BREADCRUMB

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DELIVERABLE 2.2

Case Study Plans - 1

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Project acronym	BREADCRUMB		
Call topic	HORIZON-CL6-2023-FARM2FORK-01		
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D2.2 – CASE STUDY PLANS – 1

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LIST OF ABBREVIATIONS

Abbreviation	Description
CS	Case study
ID	Identification
FW	Food waste
FMS	Marketing Standards
TBD	To Be Determined

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EXECUTIVE SUMMARY

This document is the first deliverable of WP2 of the BREADCRUMB project. It is the first of 3 Case Study (CS) Plan deliverables with the aim to collect information and establish an initial plan for the case studies to facilitate the monitoring process.

To get a complete overview of each CS, the responsible partners were asked to give detailed information about the intentions they have regarding the CS in the project. This way, not only will it be possible to monitor the advancement of each CS towards its objectives, but it also facilitates joint coordination between the case studies (especially those working on the same food commodity).

The CS ID section contains all relevant information about the CS partners per CS, as well as the reasoning behind the chosen product(s) and at what stage(s) of the value chain information will be collected.

In the product mapping a visual overview is given of the chosen food products. Including information about the stage(s) of the value food chain and the regional information. Additionally, a first estimation of FW is given by CSs, with the aim of selecting food products that have the highest impact, but also to see if the current estimation coincides with the results that will be obtained throughout this task.

An overview of the case studies' objectives has been provided to help steer the research. This overview provides the overall framework so that CS partners effectively communicate on their progress and work towards meaningful outcomes.

In the data methodology section, all the data collection methods that will be used have been listed - per CS and per stage of the value food chain.

Lastly, a timeline of all the data collection per CS can be found. This is to ensure that work is effectively accomplished within the available timeframe. It is important to have all the data collected in a timely manner so that further analysis of the data can start as planned in M15 (i.e. Task 2.4).

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1 INTRODUCTION

1.1 Breadcrumb's objective and approach

The BREADCRUMB project aims to offer a thorough understanding of the purpose and characteristics of food marketing standards (MS) through empirical evidence. Our focus is on examining how these standards generate food waste (FW). We aim to propose interventions that effectively balance the dual objectives of minimizing FW while also addressing other goals associated with standards. Additionally, BREADCRUMB is dedicated to assisting food chain actors in enhancing the business potential of suboptimal foods, fostering a harmonious integration of sustainability and economic considerations.

1.2 Aim of the report

The primary objective of T2.2 is to establish a framework for the effective management of each case study (CS). This involves the initial formulation of a formal plan for every CS, with continuous refinement of the objectives. The comprehensive plan will encompass detailed descriptions of scheduled actions, reporting mechanisms, and periodic assessment procedures. These elements are crucial for monitoring the progress of each CS, allowing our project team to promptly identify and address potential challenges and obstacles.

Moreover, T2.2 is dedicated to conducting a thorough analysis of the available empirical data at the project's commencement and the new data to be collected through CS activities. This analytical approach ensures that we leverage insights gained from empirical evidence, optimizing our strategies and approaches accordingly.

A key aspect of this task is fostering collaboration and knowledge sharing among the various Case Studies, particularly those addressing similar food commodities. By facilitating the exchange of lessons learned and challenges faced, T2.2 aims to create a synergistic environment where the collective experiences contribute to the overall success of the project.

1.3 Interacting with Case Studies and Monitoring Progress

As Case Study Coordinators, we have established effective communication channels and monitoring mechanisms to ensure the progress of the Case Studies. We have implemented a comprehensive plan to interact with and monitor our Case Studies (CSs) to facilitate their progress and address any challenges they encounter.

To achieve this, we hold regular monthly meetings, which take place on the first Monday of each month. The meetings are split into two groups to ensure focus and productivity. Group 1 consists of CSs in the egg, fish, and meat sectors, while Group 2 comprises CSs in the fruit, vegetable, and cereal sectors. Each sector meeting lasts for 1.5 hours, allowing for updates, challenges, and relevant issues to be discussed within the respective sectors.

To encourage interaction between different CSs, we are planning to introduce breakout room sessions during these meetings. These sessions enable the CSs to discuss progress, challenges, and ideas within smaller groups, promoting collaboration and knowledge exchange. After the breakout sessions, there will be a plenary session to share experiences and insights from all groups, further enhancing communication and learning. In addition to the sector meetings, we hold quarterly general meetings involving all CSs.

These gatherings provide a platform for comprehensive updates from coordinators, WP participants, and CSs, and foster discussions among CS partners across the sectors. Our meetings serve as a crucial part of our monitoring plan. By having regular interactions and updates, we can monitor the progress of individual CSs and identify any areas requiring additional support or intervention.

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We are committed to maintaining open lines of communication with our CS partners. When CSs require personalized attention or encounter significant challenges, we are available for one-on-one meetings upon request or when we notice a need for a more individualized approach.

Furthermore, during the project, there will be two updates of the Case Study Plans (Case Study Plan 2, Case Study Plan 3), providing us with an opportunity to stay on track with the progress occurring within each of the CS.

Our aim is to foster collaboration, facilitate knowledge sharing, and closely monitor the progress of our Case Studies to ensure their success.

2 CASE STUDIES IN GENERAL

In BREADCRUMB we investigate five distinct food commodities: cereals, fruit & vegetables, fish, meat, and eggs (Figure 1) This exploration is conducted through 16 diverse case studies, each serving specific purposes :

- **Informing on marketing standards**: BREADCRUMB aims to provide comprehensive information on both private and Member State marketing standards associated with the identified food commodities.
- **Estimating FW impact:** The project seeks to estimate the extent of food waste (FW) caused by these marketing standards, contributing valuable insights into the associated wastage.
- **Analysing trade-offs:** BREADCRUMB endeavours to shed light on the trade-offs between FW reduction and other objectives linked to marketing standards, offering a nuanced perspective on the challenges and benefits.
- **Supporting model development and validation**: The case studies play a crucial role in supporting the development of agent-based and economic models. Additionally, they contribute to the validation of these models by providing real-world data and scenarios.
- **Co-creating recommendations**: BREADCRUMB actively engages in a collaborative process to co-create recommendations. These recommendations are geared towards preventing FW attributable to marketing standards and promoting increased market access for suboptimal foods.

Through this multi-faceted approach, BREADCRUMB aims to generate an understanding of the complexities surrounding food marketing standards across these five commodities. The project strives not only to uncover challenges but also to collaboratively devise effective solutions for reducing FW and enhancing market access in the context of diverse food products.

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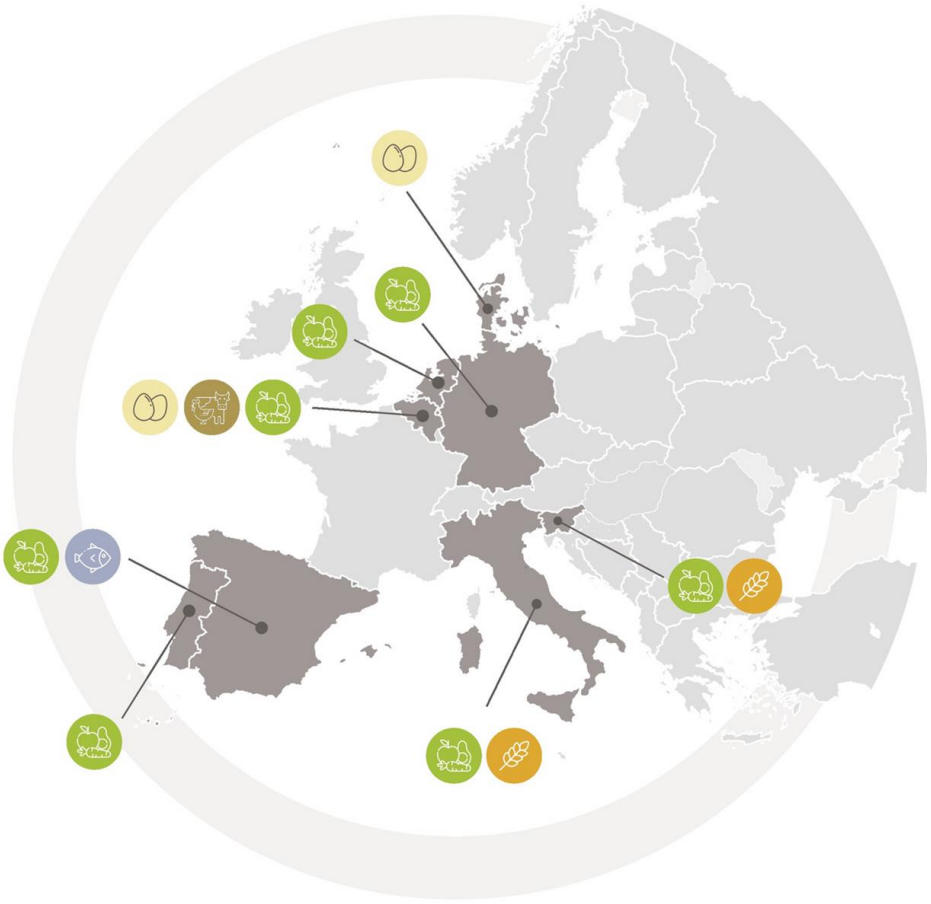

Figure 1. Geographical representation of the five food commodities

Table 1 provides an overview of the different case studies and their assigned codes.

Table 1: Overview of cases with their codes

Food commodity	Name and country	Code
Cereals	Natura Nuova – Italy	C.CS1.NN-IT
	Vila Natura – Slovenia	C.CS2.VN-SI
Eggs	LANDBURG AND FODEVARER – Denmark	E.CS1.LF-DK
	AVEC – Europe	E.CS2.Ave-BE_EU
Fish	OPPPB – Spain	F.CS1.Opp-ES
Fruit & Vegetables	Natura Nuova – Italy	F&V.CS1.NN-IT
	MC-MCH - Portugal	F&V.CS2.MC-PT
	Zelena Tocka – Slovenia	F&V.CS3.ZT-SI
	Mensana – Slovenia	F&V.CS4.Men-SI
	Lehman Natur- Germany	F&V.CS5.LN-DE
	Anecoop – Spain	F&V.CS6.Ane-ES
	ILVO – Belgium	F&V.CS7.ILVO-BE

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	ILVO – the Netherlands	F&V.CS8.ILVO.BE_NL
Meat	Fenevian - Belgium	M.CS1.Fen-BE
	Avec - Europe	M.CS2.AVE-BE_EU
	FEBEV - Belgium	M.CS3.Feb-BE

Table 2 provides and an overview of the 16 case studies, encompassing key information such as name, website, location, primary contacts, rationale of the CS and stage of the supply chain. This overview serves as a valuable tool for efficient communication and contextual understanding amongst the project partners.

Table 2: Case studies ID for Cereal, Fruit, Vegetable, Fish, Eggs, and Meat Sectors

Cereals	
C.CS1.NN-IT	
Case study information	Name: NATURA NOUVA Website: Home - Natura Nuova (natura-nuova.com) Location: Italy
Logo	
Primary contact	Simone Prospero (**E-mail**: simone.prospero2@unibo.it)
Rationale of the case study	The choice of products included in the product mapping is due to their fresh nature compared to other cereal-based products produced by NN. The short shelf life of these products (3 weeks to 1 month) poses a problem in meeting retailers' demands for the remaining shelf life of the product when delivered to the supermarket. These standards oblige NN to deliver the product almost immediately after production; batches that have a residual shelf life that allows them to be sold in full, but do not meet the retailer's standard, are often rejected. This translates into important economic impacts for the company, and in cases where products cannot be donated to social canteens, also into environmental impacts.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing Retail & other distribution (wholesale)
C.CS2.VN-SI	
Case study information	Name: VILA NATURA Website: Vila Natura - Bio dobrote iz prleške ravnice (vila-natura.si) Location: Slovenia

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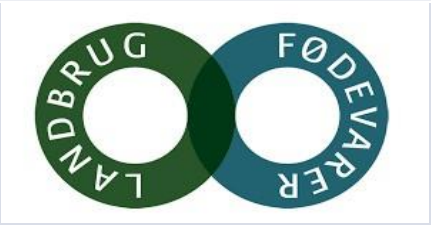
Logo	
Primary contact	Marko Slavic (**E-mail**: marko@vila-natura.si) Sasa Straus (**E-mail**: sasa.straus@itc-cluster.com)
Rationale of the case study	Quantities do not contribute significantly to the economic losses, but as we are also farmers, we do not like to see the product go to waste, so we want to reduce FW as much as it is possible.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing
Eggs	
E.CS1.LF-DK	
Case study information	Name: LANDBURG AND FODEVARER Website: Landbrug & Fødevarer (lf.dk) Location : Denmark
Primary contact	Jørgen Nyberg LARSEN (**E-mail**: jnl@lk.dk)
Logo	
Rationale of the case study	L&F is part of the case study for egg. We provide insight and data on the marketing standards used in the egg sector in Europe (EU). We would like to analyse food waste to document that the waste due to handling of this edible product along the chain and due to the EU marketing standards is as low as we think, as well as to propose alternatives to reduce the food waste and put a higher value to the products in question by increasing valorizatio. potential of the rejected products due to FMS. We have chosen to focus within the supply chain on the stage from the barn to the egg packing station / egg product factory.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing

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E.CS2.Ave-BE_EU	
Case study information	Name: AVEC Website: Association of Poultry Processors and Poultry Trade in the EU countries (avec-poultry.eu) Location: Belgium
Logo	
Primary contact	Nadia Khaldoune (**E-mail**: nk@avec-poultry.eu)
Rationale of the case study	Will be updated in Case study Plan 2
Stage(s) of the value chain where food waste occurs	Will be updated in Case study Plan 2
Fish	
F.CS1.Opp-ES	
Case study information	Name: OPPPB Website : https://opeixblau.com/ Location: Spain
Logo	
Primary contact	Marta Felip (**E-mail**: oppeixblau@gmail.com)
Rationale of the case study	The case study chosen was fish, mainly oily fish but including also lean fish. The scope of this case study is along the whole supply chain but especially on primary production because key food marketing standards affect this stage, and all the stages involved in the fish value chain can be found purchasing at this level through short food supply chain. Fish FMS create FL and FW in primary production stages, especially for edible but not commercial species. Despite the low ratio of FLW in fish compared to other food products the interest in this case study is motivated by the huge economic and nutritional impact of fish losses and waste.

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	The main idea is to reduce all the avoidable FLW in this stage and to better understand the elasticity and main factors affecting fish FMS in order to be able to manage the market expectations. Also, the disposal of these fish residues is complicated. If they are returned to the sea, they can cause an increase in available biomass, affecting the equilibrium of the ecosystem. Nevertheless, the main problem with FLW disposal is the loss of high nutritional value for human consumption, as well as other potential uses such as pharmaceutical or the feed industry. Nowadays we are in a scenario where feeding the world is becoming more complex, especially when it comes to animal food products and high-quality nutrients such as unsaturated fatty acids and proteins. Avoiding FLW and increasing the efficiency of the fish value chain need to be addressed.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing
Fruit and vegetables	
F&V.CS1.NN-IT	
Case study information	Name: NATURA NUOVA Website: Home - Natura Nuova (natura-nuova.com) Location: Italy
Logo	
Primary contact	Simone Prospero (**E-mail:** simone.prospero2@unibo.it)
Rationale of the case study	The choice of products included in the product mapping is due to the availability of data already held by the company and the ease with which other data can be collected through interviews, focus groups and other methods. Furthermore, the products were selected because they are those that mainly derive from short supply chains and thus NN can easily get in touch with primary producers and distributors. The FW that occurs for these products generates economic losses and environmental impacts common to all other fruit purees regardless of taste, so we believe that they can be taken as an example and then expand the results to other products as well.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing Retail & other distribution (wholesale)
F&V.CS2.MC-PT	

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Case study information	Name: MC – MCH Website: MC | Food Retail Market Leader in Portugal - MC (sonae.pt) Location: Portugal
Logo	
Primary contact	Rita Silva (**E-mail**: ribsilva@mc.pt)
Rationale of the case study	There is significant food waste occurring along the food value chain what has an impact on the environmental, economic and social aspects. The rationale used to determine the fruit and vegetables for CS were based on following criteria: • Products highly affected by food marketing standards, • Products with relevant food waste, • Ability to gather data from as many stages of the food value chain as possible. • Economic relevance in MC/MCH. 1. Tomatoes - Significant food waste in the primary production due to handling and sensitivity. 2. Carrots - Food waste highly associated with private marketing standards (shape, cracks, calibre); 3. Citrus fruit (orange) - Tight private marketing standards and production highly affected by climate change (drought), leading to a decrease in the availability of this fruit in Portugal; 4. Lettuce - Very susceptible to food waste creation in retail due to high perishability; 5. Bananas - Fruit that is not much regulated by public food marketing standards but highly regulated by private food marketing standards. Fruit with high economic potential. 6. Red fruit - High food waste creation in primary production and retail due to the need for very careful handling and very perishable fruit with short shelf life.
Stage(s) of the value chain where food waste occurs	Primary production Retail & other distribution (wholesale) Restaurants & food services Household / Consumers
F&V.CS3.ZT-SI	
Case study information	Name: ZELENA TOCKA Website: Location: Slovenia
Logo	

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Primary contact	Aleksandra Kocet (**E-mail**: aleksandra.kocet@zelena-tocka.si) Sasa Straus (**Email**: sasa.straus@itc-cluster.com)
Rationale of the case study	In the product mapping we include the products that are the most perishable and are usually rejected by consumers because of over-ripeness. The products don't contribute significantly to economic losses. But we want to contribute to surplus valorisation and to lower FW. We include thus those products that are the most perishable and are usually rejected. As we increase cooperation with the farmers, the important factors for FW are marketing standards related to cosmetic requirements on our entry point. As we want farmers to reduce food loss waste FLW, we would like to increase awareness on this point, especially for the consumer. "Ugly food" contributes largely to economic loss and also to the volume of food waste.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing Retail & other distribution (wholesale) Restaurants & food services
F&V.CS4.Men-SI	
Case study information	Name: MENSANA Website: https://www.mensana.net/restavracija-kafeterija Location: Slovenia
Logo	
Primary contact	Sanja Zelko (**E-mail**: sanja@korenika.si) Sasa Straus (**Email**: sasa.straus@itc-cluster.com)
Rationale of the case study	In our restaurant/food services, we have chosen to focus our CS on fruits and vegetables that we procure and require in the largest quantities for the preparation of composite meals. This decision was driven by several key factors. • These products significantly contribute to economic losses within the supply chain. By concentrating on the most-used items: • These products significantly contribute to economic losses within the supply chain. By concentrating on the most-used items: 1. Green lettuce 2. Tomatoes 3. Potatoes 4. Apples We aim to tackle the areas where interventions can have the most substantial economic impact. • These items represent the most significant contribution to our food loss and waste (FLW) volumes. Given their high usage, the waste generated is proportionately larger, thus prioritizing them allows us to address the bulk of our FLW and create more impactful waste reduction strategies.

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	• Problematic disposal is a concern. These commonly used products, when wasted, pose challenges in terms of disposal, which can lead to severe environmental problems due to their volume and biodegradability factors. We have categorized our fruits and vegetables into individual groups. We have separated green lettuce, tomatoes, and potatoes as they are used in the highest volumes, resulting in the greatest amount of food waste. All other vegetables fall under a general category of 'other vegetables.' For fruits, apples have been singled out due to their high procurement volume, with all other fruits being grouped under 'other fruits.' Due to their substantial contribution to food waste, we will address these isolated products – green lettuce, tomatoes, potatoes, and apples – individually in our waste reduction efforts. Problematic disposal is a concern. These commonly used products, when wasted, pose challenges in terms of disposal, which can lead to severe environmental problems due to their volume and biodegradability factors. We have categorized our fruits and vegetables into individual groups. We have separated green lettuce, tomatoes, and potatoes as they are used in the highest volumes, resulting in the greatest amount of food waste. All other vegetables fall under a general category of 'other vegetables.' For fruits, apples have been singled out due to their high procurement volume, with all other fruits being grouped under 'other fruits.' Due to their substantial contribution to food waste, we will address these isolated products – green lettuce, tomatoes, potatoes, and apples – individually in our waste reduction efforts.
Stage(s) of the value chain where food waste occurs	Restaurants & food se
F&V.CS5.LN-DE	
Case study information	Name: LEHMANN NATUR Website: https://www.lehmann-natur.com/en/ Location: Germany
Logo	lehmann natur ORGANIC PRODUCER
Primary contact	Julian Heusler (**E-mail**: jhr@lehman-natur.com) Marc Stracke (**Email:** mse@lehmann-natur.com)
Rationale of the case study	1. Limes • Most of the limes purchased by LN are cultivated on small farms in Columbia. If the farmers can only sell the limes with a special size and special colour, the income is not sufficient to survive. It is necessary to find alternative marketing channels for small limes which are out of the standard costumer specification. The local (public) market is not sufficient.

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- Most significant contribution to food loss and waste (FLW) volumes: Are the chosen product(s) responsible for a substantial portion of FLW volumes?
- The FLW rate at LN warehouse is 2,04 %. In addition, the limes which were not exported are directly wasted in Columbia.
- Problematic environmentally severe disposal. But “only” used for energy recovery, so at lower level of the “food use hierarchy”.

2. Lemons

- Main FLW is contributed by green lemons and small lemons. German supermarkets normally purchase yellow limes in their shops and avoid selling green limes. Green lemons are treated with ethylen to achieve the yellow coloring. This is cost and energy intensive. Selling green lemons would be of higher value. Lemons are an important product throughout the year.
- Problematic environmentally severe disposal. But “only” used for energy recovery, so at lower level of the “food use hierarchy”.

3. Tomatoes

- Tomatoes of small size are sorted out directly on the farms. Furthermore, pre-packed “Rispentomaten/stem tomatoes” must be sorted out, if the tomatoes are not fixed at the stem. It is costly to separate the tomatoes from paper and plastic. There are no marketing channels for small tomatoes.
- Tomatoes are an important product throughout the year. FLW at LN 3,09%.
- Problematic disposal: Separation of tray, plastic foil and tomatoes e.g. for disposal is costly.

4. Peppers

- There are no marketing channels for small sized peppers, only local markets.
- Most significant contribution to food loss and waste (FLW) volumes: peppers are also an important and main product for customers throughout the year.
- Problematic disposal: Separation of plastic foil and peppers e.g. for disposal is costly.

5. Cucumbers

- Contribution to economic losses: Marketing standards for cucumber are strict. The potential to sell short or crooked cucumbers is low. Most of the ugly cucumbers are directly sorted out in the greenhouses. In addition, the rejection rate of light yellow and weak cucumbers is high.
- Most significant contribution to food loss and waste (FLW) volumes: cucumbers are an important product throughout the year. FLW at this stage at LN is about 4,05 %.

Problematic disposal: No big problems. Most of the cucumbers LN sells are packed loose. Only in the summer months, LN purchases the cucumbers with plastic foil. The disposal is costly because LN must separate cucumber and plastic.

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Stage(s) of the value chain where food waste occurs	Primary Production Retail & other distribution (wholesale)
F&V.CS6.Ane-ES	
Case study information	Name: ANECOOP Website: Anecoop, la primera empresa hortofrutícola del mediterráneo Location: Spain
Logo	
Primary contact	Maria Miranda (**E-mai**l: mmiranda@anecoop.com)
Rationale of the case study	In our CS We have chosen following fruits: 1. Clementines, 2. Mandarins 3. Orange) and 4. Kaki/Persimmon These products are very important for our organization and have important economic losses due to FW. In addition, in regard to these commodities, we are able to obtain a lot of data about quality marketing standards and their relationship with food waste.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing Retail & other distribution (wholesale)
F&V.CS7.ILVO-BE	
Case study information	Name: ILVO Website: https://ilvo.vlaanderen.be/nl/ Location: Belgium
Logo	ILVO Flanders Research Institute for Agriculture, Fisheries and Food
Primary contact	Rani Van Gompel (E-mail: Rani.VanGompel@ilvo.vlaanderen.be)
Rationale of the case study	The F&V.CS7-BE was conceived to supplement the other F&V case studies, especially on soft fruits in the Breadcrumb project. In addition to the economic potential of the soft fruits (red, rasp, and blueberries) in Belgium, and their contribution to food loss and waste generation, the

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	supplementary nature of this case study is centered mainly on the provision of more data on soft fruits in Belgium. More so, the stages in the supply chain (primary production, processing and manufacturing, and retail and distribution) targeted are such that, the data collected will fill the void of expected data from other F&V case studies in other member states countries.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing Retail & other distribution (wholesale)
F&V.CS8.ILVO.BE_NL	
Case study information	Name: ILVO Location: Netherlands
Logo	ILVO Flanders Research Institute for Agriculture, Fisheries and Food
Primary contact	Rani Van Gompel (**E-mail**: Rani.VanGompel@ilvo.vlaanderen.be)
Rationale of the case study	The F&V.CS8-BE_NE was conceived to supplement the other F&V case studies, especially on vegetables in the Breadcrumb project. Considering the importance and relevance for creation of FW of the particular vegetables we have decided to work with: 1. Tomatoes, 2. Bell Pepers 3. Lettuce In addition to the economic potential of the above-listed vegetables in the Netherlands, and their contribution to food loss and waste generation, the supplementary nature of this case study is centered mainly on the provision of more data on vegetables in the Netherlands. More so, the stages in the supply chain (primary production, processing and manufacturing, and retail and distribution) targeted are such that, the data collected will fill the void of expected data from other F&V case studies in other member states countries.
Stage(s) of the value chain where food waste occurs	Primary production Processing & Manufacturing Retail & other distribution (wholesale)
Meat	
M.CS1.Fen-BE	

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Case study information	Name: FENAVIAN Website: Fenavian | Nationale federatie van vleeswarenmakers, Fédération Nationale des Fabricants de Produits de Viandes Location: Belgium
Logo	
Primary contact	Anneleen Vandewynckel (**E-mail**: av@fenavian.be)
Rationale of the case study	The case study of Fenavian is about processed meat, of all kinds of species: as well as beef, pork, and poultry. We process meat for the Belgian market, but also for quite a lot of other European countries. Our members are working with an incredible number of marketing standards. We will first give a thorough overview of the multitude of marketing schemes with which our companies are confronted, these are mostly private schemes. We will clearly categorize all the existing standards and describe the difficulties they cause. Key problems are that these marketing schemes are not sustainable, cause more food waste, and consequently a lot more problems on various aspects for our companies, such as economic losses. In terms of economic losses, the cost is high. We are talking about financial losses, but also production capacity loss, increase of inefficiency (waste of energy, water, raw material, waste generation, etc.) and loss of human resources to name a few. We will try to come up with figures in tons and euros. There is absolutely no added value in terms of quality or food safety. We will map what happens with the food "waste", by focusing on our main products in different processing categories: chicken filet (our main product in volume in the poultry category), cooked ham (main product in the cooked products/pork), salami (fermented) and bacon (dried/smoked/baked).
Stage(s) of the value chain where food waste occurs	Processing & Manufacturing Retail & other distribution (wholesale)
M.CS2.AVE-BE_EU	
Case study information	**Name**: AVEC **Website:** Association of Poultry Processors and Poultry Trade in the EU countries (avec-poultry.eu) **Location:** Belgium
Logo	
Primary contact	Nadia Khaldoune (**E-mail**: nk@avec-poultry.eu)

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Rationale of the case study	AVEC is part of the case study for meat (poultry). We provide insight into and data on the marketing standards used in the poultry sector in Europe (EU/national/private schemes). We would like to analyse the impact of the downgraded products from a food waste point of view because they do not fulfil the standards or market access requirements, as well as proposed alternatives to reduce the food waste and valorise the products in question. We have chosen to focus on 3 products: 1. Whole chicken 2. Breast fillet 3. Legs Those products are the most representative of the poultry sector and the products the most sold and consumed in Europe. The breast fillet is the cut with the highest value and will therefore trigger the highest losses from an economic point of view.
Stage(s) of the value chain where food waste occurs	Processing & Manufacturing
M.CS3.Feb-BE	
Case study information	**Name**: FEBEV **Website**: Febev **Location**: Belgium
Logo	
Primary contact	Michael Gore (E**-mail**: michael.gore@febev.be)
Rationale of the case study	FEBEV is part of the case study for meat (beef/pork). The purpose is to provide an overview of the main marketing standards used in the cattle industry in Belgium (national & private schemes). Cattle as part of quality standards can be downgraded because they don't fulfil specific criteria such as weight, colour, etc. Further in the manufacturing process there is also an interest in specific cuts leaving specific parts of the carcass unexploitable and therefore downgraded into standard production or low-grade manufacturing processes. Another question mark is the downgrading because of legal requirements such as category –3 and 2 materials because they are declared unfit for human or animal consumption. Our focus will be placed on three specific products, the carcass itself, the front and hind quarter, and prepacked products. The biggest downgrading we believe is in the initial part of the production process from farm to cutting plant.
Stage(s) of the value chain where food waste occurs	Processing & Manufacturing

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3 PRODUCT MAPPING

The Breadcrumb project features case studies focusing on five different commodity groups: cereal, eggs, fish, fruit & vegetables, and meat. A crucial part of the case studies' work is identifying the product portfolio by performing a product mapping exercise. This means correctly selecting the products of interest that are highly important for the sector (production, economic) and have environmental and economic impact in the case study context. In this context, it means choosing the products affected by FMS and contributing to increased FW creation. Product mapping information collected by each case study creates an opportunity for better collaboration between case studies that cover the same product but in different stages of the food value chain or country.

Each case study was asked to complete a product mapping document to gather information about their selected products. This document is divided into two sections: product information and impact assessment. In the first part of the document, general information regarding the products is provided, including the type of product, packaging, seasonality, the most common reasons for rejection by reception, rejection rate (subjective opinion of the CS partner), and data availability. The other part of the document focused on impact assessment based on each CS partner's own experiences and internally gathered data, where the case studies were asked to provide information on the type of product, estimate the percentage (%) of FLW based on their own experience (including all types of reasons, not only focusing on FMS), estimate the absolute amount of FLW (tons or kg) happening in their company, current disposal/valorisation route, and estimated environmental impact. These questions were asked to better understand the chosen products' relevance, which would lead to more effective actions during the case studies work. Furthermore, some of these questions will provide important insight into the relevance of marketing standards in creating FLW. Also, a comprehensive overview of the product mapping was prepared for each commodity group. The overview contains the graphical representation (Figure 2) of the stage of the food supply chain, geographical coverage, and name of the CS partner.

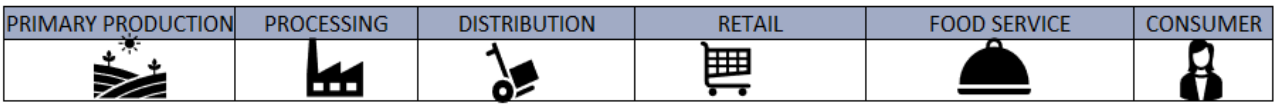

Figure 22. Stages of the Food Supply Chain used in product mapping

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Wheat	SLOVENIA		X	X	X
	VILA NATURA	VILA NATURA	X	X	X
Flakes	SLOVENIA		X	X	X
	VILA NATURA	VILA NATURA	X	X	X
Oat unshelled	SLOVENIA		X	X	X
	VILA NATURA	VILA NATURA	X	X	X
Organic cereals	SLOVENIA		X	X	X
	VILA NATURA	VILA NATURA	X	X	X
Processed cereals	SLOVENIA		X	X	X
	VILA NATURA	VILA NATURA	X	X	X
Seitan	X	ITALY			X
	X	NATURA NUOVA	NATURA NUOVA	NATURA NUOVA	X
Tofu	X	ITALY			X
	X	NATURA NUOVA	NATURA NUOVA	NATURA NUOVA	X
Tempeh	X	ITALY			X
	X	NATURA NUOVA	NATURA NUOVA	NATURA NUOVA	X

Figure 33. Product mapping of the produce chosen in the cereal commodity

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Eggs	DENMARK		X	X	X
	LF	LF	X	X	X

Figure 4. Product mapping of the produce chosen in the eggs commodity

Sardine	SPAIN		X	X	X
	OPPPB	OPPPB	X	X	X
Anchovy	SPAIN		X	X	X
	OPPPB	OPPPB	X	X	X

Figure 5. Product mapping of the produce chosen in the fish commodity

Apples	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X
Pears	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X
Nectarines	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X
Peaches	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X

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Bananas	PORTUGAL SLOVENIA	SLOVENIA		PORTUGAL SLOVENIA		PORTUGAL
	MC	X	X	MC	MC	MC
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X

Lemon	GERMANY	X	GERMANY	X	X	X
	LEHMANN NATUR	X	LEHMANN NATUR	X	X	X

Lime	GERMANY	X	GERMANY	X	X	PORTUGAL
	LEHMANN NATUR	X	LEHMANN NATUR	X	X	MC

Mandarins	SLOVENIA / SPAIN	SLOVENIA/SPAIN	SLOVENIA/SPAIN	SLOVENIA	SLOVENIA	
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	MENSANA	X
	ANNECOP	ANNECOP	ANNECOP	X	X	X

Orange	SPAIN/PORTUGAL	SPAIN		PORTUGAL		
	ANNECOP	ANNECOP	ANNECOP	X	X	X
	MC	X	X	MC	MC	MC

Clementins	SPAIN			X	X	X
	ANNECOP	ANNECOP	ANNECOP	X	X	X

Kaki	SPAIN				X	X
	ANNECOP	ANNECOP	ANNECOP	X	X	X

Red fruit	PORTUGAL / BELGIUM	BELGIUM		PORTUGAL / BELGIUM	PORTUGAL	
	MC	X	X	MC	MC	MC
	ILVO	ILVO	ILVO	ILVO	X	X

Appels / Pear/Peach/Plum Purres	ITALIE					X
	NATURA NUOVA	NATURA NUOVA	NATURA NUOVA	NATURA NUOVA	NATURA NUOVA	X

Figure 6. Product mapping of the produce chosen in the fruit commodity

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Broccoli	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	X

Cauliflower	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X

Carrots	SLOVENIA / PORTUGAL	X	SLOVENIA / PORTUGAL		SLOVENIA	PORTUGAL
	ZELENA TOCKA	X	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X
	MC	X	MC	MC	X	MC

Peppers	GERMANY/SLOVENIA/NL	SLOVENIA/NL	GERMANY /SLOVENIA/NL	SLOVENIA		X
	LEHMANN NATUR	X	LEHMANN NATUR	X	X	X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA / MENSANA	X
	ILVO	ILVO	ILVO	ILVO	X	X

Cucumbers	GERMANY	X	GERMANY	X	X	X
	LEHMANN NATUR	X	LEHMANN NATUR	X	X	X

Lettuce	PPORTUGAL/NL	NL	PORTUGAL/ NL		PORTUGAL/SLOVENIA	PORTUGAL
	MC	X	MC	MC	MC	MC
	X	X	X	X	MENSANA	X
	ILVO	ILVO	ILVO	ILVO	X	X

Tomatoes	SI / PT / GERMANY/NL	SLOVENIA/NL	SI / PT /GE /NL	SI / PT / NL	SLOVENIA/ PORTUGAL	PORTUGAL
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	MENSANA	X
	MC	X	MC	MC	MC	MC
	LEHMANN NATUR	X	LEHMANN NATUR	X	X	X
	ILVO	ILVO	ILVO	ILVO	X	X

Zucchini	SLOVENIA					X
	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA	ZELENA TOCKA /MENSANA	X

Potatoes/ Onion	X	X	X	X	SLOVENIA	X
	X	X	X	X	MENSANA	X

Figure 7. Product mapping of the produce chosen in the vegetable commodity

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Poultry meat	X	BELGIUM	X	X	X
All Chicken	X	AVEC	X	X	X
Breast filet	X	AVEC	X	X	X
Legs	X	AVEC	X	X	X

Bovien	X	BELGIUM	X	X	X
Carcass	X	FEBEV	X	X	X
Front/hind quarter	X	FEBEV	X	X	X
Prepacked beef	X	FEBEV	X	X	X

Meat Products	X	BELGIUM	BELGIUM	X	X
Chicken Filet	X	Fenavian	Fenavian	X	X
Cooked Ham	X	Fenavian	Fenavian	X	X
Salami	X	Fenavian	Fenavian	X	X
Bacon	X	Fenavian	Fenavian	X	X

Figure 8. Product mapping of the produce chosen in the meat commodity

Table 2 The table contains information regarding product details and impact assessments delivered by case studies. The data related to rejection levels, estimated %FLW (percentage of food loss and waste), estimates of absolute amounts of FLW, and environmental impacts are on a company level and based on their own experiences and internal data.

Table 2:Product Mapping for all Case Studies

Cereals					
C.CS1.NN-IT					
Product information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1. Tofu	Yes, plastic food tray surrounded by cardboard.	Year-round	Too short shelf life regarding the retailer requirements (private standards).	Medium	Partial
2. Tempeh	Yes, plastic food tray surrounded by cardboard.	Year-round	Too short shelf life regarding the retailer requirements (private standards).	Medium	Partial

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3. Seitan	Yes, plastic food tray surrounded by cardboard.	Year-round	Too short shelf life regarding the retailer requirements (private standards).	Medium	Partial
Impact assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1. Tofu	TBD - still need for correct calculations	1,1 t (packaging irregularities) 0,8 t (short shelf life)	Trashed, donation to social canteens.	Medium	
2.Tempeh	TBD - still need for correct calculations	0,5 t (packaging irregularities) 0,15 t (short shelf life	Trashed, donation to social canteens.	Medium	
3. Seitan	TBD - still need for correct calculations	1,5 t (packaging irregularities) 1,7 t (short shelf life)	Trashed, donation to social canteens.	Medium	
C.CS2.VN-SI					
Product information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1.Wheat	Yes	Year-round	Grain: Due to organic production, the grain can be smaller. The customer rejects it due to lack of knowledge about organic production.	Medium	Partial

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2. Flakes	Yes	Year-round	Small oat grains are slightly darker in colour after flaking. The client refuses it due to fear that it is a foreign body in the flakes. Additional cleaning of the flakes is necessary - we get a second class of flakes which we use for flour or animal feed.	Low	Partial
3. Oat - unshelled	Yes	Year-round	Due to the darker colour of the grain, which is the result of the weather conditions before the harvest, the customer has doubts about contamination with mycotoxins. There are complaints and rejections.	Partial	Partial
4.All organic cereals and processed cereals	Yes	Year-round	Due to the retailers requirements for longer period of use from processing – 10 to 12 months contamination with storage pests occurs, especially in the summer months on store shelves. There are rejections from both customers and stores. Although the raw material is still adequate in terms of quality.	Medium	Partial

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5.All organic cereals and processed cereals			After harvest, all grains are cleaned of weeds and residues, and calibrated to the appropriate size specific to each grain or seed. In the cleaning process, small grains remain, which are not suitable for further processing for pre-packaged organic products. Due to the partially underdeveloped market for organic animal feed, this part of the grain is thrown away.	Medium	Partial
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption, ect.)*	**Estimated Environmental impact?**	**Remarks**
1.Wheat	0.005 %	500 kg yearly	In case of rejection, we offer or use for animal feed.	Medium	
2.Flakes	0.005 %	1000 kg yearly	In case of rejection, we offer or use for animal feed.	Medium	
3.Oat - unshelled	0.05-%	100 kg yearly	In case of rejection, we offer or use for animal feed.	Medium	
4.All organic cereals and processed cereals	0.05-%	1500 kg yearly	In case of rejection, we offer or use for animal feed.	Medium	
5.All organic cereals and processed cereals	1.5-%	15000 kg yearly	Bio-waste	Medium	
Eggs					

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E.CS1.LF- DK					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1. Eggs	Yes	Year- round	Table eggs can be 'discarded' because of big cracks, dirty eggs, too small or too big. Normally a big part of those discarded eggs will go to the egg product factories to be processed into a range of products for human consumption. The egg product factories also use a huge number of 'normal' eggs.	Low	Partial
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1. Eggs	TBD	TBD	Pet food	Low	
Fish					
F.CS1.Opp-ES					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**

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1. Sardine	Yes, in wooden or plastic boxes.	Year-round: Except for months of biological stoppage imposed by the Ministry of State they usually are two or three months at the end or beginning of the year.	Large quantity of available fish.	Low	Comprehensive
2.Anchovy	Yes, in wooden or plastic boxes.	Year-round: Except for months of biological stoppage imposed by the Ministry of State they usually are two or three months at the end or beginning of the year.	Large quantity of fish offered (more than permitted).		
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1.Sardine	5 %		It's either thrown away or sold at a very low price. Attempts have been made to donate it to hospitals, schools, or similar institutions, but it hasn't been successful because those places operate with forecasts made days in advance, which	Low	

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			disrupts their organizational plans.		
2. Anchovy	10 %				
Fruit and Vegetables					
F&V.CS1.NN-IT					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1. Apple puree **2.Pear puree** **3.Plum puree**	Yes. It can be a pouch (doypack) or an aluminium tray (100% recyclable) depending on retailers' requirements.	Year-round. Natura Nuova receives the fruit during the ripening season and stores it in cold storage. Later, when necessary, the fruit is processed into puree throughout the year. Thus, the company works with seasonal raw material, but thanks to the storage and processing methods it is able to treat the fruit as raw material all year round.	Packaging irregularities, and shelf-life requirements.	Medium	Partial
Impact Assessment					

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Type of Product	Estimated % FLW	Estimate Absolute amount of FLW (tons or kg)	Current Disposal/valorization route? *(e.g. Energy, feed, re-use for consumption)*	Estimated Environmental impact?	Remarks
1. Apple puree **2. Pear puree** **3.Plum puree**	TBD	The three products together generate a total waste of 6.4 t due to marketing standards for packaging irregularities and 5 t for shelf life ones. Data for each product will be provided	Trashed Donated to social canteens	Medium	
F&V.CS2.MC-PT					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1.Tomatoes	No	Year- round	• Abnormal external humidity; • Cracks; • Dehydration; • Softness; • Shape defects; • Non-compliant; • Colouring (too green).	Medium	Comprehensive
2.Carrots	No	Year- round	• Dehydration; • Soft and bendable; • Cold damage ; • Cracks; • Shape defects.	High	Comprehensive
3.Lettuce	No	Year- round	• Foot oxidation; • Leaves with browned tips; • Leaf defects.	Medium	Comprehensive

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4.Bananas	No	Year- round	• Colour ; • Over-ripeness; • Epidermal defects (scars); • Cold damage; • Bruising.	High	Partial
5.Red Berries	Yes	Seasonal	• Scars; • Deformation; • Discolouration; • Over-ripeness; • White spot > 1/10 of the total surface area.	Medium	Comprehensive
6.Citrus Fruit (Oranges)	No	Year- round	• Colour not compliant; • Peel thickness not compliant; • Green colour on more than 1/5 surface; • Shape defect.	High	Comprehensive
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**

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1.Tomatoes	~ 20%	~ 22 451 kg	**1) Zero waste range:** About 40% of fruit and vegetable production in the field is wasted. To combat this problem in its shops, Continente has launched the Zero Waste range, made up of fruit and vegetables that would otherwise be wasted in the field and which Continente is giving a new chance. Products with small imperfections that in no way detract from their quality or flavour. By buying these items you are helping to reduce food waste. **2) Donating surplus food:** Continente shops have been reusing and redistributing food for 27 years. -To charitable organisations and animal welfare associations. -With employees in the social areas of the shops and warehouses. To date, more than 29.8 million euros in surpluses have been donated. **3) Pink labels:** For more than 10 years, these labels have been communicating a price reduction in Continente shops for products approaching their sell-by date. This system avoids wastage and at the same time offers	High	

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			economic benefits to the customer. **4) Zer0% Waste boxes:** With the aim of helping to reduce food waste, various projects have been set up that work from the production process to the final consumption of products, to the creation of circular economy products, which made it possible to avoid more than 54M€ of waste in 2022. In 2022, all Continente, had Zer0% Waste boxes in place, preventing fruit and vegetables from being wasted. These boxes contain a range of fruits and vegetables with imperfections at a reduced price.		
2.Carrots	~ 2,1%	~ 37 702 kg	**1) Donating surplus food** (as describe above) **2) Pink labels** (as described above) **3) Zer0% Waste boxes** (as described above)	Medium	
3.Lettuce	~ 7,2%	~ 387 362 kg	**1) Donating surplus food** (as described above) **2) Pink labels** (as described above) **3) Zer0% Waste boxes** (as described above)	Medium	

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4.Bananas	~ 22 %	~ 1 538 112 kg	**1) Donating surplus food** (as described above) **2) Pink labels** (as described above) **3) Zer0% Waste boxes** (as described above) **4) Jams and chutneys:** In order to avoid wasting tonnes of surplus food, Continente has created jams & chutneys, made from end-of-life fruit and vegetables. These exclusive Continente products are distinctive not only because of the principles of Circular Economy and sustainability on which their process is based, but also because they are the first of their kind to be launched by a retail chain. **5) Panana:** Panana is a cake made from surplus bananas that no longer have commercial value because they are too ripe. Panana has a moist texture and a sweet, characteristic banana flavour, making it an excellent choice for snacking. This product makes it possible to rescue more than 80,000 bananas every year that would otherwise go to waste, giving the surplus fruit a new destination. **6) Single Bananas**	High	

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			Loose bananas are one of the items with the highest percentage of waste in our shops. One of the main reasons is that consumers break the bunches and leave loose bananas, which therefore become less appealing to buy. But we still find "single" bananas attractive! To reverse this situation and sensitise consumers to the fight against food waste, we are offering these loose bananas in a single basket.		
5. Red Berries (strawberries, blueberries, raspberries, blackberries)	~ 10,5 %	~ 16 512 kg	**1) Donating surplus food** (as described above) **2) Pink labels** (as described above) **3) Zer0% Waste boxes** (as described above) **4) Jams and chutneys** (as described above) **5) Balsamic vinegar** made from strawberries and raspberries **6) Fruit juices** made from red berries	High	
6.Oranges	~ 4,1 %	~ 209 597 kg	**1) Donating surplus food** (as described above) **2) Pink labels** (as described above) **3) Zer0% Waste boxes** (as described above) **4) Jams and chutneys** (as described above)	Medium	

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F&V.CS3.ZT-SI					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1.Flower vegetables (broccoli, cauliflower)	No	Year-round	Over-ripeness	Medium	Comprehensive
2.Fruit vegetables (especially tomato, pepper and zucchini)	No	Year-round	• Over-ripeness; • III category.		
3.Root vegetables (carrot)	No	Year-round	Softness	Low	Comprehensive
4.Apples	No	Year-round	• Over-ripeness; • III category.	Medium	Comprehensive
5.Pears	No	Year-round	Over-ripeness		
6.Nectarines, Peaches	No	Year-round	Over-ripeness	High	Comprehensive
7.Bananas	No	Year-round	Over-ripeness	High	Comprehensive
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorization route? (eg. Energy, feed, re-use for consumption)**	**Estimated Environmental impact?**	**Remarks**
1.Flower vegetables (broccoli, cauliflower)	<1	20	None	Low	
2. Fruit vegetables (especially tomato, pepper and zucchini)	<1	440	Partially valorisation new product	High/Medium	

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3.Root vegetables (carrot)	<1	10	Partially valorisation new product	Low	
4.Apples	<1	200	Partially valorisation new product	Low	
5.Pears	<1	100	Partially valorisation new product	Low	
6.Nectarines, Peaches	<1	60	Partially valorisation new product	Low	
7.Bananas	<1	280	Partially valorisation new product	Low	
F&V.CS4.Men-SI					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1.Lettuce	In the restaurant no packaging; for delivery plastic packaging	Year-round	• Freshness; • Cleanliness; • Variety of vegetables.	Low	Partial
2.Tomato	In the restaurant no packaging; for delivery plastic packaging	Year-round	• Taste; • Freshness; • Colour.	Low	Partial
3.Potato	In the restaurant no packaging; for delivery plastic packaging	Year-round	Variety of vegetables	Low	Partial
4.Other vegetables (carrot,	In the restaurant no packaging; for delivery	Year-round	• Texture; • Taste; • Colour; • Quality.	Low	Partial

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peppers, onion, zuccini)	plastic packaging				
5.Apples	In the restaurant no packaging; for delivery plastic packaging	Year-round	• Variety of vegetables; • Quality; • Size; • Texture; • Taste; • Colour.	Low	Partial
6.Other fruits (bananas, mandarins, nectarines, pears, peaches)	In the restaurant no packaging; for delivery plastic packaging	Year-round	• Quality; • Size; • Texture; • Taste; • Colour.	Low	Partial
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route? (*eg. Energy, feed, re-use for consumption*)**	**Estimated Environmental impact?**	**Remarks**
1.Lettuce	15%	15 kg per week	Disposal	Medium	
2.Tomato	5%	2,5 kg per week	Disposal	Low	
3.Potato	10%	50 kg per week	Disposal	Medium	
4.Other vegetables (carrot, peppers, onion, zuccini)	15%	67,5 kg per week	Partly re-use for other products (making vegetable spices, for re-use in other food products), partly disposal.	Low	Mostly re-use
5.Apples	3%	1,80 kg per week	Party re-use for compote, desserts, partly disposal.	Low	Mostly re-use

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6.Other fruits (bananas, mandarines, nectarines, pears, peaches)	0,25%	1,75 kg per week	Party re-use for desserts, partly disposal.	Low	Mostly re-use
F&V.CS5.LN-DE					
Product information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1. Limes	Yes. In nets to 500g or loose, trays packed with 4 limes.	Year-round Origin is Columbia, availability throughout the year. Furthermore Spain and Brasil.	• Size; • Colour; • Brown spots.	Medium	Comprehensive
2. Lemons	Yes. In nets to 500g or loose.	Year-round Origins are Spain, Italy and Dom. Rep. Furthermore Columbia, Peru, South Africa	• Size; • Colour; • Brown spots; • Sour rot (fungi); • Mold	Medium	Comprehensive
3.Tomatoes	Yes. In 500 g paper trays with plastic foil, loose.	Year-round Main origins: Netherlands, Spain and Italy Furthermore Marocco, France.	• Size • Colour • “tomatoes on stem”	Medium	Partial
4.Peppers	Yes. 500g plastic bag or loose	Year-round Main origin is Netherlands, Spain and Israel. Furthermore Marocco, France.	• Size	Medium	Partial

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5. Cucumbers	Yes. Loose	Year- round Main origins Netherland, Spain. Furthermore Bulgaria, Greece.	• Colour; • Weakness Blossom; • Rot; • Mold.	High in summer	Partial
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1. Limes	2,04%	40.000 kg	• Energy • Feed	High	Container transport via sea.
2. Lemons	1,64%	30.500 kg	• Energy • Feed	High	Container transport via sea.
3. Tomatoes	3,09%	90.700 kg	• Energy • Feed	Medium	
4. Peppers	3,37%	83.000 kg	• Energy • Feed		
5. Cucumber	4,05%	90.800 kg	• Energy • Feed		
F&V.CS6.Ane-ES					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1. Orange	Yes	Seasonal	• Decay/rot; • Rind blemish /breakdown; • Softness; • Rind blemish (wind scratches, trip, etc.) • Green colour	High	Comprehensive

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2.Clementines	Yes	Seasonal	• Decay/rot; • Rind blemish /breakdown; • Softness; • Rind blemish (wind scratches, trip, etc.) • Green colour	High	Comprehensive
3.Mandarin (satsumas and hybrids)	Yes	Seasonal	• Decay/rot; • Rind blemish /breakdown; • Softness; • Rind blemish (wind scratches, trip, etc.) • Green colour	High	Comprehensive
4.Kaki (Persimmon)	Yes	Seasonal	• Softness • Rind blemish (wind scratches, trip, etc) • Flesh browning • Green colour	High	Comprehensive
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorization route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1.Orange **2.Clementines** **3.Mandarin (satsumas and hybrids)**	20%	60.000.000 kg	Juice	High	
4.Kaki (Persimmon)	30%	40.000.000 kg	A very little quantity of juice and animal food		
Meat					
M.CS1.Fen-BE					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**

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1. Chicken Filet	Yes. Packaging B2B and B2C.	Year-round	• Cut/slicing losses: bad slices, different colours of slice; • Texture; • Meat quality; • Meat defaults; • Production faults.	The rejection rate is depending on the reason.	Comprehensive
2. Cooked Ham	Yes. Packaging B2B and B2C.	Year-round	• Cut/slicing losses: bad slices, different colours of slice; • Texture; • Meat quality; • Meat defaults; • Production faults.	The rejection rate is depending on the reason.	Comprehensive
3. Salami	Yes. Packaging B2B and B2C.	Year-round	• Cut/slicing losses: bad slices, different colours of slice; • Texture; • Meat quality; • Meat defaults; • Production faults.	The rejection rate is depending on the reason.	Comprehensive
4. Bacon	Yes. Packaging B2B and B2C.	Year-round	• Cut/slicing losses: bad slices, different colours of slice; • Texture; • Meat quality; • Meat defaults; • Production faults.	The rejection rate is depending on the reason.	Comprehensive
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1. Chicken Filet	10%	Research needed	• Re-use • Further processing • Energy • Export	Medium	To be studied. Results will be very interesting.
2. Cooked Ham	10%	Research needed	• Re-use • Further processing	Medium	To be studied. Results will be

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			• Energy • Export		very interesting.
3. Salami	10%	Research needed	• Re-use • Further processing • Energy • Export	Medium	To be studied. Results will be very interesting.
4. Bacon	10%	Research needed	• Re-use • Further processing • Energy • Export	Medium	To be studied. Results will be very interesting.
M.CS2.Ave-BE_EU					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**
1. All chicken	Yes	Year-round	• Animal by-product categorization into category 2 instead of category 3 as per Regulation (EC) No 1069/2009. • Grading as classes A/B of the poultry carcasses and cuts as per regulation 543/2008 on marketing standards for poultry meat.	Low	Partial
2.Breast filet	Yes	Year-round	• Animal by-product categorization into category 2 instead of category 3 as per Regulation (EC) No 1069/2009. • Grading as classes A/B of the poultry carcasses and cuts as per regulation 543/2008 on	Low	Partial

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			marketing standards for poultry meat.		
3. Legs	Yes	Year-round	• Animal by-product categorization into category 2 instead of category 3 as per Regulation (EC) No 1069/2009. • Grading as classes A/B of the poultry carcasses and cuts as per regulation 543/2008 on marketing standards for poultry meat.	Low	Partial
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1.All Chicken	TBD	TBD	• Standard production • Pet food • Further processing	Low	
2. Breast fillet	TBD	TBD	• Standard production • Pet food • Further processing	Low	
3. Legs	TBD	TBD	• Standard production • Pet food • Further processing	Low	
M.CS3.Feb-BE					
Product Information					
Type of Product	**Packaging**	**Seasonality**	**The most common rejection reasons**	**Rejection rate**	**Data availability**

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1.Carcass	No	Year-round	• Weight; • Conformation; • Quality; • Downgrading into cat. 3; • Presence of E.*coli* STEC; • Sarcosporidiosis.	High	Partial
2.Front/hind quarter	No	Year-round	• Weight; • Conformation; • Quality; • Yield.	Medium	Partial
3.Prepacked beef	Yes	Year-round	• Labelling; • Weight.		
Impact Assessment					
Type of Product	**Estimated % FLW**	**Estimate Absolute amount of FLW (tons or kg)**	**Current Disposal/valorisation route?** *(e.g. Energy, feed, re-use for consumption)*	**Estimated Environmental impact?**	**Remarks**
1. Carcass	TBD	TBD	• Standard production • Pet food • Further processing	Low	
2. Front/hind quarter	TBD	TBD	• Standard production • Pet food • Further processing	Low	
3.Prepacked beef	TBD	TBD	• Standard production • Pet food • Further processing	Low	

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4 OBJECTIVES

Including clear objectives in the BREADCRUMB case study plans are indispensable for steering the research with purpose and precision. Table 3 provides the objectives of the different case studies. These objectives ensure that the study remains focused on its intended goals. Clearly stated objectives facilitate effective communication among the project partners and other stakeholders, fostering a shared understanding of the case study's purpose. This, in turn, enhances decision-making, problem-solving, and the overall quality of the case study by ensuring that efforts are directed toward relevant and meaningful outcomes.

Table 3: Overview of case study objectives

Case study partner	Objectives
Cereals	
C.CS1.NN-IT	• Avoid wasting open puree barrels for fruit that are contained in low percentages in the final product. • Reducing food waste related to suboptimal foods (visual packaging irregularities). • Reduce food waste related to shelf-life.
C.CS2.VN-SI	• Collect information about existing marketing standards (private and public), which are in place in Slovenia. • Collect data on food waste resulting from these marketing standards. • Valorise suboptimal food.
Eggs	
E.CS1.LF-DK	• To evaluate the impact of EU marketing standards on food waste. • To quantify the downgraded products from a food waste point of view (because they do not fulfil the standards) at EU level. • To propose alternatives/recommendations to reduce the food waste and put a higher value to the products that are rejected for the market.
E.CS2.Ave-BE_EU	*(to be updated in Case Study Plan 2)*
Fish	
F.CS1.Opp-ES	• Improve the economic profit of fishing. • Co-create recommendations on preventing food waste due to marketing standards and to enhance market access for “suboptimal” foods. • Reduce the avoidable waste fraction of high nutritional value products. • Establish acceptance scales for the different FMS to detect the allowance ratio and its direct effects of FW creation. • To better understand fish FMS and its effects (on FW?) along the value chain.

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Fruit & Vegetables	
F&V.CS1.NN-IT	• Avoid waste of fruit puree barrels that are contained in low percentages in the final product. • Reduce food waste related to “suboptimal” food (visual packaging irregularities). • Reduce food waste related to shelf-life.
F&V.CS2.MC-PT	• Identify different causes of food waste in the supply chain. • Quantify food waste. • Understanding the relationship between food waste and private marketing standards. • Minimise the negative impacts of private marketing standards in food waste.
F&V.CS3.ZT-SI	• Collect information about existing food marketing standards (private and public), which are in place in Slovenia. • Collect data on food waste resulting from these marketing standards. • Valorise “suboptimal” food.
F&V.CS4.Men-SI	• Collect information about existing food marketing standards (private and public), which are in place in Slovenia. • Collect data on food waste resulting from these standards. • Validation of “suboptimal” food.

F&V.CS5.LN-DE	<u>General objectives</u>
	• Providing estimates of the amount of FLW for products resulting from marketing standards to illustrate the urgency and inspire action.
	• Better understanding of the underlying reasons for setting up private marketing standards.
	• Identifying and discussing solutions to increase market access of nowadays non-conformity fruit and vegetable products, e.g.:
	  ○ limiting product shipping with impacts on overall food waste creation;
	  ○ better exchange between industry and wholesale / retail to facilitate use of returned products;
	  ○ change price labelling to facilitate selling by weight instead of by piece.
	<u>Specific objectives</u>
	• Contribute to the discussion by providing FW estimates on 4-5 fruit and vegetable products in own operations and client relations.
	• To improve market access of specific aesthetically non-conformity fruit and vegetables (e.g. green lemons and yellow limes) thanks to: a)

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	changed motivation and buying behaviour of end-consumers, and b) additional marketing and use channels for surplus / returned products.
F&V.CS6.Ane-ES	• Providing estimates of the amounts of FLW for products resulting from marketing standards (oranges, clementines, satsumas mandarins, and hybrids) and kaki (persimmon). • Better understanding of the underlying reasons for setting up private marketing standards.
F&V-CS7.ILVO-BE	• To understand the broad view of marketing standards in the soft fruits sector in Belgium. • To provide estimates of food loss and waste related to all relevant soft fruit marketing standards in Belgium.
F&V-CS8.ILVO.BE_NL	• To understand the broad view of marketing standards in the vegetable sector in the Netherlands. • To provide estimates of food loss and waste related to all relevant vegetables (bell peppers, tomatoes, and lettuce) marketing standards in the Netherlands.
Meat	
M.CS1.Fen-BE	• Describing the field of marketing standards in meat sector, categorisation. • Impact assessment of the multitude of marketing standards on our companies. • Mapping/quantifying food waste, and specifically the link with marketing standards. • Identify opportunities to broaden the possibility of added value (certificated) products entering the consumption space. • Raise awareness, informing owners of marketing standards and companies how to improve the system as a whole.
M.CS2.Ave-BE_EU	• To evaluate the impact of private, Member State and EU-specific poultry marketing standards on food waste. • To quantify the downgraded products from a food waste point of view (because they do not fulfil the standards or market access requirements) at EU level. • To propose alternatives/recommendations to reduce the food waste and valorise the products above in question.
M.CS3.Feb-BE	• Identify to what extent products that do not meet marketing standards through the beef supply chain are downgraded and what proportion this represents of the market. • Identify to what extent regulatory decisions impact product downgrading, and hence not being able to commercialise these and therefore creating food waste. To what extent can this be avoided or is it inherent to the production system?

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	• Seek opportunities to provide more transparency within the supply chain allowing a better usage and a smaller amount of downgrading through alignment of supply and demand.

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5 MARKETING STANDARDS

Food marketing standards constitute a group of rules, regulations and guidelines put in place to ensure the fair and transparent promotion, presentation, and labelling of food products in the market. In the European Union, these established rules touch product characteristics and other requirements that must be met for both EU-produced and imported products to enter the EU market. These standards are categorized into specific directives that address different aspects of food marketing, including quality, size, and labelling requirements etc. for different food items. The categories of food marketing standards outlined in Regulation (EU) 1308/2013 within the scope of the BREADCRUMB project include the following:

- technical definitions, designation and sales descriptions
- classification criteria, e.g. grading into classes, weight, sizing, age and category
- indication of species, plant variety, animal race or commercial type
- presentation, labelling, packaging, marking, year of harvesting
- criteria such as appearance, consistency, conformation (shape/structure), product characteristics, percentage water content
- specific substances, e.g. quantitative content, purity, identification
- type of farming and production method (sustainable production)
- coupage (combinations) of must and wine
- frequency of collection, delivery, preservation and handling, conservation methods/temperature, storage and transport
- indication of place of farming/origin
- restrictions on the use of certain substances and practices
- specific use.

These standards play a pivotal role in maintaining consumer confidence and satisfaction, promoting fair competition among stakeholders involved at the same level of the supply chain, and facilitating the free movement of goods within the EU.

Nonetheless, for case studies in the Breadcrumb project in the various member states, the strict adherence to certain standards, particularly those related to the visual appearance and size of fruits and vegetables, can contribute to food waste generation. The level or severity of the impact of food waste generation varies. Table 4 below gives an illustration of which category of FMS have an impact on the different food sectors and the estimated (by CS partners) importance and relevance of specific FMS categories in their sector.

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Table 4: Marketing standards in the five food sectors targeted (cereal, egg, fruits and vegetables, fish, and meat sectors)

Cereals		
C.CS1.NN-IT		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
Classification criteria	Selected products are produced for vegetarian and vegan customers.	9
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	Selected products must be packaged in a protected atmosphere and under controlled hygienic conditions.	9
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	The packaging may swell if the cold chain is not respected (related to category 7).	7
The type of farming and production method	Clients ask for products obtained from organic or conventional produced cereals.	7
The place of farming and/or origin	The raw material must originate in Europe (mainly Italy) to avoid GMO contamination.	9
Restrictions as regards the use of certain substances and practices	There are limitations on the type and quantity of additives that can be used during the process.	7
The conditions governing the disposal, the holding, circulation and use of products	The cold chain during transport, storage, and sale of the product must be respected to ensure the quality characteristics of the product.	9
C.CS2.VN-SI		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
The species, plant variety or animal race or the commercial type	**Wheat** • It is necessary to take into account quality criteria or baking properties. If the wheat does not meet the criteria of	9

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	the baking industry, the consumer will reject the flour from this wheat. However, we can use wheat with poorer baking properties, for example for flakes, cakes, breadcrumb. • There is no legislation on cereal quality for the baking industry, but there are requirements of the baking industry (protein content, sedimentation, falling number and hectolitre weight). • For milling products, the national regulation in place is **Regulation on the quality of cereal products**, mainly about the classification of cereal products and minimum quality of hulled grain, minimum quality criteria of grinding products, prepared cereal products, pasta and dough. • For bakery products national legislation has **Rules on the quality of bakery products[1],** which do not address specific cereal requirements, but mainly bread types and other bakers' pastry and their water content.	
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centres	• Marking the origin of raw materials (Agriculture Slovenia). In organic production-processing, the origin of the raw material is important to the consumer. • Labelling of allergens, gluten. • Labelling of health claims - only if this is supported by analysis of the basic raw material. • Labelling applicable to raw material traceability.	9
Substances used in production	• Natural presence of gluten • In the production process, natural additives are used to stabilize the processed raw material or enhancers of certain quality characteristics. In organic production only natural additives are allowed according to Regulation (EC) No 834/2007 of 28	5

[1] Pravilnik o kakovosti pekovskih izdelkov (pisrs.si)

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	June 2007 on organic production and labelling of organic products[2]	
The type of farming and production method	• Organic production • Plant production • Minimal tillage	6
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	• Weekly orders • Weekly packing plan on the packing lines. • Weekly deliveries to smaller organic shops, public institutions, bakeries - own means of transport. • Pallet delivery to a larger retail chain, rental transport. • Control of the temperature regime in our own warehouse - temperature and relative humidity, control daily (rules on the quality of cereal products state that it could adversely affect the quality of the milled products (if they are stored together with other milled products?) and organic regulation state that organic products should be separated from non-organic). • Preservation of the basic raw material in the summer months by vacuuming and CO2.	6
Restrictions as regards the use of certain substances and practices	• In organic production use of chemical for storage pests is not allowed.	9
Eggs		
E.CS1.LF-DK		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
Technical definitions	• The absence of a clear definition of a 'cracked' or a 'dirty' egg can cause discussions with the control authorities and lead to more food waste.	2

[2] Regulation - 834/2007 - EN - EUR-Lex (europa.eu)

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	• On the other hand we have clear definitions on the different sizes of eggs. Likewise for the durability.	
Classification criteria	Looking at eggs in different part of the EU there is definitely a huge difference in how you have to set the grading equipment to discard dirty table eggs.	8
The species, plant variety or animal race or the commercial type	*Gallus gallus*	
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	We have had compulsory labelling of production type, weight and/or size for many years, and it works well.	
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	• Table eggs are an edible product and you are not allowed to change that. • There is an exception in the new marketing standards where you are allowed to store eggs next to 'smelly' substances like garlic or truffles, which should make the eggs taste like those substances.	1
The type of farming and production method	There are clear definitions for eggs from enriched cages, barn eggs, free range eggs and organic eggs.	
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	• You have to collect the eggs at least once a day and they have to be kept at a constant temperature. • In Denmark we also have a national law demanding a cool chain from the farm all the way to the consumer.	
The place of farming and/or origin	Mandatory stamping on every egg.	
Restrictions as regards the use of certain substances and practices	Eggs are an edible product therefore there are strict restrictions on the use of certain substances. • The exception being point 5. • They are allowed to wash eggs on the packing stations in Sweden – (and maybe also in the Netherlands).	

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The conditions governing the disposal, the holding, circulation and use of products	Regulated by law.	
Fish		
F.CS1.OPPPB-ES		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
Classification criteria	Regulation (EC) No 2406/96. Available criteria for classifying product's quality with freshness and size (weight and length) as indicators.	7
Indication of species, animal race, the commercial type	EU Regulation No 1379/2013 and No 1380/2013. Available list of allowed and not allowed species; its minimal size.	9
	Some species do not have human consumption due to preferences, so it goes to other uses becoming FW (ex. *Sardinella aurita*).	8
	Some species have higher demand and lower availability in the market, so their price and acceptance are higher than for others. Ex. Angle fish.	8
Presentation, labelling, packaging rules	EU Regulation No 1379/2013: 1. Control of labelling --> Mandatory information for labels. 2. Homogeneity in batch size and freshness.	9
Appearance, consistency, conformation, characteristic	As Regulation (EC) No 2406/96 indicates, parasites are allowed, but their presence can have a direct effect, such as lowering prices or producing food waste at any stage along the value chain.	7

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	Rigor mortis status is a key factor for price but also for FW, especially for oily fish. Oily fish in rigor mortis at first sale has a lower price or is wasted due to a very relative lack of freshness.	6
	Lack of integrity in the individuals, such as missing parts or wounds, cause FL and FW despite being in non-edible parts. Bigger individuals have more acceptance for skin damages or missing parts than smaller ones.	8
	Ventral part consistency especially for lean fish. For FAO zone 37 (Med) the fish is commercialised with the viscera, and the integrity of the ventral part is crucial as a quality indicator.	6
Standards on the type of farming and production method	Purse sein is less invasive and harmless than trawling for the individuals, so the FL related to the loss of integrity is directly related to the extraction method. It also requires better appearance for purse sein catches, producing FW if the fish state is not near to perfection.	5
Collection frequency, delivery, preservation, handling, storage and transport	Homogeneity in batches is required not only as a regulation but also as a private FMS along the whole value chain.	7
	The amount of ice in the box is an indicator of good cold chain and better quality.Presence of ice in boxes can produce FW since the product is then more likely to be rejected.	5
	Quantity of fish per box: If the box is full, the fish in the bottom part likely will have damages due to squashing. This fish will be wasted, or sometimes the whole box is wasted. This is important especially between distributors and retailers.	4
	Quantity of fish in the market: More quantity, more demanding FMS for all the species, but specially for oily fish.	9
Indication of the place of farming and or origin	Aquaculture fish has less food loss (FL) and less FW along the value chain, but since consumers prefer fish from fisheries,	3

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	at retail stage aquaculture fish is more sensible (sensitive?) to FW.	
Restrictions as regards substances and practices	Use of sulphites to improve appearance and increase freshness. This substance is commonly used in crustaceans, but some retailers also apply it. Its excessive use can cause FW because of food safety issues / concerns.	
Fruits and Vegetables		
F&V.CS1.NN-IT		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of FMS (1= lowest, 9= highest)**
The technical definitions	The product characteristics must comply with the information in the data sheet.	9
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	Selected products must be packaged in a protected atmosphere and under controlled hygienic conditions.	9
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	The packaging of the product during transport may undergo visual changes that alter its consistency but not its functionality.	9
The type of farming and production method	The type of farming affects the product e.g. organic, conventional or baby food	9
Shelf-life requirements	Shelf-life limits result from private contracts with retailers requiring a minimum shelf-life.	8
F&V.CS2.MC-PT		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
The technical definitions	Technical definitions (specs) are the tool used to monitor the profile of the product that was initially negotiated with the supplier, being composed of legal requirements and business requirements.	9

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	Fruit and vegetable suppliers must deliver products in accordance with the technical data sheets provided by MC. Ex: If a supplier delivers a product that doesn't comply with the technical data sheet, the product is rejected at the warehouse (at the reception of the product).	
Classification criteria	The classification criteria, such as caliber, are part of the negotiated standards that must be met because they imply their availability to the consumer. If they don´t match this classification criteria, they can be rejected or follow another route of valorisation.	9
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	All mandatory references, including protected origin, are inspected by the warehouse quality teams upon reception of the product. If the product does not have the information required by law in terms of labelling and packaging, it is rejected at the warehouse.	9
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	This MS highly impacts carrots and apples. Most carrots and apples are rejected because they don´t have the size or shape to meet consumers' expectations.	9
The type of farming and production method	There are established criteria for the use of pesticides and regular analyses are carried out to check compliance. If non-compliance is found, the product is rejected, and food waste is generated as a result. Ex: Bio certification and Zero Residue Certification are relevant standards for fruits and vegetables.	9
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	Compliance parameters of temperature throughout the supply chain (including transportation) as well as good handling practices in stores, avoiding, for example, product massification are highly important aspects that are monitored and audited. For tomatoes, lettuce and red berries, collection, delivery, preservation and	9

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	handling, the conservation methods highly affect the quality of the product and can create food waste in these products. Ex: Inadequate handling of tomatoes and red berries during collection and in stores can contribute to food waste. Inadequate preservation and temperature methods in lettuce highly contribute to Food Waste.	
Quality Standards	Quality standards include parameters for sensory, microbiological, and physicochemical evaluation, which are monitored throughout the year. Some of these parameters are legal requirements, while others are agreed upon with suppliers. Ex: If the fruit does not meet Brix requirement it can be rejected	9
F&V.CS3.ZT-SI		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
The technical definitions	The product is rejected on the entry point if it is not of suitable quality.	8
Classification criteria	The product should be suitable based on 3 class.	8
The species, plant variety or animal race or the commercial type	The species needs to be uniform and have the allowed weight for each class. This is difficult for some varieties.	7
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	Important especially for the product that needs to be uniform in appearance for each of the classes. Water content is important for lettuce / to keep lettuce fresh on the shelf. In the MS there is only the requirement that the lettuce is fresh and that it is free of abnormal external moisture.	5
The type of farming and production method	We labelled organic products separately. The amount of organic in our retail is very	6

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	small, so it does not contribute significantly to FW generation.	
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	Time of delivery is important, to ensure freshness.	8
Restrictions as regards the use of certain substances and practices	Slovenian legislation needs to be followed, as fewer protection means are approved in Slovenia / fewer protection means are approved than in EU.	8
F&V.CS4.Men-SI		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
The technical definitions	Type, variety or quality. Example: The lettuce or apple is rejected if it is not a suitable variety and quality.	9
The species, plant variety or animal race or the commercial type	Customers reject special peach variety.	9
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	If the lettuce is not fresh and contains low percentage of water (we reduce this waste with high criteria when delivering the lettuce to customers); if the fruits do not contain enough water.	7
The type of farming and production method	Organic production	8
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	Time of delivery (from transport to the customer), distance to the customer, temperatures.	9
Restrictions as regards the use of certain substances and practices	Customers do not have information about the origin of F&V.	1
F&V.CS5.LN-DE		

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FMS categories	Impact in the context of the case study? Example.	Estimate the importance of the FMS (1= lowest, 9= highest)
Classification criteria	LN only sells in class II because organic products are mostly smaller, and it is often not possible to sell in class I.	5
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	All labels of packed goods must comply with the obligatory marketing standards. If a label is incorrect and does not meet the requirements of EU legislation the goods are rejected by the customer.	7
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	• Products are often too small or too big. • Problems in selling yellow limes. • No acceptance for green lemons. Green lemons are not an indication that the fruit is not ripe. • Too small fruit often has less juice content and does not meet the requirements within regulations. • This is caused by too small differences in day and night temperatures. • Cucumbers are often too weak in summer months.	9
Substances used in production	All organic products and covered by EU regulation.	2
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	Product's individual temperature and storage conditions (obliged by a consumer standard) are necessary for product quality and shelf-life.	
Restrictions as regards the use of certain substances and practices	• Substances used post-production (e.g. anti mold or conservation of citrus peel). • Limes and lemons: Conservation with wax or anti-mold substances are forbidden for organic citrus fruits. As a result, the shelf life is shorter compared to conventional products.	7
F&V.CS6.Ane-ES		

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FMS categories	Impact in the context of the case study? Example.	Importance of the FMS (1= lowest, 9= highest)
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	These are the main factors contributing to FW: • Aesthetic defects: wind damage, pests; • Size; • Colour.	9
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	To extend marketing season and to meet customer demands about frequency in our deliveries can produce FW.	7
Restrictions as regards the use of certain substances and practices	Restrictions in some pesticides provoke more pest attacks and more FW.	7
Meat		
M.CS1.Fen-BE		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
Technical definitions	Ingredients, additives raw materials, tests, processing instructions.	2
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	Very important aspects of meat processing as people want uniform products, but meat is not a uniform raw material of course.	9
The species, plant variety or animal race or the commercial type	The number of race/varieties of raw materials and the impact on the products, production methods, ingredients.	7
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	Packaging, labelling, marketing.	5
The frequency of collection, delivery, preservation and handling, the conservation	Very important, food safety wise, and traceability is also of great importance.	7

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method and temperature, storage and transport		
Substances used in production	Ingredients, additives etc.	4
Type of farming and production method	Organic, conventional	2
The place of farming and/or origin	Viande d'origine Francaise, Red tractor (UK)	7
M.CS2.AVEC-BE_EU		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
Technical definitions	The absence of definition for certain poultry cuts in the current Regulation 543/2008 on marketing standards for poultry meat weighs into the food waste balance. For examples: feet and paws are not defined while there is a potential market for those products that are safe for human consumption.	2
Classification criteria	Grading as classes A/B of the poultry carcasses and cuts as per Regulation 543/2008 on marketing standards for poultry meat has one of the main impacts in the case study along with the animal by-products categorization as per Regulation (EC) No 1069/2009 laying down health rules for animal by-products and derived products not intended for human consumption, and the strict categorization of by-products as category 2 (instead of category 3 offering higher valorisation solutions for products).	8
Criteria such as appearance, consistency, conformation, product characteristics and the percentage of water content	As per Regulation 543/2008 on marketing standards for poultry meat, products not compliant from a water protein content should bear a specific warning statement (labelling). Such statement would de-valorise the product (as it would not sell) while still safe for human consumption and most important, compliant from a principle of 'non-added' water standpoint. However, the sector and EU authorities are informed that the current thresholds listed in the Regulation are outdated.	

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M.CS3.Feb-BE		
FMS categories	**Impact in the context of the case study? Example.**	**Importance of the FMS (1= lowest, 9= highest)**
Classification criteria	Specific criteria apply for the classification of beef: Meat Market Observatory[3] Regulation 2006/1183[4] BelBeef[5]	**8**
The species, plant variety or animal race or the commercial type	The type of animal predominantly raised for meat production is the Belgian Blue.	**9**
The presentation, labelling linked to obligatory marketing standards, packaging, rules to be applied in relation to packing centers	Specific (voluntary) labelling applies for Belbeef product. Labelling requirements are also detailed in EU and national legislation[6]	**7**
The frequency of collection, delivery, preservation and handling, the conservation method and temperature, storage and transport	These can have an impact, yet they are minor compared to the above-mentioned downgrading options; specific restrictions apply for bovine.	**5**
Restrictions as regards the use of certain substances and practices	These are included in the marketing standards. Their impact is not so great compared to the other downgrading options. Specific restrictions apply for bovine.	**4**
Bovine		
Substances used in production	Specific restrictions apply.	**2**
Type of farming and production method	Specific restrictions apply.	**3**
The place of farming and/or origin	The marketing of Belgian blue is predominantly a local (national) market.	**6**

[3] Classification of carcasses of bovine animals aged eight months or more (europa.eu)
[4] Regulation 2006/1183 - EC scale for the classification of carcasses of adult bovine animals (codified version) - EU monitor
[5] Documents | Belbeef
[6] Etikettering van rundvlees | EUR-Lex (europa.eu)

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Restrictions as regards the use of certain substances and practices	Specific restrictions apply.	2

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6 DATA COLLECTION METHODOLOGY

Different methods of data collection are possible. In D1.1 Data protocol several examples are given. Based on this information, the CS partners were asked to indicate which methods they would be using. They were also asked to indicate at what stages of the food chain the data would be collected.

Table 5: Data methodology used in the cereal CS and the stage of food chain where the data will be collected

	C.CS1.NN-IT	C.CS2.VN-SL
Primary production		• In-depth interviews • IT tools (DIH agrifood traceability system and customized tools) • Desk research
Processing & Manufacturing	• Interviews • Focus Groups • IT tools (management control materials)	• In-depth interviews • IT tools (DIH agrifood traceability system and customized tools) • Desk research
Retail & other distribution (wholesale)	• Interviews • Focus Groups • IT tools (management control materials)	

Table 6: Data methodology used in the egg CS and the stage of food chain where the data will be collected

	E.CS1.LF-DE	E.CS2.Ave-BE_EU
Primary production	• Interviews	
Processing & Manufacturing	• Interviews • Survey	• Interviews • Survey • Contact members

Table 7: Data methodology used in the fish CS and the stage of food chain where the data will be collected

	F.CS1.Opp-ES
Primary production	• Surveys or semi-structure interviews • In-depth interviews • Workshop
Retail & other distribution (wholesale)	• Surveys or semi-structure interviews • In-depth interviews • Workshop

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Table 8: Data methodology used in the fruit and vegetable CS and the stage of food chain where the data will be collected

	F&V.CS1.NN-IT	F&V.CS2.MC-PT	F&V.CS3.ZT-SI	F&V.CS4.Men-SI	F&V.CS5.LN-DE	F&V.CS6.Ane-ES	F&V.CS7.ILVO-BE/ F&V.CS8.ILVO-BE_NL
Primary production	• Interviews • Focus groups • IT tools	• Internal data • Interviews • Survey	• IT tools (DIH) • In-depth interviews • Desk research	NA	• Interviews • Quantification methods, e.g. internal managing system / weigh products	• Survey	NA
Processing & Manufacturing	• Interviews • Focus groups • IT tools	NA	• IT tools (DIH) • In-depth interviews • Desk research	NA	NA	• Survey	• In-depth interviews
Retail & other distribution (wholesale)	• Interviews • Focus groups • IT tools	• Internal data	• IT tools (DIH) • In-depth interviews • Desk research	NA	• Quantification methods, e.g. internal managing system / weigh products • B2B complaint managing tool	• Compliant Sheets	• In-depth interviews
Restaurants & food services,	NA	• Internal data • Interview • Survey	• IT tools (DIH) • In-depth interviews	• IT tools (DIH) • In depth interviews	NA	NA	NA

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			• Desk research	• Desk research			
Household / Consumers	NA	• Survey	NA	NA	NA	NA	NA

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Table 9: Data methodology used in the meat CS and the stage of food chain where the data will be collected

	M.CS1.Fen-BE	M.CS2.Ave-BE_EU	M.CS3.Feb-BE
Processing & Manufacturing	• Surveys meeting with companies • Interviews, conversation, discussions, working groups	• Interviews • Surveys • Contact members	• Interviews • Surveys • Contact members
Retail & other distribution (wholesale)	• Surveys meeting with companies • Interviews, conversation, discussions, working groups	NA	NA

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7 TIMELINE

The timeline gives a visual representation of the scheduled actions of data collection in the different case studies (*Table 10*). As the data needs to be ready for further analysis in other WPs, a timeframe for data collection and pre-processing was set up for the first 14 months of the BREADCRUMB project.

Table 10: Timeline of all the data collection steps of the CS

Data collecion method															
Cereal	C.CS1.NN-IT														
	Internal data		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Internal meeting to understand already available data			X											
	2	Collection of internal data								X	X	X	X			
	3	Collection of internal private food marketing standards for the selected products								X	X	X	X			
	4	Data pre-processing													X	
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire						X								
	2	Questionnaire developed								X						
	3	Interview implementation									X	X	X			
	4	Data pre-processing (cleaning, transcription, anonymization)													X	
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the survey						X								
	2	Survey developed								X						
	3	Survey implementation									X	X	X			
	4	Data pre-processing													X	
	C.CS2.VN-SI															
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire				X	X	X								
	2	Questionnaire developed							X	X	X					

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	3	Starting interviews									X				
	4	Completing interviews (all data collected)											X		
	IT Tool		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Developed						X								
	2	Started to collect data									X					
	3	Data collected and preprocessed													X	
	Desk research		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Desk research				X	X	X								
	2	Data collected											X			
Eggs	**E.CS1.LF-DK**															
	Interviews		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire			X	X	X									
	2	Starting interviews						X	X	X	X					
	3	Completing interviews								X	X	X				
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft survey questions			X	X	X									
	2	Starting surveys						X	X	X	X					
	3	Completing surveys								X	X	X				
	E.CS2.AV-BE_EU															
	Interviews		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft interview question			X	X										
	2	Starting interviews							X	X	X					
	3	Completing interviews										X	X	X		
	4	Data pre-processing														X
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft survey questions			X	X										
	2	Starting surveys							X	X	X					
	3	Completing surveys										X	X	X		
	4	Data pre-processing													X	X
Fish	**F.CS1.Opp-ES**															
	Survey		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire				X	X	X								
	2	Questionnaire developed							X	X						
	3	Starting data collection									X					

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	4	Completing data collection (all data collected)											X			
	5	Data pre-processing (cleaning, transcription, anonymization)													X	
	In-depth interview		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	In deep interviews to better design the questionnaire				X										
	Workshop		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Validating data (M15)														
Fruit And Vegetables	**F&V.CS1.NN-IT**															
	Internal data		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Internal meeting to understand already available data			X											
	2	Collection of internal data								X	X	X	X			
	3	Collection of internal private food marketing standards for the selected products								X	X	X				
	4	Data pre-processing													X	
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire						X								
	2	Questionnaire developed								X						
	3	Interview implementation									X	X	X			
	4	Data pre-processing (cleaning, transcription, anonymization)													X	
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the survey						X								
	2	Survey developed								X						
	3	Survey implementation									X	X	X			
	4	Data pre-processing													X	
	F&V.CS2.MC-PT															
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire						X								
	2	Questionnaire developed								X						
	3	Interview implementation									X					
	4	Completing interviews (all data collected)									X	X	X			

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	5	Data pre-processing (cleaning, transcription, anonymization)													X
	Survey		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the survey						X								
	2	Survey developed								X						
	3	Survey implementation									X	X	X			
	4	Data pre-processing														X
	Internal data		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Collection of internal data (1/1/23 to 31/12/23) on food waste creation (value and kg) in selected Fruits and Vegetables								X						
	2	Collection of internal private food marketing standards for the selected products								X						
	3	Data pre-processing														X
	F&V.CS3.ZT-SI															
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire				X	X	X								
	2	Questionnaire developed							X	X	X					
	3	Starting interviews									X					
	4	Completing interviews (all data collected)											X			
	IT Tool		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Developed						X								
	2	Started to collect data									X					
	3	Data collected											X			
	4	Data pre-processing													X	
	Desk research		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Desk research				X	X	X								
	2	Data collected											X			
	F&V.CS4.Men-SI															
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	A first draft of the questionnaire				X	X	X								
	2	Questionnaire developed							X	X	X					
	3	Starting interviews									X					
	4	Completing interviews (all data collected)											X			

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IT Tool		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
1	Developed						X								
2	Started to collect data									X					
3	Data collected and data pre-processed													X	
Desk research		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
1	Desk research				X	X	X								
2	Data collected											X			
F&V.CS5.LN-DE															
Internal data collection		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
1	Internal meeting CEO, QM, Key accounts, to review the available internal data on the chosen products, to assess possibilities to take more detailed notes of return reasons and specific FMS involved.			X											
2	Collect reclamation assessments				X	X	X	X	X	X					
3	First analysis for potential adjustments to the collection					X									
4	Monthly analysis of reclamation assessments						X	X	X	X	X				
5	Organise weighing of chosen products in own warehouse (idea: 4-6 days) -packaging vs food -alternative marketing channels for human consumption -energy/feed destination						X	X	X	X	X				
6	Data pre-processing													X	
Interviews with suppliers		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
1	Identification of relevant suppliers (idea: 2 per chosen product each 1 hour)			X											
2	A first draft of the questionnaire together with ILVO; VLTN; CREDA & UNIBO and other CSs				X										
3	Questionnaire developed together with ILVO; VLTN; CREDA & UNIBO and other CSs					X									
4	TBD: Potential translation into Spanish by LN / CSCP / PNO / CRE					X									
5	Establishing contacts to interviewees					X									

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	6	Starting interviews						X							
	7	Completing interviews (all data collected)											X		
	8	Data pre-processing (cleaning, transcription, anonymization)												X	
	Interviews with customers (from customers)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Identification of relevant retail costumers (for each chosen product 1 retailer)					X									
	2	A first draft of the questionnaire (incl. asking for feedback on potential solutions, possibility to engage in WP4 activity)				X	X	X								
	3	Questionnaire developed								X	X					
	4	Starting interviews										X				
	5	Completing interviews (all data collected)											X			
	6	Data pre-processing (cleaning, transcription, anonymization)													X	
	Survey with end consumers		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Contact to retail customers for their initial cooperation (see step 4)				X										
	F&V.CS6.Ane-ES															
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Questionnaire developed				X	X	X	X	X						
	2	Starting interviews									X	X				
	3	Completing interviews (all data collected)											X			
	4	Data pre-processing (cleaning, transcription, anonymization)												X	X	X
	Obtention of customer perspective through Complaint Sheets as a vision of consumers' acceptance		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Complaint sheet developed				X	X	X								
	2	Complaint sheet delivery and data collection							X	X	X					
	3	Data pre-processing (cleaning, transcription, anonymization)										X	X	X	X	X
	F&V.CS7_ILVO-BE and F&V.CS8.ILVO-BE_NL															
	In-depth Interview (IDI)		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**

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	1	Contact of stakeholders (processing and manufacturing, retail and distribution/wholesale) and for the IDI				X	X									
	2	First draft of IDI questions developed					X									
	3	Review of first draft of IDI questions by partners						X								
	4	Working on feedback from draft IDI questions and second draft developed						X								
	5	Confirmation and planning of IDI				X	X	X	X							
	6	IDI questions fully developed and accepted by WP leads							X							
	7	Conducting IDIs								X	X	X	X			
	8	IDIs conducted												X		
	9	IDI records transcribed													X	X
Meat	**M.CS1.Fen-BE**															
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Thorough research of the field, mapping the problems and situation	X	X	X	X	X									
	2	Draft questions					X	X	X							
	3	Starting survey							X	X	X	X				
	4	Processing data										X	X	X		
	5	Reporting													X	X
	Interviews/meeting with companies		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft goals and questions		X	X	X	X									
	2	Planning and performing meetings, interviews and workgroups					X	X	X	X	X	X				
	3	Processing data										X	X	X		
	4	Reporting													X	X
	M.CS2.Ave-BE															
	Interviews		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft interview question			X	X										
	2	Starting interviews							X	X	X					
	3	Completing interviews										X	X	X		
	4	Data pre-processing													X	X
	Surveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**

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	1	Draft survey questions			X	X										
	2	Starting surveys							X	X	X					
	3	Completing surveys										X	X	X		
	4	Data pre-processing													X	X
	M.CS3.Feb-BE															
	Interviews		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft interview question			X	X										
	2	Starting interviews							X	X	X					
	3	Completing interviews										X	X	X		
	4	Data pre-processing													X	X
	Suveys		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**
	1	Draft survey questions			X	X										
	2	Starting surveys							X	X	X					
	3	Completing surveys										X	X	X		
	4	Data pre-processing													X	X

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8 CONCLUSION

In conclusion, deliverable D2.2 serves as a first version of the case study plan, forming the base for future work to be done within the case studies. This comprehensive document encompasses key aspects that lay the groundwork for the forthcoming activities in T2.2 and T2.3. Moving forward, the 16 case studies will work on specific products, providing an overview under ‘product mapping’ and identify the food marketing standards that are related to food waste. This document will be updated in October 2024 (D2.3) and in February 2025 (D2.4).