



DURUM WHEAT SEMOLINA PASTA SELEZIONE ORO CHEF SOLD IN ITALY

ENVIRONMENTAL PRODUCT DECLARATION



The first EPD process certified in the Food industries



REGISTRATION NUMBER

S-P-00492

CPC CODE

2731 Uncooked pasta, not stuffed or otherwise prepared
PCR 2010:01 v. 4.0.3
2022/12/21

PUBLICATION DATE

2014/09/22

REVISION

8 of 2023/12/18

VALID UNTIL

2028/11/21

PROGRAMME

The International EPD® System
www.environdec.com

PROGRAMME OPERATOR

EPD International AB

This EPD has been developed in conformity to ISO 14025. An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.environdec.com.

1. BRAND AND PRODUCT

THE BRAND BARILLA

The Barilla brand is born in 1877 as a small bread and pasta shop in Parma. The best durum wheat and cutting-edge technologies make it possible to offer pasta that always remains “al dente” and ready-made sauces to millions of people around the world.

Barilla for Professionals offers high-quality products, services and know-how for the catering industry.

Further information on [Barilla for Professionals](#) website.

THE PLANT AND THE PROCESS

This Environmental Product Declaration is about Barilla’s pasta Selezione Oro Chef produced in three Italian plants (Pedrignano, Foggia, Marcianise) and sold in Italy.

Dry semolina pasta Selezione Oro Chef is made from only water and special quality durum wheat, with final moisture content below 13%, as prescribed by Italian legislation on pasta. It is produced by extrusion or lamination and then a drying process.

The pasta production process does not require additives and preservatives: it is the drying process that guarantees the conservation.

THE PRODUCTS

The new Selezione Oro Chef has a new blend of selected quality durum wheat and a 14% protein content, for a robust texture and elasticity in all professional kitchens. With its strong cooking tolerance, this product is the right ally to the Chefs and their customers.

Selezione Oro Chef is versatile and therefore designed for all professional usage:

- Optimized for double cooking
- Suitable for express cooking
- Tested rapid delivery

Products included in the analysis are Classic semolina pasta cuts (spaghetti, penne, fusilli, etc.); Regionali (gnocchetti sardi, orecchiette pugliesi, casarecce siciliane, trofie liguri). Shape is the only feature differentiating these products.

From a nutritional point of view, its main characteristics are:

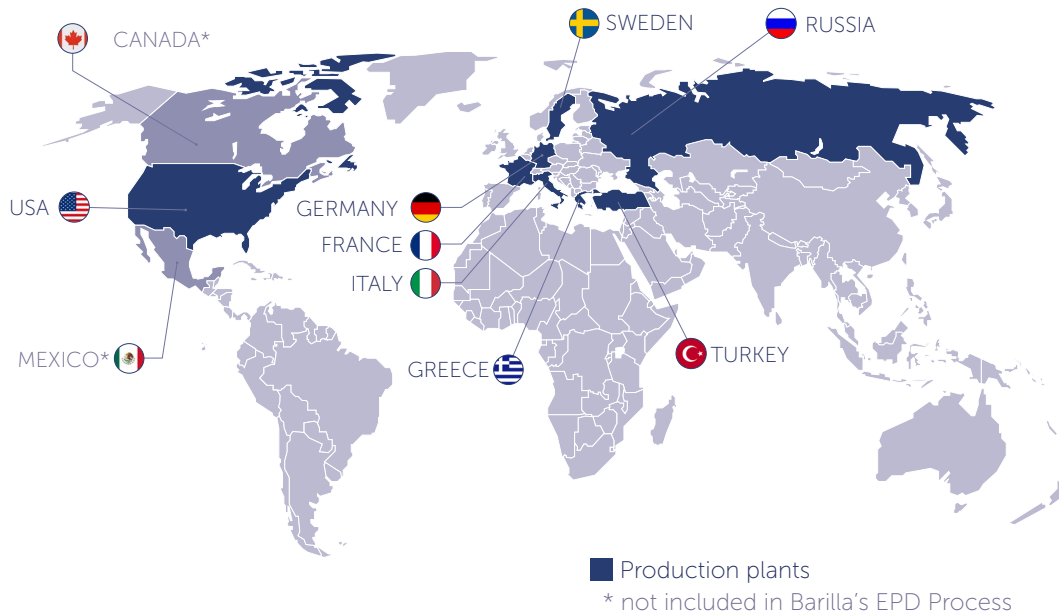
NUTRITIONAL INFORMATION (per 100 g)		
Energy	kJ	1 521
	kcal	359
Fats <i>of which saturated</i>	grams	2 0.5
Carbohydrates <i>of which sugars</i>	grams	70 3.5
Fibres	grams	3
Proteins	grams	14
Salt	grams	0.01

2. BARILLA GROUP

Our story begins in Parma in 1877, when Pietro Barilla opens a small bakery and pasta shop.

Today, after 145 years, our products are eaten by people throughout the day. We have a presence in over 100 countries thanks to our brands, we have become an icon of excellence in the market for pasta, ready-made sauces, baked goods, and crispbread.

Thanks to the 29 production facilities, each year we provide over 2,109,000 tonnes of products to people.



Our Purpose: The joy of food for a better life

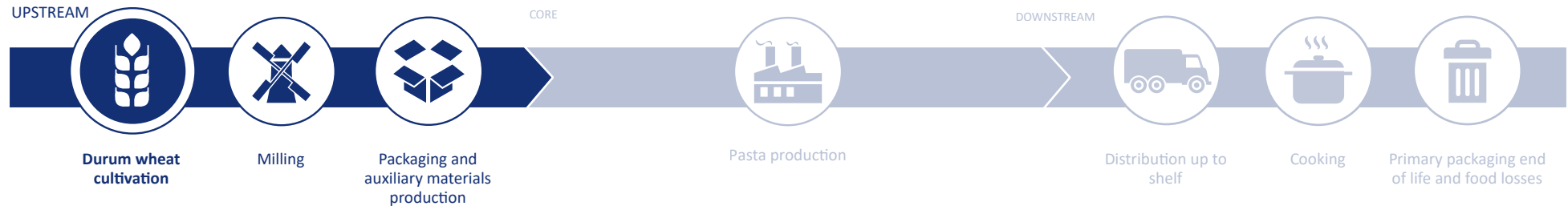
In order to make a concrete contribution to global challenges, Barilla has renewed its commitment to society and the planet with a new Purpose containing the "why" of our way of doing business: "The joy of food for a better life".

It is a commitment from field to fork, to offer people tasty products, made with selected raw materials from responsible supply chains.

Because good food is a joy for the present and a choice for a better future.



4. DURUM WHEAT CULTIVATION

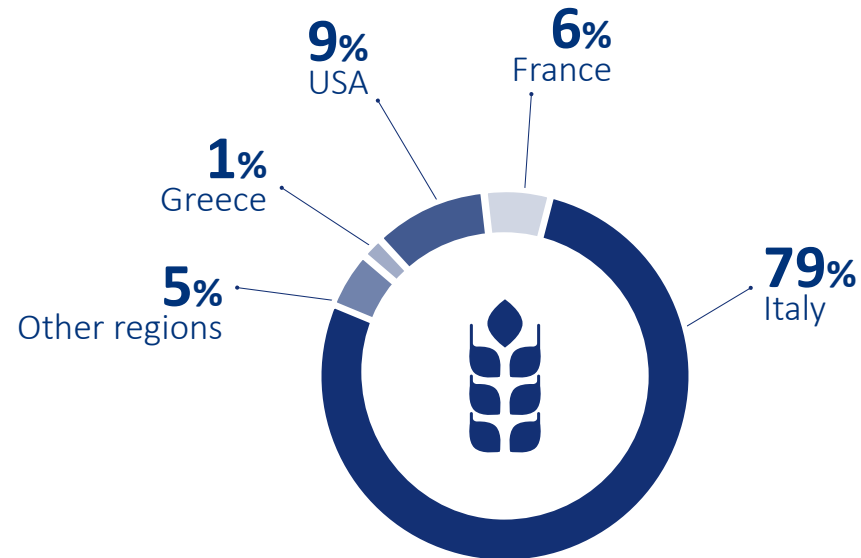


Durum wheat cultivation environmental performances were analysed considering the specific durum wheat origin; 9 different regions were analysed (Italy; France; Greece; Australia; North and South USA; Turkey; Spain; Central East Europa).

Percentages are calculated as average purchased amounts for years 2020, 2021, 2022.

Country specific data were used for fertilizers amount, crop yields and water use. Secondary data (mainly from Ecoinvent database) were used for fertilizers production and diesel production and use.

For every involved country, yield is calculated as average of three years (2020, 2021, 2022).



The 57% of Italian wheat and the 9% of Greek wheat come from agriculture that meets the standards defined by Barilla Sustainable Farming.

Durum wheat semolina for Selezione oro Chef pasta has unique features especially for its high protein value, gluten quality and golden color.

Barilla purchases only wheat that fulfills its high safety and quality standards. It may occur that the Italian production during one year it is not sufficient to fulfill the quantitative and qualitative demand from Barilla, that's why the percentage of grain purchased from Italy may decrease or increase from year to year.

THE EFFORTS FOR A RESPONSIBLE FARMING

Since 2010, a team of Barilla professionals has been carrying out a study designed to identify the main areas for growing durum wheat in Italy and the cultivation systems with lower environmental impact. The main results of the project have been the publication of the Handbook for sustainable cultivation of durum wheat and the development of Granoduro.net in collaboration with Horta srl, a spin-off of the Università Cattolica di Piacenza. Barilla's commitment to the future is to disseminate these practices to reduce the durum wheat supply chain's environmental impact.

THE LCA OF PASTA

The EPD shows that the 60% of the Global Warming Potential of pasta is due to the cultivation of durum wheat.



2009

THE SUSTAINABLE AGRICULTURE PROJECT BEGINNING

A multidisciplinary team, composed of agronomists and LCA experts, starts a study on the agricultural systems to individuate how to reduce the environmental impact of durum wheat cultivation on the environment.



2010

THE HANDBOOK FOR SUSTAINABLE CULTIVATION OF DURUM WHEAT

As a result of the project a handbook with suggested agricultural practices for the reduction of cultivation environmental impact was published and given to farmers.



2011

GRANODURO.NET

The web decision support system (DSS) granoduro.net is developed by Horta and given to farmers. It supports farmers with information about the optimal seeding rate, the nitrogen requirement, the risk of diseases and about the weather forecast.



2012

CONTRACT WITH FARMERS FOR SUSTAINABLE DURUM WHEAT

Starting from 2013, bonus are given to farmers who cultivate durum wheat adopting the agricultural practices suggested within Barilla's handbook.

2013

NEW HANDBOOKS AND INCREASED BSF APPLICATION

The positive experience with the first Handbook led to the development of four new handbooks for foreign countries. Compared to 2013, the total area cultivated with BSF (granoduro.net) is more than doubled.

2017

THE DURUM WHEAT MANIFESTO

In 2020 Barilla brand launches in Italy its first pasta produced with 100% Italian durum wheat: this result is possible thanks to farmers' engagement and the increasingly widespread application of responsible agricultural practices. For more information, visit the dedicated page on [Barilla website](#).



2020

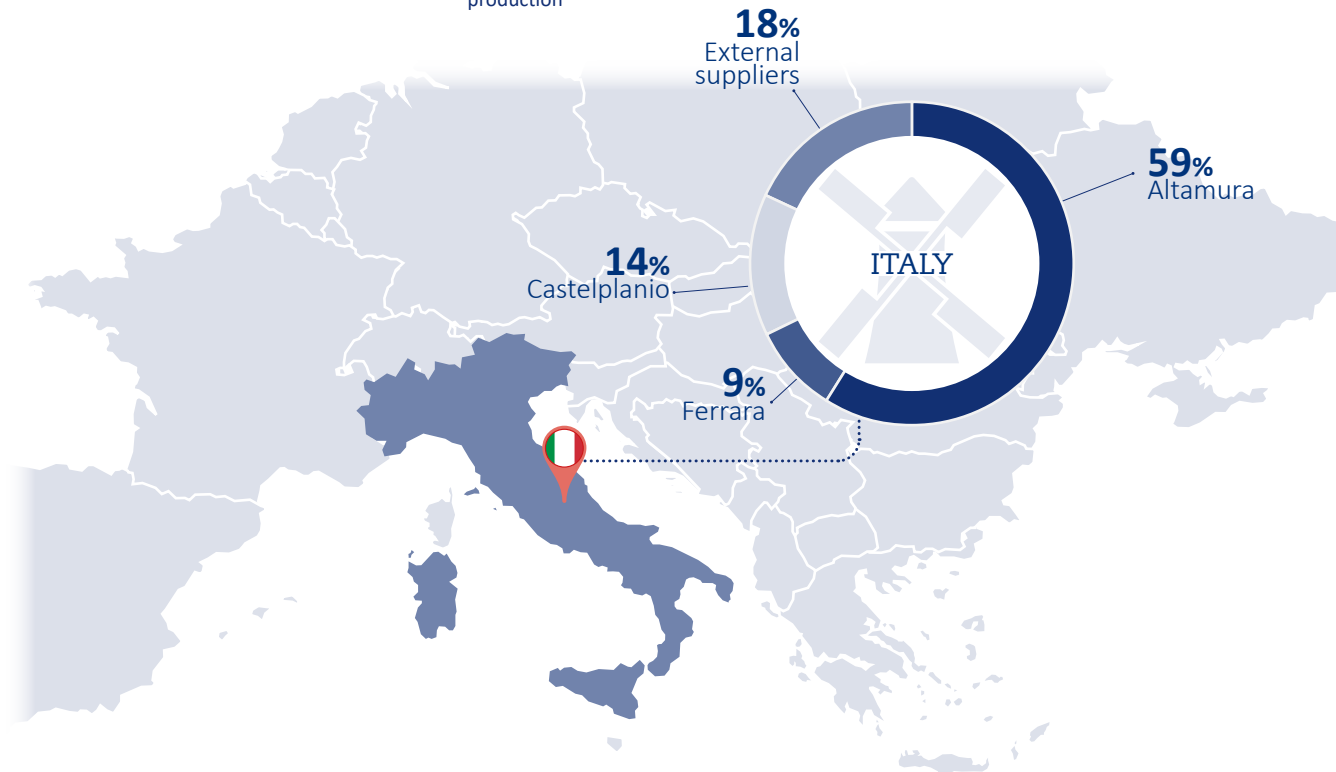
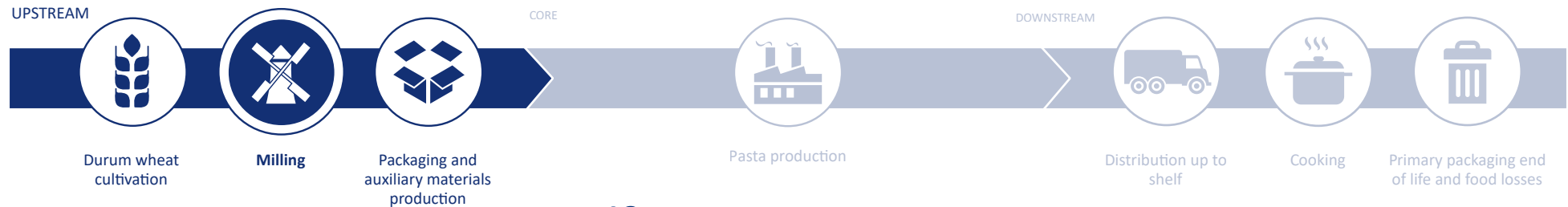


BARILLA SUSTAINABLE FARMING (BSF) PROMOTES MORE EFFICIENT CROPPING SYSTEMS IN ORDER TO HAVE SAFE AND HIGH QUALITY AGRICULTURAL PRODUCTS IN A WAY THAT PROTECTS AND IMPROVES THE NATURAL ENVIRONMENT AND THE SOCIAL AND ECONOMIC CONDITIONS OF FARMERS.



With the project Sustainable Agriculture, Barilla is the winner of the 1st European CSR Award Scheme which is an initiative promoted by the European Commission with the aim to give visibility to the best practices of Corporate Social Responsibility in Europe. The project, in collaboration with HORTA Srl and Life Cycle Engineering, has allowed the definition of the guidelines for the production of durum wheat with agricultural practices with lower environmental impact.

5. MILLING



Milling process environmental performances were calculated considering energy and water consumption for each Barilla property mill in Italy. Primary data (2022 year) are used for water and energy consumption and waste production. Secondary data, mainly from Ecoinvent database, are used for water and energy supply.

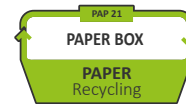
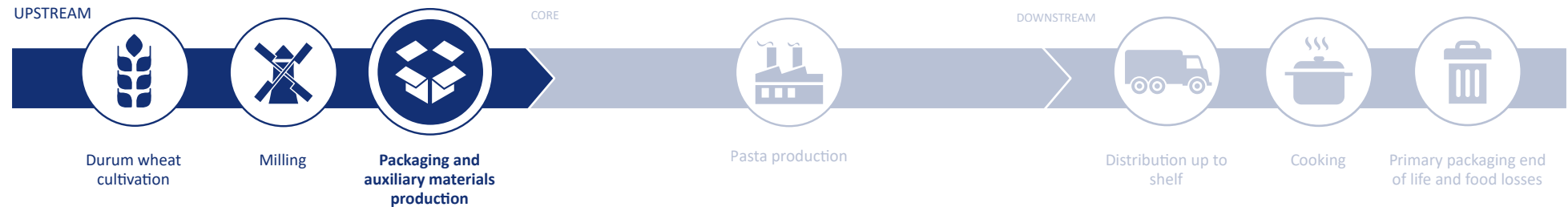
Environmental performance on non property mill were evaluated considering property Barilla mill data average.

Environmental performances related to durum wheat transport from field to mill were evaluated by means of specific hypothesis for every production area. Secondary data, mainly from Ecoinvent database, are used for transport means.

Durum wheat does not need any particular storage condition (such as refrigeration).

Percentage are referred to durum wheat milled in Barilla property and non-property mills, reference year 2022.

6. PACKAGING AND AUXILIARY MATERIALS PRODUCTION



LCA Pack Designer

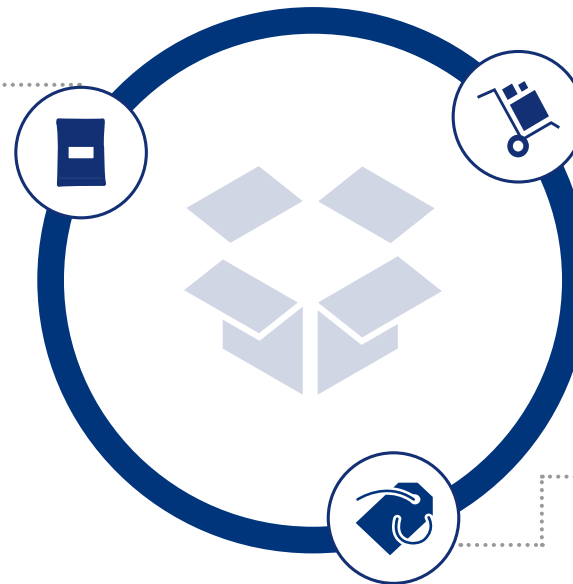
Since 2004, Barilla designs new packaging with the "LCA packaging design tool". It allows the assessment of the environmental impacts of the packaging solutions already during the design phase.

PRIMARY PACKAGING

Packaging environmental performances are calculated considering the 1 kg format (the most conservative one). For all the other items of this product, the impact related to the packaging phase is lower.

The primary packaging consists in a multilayer plastic (PP) film.

Primary data (from packaging unit, reference year 2022) are used for packaging amount and packaging materials production; data about packaging production process come from Barilla LCA database.



Packaging used for Barilla pasta is designed for recycling.

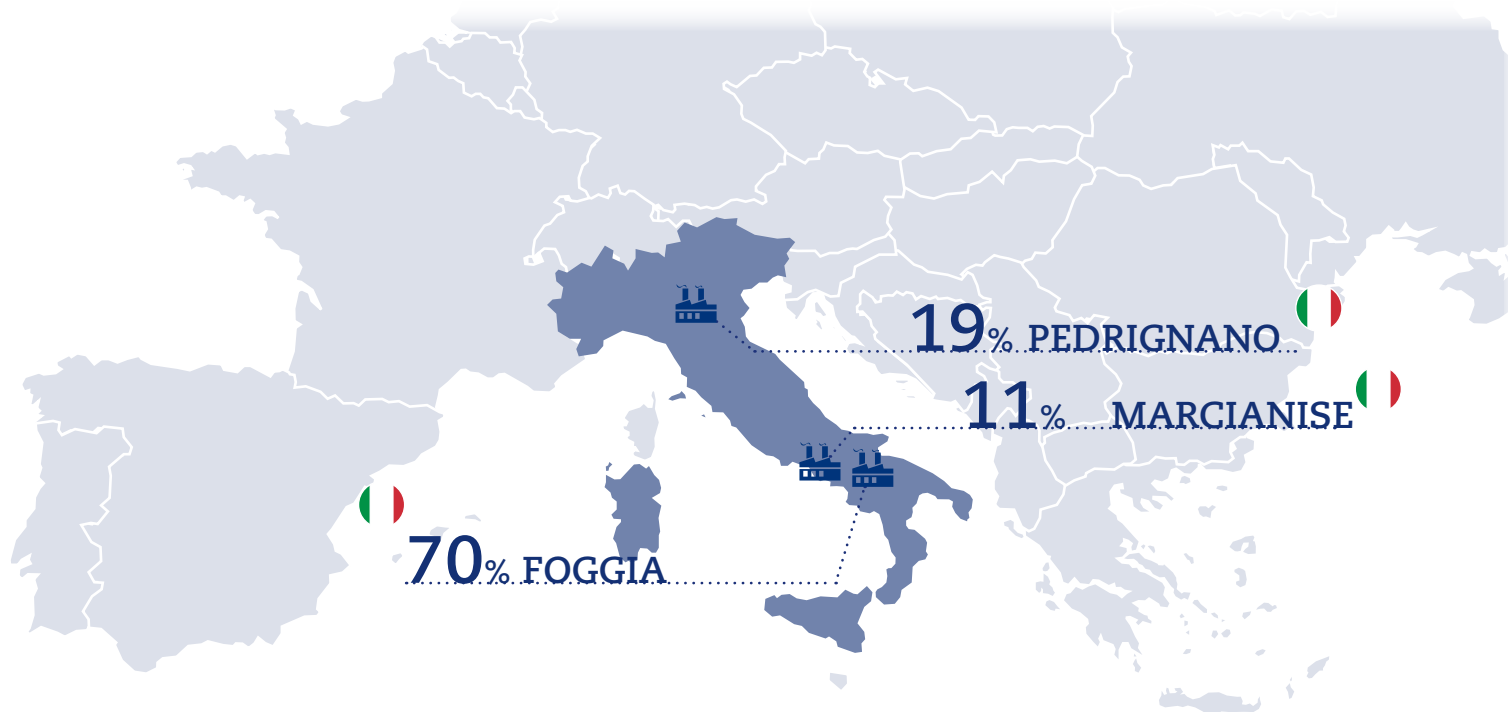
PACKAGING FOR DISTRIBUTION

The packaging for transport consists in cardboard boxes (american box), used for the distribution of the product, and a plastic extensible film. The data used have been collected by LCA database (mainly Ecoinvent).

AUXILIARY MATERIALS

Auxiliary materials environmental performances are evaluated by using primary data from plant, during 2022 year. Secondary data (Ecoinvent) are used for environmental aspects associated to materials production.

7. PASTA PRODUCTION



The environmental performances related to the production process are evaluated considering input and output data of plants owned by Barilla where durum wheat pasta Selezione Oro Chef for Italy is produced: Pedrignano, Marcianise, Foggia, in Italy.

Performances are calculated weighting each plant on the pasta production basis.

Data refer to 2022 year.

7. PASTA PRODUCTION



GENERAL INFORMATION

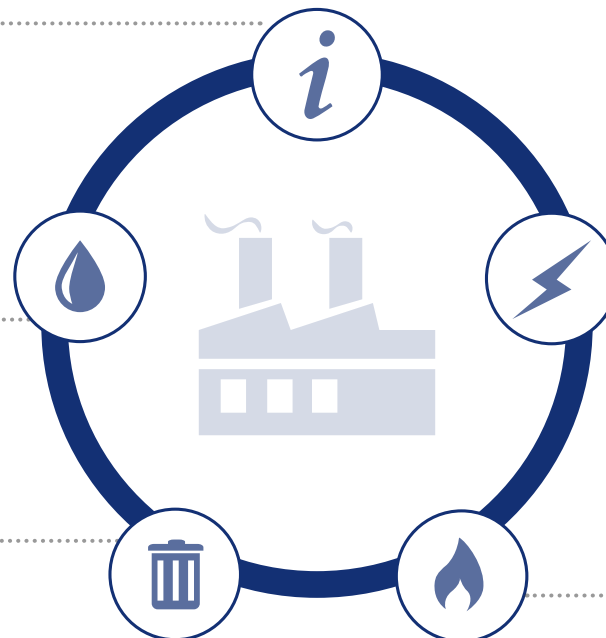
The environmental performances related to the production process are evaluated considering primary data for energy and water consumption and the waste production. Secondary data (mainly Ecoinvent) are used for the environmental aspects related to the production of energy and water. Data are referred to year 2022.

WATER

The water consumption is evaluated using primary data. The overall value is attributed to the product using the mass allocation procedure.

WASTE

The primary data are collected by the plant registrations. The overall value is attributed to the product using the mass allocation procedure.



SEMOLINA INPUT TRANSPORT

Environmental performances related to semolina transport from mill to plant were evaluated considering road transport (truck) from the national mill mix and the plants. Secondary data, mainly from Ecoinvent database, are used for transport means.

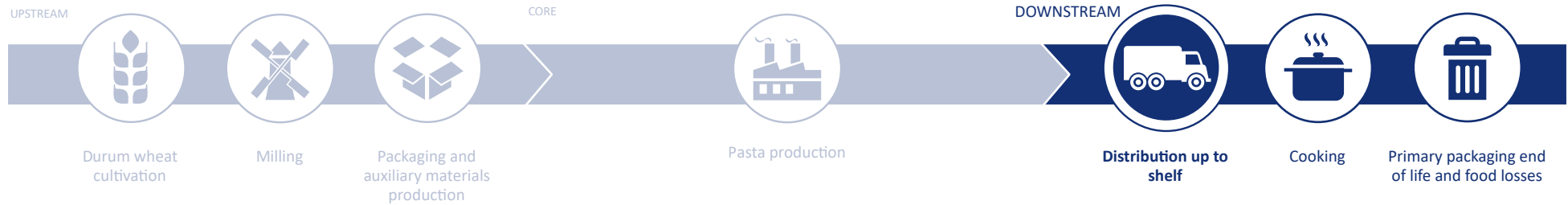
ELECTRICITY

Total plant electricity has been divided using mass allocation. Electricity production is referred to specific plant energy mix. Electric energy production is related to specific country mix for year 2022 and to trigenerators and cogenerators, where present.

NATURAL GAS

The natural gas consumption is evaluated using primary data. The overall value is attributed to the product using the mass allocation procedure.

8. DISTRIBUTION



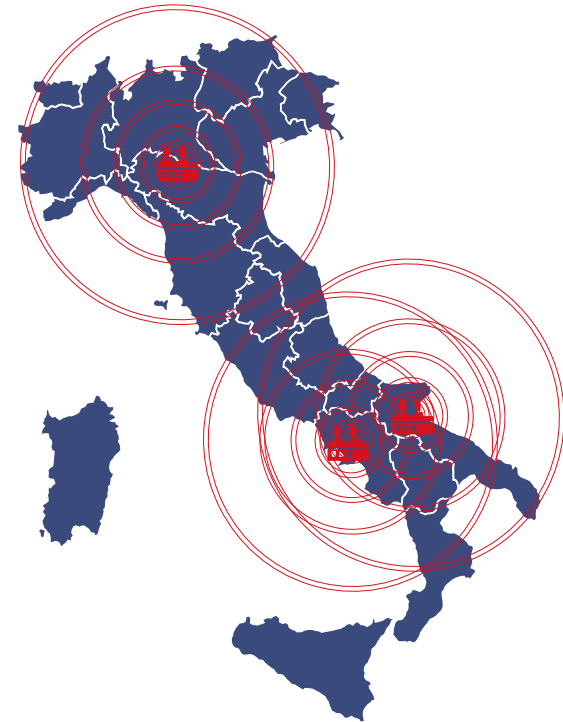
DISTRIBUTION IN ITALY



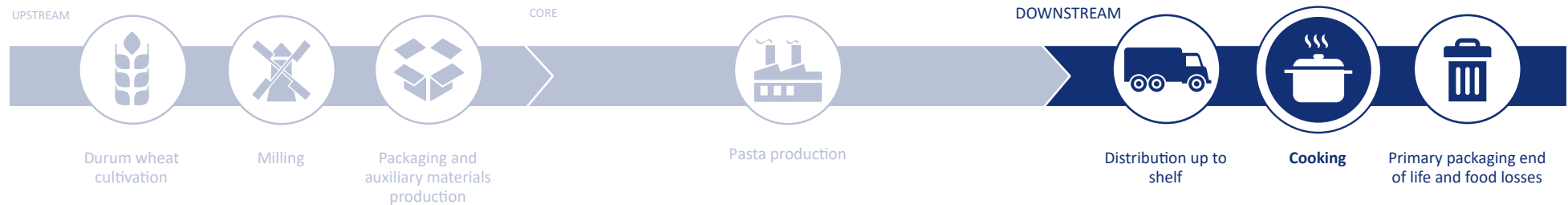
Distribution environmental performances are calculated using primary data for distances covered by truck, train and ship. Data refer to 2022.

Secondary data (Ecoinvent database) were used for transport means. Pasta does not need any particular storage condition (such as refrigeration) during distribution.

Impacts related to transport packaging end of life are calculated considering the Italian end of life scenario for plastic (reported in page ahead) and paper and paperboard: 81% recycling, 6% energy recovery, 13% disposal (reference: Comieco 2022).



9. COOKING

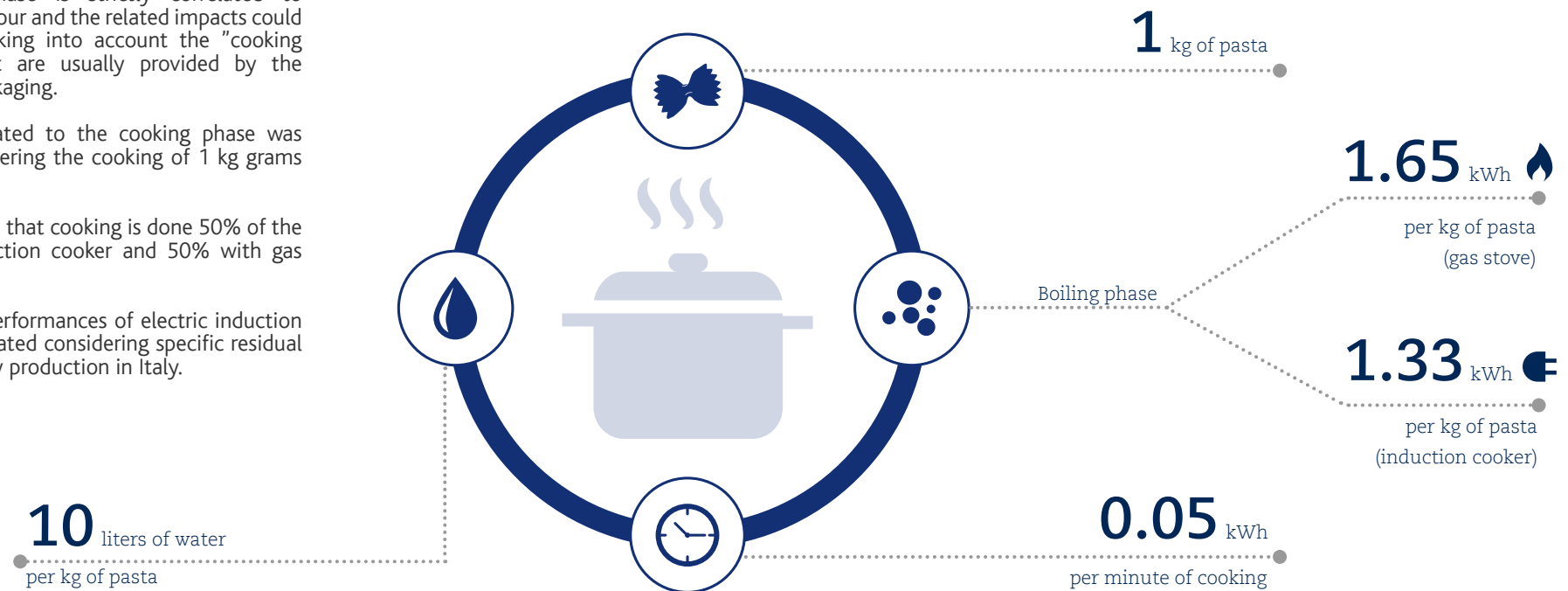


The cooking phase is strictly correlated to consumer behaviour and the related impacts could be estimated taking into account the "cooking indications" that are usually provided by the company on packaging.

The impacts related to the cooking phase was estimated considering the cooking of 1 kg grams of pasta.

It is hypothesized that cooking is done 50% of the times with induction cooker and 50% with gas stove.

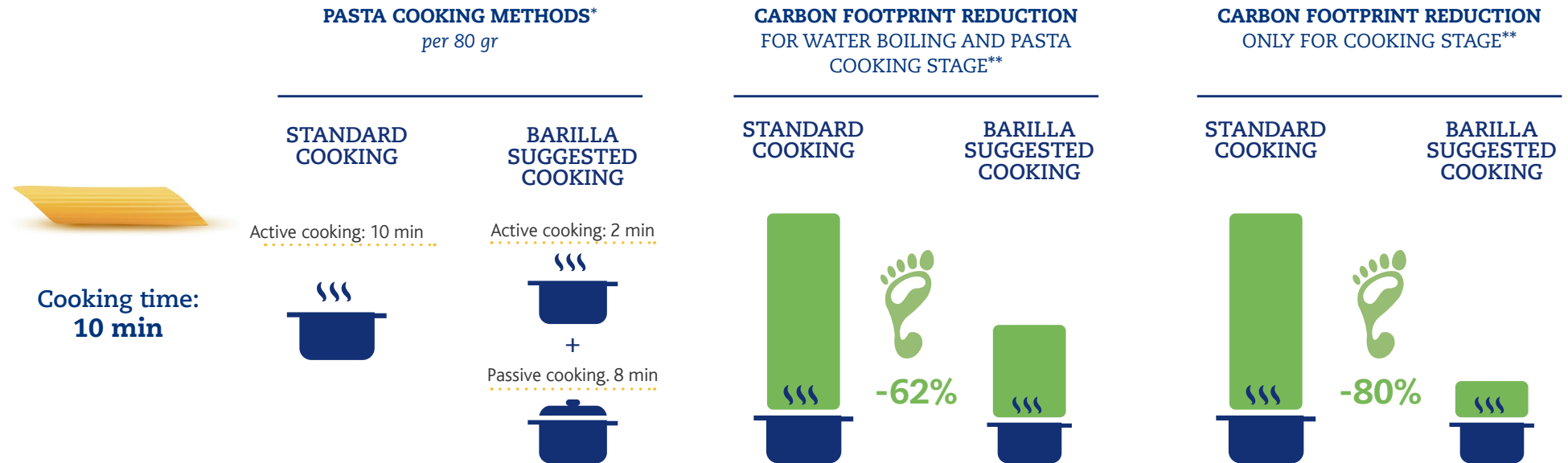
Environmental performances of electric induction cooker are calculated considering specific residual mix for electricity production in Italy.



BARILLA SUGGESTED COOKING METHOD

The energy necessary for the cooking stage has a significant impact. By choosing a cooking method that uses less energy, it is possible to sensibly reduce the carbon footprint of this stage. Pasta cooking time can be divided in two parts: the time needed to boil water and the one necessary to cook pasta. Usually, after boiling water, pasta is cooked by keeping the heat on for the entire suggested cooking time, e.g. for 10 minutes (*active cooking*). However, pasta can be cooked in a more efficient way by keeping the heat on only for the first 2 minutes of cooking and then, for the remaining suggested time, the heat can be turned off while keeping the lid on the pot (*passive cooking*).

Passive cooking can reduce the carbon footprint, due to the savings of GHG emissions related to energy use, without affecting the product quality. Considering the cooking process of a 10-minutes-cooking 80 gr portion of pasta, cooked with gas and electric stoves, these are the possible savings:

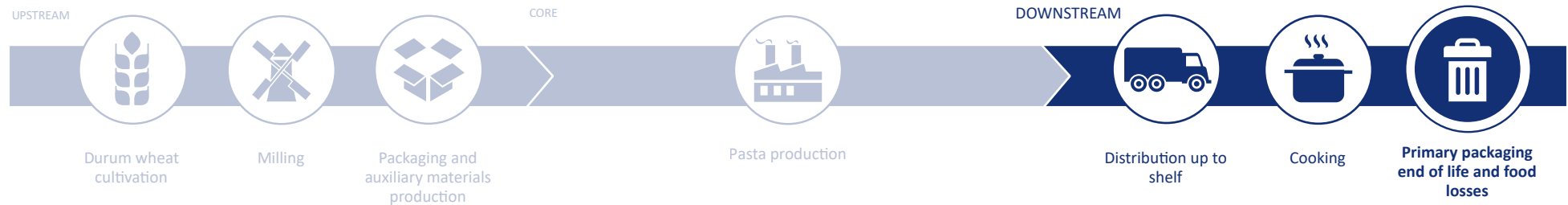


Barilla-suggested cooking method does not affect the organoleptic properties of the product but it requires more attention during the cooking phase: pay attention that pasta is completely submerged into water and mix it regularly during cooking.

*Cooking proportion is the following: 1l water x 100gr of pasta.

**The results are valid for gas and electric stove cooking.

10. PRIMARY PACKAGING END OF LIFE AND DOMESTIC FOOD LOSSES



PACKAGING END OF LIFE IN ITALY - PLASTIC FILM PRIMARY PACKAGING












Reference: Corepla 2022

FOOD LOSSES

The impacts related to food waste are estimated assuming that 2% of the pasta is not consumed and is disposed of as waste, sent to the following destinations: 50% disposal (25% landfill + 25% incineration without energy recovery), 25% composting, 25% anaerobic digestion, following the indications of the PCR document.










11. ENVIRONMENTAL RESULTS

 USE OF RESOURCES data referred to 1 kg of product		UPSTREAM			CORE	DOWNSTREAM	TOTAL	UTILISATION		
		 Durum wheat cultivation	 Milling	 Packaging and auxiliary materials production	 Pasta production	 Distribution up to shelf		 Packaging end of life and food losses	 Pasta cooking, if gas	 Pasta cooking, if electric
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	1,08E-01	2,32E-01	2,81E-01	2,19E-02	6,89E-03	6,50E-01	1,17E-04	5,08E-02	9,82E-01
	Used as raw materials ⁽¹⁾	0,00E+00	0,00E+00	9,08E-02	0,00E+00	0,00E+00	9,08E-02	0,00E+00	0,00E+00	0,00E+00
	Total	1,08E-01	2,32E-01	3,72E-01	2,19E-02	6,89E-03	7,41E-01	1,17E-04	5,08E-02	9,82E-01
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	5,86E+00	2,18E-01	1,53E+00	3,91E+00	8,34E-01	1,23E+01	4,96E-03	9,98E+00	1,88E+01
	Used as raw materials	0,00E+00	2,56E-05	4,85E-01	0,00E+00	0,00E+00	4,85E-01	0,00E+00	0,00E+00	0,00E+00
	Total	5,86E+00	2,18E-01	2,02E+00	3,91E+00	8,34E-01	1,28E+01	4,96E-03	9,98E+00	1,88E+01

⁽¹⁾The biomasses transformed into the product are not considered.



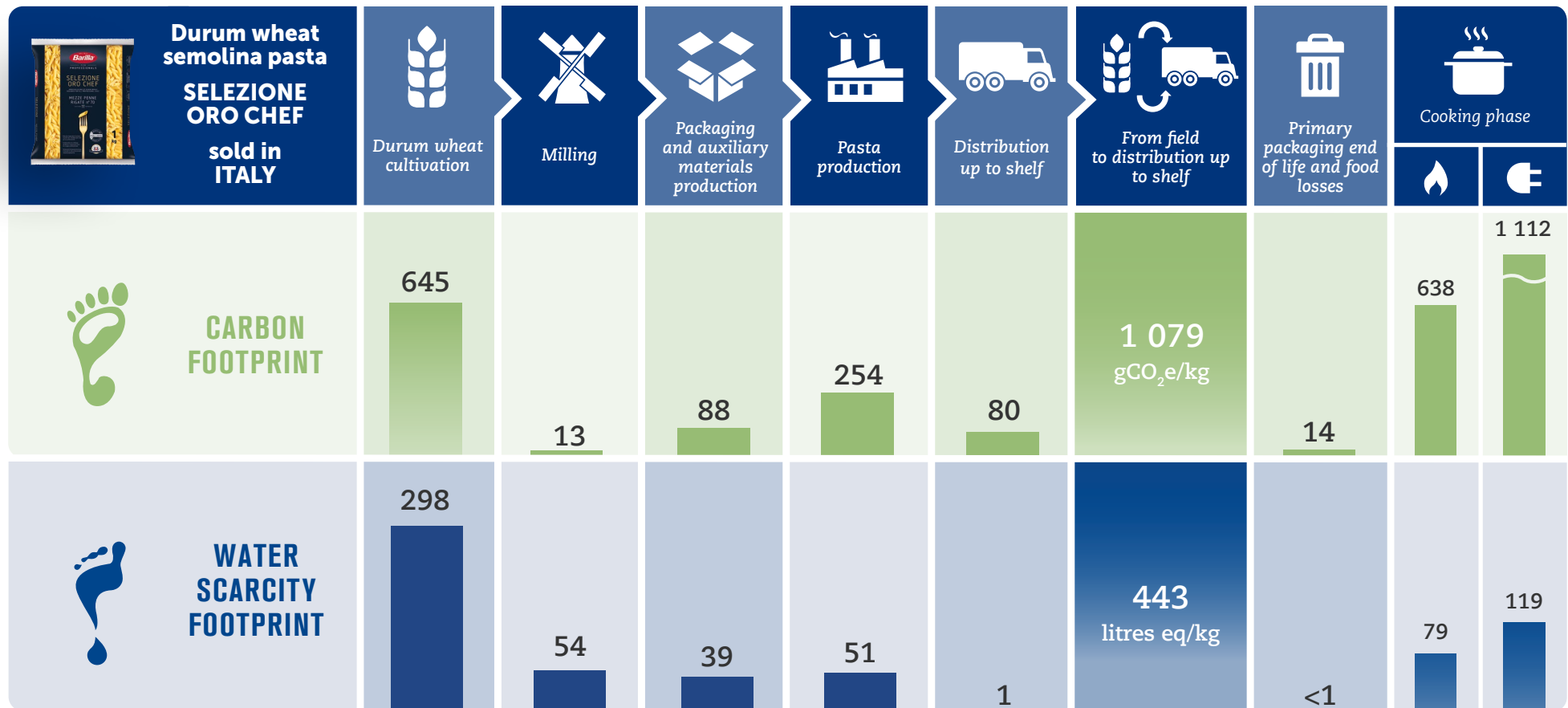
11. ENVIRONMENTAL RESULTS

 POTENTIAL ENVIRONMENTAL IMPACTS data referred to 1 kg of product	UPSTREAM			CORE	DOWNSTREAM	TOTAL	UTILISATION			
	 Durum wheat cultivation	 Milling	 Packaging and auxiliary materials production	 Pasta production	 Distribution up to shelf		 Packaging end of life and food losses	 Pasta cooking, if gas	 Pasta cooking, if electric	
GLOBAL WARMING POTENTIAL - GWP (g CO ₂ e)	Fossil	6,44E+02	1,24E+01	8,69E+01	2,54E+02	6,16E+01	1,06E+03	1,07E+01	6,38E+02	1,11E+03
	Biogenic ⁽²⁾	1,17E-01	1,40E-01	2,08E-01	1,35E-01	1,80E+01	1,86E+01	3,07E+00	2,76E-01	3,50E-01
	Land use and land use change	3,84E-01	2,08E-03	1,10E+00	4,36E-03	4,11E-03	1,49E+00	1,15E-04	4,30E-02	8,40E-02
	Total	6,45E+02	1,25E+01	8,82E+01	2,54E+02	7,96E+01	1,08E+03	1,37E+01	6,38E+02	1,11E+03
Acidification potential - mol H ⁺ eq.	6,48E+00	4,29E-02	3,41E-01	3,05E-01	2,69E-01	7,44E+00	7,44E+00	3,49E-03	5,53E-01	3,82E+00
Eutrophication potential. aquatic freshwater - g P eq.	4,14E-01	2,55E-04	8,73E-03	6,75E-04	2,08E-04	4,24E-01	4,24E-01	2,85E-05	1,15E-02	2,91E-02
Eutrophication potential. aquatic marine - g N eq.	1,15E+01	7,24E-03	1,13E-01	1,11E-01	1,42E-01	1,18E+01	1,18E+01	7,64E-03	3,58E-01	8,27E-01
Eutrophication potential. terrestrial - mol N eq.	2,30E+01	7,86E-02	1,06E+00	1,14E+00	1,27E+00	2,65E+01	2,65E+01	1,59E-02	1,82E+00	7,11E+00
Photochemical ozone creation potential - g NMVOC eq.	4,43E+00	3,49E-02	3,25E-01	6,65E-01	4,13E-01	5,87E+00	5,87E+00	5,32E-03	1,39E+00	3,18E+00
Ozone depletion potential - g CFC 11 eq.	2,64E-05	2,44E-07	2,70E-06	6,51E-06	1,31E-06	3,71E-05	3,71E-05	1,27E-08	1,68E-05	2,26E-05
Abiotic depletion potential for minerals and metals ⁽³⁾ - g Sb eq.	8,78E-05	1,98E-07	2,01E-05	2,72E-06	2,16E-06	1,13E-04	1,13E-04	8,28E-08	1,34E-05	2,00E-05
Abiotic depletion potential for fossil resources ⁽³⁾ - MJ net calorific value	5,50E+00	1,86E-01	1,84E+00	3,48E+00	8,20E-01	1,18E+01	1,18E+01	4,54E-03	8,83E+00	1,59E+01
Water deprivation potential ⁽³⁾ - m ³ world eq. deprived	2,98E-01	5,37E-02	3,92E-02	5,08E-02	1,09E-03	4,43E-01	4,43E-01	2,25E-04	7,85E-02	1,19E-01

(2) The biogenic contribution to Global Warming Potential refers only to biogenic methane. The contribution given by biogenic CO₂ is equal to zero, since the absorbed amount is equal to the emitted biogenic CO₂ within the reference 100 years period.

(3) The results of this environmental impact indicator shall be used with care as the uncertainties of the results are high and as there is limited experience with the indicator.

11. ENVIRONMENTAL RESULTS



The results of indicator "Water Deprivation Potential" are reported here as "Water Scarcity Footprint"

11. DIFFERENCES VERSUS PREVIOUS VERSIONS OF EPD

The differences versus previous EPD versions are due to:

- updated yields for durum wheat cultivation
- updated emission factors for the energy mixes
- the implementation of Version 2 of the default list of environmental performance indicators (optional indicators were not analysed nor reported)

Moreover, in this EPD only the results for products distributed in Italy are reported, while for products exported worldwide (except Italy) a new EPD has been developed.

12. REFERENCES

- International EPD Consortium, General Programme Instructions (EPD), ver. 3.01 of 18/09/2019;
- PCR 2010:01; CPC 2371 - PCR for uncooked pasta, not stuffed or otherwise prepared; v. 4.0.3 21/12/2022;
- Eurostat database for waste management 2021
- Comieco Annual Report 2022
- Corepla Annual Report 2022

Environmental declarations published within the same product category, though originating from different programs, may not be comparable. This declaration and further information in regards are available at www.environdec.com

As EPD owner, Barilla has the sole ownership, liability and responsibility for the EPD.

EPD PROCESS CERTIFICATION

Product category Rules (PCR) review conducted by:
Technical Committee of the International EPD® system.
Chair Filippo Sessa
Contact via info@environdec.com

Program operator:
EPD International AB
Box 210 60, SE-100 31 Stockholm, Sweden
info@environdec.com



EPD PROCESS CERTIFICATION

Independent verification of the declaration and data, according to ISO 14025:

- EPD process verification
- EPD verification- Third party verifier

PROCESS INTERNAL VERIFICATION

Procedure for follow-up of data during EPD validity involves third part verifier:

- Yes
- No

Third party verifier: CCPB SRL Viale Masini 36, 40126 Bologna. Accredited by: Accredia



Process internal verifier: Ugo Pretato, Approved by: The International EPD® System



CONTACTS

Barilla G. e R. Fratelli- Società per Azioni, via Mantova 166, 43122, Parma, Italy. www.barillagroup.com

For additional information relative to the activities of the Barilla Group or in regards to this environmental declaration, please contact:

Luca Ruini - luca.ruini@barilla.com



Technical support and graphic design: Life Cycle Engineering SpA - Italy www.lcengineering.eu



13. GLOSSARY

CARBON FOOTPRINT

A product carbon footprint is the total amount of greenhouse gases produced along the entire life cycle. It is expressed in equivalent mass of carbon dioxide (CO₂e). In agriculture a significant contribution is given by the emission of nitrous oxide (N₂O) due to the fertilizers use. It is also known as Global Warming Potential (GWP).

www.ipcc.ch

WATER DEPRIVATION POTENTIAL

Water deprivation measures the available water remaining per unit of surface in a given watershed relative to the world average, after human and aquatic ecosystem demands have been met. This method builds on the assumption that the potential to deprive another user of water is directly proportional to the amount of water consumed and inversely proportional to the available water remaining per unit of surface and time in a region (watershed).

www.wulca-waterlca.org

ACIDIFICATION POTENTIAL (AP)

It is a phenomenon for which precipitation is unusually acidic, meaning that it has substandard levels of pH. It can have harmful effects on plants, aquatic animals and infrastructure. Acid rain is caused by emissions of SO₂, NO_x and NH₃.

EUTROPHICATION POTENTIAL (EP)

It is an abnormal proliferation of vegetation in the aquatic ecosystems caused by the addition of nutrients into rivers, lakes or marine water, which determines a lack of oxygen. The eutrophication potential is mainly influenced by emission into water of phosphates and nitrates.

OZONE DEPLETION POTENTIAL (ODP)

Degradation of the stratospheric layer of the ozone involved in blocking the UV component of sunrays. Depletion is due to particularly reactive components that originate from chlorofluorocarbon (CFC) or chlorofluoromethanes (CFM). The substance employed as benchmark measure for OPD is trichlorofluoromethane, or CFC-11.

PHOTOCHEMICAL OZONE CREATION POTENTIAL (POCP)

Production of compounds that, under the light effect, are able to promote an oxidation reaction leading to ozone production in the troposphere. The indicator is mainly influenced by VOCs (Volatile organic compounds) is usually expressed in mass of VOCs equivalent (g NMVOC - equivalent).