



**Universiteit Utrecht**

**Surplus Food Redistribution: Towards a  
World Where No Good Food Goes to Waste**

*Combatting food waste through surplus food redistribution in  
the European Union*

MSc Thesis

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## **Abstract**

Food waste is a major global issue, with negative environmental, social and economic impacts. Surplus food redistribution is a strategy, through which the problem of food waste can be effectively combatted by redirecting edible food, which would otherwise be wasted, to people. In the European Union, 127 kg/capita of food is wasted every year, while 36.2 million people cannot afford a nutritious meal every second day. Reducing these figures is paramount, and can be achieved effectively through surplus food redistribution. The aim of this research was to explore surplus food redistribution possibilities across the Member States of the European Union, present an overview of practices from the non-profit and for-profit sectors, and find best practice examples through a multi-criteria decision analysis. Stakeholders from these organisations, and other experts, were then interviewed to gain insights on the impact of surplus food redistribution, challenges, perceptions of policies and future outlooks for surplus food redistribution in the European Union. This research found that food waste can be combatted through surplus food redistribution in the EU with increased funding and awareness of surplus food redistribution organisations and their activities, knowledge-sharing and replication of virtuous practices, and last but not least, harmonised monitoring and reporting of food waste across the European Union. Focusing on these solutions can increase surplus food redistribution in the EU, and thus prevent food waste and have positive effects on the planet, as well as on its people.

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# 1. Introduction

## 1.1 Background

Food waste is a major global sustainability issue. According to the IPCC (2019), food waste accounts for 8-10% of global anthropogenic GHG emissions, corresponding to approximately four times the emissions of the global aviation sector. It is thus unsurprising that according to Project Drawdown (Sundaralingam, 2019), food waste reduction is one of the top solutions to reverse climate change. Moreover, an estimate of 1.3 billion tons of perfectly good food ends up in landfills annually, which is over 1/3 of all food produced globally, “while almost 1 billion people go undernourished and another 1 billion hungry” (UN, 2015). In the European Union, approximately 57 million tonnes of food are wasted annually with costs estimated at 130 billion euros, while approximately 36.2 million EU citizens experience food insecurity (Eurostat, 2022).

Prior to delving into the topic of surplus food redistribution in the European Union, it is important to define food waste and surplus food. The FAO defines food waste as food that is or was appropriate for human consumption, but has been discarded during processing by the retailer, food service or consumer (2014). This can be food that was left to spoil or pass its expiry date, but can also be due to an individual’s food habits, market oversupply or even stylistic mistakes on packaging (FAO, 2014). Furthermore, FUSIONS present the following definition: “Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed [...]” (FUSIONS, 2014). Food surplus is, as defined by the FAO, the quantity of food grown, produced or imported to a specific location, that is in excess of its needs and at risk of becoming inedible food waste; thus, this refers to the edible portion of food waste, which is still fit for human consumption (2014). There are numerous other definitions of food waste and surplus, however, this research will use the combination of these two, as the FAO definitions are globally used and accepted, and the FUSIONS project has been carried out under the agenda and supervision of the European Commission, and is thus applicable for the scope of this study.

In recent years, food waste has become more prominent as a major social and environmental issue in the world, preventing us from a sustainable way of life (UNEP, 2021). The detrimental environmental impact of food waste comes from the embedded GHG emissions from its life cycle and the impact of resources (water, electricity) used to produce it, as well as GHGs emitted during the decomposition process in landfills (Papargyropoulou et al., 2014). Less talked about negative environmental effects of food waste are, for example, the disruptions of nitrogen and phosphorus cycles, as well as the depletion of soil nutrients (Papargyropoulou et al., 2014).

Food losses and food waste are unfortunately an unavoidable part of any food supply chain; however, these can be drastically decreased through various mitigation measures (UNEP, 2021). Food losses typically happen at the production, post-harvest and processing stages of the food supply chain, with approximately 13% of all food produced being lost (UN, 2015). Food waste, on the other hand, happens mostly in the later stages of the supply chain at retail, food service and consumer level, and refers to edible, or once edible food, that is discarded (FAO, 2014). In the EU, which is comprised of high income countries, food waste occurs mainly at retail, food service and household levels, as opposed to low income countries, where food waste (and loss) is concentrated at post-harvest and processing (FAO, 2014). Food waste typically has a worse environmental impact than food losses, as it happens further along the supply chain, and is also a bigger issue in high income countries than food losses (FAO, 2014), which motivates the focus on food waste of this research. In the European Union, over 70% of food waste happens at food service, retail and household level (Stenmarck et al., 2016).

One of the most effective food waste mitigation strategies is surplus food redistribution, which allows safe-to-eat food, which would have otherwise been discarded, to be made available for people to eat (Fattibene & Bianchi, 2017). Food redistribution tackles the twin issues of food waste and food insecurity, and is therefore an environmentally, socially and economically conscious way to deal with surplus food (Fattibene & Bianchi, 2017). As Garrone et al. (2014) write, even with increased efficiency and a change in behaviour towards more sustainable food systems, a certain amount of surplus food is unavoidable and surplus food redistribution presents the ideal solution to this.

Moreover, it is crucial to understand the social unsustainability of food waste and surplus, and the opportunities of the above-stated practice of surplus food redistribution. In the last decades, inflation and rising living costs, which are not matched by an adequate rise in salaries, have led to more and more Europeans not being able to access enough nutritious food (Lambie-Mumford, 2016). Surplus food redistribution offers, at least temporary, solutions to this. It has been proven time and time again that providing people with food security is crucial in helping them improve their quality of life, and even lift them out of poverty (Lambie-Mumford, 2016). Though hindrances in access to food are not a new phenomenon, they manifest themselves in a particular manner in the current climate due to increasing zero hour contracts, stagnating wages but increasing prices, and increase in low paid work in Europe (Pfeiffer et al., 2011). This leads to an increase in demand for food bank models<sup>1</sup>, which redistribute surplus food. For example, in Germany in the year 2000, there were 270 food banks, whereas 11 years later this number grew to 880 (Pfeiffer et al., 2011) and is still rising with over 950 food banks in 2022 (Tafel Deutschland, n.d.). Non-profit organisations are significant and necessary in the functioning of European countries, especially with regards to food security issues (Bagliori et al., 2017a). In terms of food poverty, most governments in the European Union leave it up to non-profit organisations to tackle this issue (Bagliori et al., 2017a). This is due to the historic tradition of non-profits and charity organisations systematically providing emergency and basic goods, such as food; however, despite such responsibility, financial support for these organisations is often lacking (Bagliori et al., 2017b).

Across the European Union, there are various organisations, mostly social enterprises and non-profits, which tackle the issue of food waste through food redistribution. Next to food banks, which supply food free of charge to those in need from warehouses or pick-up points, these are increasingly more tech-based solutions. Although food sharing is traditionally a “hyper-social practice”, in the last two decades it is gradually moving into a practice built on technology (Davies, 2019). FoodCloud, for example, is a mobile application backed by complex technology, which was developed as an answer to the lack of a national surplus food redistribution strategy in Ireland and the scale of its impact could not be as large without technology (Davies, 2019).

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<sup>1</sup> Food bank = “Non-profit organisation, with a legal status, which recovers surplus food from actors in the food supply chain and transport, store and redistribute to a network of affiliated and qualified charitable organisations including charities, social restaurants, social enterprises, etc. Food Banks may also redistribute produce withdrawn from the market, food coming from the Fund for European Aid to the Most Deprived, and food from food collections. Furthermore, Food Banks can process and prepare food and/or meals which are provided to the charitable organizations. In some countries (Estonia, Germany, and Netherlands) Food Banks redistribute food not only to other charitable organisations but also provide food directly to end beneficiaries.” (FEBA, n.d.)

## 1.2 Problem Definition and Research Objective

The potential of food redistribution as a strategy to decrease food waste is immense. Annually, approximately 57 million tonnes of food are wasted across the EU (Eurostat, 2022). Especially in the European Union, where food waste is a much bigger issue than food losses, the possible positive impact of well-organized, integrated food redistribution is large (FAO, 2014). In a study carried out on the potentials of food redistribution in the UK<sup>2</sup>, it has been found that effective food redistribution could lead to a “reduction of approximately 3.1 tonnes of CO<sub>2</sub> eq. per tonne of food waste” (WRAP, 2015).

There are various food redistribution solutions across the EU, some of which are active in only one or few Member States, and some of which function (almost) everywhere. Food banking, for example, is a very common food redistribution practice, and in the EU<sup>3</sup> food banks are often members of FEBA, which is the European Food Banks Federation (FEBA, n.d.). However, other food redistribution organisations, which are from the for-profit sector, are only available in one or a few Member States. Examples include the app Too Good To Go or Karma, which both connect shops and food services with surplus food that has been discounted, to any consumer interested in it, and is often used by students, young professionals and environmentally conscious consumers, who can purchase surplus food for a discounted price (Too Good To Go, n.d.; Karma, n.d.). Too Good To Go, for example, is only available in major cities of 13 Member States of the EU (Too Good To Go, n.d.). Though there are various options available for food redistribution in the EU, these efforts are often localized.

This research aimed at showing the opportunities for positive environmental, social and economic impact of combatting food waste through surplus food redistribution in the European Union, based on knowledge sharing and replication of best practices.

## 1.3 Research Question

The objective of this research was to present surplus food redistribution possibilities, find best practice examples and show the opportunities of surplus redistribution at an EU scale. This has shown that investing time and funds into ensuring widespread availability of food redistribution solutions is relevant and necessary, due to the potential positive environmental, social and economic impact of such endeavours. The research question of this study was:

*“How can the issue of food waste be combatted through surplus food redistribution in the European Union?”.*

### 1.3.1 Sub-questions

In order to answer the above stated research question, the following sub-questions were researched:

1. *What are the most successful food redistribution organisations amongst the EU Member States?*

The answer to this question has presented an overview of impactful food redistribution organisations across the EU in order to show the current state. Through a multi-criteria dimensional analysis, those used as best practice examples in this study were chosen.

2. *What are the activities and the impact of the current best practice food redistribution organisations in the EU?*

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<sup>2</sup> This study was carried out in 2015, when the UK was still part of the European Union.

<sup>3</sup> FEBA members are also from outside of the EU, from other European countries.



The answer to this question has shown the impact of the best practice organisations and why it is important to use surplus food redistribution to combat food waste from an environmental, social and economic perspective.

*3. What are the perceptions of relevant stakeholders in terms of current EU policies, barriers and future opportunities of surplus food redistribution?*

Answering this question has shown insights of relevant stakeholders, mainly surplus food redistribution initiatives, as well as policymakers and NGOs on the current state of surplus food redistribution to find how it could be supported and improved.

## **2. Research Framework**

### **2.1 Research Boundaries**

The geographical scope of this research was the European Union, with Member States as of April 2022. This choice was motivated by the partial harmonisation of legislation and policies across the Member States, which favours overarching policies, strategies and funding across the EU. Moreover, as mentioned in the introduction section, food waste and surplus is a pressing issue EU. A research strategy such as this could be applied to any region, country, cluster of countries or continent.

Furthermore, the focus has been on surplus food, referring to wasted food which is still safe to eat, as opposed to all food waste, edible and non-edible. There is much potential in repurposing non-edible surplus food as well, however it was out of the scope of this research to explore this. The focus on surplus food only was due to the environmental, economic and social opportunities of redistribution, which are all important pillars of sustainability.

### **2.2 Theoretical Framework**

The role of food waste and surplus, especially as a major cause of anthropogenic GHG emissions, has been a topic of debate for decades (United Nations, 2015). As is evident from the 2021 United Nations Environment Programme report from March 2021 (UNEP, 2021), there is still much research needed into its true impacts, since the report shows that we have consistently underestimated just how major of a pollutant food waste really is. During the last decade, it was widely believed that food waste accounted for 8% of global anthropogenic GHG emissions, however this figure was later found to be between 8-10% (IPCC, 2019), with researchers claiming this number may still increase as research into the topic continues. This is reflected in the latest Food Waste Report (UNEP, 2021), which, through increased sampling and data collection, found that amounts of food wasted globally are much higher than previously estimated

The systemic issue of surplus food, which is not redistributed, in the European Union is threefold; it leads to the waste of edible food, the waste of the monetary value of that food and lastly it leads to unnecessary and avoidable CO<sub>2</sub> emissions eq., as can be seen on Figure 1 on the following page.

# The Issue of Surplus Food in the European Union

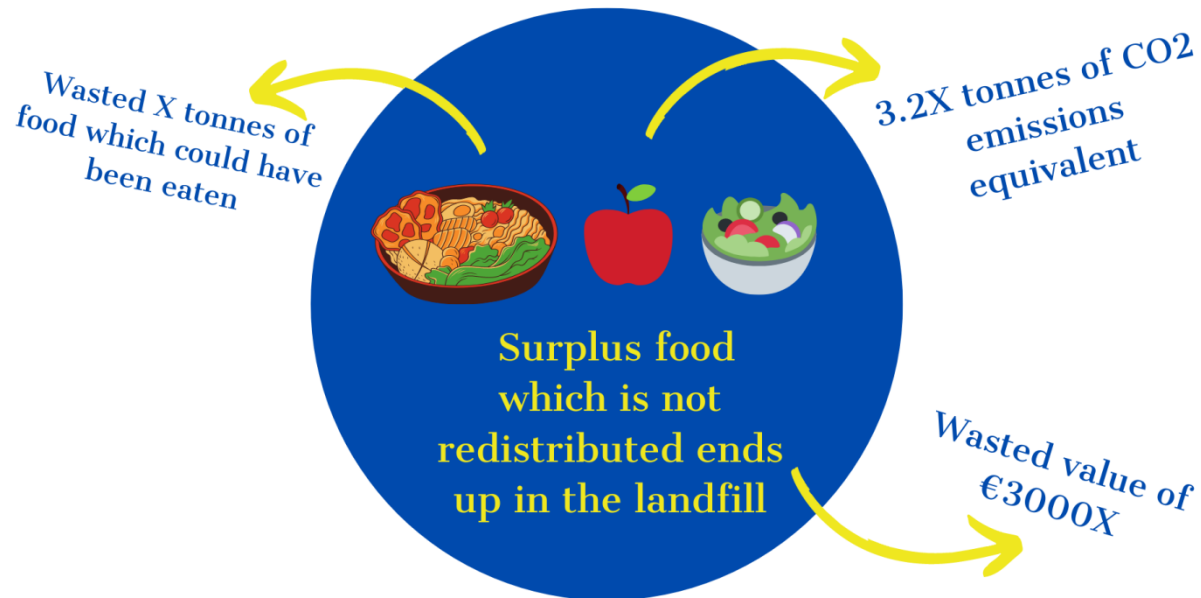


Figure 1: An illustration of the issue of surplus food in the European Union<sup>4</sup>. X is equal to approx. 57 tonnes/year (Eurostat, 2022).

It is evident that not using the potential of surplus food leads to environmental, social and economic losses.

## 2.2.1 Circular Economy and Surplus Food Redistribution

The framework of circular economy refers to an economy that diverges from the linear model of “take, make, dispose” (Ellen MacArthur Foundation, 2015), but rather intends to keep products and materials at their highest value possible throughout their life cycle. Such an economy does not produce waste, but rather repurposes its used materials and “waste” into new products and uses. Food waste mitigation, and especially surplus food redistribution, fit very well within the circularity principles of maintaining the highest product value possible throughout its life cycle.

It is important to note that circular does not always mean sustainable (Papargyropoulou et al., 2014). This is why this research has combined the theoretical frameworks of Circular Economy and Sustainability, which aims to ensure efficient use of resources in the present, as well as ensuring resource availability for future generations (Bringezu, 2002). This combination is convenient for the assessment of current surplus food redistribution possibilities, which are discussed in detail in chapter 4 of this thesis.

The aim of this research was presenting circular and sustainable surplus food redistribution strategies, which use food surplus to benefit both our planet and, for the purposes of the geographic scope, the population of the European Union.

<sup>4</sup> 1 tonne of wasted food = 3.2 tonnes of CO<sub>2</sub> emissions equivalent (KPMG, 2021), 1 tonne of wasted food = €3000 value for retail and household (EPA, 2015)

### 2.2.2 Food Waste Hierarchy

The Food Waste Hierarchy pyramid is a widely used framework intended to prioritise the various ways of using food waste and surplus. The food waste hierarchy has been used within the EU, as well as globally since being described in 1989 in the Community Strategy for Waste Management (European Parliament Council, 1989). This hierarchy is largely focused on the best possible environmental impact of strategies combatting food waste and surplus, however, it lacks focus on social and economic sustainability (Papargyropoulou et al., 2014). Therefore, it is valuable if approached more flexibly, rather than as a set guideline. Figure 2 shows its categorization of management strategies for tackling food waste from most desirable to least.

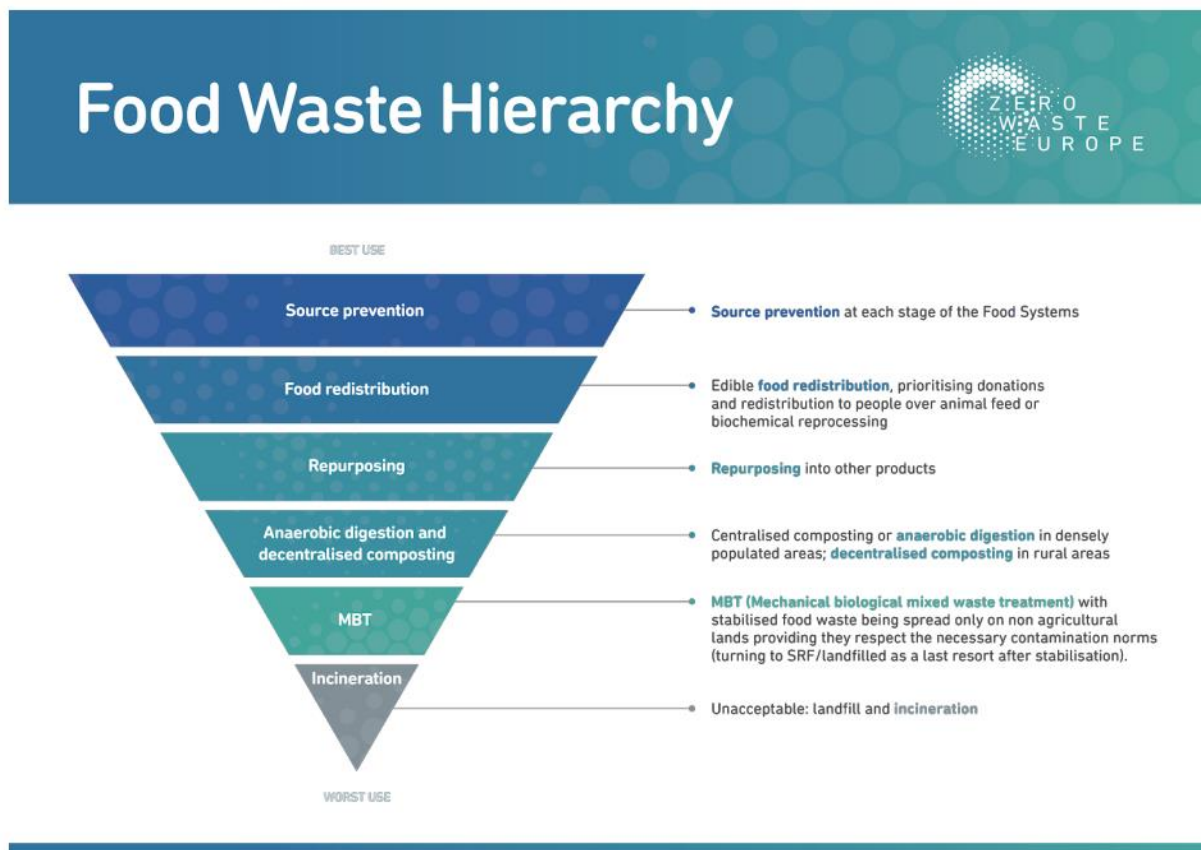


Figure 2: Food Waste Hierarchy (Zero Waste Europe, 2019)

The most desirable way of reducing food waste is source prevention at each stage of a food system. This, unlike all the other tiers, is a preventative strategy. Such strategies can be difficult to establish, as they often rely on expensive structural and systemic changes, the results of which will only be visible in the long term (UNEP, 2021). However, the second most desirable is the recovery of food, which often means redistribution through, for example, food bank models. This can be a very advisable strategy, as it tackles both the environmental and social aspects of food waste. The other tiers, such as repurposing, anaerobic digestion and composting are further valuable food waste reduction strategies. The last tier is that of incineration or landfill disposal, which is ethically unacceptable towards the planet, those who grow and produce the food, and towards those who face food insecurity and poverty (Food Ethics Council, n.d.).

### 2.2.3 Policy Context of the European Union

In this section, the policy context of surplus food redistribution in the EU is outlined, with the aim of showing the legislative environment within which surplus food redistribution organisations operate at the EU level (national policies differ by country). This is important to know in order to understand the boundaries and limits of the activities of such organisations, as well as the possibilities for future improvements in terms of surplus food redistribution policies.

The authority of the EU in creating policies or legislations is based on the following three principles: conferral, proportionality and subsidiarity. This means that the EU only has authority based on treaties which have been ratified by all of its Member States, that the EU must not exceed what is required to fulfil the aims of these treaties, and lastly, that where a national government as well as the EU have policymaking power, the EU must only step in if its actions can be more effective than those of the national government. (European Commission, n.d.)

Furthermore, there are areas in which only the EU can legislate, areas in which both the EU and national governments can legislate, and lastly those in which only national governments have legislative power, with the EU having supporting competences (European Commission, n.d.). The areas of legislature appropriate to the topic of surplus food redistribution are “environment” and “social affairs” for which national governments of Member States and the EU have shared competences (European Commission, n.d.). Therefore, this means that in terms of surplus food redistribution policies and legislation, there must be a harmonisation between national and EU laws, with the EU proposing policies only to the extent to which all Member States are able to put them into practice, taking into account differences in, for example, each Member State’s infrastructure or economic capability.

In the year 2016, the European Commission established the EU Platform on Food Losses and Food Waste (EU Platform FLW), which is the key tool of the EU in fighting food waste. The EU Platform FLW is divided into 5 main sub-groups, one of which is the Food Donation sub-group, that concerns itself with surplus food redistribution guidelines, strategies and policies. Through the EU Platform FLW, various actors from EU food systems come together including, but not limited to, farmers, retailers, policy makers, researchers, NGOs, food banks and others, which are selected through an application process. This allows for knowledge sharing of best practices, as well as finding sustainable solutions to the complex issue of food waste. (European Commission, n.d.)

Directive (EU) 2018/851, which has amended Directive 2008/98/EC re-stated the commitment of EU countries to preventing and reducing food losses and waste, as well as requiring the Member States to enact the following measure through national policies: raising awareness on labelling (differences between “best before” and “use by”), measuring progress on food waste reduction and thirdly, incentivising the donation of surplus food still fit for human consumption (Directive (EU) 2018/851, 2018). Food donation is encouraged through various strategies at national level across the Member States, some of which are for example VAT reduction/exemption for donated food, support of food banks and food bank models of donation, obliging food businesses over a certain size to donate all unsold food, or revisions of legislation with the aim to simplify food donation.

Furthermore, surplus food redistribution is promoted through the EU’s Circular Economy Action Plan and the Farm to Fork Strategy. The Circular Economy Action Plan, or CEAP, has been adopted by the EU in March of 2020, and it is a core part of the European Green Deal (European Commission, n.d.). The CEAP is focused on promoting circularity, both in terms of legislative and non-legislative measures, especially in sectors with intensive resource use (CEAP, 2020). As the food sector creates a lot of waste and is a major polluter, food waste reduction is one of the main aims of the Farm to Fork Strategy, which targets the unsustainability of our European food system, with the goals of climate mitigation, ensuring food security and having a neutral or positive environmental impact amongst others (Farm to Fork, n.d.). As the European Commission is committed to UNSDG 12.3, which is to halve food waste per capita levels by 2030, it aims to set a baseline based on data collected by Member States through a new, common methodology (Farm to Fork, n.d.). Through this, legally binding targets will be proposed in order to accelerate food waste reduction.

Overall, the decisions of the European Commission regarding food waste and food redistribution in particular, are usually based on the work of the FLW, in line with the goals of the CEAP, Green Deal and Farm to Fork Strategy, and all policies and legislature are based on expert research. The FLW enables knowledge sharing and facilitates conversation and brain storming with regards to preventing and reducing food losses and waste, and shows the commitment and motivation of the European Commission to reduce food waste across the EU (EU Platform on Food Waste and Food Losses, n.d.).

## 3. Method

### 3.1 Overview

Figure 3 below depicts the method used in this study. Starting at the top left corner of the figure, there is the main research question of this study. In order to answer this question, three sub-questions were researched and answered. For sub-question 1 (*Phase 1*), the methods used were a review of academic and grey literature, which determined an overview of active and impactful food surplus redistribution organisations across the Member States of the European Union. 27 examples of surplus food redistribution organisations were found during this initial stage of data collection. Once a list had been compiled, including the activities and impact of these organisations, they were ranked according to a multi-criteria decision analysis in order to find the most successful organisations, which are used as best-practice examples. Ten such examples were found through the multi-criteria decision analysis.

Next, sub-question 2 (*Phase 2*) was answered through a literature review and semi-structured interviews with food surplus redistribution organisations. To establish the impact of these organisations, the pre-determined environmental, social and economic indicators were used.

Lastly, answering sub-question 3 (*Phase 3*) was done through the findings from semi-structured interviews<sup>5</sup> with relevant stakeholders<sup>6</sup>, which consisted of employees of surplus food redistribution organisations, as well as an EU Policy Officer focused on the topic of food waste, the Director General of the European Food Banks Federation and the founder of an anti-food waste NGO. These findings communicate perceptions, insights, barriers, opportunities and possibilities for improvement of surplus food strategies by relevant stakeholders.

The answers to these three sub-questions have resulted in insights for the future of surplus food redistribution in the European Union, showing the opportunities of combatting food waste through surplus food redistribution at the EU level, and thus answering the research question of this study. In the following sections of this chapter, these steps are explained in detail.

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<sup>5</sup> These were the same interviewees as in Phase 2 and three others (EU Policy Officer, FEBA Director, NGO founder)

<sup>6</sup> FEBA and the EU Platform FLW were interviewed due to the relevance and focus of their work on food waste and surplus food redistribution. Zachraň jídlo was chosen as an example of an NGO from the same country of one of the best practice examples, in order to gain insights from an organisation, which focuses on combatting food waste in a different way than by redistribution.

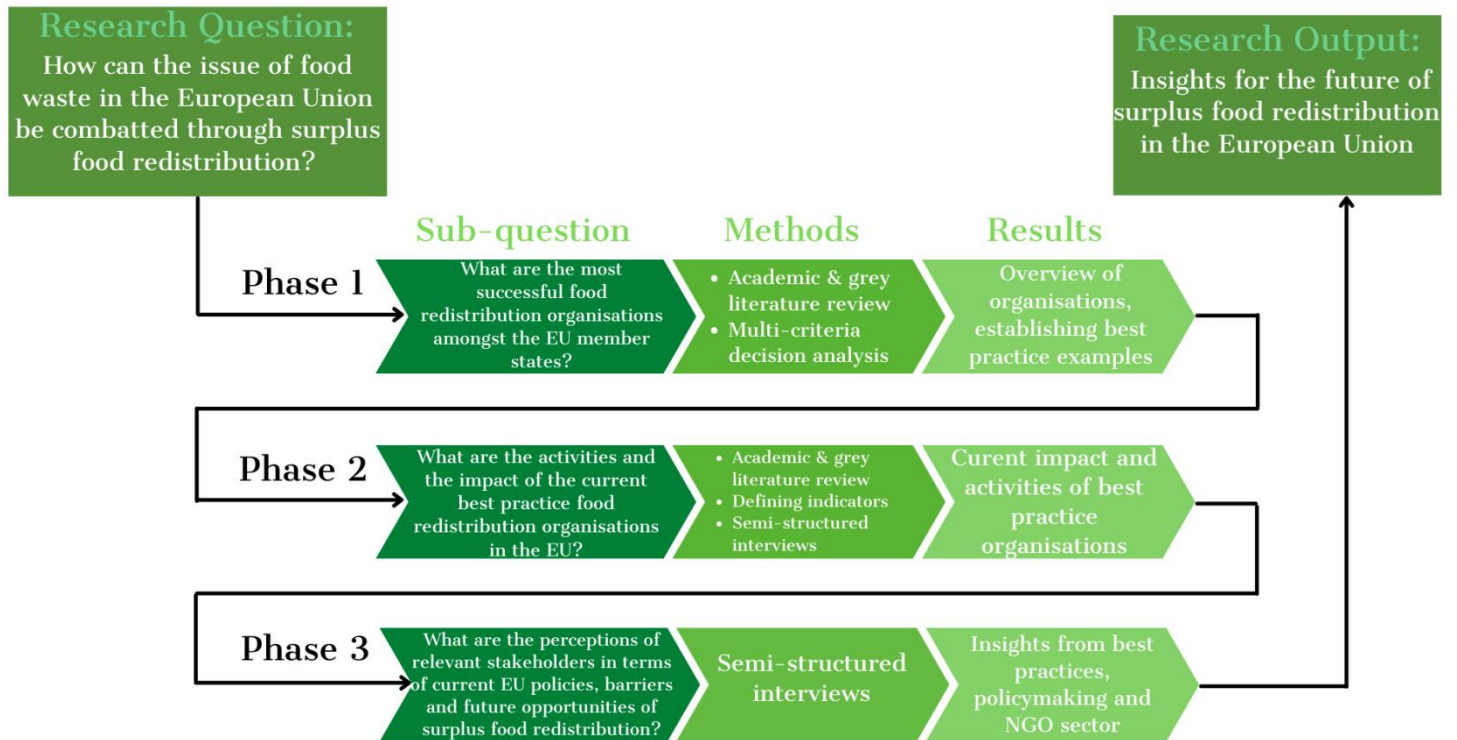


Figure 3: Research Method Overview

## 3.2 Phase 1

### 3.2.1 Academic and Grey Literature Review

In Phase 1, a literature review was the starting point of this study in order to answer sub-question 1: “*What are the most successful food redistribution organisations amongst the EU Member States?*”. Academic literature and grey literature such as news articles, websites and annual reports of surplus food redistribution organisations were important in understanding which organisations are well-established, and are having a positive impact on the environment and within communities. Thus, “successful” in this case refers to a food redistribution organisation which has shown to be combatting the issue of food waste effectively with positive results, such as reducing emissions, providing food to those who need it and/or saving money through their actions. Academic literature has been found in peer reviewed journals, using search engines of JSTOR, Google Scholar and Web of Science. Key search terms have include “surplus food redistribution”, “food redistribution in EU”, “surplus food redistribution EU”, “surplus food organisation”, “surplus food EU”, “surplus food strategy”, “food waste solution”, “surplus food solution” and “best surplus food solution”. For grey literature, the same search terms were used.

### 3.2.2 Best Practice Examples & Multi-criteria Decision Analysis

Through the literature review mentioned in section 3.2.1, two lists of available strategies have been compiled – one for non-profit and one for the for profit sectors. From those, the best practice examples have been chosen based on their environmental and social impact, as well as their economic viability. To enable fair comparison between organisations, their amount of redistributed food has been calculated per



capita. This was done due to the fact that organisations come from countries with varying population sizes, and thus looking only at amount of food redistributed without considering the size of the population would yield skewed results. Thus the following calculation has been made in order to find the impact per capita:

$$\text{Kg of food redistributed} \div \text{population of country}$$

In order to rank these solutions, and thus choose best practice examples, a multi-criteria decision analysis (described below in Table 1) has been used. This tool enabled a standardized and as fair as possible ranking of all the solutions in order to find those with most potential for combatting food waste through surplus redistribution.

Table 1: Explanation of scoring according to the multi-criteria decision analysis

Area	Max. points	Description
Environmental impact	2	<p>0 – Organisation/strategy has no positive environmental impact. This refers to strategies which, through their actions, emit more or as much CO<sub>2</sub> eq. than they save by redistributing surplus food.</p> <p>1 – Organisation/strategy has some positive environmental impact. This refers to redistribution strategies which impact the environment positively by saving CO<sub>2</sub> eq. emissions, however, which are aimed at a small or niche group of recipients, and thus cannot redistribute quantities larger than 0.5 kg/capita/year<sup>7</sup>, saving at least 1.6 kg CO<sub>2</sub> equivalent emissions/capita/year.</p> <p>2 – Organisation/strategy has high potential for positive environmental impact. Such strategies serve or have the potential to serve a broad group of people and redistribute over 0.5 kg/capita/year.</p>
Social impact	2	<p>0 – Organisation/strategy has no positive social impact. This refers to redistribution strategies which are not aimed at those who would otherwise not be able to access such diverse and/or nutritious food.</p> <p>1 – Organisation/strategy has some positive social impact. Such strategies provide food to those who need it in their communities/countries, however, they redistribute less than 0.5 kg/capita/year to those in need.</p> <p>2 – Organisation/strategy has high potential for positive social impact. This refers to strategies which have shown to be indispensable to their communities/countries, and on which a large amount of people rely to obtain nutritious food. Such strategies redistribute at least 0.5 kg/capita/year to those in need.</p>
Economic viability at EU/country level	2	<p>0 – Organisation/strategy is expensive to set up and/or run. This refers to strategies which rely entirely or almost entirely on</p>

<sup>7</sup> In the EU, 127 kg of food is wasted per capita each year, this includes both edible and non-edible food (European Commission, n.d.). Reporting on wasted edible food is not required, and thus data on it is lacking. 71% of all food happens at household level, which means 36.83 kg happens at all other levels, including non-edible food. Thus, 0.5 kg/capita/year has been chosen as the minimum based on data on food waste in Europe (Our World in Data, 2019). As the size of countries and their populations differs largely across the EU, this number has been calculated per capita, in order to enable comparison of a more realistic impact organizations have with regard to how much food waste and how many recipients of food there are/can be. Only surplus food redistributed is counted here, not purchased or donated food.

	<p>outsider funding, wherein such funding is not easily obtained.</p> <p>1 – Organisation/strategy is economically viable, but only for countries with higher resources. EU Member States are not uniform, and some lack the infrastructure and innovation of others. This can mean that in such a country, more investment would be needed in order to replicate a successful strategy due to lack of facilities or infrastructure.</p> <p>2 – Organisation/strategy is inexpensive to set up and run and/or can be easily subsidized on an EU/country level. This can refer to strategies which are, for example, based on an IT platform that is already developed, or which are already funded through the EU in their Member State of origin. Such strategies have been shown to successfully financially function in their countries of origin.</p>
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This multi-criteria decision analysis (abbreviated as MCDA) aims for fair scoring of all relevant areas (Sardinha & Pinto, 2019). All areas are given a maximum score of 2 and a minimum of 0 points, however, the different aspects weigh differently (%) in the final comparison. Establishing this weighting in an as objective as possible manner was important, as this is known to be the key issue in MCDA studies (Odu, 2019). The input data for the MCDA are impact figures supplied by the organisations from year 2021, if those are unavailable 2020 figures were used. This comparison of impact from one year only has been done due to the fact that some organisations are active much longer than others, and thus a cumulative impact for all years active would not provide a fair comparison.

The key objective of this research is analysing and proposing a more sustainable way forward within the area of food waste and surplus food redistribution, in the scope of the European Union. Food waste, as well as food insecurity, food poverty and hunger are pressing issues in our world today, and Sustainable Development Goals 2 and 12 (12.3 specifically) have been set to tackle these twin issue of food waste and hunger (United Nations, 2015). Therefore, the environmental and social areas of this MCDA weigh twice as much as the economic viability – 40% environmental, 40% social and 20% economic. This has allowed for the selection of best practices with positive social and environmental effects first and foremost, while still taking into account the economic side. The economic viability is important, however in the fight against climate change and food insecurity, higher costs which lead to positive environmental and social change are worthwhile (Zero Waste Europe, 2019).

### 3.3 Phase 2

#### 3.3.1 Defining Indicators

In Phase 2, the quantification of surplus food redistribution activities across the EU has been done by using indicators. The indicators are presented in Table 2, and they have been chosen based on measurements through which surplus food redistribution organisations communicate their impact. This is both in terms of surplus food redirected from being wasted to being eaten, as well as indicators used by the European Food Banks Federation (FEBA, 2019). As this study aims at presenting the environmental, social and economic opportunities of surplus food redistribution, an indicator has been chosen for each of these impact areas in order to measure its (potential) impact. These indicators have been used to guide the literature research and interviews in this phase.

Table 2: Indicators used for this research

Indicator	Impact Area	Definition	Quantification of Definition	Units
CO <sub>2</sub> equivalent emissions avoided	Environmental	The CO <sub>2</sub> equivalent mass of the emissions avoided through the activities of a surplus food redistribution organization.	On average 3.2 tonnes of CO <sub>2</sub> equivalent is emitted from 1 tonne of food waste (EPA, 2015). This aims to account for the differing emissions of local vs. imported products and varying food sorts (meat, vegetables, fruit, dairy, baked goods etc.)	Tonnes of CO <sub>2</sub> eq. (t)
Kg of food eaten	Social	The mass of food saved through the activities of a surplus food redistribution organization, which is diverted from landfill in order to feed people, who would otherwise not be able to access such diverse and/or nutritious food.	N.A.	Kg (kg)
Money saved	Economic	The amount of money saved by suppliers as well as recipients of surplus food.  The economic indicator is set an approximated value of retail and food service surplus, which have been found through various studies of relevant stakeholders in the surplus food redistribution sector.	Average retail value of 1 kg of food refers to €3 (EPA, 2015)	Euros (€)

### 3.3.2 Semi-structured Interviews and Literature Research

Semi-structured interviews were carried out where possible to obtain information on the impact from the organisations which are active in surplus food redistribution in EU countries. The same tool as in Phase 3, the semi-structured interviews, were used here, however it was a different section of the interview, which

was focused at the quantification of the impact of surplus food redistribution organisations by using the environmental, social and economic indicators developed in the previous section. Thus, only the interviews with the organisations were relevant at this stage. In the case of unavailability of an organisation for interview, literature research has been used with the aim to substitute for the interview and obtain information on organisations' impact.

### 3.4 Phase 3

#### 3.4.1 Semi-structured Interviews

In phase 3, semi-structured interviews were used in order to gather insights, experiences and ideas for improvement from relevant stakeholders (experts, policymakers, surplus food redistribution initiatives, NGOs) on the current state of surplus food redistribution. Semi-structured interviews enable the collection of both quantitative data on impact as well as qualitative data (Dearnley, 2005), allowing interviewees to not only answer specific questions, but also volunteer any relevant information they deem important.

The number of interviews was six and interviewees were from the surplus food redistribution solutions which were found to be the most successful through the literature research and following MCDA in Phase 1 (three), as well other above-mentioned relevant stakeholders (three). Interview guide is included in sections 8.1 and 8.2 in the Annex of this thesis. These have been successfully tested through the interviews with FoodCloud and FEBA. In case of unavailability of interviewees, interviews were substituted by literature research; in this case, especially official websites of the organisations and annual reports have been useful. This alternative was used in the case of seven best practice examples.

Answering the previous two sub-questions of this thesis aimed at finding the best practice examples of surplus food redistribution in the EU, and delving deeper into their impact and activities, in order to present a clear overview of the current situation. In this last sub-question of this study, it was important to understand how various stakeholders view the status quo, what sort of opportunities and barriers they experience, as well as how they view the current EU policies regarding surplus food redistribution.

For the purposes of answering this sub-question, interviews were conducted with six stakeholders from different organisations. These were the following:

- Anna Strejcová, the founder of Zachraň jídlo (“Save good” in English), which is a Czech NGO that was set up with the aim of raising awareness of food waste in the Czech Republic (and elsewhere).
- Greta Caglioti, Secretariat General Officer at Fondazione Banco Alimentare ONLUS, the Italian Food Bank Foundation and one of the best practice examples in this research.
- Angela Frigo, the Secretary General, and Anna Friederitz, Assistant to the Secretary General, at the European Food Banks Federation (FEBA), which is the representative body of food banks at a European level.
- Christopher Hill, the Operations Development Director at FoodCloud, one of the best-practice examples in this research, from Ireland.
- Cristina Lisetschi, Policy Officer at the European Commission, and expert on the EU Platform on Food Losses and Food Waste.
- Veronika Láčová, the Group CEO of Česká Federace Potravinových Bank, which is the Czech federation of food banks and one of the best practice examples in this research.

The recordings of all interviews are available upon request, as are documents of key takeaways from each interview, which include quotes, and all the information given by interviewees. The written permissions of interviewees to use the recordings for the purposes of this research, as well as their written approval of how their interviews are used are also available.

In order to communicate the findings of the semi-structured interviews, the answers of all interviewees have been grouped thematically. Firstly, the work of Zachraň jídlo, FEBA and the EU Platform on Food Losses and Food Waste has been summarised<sup>8</sup> in this chapter, in order to provide context, the stakeholder organization. In the results of this thesis, all of the stakeholders' perceptions of the EU policy context were explored, followed by the respondents' opinions regarding barriers to surplus food redistribution, and lastly the possibilities and future outlooks on surplus food redistribution have been discussed.

### 3.4.2 Contextualising the Stakeholder Organisations

In this section, the work of Zachraň jídlo, FEBA and the EU Platform on Food Losses and Food Waste is briefly summarised in order to provide context of why these three actors were chosen to share their perceptions on the following topics.

#### Zachraň jídlo

Zachraň jídlo is Czech non-profit NGO, which started as a volunteering initiative in Czech Republic that aimed to raise awareness of the issues of food waste amongst the general public. This was done through various campaigns and happenings, and their aim with their events was to interest and engage the public, as well as the media, who could then spread their message. One of these successful events was the “Feast for a Thousand”, which was took place in Wenceslas Square in Prague, one of the main squares of the city, and consisted of meals cooked from 450 kg of surplus food, available for anyone (around 1000 people) to eat there. With this “happening”, the organisation aimed to raise awareness of the issue of throwing out perfectly edible food, and framing food waste as a problem for everyone. Following this, the organisation was crucial in bringing awareness to the 15% tax that retailers had to pay when giving surplus food to charities, and thus were vital in influencing this law being revoked in 2014. They were also key in influencing the government to pass the 2018 law which requires stores over 400 m<sup>2</sup> to donate their surplus, alongside, for example, the Czech federation of food banks. Moreover, they have led many educational programmes in schools, engaging children and teenagers to learn about food waste in fun and enjoyable ways. They have also written a cookbook with recipes with often wasted food, or parts of food that people do not often know can be used, as well as including tips on how to reduce food waste at home. Though they are still active in their campaigning, they have now also started with a project inspired by Siticibo, and are thus aiming to increase the impact of that in the coming years. (Anna Strejcová, personal communication, November 2022)

#### FEBA

FEBA, the European Food Banks Federation, has been mentioned in this research previously. The work carried out by them, through monitoring and assessing the activities and impact of their members, as well as legislative and non-legislative EU initiatives and advocating for their members, is crucial for surplus food redistribution in the EU. FEBA represents its members and works in their interest from their seat in Brussels. They also facilitate events, sharing of best practices, training sessions or workshops on

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<sup>8</sup> For the descriptions of the three surplus food redistribution best practice examples, please refer to section 4.2.2, 4.2.6 and 4.2.7

topics useful to their members. Similarly, they support their members by establishing and reinforcing partnerships with companies and other organisations in order to secure in-kind and financial donations, facilitating collaborations on national levels for food banks. Lately, they have been gathering and analysing data provided by their members in order to obtain tangible information on, among others, the volume of redistributed surplus food. “Collecting and communicating coherent, reliable data is crucial for quantifying the social, economic, and environmental benefits of food donation”. (Angela Frigo and Anna Friederitz, personal communication, May 2022)

#### EU Platform on Food Losses and Food Waste

Lastly, the EU Platform on Food Losses and Food Waste has been shortly introduced in section 2.2.3 of this study. It is the expert group that was created in 2016 in order to bring together stakeholders from different sectors and countries, including, but not limited to primary producers, food producers, retailers, consumers’ associations, NGOs, the United Nations Food and Agriculture Organization, FEBA, WWF EPO, policymakers and delegates from ministries. It is divided into five thematic sub-groups and aims to support knowledge sharing and finding solutions to the issue of food waste in the European Union. (Cristina Lisetchi, personal communication, September 2022).

## 4. Results

### 4.1 Sub-question 1: The Most Successful Food Redistribution Strategies amongst the EU Member States

Section 4.1 presents some of the most impactful food redistribution strategies active across the European Union. These are divided into two categories: the non-profit and the for-profit sectors, in order to present a clearer overview. Furthermore, sub-section 4.1.3 discusses the best practices from EU Member States found through this research.

#### 4.1.1 The Non-profit Sector: Food Banks & Overview of Impact

##### 4.1.1.1 Food Banking in the European Union

In the European Union, the majority of surplus food redistribution initiatives are food bank models, which are non-profit organisations (Eurostat, 2022). This means, that surplus food is provided by actors across the food supply chain, examples being primary producers, food manufacturers, retailers and horeca<sup>9</sup>, to an organisation (food bank). The food bank manages its distribution to local charities and community centres, who redistribute the food among people in need, who struggle with, or lack, access to nutritious food or directly to recipients. Food banks have been formally a part of most European societies since 1984, when the first European food bank was set up in France (FEBA, n.d.). In addition to surplus food from the food supply chain, FEBA Members also redistribute food from the Fund for European Aid to the Most Deprived (FEAD) and the EU Fruits and Vegetables withdrawal scheme, as well as from individual and corporate food collections (FEBA, n.d.).

In 1986, FEBA, the European Food Banks Federation, was formed with the aim to act as a representing body of food banks on a European level, as well as supporting their members and facilitating communication and knowledge sharing (FEBA, n.d.). Today, FEBA is a network of 341 food banks across 30 European countries (FEBA, n.d.). FEBA Members are surplus food redistribution organisations. In 2021 they provided surplus food, as well as food from FEAD, donations and collections to 45,810 charitable organisations, assisting 11.8 million people in need to reduce food insecurity (FEBA, n.d.). FEBA, alongside the EU Platform on Food Losses and Food Waste, also carry out and provide assessments related to the issues surrounding food waste and surplus food, with some of their most immediate aims including improved impact monitoring, measuring and reporting. This is crucial in supporting knowledge sharing and allowing reproduction of best practices across surplus food redistribution organisations. For this, there is a need for harmonised and meticulous reporting on surplus food prevented from becoming waste and instead being redirected to people in need (FEBA, 2021).

In the following section, food redistribution activities from different EU countries are described based on four groups according to the geoscheme of EuroVoc<sup>10</sup> of the EU's Publication Office. The four sub-regions of the EU according to this geoscheme are: Northern Europe, Western Europe, Southern Europe and Central and Eastern Europe (EuroVoc, n.d.).

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<sup>9</sup> Hotels, restaurants, catering

<sup>10</sup> This geoscheme was chosen due to its use in EU policy and across academic literature and as a tool to simplify the readability of the results of the overview included in the Annex. The author does not insinuate that this is the best available clustering of European countries, as there are many different approaches, as well as social and cultural nuances, especially in the Eastern/Central European sub-region to be considered.

## Northern Europe

Of the 27 EU members, the following six are considered as Northern European: Sweden, Finland, Denmark, Estonia, Lithuania and Latvia. Two of the three Baltic countries, Lithuania and Estonia, both have official established, country-wide surplus food redistribution services in place. In both of these countries, food is made available to those in need; in Estonia, this is done both through charities and directly to recipients and in Lithuania, food banks donate surplus food to charitable organisations, who then pass it on to the final recipients. (Toidupank, n.d.; Maisto Bankas, n.d.). In Latvia on the other hand, there is no centralised surplus food redistribution, and there are only small projects in certain cities, which usually buy food for those in need, and do not use surplus.

Furthermore, of the extended<sup>11</sup> Scandinavian countries which are in the EU, Denmark is the only one with a food bank model in place. The food bank receives surplus food from producers and wholesalers, and distributes this food to non-profit organisations across the country through a large volunteer network. (FødevarerBanken, n.d.). Meanwhile, neither Finland nor Sweden have established food banks, with few direct and decentralised food donation initiatives in both, such as the Stadsmissionen project in Sweden (Stadsmissionen, n.d.). This is surprising, as (extended) Scandinavian countries are often praised to have some of the most comprehensive welfare systems in Europe (Cox, 2004). This reality may be due to a lesser need of food donation as a solution to social issues, but also perhaps due to a different approach to food waste; for example, in Sweden, biogas production from food waste is favoured over redistribution to people, in opposition to the Food Waste Hierarchy (Johansson, 2021). Overall, surplus food redistribution does not seem to be very established in the extended Scandinavia, however, with all the above mentioned active organisations<sup>12</sup> being part of FEBA, there is much hope that with the right support and knowledge-sharing, this can change in the future, and countries without food banks can be encouraged to establish them.

## Western Europe

There are seven countries in the EU which are considered to be Western European: Austria, Belgium, Luxembourg, France, Germany, Ireland and the Netherlands. France was the first European country to ever establish a food bank in the year 1984. Two years later, the French food banks federation, Fédération Française des Banques Alimentaires, was also crucial in establishing FEBA. It is thus unsurprising that the French federation of food banks is a leader in the food redistribution sphere in the EU, with 31 branches and 79 food banks across the country to date, as well as acting as a key stakeholder for the government in terms of surplus food policies. The food banks of the Fédération Française des Banques Alimentaires has served 2.2 million beneficiaries in 2021, while saving 241, 920 tonnes of CO<sub>2</sub> equivalent. (Fédération Française des Banques Alimentaires, n.d.)

Furthermore, in Austria the Wiener Tafel, and in Germany, the Tafel Deutschland, are the non-profit surplus food redistributors. Though similar in name, these two organisations are not affiliated. The Wiener Tafel is at the moment only active in Vienna, where it supports 92 charities, through a large storage facility (TafelHaus), while running side projects to raise awareness on the issue of food waste and involve the greater public in their mission through creating products such as the Meaningful Marmalade, Sugo and Soup, as well as a monthly box of wonky vegetables one can order. The Tafel Deutschland, on the other hand, is much more established, and is a co-ordinating body of 960 food Tafel food banks across

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<sup>11</sup> Historically, Scandinavian countries include Denmark, Sweden and Norway. The extended Scandinavia includes also Finland, Iceland, the Faroe Islands and Aland (Nordic Co-operation, n.d.).

<sup>12</sup> Toidupank, Maisto Bankas and FødevarerBanken.



Germany. These food banks, unlike many others, donate or sell for a symbolic price their food directly to the end beneficiaries, having served approx. 1.65 million people in 2020. They also differ from most other food bank models in the EU by having no government financing and relying solely on private donors and volunteers. Such independence from the state may be commendable, but is also an ever-present risk of losing funding. (Wiener Tafel, n.d.; Tafel Deutschland, n.d.)

The Dutch food banks, Voedselbanken Nederland, are one other example of the unusual practice of also redistributing surplus, as well as bought foods directly to people in need, either through the official food banks or through designated issue points. Unfortunately, they also provide little data<sup>13</sup> to the general public, and do not track and report their impact in weight of food redistributed, as is the norm, but in number of products. This makes their work impossible to compare with other food redistribution strategies, although it is likely their practices will have to change in the future, with increased focus on measurements and reporting. (Voedselbanken Nederland, n.d.). In Belgium, the official coordinating body, which represent 9 regional food banks is called Fédération Belge des Banques Alimentaires/Belgische Federatie van Voedselbanken (abbreviated as FBBA). They redistribute surplus food from industry and retail, as well as organizing public food collections and support 654 charities, and approx. 117,238 beneficiaries. (FBBA, n.d.)

Due to a recent change in legislature following the Covid-19 crisis, the food bank from Luxembourg, Banque Alimentaire Luxembourg a.s.b.l, has been prohibited from recovering and redistributing surplus food. This has been unfortunately a major step backwards, as the food bank was having a great environmental and social impact until then. There is no other country which has banned this on the grounds of hygiene issues, and FEBA with the support of the EU try to actively prevent the misinformation that surplus food redistribution could be a health hazard. The Luxembourgish food bank now buys all its food with private donation in order to support the increasing amount of people who are in need of their services. (Banque Alimentaire Luxembourg, n.d.)

Lastly, the non-profit social enterprise FoodCloud from Ireland introduced its innovative model in 2013. Before this time, Ireland lacked a solution to surplus food redistribution, and FoodCloud presented two-fold solution to the environmental and social concerns of edible food waste. Currently their model functions firstly as a traditional food bank, with three warehouses across the country housing large quantities of food from which food is brought out to charities, as well as charities picking the food up themselves. Secondly, the FoodCloud technology named Foodiverse is a mobile app, which connects retailers and producers with charities and community organisations in their vicinity, who can then pick the surplus food up, thus increasing majorly the amount of surplus ending up with people who need it. FoodCloud has also shared their technology with other food banks, such as FareShare in the UK, who have seen a great increase of redistributed food since using the technology. At the moment, FoodCloud's technology is also being used by the Czech Federation of Food Banks and the Slovak Federation of Food Banks, with aims to spread to more countries. (FoodCloud, n.d.)

It is evident that Western Europe is a region with established and interesting strategies of surplus food redistribution. This may be due to countries such as France having been pioneers in the EU, as well as supportive governmental policies or available finances to support such work.

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<sup>13</sup> Unfortunately, eight of the 23 food banks researched in this section do not share their data with the general public, and after having asked for them, only one (Bulgarian Food Bank) provided them. This may be because they are not legally obliged to share Annual Reports, or also because food banks are non-profit organisations and not all of them have a Communications person/team in charge of their online presence.

### Southern Europe

Southern European EU states include Cyprus, Italy, Greece, Malta, Portugal and Spain. Similarly to Western Europe, this is a region on which food banking and surplus food redistribution are well established. Of the six countries, Cyprus is the only one without a centralised or organised system, only with small local initiatives. The other five countries all have established food bank foundations or federations. The Malta Food Bank Foundation employs the usual food bank model of recovery and donation of surplus food, however, they do not share much information, nor any figures online, thus their operations' effectiveness cannot be explored (Malta Food Bank Foundation, n.d.). Food Bank Greece includes various food banks across the country, which have all been established at different times. The food banks donate surplus food to charities and shelters, as well as having volunteers who cook a daily meal, which is on offer to anyone in need (Food Bank Greece, n.d.). Similarly in Portugal, the Federação Portuguesa dos Bancos Alimentares is in charge of redistribution of surplus, as well as organising food collection campaigns in supermarkets and elsewhere. They are also in charge of a pioneering project in which people can donate their paper waste, and the food bank sells this to certified recycling centres or paper waste treatment facilities, and buys food for those in need with the money made. This federation, however, does not share their impact figures with the public, only the figures on donated paper and food bought. (Federação Portuguesa dos Bancos Alimentares, n.d.)

Italian and Spanish food banks have both been well-established with continuous positive impacts on their communities. In Spain, the Federación Española de Bancos de Alimentos coordinates 54 food banks across Spain, which all redistribute surplus food to charities in their area. They also organise occasional food collection campaigns, and are an important voice and stakeholder in the food waste sphere within Spain. They support over 1.35 million people, as well as 7497 charities. (Federación Española de Bancos de Alimentos, n.d.). Similarly, the Italian Fondazione Banco Alimentare ONLUS supports almost 1.7 million people and 7612 charities. Their food bank network daily recovers food surpluses from the entire agrifood chain, which include fresh fruit and vegetables, retail, and catering. These are redistributed free-of-charge to local charities, which make the food available for people in need. The Italian Food Bank Foundation has also developed the Siticibo programme, which recovers surplus food from various catering sources, including partnerships with cruise ships, which prepare their surplus for the food bank upon docking at an Italian harbour, and all of this catered food is recovered and redistributed on the same day due to food safety reasons. This is one of the few initiatives in the EU redistributing cooked food in such an effective way, having redistributed 854,754 portions in 2021. Siticibo is a commendable example of the viability of also redistributing cooked food. (Fondazione Banco Alimentare ONLUS, n.d.)

Southern Europe, much like Western Europe, is a region with a long history of food banking and with many successful examples of it.

### Central and Eastern Europe

In the European Union, eight Member States are classified as Central and Eastern European: Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia. Although there are official food bank networks in each of these countries, unfortunately many of them do not share their figures with the general public<sup>14</sup>, and some do not have an online presence either, making it impossible to evaluate their work and impact. The Croatia food bank, Banka Hrane Hrvatska, does not have a website, only a Facebook page, which is not up-to-date and does not include information about their work. Similarly, the Slovenian food bank, SIBAHE, has very little information on their website, and the only available

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<sup>14</sup> Food banks from Croatia, Slovenia, Slovakia, Romania.

information is on their model of redistribution, which works in the same way as most traditional food banks – surplus is recovered mostly from retail and donated to charities, who then provide it to those in need.

The Slovak food bank, Potravínová Banka Slovenska, redistributes surplus, as well as organising food drives. In the last year, many of their activities centre on providing food and support to Ukrainian refugees. They are also one of the countries trialling the FoodCloud technology in some of their operations. However, they do not share Annual Reports online. (Potravínová Banka Slovenska, n.d.). In Romania, the Federația Băncilor pentru Alimente din România has been set up in 2020 and became operational in the second half of 2021. Again, they do not share their impact figures and do not have public Annual Reports. (Federația Băncilor pentru Alimente din România, n.d.). The Bulgarian Food Bank is the first registered food bank in Bulgaria, whose sole aim is to recover surplus food and provide it to charities who then distribute it to the end beneficiaries. Although this food bank also does not share Annual Reports publicly, they did provide their report from 2021 upon request. (Bulgarian Food Bank, 2021)

Lastly, the three food bank networks from Central and Eastern Europe, which are most established and active are those from Hungary, Poland and Czech Republic. The Hungarian food bank, Magyar Élelmiszerbank Egyesület, serves over 550 charities and over 250,000 beneficiaries through the collection and donation of surplus food from wholesalers and producers. (Magyar Élelmiszerbank Egyesület, n.d.). The Polish food banks federation, Federacja Polskich Banków Żywności, comprises of 32 food banks, which supply 3200 charities and community groups, offering food to 1.5 million people. They also organise projects aiming at raising awareness of the issue of food waste and its solutions. (Federacja Polskich Banków Żywności, n.d.). Neighbouring Poland, the Czech Republic is home to the food bank network called Česká Federace Potravinových Bank. This federation acts as the representative body of 15 regional food banks, both on a national and international level. Next to redistributing surplus food to 1175 charities, who give it to groups such as seniors, homeless people, single parents or families in crisis, the food bank federation has also been piloting food transformation kitchens, which use large amounts of fresh fruit and veggies, which are at their end-of-life to turn them into products by drying, pickling, making jams etc. the Czech food bank federation also uses the FoodCloud technology with their Tesco stores. (Česká federace potravinových bank, n.d.)

Food banking in Central and Eastern Europe often lacks online communication of achievements and activities. However, it is evident that when food banks do make use of such tools to raise awareness, this can be very beneficial for gaining more support and funding.

For further details, please consult Table 5 in section 8.3 in the Annex, which presents an overview of activities<sup>15</sup> from the non-profit sector across Member States, including explanations of each organisation's work, and impact. Such a comprehensive table was made with the aim of mapping all the food banking practices across Member States, in order to be able to carry out a fair selection of those which are, at the moment, the most effective in their aims of redistributing surplus food.

#### **4.1.1.2 Non-profit Sector: Impact per Capita**

In this section, table 3 is presented, which includes only those organisations for which data on amounts of redistributed food were found, and the calculation *Kg of food redistributed ÷ population of country* is used

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<sup>15</sup> Most of these organisations are also partner country organisations of FEAD. FEAD is the European Fund for Aid to the Most Deprived, which “supports EU countries' actions to provide food and/or basic material assistance to the most deprived” (Regulation 223/2014, 2014), alongside social inclusion measures.

to calculate impact of food redistribution per capita. This is done in order to enable a fairer comparison between organisations from differently sized countries with differently sized populations, and to show more clearly what the amount of food redistributed really means in the context of a country.

Table 3 below thus shows the amount of food redistributed by each organisation in the second column, followed by the population of the country in which it is active in the third column, and the impact per capita in the fourth column. In order to carry out the MCDA, calculating the impact per capita was a crucial step. 0.5 kg/capita/year has been chosen as the minimum for an organisation’s environmental impact to be considered as high potential for positive impact, as is further explained in section 3.2.2 on the MCDA in the Method section. The table below shows all the non-profit organisations explored in section 4.1.1.1., for which impact figures were available<sup>16</sup> and found. For each organisation, the amount of food redistributed in 2021 is shown, as well as the country’s population in 2021 and from these two figures the impact per capita is calculated.

Table 3 shows the amount of food distributed in 2021. Although the amounts are relative to size of a country and its population, it is positive to see such high numbers across the board. Even organisations, whose impact per capita will not be high enough to classify them as best practices, should be commended for the work they do, because every product or meal directed from the landfill to people is a win in the fight against food waste and food insecurity. This table also shows the impact per capita of each organisation from 2021 and has been used as input for one part of the MCDA. There are only three organisations, the Bulgarian food bank, FødevarerBanken Denmark and the Greek food bank, whose impact of food redistribution per capita was smaller than 0.5 kg/capita/year. The reasons for this are further discussed in the Discussion chapter (Chapter 5), and may range from factors such as lack of funding to lack of government support, or a small redistribution network. The remaining 11 organisations have impact of food redistribution per capita ranging from 0.62 kg/capita/year to 3.72 kg/capita/year.

*Table 3: Impact per capita from non-profit sector*

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<sup>16</sup> Furthermore, Wiener Tafel is left out of the comparison, as it is only active in Vienna “and surroundings”. As data on what sort of area “and surroundings” encompasses is not provided, it is not possible to know the population served by them.

Name of organisation	A: Amount of food redistributed in 2021 (kg)	B: Population of country of organisation's origin in 2021 (World Bank, 2021)	Impact of food redistribution per capita in 2021 <sup>17</sup> (A÷B) (kg/capita/year)
Fédération Belge des Banques Alimentaires/Belgische Federatie van Voedselbanken	22,229,000	11,590,000	1.92
Bulgarian Food Bank	184,000	6,899,000	0.03
Česká Federace Potravinových Bank	9,300,000	10,700,000	0.87
FødevareBanken	1,377,000	5,857,000	0.24
Toidupank	2,880,000	1,329,000	2.17
Fédération Française des Banques Alimentaires	75,600,000	67,500,000	1.12
Tafel Deutschland e.V	265,000,000	83,130,000	3.19
Food Bank Greece	2,168,000	10,660,000	0.20
Magyar Élelmiszerbank Egyesület	7,652,000	9,710,000	0.79
FoodCloud	3,126,000 Internationally: 13,254,000	5,028,000	0.62 (+ international impact)
Fondazione Banco Alimentare ONLUS	61,710,000	59,070,000	1.04
Maisto Bankas	5,300,000	2,795,000	1.90
Federacja Polskich Banków Żywności	58,000,000	37,780,000	1.53
Federación Española de Bancos de Alimentos	79,535,776	47,330,000	1.68

#### 4.1.2 The For-profit Sector & Overview of Impact

Surplus redistribution in the for-profit sector is the second way through which surplus food is saved in the European Union. These are business solutions, targeting the broader public, as opposed to food insecure groups. In most cases, available solutions are not country-specific, but tend to be technologies, namely mobile phone applications, which are available in more countries. In this section, the key information on each organisation is presented<sup>18</sup>. There are four organisations from the-for profit sector active in the EU in the surplus food redistribution sector at the time this research.

#### *Too Good To Go*

Too Good To Go is a mobile app which was developed in Denmark in 2015, and is now active in the following EU countries: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Poland, Portugal, Spain, Sweden and the Netherlands, as well as some countries outside of the European Union, such as the

<sup>17</sup> Some of these figures are from year 2020, when figures from 2021 were unavailable.

<sup>18</sup> Table 6 in section 8.4 in the Annex shows surplus food redistribution solutions from the for-profit sector, which are active and available in the European Union, including a brief description of their activities and impact figures.

UK and most recently some cities in the US. Too Good To Go is available mostly in bigger cities, where food shops, bakeries, restaurants and supermarkets can join the Too Good To Go network through their mobile app. Once a food provider is part of this network, they can offer surplus food for a discounted price, which is usually around one quarter of the original price. On the side of the customer, anyone in a country where the app is active can download the app to their smartphone and purchase any of the offered food with a bank card or Paypal. Each listing includes a time at which the food will be ready, and at this point, the customer arrives and shows a code on their app for pick-up. Furthermore, Too Good To Go have launched various successful food waste awareness campaigns, as well forming partnerships with important stakeholders and governments – as a for-profit organisation, they are able to invest much more into Communications, PR and marketing in comparison to food banks. In 2022, there are over 54 million users of their app and 52,554,009 meals have been saved in 2021 globally. (Too Good To Go, n.d.)

### *Karma*

Karma is a Swedish organisation, which is active in all of Sweden and in two French cities – Paris and Toulouse. It works on the same model of a mobile app as Too Good To Go, by connecting retailers with surplus food to consumers. Unlike Too Good To Go, Karma focuses more on retail and less on cooked/catered food. This may also be due to Sweden’s lack of food banking and support of surplus food redistribution as a political choice – supermarkets and food shops are left with a lot more surplus than in countries where food banking is available. They have also created food waste awareness campaigns. Unfortunately, they do not share impact reports, Annual Reports or other documents, which would show in detail their work and impact. The only figure they share is having rescued 1,200, 000 kg of food since their launch in 2016 until 2021. (Karma, n.d.)

### *YourLocal*

YourLocal is a Danish organisation, which works on the same model as both Too Good To Go and Karma. Over 250,000 have downloaded the app in Denmark, which is as of now the only EU country where it is available. Similarly to Karma, YourLocal does not share impact figures. (YourLocal, n.d.)

The fact that of these three same models, two have been founded in Denmark and one in Sweden may mean that there is some awareness in these two Nordic countries of the issue of food waste, which inspired the creation of these initiatives, as well as willingness to participate in solving it.

### *Olio*

Olio, unlike the above mentioned three organisations, has a very different model. Olio is also a mobile app, however it can be used anywhere in the world – an Olio network is created organically through the people who download it and use it in the same city or neighbourhood. Olio is used to share food, as well as other household items, by individuals as well as retailers. For an Olio network to function, there need to be enough participants who offer items, as well as enough participants who want to take those items. Olio has been successfully used in 62 different countries as of 2021, with 65, 312, 492 portions of food shared in 2015-2021 between 6,310,450 app users. (Olio, n.d.)

Due to its model, it is not possible to measure impact in kg with certainty. This is because users are not required to include the weight of the food they share. However, it is nevertheless a unique and commendable strategy fighting food (and other) waste, as it presents an easy way to share locally.

## **4.1.3 MCDA & Finding Best Practice Solutions**

In this section, the organizations listed in Table 3 are analysed through the MCDA, developed and presented in section 3.2.2 of the Method chapter. Through this MCDA, the best practice examples of

surplus food redistribution in the EU have been found. Their work and impact is explored more in detail in section 4.2. In table 4 below, the MCDA is carried out.

Table 4: MCDA

Name of organisation	Environmental impact (/2)	Social impact (/2)	Economic viability at EU/country level (/2)	Overall score (/2) <sup>19</sup>
Fédération Belge des Banques Alimentaires/Belgische Federatie van Voedselbanken	1.92 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Bulgarian Food Bank	0.03 kg = <b>1 pt</b>	<b>1 pt</b>	<b>2 pts</b>	<b>1.2 pts</b>
Česká Federace Potravinových Bank	0.87 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
FødevareBanken	0.24 kg = <b>1 pt</b>	<b>1 pt</b>	<b>2 pts</b>	<b>1.2 pts</b>
Toidupank	2.17 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Fédération Française des Banques Alimentaires	1.12 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Tafel Deutschland e.V	3.19 kg = <b>2 pts</b>	<b>2 pts</b>	<b>1 pts</b>	<b>1.8 pts</b>
Food Bank Greece	0.20 kg = <b>1 pt</b>	<b>1 pt</b>	<b>2 pts</b>	<b>1.2 pts</b>
Magyar Élelmiszerbank Egyesület	0.79 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
FoodCloud	0.62 kg (+ international impact) = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Fondazione Banco Alimentare ONLUS	1.04 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Maisto Bankas	1.90 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Federacja Polskich Banków Żywności	1.53 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>
Federación Española de Bancos de Alimentos	1.58 kg = <b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>	<b>2 pts</b>

In terms of environmental impact, only three organisations scored one point out of two. There are Food Bank Greece, the Bulgarian Food Bank and FødevareBanken Denmark. This is due to the fact that their impact of food redistributed per capita in 2021 was less than 0.5 kg/capita/year. They scored one point because they still have a positive environmental impact in their communities. All other organisations surpassed the 0.5 kg/capita/year mark and were awarded two points.

Moving on to social impact, this is closely linked to environmental impact. If an organisations is saving food and redistributing it directly or through a charity to people in need, their environmental and social impacts are very closely connected – an amount of food diverted from waste (an environmental gain) is donated to a person or persons who are experiencing food insecurity (a social gain). Therefore, the scoring is the same as for environmental impact.

<sup>19</sup> Environmental impact\*40% + Social impact\*40% + Economic viability\*20%

Lastly, economic viability at EU and country level is homogenous, with most of the strategies receiving, two points. Tafel Deutschland received one point as they are solely privately funded, with no support from the German government or the EU, which could become a risk in a situation in which private donors stop their funding. The homogeneity shows that surplus food redistribution is a truly advisable way to fight food waste, and with it the issues of climate change, and is possible in the EU.

The best practices of organisations who received an overall score of two were reviewed. Their work and impact are discussed in detail in the next section.

## **4.2 Sub-question 2: The Activities and the Impact of the Current Best-practice Food Redistribution Strategies in the EU**

### **4.2.1 Fédération Belge des Banques Alimentaires/Belgische Federatie van Voedselbanken (Belgian Federation of Food Banks)**

The Belgian Federation of Food Banks was created only a year after the first European food bank was opened in France. They have been active since 1985, and have seen a steadily yearly increase of redistributed food and supported beneficiaries. This growth has not been due to an increase of food waste and people who are food insecure, but rather it is the result of improving and expanding operations of the food banks. In 2021, on average 177,000 beneficiaries were served monthly by the food banks in Belgium through 654 charity organizations. Of these food recipients, 63% are adults between the ages of 25-65, 28.6% are children between the ages of 0-18, 8.4% are seniors and 37.9% are single parents (of whom 70.1% are female). These figures show the social importance of the food banks in Belgium, especially in supporting vulnerable groups such as single parents and children (for whom it will often be the legal guardians picking up food, thus skewing the above mentioned statistics of adults/children as recipients). (FBBA, n.d.)

Furthermore, the food banks aim to redistribute nutrient rich food to people, shying away from empty calories. Thus, 28% of the surplus food is fresh produce (fruits and vegetables) and almost one quarter are dairy products, with only 4% being sweets, chocolate or crisps. They have a strong social focus, and next to collecting surplus from the food industry and retail, they also organize public food collections and various food drives, especially in the winter months, to ensure enough food is available to their beneficiaries, even if this food is bought. (FBBA, n.d.). Although the Belgian Federation of Food Banks is seen by the general public more as a social charity, which reflects their communications and marketing, as well as the common view of food banks as charities for people, their work is equally as valuable in terms of the environment. By having diverted 22,229,000 kg of surplus food from the landfill in 2021, they are directly responsible for saving 71,132,800 kg of CO<sub>2</sub> equivalent, which is as much as 15,464 gasoline cars will emit on average per year. (FBBA, n.d.).

### **4.2.2 Česká Federace Potravinových Bank (Czech Federation of Food Banks)**

The Czech Food Banks Federation was created in the year 2016, based on an idea from a bachelor thesis by one of its founders. Until then, there were regional and local food banks in the Czech Republic, but they were all individual entities, who did not collaborate extensively. The idea to establish a federation which would be the coordinating and representative body of the interests of all the country's food banks in the national and international policymaking sphere proved to be an incredibly good one. Over the last 6 years, the federation's mission has been to take some burden off the regional food banks, and lobby in their interests, while providing them with ready-made solutions which can improve their practices, as well as making them more efficient. (Veronika Láčová, personal communication, June 2022)



Up to 82% of all food redistributed in the Czech Republic by food banks is surplus, with the rest coming from either the FEAD programme or food collections. The federation is also using partnerships with retailers, such as Albert Heijn, to build transformation kitchens through which they are able to salvage much more fresh produce by making jams, pickling or drying fruit and vegetables. (Veronika Láčov, personal communication, June 2022). The federation’s partnership with the government has led to some great results both socially and environmentally, as well as leading to policy changes. In 2018, a law was passed that every food shop with an area of over 400 m<sup>2</sup> has to offer up their surplus for redistribution. Furthermore, there is much more investment into surplus food redistribution in the non-profit sector, which enables food banks to, for example, acquire vans that can transport more food, thus diverting more of it from landfill and towards people in need. (Veronika Láčov, personal communication, June 2022)

Veronika Láčov, the CEO of the federation, also highlights the importance of improved management and good partnerships in the federation’s increasing impact over the years. She underlines the importance of marketing the work of the food banks depending on the context – sometimes “selling” the social side, sometimes the economic and at other times the environmental. Surplus food redistribution positively impacts all three, however, depending on what government or EU funds are being invested into, or what is important to the people in the country, they try to find the right way to communicate the positive impact of their work. For example, the Ministry of the Environment is a long-standing partner of the federation, and they support food banks in their environmental mission, however, at the moment there is also need for resources coming in for the social mission of the federation. (Veronika Láčov, personal communication, June 2022)

The Czech food banks served over 200,000 beneficiaries in 2021 through the help of 1175 charities. They saved 9,300,000 kg of edible food, which corresponds to of 29,760,000 kg CO<sub>2</sub> and that is the equivalent of approximately 99,200 round trip flights<sup>20</sup> from Prague to Brussels. (esk federace potravinovch bank, n.d.; Flight Emissions Calculator, n.d.)

#### **4.2.3 Toidupank (Estonian Food Bank)**

The Estonian Food Bank is one of the few examples of food banks distributing food directly to people in need. Across the country, they have a network of 14 food banks serving over 10,000 people weekly. The organization relies heavily on the work of volunteers, who collect, sort, pack and redistribute food weekly.

In 2021, the food banks redistributed 3,200,000 kg of food, 2,880,000 kg of which was surplus, in a country with a population of less than 1.5 million people. 9,216,000 kg CO<sub>2</sub> eq. was saved through their actions that year, and as an organisation which positions itself as both social and environmental in the Estonian non-profit sphere, their impact has also been in raising awareness of the issues of food waste. (Toidupank, n.d.)

#### **4.2.4 Fdration Franaise des Banques Alimentaires (French Federation of Food Banks)**

The first ever food bank model introduced in Europe developed into the French food banks federation in 1984, inspired, just as most others mentioned in this section, by the first food bank model created in the US by John Van Hengel (FEBA, n.d.). Today, the federation includes 79 food banks and 31 branches, and is a pioneer of food banking in the EU (Fdration Franaise des Banques Alimentaires, n.d.).

France was the first country in the EU to introduce legislation which requires food stores bigger than 350 m<sup>2</sup> to donate surplus food to food banks or charities, and fines for not doing so. The established

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<sup>20</sup> Per passenger

reputation of the French food banks federation was key in ensuring they are a stakeholder in such decisions. This sort of legislation can be incredibly beneficial, though it may have its downsides too. This is explored further in the Discussion section of this thesis. (Fédération Française des Banques Alimentaires, n.d.)

The federation is also very active in expanding their activities beyond surplus food redistribution. For example, similarly to the Czech food banks, they use transformation of wonky vegetables and fruits, or fresh produce close to its sell-by date, to create purees, soups, ready meals or jams. They also take initiative to utilize the value of non-edible food through various partnerships. For example, they support farmers in recycling food waste into animal food or compost. The food bank in Savoie mechanizes all of its organic waste through a partnership with a local agricultural school. Other food banks are partnered with energy producers to meth anise bio-waste into fuel. (Fédération Française des Banques Alimentaires, n.d.)

Furthermore, one of the federation's key actions in the last decade has been to increase social inclusion. They do this by employing people with a distance to the labour market, and through various integration projects. They also offer collecting, handling and sorting of food as a way to fulfil community service. Since 2019, there is also a partnership with the French Ministry of Justice, which is amplifying links with prison services and promoting community service integration within the food banks. (Fédération Française des Banques Alimentaires, n.d.). In 2021, 75,600,000 kg of surplus food was redistributed to 2.2 million beneficiaries through 942 charities in France. This has also led to savings of 241,920,000 kg of CO<sub>2</sub> eq., which is as much as 51,038 French citizens emit in one year<sup>21</sup>. (Fédération Française des Banques Alimentaires, n.d.)

#### **4.2.5 Magyar Élelmiszerbank Egyesület (Hungarian Food Bank Association)**

In Hungary, the Hungarian Food Bank Association serves as the national surplus food redistributor from the non-profit sector. Through other non-profit organizations in the country, they offer food to people who need it. They also organize food collections and food drives. In recent years, they are also aiming to raise awareness about food waste. They have partnered up with Urbango, which is an initiative that organizes outdoor treasure hunts. Their joint project, the Foodbango, is a treasure hunt, similar in nature to an Escape room, through which teams solve tasks, all with the theme of food waste and including many facts about the topic, as well as tips of household food reduction. This is an engaging way of bringing their work and the reasons for it to people who would otherwise not necessarily be aware of it. (Magyar Élelmiszerbank Egyesület, n.d.)

The impact of the Hungarian food bank in 2021 was 7,652,00 kg of edible food saved, which was redistributed to 250,000 beneficiaries through 550 non-profit organisations. This led to savings of 24,486,400 kg CO<sub>2</sub> eq..

#### **4.2.6 FoodCloud (Irish surplus food redistributor)**

Of the ten best practice organisations, FoodCloud is the only one with a slightly different model than a regular food bank. FoodCloud was started<sup>22</sup> in 2013, as continuation of an Enactus<sup>22</sup> project, with the aim to simplify surplus food donation and collection, and so increase amounts of food saved, while feeding more people. The tool for this is a mobile app, and the technology solution behind it called Foodiverse, which

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<sup>21</sup> Average per capita CO<sub>2</sub> emissions in France in 2021 = 4740 kg CO<sub>2</sub> (World Bank, 2019)

<sup>22</sup> "The Enactus program provides a platform for teams of college/university students to take entrepreneurial action for others while using business principles and innovation to further the Global Goals and create a sustainable positive impact on people, planet and prosperity." (Enactus, n.d.)

works by connecting retailers with surplus food and charities or community groups in their area who can take up this food. This is especially useful for fresh produce or items very close to their sell-by-date. (Christopher Hill, personal communication, May 2022)

FoodCloud offers the “traditional” food bank model with a twist, with three warehouses across the country in Dublin, Cork and Galway, which are equipped to store large amounts of food that can then be either picked up or brought out to charities. Next to this, their partner charities and community groups are also given the chance to be trained at using their platform Foodiverse and their mobile app, and thus be able to access bigger amounts of more nutritious food for their clients. (FoodCloud, n.d.). When FoodCloud was first established, Ireland lacked a food banking network, so charities mostly had to buy their food, whereas now, they only pay a symbolic fee for FoodCloud’s services and are able to use their funds for the services they provide to their clients. This meant that FoodCloud experienced fast growth in their first four years, fuelled by establishing new partnerships with various retailers and bringing on more charities. In 2018, they started to focus more on improving their services and existing connections, followed by more than two years of the Covid-19 crisis, which resulted in increased need for food banks all over Europe. For the last two years, they have worked on perfecting their technology and forging international partnerships. At the moment, the Czech Federation of Food Banks, as well as the Slovak one, are trialling and using their technology, while FareShare (UK surplus food redistributor) has already seen massive increase in redistributed food by using Foodiverse. (Christopher Hill, personal communication, May 2022).

FoodCloud also employs people with a distance to the labour market, or who experience unemployment under the Irish TUS scheme. They are also active in raising awareness of the problem of food waste through awareness campaigns. FoodCloud is planning on branching out into more international markets, as they believe they have a technology which can help other food banks to increase their impact. In 2021, FoodCloud redistributed 3,126,000 kg of surplus food in Ireland, as well as 13,254,000 kg internationally. This adds up to 52,413,003 kg CO<sub>2</sub> emissions equivalent avoided with an estimated savings of €49,140,000<sup>23</sup>, showing the power of using innovative technologies in the non-profit sector. (Christopher Hill, personal communication, May 2022)

#### **4.2.7 Fondazione Banco Alimentare ONLUS (Italian Food Bank Foundation)**

The Italian Food Bank Foundation was founded in 1989 in Milan and includes 21 food banks across Italy who daily recover surplus food to donate to charities, which then offer them to people in difficulty. The foundation is part of the Italian Alliance for Sustainable Development and is focused on tackling SDG 2, zero hunger, and SDG 12, responsible consumption and production, in particular target 12.3 which is to halve global per capita food waste by 2030. The foundation names innovative advances as very important in continuously improving and increasing their impact. These have been digital, such as using the Bring The Food web app to track and measure impact of their food recovery activities, and also organisational, such as their Siticibo programme. Siticibo recovers cooked and catered surplus, as well as fresh produce to redistribute on the same day. In 2021 alone, 17,010,000 kg of food, such as fruits, vegetables and bread was saved, alongside some 854,754 portions of cooked food (approx. 358,997 kg<sup>24</sup>). (Greta Caglioti, personal communication, August 2022)

The food banks network recovered 44,700,000 kg of food in 2021, avoiding around 198,620,790 of kg CO<sub>2</sub> eq. through the food banks and Siticibo combined. The total value of the food redistributed,

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<sup>23</sup> 1 kg of food = €3 (EPA, 2015) – but likely to be much more (FEBA, 2021).

<sup>24</sup> 1 meal = 0.42 kg (EPA, 2015)

which would have otherwise been lost amounts to €358,673,490. (Greta Caglioti, personal communication, August 2022)

#### **4.2.8 Maisto Bankas (Lithuanian Food Banks)**

The Lithuanian food banks were established in 2001 and work on the same principle as any other food bank. They have five regional food banks, and operate in 84 cities and districts of Lithuania. Like many others, they also have some interesting projects, apart from their main mission which is to save edible surplus food and ensure it is given to someone who needs it. One of these, is the Food Banks Academy, which is a training programme for the beneficiaries of FEAD (Fund for European Aid to the Most Deprived) in which they are given professional lessons on job searching, saving money and cooking healthy and nutritious meals from the donated food. Moreover, through their platform fud.lt, the food banks created a simple way for companies from the horeca sector to offer up their leftover food, which gets picked up food bank volunteers and redistributed, while saving the food provider disposal costs, as well as making continuous donors eligible for tax relief. (Maisto Bankas, n.d.)

In 2021, the activities of the Lithuania food banks resulted in 5,300,00 kg of food being collected and given to 143,00 beneficiaries, while saving 16,960,000 kg CO<sub>2</sub> eq.. (Maisto Bankas, n.d.)

#### **4.2.9 Federacja Polskich Banków Żywności (Federation of Polish Food Banks)**

In Poland, 32 food banks form the Polish food banks federation, which is a community of independent NGOs, all working with the aims of increasing food security, decreasing hunger and poverty, and tackling the issue of food waste. (Federacja Polskich Banków Żywności, n.d.). Next to surplus food redistribution, the federation and its members also strive to raise awareness of the problem of food waste and promote actions to counteract it. They do this through various educational projects and campaigns. One of their programmes is called PROM, and it is a research project aiming to develop an effective food waste monitoring system and a programme on reducing food waste in Poland, which is a partnership with the National Centre for Research and Development. (Federacja Polskich Banków Żywności, n.d.)

Moreover, the federation has set up the Ecomission educational programme, which is a project kindergartens and primary schools can use freely to educate their students about ecology, and increase environmental awareness amongst children, focusing on producing as little waste as possible. (Federacja Polskich Banków Żywności, n.d.). There are other projects, such as the Fields of Action, which is a two year project aiming to improve the work of the charity organisations partnered with the food banks, as well as reaching new ones to expand their activities. Another interesting initiative is the Financially Strong 2 project, in partnership with National Bank of Poland, devoted to financial education of the beneficiaries of the food banks who are in need of support, and can benefit from more than “just” food aid. (Federacja Polskich Banków Żywności, n.d.)

The Polish food banks federation has become very active in creating innovative campaigns and partnerships in the last few years, and are an example to be followed. Although supplying food to those in need, while having a positive environmental impact is already a great benefit to society, with increased funding the federation has had the chance the branch out and include more educational and research-based activities, which form a holistic approach to the issues of hunger and food waste. (Federacja Polskich Banków Żywności, n.d.). In 2021, the Polish food banks redistributed 58,000,000 kg of food to 1.5 million beneficiaries through 3200 charities, while saving 185,600,000 kg of CO<sub>2</sub> eq.. It will be interesting to see how they monitor the impact of their other activities in the future, and whether these can become something other food banks and food bank federations can replicate. (Federacja Polskich Banków Żywności, n.d.)

#### 4.2.10 Federación Española de Bancos de Alimentos (Spanish Federation of Food Banks)

The Spanish federation of food banks was founded in 1995 as an apolitical and non-denominational entity, with the aims of representing and promoting the work of 54 associated food banks across Spain. The main aim of these food banks is to fight against hunger, food insecurity and the environmental damages of food waste. (Federación Española de Bancos de Alimentos, n.d.). The campaigns of the federation centre mostly on receiving monetary donations from individuals, for different parts of their operations, and to purchase non-surplus for their beneficiaries. In 2021, the food banks in Spain redistributed 79,535,776 kg of surplus food to over 1.35 million beneficiaries through 7497 charities. Their activities have saved 254,514,483 kg of CO<sub>2</sub> eq. in 2021, which is as much as 509,029 round trip flights<sup>25</sup> between Madrid and Brussels (Flight Emissions Calculator, n.d.).

#### 4.2.11 Trends and Takeaways

It is interesting to see that even with ten organisations, whose mission and vision are the same - fighting hunger and food waste - the ways they reach their aims can vary greatly. In terms of similarities, almost all examples show the importance of good partnerships, both with other non-profit organisation, as well as across sectors for raising awareness and funds. Almost all organisations rely on a small percentage of full-time employees, and a larger portion of volunteers, without whom their activities and impact could not reach the magnitudes they do. All the strategies mentioned are based on the circular model of recovering surplus food from producers, industry and retail (and for some also horeca), and transporting this surplus to a food bank, where it is sorted and prepared to be distributed to its beneficiaries, usually through the help of another local charity or community organisation, or in some cases directly to the people in need. Yet, there is also a lot of variety in the way this process can be streamlined, as well as other activities a food bank can undertake. For example, food transformation, as is seen in the Czech federation of food banks and the French food banks, is an effective way to ensure fresh produce does not get thrown out, even if the network of food banks is unable to redistribute it before its use-by date. Furthermore, these two examples also show food banks that have focused on their partnership with the government, and have been able to influence important legislation, which has made food donation easier, and ensured surplus food must be offered to people before it is thrown out.

Moreover, food banks such as the French food banks network and FoodCloud are actively increasing social inclusion by employing people with a distance to the labour market, as well as people who are unemployed. The French food banks have a partnership with the Ministry of Justice to promote integration. The Polish food banks federation is also a great example of focusing on social inclusion, by offering financial education to their beneficiaries, similarly to the Lithuanian food banks, who offer training programmes on job searching and money-saving. The Estonian and Spanish food banks mostly focus on their day-to-day tasks, organising campaigns only in times when they need to raise money. This may not seem particularly innovative in comparison to some other examples mentioned here. However, the reality of non-profit organisations, who do such an important job for their societies that food banks do, is that they really are doing the “government’s job” and are often in need of more funding and support. Therefore, organising campaigns to raise money or to have people donate non-surplus food, especially in the winter, or during times of inflation and economic recession, is still an action which leads to commendable social impact.

When it comes to campaigns aiming to include the general public in the environmental goals of food banks, some great initiatives are being undertaken in Hungary and Poland. The treasure hunt

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<sup>25</sup> Per passenger

developed by the Hungarian food banks in partnership with Urbango is a great tool, which, for example companies can use for team building, and through playing an engaging game, people are learning important facts about food waste, while receiving tips on how to decrease their own food waste. Similarly, the Polish food banks federation is focusing on educating children and young adults about the importance of sustainability and preventing waste, as well as investing into research and development into food waste reduction. Such actions are incredibly necessary, as household waste in the EU accounts for 54% of all food wasted (EU Platform on Food Losses and Food Waste, 2019).

Lastly, there are organisation like FoodCloud and the Italian food banks, which are transforming the way a food bank can work and supporting circular economy efforts in Ireland and Italy respectively. FoodCloud has developed a simple to use, yet effective technology through which retailers are able to donate more food, and charities are also able to collect bigger amounts than without it. Seeing FoodCloud's aims to share their technology internationally is a positive outlook into the future, as the technology can support other food banks in redistributing higher amounts of surplus. If such technology can be embedded into markets across the European Union, and even further, it can lead to more surplus food being saved, as was the case with FareShare in the UK. Similarly innovative is Siticibo, the project of the Italian Food Bank Foundation, because they are the first in the EU to be redistributing cooked surplus. They are the best example of how redistribution of cooked food can be made possible, and are still improving their practices, in order to be able to redistribute bigger amounts of cooked food. Similarly to the fud.lt portal of the Lithuanian food banks, which are also in the first stages of creating a redistribution network of cooked food.

### **4.3 Sub-question 3: The Perceptions of Relevant Stakeholders in terms of Current EU Policies, Barriers and Future Opportunities of Surplus Food Redistribution**

In this section, perceptions and experiences of relevant stakeholders within the surplus food redistribution community in the European Union are discussed.

#### **4.3.1 Perception of the EU Policies**

According to the Secretary General of the European Food Banks Federation, especially the establishment of the EU Platform on Food Losses and Food Waste was “a key moment for the surplus food redistribution sector” (Angela Frigo and Anna Friederitz, personal communication, May 2022). During the interview with Cristina Lisetchi, a Policy Officer at the European Commission and expert on food losses and waste, she highlighted the amount of work that has been put into the platform, to ensure it can be useful for various actors across the EU (Cristina Lisetchi, personal communication, September 2022). This work culminated in, amongst others, recommendations to national governments on how to incentivise surplus food donation, such as fiscal incentives like tax reductions or zero tax on redistributed food whose monetary value reaches a low one compared to the initial value (Cristina Lisetchi, personal communication, September 2022).

Furthermore, guidelines are available on the EU Platform FLW to simplify donations by smaller businesses based on feedback on barriers. They also amended guidelines on frozen meat redistribution, allowing freezing meat at retail level, not only at slaughter as it was until then. Through the platform, the EU Food Donation Guidelines were also put together for all actors within surplus food redistribution to clarify the relevant EU legislations and thus facilitate compliance. (Cristina Lisetchi, personal communication, September 2022)

According to Lisetchi, “the EU has done as much as they could within their competence”. She highlighted the importance of Member States using the guidelines and recommendations they have created

to set national policies, laws and targets, as practices still differ greatly across the EU. Although there may still be some space for more policies and obligations on EU level, if those can be agreed on by all Member States, Lisetchi pointed out that there is no silver bullet policy, and thus a combination of various policies and strategies to combat (surplus) food waste should be implemented. For example, an EU law which would make surplus food donation an obligation in all Member States, could run into many issues in practice, as the infrastructure and possibilities on national levels differ greatly, and some Member States just lack infrastructure to be able to comply with such requirements. However, she believes that there are many possibilities for collaboration, sharing best practices and using the work that has been done by the EU to find the right fit for every Member State. (Cristina Lisetchi, personal communication, September 2022)

Anna Strejcová from Zachraň jídlo confirms what Lisetchi discussed. She believes the topic of fighting food waste must be “much more political in the national contexts”. Although targets and solutions are discussed at EU level, as well as at various summits, she does not see this translated to politics in the Czech Republic. According to Strejcová, it is now the turn of the national governments of the Member States to use EU policies and recommendations and set their own. (Anna Strejcová, personal communication, November 2022)

Cristina Lisetchi mentioned the upcoming amendment to the EU guidelines on food donations, which is scheduled to be published in 2023 (Cristina Lisetchi, personal communication, September 2022). Greta Caglioti also mentioned that there is limited communication on the guidelines, which alongside individual states not labelling the issue of food waste as pressing as it is, is slowing down the process of positive change (Greta Caglioti, personal communication, August 2022). Lastly, all three stakeholders from food banks interviewed – FoodCloud, the Italian Food Bank Foundation and the Czech food banks federation mention their positive view of the funding provided by the EU, that they are able to access through their Ministries of Environment or Social Affairs (Veronika Láchová, personal communication, June 2022; Christopher Hill, personal communication, May 2022; Greta Caglioti, personal communication, August 2022).

#### **4.3.2 Barriers to Surplus Food Redistribution**

Although surplus food redistribution in the EU is becoming increasingly more widespread every year, with new food banks, as well as innovative solutions from the for-profit sector being established, there are still some barriers that existing organisations face. For this research, it was important to understand what these are, and, as Cristina Lisetchi from the European Commission said, that such feedback is used to amend existing policies or recommendations to simplify the process of surplus food redistribution. She points out that at the moment, some obstacles are, for example, “lack of understanding of ‘best before’ versus ‘use by’ dates”<sup>26</sup>, as well as lack of funds and volunteers, or the fact that businesses have to comply with everything that bigger retailers comply with, which can often be too time consuming. There is also the issue of different levels of infrastructure – Lisetchi, for example, mentions that Romania is at the beginning of their surplus food redistribution journey, with little infrastructure in place at the moment. Lastly, she highlights the issue of competing policies between the EU and national level – in Sweden, for example, surplus food is incentivised to be used for bioenergy production, rather than donation, even if it is edible, going against the Food Waste Hierarchy. Thus, according to Lisetchi, one of the main issues at

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<sup>26</sup> Food is still perfectly edible after its “best before” date, however, due to lack of awareness, many consumers take it to have the same meaning as “use by”, which is the date by which food must be eaten before it may be compromised. (EU Platform on Food Losses and Food Waste, n.d.)

the moment might be lack of awareness of the problem, and also of the possible solutions, which are available, as well as all the supporting documents and research carried out by the EU Platform on Food Losses and Food Waste, which could be extremely helpful at national level. (Cristina Lisetchi, personal communication, September 2022)

A barrier that FEBA has experienced is the general view of food banks. These are still often seen very much as social organisations, with much less awareness of the general public on their environmental missions – however, as Angela Frigo said, “food banks are equally important for their social and environmental impacts”. Most food banks act as intermediaries between retailers and charities or community groups, who are then in charge of fulfilling the social need for surplus food. Angela Frigo from FEBA mentioned, just as Cristina Lisetchi did, that barriers often crystallise at national level, with authorities giving stricter interpretation of European legislation, for example in the case of redistribution after best before date, which is allowed on EU level, but some Member States ban it. Lastly, from the view of FEBA, as the representative of food banks, they see food banks focus “all of their energy on their day to day work, meaning very little is left for promotion and marketing of their activities”. The lack of employees and funding of food banks is the problematic cause of this. It is necessary for the future that food banks are known for their social, environmental and economic impacts, and thus supported and funded much more. (Angela Frigo and Anna Friederitz, personal communication, May 2022)

Greta Caglioti from the Italian Food Bank Foundation confirmed the problem of national authorities’ strict interpretations of the EU policies and guidelines. She explained that in Italy at the beginnings of the food banks’ activity, they were “subjected to critique and rigid interpretations by both the authorities and the public”, with exaggerations on health and safety and food hygiene, fuelling suspicion amongst retail partners, as well as volunteers. This also resulted in beneficiaries distrusting the food they were receiving, and forming an idea that this is somewhat “second-class”. They were able to clarify the situation through the academic work of the Polytechnic University in Milan, as well as increased discussions with policymakers, which led to regulatory developments and more clarity amongst the general public. (Greta Caglioti, personal communication, August 2022)

The Czech food banks federation has also experienced “national policy making” as an obstacle to their work, citing lack of focus on policies which support combatting food waste, or even legislations which go against the EU recommendations. Even if now the situation has improved in Czech Republic, especially after the law which required surplus donation was passed, there are still gaps. For example, Veronika Láčková explained that in Czech Republic, the work of the food banks is funded and supported by the government from the environmental point of view, even if, paradoxically, their work is seen as mostly social by the majority of the society. This means that they are supported for the food recovery part of their activities but not for the redistribution. She mentioned that this may be due to the authorities having a problem with categorising food banks, as they are intermediaries in the chain of surplus food reaching beneficiaries. Láčková also mentioned this can be an issue when they apply for grants and government funding, as it is unclear in which category they should belong. They can also get into difficulties, as they are an apolitical organisation, but if, for example a politician or a party support them financially, the politicians cannot use this for their own promotion. This is something that the politicians would usually like to do, and so Láčková pointed out that there is “a lot of diplomacy involved” in her work too. (Veronika Láčková, personal communication, June 2022)

Within the Czech Republic, Anna Strejcová also mentioned one other barrier to surplus food redistribution, which is the fact that “contributory organisations, which is a category into which most school and hospital canteens belong, cannot legally donate surplus food, thus only canteens owned by



commercial companies can donate”. This is very paradoxical and is a futile reason to disallow donation, however, such paradoxical national legislations, which hinder surplus food redistribution are unfortunately present in many EU countries. Furthermore, she is worried that there is not enough support by the government of surplus food redistribution outside of the food banks – there is only so much the food banks can collect, and the remaining surplus is getting thrown out. She believes there needs to be more policy focus also on supporting other redistribution possibilities. (Anna Strejcová, personal communication, November 2022)

Lastly, Christopher Hill from FoodCloud also discussed the gaps in governmental support for surplus food redistribution – namely in Ireland, there are no legislative incentives or punishments for retailers and industry in terms of food donation. This is interesting to see, as FoodCloud has nevertheless been able to build a strong network of partners, but perhaps this shows potential for even more surplus food redistribution with the right policy package. Apart from this, FoodCloud’s obstacles were quite different to the other food banks mentioned, due to the nature of their model. As they base surplus food redistribution on technology, they had to be able to prove to charities and retailers that being trained to use their technology would be beneficial to them, and allow charities to access more food, more often, and in an easier way. For the retailers, FoodCloud’s job was to show them that by using their technology and donating surplus, they would gain reporting, full traceability, as well as possibilities to use this work for their CSR. Hill explained that “the main challenge has been to ensure that it is almost as easy to donate, as it would be to throw out to landfill, with the added bonus of the climate and social impact”. The fact that they have been successful in doing this and overcoming such a barrier shows the potential of sharing their technology with other food banks. (Christopher Hill, personal communication, May 2022)

#### **4.3.3 Future Opportunities and Challenges**

The EU Platform of Food Losses and Food Waste and FEBA are continuously working on improving and scaling out solutions to food waste. The next steps of the EU Platform FLW will be updating donation guidelines and promoting those on national levels. Such promotion is necessary to raise awareness, as there are still many operators who are not aware of the fact that they can easily donate their surplus. Therefore, reaching them through the help of the communication channels of Member States will be a priority. Generally, the platform is looking to increase knowledge sharing, including challenges and barriers, as well as best practice and tips on what works across countries. (Cristina Lisetchi, personal communication, September 2022)

For FEBA, alongside this knowledge sharing, a key target is communicating the need for acquiring funding for surplus food redistribution. Most funding of food banks is still coming from the private sector, and with various tax legislations there is some economic support of the food donors, but there is dire need for support to food banks and charities. Furthermore, EU funds are available for the agricultural sector, the private sector, and many others but there is no specific funding available for food banks and surplus food redistribution. This needs to change, because the sector is still a volunteer based sector, regardless of the complex logistics and administration in it. As Angela Frigo mentioned, “this should not be the case for work that is crucial to societies all over Europe”. (Angela Frigo and Anna Friederitz, personal communication, May 2022)

Similarly, Greta Caglioti from the Italian Food Bank Foundation talked about the need for more regulatory support, such as through tax incentives in Italy. She also mentioned the need for increased funding, both “to invest into training and digitalisation of the federation’s activities, and also to be able to purchase the containers and materials needed to, for example extend shelf life of perishable items”, which is crucial especially for the Siticibo project, and cooked food redistribution in general (Greta Caglioti,

personal communication, August 2022). Echoing this, Anna Strejcová sees the need for more funding, not only of food banks but also organisations that aim to raise awareness of the issue of food waste, or innovative solutions from the for-profit sector. With increased cooperation between national governments and NGOs, non-profits and other organisations, more solutions than just food banking can be found and supported, which is necessary if we want to reach a point at which no edible food is wasted at all (Anna Strejcová, personal communication, November 2022).

Christopher Hill from FoodCloud also discussed the frustrations that can come with counting on the EU and national policies to improve surplus food donation, because such change is “inevitably slow, as there are many other stakeholders apart from the food bank whose motivations are being taken into account”. At the moment, he believes there is excessive responsibility on surplus food redistributors, and would like to see this change in the future. He is hopeful that with 2030 nearing, policymakers on national levels and organisations from the private sector will try harder to reach the EU and UN targets that were set for the year 2030, which would also mean improvement for the work surplus food redistributors do. (Christopher Hill, personal communication, May 2022)

Similarly, Veronika Láchová sees much potential in improving education of food waste and surplus amongst adults, as well as children and teenagers in schools. This is something that needs to come from outside the surplus food redistribution sector – although campaigns such as Too Good To Go’s awareness campaign or the educational programmes of the Polish food banks are doing a great job, it is important that we avoid a future in which all responsibility falls on the shoulders of the surplus food redistributors. Good and meaningful cross-sectoral partnerships are needed. (Veronika Láchová, personal communication, June 2022)

Lastly, all interviewees agree that increased and improved monitoring and reporting is an important attribute of the future of surplus food. Christopher Hill also made a point of following a food systems perspective; a more global, connected thinking about the issue of surplus food waste is needed. Often, for example, it is not clear who owns the problem of imported food that is wasted, and seeing this issue more holistically is key in solving it, and thus creating a world in which no good food goes to waste. (Christopher Hill, personal communication, May 2022)

## **5. Discussion**

It is paramount that food waste management techniques are developed according to the Food Waste Hierarchy, as well as circularity principles, giving priority to higher value uses. Thus, where prevention is not possible in a cost effective way, food redistribution strategies are always the preferred option, to ensure that surplus food can be used primarily to feed people. Surplus food redistribution is a possible answer to the contradiction between massive food wastage and high food poverty (Bagliori et al., 2017). The impact figures of organisations and literature research, as well as interviews carried out for this study have shown the positive environmental, social and economic effects of redistributing surplus food. In this chapter, the key findings of this research and their relevance are discussed, followed by the limitations of this study and recommendations for further research, which can build upon the findings of this thesis.

### **5.1 Key Findings**

#### **5.1.1 More Activities in Non-profit than For-profit Sector**

The first finding of this research is the fact that there are more activities of surplus food redistribution in the non-profit sector as opposed to the for-profit sector. This can be explained by the historical tradition of surplus food used by charities and charity-like organisations to support people who are food insecure, as mentioned in the literature review, as well as by some interviewees. However, if policymakers focus on supporting and funding the environmental side of surplus food redistribution, and if large-scale awareness campaigns are created, there is potential for non-profit organisations to invest more into their activities (warehouses, transport, marketing) and redistribute higher amounts, as well as for for-profit organisations to play a bigger role in ensuring no more food is wasted. At the moment, the amount of surplus food across the European Union is higher than what food banks and other organisations from the non-profit sector are able to redistribute, therefore, offering the surplus that cannot be redistributed to people in need to other (paying) recipients can further decrease amounts of food wasted in the EU. Although none of the for-profit organisations were included in the ten best practice examples, they can have an important role to play in redistributing the surplus food that food banks do not have capacity to, while involving more of the general public in the fight against food waste. For example, Too Good To Go redistributed over 52.5 million meals in 2021 across all its markets, which shows potential for increased amounts of redistributed surplus also in the EU. It is to offer different possibilities of saving surplus food, in order to stop the wastage of edible food. By enabling not only food insecure beneficiaries, but also other consumers to be able to access surplus food for discounted prices, higher amounts of food can be saved. There is considerable potential for non-profit organisations to expand their activities and increase their impact, while simultaneously encouraging for-profit organisations to have a more prominent role alongside them, as the amount of surplus food in the EU is still higher than the non-profit sector can handle alone.

#### **5.1.2 Expansion of Activities of Food Banks and Need for Awareness**

The ten best practice examples were all food bank models, with various activities next to surplus food redistribution. This shows that often food banks and other non-profit food redistributors have an important role to play for their communities and societies beyond “only” providing food, and thus their activities should be encouraged and supported institutionally. Many organisations were shown to be expanding their activities, such as through employment of people with a distance to the labour market in various social inclusion schemes (FoodCloud, French Federation of Food Banks), or transforming fresh produce into longer lasting foods (French Federation of Food Banks, Czech Federation of Food Banks). There were also some innovative food banking models; the use of a mobile app to enable easier surplus donation and

collection (FoodCloud), or redistribution of cooked surplus (Siticibo). Some others have created educational programmes and awareness campaigns on the topic of food waste (Federation of Polish Food Banks). The need for more awareness was a key takeaway from all interviewees. This refers to various types of awareness: awareness of the issue of food waste, awareness of the work that food banks do, as well as awareness of the current possibilities of saving food.

There are numerous reasons why increased awareness is important in this context. Firstly, there is need to raise awareness on how big the food waste problem really is in terms of the environment, societal ramification and economic value that is being lost. Secondly, the work the non-profit organisations do to combat climate change and help their societies, while carrying out an important job for their governments, should be highlighted and known, in order to secure more support and funding, as well as informing the general public and gaining their support. Lastly, there are already established and impactful organisations, which can provide solutions to the problem of (edible) food waste, as well as various guidelines and recommendations from the European Commission, which national governments can use in their countries, in order to simplify the process of surplus food donation. With increased awareness of this, more retailers can take part in donating, knowledge-sharing can be boosted and best practices replicated across the EU.

### **5.1.3 Governmental Support**

It can often be national governments who do not do enough to support surplus food redistribution, and in some cases even hinder it. There are national policies across the Member States which go directly against the policies and recommendations of the EU. Some examples include the ban of surplus redistribution from contributory organisations (most school and hospital canteens) in the Czech Republic, or complete ban of surplus redistribution in Luxembourg. This is a barrier to surplus food redistribution, which could be easily overcome by harmonising national policies with EU recommendations and guidelines, and replicating policies which are seen to be having a positive effect in terms of high amounts of surplus redistributed from other countries. This is an important finding, as it shows there are already resources on which national governments across the EU can base their legislation and policies which enable surplus food redistribution, while ensuring health and safety, and food hygiene standards are upheld. Thus, one of the key findings of this research is the need for increased support and engagement of national governments in the fight against food waste, and making use of the guidelines and policy recommendations already available to them from the EU. There are also further legislative steps that can be taken, such as tax reduction on donated surplus food. However, these must be developed based on existing research and examples, in order to avoid them being misused, such as by retailers purposefully creating more waste, if its donation could be economically beneficial to them. Lastly, there is need for stricter, harmonised and required measuring and reporting of food waste from individual countries, as well as retailers and the industry, in order to understand how much food is actually wasted, and adapt the policies and solutions accordingly.

### **5.1.4 Funding**

Most importantly, surplus food redistribution of the non-profit sector lacks funding. All interviewees in this research agreed that in general, the solutions are already there, but there is a lack of funding to increase their impact, as well as for them to be able to invest into marketing and communications, which are crucial for them in getting their mission out to people and potential donors and funders. Knowledge-sharing and replication of best practices is key in saving more surplus food, and with increased funding, this can be made possible. Every EU country is different, and in every country there are also regional differences. Knowledge-sharing can support surplus food redistribution locally, in a way

which suits its context well, and is possible within the local infrastructure. There are numerous organisations with ready-made solutions that they can share with others in order to improve surplus food redistribution across the European Union, and with increased focus on the issue of food waste and more funding, zero surplus food waste can become a reality.

## **5.2 Limitations of this Research**

A limitation of this research was the fact that not all of the stakeholders from the organisations, which were found as best practice examples in this research, were available for an interview. It would have been useful to obtain perceptions of policies, as well as challenges to their activities from all best practice organisations, to understand if their experiences are similar to the ones who were interviewed. However, in the end having the possibility to speak to three organisations from three different EU regions (Southern, Central and Eastern and Western Europe), which all mentioned similar experiences, showed a pattern in the challenges, opportunities and perceptions of policies. This limitation was also tackled by substituting some interviews with literature reviews, as well as gaining an overall view of experiences of food banks from FEBA.

Lastly, the comparison of organisations in terms of environmental impact was based on amount of surplus redistributed (in kg)/capita/year. There are external factors which can influence this, such as the policy environment of the country of an organisation, as well as how long the organisation has been active for, and thus what kind of partnerships it has developed in that time. It would not have been possible to carry out a comparison which takes into account all possible limiting factors, and thus what has been done is a simplification. However, it is still a useful addition to the body of knowledge on surplus food redistribution in the EU, as the finding best practice examples was done in order to understand what can work well, and this also includes the policy environment or the importance of lasting partnerships. This study can form the basis of exploring surplus food redistribution in the EU further.

## **5.3 Recommendations for Further Research**

There are many possibilities of further research into the topics of food waste and surplus food redistribution. If data can be provided by all organisations, it would be interesting to carry out a study, which includes the for-profit sector as well as the non-profit, and interviewing a higher number of stakeholders, both from the redistribution organisations and from other NGOs, as well as policymakers from national governments, and also recipients of surplus food and retail workers directly involved in the process of redistribution. This could produce new insights on the activities, impact, challenges and opportunities of surplus food redistribution. Moreover, it would be interesting to change the scope to a different region or continent, as well as looking at global trends, in order to see similarities and differences in activities, as well as challenges to surplus food redistribution. Such studies could form a basis for global knowledge-sharing and replicating of best practice examples.

Including non-edible food waste is also important in order to understand how various strategies such as surplus food redistribution, composting, anaerobic digestion, and turning non-edible food into animal feed or into biofuel can co-exist and form a holistic approach to combatting food waste based on circularity and sustainability.

## 6. Conclusion

In response to the issues of food waste and food insecurity in the European Union, the aim of this research was to give an overview of surplus food redistribution in the EU, and has shown its potential, bringing this strategy into focus as a win-win solution for the environment and society. The strategy of surplus food redistribution in line with circularity principles was shown to have potential for positive environmental impact as well as positive social effects of making food available to people, as opposed to letting it go to waste, while being economically prudent.

In order to answer the research question of this study, an academic and grey literature review was used to find active surplus food redistribution organisations and their impact figures. An MCDA was developed, with the focus on environmental and social impact, as well as economic viability, in order to find the best practice examples among the organisations. Once the ten best practice examples were found, interviews were used where possible to obtain more information on their activities, impact, the challenges they face, the opportunities they have seen and their perceptions of surplus food redistribution policies. When interviews were not possible, literature research was used.

Through presenting the most successful surplus food redistribution organisations in the EU, describing their activities and impact, as well the challenges they face and their perception of current EU policies and opportunities for the future, the research question “*How can the issue of food waste be combatted through surplus food redistribution in the European Union?*” was answered. The conclusion of this research is that the issue of food waste in the European Union can be combatted through increased funding and awareness of surplus food redistribution organisations and their activities, as well as knowledge-sharing and replication of virtuous models, supportive national policies based on EU guidelines, and lastly harmonised monitoring of food waste and reporting requirements across Member States.

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## 8. Annex

### 8.1 Interview Guide Surplus Food Redistributors

About the project:

This project is a Master thesis on the topic of surplus food redistribution possibilities across the European Union. It aims to find best-practice examples which are active in surplus food redistribution in various member states, and show their environmental, social and economic impact. The goal is to show the gains of investing time and funds into such efforts.

The aim of the interviews with organisations:

- Learn about the environmental, social and economic impact of existing strategies
- Learn about obstacles within surplus food redistribution
- Understand what kind of support organisations need

The main research question and sub-questions are as follows:

RQ:

*“How can the issue of food waste be combatted through surplus food redistribution in the European Union?”*

SubQs:

4. *What are the most successful food redistribution organisations amongst the EU Member States?*
5. *What are the activities and the impact of the current best practice food redistribution organisations in the EU?*
6. *What are the perceptions of relevant stakeholders in terms of current EU policies, barriers and future opportunities of surplus food redistribution?*

Questions for organisations:

- Since when is the organisation active?
- How would you describe the impact of your organisation?
- What kind of development did you see in terms of impact across the years?
- What helped you increase your impact?
- What have been some obstacles to your organisations?
- What kind of support that you do not currently have would be useful to your organisation?
- What is your view on the current EU policies regarding surplus food redistribution?
  - o Positives?
  - o Negatives?
- Have you/do you receive funding and/or support from the EU institutions?
  - o If so, what kind?

- If so, how has it helped or not helped you?
- How scalable do you think your pilot kitchens with Albert are?
- Would you be interested in scaling out your unique projects, e.g. pilot kitchen?
- What is has been your environmental impact in 2021 (see indicators)?
- What has been your social impact in 2021(see indicators)?
- What is has been your economic impact in 2021 (see indicators)?
- What has been your overall environmental impact?
- What has been your overall social impact?
- What has been your overall economic impact?
- Is there anything else you would like to mention?

## 8.2 Interview Guide other Stakeholders

About the project:

This project is a Master thesis on the topic of surplus food redistribution possibilities across the European Union. It aims to find best-practice examples which are active in surplus food redistribution in various member states, and show their environmental, social and economic impact. The goal is to show the gains of investing time and funds into such efforts.

The aim of the interviews with organisations:

- Learn about the environmental, social and economic impact of existing strategies
- Learn about obstacles within surplus food redistribution
- Understand what kind of support organisations need

The main research question and sub-questions are as follows:

RQ:

*“How can the issue of food waste be combatted through surplus food redistribution in the European Union?”*

SubQs:

7. *What are the most successful food redistribution organisations amongst the EU Member States?*
8. *What are the activities and the impact of the current best practice food redistribution organisations in the EU?*
9. *What are the perceptions of relevant stakeholders in terms of current EU policies, barriers and future opportunities of surplus food redistribution?*

Questions for organisations:

- Why is food surplus redistribution important?

- How would you describe the impact of surplus food redistribution in the EU and your country (Czech Republic) over the years?
  - o Environmental, social, economic
- What bodies do you collaborate with?
  - o Do you collaborate with the Czech Federation of Food Banks?
- What indicators do you find measure impact well?
  - o Environmental, social, economic
- What are some of the most important policies on food waste and surplus food redistribution in your opinion?\*
- What are some obstacles to surplus food redistribution in the EU?
- What would you like to see change/improve within the EU in terms of surplus food redistribution?
  - o What do you think is important for a future in which less food is wasted?
- What do you think about a united EU approach to dealing with food waste through surplus food redistribution?
- Is there anything else you would like to mention?

### 8.3 Overview of Activities from Non-profit Sector

Table 5: Overview of activities from non-profit sector

Name of organisation	Country of origin	Brief description	Impact in 2021 <sup>27</sup>
Wiener Tafel	Austria	<ul style="list-style-type: none"> <li>• Active in Vienna (only) since 1999</li> <li>• Storage of very large amounts of surplus food in TafelHaus storage facility</li> <li>• Side projects to involve greater public: Meaningful Marmelade/Sugo/Soup, TafelBox, Odor &amp; Taste Lab etc.</li> </ul> (Wiener Tafel, n.d.)	<ul style="list-style-type: none"> <li>• 746,100 kg of food saved</li> <li>• 20,000 beneficiaries served</li> <li>• 92 charities supported</li> <li>• 2,387, 520 kg CO<sub>2</sub> eq. saved</li> </ul> (Wiener Tafel, n.d.)
Fédération Belge des Banques Alimentaires/Belgische Federatie van Voedselbanken	Belgium	<ul style="list-style-type: none"> <li>• Co-ordinating body, representing 9 regional food banks across Belgium</li> <li>• Redistributes surplus food from industry and retail</li> <li>• Organizes public food collections</li> </ul> (FBBA, n.d.)	<ul style="list-style-type: none"> <li>• 22, 229, 000 kg of food saved</li> <li>• 177,238 beneficiaries served</li> <li>• 654 charities supported</li> <li>• 71,132,800 kg CO<sub>2</sub> eq. saved</li> </ul> (FBBA, n.d.)
Bulgarian Food Bank	Bulgaria	<ul style="list-style-type: none"> <li>• Surplus food</li> </ul>	<ul style="list-style-type: none"> <li>• 184, 000* kg of</li> </ul>

<sup>27</sup> Some organizations have not yet publicly provided their impact for year 2021, for those impact from year 2020 is used and signaled with an asterisk (\*).

		<p>redistribution to people in need through charities and other non-profit organisations</p> <ul style="list-style-type: none"> <li>• First registered food bank in Bulgaria (Bulgarian Food Bank, n.d.)</li> </ul>	<p>food saved</p> <ul style="list-style-type: none"> <li>• Over 20,000* beneficiaries served</li> <li>• N/A charities supported</li> <li>• 588,800* kg CO<sub>2</sub> eq. saved (Bulgarian Food Bank, n.d.)</li> </ul>
Banka Hrane Hrvatska	Croatia	Information N/A for general public	Information N/A for general public
No federation, small initiatives	Republic of Cyprus	Not applicable	Not applicable
Česká Federace Potravinových Bank	Czech Republic	<ul style="list-style-type: none"> <li>• National and international representation of 15 regional food banks</li> <li>• Redistributes (not only) surplus food to non-profit organisations helping seniors, single parents, families in crisis, homeless people or people with mental and physical disabilities</li> <li>• Food transformation kitchens to use large amounts of surplus fresh produce by drying, pickling, making jams etc.</li> <li>• In some of its operations uses the FoodCloud technology (see “FoodCloud” row below)</li> </ul> <p>(Česká federace potravinových bank, n.d.)</p>	<ul style="list-style-type: none"> <li>• 9,300,000 kg of food saved</li> <li>• Over 200,000 beneficiaries served</li> <li>• 1175 charities supported</li> <li>• 29,760,000 kg CO<sub>2</sub> eq. saved (Česká federace potravinových bank, n.d.)</li> </ul>
FødevareBanken	Denmark	<ul style="list-style-type: none"> <li>• The food bank received surplus food from wholesalers and food producers and through a large volunteer network distributes it to non-profit organisations across the country (FødevareBanken, n.d.)</li> </ul>	<ul style="list-style-type: none"> <li>• 1,377,000 kg of food saved*</li> <li>• Over 32,792 beneficiaries served*</li> <li>• N/A charities supported</li> <li>• 4,406,400 kg CO<sub>2</sub> eq. saved* (FødevareBanken, n.d.)</li> </ul>
Toidupank	Estonia	<ul style="list-style-type: none"> <li>• Surplus (and other) food</li> </ul>	<ul style="list-style-type: none"> <li>• 2,880,000 kg of</li> </ul>

		<p>redistribution across the country to people in need (Toidupank,n.d.)</p>	<p>food saved</p> <ul style="list-style-type: none"> <li>• N/A beneficiaries served</li> <li>• N/A charities supported</li> <li>• 9,216,000 kg CO<sub>2</sub> eq. saved</li> </ul> <p>(Toidupank, n.d.)</p>
Direct and decentralized food redistribution system	Finland	Not applicable	Not applicable
Fédération Française des Banques Alimentaires	France	<ul style="list-style-type: none"> <li>• First food bank to ever be established in Europe in 1984</li> <li>• Today: federation of 79 food banks and 31 branches</li> </ul> <p>(Fédération Française des Banques Alimentaires, n.d.)</p>	<ul style="list-style-type: none"> <li>• 75,600,000 kg of food saved</li> <li>• 2.2 million beneficiaries served</li> <li>• 942 charities supported</li> <li>• 241,920,000 kg CO<sub>2</sub> eq. saved</li> </ul> <p>(Fédération Française des Banques Alimentaires, n.d.)</p>
Tafel Deutschland e.V	Germany	<ul style="list-style-type: none"> <li>• The German Tafel is a collection of over 960 Tafel food banks across Germany</li> <li>• They collect surplus food and donate or sell for a symbolic sum to people in need directly</li> <li>• Volunteer based, no government financing, only rely on private donors</li> </ul> <p>(Tafel Deutschland, n.d.)</p>	<ul style="list-style-type: none"> <li>• 265,000,000* kg of food saved</li> <li>• 1.65* million beneficiaries served</li> <li>• N/A charities supported</li> <li>• 848,000,000* kg CO<sub>2</sub> eq. saved</li> </ul> <p>(Tafel Deutschland, n.d.)</p>
Food Bank Greece	Greece	<ul style="list-style-type: none"> <li>• Surplus food redistribution to charity organisations and shelters</li> <li>• Volunteers cook a daily meal offered to anyone in need</li> </ul> <p>(Food Bank Greece, n.d.)</p>	<ul style="list-style-type: none"> <li>• 2,168,000 kg of food saved</li> <li>• 56,365 beneficiaries served</li> <li>• Over 150 charities supported</li> <li>• 693,760 kg CO<sub>2</sub> eq. saved</li> </ul> <p>(Food Bank Greece, n.d.)</p>
Magyar Élelmiszerbank Egyesület	Hungary	<ul style="list-style-type: none"> <li>• A federation of food banks receiving surplus food from wholesalers</li> </ul>	<ul style="list-style-type: none"> <li>• 7,652,000 kg of food saved</li> <li>• Over 250,000</li> </ul>

		<p>and producers, giving this food for free to non-profit organisations, which supply those in need with it (Magyar Élelmiszerbank Egyesület, n.d.)</p>	<p>beneficiaries served</p> <ul style="list-style-type: none"> <li>• Over 550 charities supported</li> <li>• 24,486,400 kg CO<sub>2</sub> eq. saved</li> </ul> <p>(Magyar Élelmiszerbank Egyesület, n.d.)</p>
FoodCloud	Ireland	<ul style="list-style-type: none"> <li>• FoodCloud is an Irish non-profit social enterprise which was born as a tech start-up, introducing a technology through which retailers with surplus food could connect with charities in their area in order to most effectively deliver this food to beneficiaries</li> <li>• Now, it consists of two solutions: 3 warehouses in Ireland, which work on a food bank model, distributing surplus food to charities, as well as the technology, recently renamed Foodiverse, which connects retailers and producers with charities and community organisations across Ireland, as well as 3 other European countries (Czech Republic, Slovakia, UK)</li> <li>• Projects aiming to raise awareness of food waste issues</li> </ul> <p>(FoodCloud, n.d.)</p>	<p>Impact in Ireland</p> <ul style="list-style-type: none"> <li>• 3,126,000 kg of food saved</li> <li>• N/A beneficiaries served</li> <li>• Over 544 charities supported</li> <li>• 10,000,003 kg CO<sub>2</sub> eq. saved</li> </ul> <p>International impact</p> <ul style="list-style-type: none"> <li>• 13,254,000 kg of food saved</li> <li>• N/A beneficiaries served</li> <li>• N/A charities supported</li> <li>• 42,413,000 kg CO<sub>2</sub> eq. saved</li> </ul> <p>(FoodCloud, n.d.)</p>
Fondazione Banco Alimentare ONLUS	Italy	<ul style="list-style-type: none"> <li>• The Banco Alimentare Network recovers food surpluses daily from the entire agrifood chain (fruit and vegetables, industry, large-scale organised distribution and catering),</li> </ul>	<p>Food Banks Impact:</p> <ul style="list-style-type: none"> <li>• 44,700,000 kg of food saved</li> <li>• 1,669,306 beneficiaries served</li> <li>• 7,612 charities</li> </ul>



		<p>redistributing them free of charge to local non-profit organisations that offer direct help to people in difficulty</p> <ul style="list-style-type: none"> <li>• Siticibo project: recovery of surplus food from catering and distribution sectors, same day recovery and redistribution due to food safety. This project is one of few examples of catering surplus redistribution, showing it to be a viable possibility. (Fondazione Banco Alimentare ONLUS, n.d.)</li> </ul>	<ul style="list-style-type: none"> <li>• supported</li> <li>• 143,040,000 kg CO<sub>2</sub> eq.<sup>28</sup> saved</li> </ul> <p>Siticibo Impact:</p> <ul style="list-style-type: none"> <li>• 17,010,000 kg of food saved (bread, fruit, dry, perishable)</li> <li>• And 854,754 portions of cooked food redistributed = approx., 358,997 kg<sup>29</sup></li> <li>• 55,580,790 kg CO<sub>2</sub> eq. saved (Fondazione Banco Alimentare ONLUS, n.d.)</li> </ul>
No surplus food redistribution, only small projects buying food	Latvia	Not applicable	Not applicable
Maisto Bankas	Lithuania	<ul style="list-style-type: none"> <li>• Redistribution of surplus food to community organisations or local posts of the food bank, which then offer this food to those in need</li> <li>• Also organises food drives and food collection and donation in public spaces, e.g. supermarkets (Maisto Bankas, n.d.)</li> </ul>	<ul style="list-style-type: none"> <li>• 5,300,000 kg of food saved</li> <li>• 143,000 beneficiaries served</li> <li>• N/A charities supported</li> <li>• 16,960,000 kg CO<sub>2</sub> eq. saved (Maisto Bankas, n.d.)</li> </ul>
Banque Alimentaire Luxembourg a.s.b.l	Luxembourg	<ul style="list-style-type: none"> <li>• Food bank model originally based in majority on surplus food collection</li> <li>• Since March 2020, following the start of the Covid-19 crisis, collections of surplus food are no longer legally allowed in</li> </ul>	N/A due to change in legislature prohibiting surplus food redistribution

<sup>28</sup> This is based on the conversion used as part of the methodology of this research for consistency. The organization shares different figures based on different methodology.

<sup>29</sup> 1 meal = 0.42 kg (EPA, 2015)

		<p>Luxembourg. The food bank now buys all of their food (through private financial donations) in order to feed the rising amount of people in need of their services.</p> <p>(Banque Alimentaire Luxembourg, n.d.)</p>	
Malta Food Bank Foundation	Malta	<ul style="list-style-type: none"> <li>• Redistributes surplus food, as well as organising food collection and donation</li> <li>• Lack of data online with regards to operations and impact<sup>30</sup></li> </ul> <p>(Malta Food Bank Foundation, n.d.)</p>	Information N/A for general public
Voedselbanken Nederland	Netherlands	<ul style="list-style-type: none"> <li>• The food banks in the Netherlands in majority distribute directly to their beneficiaries, either through the official food banks in different cities or through their issue points</li> <li>• Their data is tracked differently – they do not track food in weight (kg) but rather in number of products redistributed, making it impossible to compare with other countries</li> <li>• Furthermore, they only provide certain data for the most recent years – the latest data on amount of products distributed in from 2018</li> </ul> <p>(Voedselbanken Nederland, n.d.)</p>	<ul style="list-style-type: none"> <li>• N/A kg of food saved</li> <li>• Approx.. 44 million units of product redistributed in 2018</li> <li>• 160,500 beneficiaries served</li> <li>• N/A charities supported</li> <li>• N/A kg CO<sub>2</sub> eq. saved</li> </ul> <p>(Voedselbanken Nederland, n.d.)</p>
Federacja Polskich Banków Żywności	Poland	<ul style="list-style-type: none"> <li>• A federation of 32 food banks across Poland, donating surplus food to over 3000 charities and community groups who redistribute this to</li> </ul>	<ul style="list-style-type: none"> <li>• 58,000,000 kg of food saved</li> <li>• 1,500,000 beneficiaries served</li> <li>• 3200 charities</li> </ul>

<sup>30</sup> No official website, no impact figures found through grey literature research.

		<ul style="list-style-type: none"> <li>beneficiaries</li> <li>Projects aiming to raise awareness of the problem food waste (Federacja Polskich Banków Żywności, n.d.)</li> </ul>	<ul style="list-style-type: none"> <li>supported</li> <li>185,600,000 kg CO<sub>2</sub> eq. saved (Federacja Polskich Banków Żywności, n.d.)</li> </ul>
Federação Portuguesa dos Bancos Alimentares	Portugal	<ul style="list-style-type: none"> <li>A food bank redistributing mostly surplus food, as well as organising food collection campaigns</li> <li>In charge of a project in which people donate their paper waste, and the food bank sells this to certified paper waste treatment/recycling centres, and for the money gained buys food products for those in need</li> </ul> (Federação Portuguesa dos Bancos Alimentares, n.d.)	Information N/A for general public
Federația Băncilor pentru Alimente din România	Romania	<ul style="list-style-type: none"> <li>A young food bank federation set up in 2020 (Federația Băncilor pentru Alimente din România, n.d.)</li> </ul>	Information N/A for general public
Potravinová Banka Slovenska	Slovakia	<ul style="list-style-type: none"> <li>Federation of food banks distributing surplus food, as well as organising food drives for Ukrainian refugees</li> <li>Trialling the FoodCloud technology in some of its operations</li> <li>Does not share Annual Reports online</li> </ul> (Potravinová Banka Slovenska, n.d.)	Information N/A for general public
SIBAHE – Slovenian Food Bank	Slovenia	<ul style="list-style-type: none"> <li>Redistributes surplus food, as well as organising food collection and donation</li> <li>Lack of data online with regards to operations and impact<sup>31</sup></li> </ul> (SIBAHE, n.d.)	Information N/A for general public
Federación Española	Spain	<ul style="list-style-type: none"> <li>Surplus food</li> </ul>	<ul style="list-style-type: none"> <li>79,535,776 kg of</li> </ul>

<sup>31</sup> No official website, no impact figures found through grey literature research.

de Bancos de Alimentos		redistribution as well as occasional food donation campaigns <ul style="list-style-type: none"> <li>Federation of 54 food banks across Spain (Federación Española de Bancos de Alimentos, n.d.)</li> </ul>	food saved <ul style="list-style-type: none"> <li>1,353,276 beneficiaries served</li> <li>7497 charities supported</li> <li>254,514,483 kg CO<sub>2</sub> eq. saved (Federación Española de Bancos de Alimentos, n.d.)</li> </ul>
No centralised food bank system	Sweden	Not applicable	Not applicable

## 8.4 Overview of Activities from For-profit Sector

Table 6: Overview of activities from for-profit sector

Name of organization	EU countries where organization is active	Brief description	Impact in 2021 <sup>32</sup>
Too Good To Go	Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Poland, Portugal, Spain, Sweden, The Netherlands	<ul style="list-style-type: none"> <li>A mobile app set up in 2015 in Denmark</li> <li>It works in major cities, in which restaurants, bakeries, supermarkets etc. can join the network of Too Good To Go</li> <li>A restaurant in the network offers up surplus food for discounted prices (usually around ¼ of original price)</li> <li>Anyone can download the app and buy through the surplus food through it, picking it up at the location and paying through the app</li> <li>Various successful food waste awareness campaigns aimed at consumers, as well as partnerships with governments and important stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>52,554,009 meals saved = 22,072,684 kg<sup>33</sup> of food saved globally</li> <li>Figures per country N/A</li> <li>Over 54 million app users (food recipients) worldwide (Too Good To Go, n.d.)</li> </ul>

<sup>32</sup> Some organizations have not yet publicly provided their impact for year 2021, for those impact from year 2020 is used and signaled with an asterisk (\*).

<sup>33</sup> 1 meal = 0.42 kg (EPA, 2015)

		(Too Good To Go, n.d.)	
Olio	Can be used anywhere, where more people download the app	<ul style="list-style-type: none"> <li>• Olio is a mobile app, which can be downloaded anywhere in the world</li> <li>• Food and other household items can be shared through the app – whether by individuals or retailers</li> <li>• An olio network gets set up organically if more people/organizations in the same area download the app and use it – posting food and things they are giving away, as well as taking up other people’s/organization’s offers</li> </ul> (Olio, n.d.)	<ul style="list-style-type: none"> <li>• N/A - Olio does not provide yearly impact figures, no Annual Reports</li> <li>• Overall impact since launch: 65,320,492 portions of food shared</li> </ul> (Olio, n.d.)
Karma	Sweden, France (Paris, Toulouse)	<ul style="list-style-type: none"> <li>• Same model as above mentioned Too Good To Go: a mobile app connecting retailers with surplus food to consumers</li> <li>• Food waste awareness campaigns</li> </ul> (Karma, n.d.)	<ul style="list-style-type: none"> <li>• N/A – Karma does not share impact figures publicly, does not provide Annual Reports</li> <li>• Overall impact since launch: 1,200,000 kg food saved</li> </ul> (Karma, n.d.)
YourLocal	Denmark	<ul style="list-style-type: none"> <li>• Same model as above mentioned Too Good To Go and Karma</li> </ul> (YourLocal, n.d.)	<ul style="list-style-type: none"> <li>• Impact figures N/A</li> </ul>