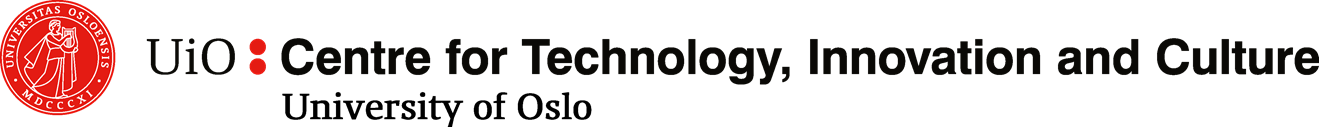
**Italian Food Waste Governance and Practice**

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**BREAD Project Report 2021**





**Table of Contents**

**Chapter 1. Food Loss and Waste in Italy**

* 1. **Introduction**
  2. **Food loss and waste in Italy: Data**
  3. **The impacts of food loss and waste in Italy**

**Chapter 2. Legislative context of food loss and waste in Italy**

* 1. **Introduction**
  2. **Food Recovery Hierarchy**
  3. **Legislative context of food loss and waste in Italy: National level**
  4. **Legislative context of food loss and waste in Italy: Regional level**
     1. **Methodology**
     2. **Results and discussion**
  5. **Urban Food Waste Policies**
  6. **Conclusion**

**Chapter 3. Best Practices along the food supply chain in Italy: a categorization**

1. **Introduction**
2. **Main aim of the research**
3. **Research Methodology**
4. **Results and discussion**
5. **Case studies analysis**

**General Conclusion**

**References**

**Chapter 1: Food Losses and Waste in Italy**

* 1. **Introduction**

Food losses and waste (FLW) represent a severe issue that is compromising our planet’s sustainability and that needs to be addressed at a global level due to its negative impacts on food security, human health, and economic, natural and environmental resources (FAO, 2013; Principato, 2018; Xue et al. 2017; Gustavsonn et al., 2011; FAO, 2019).

Tackling the phenomenon is crucial to transform our food systems into ones that are more sustainable and resilient to shocks (WWF and WRAP 2020; World Bank Group 2020). These kinds of transformations are often called ‘socio-technical transitions’ because they require alterations in the whole configuration of actors, rules and technologies of a particular societal function, such as food provision or transportation (Geels 2011; Kangera et al., 2020).

Due to its importance, the reduction of FLW has been included in the 17 Sustainable Development Goals (SDGs) promoted by the UN for the Agenda 2030, specifically in target 12.3 that calls for "halving per capita global food waste at retail and consumer levels and reducing food loss along production and supply chains, including post-harvest loss, by 2030" (UN, 2020).

According to the Food and Agriculture Organization (FAO), the term ‘food losses’ “refers to a decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retailers, food service providers and consumers,” while the term ‘food waste’ “refers to the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers and consumers” (FAO, 2019). Indeed, FLW occur throughout the entire food supply chain (FSC), from the initial agricultural production, passing for industrial transformation, distribution and retail, down to the final consumption phase (Gustavsson et al. 2011). In industrialized countries, the majority of food is wasted during the retail and consumption stages of the FSC (Principato,2018; Principato et al., 2020; Parfitt et al. 2010; Gustavsson et al. 2011; Stuart, 2009), whereas in developing countries, the largest proportion of waste occurs in the first stages of the FSC, mainly due to a lack of sophisticated agricultural techniques, poor storage facilities, and lack of infrastructures and adequate transportation (BCNF, 2012; Gustavsson et al.,2011; Chalak et al., 2015).

A recent report by the World Bank (World Bank, 2020) highlights that the best stage of the supply chain for policy action to reduce FLW depends on the specific circumstances of the country under consideration. Indeed, in developing countries, where the largest proportion of losses occurs in the first stages of the FSC, a reduction of FLW at the farm level would have a more efficient result than a reduction at consumer level. In industrialized countries, however, where most of the food is wasted in the final stages of the FSC, a reduction of FLW at the farm level would affect total FLW differently than a similar reduction at consumer level that would lead to a stronger negative cascade effect (or waste-decreasing) throughout the entire FSC. Thus, in the case of industrialized countries, the reduction of the FLW at an intermediate stage of the FSC, such as the processing level, could lead to an increase of FLW downstream and a decrease of FLW upstream. This is because upstream reductions of FLW work in the contrary direction, causing a harmful positive cascading effect (or waste-augmenting) (World Bank, 2020).

**1.2 Food losses and waste in Italy: Data**

Worldwide, the total volume of food produced for human consumption that is instead wasted or lost along the FSC amounts to over 1.3 billion tons per year, more than a third of the total food production (Gustavsson et al., 2011). The annual cost of global FLW exceeds 1 trillion dollars, increasing to 2.6 trillion dollars if we consider the "hidden" costs related to environmental impacts (USD 700 billion) and social costs (USD 900 billion) (FAO, 2014). Maintaining the current production rates would lead to an increase in FLW from 1.3 billion tons to 2.1 billion tons by 2030 (Hegnsholt et al. 2018) and even more by 2050 (Searchinger et al. 2018). On the other hand, by halving this value, environmental impacts would be reduced by 16% (World Bank, 2020).

In the European Union, the total volume of FLW is estimated at 88 million tons per year, equal to 20 percent of the food produced (CREA, 2020), with consequent costs estimated at EUR 143 billion (ASVIS, 2019).

In Italy, more than 70 percent of waste occurs during household consumption and catering phases, almost 20 percent in distribution and sales, and more than 10 percent in the agricultural and transformation phases (CREA, 2020). Considering the costs, the total economic value of FLW is estimated at around EUR 10 billion (Waste Watcher, 2020). Household food waste in particular has an average cost of EUR 4.9 per family per week, for a total of approximately EUR 6.5 billion (Waste Watchers, 2020). This amount is about 25 percent less than the 2019 data (Waste Watchers, 2019) - considering that in 2019 an average value of EUR 6.6 per family per week was lost, for a total of about EUR 8.4 billion. It is important to note that these data consider both perceived and declared waste.

The figure of actual food waste was calculated in 2018-2019 as a result of the European Project Reduce (University of Bologna/Distal with the Ministry of the Environment and the campaign Waste Zero) that conducted an experiment that measured food waste in Italian families using the food diaries methodology, highlighting a weekly food waste for each household equal to EUR 8.7, for a total value of EUR 11.5 billion per year.

In terms of weight, the weekly food waste per capita (to be considered as avoidable food waste[[1]](#footnote-1) corresponding to 60 percent of the total waste) amounted to 530 grams, the weekly waste per family corresponds on average to 1,224 grams and, annually, this amounts to 27.5 kilograms per person per year, equivalent to 1.6 million tons per year (Giordano et al., 2019a).

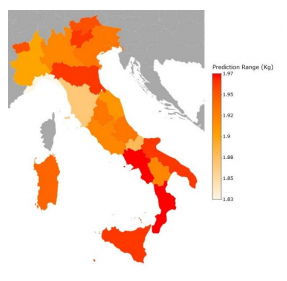
Besides that, food losses are estimated at over EUR 3 billion. A value of EUR 833 million per year is estimated for losses that occur in agriculture, EUR 1 billion for industrial waste, and EUR 1.3 billion for waste concentrated in the distribution phase (Waste Watchers, 2019).

If we consider food loss numbers, which are often more difficult to calculate, the Italian National Institute of Statistics (ISTAT, 2018) highlighted that the agricultural production left in the field is over 1.4 million tons of produce per year, representing 2.8 percent of the total production. Of this figure, 21.9 percent of uncollected production is attributable to growing vegetables in the open air, followed by cereals, with a share of 17.3 percent, olive trees (14.1 percent) and fresh fruit (13.4 percent) (CREA, 2020).

According to the Reduce project, in Northern Italy food waste is lower, on average at a regional level, than in the Center and South and the Islands. This data might be linked to the fact that in Northern Italy the system of separate collection and composting is more widespread, and that individuals who compost food seem to waste less food (Secondi et al., 2015; Giordano et al., 2019a).

Moreover, another study (Masotti et al., 2019)that estimated potential household food waste, and which considered the current values of different socio-economic and demographic factors, such as GDP, national tertiary education levels, national employment rate, average household size and house ownership status, showed that the lowest levels of food waste are registered in the region of Liguria (with an average household food waste volume of 89.44 kilograms), while the highest levels are registered in the Campania region (with a volume of 96.98 kilograms per year).

Figure 1 summarizes household food waste in Italy, highlighting the differences at regional level.



Source: REFRESH Road Map

Figure 1: Estimated food waste per household in Italian regions

**1.3 The impacts of food loss and waste in Italy**

As widely acknowledged, FLW cause negative environmental impacts due to the use of land, water, and energy and other natural resources used to produce food that no-one consumes (FAO, 2013). Consequently, the non-fruitful use of natural resources, such as land and water, that results from FLW has repercussions for food security and nutrition, income generation and economic growth (FAO, 2013). According to a WWF study, FLW in Italy results in a waste of 1226 m3 per year, equal to 2.5 percent of the entire annual flow of the river Po (WWF, 2013). Indeed, on the one hand, the volume of water wasted by consumers in Italy, due to food that has been unused or thrown away without real consumption, is equal to approximately 706 million m3. Of this, about 43 percent is due to waste of meat, 34 percent to waste of cereals and derivatives (pasta, bread, etc.), 16 percent to fruit and vegetables, 4 percent to milk and derivatives, and 3 percent to waste of tubers. On the other hand, the waste of water associated with food that is produced and is lost along the food chain and never reaches the distribution level, is around 520 million m3 (WWF 2013;ISPRA 2018).

If we also consider the carbon footprint of FLW, in Italy the quantity of greenhouse gases (GHG) associated with food waste amounts to approximately 14.3 million tons of CO2**,** while GHG associated with food losses, from post-harvest to distribution phases, amount to 10.2 million tons of CO2 (WWF, 2013). Therefore, FLW in Italy leads to a useless emission of 24.5 million tons of CO2. The production phase (i.e., cultivation or breeding) is the one that contributes most to emissions, representing 70 percent of total GHG emissions. The transformation and packaging phases contribute 18 percent, and the transport phase 12 percent (WWF, 2013). To get an idea of the size of wasted CO2: the absorption of the CO2 wasted by consumers alone requires a quarter of the current Italian forested area (WWF, 2013).

**Chapter 2: Legislative context of food loss and waste in Italy**

**2.1 Introduction**

Given that food waste is a very complex issue, a multifaceted policy mix is necessary to achieve a concrete reduction aligned with the SDGs. The diversity and number of instruments included in the policy mix reflect its varied application, and – as also acknowledged in the FUSIONS Eu Report on FLW prevention and redistribution policies in Italy – these could include a national plan or strategy on food waste reduction, market-based instruments (for instance fiscal incentives for the donation of food surpluses), regulatory instruments, voluntary agreements, and communication campaigns and projects(Azzurro et al., 2016).

Similarly, according to Principato (2018), food policies aimed at reducing food waste are based on five major types of measures: information-based (like social and awareness-raising campaigns), market-based (fiscal/tax incentives, and monitoring of programs to ensure voluntary agreements are followed), regulatory policies (ministerial orders having the force of law; some also specifying binding reduction targets), voluntary agreements (at public-private level, or signatory pacts among institutions and other stakeholders), and nudging tools (like interventions to promote behavior change through a gentle nudge, or choice architecture settings, or promoting the use of doggy bags to consume restaurant leftovers at a later time).

The main aim of this chapter is to assess the national legislative context of Italy regarding FLW, using the food recovery hierarchy approach (EPA, 2015), and at the same time highlighting the ways in which the policies in Italy can be also classified according to Principato (2018).

**2.2 Food Recovery Hierarchy**

The Food Recovery Hierarchy created in 2015 by the United States Environmental Protection Agency (EPA) can play an important role to prioritize policies and actions that policy makers and organizations can propoze to prevent, reduce and redistribute FLW. This is represented through an inverted pyramid divided into six levels, each of which focuses on a different FLW management strategy. At the top of the pyramid there are the most preferred suggested management methods that create the greatest benefits for the economy, society and the environment. Indeed, the first level is represented by “source reduction,” which consists of reducing the volume of surplus food generated, that means that efforts to “not waste food at all” should be the priority. If all the first-level suggested actions have been taken to avoid food waste, the second pyramid level represents the second-best option, namely “feed hungry people,” which consists of donation of surplus food to food banks, soup kitchens and shelters in order to help people in need. The third level highlights the necessity to “feed animals,” consisting of diverting food scraps to animal feed. At the fourth, fifth and sixth levels there are "industrial uses”, "composting" and “landfill/ incineration,” depending on the different contexts and possible treatments of FLW (EPA, 2019).

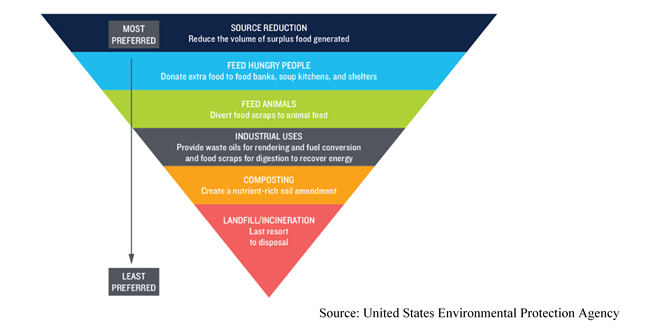


Figure 2 - Food Recovery Hierarchy

**2.3 Legislative context of food loss and waste in Italy: National level**

If we consider the Italian legislative context regarding food waste using an evolutionary key, we notice that the first law regarding FLW prevention and reduction specifically targeted food donation. Indeed, Law n.155 of 16/07/2003, known as the law of the Good Samaritan, aims at encouraging donations of ready and uneaten food that would otherwise be wasted by restaurateurs, and to facilitate the activities of not-for-profit organizations that deal with free distribution of meals to people in need (L. n.155/2003). Owing to this law, over 10 million portions of ready meals have been recovered in ten years, according to the estimations made by Food Bank Foundation (Banco Alimentare, 2013).

Subsequent to this first legislation, the push for concrete actions to reduce and prevent waste has been further developed by the Ministries of the Environment and Agricultural Policies and by local authorities (Life Food Waste Stand Up, 2018). In 2011, the “Carta Spreco Zero” (“Zero Waste Charter”) was founded. This is a network of municipalities (currently over 800) committed to implementing active policies at local and city level (Last Minute Market, 2012). In 2013, the Ministry of the Environment and the Protection of the Territory and the Sea launched the National Waste Prevention Program, which recognizes biodegradable waste among the priority intervention flows and identifies a set of measures primarily aimed at reducing food waste (G.U. n. 245/2013). Subsequently, in 2014, the first national FLW prevention plan (also called PINPAS) was announced in Italy. This addresses the issue at different levels of the food supply chain, focusing in particular on surplus food donations (PINPAS, 2014).

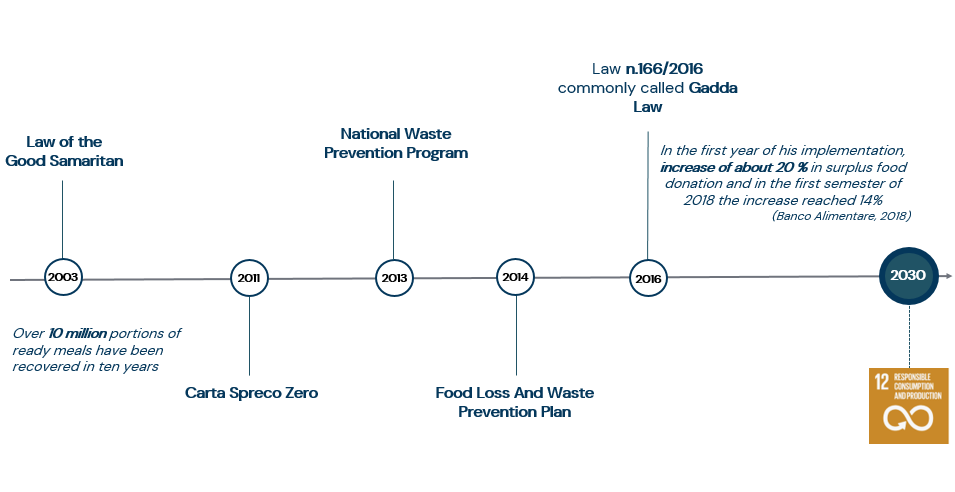
In August 2016, the Italian Parliament approved Law n.166 that introduced further measures to facilitate and regulate the donation and distribution of food and pharmaceutical products, with the purpose of social solidarity and for the limitation of FLW. Through the adoption of this law (commonly called "Gadda Law"), Italy became the first country in the world to regulate the problem of FLW using a strategic key (Life Food Waste Stand Up, 2018). The Gadda Law is a perfect example of the application of the subsidiarity principle (Life Food Waste Stand Up, 2018); indeed, it is the result of the contribution of many fields involved in the process of management, recovery and redistribution of surplus food, and it builds on the experience and good practices already existing in Italy (Life Food Waste Stand Up, 2018).

In the first year of its implementation, the Gadda Law already proved to be highly effective, with an increase of about 20 percent in surplus food donations, with higher values in the Central-Northern area, considering the greater presence of third sector organizations and companies, but with a very significant percentage increase in the South of Italy as well. In the first semester of 2018 the increase

was 14 percent (ASVIS, 2019; Banco Alimentare, 2018; BCFN, 2019). In 2018, according to the estimates of the Italian Food Bank (Banco Alimentare), more than 90 thousand tons of excess products were recovered from large-scale distribution and organized catering, which were distributed in 7569 among charitable structures and canteens, for the benefit of over 1.5 million needy

people (CREA 2020; Banco Alimentare 2018).

Figure 3- The evolution of FLW policies in Italy (National level). Author’s elaboration.



The Law 166/16 clarified, consolidated and simplified the past legislative framework on FLW, encouraging companies, supermarkets, smaller shops and restaurants to donate surplus food, allowing non-profit organizations to recover even more food than before, due to the de-bureaucratizing regulations that it legislated and the introduction of new tax incentives and deductions. The law also expanded the target audience on the receiving end, due to its social purpose, that aims to feed people in need through the donation of food. It has been estimated that more than 5 million tons of food can be recovered in Italy every year, and this law certainly facilitates the process (ASVIS, 2019). Another interesting aspect is that the Gadda Law does not provide for mandatory obligations or punitive sanctions, but is rooted in voluntary compliance that empowers all subjects. Indeed, it provides administrative concessions for donors by simplifying the donation procedures relating to food destruction. The development of virtuous surplus food collection networks is promoted through measures like incentives and enhancement of good practices, reducing the number of formal fulfilments that prevented easy management of donations to non-profit organizations (Life Food Waste Stand Up, 2018). In fact, in the past, companies and distribution chains were limited to food donations worth EUR 5,000. For larger amounts a communication had to be sent to the Revenue Agency. With the Gadda law, that limit was raised to EUR 15,000; and, in addition, it requires those who want to destroy food surpluses to follow a very complex procedure (Legge n. 166/2016). The law also introduces the possibility for municipalities to reduce the waste tax for businesses that document donations and increases the 2016 budget of the National Fund for the distribution of foodstuffs to the needy by EUR 2 million. The law removed the obstacles, often caused by food safety fears or bad communication, that the supply chains, companies and voluntary organizations met in recovering surplus food, (ASVIS, 2019).

For example, the law clarifies the definitions of ‘food surplus’ and ‘waste’. According to the Gadda law’s definitions: (i) Food surpluses are “food, agricultural and agri-food products which, without prejudice to the maintenance of the hygiene and safety requirements of the product, are, by way of example and not exhaustive: unsold or unserved due to lack of demand; withdrawn from sale as they fail to meet the company’s sales standards; leftovers from promotional activities; nearing their expiry date; remainders from market testing initiatives for new products; unsold due to damage caused by the weather; unsold due to erroneous production scheduling; not suitable for sale due to alterations of the secondary packaging that do not compromise the storage conditions”; (ii) Food waste “is the collective name for the food products discarded from the agri-food chain for commercial or aesthetic reasons, or because they are nearing their expiry date, and which are still edible and can potentially be destined for human or animal consumption and that, unless otherwise used, are destined to be disposed of” (L. n.166/2016).

Therefore, according to these definitions, the Gadda Law does not precisely follow the one provided by FAO (2011), as it distinguishes between food surpluses and food waste. Indeed, while the term ‘food surpluses’ means excess food that is generated in the entire agri-food chain and that can be recovered, without prejudice to the maintenance of hygiene and safety requirements, here ‘food waste’ refers more to food scraps, meaning that there is no possibility to redistribute this type of waste for human consumption or animal feeding, and that it can only be prevented by information and education campaigns. This report will use the term “food waste” according to the FAO definition, which indiscriminately encompasses the terms ‘food surpluses’ and ‘food scraps’.

According to the Polytechnic of Milan, Italy generates about 5.6 million tons of food surpluses every year. Less than 10% of this is recovered in donations – the rest, equivalent to 15.4 percent of food consumption, becomes waste (ASVIS, 2019).

Another important contribution of Law 166/16 is to highlight that food that has exceeded the minimum storage term (that is, passed their “best before” date) can still be consumed and donated without any risk of sanctions, because it poses no health hazards for individuals who eat it. In this sense, the law seeks not only to promote the recovery of such food from the companies, but also to inform and raise awareness of the FLW phenomenon among consumers and institutions. Consequently it also asks for the direct involvement of the Italian state broadcaster (RAI) and the Ministry of Education.

The Gadda law, therefore, is the first example of Italian legislation focused on the circular economy and has paved the way for the adoption of many principles that are central to the European Community, and as such has attracted the interest of many countries that still lack legislation in this area (BCFN, 2019).

Other interesting and effective regulations have been developed in Europe. Indeed, in the same year as the Italian one, French’s law against food waste was created (L. No. 138/2016). The main difference between the Italian and French laws concerns the policy approach they adopt: the Italian one is persuasive and based on fiscal incentives and tax deductions, while the French one is punitive and focuses more on regulatory measures (Giordano et al., 2020. BCFN 2019). Indeed, while the French law makes donation of food mandatory and provides sanctions for medium-big retailers (supermarket 250 m2 and bigger) that do not respect the stipulated donation agreements with charities, the Italian regulation only encourages and supports donations, simplifying the procedures and providing waste tax incentives. In addition, the French law focuses mainly on donations by supermarkets, rather than on preventative actions, while the Italian law is more committed to improving prevention through investments in awareness-raising campaigns. Another major difference is that the France law lays all the responsibilities on retailers, who are forced to enter into agreements with charities, while the Italian one has a wider application, and not only focuses on large-scale distribution, but supports the donation process at different stages of the supply chain with the involvement of different stakeholders, while also including non-food products like pharmaceutical goods (Giordano et al.,2020).

It is also possible to analyze the Italian National policies, as shown in Figure 3, under the five policy categories highlighted by Principato (2018) and classify them as: (i) Law of the Good Samaritan – regulatory and nudging; (ii) Carta Spreco Zero – voluntary agreement; (iii) National Waste Prevention Program and Food Loss and Waste Prevention Plan – regulatory (albeit without a binding reduction target); and (iv) Law 166-2016 – market based and nudging.

**BOX 1 - A FOCUS ON HOUSEHOLD FOOD WASTE: NATIONAL, REGIONAL AND LOCAL POLICIES IN ITALY**

As stated before, in Italy, like in many other Western Countries, more than 70 percent of waste occurs during the household consumption and catering phases. This box highlights a few relevant policies and interventions proposed at national, regional and local level in Italy, in order to tackle household food waste.

At national level, the main initiatives rely on education and awareness-raising campaigns.

In 2020 the Ministry of Health published a brochure on its website entitled “Stop food waste. Tips to reduce food waste,”[[2]](#footnote-2) with the aim of providing educational material to consumers. In 2017, following the same aim, the Ministry of Agricultural, Food and Forestry Policies website announced the vademecum "Io Non Spreco"[[3]](#footnote-3) (“I do not waste”), a list of tips and practical information to combat food waste.

At regional level, the Lombardy Region proposed a project called “Reti territoriali virtuose contro lo spreco alimentare”[[4]](#footnote-4) that provides for the participation of the main actors of the supply chain for the redistribution of food surpluses, through the signing of a Memorandum of Understanding (Municipalities, GDO, Non-Profit Bodies, Consumer Associations). The main purposes of the project are: (i) to identify and analyze the legislation and the procedures for recovering food, highlighting the best practices already implemented and identifying any critical aspects; (ii) to introduce mechanisms to incentivize those involved in the redistribution process in the administrative procedures of the Municipalities; (iii) to initiate communication campaigns to disseminate the activities carried out by the project and other initiatives regarding food waste.

In addition to this, the Lombardy Region has allocated EUR 2.8 million to invest in 2021-2022 to support projects that have the main aim of fighting food waste and boost food surpluses redistribution.

At local level, in 2017 a Memorandum of Understanding was signed with the National Association of Italian Municipalities (ANCI)[[5]](#footnote-5) for the promotion of initiatives aimed at reducing food waste, such as the promotion of the use of reusable containers for take-away food, as well as tax reductions for catering activities that promote the use of doggy bags, in line with the National Gadda Law.

Finally, in the city of Bologna, the Local Health Authority and the FICO Foundation[[6]](#footnote-6) promote a cycle of meetings dedicated to nutrition, health, food safety and environmental sustainability, paying particular attention to useful information to reduce food waste at consumer level.[[7]](#footnote-7)

**2.4 Legislative context of food loss and waste in Italy: Regional level**

The role of the regions is particularly important in the context of food waste policies. Indeed, most of the regions have been committed to specific regional laws expressly aimed at improving the donations of surplus food and combating food waste (Azzurro et al., 2016).

Based on the method of Food Recovery Hierarchy, the existing Italian regional legislation pertaining to FLW was classified, based on the purposes which it accomplishes.

**2.4.1 Methodology**

The Italian regional legislation on FLW was classified based on the EPA Food Recovery Hierarchy framework, in line with the paper by Giordano et al. 2020, in which policies to tackle the phenomenon are discussed with reference to the priorities identified in the food waste pyramid (Giordano et al., 2020).

The first stage of this study was the selection of regional policies to be included in the list. Thus, the following study procedure was used:

* A search of major academic journals, EBSCO, Elsevier, Google Scholar, Scopus, Emerald databases using the following keywords: "regional laws on food waste"; "anti-food waste legislation"; “food waste policies in Italy”.
* The following keywords were included in Italian in the Google search engine: "regional laws on food waste"; "anti-food waste legislation"; “food waste policies in Region x” (for all twenty Italian Regions).
* Laws and interventions on the subject were researched by visiting the institutional websites of each Italian Region.

The policies were selected from this pool based on two main criteria:

- extent of the relevant information.

- policies effectively implemented and policy proposals.

This process identified 36 regulatory interventions on the topic of FLW. Subsequently, the regional and provincial laws were categorized according to other sources such as resolutions, legislative proposals and regional decrees, resulting in a total of 18 regional laws, 1 provincial law and 17 interventions from other sources.

As a result of this classification, the main intervention adopted by the Italian regions regarding FLW have been classified according to the relevant Food Recovery objective pursued, distinguishing between prevention, reuse for human consumption, recycling for animal consumption, recovery, agricultural recycling or disposal.

We also compiled a table of all interventions showing the following information: (i) type of intervention, distinguishing between regional, provincial law or other sources, (ii) year initiated, (iii) Food Recovery objective pursued. All these policies listed in Appendix 1 represent the sample for investigation.

**2.4.2 Results and discussion**

When analyzing the Italian regional legislation against FLW in detail, we notice that each Region of the territory has adopted, measures against the phenomenon, albeit in different forms. The regulatory interventions concern various objectives, such as the fight against social unease and poverty through the activities of recovery and redistribution of food surpluses, the promotion of initiatives aimed at reducing FLW, and the recovery and donation of food products that are about to expire and that would remain unsold.

Based on our research, it is possible to propose the following considerations: First, the picture is rather fragmented from a regional point of view. The majority of the laws regarding FLW conform to the first two levels of the Food Recovery Hierarchy, as they have the purpose of preventing and reusing surpluses in favor of people in need. We specifically find (i) 6 regional measures to prevent food waste, (ii) 18 regional measures to reuse surpluses for human consumption, (iii) 11 regional measures to both prevent and reuse and (iv) one regional measure to recover food surpluses – for a total of 36 regional measures. Second, we also noted that some regions, such as Lazio, Molise, Sardinia and Sicily, do not have regional legislation on FLW but only draft laws and proposals. An exception is the Valle D’Aosta region, which is the only Italian region that does not provide for any legislation in this field.

The results of the research are in line with the results of Giordano et al. 2020, according to which the measures included in Italian Law 166/ 2016 mainly focus on the second level of the Food Recovery Hierarchy, i.e., the redistribution of food surpluses for people in need, with a secondary focus on FLW prevention (first level of the Food Recovery Hierarchy). However, it is interesting to note that, at regional level the interventions are focused on both levels of the Food Recovery Hierarchy, namely prevention and re-use of food surpluses. Six regional level measures have a main objective of preventing FLW, and 11 aim at preventing as well as redistributing food surpluses. As is evident from the research carried out, at regional level the interventions are focused on both the prevention and re-use of food surpluses levels of the Food Recovery Hierarchy, so that the policies are almost equal in number and scope.

The table below highlights the main results of the research.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PREVENT** | **REUSE** | **PREVENT AND REUSE** | **RECOVERY** | **TOT.** |
| **REGIONAL MEASURES** | 6 | 18 | 11 | 1 | 36 |

Table 1- Classification of regional measures according to the Food Recovery Hierarchy

**2.5 Urban Food Waste Policies**

At local level, cities have proven to be key actors in combating food waste, due to effective policies and initiatives to address it (Fattibene, 2020). Urban contexts represent the main source of post-consumer food waste, with organic waste representing more than half of entire urban waste volumes (Kaza et al, 2018). By acting on an urban scale, cities can combine the regulatory approach typical of national and regional institutions with the administrative approach typical of local authorities, which allows them to aggregate players rooted in the territory towards common objectives (Magarini et al., 2018a). Indeed, urban food waste policies and initiatives involve a large number of actors working from cross-sectoral governance approaches (Fattibene et al., 2020; Magarini et al., 2018b): food waste management requires diversified actions that are simultaneously coordinated and integrated and that involve local public authorities. Examples of these are cities, regions, provinces, and other actors including citizens, school canteens, non-governmental organizations, retailers, food markets and restaurants. (Michelini et al., 2018; Cicatiello et al., 2016; Boschini et al., 2017; Denseroet al., 2019; Giordano et al., 2016; Fattibene 2018; Warshawsky 2015). All these actors and levels of governance must work synergistically to guarantee effective urban food waste policies. For these reasons cities can play a crucial role in the fight against food waste through the adoption of multi-level and multi-sector policies (Fattibene et al, 2020).

In 2010, more than 700 Italian municipalities signed the charter of commitment against food waste, known as the "Charter for a network of zero-waste local authorities", promoted by Last Minute Market with the campaign “Year against waste 2010". According to the charter, the signatory municipalities undertake to carry out at least 10 actions against food waste that are inspired by the European Parliament resolution on food waste of January 2012. The program started in 2010, and continued in 2014 with the association Sprecozero.net, whose goal is to promote, disseminate and share practices to prevent food waste among the Italian local authorities (Azzurro et al., 2016).

In October 2015, the international Milan Urban Food Policy Pact (MUFPP) was signed by 160 cities around the world. The agreement commits mayors to work to make food systems sustainable, guarantee healthy and accessible food for all, preserve biodiversity, and fight against FLW (BCFN, 2018). The fight regarding food waste and the recovery of surpluses is one of the fundamental pillars contained in the proposal. To date the pact has 210 signatory cities, of which 19 are Italian.

The boxes below highlight a few of the most important initiatives taken by Italian cities, explaining how they are conceived, and why they are a good benchmark to follow in the fight against FLW.

**BOX 2 - Milan: Milan Food Policy**

The city of Milan represents a virtuous model in tackling FLW at the local level. Milanese authorities decided to commit to a more equitable and sustainable food system by implementing its Food Policy, a strategy that will guide the city's policies related to food from 2015 to 2020. In July 2014 the Municipality of Milan and the Cariplo Foundation signed an agreement for the definition and adoption of the Food Policy. After analyzing the strengths and weaknesses of the Milanese food system, five priorities emerged in the Milan Food Policy: (i) ensure access to healthy food for all; (ii) promote a sustainable food system; (iii) educate about food by promoting a culture oriented towards conscious consumption; (iv) reduce surpluses and food waste at different stages of the FSC; and (v) support and promote scientific research in the agri-food sector. Thus, the reduction of food loss and waste is one of the priorities of the Food Policy, and it is developed through engagement of various local actors, such as research centers, institutions, the private sector, foundations and social actors. To translate this priority into concrete actions, the Food Hub project was born in 2016, according to the actions defined in the "Zero Waste" protocol promoted by the Municipality of Milan, Assolombarda, the Polytechnic of Milan, created in collaboration with the Food Bank of Lombardia, in order to support food recovery and redistribution by small local actors.

In one year, 77 tons of food was recovered, equivalent to 154.000 meals, with an economic value of EUR 308 thousand. The number of beneficiary social actors also increased: the number of non-profit organizations involved grew from 14 to 21, and 11 supermarkets and five company canteens were also involved. The environmental impacts are quite impressive: 240 tons of CO2 was mitigated, and 77,000 cubic meters of water was saved (Food Policy Milano, 2020). Moreover, in 2018 Milan adopted a 20 percent reduction in the tax on waste for food businesses that donate FLW to charities. The reduction in the tax on food waste benefited almost 10.000 people, with an impact of EUR 1.8 million (FAO, 2018).

**BOX 3 - Turin: “Progetto Organico Porta Palazzo”**

Since 2016 the city municipality of Turin has developed a project called “Progetto Organico Porta Palazzo (Popp),” to strengthen the separate collection and reduction of food waste in the Market of Porta Palazzo, the city’s largest municipal market, with the food donated to people in need,.

The project, carried out by a group of volunteers (including refugees and asylum seekers), focused on raising the awareness of the correct disposal of waste and matters of food waste of market sellers, convincing them to donate the food that remains unsold at end of the business day. Twentyfive thousand compostable bags were distributed to start an efficient separate collection of organic waste. In 2017, the collection of organic waste grew by 130 percent, increasing the differentiated share of total waste to 60 percent (Magarini et al., 2018a). On the other hand, the collection of unsold food is carried out using trolleys specially designed to transport surplus food from vendors to redistribution stalls more effectively. In the first year a total of 66 tons of food was donated, whereas in 2018 66.672 kilograms of food were recovered, and 73.919 kg in 2019 (Magarini et al., 2018a; ISPRA, RePopp – Progetto Organico Porta Palazzo). The project, realized as a result of the collaboration between public and private actors, intervenes on two central issues for urban food policies, namely the fight against food waste and the need to provide a meal to those in need.

In addition, the project conforms to the realization of other SDGs, such as SDG 2 (Zero Hunger), since still edible food is recovered and distributed to the neediest people; SDG 8 (Decent work and economic growth), through the creation of new job opportunities for a few marginalized population; SDG 11 (Sustainable cities and communities) for increased cleaning of market areas and streets and improved waste collection; and SDG 4 (Quality education) for the promotion of more sustainable lifestyles at the urban level (Fattibene et al., 2020; Magarini et al., 2018a; ISPRA, RePopp - Progetto Organico Porta Palazzo).

**BOX 4 - Genoa: Ricibo Project**

After the adoption of Law 166/2016, the Ricibo project, an urban network project for the recovery and redistribution of food surpluses with solidarity purposes, was born in the city of Genoa. The objective of the project is the coordination of all existing projects and practices previously implemented by the Municipality, and the implementation of a concrete plan to collect food surpluses from retailers and distribute it to people in need, consolidating 150 Genoese entities (Magarini et al., 2018a; Leoni et al., 2018). It is a hybrid system that involves a multi-stakeholder audience (public and private, for-profit and non-profit organizations) which aims at a zero waste city, experimenting with new models of collaboration. The objective of facilitating the connection and collaboration between public bodies, non-profit organizations and donor companies is accompanied by other objectives that relate to the increase in the use of technologies to facilitate the recovery of food surpluses, and the improvement of food storage and redistribution, as well as an efficient communication system to inform citizens of existing projects in the city (Magarini et al., 2018b; Leoni et al., 2018). Currently, there are 150 associations and other entities involved, 1500 active volunteers and 2000 beneficiaries. The estimated food surplus recovered is 180 tons per year with an estimated value of about EUR 300.000 (Municipality of Genoa, Ricibo), as a result of an estimated increase in collection efficiency of about 25% (Magarini et al., 2018a).

**BOX 5 - Cremona: Reduction of waste in school canteens**

The city of Cremona addresses the issue of food waste by starting at school canteens. The Municipality of Cremona has implemented a series of measures aimed at reducing food waste in school canteens that covers the organization and internal management of the canteen service, the creation of educational programs, and the introduction of qualitative and quantitative waste controls, in addition to the donation of surplus food. Therefore, to avoid kitchen waste through improved planning of the modalities and timing of the orders, food supplies in school kitchens for both weekly and daily orders are monitored continuously. Furthermore, the chefs have been trained and sensitized to ensure quality and quantity control of food that is suitable for children, thus avoiding waste. In addition, food education programs were initiated, making lunch in school canteens an educational event, involving teachers and other staff involved in the distribution of food.

Following the introduction of these changes, the quantities of kitchen waste have decreased significantly. All leftovers are donated to the volunteers of the APAC Onlus (Animal Protection Association Cremona Onlus), thus finding a new useful destination under the Food Recovery Hierarchy (Comune di Cremona, 2016).

**BOX 6 - Various Municipalities: SpesaSospesa.org**

SpesaSospesa.org is a project of circular solidarity against food waste that was born in support of families experiencing economic difficulties due to the Coronavirus outbreak. The project makes it possible to transform potential food waste into help for the most vulnerable and needy citizens. Agri-food and non-food companies, distribution chains and local producers can donate or sell their surplus products at discounted prices. In addition, if private individuals donate money, this is handed over to local non-profit associations that use the money to buy food from the companies that participate in the platform, and then distribute it to people in need.

The project is based on the innovative digital blockchain platform of Regusto that allows purchase, sale and donation of basic goods, and ensures high levels of traceability and transparency. To date, SpesaSospesa.org has collected more than EUR 600.000, of which around 530.000 has already been distributed in 11 municipalities throughout the territory, with over 94 tons of food (SpesaSospesa.org).

**2.6 Conclusions**

On the basis of the research, we can state that, considering the National legislative framework, Italy has been the first country in the world to adopt a law that presents a strategic approach to the problem of food waste, thus becoming a reference model for the European Union. The implementation of the Italian legislation is expected to have an important direct and indirect impact on the fight against FLW, increasing the volume of food recovered by about 20 percent since 2016, according to the Italian Food Bank’s estimates (Banco Alimentare), (ASVIS, 2019; BCFN, 2019).

According to our analysis, the Gadda law complies with the first two levels of the Food Recovery Hierarchy, namely prevention and reuse for human consumption, with a specific focus on the second level, since it aims at encouraging the donation and redistribution of food surpluses.

From a regional point of view the picture is rather fragmented, but the majority of the FLW laws still correspond to the Food Recovery Hierarchy’s first two levels, with an interesting focus on food waste prevention.

At a local level, the key role of cities in the fight against food waste is highlighted, due to the adoption of multi-level and multi-sector policies. At this level, too, most of the initiatives are aligned with the first two levels of the Food Recovery Hierarchy.

With reference to the FUSION Eu Report and the ways in which the Italian policy mix framework has evolved from 2016 onwards (Azzurro et al., 2016), we note that all the instruments included in the Italian policy mix are still in force or being implemented, and that Italy has not yet implemented a reduction/prevention target or assessment to measure its FLW.

To specify, the aforementioned Good Samaritan Law (regulatory instrument), “Carta Spreco Zero” (voluntary agreements), National Waste Prevention Program, Food Loss and Waste Prevention Plan and the Gadda Law (national strategies on food waste prevention) are all still in force.

Furthermore, national, regional and local communication and awareness campaigns, as well as projects and other measures that aim to fight food waste (such as SpesaSospesa.org or Ricibo Project), are still in force and have expanded their activities since 2016. Moreover, as this report shows, many other initiatives have sprung up.

In the next few years, it could be useful to propose and/or invest in more policies and initiatives that aim to reduce food losses during the early stages of the FSC, for example by setting up agreements with farmers or targeting the whole production system to identify where and in what ways the generation of food waste can be avoided. Considering the cascading effect, it is important to identify at which of the FSC’s stages the interventions would lead to the highest desired impact. Moreover, considering the high quantity of household food waste, educating people to eat better and produce less waste is a crucial challenge that will demand better collaboration between institutions, producers, retailers and consumers.

**Chapter 3: Best practices along the supply chain in Italy: a categorization**

* 1. **Introduction**

The present chapter aims at analyzing the main initiatives put forward against FLW in Italy, according to the stream of research of sustainability transition and food sharing model.

Addressing contemporary environmental problems, such as climate change, food waste, or biodiversity loss, requires profound structural changes, such as shifts to new kinds of energy, mobility, agri-food and other systems (Elzen et al., 2004; Van den Bergh and Bruinsma, 2008; Grin et al., 2010; Geels 2011; 2018). These structural changes are called “socio-technical transition”, meaning the shifts from one socio-technical system to another (Geels and Schot, 2010), where the term “socio-technical system” refers to a configuration of actors, technologies and rules that encompasses the dimensions of scientific knowledge, economy, policies, markets, consumer behavior and practices, infrastructure and culture (Elzen et al. 2004; Geels, 2004; 2018; Kanger et al. 2020). Actors, such as firms, policy makers, politicians, consumers and researchers reproduce, change and maintain all these elements. Consequently, transitions are complex, long-term processes that involve multiple actors. According to this perspective, socio-technical transitions to sustainability are important transformation processes through which established socio-technical systems change to more sustainable methods of production and consumption (Smith et al., 2005). In particular, the literature highlights that sustainability transitions have several features that make them different from other types of transitions, because the former are goal oriented (i.e. addressing persistent environmental problems), and require multi-dimension and multi-actor processes that are often nonlinear, and long-term macro-level changes (Geels 2011, 2018; Smith et al. 2005). They also require a change in policies: because sustainability is a collective good, public policy must play a key role in determining transitions towards sustainability through taxes, subsidies, innovation policies and environmental regulations (Geels 2011; Köhler et al., 2019).

To understand, analyze and promote the transition to sustainability, many theoretical and conceptual frameworks have been used in the literature, including the multi-level perspectives (MLP) **(**Rip and Kemp, 1998; Geels 2002, 2005a, b, 2010, 2011; Smith et al. 2005, 2010 Schot and Geels 2008; Kanger et al., 2020). According to Geels (2011), “the MLP is a middle-range theory that conceptualizes overall dynamic patterns in socio-technical transitions”. The MLP consider that transitions are non-linear processes that result from the interaction within and between three analytical levels: (i) niches (micro level and locus for radical alternatives to regime), (ii) socio-technical regimes (meso-level and practices and rules that orient and coordinate the behavior of actors in certain systems), and (iii) sociotechnical landscape (exogenous macro-level forces that influence niche and regime dynamic) (Rip and Kemp, 1998; Geels 2002, 2005b; 2011; Kanger et., 2020). Thus, the MLP offer an inclusive vision of transitions, spanning the gamut from local projects to niche innovations to sector-level regimes and the wider societal sphere (Geels 2018).

In recent years, multiple initiatives against food waste have been implemented in Italy to kickstart transitions of food systems towards sustainability. These initiatives are important because they stimulate systematic change through the diffusion of different ways of organizing, doing and thinking, usually focused on being more sustainable. In fact, sustainable initiatives often experiment with alternative technological, organizational and social innovations, such as the sharing of platforms, for example (Gorissen et al., 2017). According to the literature, one of the most important aspects of the sharing economy platforms is that it encourages access to existing resources by redistributing excess supplies, rather than producing new ones, which consequently allows the reduction of environmental problems and the alleviation of poverty (Michelini et al., 2018; Mair and Reischauer, 2017). Moreover, Martin (2016 p. 154) highlights that “the sharing economy is presented as a desirable and necessary innovation on the basis that it: empowers individuals; creates economic, social and environmental value; enables ‘sharing’ practices that are fundamental aspects of human nature; and enables more efficient utilization of resources.”

Based on the research by Michelini et al. (2018), it is possible to distinguish 3 typologies of food sharing models to tackle sustainability challenges like food poverty and food waste: (i) food sharing for money, which is a B2C for-profit model with the purpose of reducing food waste but at the same time producing revenue; (ii) food sharing for charity, where food is collected from donors and given for free to non-profit organizations – a model that mainly generates profit for society by reducing food waste, increasing awareness of the phenomenon and alleviating poverty; (iii) food sharing for community, the P2P model, operated by profit and non-profit organizations, where food is shared by consumers with other consumers (Michelini et al., 2018)

**3.2 Main aim of the research**

The purpose of the present analysis has been: (i) to identify the main private initiatives proposed in Italy regarding food waste along the supply chain, that is from the cultivation to the consumption phase; (ii) to create homogenous groups of similar initiatives through a cluster analysis; (iii) to discuss the results using the sustainability transition approach and highlight the most interesting initiatives in order to replicate their peculiarities in Norway and in other European Countries.

**3.3 Research Methodology**

The analysis has been divided into two parts:

1. Research and collection of food waste initiatives at consumption level.
2. Cluster analysis of the identified initiatives.

The analysis began with a desk collection of the anti-food waste initiatives implemented at private level in Italy. As a first step, for a period of two months (June-July 2020) the following keywords in Italian were included in the Google search engine: "initiatives against food waste"; "businesses against food waste"; “anti-food waste organizations.” Secondly, a few initiatives were already known to the author of this report and were included in the analysis. Once the initiatives were collected, all their corresponding websites were checked to see if they were still operational during the research timespan.

The initiatives have been classified according to some relevant parameters: the year in which they were implemented; the organization’s name and business profile (profit, non-profit); the area of implementation (national, regional); the localization (per region and province); the food recovery objective (food waste prevention, food waste recovery, food waste redistribution for human consumption, reuse for animal consumption, agricultural recycling and composting); the delivery model (business to business, business to consumer, consumer to consumer); the revenue model (percentage of revenues, direct sales, donation, partnerships, not defined model, other); type of activity (food sharing for charity, food sharing for money, processing of agri-food waste, waste management, information, sustainable production, catering, production of food containers); and level of the supply chain phase (harvest, food transformation, food distribution, food consumption). Finally, a qualitative description of the initiatives’ value proposition was provided.

These parameters were defined according to the sustainability transition and food sharing models’ streams of research (Michelini et al.,2018; Geels 2002;2005; a; b;2011;2018; Kanger 2020; Smith et al., 2005). Concerning the objective, we have drawn from the food waste recovery hierarchy to find the most relevant goals for anti-waste initiatives.

A total of 55 initiatives was collected, relating to the period between 1984 and 2019. Six initiatives were deleted from the analysis since they are no longer active. Therefore, the final analysis was implemented using 49 initiatives.

After identifying the main initiatives, a cluster analysis, with the aim of creating groups of similar initiatives, was performed as the second step of the analysis. Cluster Analysis (CA) is a multivariate analysis technique used to select and group homogeneous elements in a set of data, based on measures of similarity between elements.

We used Stata software to perform the analysis, and applied the hierarchical classification method by referring to the Ward’s linkage criterion (method), with the Gower distance measure selected by considering the mixed nature of the variable used (qualitative and quantitative variables). The CA is often used for exploratory analysis, as the procedure follows a simple way to classify a given data set through a certain number of clusters identified by referring to the visualization (as expressed by the dendrogram) as well as analytical criteria. Specifically, we referred to the Caliski/Harabasz pseudo F stopping rules to identify the cluster analysis, to determine the number of clusters, in which larger values indicate more distinct clustering.

We identified three clusters; that is, the cluster analysis was performed using the objectives of the initiatives as the variables able to differentiate groups between them and able to group the similar initiatives.

**3.4 Results and discussion**

The identified cluster can be described according to the variables used for the analysis, as we report below. It is worth noting that the Chi-square non parametric test was performed in order to assess whether there is independence or dependence between clusters and each of the variables considered in the analysis. The null hypothesis of independence is rejected for all the variables (except for the region), thus making our classification, the number of selected clusters and the identified peculiarities/profiles more robust. Indeed, here we highlight the three different clusters that emerged from the study:

1. **Profit – B2B initiatives**

This clustercontains all profit – business to business initiatives. 33% of these initiatives do not have a clear revenue model, 25% mainly work in partnerships, and another 25% sell their products directly without intermediaries. These initiatives mainly operate in the transformation phase of the food supply chain and are involved in recovery and processing of agri-food waste. This cluster counts the older initiatives according to the year they started with their activities.

1. **Profit – B2C- C2C initiatives**

In this clusterthere are all the profit – business to consumer or consumer to consumer initiatives. The revenue model of these initiatives mainly consists of direct selling and percentage of revenues. These initiatives mainly operate in the transformation and distribution phases of the food supply chain and are involved in recovery and processing of agri-food waste, and in sharing and redistributing excess food for profit purposes (sharing for money). This cluster counts the youngest initiatives according to the year they started with their activities.

1. **No profit- *Sharing for charity* initiatives**

This clustercontains all non-profit initiatives – with a mixed composition in terms of delivery model, but with a prevalence of business to consumer or consumer to consumer initiatives. Their revenue model is based on donations. These initiatives operate in the distribution phase of the supply chain with the purpose of redistributing food waste to needy people. Therefore, they are mainly involved in the *sharing for charity* model (89%), or in information/awareness raising activities (11%). Considering the “seniority” of enterprises, this cluster is in line with the general average start year, which is the end of 2014.

Immagine che contiene tavolo

Descrizione generata automaticamente

Table 2- Best practices in Italy along the food supply chain: cluster analysis results.

The analysis of the output of the STATA software (STATA 14.2) enables us to make the following observations. First, the Chi-square test is significant, indeed the p-value is equal to 0.000 for all the variables used in the cluster analysis, except for the variable referring to the localization (region), therefore leading us to reject the null hypothesis of independence between clusters and each variable considered from time to time. Second, the number of initiatives per cluster is not homogeneous: Cluster 1 - Profit-B2B initiatives has 12 initiatives; Cluster 2 Profit-B2C-C2C initiatives has 19 initiatives; and Cluster 3 No profit- *Sharing for charity* initiatives has 18 initiatives.

Finally, from the cluster analysis it emerged that the region parameter is not discriminating and statistically significant, maybe because almost all the initiatives operate in a supra-regional context, and in Italy in general there is a wide variety of anti-food waste organizations.



**Tab 1.1 – Dendrogram for Food Waste initiatives Cluster Analysis.**

**3.5 Case studies analysis**

This paragraph lists and explains one of the more interesting initiatives for each cluster. The three chosen initiatives are “Orange Fiber” for cluster 1, “Biova Project” for cluster 2, and “BringTheFood” for cluster 3.

Below we provide an identikit and a detailed explanation of these best practices.

**Profit – B2B initiative: Orange Fiber**

**Implementation area:** Sicilia (Catania)

**Food recovery objective:** Recovery

**Supply chain phase:** Transformation

**Value Proposition:** Sustainable fabrics production from citrus by-products.

**Start Year:** 2014

**Partnerships:** individuals, foundations and corporates (e.g., Angels for women (AXA Italia); Connect4Climate)

**Achievements:** 12 top startup finalists at MassChallenge Switzerland 2020; Best Innovation at MF Supply Chain Awards 2020; Compasso d'Oro 2016 (finalist for the research category for the company) - ADI Association for Industrial Design; Among the 5 winners of the Global Change Award 2015; Ideas 4 Change Award 2015 – UNECE.

**Profit – B2C- C2C initiative**: **Biova Project**

**Implementation area:** Piemonte (Turin)

**Food recovery objective:** Recovery

**Supply chain phase:** Transformation

**Value Proposition**: Use unsold bread from supermarkets, bakeries, restaurant chains or fast food outlets to produce beer

**Start Year:** 2018

**Partnerships**: Ipercoop; Winelivey; Gioosto; Social Innovation Team (SIT); Cortilia; Unes supermarkets.

**Achievements:** 1,752 kg of bread recovery, 1,000 kg of raw materials saved and 15,925 gr of CO2 saved.

**No profit- *Sharing for charity* initiatives: BringTheFood**

**Implementation area:** Trentino-Alto Adige (Trento, Bolzano);

Friuli-Venezia Giulia (Trieste); Veneto (Padova); Liguria (Genova);

Lombardia; Emilia Romagna (Parma)

**Food recovery objective:** Redistributing food waste to needy people

**Supply chain phase:** Distribution

**Value Proposition:** Simplifies the collection and distribution of surplus food: it allows producers, people, shops, canteens and restaurants to donate surplus food to people in need.

**Start Year:** 2015

**Partnership:** Banco Alimentare; Rete Solida; Ricibo.

**Achievements**: In 2020, more than 3 million portions of food of 150 grams each, equivalent to 472 tons of food, were recovered and distributed to the needy.

From 2015 until now more than 2,600 tons of food have been recovered and distributed. In the primary sector, specifically, 1,893 tons of surplus food have been recovered from networks using BringTheFood; while the food services sector recovered 74.24 tons, and the large and small distribution sector 416.03 tons.

**General conclusion**

This research aims to understand the Italian regulatory framework regarding FLW at national, regional and urban levels, the ways in which the implemented policies work and affect food waste in the country, and what lessons can be learned from it.

Firstly, Italy was the first country in the world to adopt a law that presents a strategic approach to the problem of food waste (EU Life Food Waste Stand Up, 2018). The implementation of this legislation is expected to have an important direct and indirect impact on the fight against FLW, increasing the volume of recovered food by about 20 percent during the period from 2016 up to the present, according to the Italian Food Bank’s estimations (Banco Alimentare).

The Law 166/16 has a persuasive approach, encouraging companies, supermarkets, shops and restaurants to donate more surplus food due to de-bureaucracy and introducing new tax incentives and deductions. According to our analysis, the so-called Gadda law conforms to the first two levels of the Food Recovery Hierarchy, namely prevention and reuse for human consumption, with a main focus on reuse, since it aims to encourage the donation and redistribution of food surpluses to people in need.

Secondly, the regional point of view is rather fragmented, but the majority of the laws regarding FLW still conform to the first two levels of the Food Recovery Hierarchy, as they have the purpose of preventing and reusing food surpluses in favor of people in need, with an interesting focus on food waste prevention.

Thirdly, our analysis shows that the main private initiatives proposed in Italy against food waste are mainly profit B2B or B2C, although there is also a strong presence of not for profit - *sharing for community* initiatives.

Finally, the analysis highlights that all the estimates regarding the recovery of food surpluses in Italy were done by private or not-for profit organizations, such as Banco Alimentare, and that, due to a lack of monitoring of the national performance in food waste reduction, nowadays there is no quantitative measurement of the contribution that national initiatives make to the reduction of food waste.

In line with this, it is important to underline that the Italian Gadda Law, albeit innovative, has not announced binding objectives to be achieved by 2030, and the lack of specific tools to monitor national performance certainly makes it more difficult to achieve the objectives set by the Agenda 2030. Because many other EU Countries still lack specific reduction targets and measurements, it is worth noting that the European Commission will propose legally binding targets to reduce food waste across the EU, by end 2023, defined against a baseline for EU food waste levels set following the first EU-wide monitoring of food waste levels.

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**Appendix 1 - Classification of the main interventions on the issue of food waste by Italian regions**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Region | **Regional Laws** | **Provincial Laws** | **Other sources** | **Year** | **Prevention** | **Reuse for human consumption** | **Recycling for animal consumption** | **Recovery** | **Agricultural recycling** | **Disposal** |
| ABRUZZO | Legge Regionale 12/01/16 n.4: “Lotta agli sprechi alimentari” |  |  | 2016 |  | X |  |  |  |  |
| BASILICATA | Legge Regionale 11/08/15 n.26: “Contrasto al disagio sociale mediante l'utilizzo di eccedenze alimentari e non” |  |  | 2015 |  | X |  |  |  |  |
|  |  | D.G.R.10/02/16 che, con riferimento alla LG 11/08/15 “Contrasto al disagio sociale, mediante l'utilizzo di eccedenze alimentari e non” approva le Linee Guida attuative | 2016 |  | X |  |  |  |  |
| CALABRIA | Legge Regionale 03/08/18 n.27: Promozione dell’attività di recupero e ridistribuzione delle eccedenze alimentari per contrastare la povertà e il disagio sociale |  |  | 2018 |  | X |  |  |  |  |
| Legge Regionale 22/12/17 n.55: Legge di stabilità regionale 2018, art. 3 (prevenzione e riduzione dello spreco alimentare) |  |  | 2017 |  | X |  |  |  |  |
|  |  | Proposta di legge n.27/10/16“Norme per la promozione delle attività di recupero e ridistribuzione delle eccedenze alimentati per contrastare la povertà e il disagio sociale” | 2016 |  | X |  |  |  |  |
| CAMPANIA | Legge Regionale 06/03/15 n.5: “Interventi regionali di riconversione delle eccedenze alimentari” |  |  | 2015 |  | X |  |  |  |  |
|  |  | D.G.R. n.344/2017: Direzione Generale per le politiche sociali e sociosanitarie. Oggetto dell’Atto: “Promozione di interventi volti al recupero e alla redistribuzione delle eccedenze alimentari” | 2017 |  | X |  |  |  |  |
| EMILIA-ROMAGNA  EMILIA-ROMAGNA | Legge Regionale 06/07/07, n.12: “Promozione dell’attività di recupero e distribuzione di prodotti alimentari a fini di solidarietà sociale |  |  | 2007 | X |  |  |  |  |  |
| Legge Regionale 05/10/15, n.16: disposizioni a sostegno dell'economia circolare, della riduzione della produzione dei rifiuti urbani, del riuso dei beni a fine vita, della raccolta differenziata e modifiche alla legge regionale 19 agosto 1996 n. 31 (disciplina del tributo speciale per il deposito in discarica dei rifiuti solidi)” |  |  | 2015 |  |  |  | X |  |  |
|  |  | Risoluzione 28/04/16 per impegnare la Giunta ad avviare studi di fattibilità volti alla ridestinazione ed alla ricollocazione delle merci e dei prodotti alimentari commestibili ma scartati | 2016 |  | X |  |  |  |  |
| FRIULI-VENEZIA GIULIA | Legge Regionale 20/10/17, n.34: Sistema regionale di gestione dei rifiuti, art. 5 disposizioni per la limitazione degli sprechi di prodotti alimentari e farmaceutici” (Testo vigente dal 01/01/20) |  |  | 2017 | X | X |  |  |  |  |
|  |  | Decreto del Presidente della Regione n.04/2016, approvato il “Programma regionale di prevenzione della produzione dei rifiuti” parte integrante del Piano regionale di gestione dei rifiuti | 2016 | X | X |  |  |  |  |
| LAZIO |  |  | 15/10/19 Firmato il “Protocollo per la riduzione dei rifiuti e il contrasto allo spreco alimentare” | 2019 | X |  |  |  |  |  |
| LIGURIA | Legge Regionale 27/12/19, n.31: “Disposizioni collegate alla legge di stabilità per l’anno 2020, art. 9 contrasto alla povertà e sostegno alle famiglie” |  |  | 2019 | X | X |  |  |  |  |
| LOMBARDIA | Legge Regionale 11/12/06, n.25: “Politiche regionali di intervento contro la povertà tramite promozione dell'attività di recupero e distribuzione dei prodotti alimentari a fini di solidarietà sociale” |  |  | 2006 |  | X |  |  |  |  |
|  |  | D. G.R. n.10/6973 del 31/07/17 “determinazione in ordine alla promozione dell’attività di recupero e distribuzione dei prodotti alimentari ai fini della solidarietà sociale: anno 2017/2018” | 2017 |  | X |  |  |  |  |
| Legge Regionale 6/11/15, n.34: “Legge di riconoscimento, tutela e promozione del diritto al cibo” |  |  | 2015 | X | X |  |  |  |  |
| MARCHE | Legge Regionale 13/11/17, n.32: “Interventi di economia solidale, lotta agli sprechi e prime azioni di prevenzione della produzione dei rifiuti” |  |  | 2017 | X | X |  |  |  |  |
| MOLISE |  |  | Proposta di legge del 31/10/17: “Norme per la limitazione degli sprechi, l’uso consapevole delle risorse e la sostenibilità ambientale, attraverso recupero e utilizzo di eccedenze alimentari e beni a fine vita”. | 2017 | X | X |  |  |  |  |
| PIEMONTE | Legge Regionale 23/06/15, n.12: “Promozione di interventi di recupero e valorizzazione dei beni invenduti" |  |  | 2015 | X | X |  |  |  |  |
|  |  | Approvazione del 09/11/19 da parte della Giunta Regionale della delibera di attuazione della L.R. n.12/2015 | 2019 | X | X |  |  |  |  |
|  |  | Comunicazione G. R. del 20/10/17 “Politiche sociali regione Piemonte e Banco Alimentare insieme per la prima raccolta alimentare aziendale di un ente pubblico” | 2017 |  | X |  |  |  |  |
|  |  | D. G. R. del 06/07/15, n.20/1673: “Adesione della regione Piemonte dell’Associazione senza fini di lucro Sprecozero.net” | 2015 | X |  |  |  |  |  |
| PUGLIA | Legge Regionale 18/05/17, n.13: “Recupero e riutilizzo di eccedenze, sprechi alimentari e prodotti farmaceutici” |  |  | 2017 |  | X |  |  |  |  |
| SARDEGNA |  |  | Risoluzione del Consiglio Regionale n.159 di giugno 2015 sulle “perdite e sprechi alimentari e utilizzo ai fini di implementare politiche d’inclusione sociale e sistemi di welfare innovativi” | 2015 | X |  |  |  |  |  |
| SICILIA |  |  | Comunicato stampa del 04/02/18 della Giunta Regione Sicilia: “Spreco alimentare un insulto alla povertà” | 2018 | X |  |  |  |  |  |
|  |  | Disegno di Legge del 13/02/17: “Iniziative in ordine agli sprechi alimentari” | 2017 |  | X |  |  |  |  |
|  |  | Disegno di Legge del 16/02/16: “Promuovere da parte della Regione lo sviluppo di una cultura del consumo critico come modello di vita virtuoso produttivo di effetti positivi sia economici, sia ambientali e sociali” | 2016 | X | X |  |  |  |  |
| TOSCANA | Legge Regionale 25/06/09, n.32: “Interventi per combattere la povertà ed il disagio sociale attraverso la redistribuzione delle eccedenze alimentari” |  |  | 2009 |  | X |  |  |  |  |
| Legge Regionale 10/12/19, n.75: “Norme per incentivare l’introduzione dei prodotti a chilometro zero provenienti da filiera corta nelle mense scolastiche” |  |  | 2019 | X |  |  |  |  |  |
| TRENTINO-ALTO ADIGE |  | Legge Provinciale 13/03/18, n.2: “Promozione di iniziative contro lo spreco di prodotti alimentari e non alimentari” |  | 2018 | X | X |  |  |  |  |
| UMBRIA | Legge Regionale 14/11/17, n.16: “Interventi regionali per la promozione delle attività di donazione e distribuzione a fini di solidarietà sociale di prodotti alimentari, non alimentari e farmaceutici” |  |  | 2017 | X | X |  |  |  |  |
| VALLE D’AOSTA |  |  |  |  |  |  |  |  |  |  |
| VENETO | Legge Regionale 26/05/11, n.11: “Interventi per combattere la povertà ed il disagio sociale attraverso la redistribuzione delle eccedenze alimentari” |  |  | 2011 |  | X |  |  |  |  |
|  |  | D.G.R. n.1592/2017: “Azioni per favorire e valorizzare la donazione delle eccedenze alimentari” tra Regione Veneto e federdistribuzione | 2017 |  | X |  |  |  |  |
|  |  | D.G.R. n.1589/2018, “Interventi per combattere la povertà ed il disagio sociale attraverso la redistribuzione delle eccedenze alimentari” | 2018 |  | X |  |  |  |  |

1. The avoidable waste fraction is composed of edible and potentially edible (e.g apple and apple peel). The non-avoidable fraction of waste refers to the inedible part of the food (chicken bone, fish bone) (Giordano et al., 2019a) [↑](#footnote-ref-1)
2. <http://www.salute.gov.it/portale/documentazione/p6_2_5_1.jsp?lingua=italiano&id=256> [↑](#footnote-ref-2)
3. <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11656> [↑](#footnote-ref-3)
4. <https://www.regione.lombardia.it/wps/portal/istituzionale/HP/DettaglioPubblicazione/servizi-e-informazioni/Enti-e-Operatori/ambiente-ed-energia/rifiuti/atti-convegno-ridurre-lo-spreco-alimentare-futuro> [↑](#footnote-ref-4)
5. <https://www.minambiente.it/pagina/spreco-alimentare> [↑](#footnote-ref-5)
6. <https://www.fondazionefico.org/la-fondazione/> [↑](#footnote-ref-6)
7. <https://www.ausl.bologna.it/news/archivio-2018/auslnews.2018-03-23.6108838765> [↑](#footnote-ref-7)