the public ones, with the overall objective of achieving product differentiation and solidifying a product's position in the market. Enhancing visual appeal of the product, and adhering to sustainability measures and ethical practices are key drivers in shaping private standards. Discussions among food chain actors will continue as to whether or not these private standards are an indication that public standards alone do not meet the expectations of society and the industry at large. This report contributes to the current debate about not only the multiplicity and diversity of existing standards, but also how and why they were established, and who is able to effectively implement them. It is data that is necessary for further discussions about potential ways that these standards can evolve to meet the demands of an increasingly competitive market, where economic, environmental, and social factors are intertwined and all need to be taken into consideration.

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6. CONCLUDING REMARKS AND NEXT STEPS

The development of sustainable food systems is vital keeping in mind the world's increasing population and limited natural resources. The Farm to Fork Strategy of the European Commission launched in 2020, aims to ensure transition across the EU to more sustainable food systems.[31] Part of that effort entails investigating food marketing standards to determine their effects on stakeholders in the supply chain, trade, and environmental and social sustainability.

This report has set out to uncover the vast range of food marketing standards that currently exist in the EU, and provide an understanding about the origin and purpose of both private and public standards. What has emerged from the research is an intricate network of standards, applicable at the international, EU, and member state level, across supply chain stages and food commodity categories. And while obtaining access to a competitive market position is a key motivating factor for entities implementing standards, supply chains are becoming increasingly complex with more being requested from the food industry at large. Standards are changing to reflect stakeholder expectations, such as including sustainability considerations.

The research demonstrated that there are however challenges with implementation of certain standards (in particular for upstream actors) and certain standards, such as stringent requirements related to product aesthetics, may not be necessary. The context of changing climatic conditions also needs to be taken into account, with certain crops being more sensitive than others to alterations in weather and temperature. The effects are variable depending on the food commodity and geographical location, but with changing climatic conditions, production quantity and quality become less predictable. The power dimensions within the agricultural supply chain also became evident via this research. The standards themselves are important, but in and of themselves do not provide the complete picture. Rather, information about who establishes these standards, how they are created and applied, as well as how they are being implemented is key. The multiplicity of standards makes this a difficult feat, but only then can a more holistic understanding of the current standards emerge and a clearer picture of how to move forward in terms of any revisions to the existing system.

6.1 Limitations of the Study

This research provides crucial insights into the origin and purpose of public and private food marketing standards evident in the EU. However, there were some limitations of the study, which are mentioned here below and should be taken into consideration by the reader.

- The vast amount of public and private standards: There are numerous food marketing standards being implemented across the EU. This report and the overall BREADCRUMB project focus on five main commodity groups: fruits and vegetables, meat, cereals, eggs, and fish. Consequently, the inventory of standards is not entirely comprehensive covering all existing standards across the EU.

[31] European Commission Farm to Fork Strategy: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en

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- Consumers: The task and subsequent research was not geared towards systematically investigating the role of consumers in the creation and implementation of food marketing standards. However, interviews were conducted with 4 consumer representative entities, and consumer organizations will be invited to the workshop with external stakeholders which is to take place towards the end of work package 1. In addition, work package 4 of the project, which will focus more on the consumer dimension, will build upon the results of the research in work package 1.

- Gender: This report does not address the relationship between gender and food marketing standards. However, this issue will be addressed in the next task in work package 1 (task 1.4), when developing hypotheses regarding the relationship between specific food marketing standards and food waste.

6.2 Next Steps and Future Research

The main objectives of the research were to create an inventory of public and private food marketing standards in the EU within the five commodity categories of fruits and vegetables, cereals, fish, meat, and egg, and to understand the origin and purpose of the standards. To achieve this goal, three data collection methods were used: desktop research, a survey, and in-depth interviews.

The inventory, providing a large variety of cross-country standards, along with the data obtained from the survey responses and interviews, provides the groundwork for further analysis in the next task of the work package. Task 1.4 will delve into unpacking the interconnections between private and public standards and explore the underlying causes of food waste related to these standards.

The research results discussed in this report will also be used to inform work in other work packages and their respective tasks. In particular, the data generated is important for the modelling efforts in work package 3, as well as the overall objective in work package 4 to improve market access and business potential for foods that do not meet food marketing specifications but are still safe to consume.

Externally, this is research that contributes to and builds upon international and EU research data and debate related to transitioning to sustainable food systems. While the report is relevant for all stakeholders in the food supply chain, in particular public and private sector led initiatives to establish and /or revise current standards may benefit from the research presented in this deliverable.

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8. APPENDICES

8.1 Key Definitions

FOOD SUPPLY CHAIN STAGES		SOURCE
Primary Production: The production, rearing or growing of primary products including harvesting, milking and farmed animal production prior to slaughter. It also includes hunting and fishing and the harvesting of wild products. Please note that the majority of material lost in primary production (pre-harvest losses, losses at harvest, animals dead before slaughter) is not regarded as food waste, as it has not been regarded as "food" yet.		Eurostat. (version of June 2022). Guidance on reporting of data on food waste and food waste prevention according to Commission Implementing Decision (EU) 2019/2000. Luxembourg: Publications Office of the European Union (p. 36).
Processing & Manufacturing: This stage of the food supply chain refers to the first processing and manufacturing of food after the primary production and before the retail and other distribution stage of the food supply chain. It is usually the only phase where the slaughtering of animals is foreseen and admitted by law. It is also the phase in which food is transformed, canned, packed and finally made available for retail and distribution.		Eurostat. (version of June 2022). Guidance on reporting of data on food waste and food waste prevention according to Commission Implementing Decision (EU) 2019/2000. Luxembourg: Publications Office of the European Union (p. 36).
Valorisation: Any processing activity whereby food is transformed into a range of value-added products.		European Commission. (version 2020) Brief on food waste in the European Union. Brussels: The European Commission's Knowledge Centre for Bioeconomy (p. 1).
Retail and Other Distribution: This is a stage of the food supply chain concerning the handling of food and its storage at the point of sale or delivery to the final consumer, and includes distribution terminals, shops, supermarket distribution centres and wholesale outlets.		Eurostat. (version of June 2022). Guidance on reporting of data on food waste and food waste prevention according to Commission Implementing Decision (EU) 2019/2000. Luxembourg: Publications Office of the European Union (p. 36).
Food services: This is a stage of the food supply chain concerning the processing of food at the point of sale or delivery to the final consumer, and includes catering operations, factory canteens, institutional catering, restaurants and other similar food service operations.		Eurostat. (version of June 2022). Guidance on reporting of data on food waste and food waste prevention according to Commission Implementing Decision (EU) 2019/2000. Luxembourg: Publications Office of the European Union (p. 36).
Households: This is a stage of the food supply chain concerning the processing and consumption of the food in the households or small residential facilities which are processing the food themselves.		Eurostat. (version of June 2022). Guidance on reporting of data on food waste and food waste prevention according to Commission Implementing Decision (EU) 2019/2000. Luxembourg: Publications Office of the European Union (p. 36).

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FOOD MARKETING STANDARDS & FOOD WASTE		SOURCE
Food marketing standards: Obligatory rules or optional reserved terms aiming to address the expectations of consumers and to improve the economic conditions for the production and marketing as well as the quality of agricultural products.[32] They establish rules regarding product characteristics and other requirements that must be met for products to circulate within in the EU market.		BREADCRUMB Grant Agreement, Annex I, Part A, page 2; electronic version page 98. Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007.
Private food marketing standards are defined as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.		BREADCRUMB Deliverable 1.3
Public food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.		BREADCRUMB Deliverable 1.3
Food waste is defined in accordance with the EC definition[33] as any food and its associated inedible parts (such as bones or fruit cores) that do not find their way to human consumption and rather become discarded. This can occur at all stages of the food supply chain, from farm to fork. In BREADCRUMB, if food products are returned to the land, utilised as animal feed, composted, subjected to anaerobic digestion, or left unharvested, they are considered food waste.		BREADCRUMB Deliverable 1.3 Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 4, point 4a).

[33] Directive 2008/98/EC stipulates that food waste is "All food as defined in Article 2 of Regulation (EC) No 178/20023 of the European Parliament and of the Council that has become waste".

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8.2 Desktop Research Guidance

*(*Lists and links here below are by no means exhaustive, but only a starting point for research.)*

a) Academic literature (scientific journals, EU project results, Joint Research Centre).

b) Grey literature (reports from governmental agencies, think tanks, food associations, position papers).

c) Internet searches (ScienceDirect, Google Scholar, Scopus, Web of Science).

Private food marketing standards:

Three sets of private standards that have EU-wide importance, i.e. those developed by:[34]

a) British Retailer Consortium (BRC)
https://www.brc.org.uk

b) Global Standards, by Global Good Agricultural Practices (GLOBALG.A.P.)
https://www.globalgap.org

c) International Featured Standards (IFS)
https://www.ifs-certification.com/en/

Literature review:

Sustainable Food Science
https://www.ifis.org/ifis-sustainability

AgEcon
https://ageconsearch.umn.edu

Directory of Open Access Journals
https://doaj.org

OpenAire Journals
https://explore.openaire.eu/search/journals

Elsevier (Scopus)
https://www.elsevier.com/solutions/scopus
https://www.elsevier.com/search-results?query=food%20waste

[34] European Commission (Directorate-General for Agriculture and Rural Development) "Evaluation of Marketing Standards - Contained in the CMO Regulation, the "Breakfast Directives" and CMO secondary legislation – Final Report November 2019" (pages 39-41):
https://op.europa.eu/en/publication-detail/-/publication/309c4642-7ec0-11ea-aea8-01aa75ed71a1/language-en

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ResearchGate
https://www.researchgate.net

ScienceDirect
https://www.sciencedirect.com/#life-sciences

Google Scholar
https://scholar.google.com

European Council LibGuides
https://consilium-europa.libguides.com

European Parliamentary Research Service
https://epthinktank.eu

European Think Tanks Group
https://ettg.eu/about/

European Food Information Council
https://www.eufic.org/en/who-we-are

FoodDrinkEurope
https://www.fooddrinkeurope.eu/policy-area/food-waste/

Food Navigator
https://www.foodnavigator.com

Euractive
https://www.euractiv.com/sections/agriculture-food/

Examples of some possible keyword searches:

a) "food marketing standards"
b) "private food marketing standards"
c) "public food marketing standards"
d) "voluntary food marketing standards"
e) "food marketing standards" and supply chain stage (i.e. "primary production", "retail", etc.) and geographic location and commodity
f) "food marketing standards" and "labelling", "date marking", "quality", "imperfect / suboptimal food", "nutrition", "packaging", "production", "organic farming", "classification", "food waste"
g) "food waste" and supply chain stage (i.e. "primary production", "retail", etc.) and geographic location and commodity
h) "food waste measurement"

Some key European Commission sites:

https://food.ec.europa.eu/safety/food-waste/eu-actions-against-food-waste/eu-platform-food-losses-and-food-waste/platform-members_en

https://ec.europa.eu/newsroom/sante/newsletter-archives/view/service/1826

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https://food.ec.europa.eu/safety/food-waste/resources-library_en

https://ec.europa.eu/food/safety/food_waste/eu-food-loss-waste-prevention-hub/resources

https://ec.europa.eu/food/safety/food_waste/eu-food-loss-waste-prevention-hub/eu-member-states

https://ec.europa.eu/eurostat

https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/joint-research-centre_en

Other key sites:

United Nations Economic Commission for Europe (UNECE) – Working Party on Agricultural Quality Standards:
https://unece.org/trade/wp7/FFV-Standards

https://unece.org/trade/working-party-agricultural-quality-standards-wp7

https://unece.org

FAOLEX database
https://www.fao.org/faolex/country-profiles/en/

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8.3 Participant Information Sheet and Consent Form (survey)

Welcome to BREADCRUMB survey

Please **read this information sheet and consent form** and **mark your answer.**

Dear participant,

You are invited to voluntarily participate in BREADCRUMB's research activity, **"Survey on Food Marketing Standards in the EU".** Before you agree to participate in this study, it is important that you please **read this information form carefully.** If anything is not clear, please do not hesitate to ask questions, contact information can be found at the very bottom of this information sheet.

Purpose of the project: BREADCRUMB **(https://www.breadcrumb-project.eu)** aims to provide an empirical evidence-based understanding and purpose of food marketing standards, along with their influence on the generation of food waste (FW). Its goal is to suggest interventions that strike a balance between the aim of FW reduction and other standards-related objectives, while assisting food chain participants in maximizing the commercial viability of less-than-optimal food products.

Process description: The purpose of the "Survey on Food Marketing Standards in the EU" is to compile an inventory of existing food marketing standards across the European Union (EU), as well as a better understanding about the relationship between public and private food marketing standards, and insight into possible links between food marketing standards and food waste.

What does participation involve for you? The survey will be conducted electronically via an on-line survey, however, there may be instances where it is conducted via phone if more convenient for the responder. The information collected will be strictly about food marketing standards and is expected to take **approximately 10-15 minutes.** The answers will be recorded electronically.

Potential benefits or risks of participation: Your involvement contributes to advancing scientific understanding, developing evidence-based solutions to combat food waste, and benefiting society. The overall results of this survey will be included in a deliverable report and will be made available to respondents. There are no foreseeable risks in participating in this survey.

Participation is voluntary: Your participation is completely voluntary, and there will be no negative consequences for declining to participate or withdrawing from the study at any time. You have the right to refuse to answer any questions you are uncomfortable with or to skip any sections. If you chose to participate, you can withdraw your consent at any time without giving a reason. The withdrawal of consent shall not affect the lawfulness of processing based on consent before its withdrawal. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Confidentiality: Only the project researchers will have access to the data collected during the study. Your identity will remain confidential, and all responses will be anonymized. Any personal information obtained will be stored securely and handled confidentially. It will not be disclosed to

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anyone outside of the research team without your explicit consent. The project will end in December 2026. All project data will be stored only for the minimum period required to complete the research activities, which is 3 years, and in accordance with the accounting rules that apply under EU Horizon 2020, no longer than five years from the end of the project, when it will be deleted.

Contact information: If you have questions or concerns about the BREADCRUMB project before starting the survey, or want to exercise your rights, please **contact**: [Name of Survey Contact Person] [E-mail].

Consent Form

Selecting "Yes" below indicates that:
- You have received and read the information in the BREADCRUMB Information sheet;
- You understand the procedures described above and the expected duration of the storage of the data;
- You have been given the opportunity to ask questions;
- You voluntarily agree to participate, and you are free to withdraw at any time without giving a reason and without consequences;
- You understand that your personal information will be treated and handled in accordance with the provisions of the EU General Data Protection Regulation (Reg. 2016/679);
- You are at least 18 years of age.

Please mark **"yes"** if you consent (agree) or **"no"** if you do not consent.

1 ○ Yes

2 ○ No

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8.4 Survey Questions

PART I: INTRODUCTORY QUESTIONS

Q1. At which level does your entity operate?

1	□	Only locally within a specific region/city of a country
2	□	At the national (i.e. country) level
3	□	Internationally (within the EU)
4	□	Internationally (within and outside of the EU)
98	○	Choose not to answer

Q2. In which EU country/countries does your entity operate?

1	□	Austria
2	□	Germany
3	□	Belgium
4	□	Bulgaria
5	□	Croatia
6	□	Republic of Cyprus
7	□	Czech Republic
8	□	Denmark
9	□	Estonia
10	□	Finland
11	□	France
12	□	Greece
13	□	Hungary

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14	□	Ireland
15	□	Italy
16	□	Latvia
17	□	Lithuania
18	□	Luxembourg
19	□	Malta
20	□	Netherlands
21	□	Poland
22	□	Portugal
23	□	Romania
24	□	Slovakia
25	□	Slovenia
26	□	Spain
27	□	Sweden
98	○	None of the above

Q3. Indicate the **stage(s) of the supply chain** your entity primarily operates at?

1	□	Primary Production
2	□	Processing & Manufacturing
3	□	Retail and Distribution (wholesale)
4	□	Restaurants and Food Services
98	○	Don't Know / Hard To Say

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PART II: INTRODUCTORY COMMODITY QUESTIONS

Q4_1. Does your entity operate with the following **food commodity?**

Fruits and/or Vegetables

1 ○ Yes
2 ○ No
98 ○ Don't know / Hard to say

Q4_2. Does your entity operate with the following **food commodity?**

Meat (poultry, bovine or pork)

1 ○ Yes
2 ○ No
98 ○ Don't know / Hard to say

Q4_3. Does your entity operate with the following **food commodity?**

Fish

1 ○ Yes
2 ○ No
98 ○ Don't know / Hard to say

Q4_4. Does your entity operate with the following **food commodity?**

Eggs

1 ○ Yes
2 ○ No
98 ○ Don't know / Hard to say

Q4_5. Does your entity operate with the following **food commodity?**

Cereals

1 ○ Yes
2 ○ No
98 ○ Don't know / Hard to say

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PART III: PRIVATE FOOD MARKETING QUESTIONS

Q5_1. Fruits and Vegetables - PRIVATE standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
This survey defines **PRIVATE food marketing standards** as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Go to Question 3 and put the number of the answer next to a specific standard(s) on your list in the text box.
d. Separate the answers with a semi-colon (;).

Question 1:
Which **PRIVATE** food marketing standards (for **fruits and / or vegetables**) does your entity **establish or adhere to?**
Please **list the standards.**

Question 2:
In your opinion, for your entity, the **relations between** the **PRIVATE** food marketing standards (for fruits and / or vegetables) that you listed and **PUBLIC** standards are:
1 - totally complementary
2 - somewhat complementary
3 - not at all complementary
4 - unclear
Please **put a number** next to the standards you listed.

Question 3:
In your opinion, for your entity, what **effect do the PRIVATE** food marketing standards (for fruits and/or vegetables) that you listed have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a second number** next to the standards you listed.

Example:
Standard; 1; 3
Next standard; 2; 4
Next standard; 3; 3

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Q5_2. Meat (poultry, ovine or pork) - PRIVATE standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
This survey defines **PRIVATE food marketing standards** as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Go to Question 3 and put the number of the answer next to a specific standard(s) on your list in the text box.
d. Separate the answers with a semi-colon (;).

Question 1:
Which **PRIVATE** food marketing standards (for **meat: poultry, ovine or pork**) does your entity **establish or adhere to?**
Please **list the standards.**

Question 2:
In your opinion, for your entity, the **relations between** the **PRIVATE** food marketing standards (for **meat: poultry, ovine or pork)** that you listed and **PUBLIC** standards are:

1 - totally complementary
2 - somewhat complementary
3 - not at all complementary
4 - unclear
Please **put a number** next to the standards you listed.

Question 3:
In your opinion, for your entity, what **effect do the PRIVATE** food marketing standards **(for meat: poultry, ovine or pork)** that you listed have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a second number** next to the standards you listed.

Example:
Standard; 1; 3
Next standard; 2; 4
Next standard; 3; 3

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Q5_3. **Fish - PRIVATE** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
This survey defines **PRIVATE food marketing standards** as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Go to Question 3 and put the number of the answer next to a specific standard(s) on your list in the text box.
d. Separate the answers with a semi-colon (;).

Question 1:
Which **PRIVATE** food marketing standards (for **fish**) does your entity **establish or adhere to?**
Please **list the standards.**

Question 2:
In your opinion, for your entity, the **relations between** the **PRIVATE** food marketing standards (for fish) that you listed and **PUBLIC** standards are:
1 - totally complementary
2 - somewhat complementary
3 - not at all complementary
4 - unclear
Please **put a number** next to the standards you listed.

Question 3:
In your opinion, for your entity, what **effect do the PRIVATE** food marketing standards (for **fish**) that you listed have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a second number** next to the standards you listed.

Example:
Standard; 1; 3
Next standard; 2; 4
Next standard; 3; 3

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Q5_4. Eggs - PRIVATE standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
This survey defines **PRIVATE food marketing standards** as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Go to Question 3 and put the number of the answer next to a specific standard(s) on your list in the text box.
d. Separate the answers with a semi-colon (;).

Question 1:
Which **PRIVATE** food marketing standards (for **eggs**) does your entity **establish or adhere to?**
Please **list the standards.**

Question 2:
In your opinion, for your entity, the **relations between** the **PRIVATE** food marketing standards (for eggs) that you listed and **PUBLIC** standards are:
1 - totally complementary
2 - somewhat complementary
3 - not at all complementary
4 - unclear
Please **put a number** next to the standards you listed.

Question 3:
In your opinion, for your entity, what **effect do the PRIVATE** food marketing standards (for **eggs**) that you listed have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a second number** next to the standards you listed.

Example:
Standard; 1; 3
Next standard; 2; 4
Next standard; 3; 3

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Q5_5. **Cereals - PRIVATE** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
This survey defines **PRIVATE food marketing standards** as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Go to Question 3 and put the number of the answer next to a specific standard(s) on your list in the text box.
d. Separate the answers with a semi-colon (;).

Question 1:
Which **PRIVATE** food marketing standards (for **cereals**) does your entity **establish or adhere to?**
Please **list the standards.**

Question 2:
In your opinion, for your entity, the **relations between** the **PRIVATE** food marketing standards (for cereals) that you listed and **PUBLIC** standards are:
1 - totally complementary
2 - somewhat complementary
3 - not at all complementary
4 - unclear
Please **put a number** next to the standards you listed.

Question 3:
In your opinion, for your entity, what **effect do the PRIVATE** food marketing standards (for **cereals**) that you listed have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a second number** next to the standards you listed.

Example:
Standard; 1; 3
Next standard; 2; 4
Next standard; 3; 3

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Q5_6. Restaurants and/or Food Services - PRIVATE standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
This survey defines **PRIVATE food marketing standards** as not EU or national legislation, but rather food marketing standards developed and operated by entities other than government bodies - this can include individual companies, food manufacturers, non-governmental organisations, industry associations, and retailers. They operate within the legal framework but are voluntary in nature.

PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Go to Question 3 and put the number of the answer next to a specific standard(s) on your list in the text box.
d. Separate the answers with a semi-colon (;).

Question 1:
Think about the following food commodities: **fruit & vegetables, cereals, meat (poultry, bovine, pork), eggs, fish.** Which **PRIVATE** food marketing standards (for **these commodities)** does your entity **establish or adhere to?**
Please **list the standards.**

Question 2:
In your opinion, for your entity, the **relations between** the **PRIVATE** food marketing standards (for **these commodities)** that you listed and **PUBLIC** standards are:
1 - totally complementary
2 - somewhat complementary
3 - not at all complementary
4 - unclear
Please **put a number** next to the standards you listed.

Question 3:
In your opinion, for your entity, what **effect do the PRIVATE** food marketing standards (for **these commodities**) that you listed have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a second number** next to the standards you listed.

Example:
Standard; 1; 3
Next standard; 2; 4
Next standard; 3; 3

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PART IV: PUBLIC FOOD MARKETING QUESTIONS

Q6_1. **Fruits and Vegetables - PUBLIC** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Separate the answers with a semi-colon (;).

Question 1:
Which **PUBLIC** food marketing standards (for fruits and / or vegetables) does your entity **adhere to?**
Please **list the standards**.

Question 2:
In your opinion, for your entity, what **effect do the PUBLIC** food marketing standards (for fruits and / or vegetables) have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a number** next to the standards you listed.

Example:
Standard; 1
Next standard; 2
Next standard; 3

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Q6_2. **Meat (poultry, ovine or pork) - PUBLIC** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Separate the answers with a semi-colon (;).

Question 1:
Which **PUBLIC** food marketing standards (for **meat: poultry, ovine or pork)** does your entity **adhere to?**
Please **list the standards**.

Question 2:
In your opinion, for your entity, what **effect do the PUBLIC** food marketing standards (for **meat: poultry, ovine or pork**) have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a number** next to the standards you listed.

Example:
Standard; 1
Next standard; 2
Next standard; 3

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Q6_3. Fish - PUBLIC standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Separate the answers with a semi-colon (;).

Question 1:
Which **PUBLIC** food marketing standards (for **fish**) does your entity **adhere to?**
Please **list the standards**.

Question 2:
In your opinion, for your entity, what **effect do the PUBLIC** food marketing standards (for **fish**) have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a number** next to the standards you listed.

Example:
Standard; 1
Next standard; 2
Next standard; 3

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Q6_4. **Cereals - PUBLIC** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Separate the answers with a semi-colon (;).

Question 1:
Which **PUBLIC** food marketing standards (for **cereals**) does your entity **adhere to?**
Please **list the standards**.

Question 2:
In your opinion, for your entity, what **effect do the PUBLIC** food marketing standards (for **cereals**) have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a number** next to the standards you listed.

Example:
Standard; 1
Next standard; 2
Next standard; 3

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Q6_5. **Eggs - PUBLIC** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Separate the answers with a semi-colon (;).

Question 1:
Which **PUBLIC** food marketing standards (for **eggs**) does your entity **adhere to?**
Please **list the standards**.

Question 2:
In your opinion, for your entity, what **effect do the PUBLIC** food marketing standards (for **eggs**) have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a number** next to the standards you listed.

Example:
Standard; 1
Next standard; 2
Next standard; 3

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Q6_6. **Restaurants and/or Food Services - PUBLIC** standards

Please read the **definitions** and answer the **questions** below following the **instruction**.

Definitions:
PUBLIC food marketing standards are defined as standards established by government agencies or inter-governmental bodies. The standards are often mandatory baseline (minimum) criteria needed for food products in order to legally access the market.

FOOD WASTE is defined as any food, or inedible parts reasonably intended for human consumption that became waste along the entire food supply chain.

Instruction:
Having these definitions in mind, please
a. Start with Question 1, and list the standard(s) in the text box below.
b. Go to Question 2 and put the number of the answer next to a specific standard(s) on your list in the text box.
c. Separate the answers with a semi-colon (;).

Question 1:
Think about the following food commodities: **fruit & vegetables, cereals, meat (poultry, bovine, pork), eggs, fish.**

Which **PUBLIC** food marketing standards (for **these food commodities**) does your entity **adhere to?**
Please **list the standards**.

Question 2:
In your opinion, for your entity, what **effect do the PUBLIC** food marketing standards (for **these food commodities**) have **on FOOD WASTE**:
1 - reduce food waste
2 - increase food waste
3 - have no connection to food waste
4 - the connection is unclear
Please **put a number** next to the standards you listed.

Example:
Standard; 1
Next standard; 2
Next standard; 3

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PART V: FINAL QUESTIONS

Q7. Is the amount of food waste generated within your entity measured?

1 ○ Yes
2 ○ No
3 ○ Prefer Not to Say

Q8. Does your organization track what is done with food that does not comply with a food marketing standard?

1 ○ Yes
2 ○ No

Q9. Would you be willing to help us to learn more about the relationship between food marketing standards and food that does not comply with those standards if we contacted you in future?

1 ○ Yes
2 ○ No

Q10. If you would like, please provide an e-mail address under which we can contact you.

THANK YOU FOR YOUR SUPPORT AND CONTRIBUTION TO THE BREADCRUMB PROJECT.

THE END OF THE SURVEY

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8.5 Participant Information Sheet and Consent Form (interviews)

Dear participant,

This is an inquiry please for participation (i.e. an **interview**) within the research activities of the BREADCRUMB project. In this letter, you will receive information about the purpose of the project, the data collection and processing activity, what your participation will involve, and your rights.

Before you agree to participate in this interview, it is important that you **please read this information form carefully.** If anything is not clear, please do not hesitate to ask questions. Contact information can be found at the very end of this information sheet.

Purpose of the project: BREADCRUMB **(https://www.breadcrumb-project.eu)** aims to provide an empirical evidence-based understanding and purpose of food marketing standards, along with their influence on the generation of food waste (FW). Its goal is to suggest interventions that strike a balance between the aim of FW reduction and other standards-related objectives, while assisting food chain participants in maximizing the commercial viability of less-than-optimal food products.

Process description: The purpose of the interview is to obtain a better understanding about:
a) the origin and rationale for private food marketing standards;
b) the relationship between food marketing standards, in particular the relationship between public and private ones;
c) the relationship between these food marketing standards and food waste**.**

What does participation involve for you? The interview may be conducted virtually or in-person. The information obtained in the interview will be strictly about food marketing standards and is **expected to take approximately 60 minutes.** In case translation between different languages is needed, the interview may last a little longer. If you permit, your answers will be recorded via sound recording and transcribed. If you are not comfortable with sound recording, detailed written notes will be taken.

Potential benefits or risks of participation: Your involvement contributes to advancing scientific understanding, developing evidence-based solutions to combat food waste, and benefiting society. There are no foreseen risks in participating in this survey.

Participation is voluntary: **Your participation is completely voluntary**, and there will be no negative consequences for declining to participate or withdrawing from the study at any time. You have the right to refuse to answer any questions you are uncomfortable with or to skip any sections. If you chose to participate, you can withdraw your consent at any time without giving a reason. The withdrawal of consent shall not affect the lawfulness of processing based on consent before its withdrawal. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Confidentiality: Only the project researchers will have access to the data collected during the study. **Your identity will remain confidential**, **and all responses will be anonymized.** Any

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personal information obtained will be stored securely and handled confidentially. It will not be disclosed to anyone outside of the research team without your explicit consent. The project will end in December 2026. All project data will be stored only for the minimum period required to complete the research activities, which is 3 years, and in accordance with the accounting rules that apply under EU Horizon 2020, no longer than five years from the end of the project, when it will be deleted.

Contact information: If you have questions or concerns about the BREADCRUMB project or want to exercise your rights, please contact: [name of project partner], participating in data collection for the interview.

Thank you.

Kind regards,

[Name of project partner],
[Title and Company] on behalf of the BREADCRUMB project
[E-mail of project partner]

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Consent Form

Selecting “Yes” below indicates that:

- You have received and read the information in the BREADCRUMB Information sheet;
- You understand the procedures described above and the expected duration of the storage of the data;
- You have been given the opportunity to ask questions;
- You voluntarily agree to participate, and you are free to withdraw at any time without giving a reason and without consequences;
- You understand that your personal information will be treated and handled in accordance with the provisions of the EU General Data Protection Regulation (Reg. 2016/679);
- You are at least 18 years of age.

Please mark **“yes”** if you consent (agree) or **“no”** if you do not consent.

o Yes

o No

Name of Participant: _____

Participant's Signature: _____

Date: _____

Name of Researcher: _____

Researcher's Signature: _____

Date: _____

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8.6 Interview Protocol

Location and Equipment:
If interviewing in-person, please ensure that the **environment** in which you are in is appropriate for an interview (quiet enough to have the conversation / discussion, opportunity to sit down, etc.) and that you have with you the **necessary tools** (i.e. audio recording device(s), computer, notepad, pens/pencils, etc.). If interviewing virtually, be sure that the necessary **equipment is functioning** (computer, audio, internet connection, etc.).

Introduction:
Before the interview commences, please provide a **brief introduction** of yourself, **thank the participant** for agreeing to do the interview, and allow them the opportunity to **introduce themselves** to you.

Overall objective of interview:
Please remind the participant about the **overall objective of the interview** (i.e. to obtain their insights on the origin and rational for food marketing standards, in particular private ones, and the relationship between food marketing standards and food waste.)

Timeframe for interview:
Please let the participant know that the interview will take approximately 60 minutes.

Participant Information Sheet and Consent Form:
Please ask if the participant has received the Participant Information Sheet and the Consent Form, if there has been the opportunity to thoroughly review both, and if there are any remaining questions. If there are questions, please address them as best as possible.
*(Both the Participant Information Sheet and the Consent Form should please be sent to the participant approximately 1 week in advance of the interview**,** to allow time for review, questions, and signature.)*

Signature/Consent Form:
Please ensure that the **Consent Form has been signed and dated by the participant before commencing the interview.** Please do not commence the interview without done so.

Recording:
If there are no questions, and the Consent Form has been signed, remind the participant that **audio recording** will commence. In cases of a virtual interview, if the participant does not want to be on video, please allow them the opportunity to turn off their camera. If they have not agreed to the audio recording, please do not record and be sure to take **detailed notes.**

Before starting the interview:
Please be sure to transcribe / make a written note of:
a) Who is conducting the interview
b) Organization / entity being interviewed

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c) Date of interview
d) Location of interview: location or virtual

During the interview:
Please remember to speak clearly, be an **active listener** throughout the process (i.e. be careful to not let your own assumptions get in the way of hearing the participant's perspective), and allow the participant time to fully answer a question (i.e. please do not interrupt or rush the participant).

Closing the interview:
After the last question, please **thank the participant** for their time and insights, and ask them if there are any remaining questions or thoughts that they would like to share with you. Remind them of **your contact information** in case they would like / need to get in touch with you at any time in the future, and the **BREADCRUMB website** where they can follow the project's progress.

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8.7 Interview Questions (business / industry)

1. Could you please briefly describe your role and responsibilities within your organization / company?

2. How familiar are you with both public and private food marketing standards?

3. With which food commodity(ies) does your organization / company operate and at what stage of the supply chain (i.e. primary production, processing & manufacturing, retail and distribution (wholesale), restaurant and food services)?

4. (WP 3) What food marketing standards (public and private) are relevant for your organization / company? i.e. which food marketing standards does your organization / company have to comply with?

5. (WP 3 & WP 4) Do you think these food marketing standards are relevant for consumers? How so?

6. Can you discuss any challenges or benefits your organization / company has experienced from implementing these standards?
{Follow-up questions to spur discussion: What are the costs and benefits (financial, social, environmental) of implementing the food marketing standards standard(s)?}

7. (WP 3) If working with suppliers, does your organization / company require from suppliers that particular food marketing standards be enforced?
   a. If yes, which standards and why?
   b. What would be the consequences of relaxing these standards? What impact would it have on products quantities?

8. (WP 3) If working with suppliers, how much do you value the environmental sustainability practices of your suppliers, compared to economic and financial factors (e.g., price of the product)? Can you please explain your reasoning?

Economic factors are most relevant									Environmental sustainability is most relevant
1	2	3	4	5	6	7	8	9	10

How much do you value the social sustainability practices of your suppliers, compared to economic and financial factors (e.g., price of the product)? Can you please explain your reasoning?

Economic factors									Social sustainability

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are most relevant									is most relevant
1	2	3	4	5	6	7	8	9	10

How much do you value food waste reduction practices of your suppliers, compared to economic and financial factors (e.g., price of the product)? Can you please explain your reasoning?

Economic factors are most relevant									Reducing food waste is most relevant
1	2	3	4	5	6	7	8	9	10

9. (WP 3) Thinking about private food marketing standards, what type of actors mostly establish them?

10. (WP 3) What factors influence your organization's / company's decision to adhere to private food marketing standards (e.g., access to the market, good reputation, other factors for example)?

11. How do private food marketing standards in your organization / company interact with public food marketing standards?
{Follow-up questions to spur discussion: Are they complementary for example? Or does a standard build upon/expand upon another standard perhaps?}

12. (WP 4 / T2.1) What happens with the products that do not fulfil the food marketing specifications?
{Follow-up questions to spur discussion: Are the products donated for example? Or used perhaps in another capacity – such as valorization initiatives? Are there other actions taken? If yes, can you say more about them? If no, why not?}

13. (WP 4) Would your organization / company be willing and able to engage in valorisation of surplus food? If yes, how and if no, why not?

14. (T2.1) Can you provide examples of how adherence to these standards has either increased or reduced food waste?

15. (T2.1) Are there specific policies or practices that have been effective in mitigating food waste while maintaining compliance with these standards?

16. Are there any additional comments or insights you would like to share regarding food marketing standards or food waste?

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8.8 Interview Questions (consumer entities)

1. Can you briefly describe your organization's role in advocating for consumer interests in the EU food sector?

2. How familiar are you with both public and private food marketing standards?

3. How familiar do you think consumers are with private and public food marketing standards?

4. How do you think these standards affect consumer choices?

5. Have you observed any trends or changes in consumer behavior that suggest a shift in how they respond to food marketing standards?

6. In your view, which specific marketing standards most significantly contribute to surplus food that has not been purchased by the consumer?

7. What changes would you recommend to the current food marketing standards to help minimize the generation of surplus food that has not been purchased by the consumer?

8. How do you think marketing standards related to product aesthetics (such as appearance or packaging) affect consumers' purchasing decisions and potential to consume or discard the product?

9. Do you know if there is confusion among consumers regarding date markings – in particular the “use by” and “best by”? If so, what are the elements that generate confusion? Do you think the confusion affects how consumers do / do not purchase the product?

10. Are there specific food marketing standards that you see playing a prominent role in terms of purchase and consumption of specific foods? For example, environmental certifications, social impacts, organic cultivation, ingredient specifications, place of origin / farming of the product?

11. Is there anything else you believe is important for us to understand about the relationship between food marketing standards and food waste from the consumer advocacy perspective?

12. Looking at the draft conceptual framework model developed by BREADCRUMB, particularly the aspects related to consumers, what are your thoughts? Do you have any comments or suggestions for improvements? Is there anything you feel is missing that should be included?

13. Would you be open to participate in further discussions (such as workshops, surveys) with us as we continue our research on this topic over the coming years?

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8.9 Entities Identified Establishing Private Standards

BREADCRUMB

List of Entities Establishing Private Food Marketing Standards

(*these are standards that are technically voluntary)

QS Qualität und Sicherheit GmbH	https://www.q-s.de/qs-company/organisation-en.html
Aquaculture Stewardship Council	https://asc-aqua.org
Marine Stewardship Council	msc.org
International Organization for Standardization (ISO)	iso.org
CSQA Certificazioni	csqa.it
Ecocert Group	ecocert.com
GLOBAL G.A.P.	globalgap.org
International Featured Standards (IFS)	ifs-certification.com
BRC Global Standards	brcgs.com
Rainforest Alliance	rainforest-alliance.org
Ente Nazionale Italiano di Unificazione (UNI)	uni.com
Belbeef	belbeef.be
Belpork vzw	belpork.be
Dutch Society for the Protection of Animals (Dierenbescherming)	dierenbescherming.nl
Vion Food Group	vionfoodgroup.com
Belplume	belplume.be
Bleu-Blanc-Cœur	bleu-blanc-coeur.org
Expertise Végane Europe (EVE)	eve-vegan.org
Biopartenaire	biopartenaire.com
Agri-Éthique France	agriethique.fr
Bio Equitable en France	bio-equitable-en-france.org
INTERBIO Nouvelle-Aquitaine and INTERBIO Occitanie	interbionouvelleaquitaine.com
Bio Cohérence	biocoherence.fr
The Global Seafood Alliance	globalseafood.org
COOP Group	https://info.coop.dk/media/1797/product-and-quality-requirements-for-indirect-goods-june-2020.pdf
Nature et Progrès	natureetprogres.org
Flor de Peira	flordepeira.com
Interfel	interfel.com
Inter Bio des Pays de la Loire	interbio-paysdelaloire.fr
Les Gueules Cassées	lesgueulescassees.org
Coöperatie Hoogstraten	hoogstraten.eu
LAVA	lava.be
VBT	vbt.eu
Vegaplan	vegaplan.be
REO Veiling	reo.be
Stichting EKO-keurmerk	eko-keurmerk.nl
BioForum	bioforum.be
Stichting Milieukeur	milieukeur.nl
Donau Soja	donausoja.org
ProTerra Foundation	proterrafoundation.org
Association of Meat Producers and Employers of the Meat Industry	upemi.pl
Polish Association of Pig Breeders and Producers 'POLSUS' and the 'Polish Meat' Association	polsus.pl
Fairtrade International	fairtrade.net
Global Red Meat Standard Association (Collaboration of Danish Agriculture & Food Council, in partnership with its abattoir members and the Danish Meat Research Institute)	grms.org
Avined Foundation	https://www.avined.nl/themas/kwaliteitsregelingen/ikbkip
Fair Labor Association	fairlabor.org
Social Accountability International	sa-intl.org
Ethical Trading Initiative	ethicaltrade.org
DISCO (Collaboration of Dutch Ministry of Foreign Affairs, industry organizations, NGOs)	https://www.idhsustainabletrade.com/initiative/dutch-initiative-on-sustainable-cocoa-disco/
Marin Trust	https://www.marin-trust.com
MC Sonae	https://mc.sonae.pt/en/
Carrefour, chain of stores (Varkensvlees van Weleer van Kwaliteitsketen, Filiére Qualité, Bio)	https://www.carrefour.be/nl/inspiratie/kwaliteitsketen/beenhouwerij/varkensvlees-van-weleer/prodp.html https://www.carrefour.fr/marques/filiere-qualite-carrefour/produits
Auchan, chain of stores (Cultivons le Bon)	https://www.auchan.fr/produits-auchan/nos-engagements-auchan/auchan-filieres-responsables/ca-b202213091626?page=2#fae0fe2e-537b-457c-a935-351e20cbe409_61
Systeme U, chain of stores (Filières U)	https://www.magasins-u.com
Groupe Casino, chain of stores (Zéro résidu de pesticides, Bio)	https://www.groupe-casino.fr/la-marque-casino-poursuit-son-engagement-zero-residu-de-pesticides-sur-les-fruits-et-legumes-frais/
Cora, chain of stores (Nature Bio)	https://www.cora.fr/faire_mes_courses/les_selections_du_moment/selections_cora/nature_bio-c-405159
Aldi, chain of stores (Bon et Bio)	https://www.aldi.fr/produits/NosProduitsBio.html
Cosme, chain of stores (Filiere)	https://www.charcuterie-cosme.com/filiere/
ANPOC, National Association of Cereal Producers (Cereais do Alentejo)	https://www.anpoc.pt

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8.10 Inventory of Food Marketing Standards in the EU

- The excel document “BREADCRUMB Project: Inventory of Public and Private Food Marketing Standards in the EU” can be accessed at: https://www.breadcrumb-project.eu/results/

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