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SSPICEIT!
Sustainability Skills Program for International Catering operators and Entrepreneurs through Integrated Training

SSPICE IT! – Sustainability Skills Program for International Catering operators and Entrepreneurs through Integrated Training

WP	**WP3 - Co-design and testing of innovative training programme for green operators and entrepreneurs in the catering sector**
Task	**3.6 – Final design**
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Module n° 03

THEMATIC AREA	How to create a sustainable supply chain
SUB AREA OF REFERENCE	*Sustainable Food*
HOURS	15

LEARNING OBJECTIVES

1. **Understand the various components of sustainability in relation with the production systems and be able to identify sustainable producers**
2. **Understand the impact of food on environment and know which ingredients have the highest environmental, but also economic and social impact**
3. **Be able to develop a sustainable menu, taking into account all the aspects of sustainability**
4. **Be able to build a network with local producers, to create a sustainable supply chain**

LEARNING ACTIVITIES

Theoretical	Practical
✓ Main impacts of the food system on the environment ✓ Selection of more sustainable production systems and foods ✓ Construction of networks of local producers	✓ How to evaluate the sustainability of a production system ✓ How to reduce one's water consumption ✓ How to evaluate the impact of food on the environment and choose sustainable suppliers ✓ How to create a network of local producers

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INTRODUCTION

Sustainability in a kitchen starts with conscious shopping: a kitchen can be defined as sustainable based on what one decides to put in the shopping trolley, on the choices made on which ingredients to buy and where to buy them.

As we have seen in Module 1, sustainability is a complex and multiform concept. In building a sustainable supply chain, many aspects must be taken into consideration.

In this module, we will learn in particular:

- what are the impacts of the production systems on the environment

- how to evaluate the impact of food on the environment and therefore how to select food

- how to build a network with local producers, to create a sustainable supply chain.

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CHAPTER 1: The selection of sustainable production systems

Agriculture and climate change are characterised by a 'vicious circle' of cause-effect: agricultural activity produces significant volumes of greenhouse gases, the main cause of climate change, but at the same time suffers the negative impacts - in terms of productivity and food security - of climate change.

The threat that expected climate change over the coming decades poses to the stability of the world food system, due to the increasing demand for food to feed an ever-growing population, short-term variability of food supply and new food trends is severe and very concrete. It is clear that producing enough food for everyone is a necessary condition, but it is not sufficient for food security. **It is necessary to create more sustainable food systems, which produce more with less damage to the environment and less impact on the climate system**. There can be no food production systems that go against the dynamic balance of nature.

At the same time, agriculture is the sector where virtuous paths to a concrete contribution to the reduction of global warming can be activated the most. Certainly, the possibility of more efficient use of agricultural resources, agrifood processing and technological solutions will be fundamental, but equally strategic will be to act on the social system and lifestyles.

Since all food and production systems do not have the same impact on the planet and the people living on it, it is important first of all to understand what kind of impact they have. We will therefore in this chapter analyse the interaction between production systems and water, soil, biodiversity and people. We will then define a check-list to help us select the more sustainable production systems.

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1.1. Water

Among the elements that make up matter, one of the most precious to the planet is water. Two-thirds of the planet is covered in water (oceans, seas, lakes and rivers) and the portion of the earth's surface where we find water is called the hydrosphere. The set of its transformations and dynamics on the earth's surface is generally referred to as the water cycle.

It is fundamental to understand the importance of water for humans, the environment and all the living beings on the Earth, in order to start to respect this precious resource, that risks to become more and more rare.

In fact, today, 97% of water is in the sea and the oceans and salted. Only 3% of water is fresh; but 80% of freshwater is frozen in polar ice caps and mountain glaciers. Only 20% of freshwater is available in underground aquifers and in surface rivers and lakes. And some of it is not drinkable due to pollution.

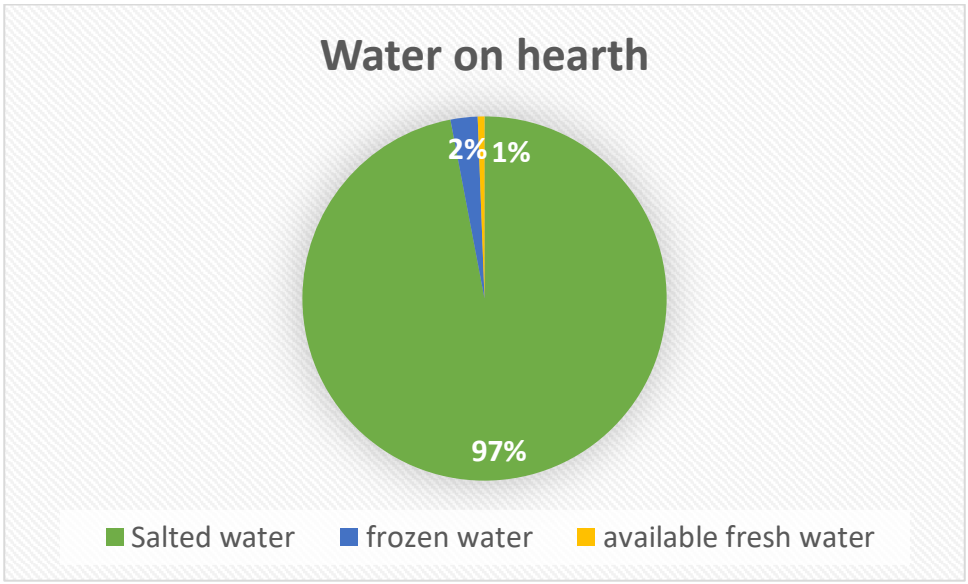

Figure n.1: Typology of water present on hearth (Green School, 2023)

Everything we use, wear, buy, sell and eat requires water to be produced, and all of this is measured through the **WATER FOOT PRINT**. The water footprint measures the amount of water used to produce each of the goods and services we use. It can be

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measured for a single process, like growing rice, for a product, like a pair of jeans, for the fuel we put in our car, or for an entire multinational corporation.

More specifically, the water footprint of a product is made up of three components, colour coded, among which we distinguish the water footprint:

- ✓ **green**, referring to rainwater consumed;
- ✓ **blue**, referring to the volume of surface and groundwater consumed as a result of the production of the product;
- ✓ **grey**, referring to the volume of fresh water necessary to assimilate the load of pollutants.

Agriculture is a major user of freshwater. Irrigated crops, livestock, fisheries, aquaculture and forestry account for approximately 70% of total freshwater withdrawals globally and over 90% in most least developed countries.

Moreover, water plays a cardinal role in all aspects of food systems, not only production, but also processing, preparation, consumption and, to some extent, distribution.

When analysing the water footprint of the agriculture, we can see that **meat-based diets have a larger water footprint than Plant Based diets.** This means that from a freshwater resource it is more efficient to obtain calories, proteins and fats through plant products than animal products.

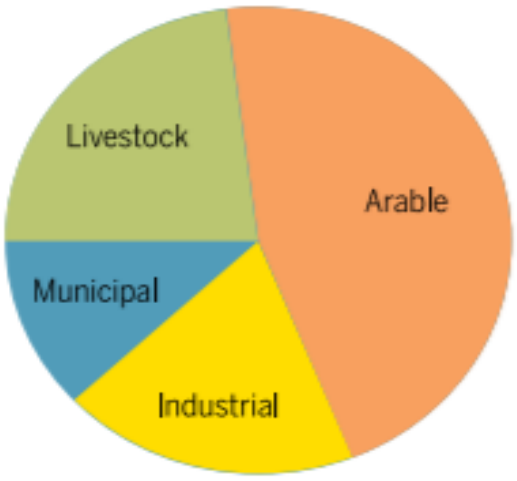

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Figure n.2: The percentage of global freshwater withdrawals (out of the total of 4001 km^2/year) used in agriculture for arable land (directly), livestock (of which the majority is used to grow crops to feed animals), industry and energy, and in the municipal and domestic sectors. (Godfray et al., 2018)

What about you? Do you pay attention to how much water do you use?

Some tips to reduce you water consumption in your everyday life:

- ✓ *shut off faucets when not in use*
- ✓ *repair leaking faucets to prevent domestic water consumption*
- ✓ *install breakers to reduce water inflow*
- ✓ *use washing machines or dishwashers at full load to minimize washing*
- ✓ *reuse water from cooking vegetables, for example, to make a vegetable broth*
- ✓ *reuse water from air conditioners for ironing or watering plants*
- ✓ *water plants in the evening hours or for large gardens use drip systems*
- ✓ *prefer showering to bathing*
- ✓ *pay attention to running water even when washing fruits and vegetables*

1.2. Soil

Soil is a fundamental, non-renewable natural resource that provides vital goods and services for various ecosystems and for human life itself. Soils are essential to produce crops, feed, fibre, fuel. They filter and purify dozens of thousands of kilometres of water per year. As one of the most important carbon sinks, soils help regulate emissions of carbon dioxide and other greenhouse gases. **Sustainable Soil Management (SSM) is an integral part of global sustainable land management as well as the basis for poverty alleviation and agricultural and rural development to promote food security and improved nutrition**.

Adopting sustainable soil management practices is a valuable tool for adapting to climate change and embarking on a path to safeguard key ecosystem services and biodiversity.

About 33% of the world's soils are moderately or severely degraded due, for example, to unsustainable management practices. It is estimated that about 75 billion tonnes of arable soils are lost every year, which costs about USD 400 billion per year in lost agricultural production. This loss also significantly reduces the capacity of the soil to store and cycle carbon, nutrients and water.

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In 2015, the FAO (Food and Agriculture Organisation) set a number of targets, including those dedicated to restoring degraded soils. Growing concerns about the state of the world's soils led to the establishment of the Global Soil Partnership (GSP), which therefore decided to develop Voluntary Guidelines to promote sustainable global soil management based on science.

The GSP recommends to **avoid land use change**, such as deforestation and improper conversion from grazing to cultivated land, **to maintain vegetation cover to protect against erosion**, to **reduce vehicle traffic and grazing intensity**, and to **ensure crop rotation**. Another topic important for GSP is the **optimisation of organic resources** in the soil. Improved soil fertility can be achieved through conservation practices such as the use of crop rotation with leguminous crops, fertilisation with crop and animal residues, and green manure with cover crops. Finally, GSP reminds in its guidelines that soils are one of the largest reservoirs of biodiversity on the planet.

1.3. Biodiversity

The sustainability of food, from an environmental point of view, is connected to the efficient use of resources and the preservation of biodiversity.
Biodiversity is a very important concept, which can explain how we have become what we are today after millennia: the interaction between many species, the cooperation between these animal and plant species, and everything that allows us to survive as a species.

There is an extraordinary variety of life forms on Earth, for example in tropical rainforests, coral reefs, grasslands, temperate forests, oceans, wetlands, islands, mountains, nature reserves, and even urban areas with parks and gardens.
A species-rich environment is able to adapt to environmental changes and disturbances, such as climate change or epidemics. Moreover, healthy ecosystems, such as forests and wetlands, act as important carbon sinks, helping to mitigate the effects of climate change.

Over the years, **biodiversity has decreased** in terms of availability of types of fruit and vegetables. For example, while 100 years ago we had 400 varieties of tomatoes, today we only have 80. While we had 500 varieties of lettuce, now we have 36.
The reduction of biodiversity has many implications:

- **Threat to food availability, diet diversity and disease resistance** of agricultural crops;
- **Reduction of certain phytonutrient substances** that can be found in the different varieties; with a standardised production we tend to assume always the same ones;
- **Loss of local varieties**: specific varieties are requested by large retailers (that guarantee certain dimensions, taste and final product) and producers are forced to buy seeds and raw material to respect these requests, abandoning local

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varieties;
- **Increase in the use of pesticides and other substances** to grow varieties that are not local (but imported for economic reasons) and therefore less adapted to the local climate and soil.

To counter biodiversity loss, each of us can contribute by joining green initiatives and adopting a more sustainable lifestyle, but a variety of strategies must also be put in place both globally and locally. Direct actions (such as creating protected natural areas with the aim of preserving landscapes, flora, fauna and marine environments) and indirect actions (such as controlling emissions of pollutants, protecting water quality and reducing consumption and waste) are essential.

1.4. The economic and social sustainability

Sustainability concerns the **three dimensions of the environment: social environment, economic environment and obviously the environmental matrices**.

In particular, as outlined in the Agenda 2030, the following development axes must be followed:

- Economic sustainability: ensuring economic efficiency and income for businesses while respecting the ecosystem;
- Environmental Sustainability: ensuring the availability and quality of natural resources in order to combat environmental degradation;
- Social Sustainability: ensuring quality of life, safety and services for citizens.

The 'operational' interpretation of the concept of sustainability is multifunctional and includes:

- ✓ environmental objectives: management and conservation of natural resources
- ✓ social objectives: fairness and equal opportunities for economic sectors, between social groups, between men and women
- ✓ economic objectives: efficiency and profitability of agricultural production

So food sustainability does not only mean quality food, but food produced in compliance with these three objectives.

These three areas encompass various aspects of modern life and production capacity, highlighting the human-driven nature of our world, where culture plays a central role. Feasibility, in this context, refers to the practical contributions individuals can make within society or productive systems. Therefore, when discussing sustainable

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development, the focus should shift to asking 'sustainable for whom?' rather than merely addressing development itself.

1.5. Check-list for the identification of sustainable production systems

Considering all the above, the first step to guarantee the sustainability of your kitchen is the selection of your food and producers.

We share here an example of check list that you can use to evaluate the impact of the farm on the environment (social environment, economic environment and environmental matrices) and how sustainable it is. Similar check list can be developed for breeders and other production systems.

DATE OF THE EVALUATION	.....
PRODUCER / PRODUCTION SITE	....

What typologies of products are grown? .....
Does it adopt a traceability system for its products? Yes / No Which one? .....
What crops are scheduled to be grown this year? .....

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Does it have a Crop Rotation Plan? Yes / No If yes which one? .....
What is its method of production? □ conventional □ organic □ integrated pest management

What are the agronomic characteristics of the farm? □ Field crops □ Greenhouse crops □ Above-ground crops
What method is used to irrigate plants? □ Submersion □ Rainwater harvesting □ Micro irrigation □ Pivot
For harvesting, does the farm use regular labour ? □ Yes □ Yes, but through the use of agencies □ Illegal workforce

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Exercise 1: Our water consumption	
Pre-requisites	/
Time	1 hour + presentation
Tools	SSPICE IT! Manual, PC or smartphones, internet connection, printer
Objectives	1. Reflect on the use of water resources and how we should use it in a smart way, even in our own daily use

Instructions

This exercise should be realised, when possible, in group.

1. Gather information on water consumption, using also the references indicated in this manual, and analyse your own water consumption
2. Draft short texts highlighting the consequences of mismanagement of water resources and suggesting ways to improve your water footprint
3. Make posters or Power Point files, inserting these texts and images previously printed or downloaded
4. Present your work to the other groups, expressing also personal considerations

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CHAPTER 2: Measuring the impact of your food and developing a sustainable menu

In the last ten years we have witnessed a rapid transformation of the consumers, both in terms of what they want and what they need. The Consumers of the new millennium are, without doubt, more informed, and want to be part of the world in which they live. This means that they have understood how important their choices and daily life are for their life, their health, and for the world in which they live and work.

Furthermore, we are witnessing an interesting phenomenon in most industrialised countries: the spread of a culture of food awareness. An increasing percentage of the population wants to be informed about what they eat, how it was produced and what its nutritional characteristics are. Being aware of how to eat properly is good for oneself, society and the planet, and to do this, consumers have the right to receive clear and safe information about the product they are buying and, consequently, companies have a duty to provide it.

The desire that drives these people is to stop being passive consumers and instead become active protagonists of their choices. This way of approaching food is reflected in the growing number of people who for different reasons are choosing to change their relationship with food: vegetarians, vegans, zero kilometre supporters... The reasons that drive these groups to embark on new food paths can be diverse: animal rights sensitivities, ethical reasons or environmental sustainability. Between the various currents there are profound differences in their approach to environmental issues.

Zero kilometre supporters advocate a diet based on seasonal and local products, not imported from other countries or continents. However, taking into consideration only one aspect of the question is not enough to ensure food sustainability. For example, a local and seasonal product could have a big impact on environment if produced in intensive farming.

Understanding the impact of the food you buy and sell is therefore extremely important: to be able to develop a sustainable menu but also to be able to explain to clients the choices behind the menu that you present.

This chapter will give some tools to understand and evaluate the impact of your food, so that you can make informed choices.

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2.1. How can we evaluate the impact of our food?

Producing food means using water, air, land, labour and fuels that emit carbon dioxide and other gases into the atmosphere. So how can we eat in a way that protects our health and our planet, and which foods are most sustainable for the environment? One suggestion comes to us from the double food pyramid.

Figure n.3. Double Food Pyramid (The BCFN Foundation Barilla Center Food&Nutrition 2016)

It includes different aspects:

- **to eat fruits and vegetables that are in season, preferring local products, definitely fresh,** that do not have to have travelled hundreds of miles to end up on our plates, **sold by the farmer, who grows them on his piece of land in our areas** (fish, for example, should be caught in the right growing season and in the seas closest to the place of consumption, with fishing methods that preserve the health of the sea);
- **to eat foods that are derived from plants and animals** that are not in danger of extinction, protecting biodiversity on land and in the sea;
- to **avoid foods that are too industrially manipulated**, as they are harmful to health and the environment;
- to **reduce meat consumption**.

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The Mediterranean Diet represents, for example, a sustainable food model for the environment but also for health

Figure n.4. New food pyramid proposed at the first world conference on the Mediterranean Diet as a healthy and sustainable model.

So how can we make the best choice while reducing our environmental impact at the dinner table?

With regard to **CO2 production**, an initial distinction must be made. There are certain foods whose carbon dioxide production is closely linked to the production process, while others are among the worst because of the distance they have to travel for them to reach our tables.

Looking at the latter, the foods with the most environmental impact with respect to the transportation process are:

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- Cherries from Chile: 21.55 kg of CO2, derived from a distance of about 11,968 km;
- Blueberries from Argentina: 20.13 kg of CO2, distance 11,178 km;
- Asparagus from Peru: 19.54 kg of CO2, distance 10,852 km;
- Walnuts from California: 18.90 kg CO2, distance 10,497 km;

This is a reason to choose 0-km products or products from the local area where the CO2 production that comes from transportation is reduced compared to foods that come from further away.

Instead if we look at the foods that have a high CO2 consumption related to production at the top we find beef. In this sense it weighs heavily on livestock farming and more so on intensive farming. This is followed by lamb cheese and dairy products. Below are 10 foods reported as worst in terms of environmental sustainability:

- Beef;
- Lamb meat and mutton;
- Cheese;
- Cows (dairy products);
- Dark chocolate;
- Coffee;
- Pork;
- Poultry;
- Fish (farmed);
- Eggs.

As for the foods with the greatest impact for **water resources** instead of beef, which still has a very high water impact, in the very first positions we find chocolate. In fact, it takes 20.000 litres of water per 1 kg of product, while we find coffee in seventh position with 18.900 litres per 1 kg of product. Beef is in third place. To make a comparison with fruit for 1 kg of apples there stands a consumption of 800 litres of water.

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Finally, we need to consider the **consumption of soil,** and in this sense we need to think about production techniques.

Organic cultivation respects nature, as well as enhances the surrounding **biodiversity** and greatly reduces the environmental impact of food throughout the process. Intensive cultivation and farming, which require large spaces, are less natural.

The land consumption is also linked to the production of animal feed. In fact, a single dairy cow can consume more than 40 kg of hay per day, while beef cattle are around 10 kg per day.

Organic and non-intensive crops should be preferred, and even in the case of meat; one can also choose meat from organic or pasture-based farms, as they consider animal welfare. In any case, the consumption of meat and cow's milk, which are among the foods with the largest environmental footprint, should be reduced.

2.2. Seasonality – typicality – local productions

As we have just seen, products that are in season, locally produced and fresh are more sustainable and should be preferred.

It is fundamental, in order **to understand the dynamics and distribution of typical products in a geographical region**, to analyse the *natural environment* in which production takes place. In fact, typical products are a direct consequence of the production and processing of agricultural products (grapes, olives, eggs, domestic animal husbandry, etc.), the production and quality of which is closely linked to the environmental characteristics in which the farms and crops are located. For example, the type of soil can influence the crop that can be planted there: soils can be acid or basic, clay or sandy, rich or poor in nutrients. Another important factor is the slope: if a land is in a valley or on a hill or a mountain, it will have different slopes and therefore the choice of cultivation will have to be adapted.

Another environmental aspect that influence the cultivability of one species over another is undoubtedly the *climate*, i.e. the physical parameters of rainfall, temperature, exposure, etc.

The climate is indeed decisive in determining whether it is possible to grow a particular domestic species. For example, the Mediterranean climate is decisive for the cultivation of vines and olive trees. In fact, we can grow these plants only in areas with a warm Mediterranean climate, which can be the Mediterranean basin, where these species originate, but also other areas of the planet (think of California in the USA, where oil and wine are produced as here) where the climatic conditions are similar. And we can

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respect seasonality, which is synonymous with good, natural cultivation that preserves the wellbeing of the land.

By typical product we mean a characteristic product, with a strong link with the geographical area in which it was born and with very specific qualitative characteristics, also due to the artisanal manufacturing processes handed down for generations. Consumers have been oriented towards this type of product for some time, increasingly searching, in a market which tends towards the standardization of tastes, for an offer based on the authenticity of the table, on the exclusivity of typical products, on what significant and unique a location can offer to increase the quality of travel experiences.

In Italy, for example, the artistic heritage is also associated with the food and wine heritage. Therefore, typical products, as holders of specific and unrepeatable values of the territory, are an economic, but also cultural wealth, capable of contributing both to the development and to the discovery of many places, not yet sufficiently known. The process of diversification of typical products is closely linked to the environmental and historical events of human populations on the planet.

Finally, it is essential to respect the seasonality of food, not only for plant-based products, but also fish products. **Seasonality identifies, in the case of food, the best time to consume a food item.** For guidance in choosing seasonal fruits and vegetables you can consult the annual seasonality calendar.

Here are the benefits of respecting the seasonality of food:

- ✓ Seasonality is good for our health and allows us to get all those nutrients we need;
- ✓ Growing produce out of season involves backing up to greenhouses and a consequent use of more energy in terms of heating, but also use of pesticides and fertilizers;
- ✓ Off-season produce has a higher price, so using seasonal produce saves us money in terms of costs;

Seasonality preserves the taste of food as seasonal produce has a higher nutritional intake which also affects taste.

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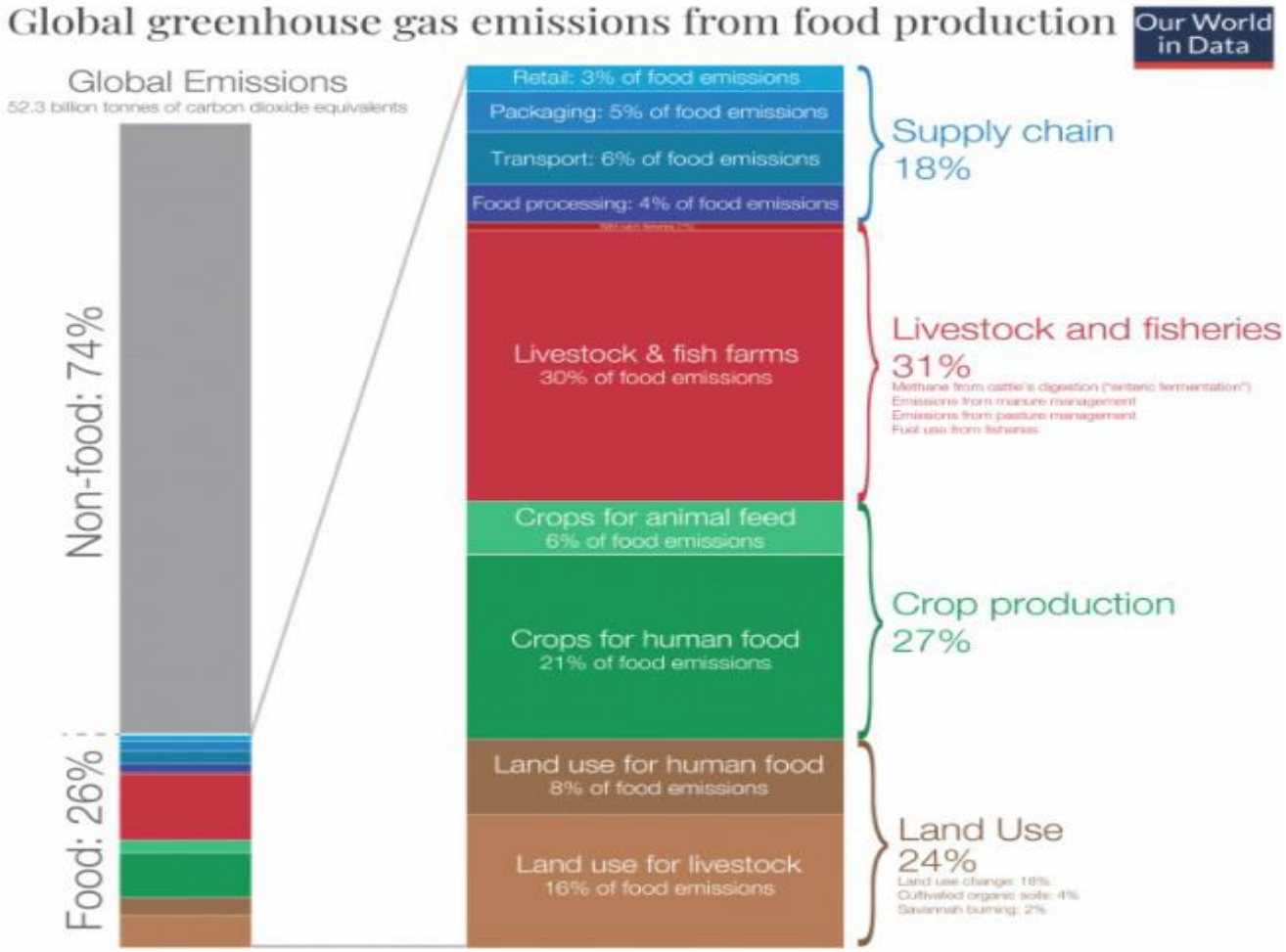
2.3. Protein transition: the environmental impact of the mass consumption of farmed meats and valorisation of agricultural productions with a high protein content

Today, the largest source of protein in our diet comes from animal products but the livestock industry is among the ones with the biggest impacts on the environment. In particular, the meat industry is estimated to emit 7.1 giga tonnes of CO2eq (equivalent) per year.

According to the study performed by Hannah Ritchie and Max Roser (2020) in 2018, food system emissions accounted for 26% of total greenhouse gas emissions, with 31% of emissions coming from livestock and fisheries (Figure n.5). The emissions came for the main part from agricultural and land use/land-use change activities (71%), while the remainder came from supply chain activities: retail, transport, consumption, fuel production, waste management, industrial processes and packaging. (Hannah Ritchie and Max Roser, 2020).



1*Figure n.5: Global GHG emissions from food production (Ritchie and Roser, 2020)*

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The methods of agriculture and animal husbandry have become intensive (aimed at obtaining maximum productivity from arable land and livestock).

The processes that contribute to the main greenhouse gas emissions during meat production are:

- feed production,
- enteric fermentation from animal digestion by animals (mainly ruminants)
- treatment of livestock effluents
- energy use in stables. (Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013

In addition to greenhouse gas emissions, livestock production is responsible for many other issues, such as lack of biodiversity, land consumption, deforestation, eutrophication and acidification. The impact on deforestation can be either direct, that is, with the need to create space for livestock using forests, or indirect, through agriculture.

Moreover, as the population continues to grow and is estimated to reach almost 10 billion by 2050, the problem of food resources is becoming more and more real: the demand for protein and thus the intensification of livestock farming will lead to an increase in problems and maintaining this style of feeding could lead to a greater environmental impact (Figure n.6).

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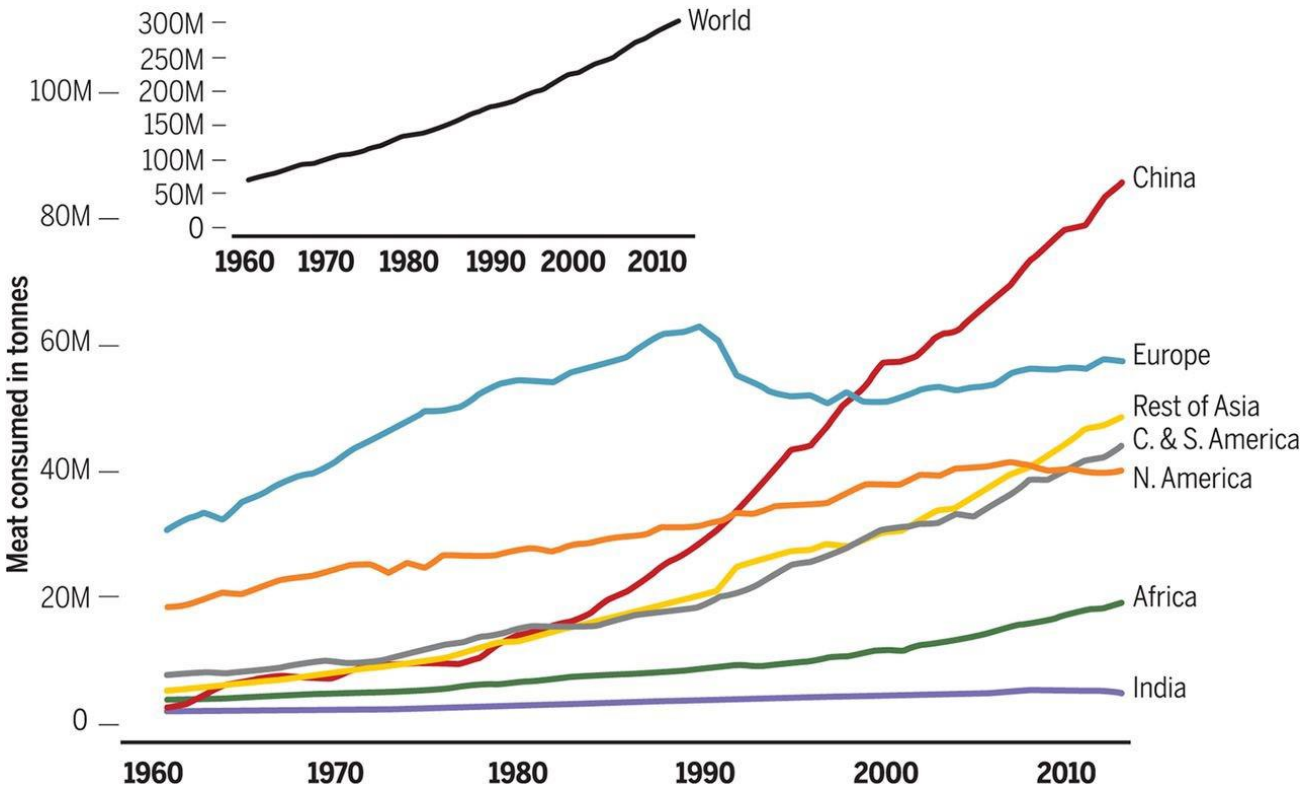

2Figure n.6: Total meat consumption (in million tonnes) in different regions and globally (Godfrayet al., Science 361, 2018)

All these analysed factors lead us to think about a **necessary change in our eating style, limiting our consumption of meat, in particular the ones with the major impact on the environment and valorising agricultural productions with a high protein content**.

Infact, not all types of meat are the same. Figure n.7 shows the estimated global emissions per species of animals, while Figure n.8 illustrates their impact on land use.

We can clearly see that beef is the most impactful of the types of meat, with significant CO2 emissions from the breeding stage and a very high land need.

For pigs and chickens, greenhouse gas emissions come mainly from feed production and manure treatment.

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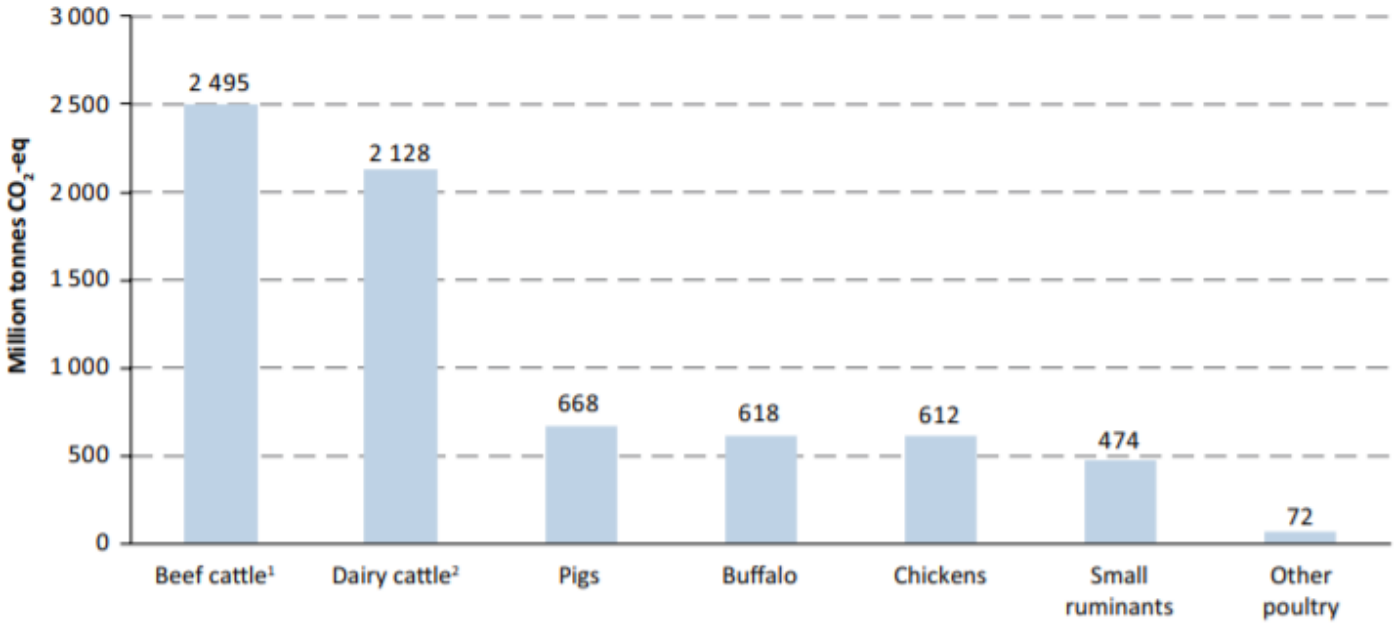
The species that require the greater land use for products are lamb and beef, both for the production of meat and dairy products such as cheese and milk.



*Includes emissions attributed to edible products and to other goods and services, such as draught power and wool.
¹ Producing meat and non-edible outputs.
² Producing milk and meat as well as non-edible outputs.

Source: GLEAM.

Figure n. 7. Estimated global emissions per species (Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013.).

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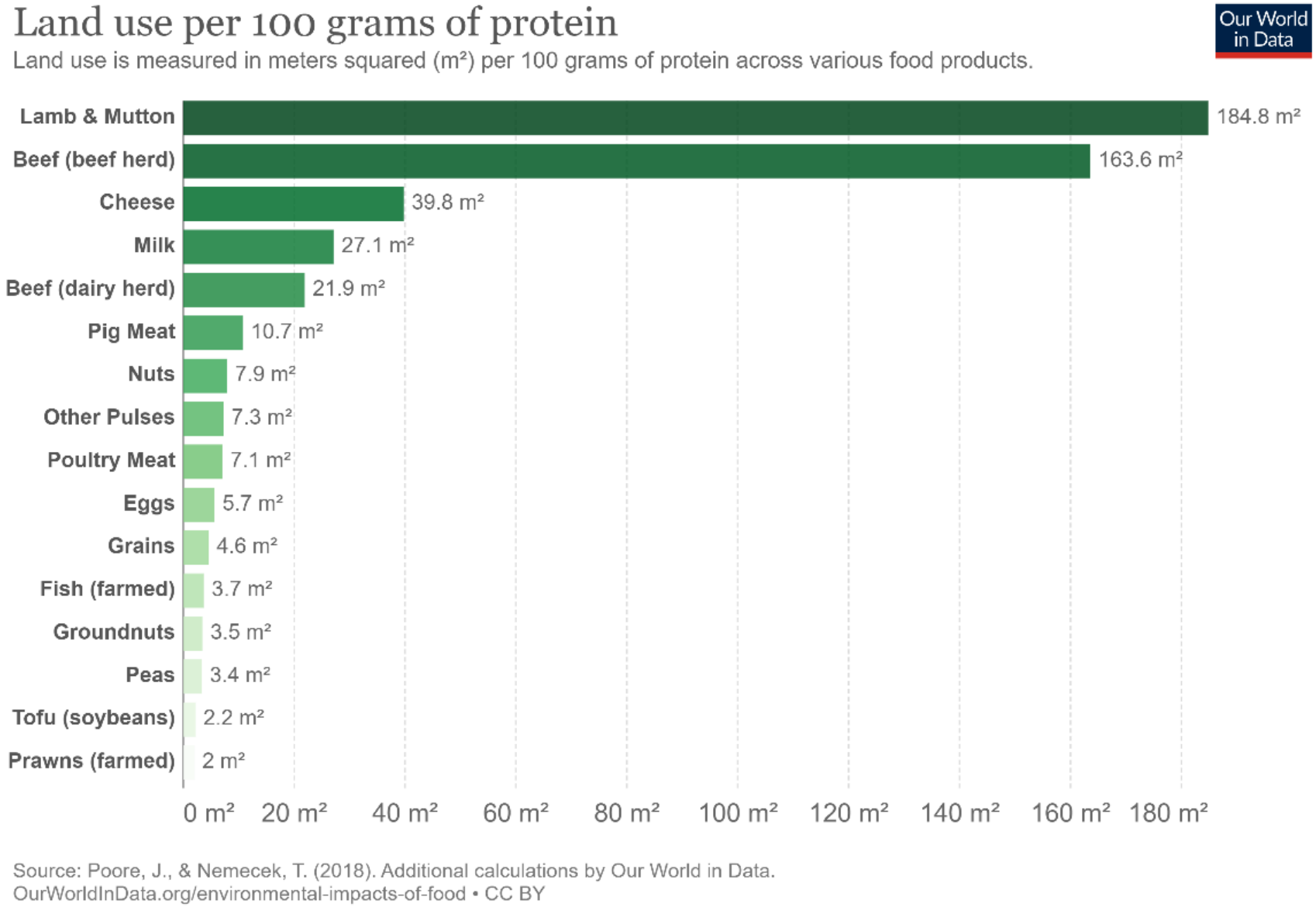

Tableau 1Figure n. 8: Land use per 100 grams of protein (Ritchie and Roser, 2020)

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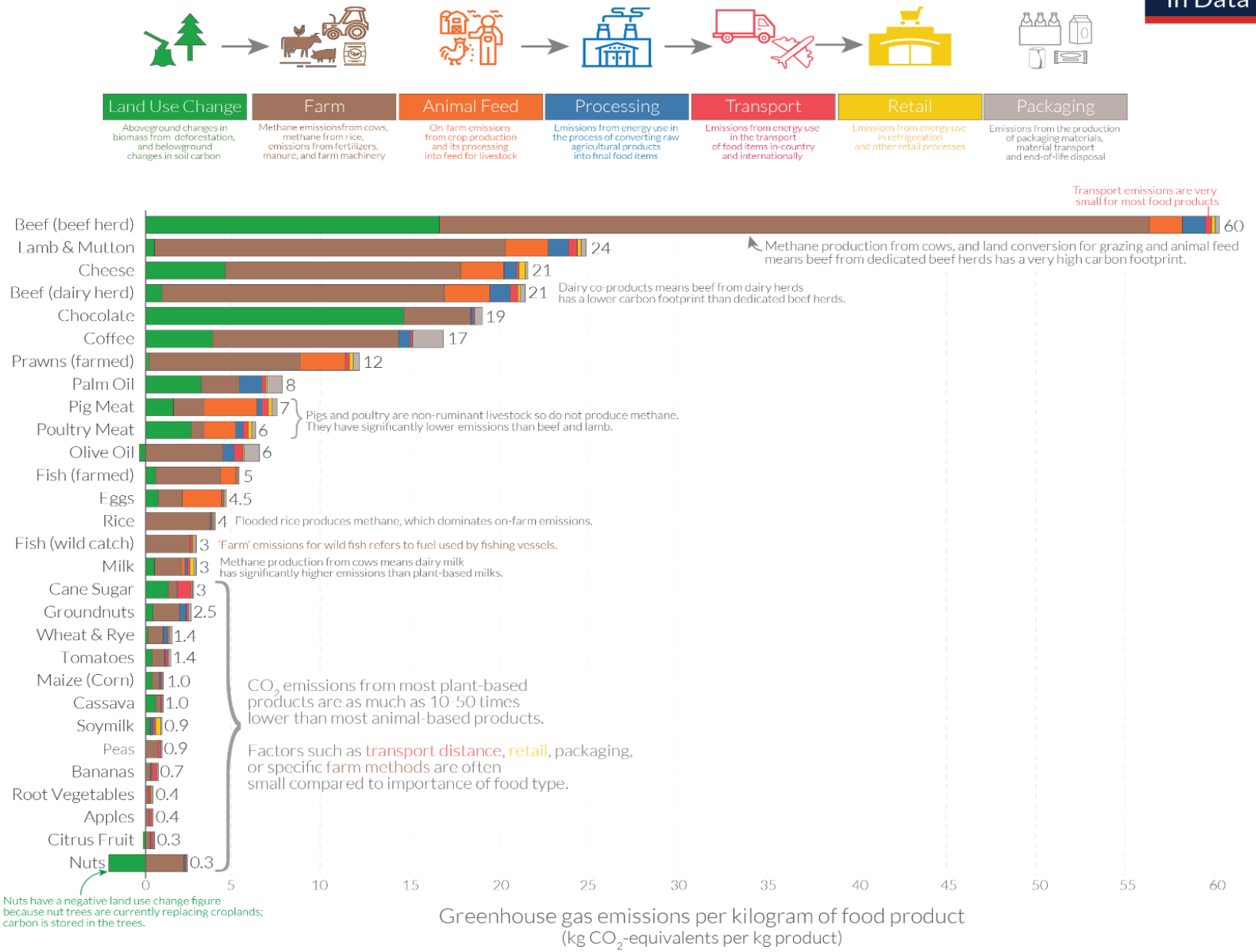
Food: greenhouse gas emissions across the supply chain

Our World in Data



Note: Greenhouse gas emissions are given as global average values based on data across 38,700 commercially viable farms in 119 countries.
Data source: Poore and Nemecek (2018). Reducing food's environmental impacts through producers and consumers. *Science*. Images sourced from the Noun Project.
OurWorldinData.org – Research and data to make progress against the world's largest problems.

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Tableau 2Figure n. 9. GHG emissions considering the entire lifecycle of a product (Ritchie and Roser, 2020)

How can you ensure that your menu is sustainable?

As we have seen, a sustainable meal is an affordable meal that uses foods that have a low impact in terms of land use, water resources used and low CO2 emissions in the air, is mindful of the conservation of biodiversity and ecosystems and have been produced sustainably from a socio-economic point of view.

Here are some **tips that you should always follow to ensure a sustainable menu at your table**.

✓ Adapt your menu to a short supply chain logic, because a menu must be linked to the territory and in symbiosis with it;
✓ Distinguish flavours and foods by building a clean sensory profile not contaminated by synthetic foods offered by the market;
✓ Choose suppliers who use techniques that preserve soil fertility and biodiversity;
✓ As a practitioner, educate yourself on the impact of food on health and the environment as well as gastronomic aspects, and develop menus that combine taste and sustainability
✓ Manage waste by putting it back into circulation, transforming it into a resource for other realities

Exercise 2: *Which food has the least environmental impact and which should be consumed most consciously*	
Pre-requisites	/
Time	1 hour
Tools	SSPICE IT! Manual, PC or smartphones, internet connection, printer
Objectives	1. Carry out a survey on Foods with Greater Environmental Impact and Conscious Consumption among school students
Instructions	
This exercise should be realised, when possible, in group. 1. Step 1: Gather information on sustainable food consumption, using the material provided in the Manual, including the additional references, and make a list of foods with less environmental impact. 2. Step 2: With the support of the teacher, realise a questionnaire to investigate conscious food consumption among your peers: the objective of the	

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questionnaire is to understand what kind of food they usually consume (food with high or low impact on the environment) and if they are conscious of the impact of their habits.

3. Step 3: Carry out a survey, using the questionnaire, among your peers, trying to reach as many students of your school as possible.

4. Step 4: Analyse the results of the survey and elaborate a report, calculating the average of each answer.

CHAPTER 3: Building a network with local producers

To reduce the environmental impact of unaware consumption, besides choosing sustainable food (as explained in Chapter 2), we should prefer local products, certainly fresh, that should not have completed hundreds of kilometers to end up in our plate, sold by the farmer, that grows them in his piece of land in our areas.

Local food distribution chains play a pivotal role in connecting farmers and producers with consumers in the same region, offering numerous advantages that extend beyond the mere act of buying and selling. These advantages range from environmental benefits to socio-economic considerations, fostering a deeper connection between people, food, and the land.

In this exploration of local food distribution chains, we will delve into the diverse advantages they offer, including reduced carbon footprint, enhanced food quality, and support for local economies. We will also address the challenges that arise in establishing and maintaining such systems, such as logistical complexities, scale limitations, and competition with mainstream supply chains.

By understanding both the benefits and obstacles of local food distribution, we can gain valuable insights into how these systems contribute to sustainable food practices and inform strategies for strengthening and expanding their reach. Ultimately, the

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examination of local food distribution chains invites us to envision a future where food consumption becomes a regenerative force, nurturing communities, ecosystems, and the well-being of all involved.

3.1 Advantages of local food distribution chains

Local food distribution chains offer a range of advantages, both for consumers and the broader community. Here are some key advantages of local food distribution chains:

- **Freshness and Quality**: Local food is often fresher because it doesn't have to travel long distances. This results in better flavour, nutritional value, and overall quality of the products.
- **Seasonal Variety**: Local food encourages seasonal eating, promoting a diverse and healthy diet. Consumers learn to appreciate and enjoy foods when they are naturally in season.
- **Health and Nutrition**: Local food tends to be more nutritious because it is picked at its peak ripeness. It can also support dietary preferences, such as organic, gluten-free, or vegan diets.
- **Reduced Carbon Footprint**: Local food travels shorter distances, reducing the carbon emissions associated with transportation. This contributes to lower greenhouse gas emissions and mitigates climate change.
- **Support for Local Economy**: Purchasing from local producers helps support the local economy by keeping money within the community. It bolsters the livelihoods of farmers, artisans, and small businesses.
- **Transparency and Traceability**: Local food often comes with transparent sourcing information, allowing consumers to know where and how their food was produced. This fosters trust and accountability in the supply chain.
- **Community Building**: Local food initiatives build a sense of community by connecting consumers with local producers. Farmers' markets, CSAs, and local food cooperatives often host community events and activities.
- **Preservation of Open Space**: Supporting local agriculture helps preserve open spaces, farmland, and rural landscapes. This, in turn, maintains biodiversity and prevents urban sprawl.
- **Reduced Food Waste**: Local food distribution chains often minimize food waste. Shorter supply chains mean less food spoilage during transportation and storage.
- **Economic Resilience**: Communities with strong local food systems are often more resilient in times of crisis. They can better withstand disruptions to global supply chains.
- **Cultural Preservation**: Local food often includes traditional and culturally significant products, helping preserve culinary traditions and heritage foods.
- **Diverse Product Selection**: Local food distribution chains showcase a diverse range of products, including heirloom varieties and unique, hard-to-find items.

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- **Education and Awareness**: Local food systems provide opportunities for consumers to learn about food production, farming practices, and the importance of sustainable agriculture.

Overall, local food distribution chains play a crucial role in promoting sustainable, community-centred, and environmentally responsible food systems. They offer numerous benefits to consumers, producers, and communities, making them an important component of a more resilient and sustainable food future.

3.2 Challenges in local food distribution

While local food distribution chains offer numerous advantages, they also face several challenges that can impact their operations and growth. Here are some common challenges associated with local food distribution:

- **Seasonal Availability**: Local food availability is often limited to what is in season. This can lead to seasonal fluctuations in product availability and challenges in meeting year-round demand for certain products.
- **Scale and Consistency**: Small-scale local producers may struggle to meet consistent demand, leading to supply shortages. Maintaining product consistency can be challenging for smaller operations.
- **Price Competitiveness**: Local products can sometimes be more expensive than mass-produced alternatives due to higher production costs. This can pose a barrier for price-sensitive consumers.
- **Distribution Infrastructure**: Developing and maintaining efficient distribution networks can be a challenge for local food systems. Transportation, storage, and delivery logistics can be complex.
- **Consumer Education**: Raising awareness among consumers about the benefits of local food and changing their purchasing habits can be a slow and ongoing process.
- **Market Access**: Some local producers may have limited access to markets beyond farmers' markets and direct-to-consumer channels, limiting their potential customer base.
- **Regulatory Hurdles**: Compliance with food safety regulations and certifications can be demanding for small-scale producers, adding to their operational costs.
- **Land Use Pressures**: As urban areas expand, farmland can be at risk of development. Preserving open space for agriculture becomes crucial.
- **Infrastructure and Technology**: Limited access to modern technology and infrastructure, such as online marketplaces and e-commerce, can hinder the growth of local food distribution.
- **Competition with Large Retailers**: Local food systems often compete with large supermarket chains that have significant resources and marketing power.
- **Access to Capital**: Securing financing and capital for local food businesses can be challenging, hindering their ability to expand and invest in infrastructure.
- **Scale-Up Issues**: Successfully scaling up a local food initiative while maintaining the principles of sustainability and community can be a delicate balance.

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- **Consumer Preferences**: Consumer preferences for convenience, which may favour one-stop shopping at large grocery stores, can pose a challenge for local food distribution.
- **Climate and Weather**: Local farmers are highly susceptible to the impacts of climate change, including extreme weather events, which can disrupt production.

Addressing these challenges often requires collaboration among local producers, policymakers, consumers, and community organizations. Creative solutions, such as cooperative distribution networks, farmer's market incentives, and public awareness campaigns, can help mitigate these challenges and support the growth of local food distribution systems.

3.3 How to create distribution chains with local producers

Creating a distribution chain with local producers requires careful planning, collaboration, and a clear vision. Here are the steps to help you establish a successful distribution chain with local producers:

1. **Research and Identify Local Producers**: Start by researching and identifying local producers in your region who offer products that align with your distribution chain's focus. Consider products such as fruits, vegetables, dairy, meat, or artisanal goods.
2. **Build Relationships**: Reach out to the local producers you have identified and start building relationships with them. Visit their farms or facilities, learn about their products and production practices, and discuss their interest in participating in your distribution chain.
3. **Define Your Distribution Model**: Decide on the distribution model that best suits your vision and the needs of the local producers. Options include farmers' markets, community-supported agriculture (CSA), wholesale to restaurants and grocery stores, or an online platform for direct-to-consumer sales.
4. **Collaborate with Stakeholders**: Engage with local stakeholders, such as farmer cooperatives, community organizations, and local government. Collaboration can provide valuable support, resources, and networks to strengthen your distribution chain.
5. **Create an Efficient Logistics System**: Develop a robust logistics system to handle the collection, storage, and transportation of products from producers to customers. Ensure that the system maintains product quality and freshness throughout the supply chain.
6. **Set Fair Pricing**: Establish fair pricing that benefits both the local producers and the end consumers. Consider the costs of production, transportation, and distribution, while ensuring the prices remain competitive and reasonable.
7. **Educate Consumers**: Educate consumers about the benefits of supporting local producers and the positive impacts of their choices on the environment, economy,

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and community. Raise awareness about the importance of local food and its contribution to sustainability.

8. **Promote Transparency**: Foster transparency by providing information about the origin of products, the production methods used by the local producers, and the positive impacts of supporting local food systems.
9. **Adapt to Seasonal Changes**: Embrace seasonal variations in product availability. Educate consumers about the benefits of eating seasonally and the diverse range of products offered throughout the year.
10. **Comply with Regulations**: Ensure that your distribution chain complies with all relevant regulations and permits required for food distribution and handling.
11. **Invest in Marketing and Outreach**: Invest in marketing efforts to promote your distribution chain and the local producers involved. Use social media, local events, and partnerships to create awareness and attract customers.
12. **Seek Feedback and Continuous Improvement**: Seek feedback from both producers and consumers to identify areas for improvement. Continuously adapt and refine your distribution chain to meet the changing needs and preferences of all stakeholders.

By following these steps and staying committed to sustainability, transparency, and collaboration, you can create a successful distribution chain with local producers. Such a distribution chain can contribute to the local economy, promote environmental stewardship, and build a stronger sense of community around food.

Exercise 3: *Analyse the sustainability of your local producers*	
Pre-requisites	/
Time	1 hour
Tools	SSPICE IT! Manual, PC or smartphones, internet connection, printer
Objectives	1. Use the information provided by the Manual to evaluate the sustainability of a supplier
Instructions	
This exercise should be realised, when possible, in group. 1. Step 1: With the support of the teachers, choose two suppliers of your territory. They will have to be located within 70 km of your VET centre 2. Step 2: Using the information provided by the Manual, develop a sustainability check list. Each check list should include the list of products obtained, the area of production, the product's characteristics, as well as any elements that characterize the products and production system in terms of sustainability.	

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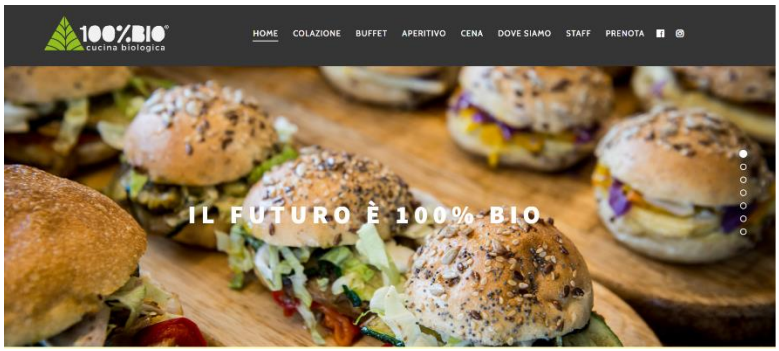
3. Step 3: Using the check list, assess the sustainability of the two suppliers, identifying the most sustainable one.

CASE STUDY – 100%Bio

100%Bio, a restaurant in the centre of Rome - www.centopercento.bio



The restaurant's owners, who have always been passionate about organic culture and attentive to the cultural transformations taking place in the field of food and catering, as well as those taking place in the environment, decided to open in Rome, in front of the Pyramid, a restaurant that would use and offer its customers only 100% certified organic products.

What were initially pleasant chats gradually turned into a concrete project and operational business plan... And so, in the historic Pyramid Square, 100% BIO opens. From an ideal to reality.

The restaurant has made the commitment to make its activity as sustainable as possible, under all aspects.

The ingredients used by the restaurant are all certified organic and a special attention is paid to the quality and origin of the raw materials.

Moreover, the suppliers with whom it has been collaborating for several years espouse their project and philosophy; they are an integral part of the project.

Lately the owners of the restaurant have even taken a small plot of land in which they make cultivation trials, using natural techniques.

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Their commitment to sustainability extends also to the use of compostable material, and the effort, together with their suppliers, to reduce the amount of plastic from packaging.

Last but not least, it embraces also sustainability from a socio-economic point of view: their employees work with consonant and regular shifts and hours, and their suppliers are also chosen and selected according to the company policy they adopt in relation to the welfare of the person and the protection of workers.

The restaurant is open from the morning till evening, with three different offers:

- ✓ for breakfasts, with only handcrafted products realised by the cooks,
- ✓ for lunch, which is held with a buffet with different dishes every day according to the seasonality and availability of raw materials,
- ✓ for dinner, "a la carte", with a creative menu that emphasizes first and foremost the material used.

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Final Task: A Sustainability Map

Final Task Module 3: *Choosing Sustainable Partners*	
Pre-requisites	/
Time	3 hours
Tools	SSPICE IT! Manual, PC or smartphones, internet connection, printer
Objectives	1. Apply the information provided by the Manual to choose sustainable producers for your fictional business.

Instructions

This exercise should be realised, when possible, in group.

1. Step 1: Think about a fictional sustainable business you would like to set up.
2. Step 2: Choose the sustainable suppliers/producers with which you would collaborate. They should be real ones, located in your area.
3. Step 3: Using the check list, assess the sustainability of the two suppliers, identifying the most sustainable one. / For each supplier, indicate:
    a. their geographical situation,
    b. their production / processing / transport / innovation / communication characteristics
    c. the reasons why they were selected.
4. Step 4: Present your results in front of the class.

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EXTRAS

5.1 Summary of the chapter

In the **first chapter** of this module, we studied he **interaction between production systems and water, soil, biodiversity and people**.

In particular, we saw how agriculture and food production are major users of freshwater, which is becoming an increasing limited resource, and how plant-based diets have a lesser Water Foot Print than meat based diet.

Soil is another fundamental, non-renewable natural resources and sustainable soil management is essential to promote food security and improved nutrition. Among other things the Global Soil Partnership, recommends to avoid land use change, to maintain vegetation cover to protect against erosion, reduce grazing intensity, ensure crop rotation and optimise organic resources in the soil.

We studied also the impact of the loss of biodiversity on the food system, such as the threat to food availability, diet diversity and disease resistance, the reduction of certain phytonutrient substances, the loss of local varieties and the increase in the use of pesticides and other substances.

Finally, we highlighted the socio and economic dimensions of sustainability, which complete the environmental one.

On the basis of all these elements, an example of check list is presented, to be used to evaluate concretely the sustainability of a producer.

The **second chapter** of the module gave you some indications on **how to evaluate the impact of your food**, in order to make informed choices.

The Double Food Pyramid gives indications on both which foods have the highest environmental impact and their recommended consumption.

Different aspects have to be taken into consideration to measure the impact of your food: the CO2 production, both through the production process and their transportation, the impact on water resources (how much water is used to produce it), the consumption of soil and the impact on biodiversity.

In general, products that are in season, locally produced and fresh are more sustainable and should be preferred. In order to identify local and typical productions, it is necessary to understand the physical characteristics of a territory, its climate, but also its history,

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culture and traditional manufacturing process. Moreover, it is essential to respect the seasonality of food not only for plant-based products, but also for fish products.

Moreover, while the largest source of protein in our diet comes from animal products, the livestock industry is among the ones with the biggest impact on environment: in terms of greenhouse gas emissions, land consumption, water consumption, deforestation, etc. It is therefore necessary to change our eating style, limiting our consumption of meat and valorising agricultural productions with a high protein content.

The **third chapter** of the module gives information **on how to build a network with local producers**.

Local food distribution chains have many advantages, not only in terms of quality of the food (freshness, seasonality) and the environment (reduced carbon footprint, reduced food waste, preservation of open spaces), but also for the development of the territory (economic resilience and development, community building, culture preservation) and foster a major awareness on local food systems among the population.

Local food distributions face however different challenges, which can have an impact on their operations and growth, for example, in terms of seasonal availability, price competitiveness, distribution infrastructures and access to capital. Addressing these challenges often requires collaboration among local producers, policymakers, consumers, and community organizations.

The final paragraph presents the concrete steps to follow to establish a successful distribution chain with local producers: 1. Research and Identify Local Producers; 2. Build Relationships; 3. Define Your Distribution Model; 4. Collaborate with Stakeholders; 5. Create an Efficient Logistics System; 6. Set Fair Pricing; 7. Educate Consumers; 8. Promote Transparency; 9. Adapt to Seasonal Changes; 10. Comply with Regulations; 11. Invest in Marketing and Outreach; 12. Seek Feedback and Continuous Improvement.

5.2 Glossary

- **CAP:** Common agricultural policy supports farmers and ensures Europe's food security. The CAP is a common policy for all EU countries, managed and financed at European level with resources from the EU budget.

- **Farm to Fork (F2F):** The Farm to Fork Strategy (F2F) is the ten-year plan developed by the European Commission to guide the transition to a fair, healthy and environmentally friendly food system.

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- **MEC: Minimum Environmental Criteria (MEC)** are environmental requirements established for the various phases of the purchasing process, aimed at identifying the best product, service or design solution in environmental terms, throughout its life-cycle, taking account of availability on the market.

- **MAI**: **Mediterranean Adequacy Index (MAI), whose function is to express the degree of adherence of a meal to the Mediterranean Diet. It does this by comparing the calories, therefore the energy, provided by the different classes of foods present in the dish we consume.**

- **PNRR:** the National Recovery and Rehabilitation Plan (PNRR) is the program by which the government intends to manage the funds of the Next Generation EU. It is the instrument of economic recovery introduced by the European Union to heal the losses caused by the pandemic

- **GSP:** Global Soil Partnership. A globally recognized mechanism established in 2012 with the mission of promoting sustainable soil management and ensuring productive soils towards Food Security

5.3 Acknowledgments

This module has been written by Loreta Grande and Andrea Palmieri, with the support of the SSPICE IT! Team in Italy and Portugal.

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