

BARILLA FOOD LOSS AND WASTE REPORT

BARILLA PAN BAULETTO 1 KG

July 2022



STANDARD USED

REPORT BY



Food
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Barilla
The Italian Food Company. Since 1877.

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INTRODUCTION

Barilla

The Italian Food Company. Since 1877.

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Barilla**

il tuo cibo, la tua terra

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**last minute
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www.lastminutemarket.it

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Aware of the urgency emerging from the Barilla Center for Food & Nutrition Foundation studies, Barilla, as a food company, has started to analyse three of its supply chains (pasta, tomato sauce and bread) in collaboration with **Last Minute Market (LMM)**, a spin-off from the University of Bologna.

Its goal is to monitor the food losses and waste all along the value chains, identifying the causes and the measures to reduce them. The reference standard used for this analysis is the global **Food Loss and Waste Accounting and Reporting Standard (FLW Standard)**.

This document refers to Barilla Soft Wheat Bread "Pan Bauletto".



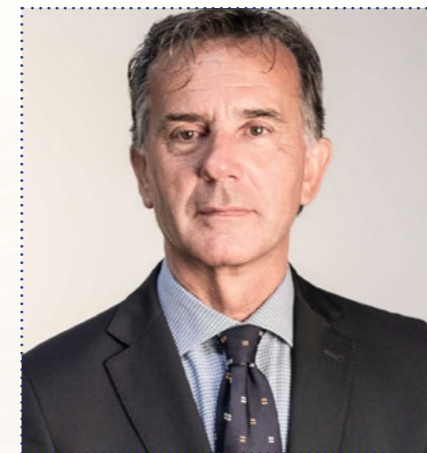
WHY FOOD WASTE IS SO IMPORTANT

Food waste is one of the most significant social, economic, and environmental issues facing our Planet.

At a time in history where nearly one billion people are still dying of hunger or have to settle for inadequate nutrition every year, it is unacceptable that over a third of the world's food remains abandoned in fields or ends up in landfills.

Food waste has serious environmental impacts. Today, we know that every product not only generates CO₂ throughout its life cycle, but also has a water footprint that weighs heavily on climate change. Producing food that will never end up on a table means unnecessarily aggravating our Planet's health. Besides the moral and environmental effects, food waste also results in the decreased social value of food. After years of agricultural industrialisation, the decline in food prices has been relentless.

This phenomenon has fuelled the hopes of those who believe it would be possible to feed everyone on the Planet. Unfortunately, the main result has rather been the loss of people's perception of food's real value, that is to say, the effort it takes to produce, cultivate and harvest food.



"Food is not simply a matter of what we put on our plate every day. It is the energy of our lives. It is about wellbeing, culture, conviviality, the resources required to produce it, and is the livelihood of many people around the world. These are the true values of food we want to preserve. It is our duty to avoid unnecessary waste, reduce the impact of the food system on the Planet and inspire people to consume responsibly and enjoy."

CLAUDIO COLZANI
CEO, Barilla Group

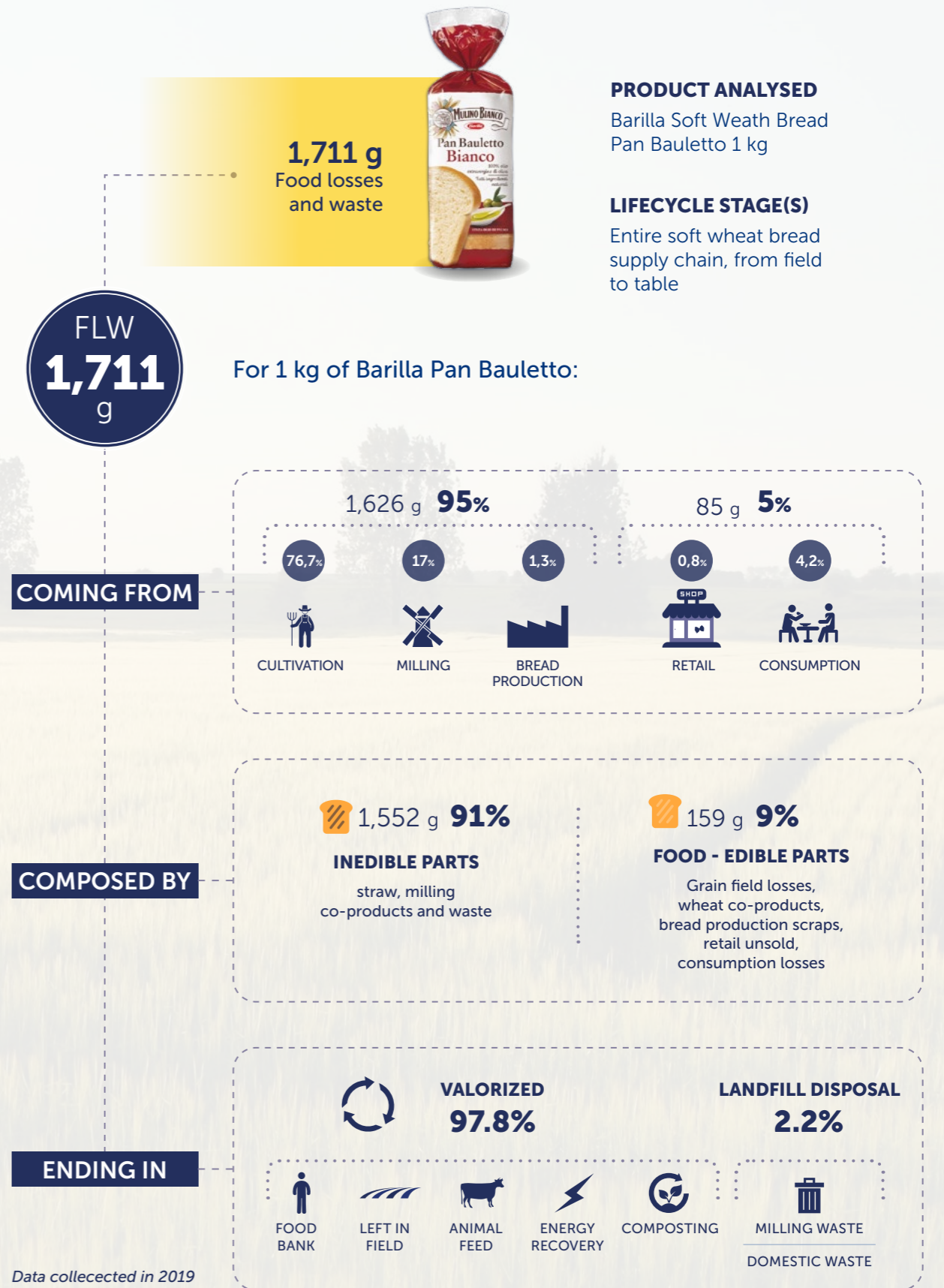
SUMMARY

Barilla, analysed the entire life cycle - from field to table - of the **bread** that it produces in Italy. It has been found that this supply chain is an example of a true circular economy, where almost nothing is lost.

Food **loss in the field** is very limited (**around 2%** due to grain losses), while the straw obtained during the harvest—weighing the same as wheat—is usually used as animal feed and for litter. **Losses** of the **edible parts** generated during the **grinding** of the grain and the **bread production** around 2%.

However, the research carried out has shown that the **greatest wastage** is concentrated in the **final phase**. In fact, the product wasted at the final level (**distribution and consumption phase**) amounted around **8.5%**.

TOTAL FOOD LOSSES AND WASTE (FLW)



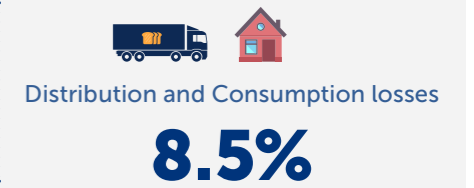


BARILLA PAN BAULETTO

A GOOD EXAMPLE OF CIRCULAR ECONOMY

Product, Co-product and Waste

SOFT WHEAT BREAD LOSSES AND WASTE



Data collected in 2019.
Percentage is referred to each single phase of the supply chain.



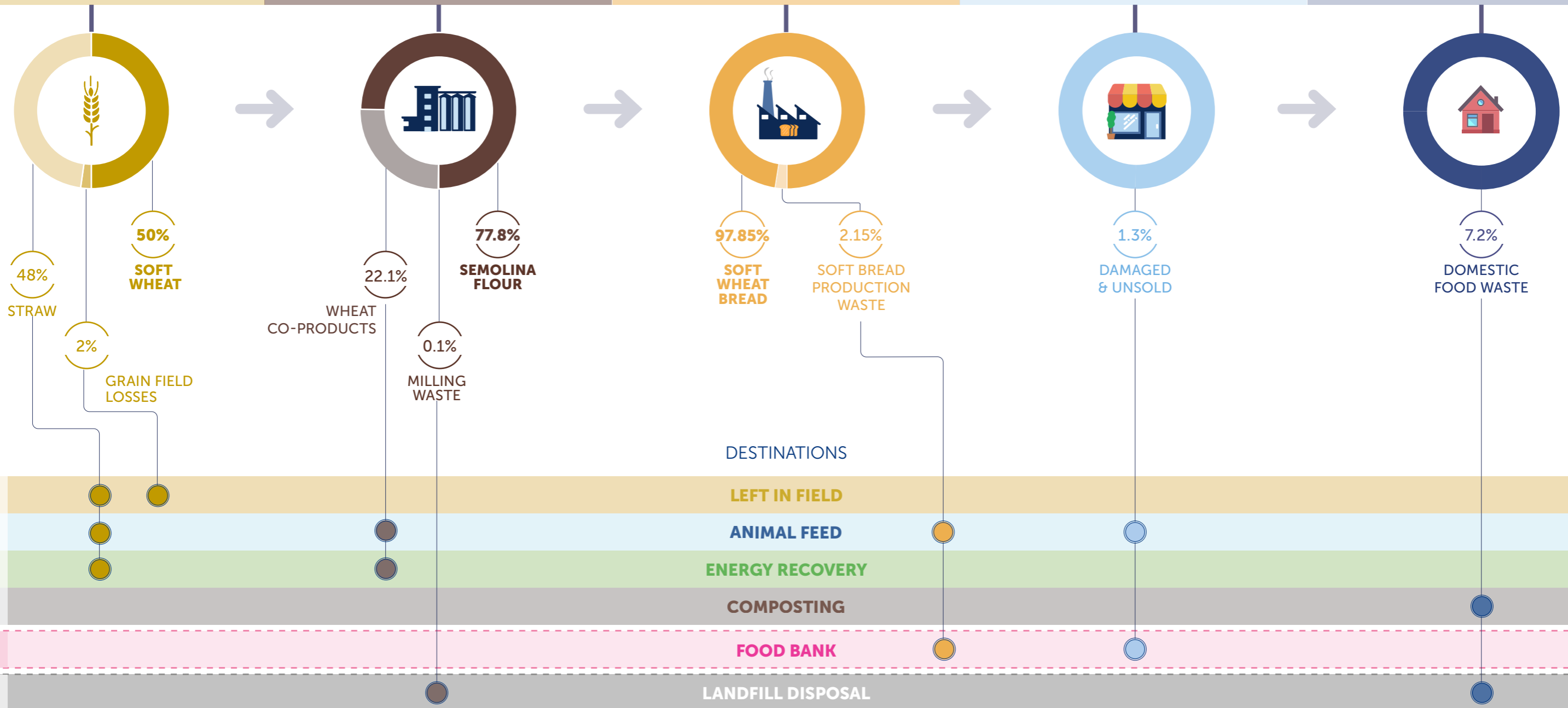
SOFT WHEAT CULTIVATION

MILLING

BREAD PRODUCTION

DISTRIBUTION

CONSUMPTION



METHODOLOGY



www.flwprotocol.org

The reference standard used for this analysis was the global **Food Loss and Waste Accounting and Reporting Standard** (FLW Standard).

“The Food Loss and Waste Accounting and Reporting Standard (or FLW Standard) is a global standard that provides requirements and guidance for quantifying and reporting on the weight of food and/or associated inedible parts removed from the food supply chain—commonly referred to as “food loss and waste” (FLW). Using the standard enables countries, cities, companies, and other entities to develop inventories of how much FLW is generated and where it goes. The FLW Standard is designed to allow for the fact that different organizations will have different reasons for quantifying FLW. These different goals lead to (or government regulations may even explicitly state) different definitions of what constitutes FLW. The FLW Standard is designed to allow for the fact that different organizations will have different reasons for quantifying FLW. These different goals lead to (or government regulations may even explicitly state) different definitions of what constitutes FLW. The FLW Standard, therefore, defines the possible components of FLW in terms of the possible material types (i.e., food and/or associated inedible parts) and destinations (where material removed from the food supply chain is directed—see Figure 1). It allows an entity to select which combination of material types and destinations it considers to be “food loss and waste,” in accordance with the entity’s stated goals”. The FLW Standard provides a credible, practical, transparent, and internationally consistent basis for entities to account for and report on FLW. An FLW inventory must meet a number of requirements to be in conformance with the standard; these requirements are listed in Table 3 at the end of this executive summary. The full document provides guidance on implementing these requirements, as well as additional recommendations.”

Regardless of the particular scope selected, the FLW Standard requires an entity to report on four components:

- Timeframe:** the period of time for which the inventory results are being reported.
- Material type:** the materials that are included in the inventory (food only, inedible parts only, or both).
- Destination:** where FLW goes when removed from the food supply chain.
- Boundary:** the food category, lifecycle stage, geography, and organization.

FIGURE 1 | Material types and possible destinations under the FLW standard

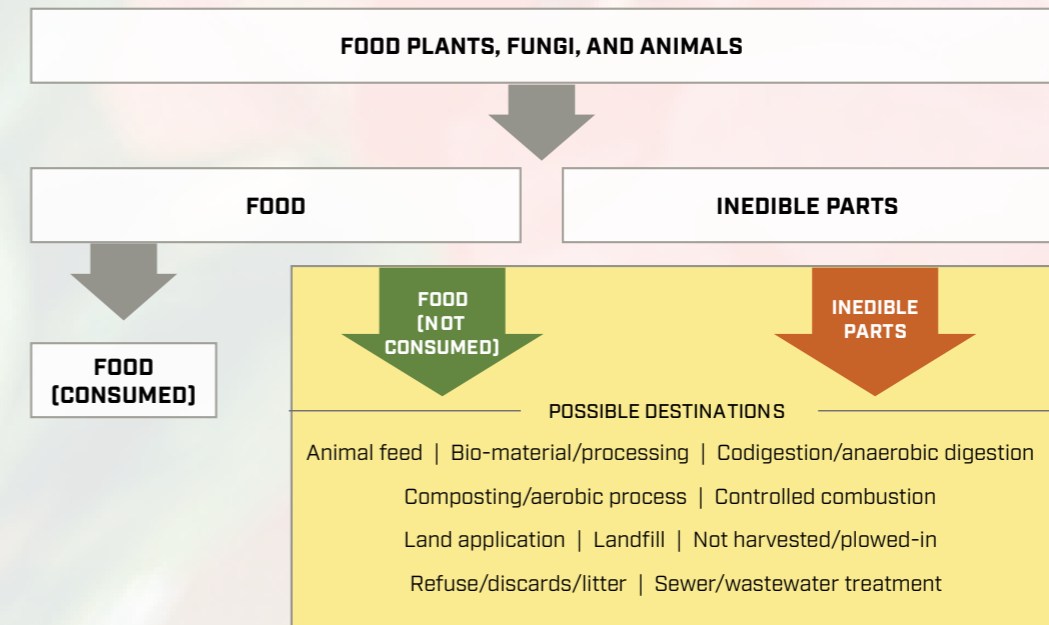
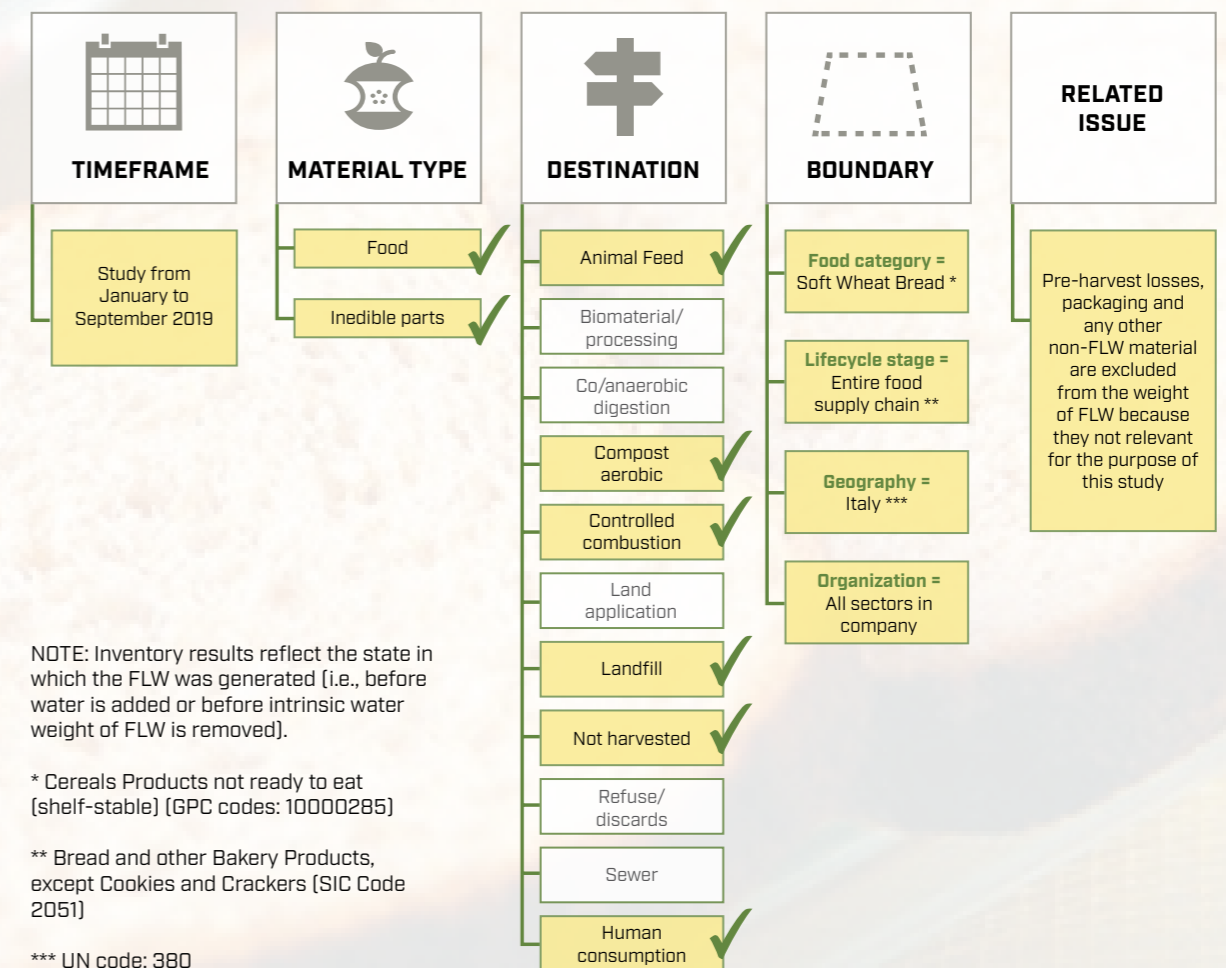


FIGURE 2 | Scope of an FLW Inventory



SCOPE AND RESULTS



The study was carried out by analysing the FLW of the life cycle of 1 Kg of Soft Wheat Bread “Pan Bauletto” produced in Italy.

The scope of this FLW inventory is the quantification of loss and waste from field to fork for the production of 1 kg of Barilla Pan Bauletto Bread.

PRODUCT

Pan Bauletto 400 g.

TIMEFRAME

The study began in January 2019 and ended in September 2019. Data relevant to bread factory date back to 2018.

MATERIAL TYPE

The total weight of the FLW has been quantified in **1.71 kg** for 1 kg of bread produced. The total is the sum of the **food (0.16 kg)** and the **inedible parts (1.55 kg)**. “Food” refers to any substance—whether processed, semi-processed or raw—that is intended for human consumption. “Inedible parts” refer to components associated with food that, in the food supply chain, is not intended to be consumed by humans.

DESTINATION

As “destination” we indicate where the material removed from the food supply chain is directed.

BOUNDARIES

We analysed the boundary of the FLW inventory in terms of the food category, lifecycle stage, geography and organisation.

EXCLUSIONS AND RELATED ISSUES

- Packaging and any other non-FLW material have been EXCLUDED from inventory results.
- Inventory results reflect the state in which the FLW was generated (i.e., before water is added or before intrinsic water weight of FLW is removed).
- Pre-harvest losses have been EXCLUDED from inventory results, because they are not relevant for the purpose of this study.

Destination	Weight of FLW (g)	%
Human consumption	7.0 g	0.4 %
Animal feed	593.2 g	34.7 %
Composting/aerobic processes	36.0 g	2.1 %
Landfill	37.3 g	2.2 %
Not harvested/plowed-in	472.7 g	27.6 %
Energy Recovery	565.2 g	33.0 %
Total FLW	1,711.4 g	100 %

BOUNDARY	
Food category(ies)	Cereals Products – Not Ready to Eat (Shelf Stable) (GPC codes: 10000285)
Lifecycle stage(s)	Bread and other Bakery Products, except Cookies and Crackers (SIC Code 2051)
Geography	Italy (UN code: 380)
Organization	All sectors in the company

METHODS AND DATA SOURCES

Data have been collected by:

- **Barilla G.&R. Fratelli SpA**, which supplied data and information concerning the processes of cultivation, milling, and bread production.
- **Last Minute Market Srl**, accredited spin-off of the University of Bologna, which provided data about cultivation, distribution and consumption.

In regard to the **cultivation stage**, we analysed documented research which provided an overview about field loss, particularly during the harvest stage. Through the comparison of various studies, we estimated the average field loss for soft wheat. In particular, we consulted 2011 FAO's "Global Food Losses and Food Waste" and a study about loss in primary production conducted by Barilla.

In regard to the **processing stage** (milling and bread production), we referred to data provided by Barilla and by the Italian primary and secondary processing plants that were taken into consideration. The data were specifically collected from one mill for the primary processing and from two production plants for the secondary processing.

In regard to **distribution**, we referred to data provided by Italian retail establishments. The data were collected by LMM through a survey conducted in 5 brands of the Italian large-scale distribution. The resulting data, useful for our analysis, were provided by four of these five companies. They refer to 1,700 points of sale, representative of the categories present in the Italian territory, from small supermarket to larger hypermarket.

The data referring to the **last stage** of the supply chain, the consumption, derives from a Last Minute Market estimate. The percentage of waste detected (7% of estimated waste for the consumption phase, which accounts for 4% of the total FLW), is calculated as the ratio between: 42,6 grams/week that is the domestic waste of bread per capita (source Department of Agro-Food Sciences and Technologies of the University of Bologna-unpublished data) and 85 grams/day that is the average consumption of bread per capita in Italy (source Confederazione Nazionale Coldiretti-published data).

DATA SOURCE

- Orta for cultivation data
- Barilla plants of Cremona and Melfi
- Last minute Market for retail and consumption data

REFERENCES

- www.eu-fusions.org
- www.fao.org
- www.theconsumergoodsforum.com
- web.unep.org
- www.wbcsd.org
- www.wrap.org.uk
- www.wri.org

CAUSES OF FOOD LOSS AND WASTE

The causes of FLW are due to a number of conditions, especially regarding the production process we consider below. For example, when we analyse the wheat cultivation process, the straw production is an inevitable part and is, therefore, considered a 'joint' production. In order to produce a certain amount of grain, straw will inevitably be produced as well. The straw produced during the cultivation stage will not be discarded, but utilised as litter and animal feed.

FLW Type	Weight g	% FLW on the whole	Cause	Additional notes
Cultivation - Straw	1,260.4	73.6%	Physiological	Joint production. That is, in order to produce a certain amount of grain, a certain amount of straw is produced. (Physiological process)
Cultivation - Field losses	52.5	3.1%	Combine harvester failure	Using the best technology available and maximizing the performance, it is not possible an increase of the amount of the harvested wheat.
Milling - Wheat co-products	290.2	17%	Wheat pre-cleaning	Physiological waste in pre-cleaning stage of wheat is, nevertheless, used in alternative production, especially in animal feed.
Milling waste	1.3	Neg.	Wheat pre-cleaning	The pre-cleaning plant removes the impurities before the wheat is stocked in the silos. These losses are partially used for animal feed. Their non-edible parts are disposed as waste.
Bread production scraps	21.5	1.3%	Equipment cleaning	The FLW in this stage of production is mainly the consequence of production lines cleaning and changes of bread shapes, not usable for human consumption.
Bread production scraps	0,5	Neg.	Equipment cleaning	The FLW in this stage of production is mainly the consequence of production lines cleaning and changes of bread shapes, still edible.
Retail unsold	13.0	0.8%	Damage	In retail store, the main cause of waste is the breaking or damaging of packaging, which makes the bread unsellable.
Consumption	72.0	4.2%	Expired, purchase higher than necessary	Info not available
Total FLW	1,711.4 g	100 %		

INVENTORY RESULTS

The following table shows the FLW by food category and lifecycle stages.

In regard to the **edible parts** of the FLW, amounting to **9.32%** only of the total losses, we see that the FLW mainly occurs in the **consumption stage**. If **on the total losses** of the FLW the consumption phase represents the **4.2 %**, it accounts for over **45.1% on the edible parts**.

During the **primary** and **secondary production stages** (milling and bread production), the FLW is limited to a **13.8 % of the edible parts**. More important, almost all the FLW of the edible portion during the production stage is reused in alternative productions, such as that of animal feed or donate for human consumption.

On the other side, considering the FLW in domestic context, excluding rare occasions of recycle of surplus for social purposes, the FLW is inevitably disposed.

Lifecycle stage	Material type removed from food supply chain	Total of all food categories (g)	% on total FLW	% on total edible part	Product
1. Soft wheat cultivation	Food + associated inedible parts	1,312.9	76.7%		
	Food only	52.5		32.9%	Grain
	Inedible parts only	1,260.4			
2. Milling	Food + associated inedible parts	291.5	17.0%		
	Food only	0	0	0%	Flour
	Inedible parts only	291.5			
3. Bread production	Food + associated inedible parts	22.0	1.3%		
	Food only	22.0		13.8%	Bread
	Inedible parts only	0			
4. Retail and markets	Food + associated inedible parts	13.0	0.8%		
	Food only	13.0		8.2%	Bread
	Inedible parts only	0			
5. Consumption	Food + associated inedible parts	72.0	4.2%		
	Food only	72.0		45.1%	Bread
	Inedible parts only	0			
TOTAL ALL LIFECYCLE STAGES	Food + associated inedible parts	1,711.4	100%		
	Food only	159.5	9.32%	100%	
	Inedible parts only	1,551.9	90.68 %		

BREAD SUPPLY CHAIN: LOSSES AND WASTE

Each kg of bread produces **1.71 kg** of losses and waste. It is important to analyse the composition and causes of FLW to identify corrective actions. In this study, we included **edible** and **inedible parts** of FLW, and the overall results are deeply influenced by the inedible part, consider that only at the cultivation stage we have almost 50% of straw losses.

Composition of FLW: food and inedible parts

Along the supply chain **90,68%** of all FLW consist in **inedible parts**, mainly related to physiological issues, as **straw (76,7%)**, and a small part during milling and pasta production stages. Only **9,32%** are considered as **edible parts**, mainly wasted in **consumption stage (45,1% of all edible part)**.

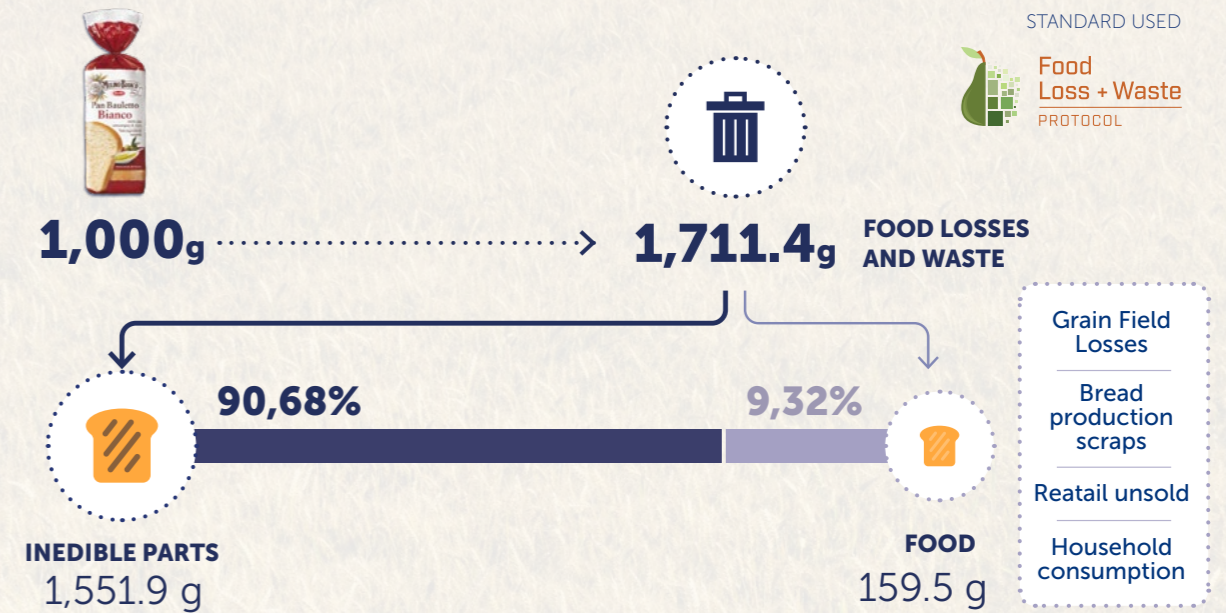
Where are FLW allocated in the chain

95% of all FLW are allocated in the **previous stages** to the **distribution**, **5%** in the final part of the supply chain, in **distribution** and **consumption phase**; However, we must consider that we lose **most edible part** at the **consumption level (45,1% on the total edible part)**.

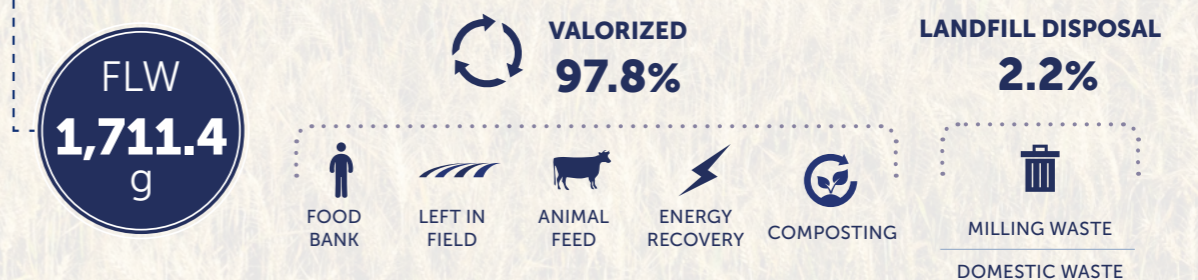
Destinations of FLW: an example of circular economy

97,8% of the total of FLW is used into **alternative sectors**, while only **2,2%** is destined to **landfill disposal**. In particular considering alternative destinations, we have **34,7%** of total FLW used for **animal feed** and **care**, **27,6%** not harvested, **33%** recover for **energy**, **2,1%** **composting**, and **0,4%** for **human consumption**.

FOOD LOSS AND WASTE - Barilla Pan Bauletto 1kg



	UPSTREAM 76.7 %	CORE 18.3 %	DOWNSTREAM 5%		
	CULTIVATION	MILLING	PRODUCTION	RETAIL	CONSUMPTION
FOOD	52.5 g	0 g	22 g	13 g	72 g
INEDIBLE PARTS	1,260.4 g	291.5 g	0 g	0 g	0 g
TOTAL FLW	1,312.9 g	291.5 g	22 g	13 g	72 g



Data collected in 2019

BARILLA CANTEEN'S PROJECT TO REDUCE FOOD LOSS AND WASTE

A research by Last Minute Market on domestic waste in the Italian households (www.sprecozero.it), shows that in Italy the **total food waste** is worth over **€ 15 billion** and **what we throw into homes, canteens and restaurants** represents **4/5 (€ 12 billion) of the total**.

Awareness about this issue, **Barilla** has started in **March 2018** a **pilot project**, called **Winnow**, for **measuring** and **minimizing waste** of the catering service in its **Pedrignano office restaurant's**.

BARILLA'S WINNOW PROJECT

Winnow project has been implemented in collaboration with the catering partner **Felsinea Ristorazione** and with the technological support from the English company **Winnow**.

The project concerns the use of a tablet for the **measurement** and **analysis** of **food waste** and the **implementation** of a **special routine**: Felsinea staff **throws** food waste into a dedicated bin and **registers** the **weight** and **type** of food waste via the digital tablet directly connected to Winnow's system that records all the information and create **daily reports** showing waste trends in the time. By analysing reports and trends Felsinea staff can understand what are the food **waste main causes**, **improvement** areas to work on and the **action** plan to adopt.

Thanks to this project the canteen's staff is now more aware and able to focus on **specific improvement areas**.

THE RESULTS

By implementing the project's routine Felsinea has **saved from waste**, in the period from March 2018 to December 2019, **4,800 kg of food**, equivalent to **11,946 meals** and **21,000 kg of CO₂ eq**. The largest amount of food waste has been recorded in the meal preparation phase and in the end of service returns. For these reasons Felsinea is working for **reducing waste during meal preparation phase** and is implementing strategies to **increase customer awareness**.

Thanks to the great results obtained Barilla is planning to **expand the project** to other Company's canteens in its Italian plants aiming to reduce food waste.

BARILLA PEDRIGNANO CANTEEN'S FOOD WASTE REDUCTION PROJECT

HOW DOES IT WORK

The canteen's routine implemented with the project consists of simple steps:



FOOD SAVED FROM WASTE

In 22 months the project the project has allowed to save from waste



PROJECT'S PARTNERS



Felsinea Ristorazione is an Italian company that provides catering services for over 40 years. It is specialized in corporate catering and offers its service in most of Barilla Italian plants' canteens.



Winnow is an English company that builds artificial intelligence tools to help chefs run more profitable and sustainable kitchens by cutting food waste. They develop digital tools that provide data to drive improvements in kitchen production processes and reduce environmental footprint.

BARILLA GROUP



Barilla is an Italian, family-owned food company. Established in 1877, it's now an international player in the market of pasta, ready-to-use sauces, bakery products and crispbreads.

Barilla is recognised worldwide as a symbol of Italian know-how and is present in more than 100 countries through its brands, which have become the icon of excellence in the food sector.

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BARILLA FOUNDATION



Barilla Foundation has always worked to build a better future and it does so starting from the study of food systems, because the well-being of Planet Earth and its inhabitants also depends on our awareness and the result of our daily actions.

Through research and dissemination projects, it promotes sustainable behaviors and healthy food choices for a concrete change in society

www.fondazionebarilla.com

LAST MINUTE MARKET SRL



Last Minute Market is an accredited academic spin-off of the University of Bologna engaged in waste reduction and prevention. Active for more than 15 years, it operates with enterprises and public

administrations across Italy ideating, implementing and monitoring recovery projects. Unsold (not for sale, but still edible) goods are donated to charities. LMM is also doing research, training and food waste analysis. It also promotes initiatives aimed at raising public, private and governmental awareness on waste issues. LMM started in 1998 as a research project by the Department of Agricultural Economics and Engineering of the University of Bologna, testing new practices of the social valorisation of the copious amount of unsold, fresh food that supermarkets dispose daily.

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