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SSPICE IT!

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

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WP	WP3 - Co-design and testing of innovative training program for green operators and entrepreneurs in the catering sector
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Module n° 01

THEMATIC AREA	Relationships between food, people, and environment	
SUB AREA OF REFERENCE	<i>Sustainable Food</i>	
HOURS	15	
LEARNING OBJECTIVES		
<ol style="list-style-type: none"> 1. Recognize the principal relations and problems between humans and environment. 2. Understand the environmental impact of food. 3. Comprehend the concept of sustainable food. 4. Understand the correlation between health and sustainable food. 5. Apprehend the complexity of the food system and the societal issues associated with it. 		
LEARNING ACTIVITIES		
	Theoretical	Practical
	<ul style="list-style-type: none"> ✓ Reading ✓ Web research ✓ Case study 	<ul style="list-style-type: none"> ✓ Researching the causes, mechanisms, and consequences of contemporary environmental issues ✓ Evaluating the impact of fictional scenarios on the global food system ✓ Composing innovative menus following sustainability principles

CONTENT

INTRODUCTION	4
CHAPTER 1: HUMANS AND THE ENVIRONMENT	5
1.1. INTRODUCTION: A BRIEF HISTORY OF THE HUMAN – NATURE RELATIONSHIP	5
1.2. IMPACT OF THE PEOPLE ON THE ENVIRONMENT	6
1.3. IMPACT OF THE ENVIRONMENT ON THE PEOPLE	7
1.4. SOLUTIONS AND PERSPECTIVES.....	7
1.4.1 <i>The European Green Deal</i>	7
1.4.2 <i>On an economic level: social entrepreneurship, the circular economy, and sustainable food</i>	8
EXERCISE 1: <i>BECOMING AWARE OF ECOLOGICAL ISSUES</i>	9
CHAPTER 2: SOCIETAL CHALLENGES OF FOOD ACCESSIBILITY	10
2.1. INTRODUCTION: THE COMPLEXITY OF THE FOOD SYSTEM	10
2.2. FOOD AND NUTRITION INSECURITY: A EUROPEAN OVERVIEW	14
2.3. RIGHT TO FOOD	15
2.4. BEYOND EUROPE: THE CONCEPT OF FOOD SOVEREIGNTY.....	16
EXERCISE 2: <i>UNDERSTANDING THE INTRICACIES OF THE FOOD SYSTEM</i>	17
CHAPTER 3: INVESTIGATING THE INTERSECTIONS OF FOOD, HEALTH, AND THE ENVIRONMENT	19
3.1. INTRODUCTION: THE ECOLOGICAL FOOTPRINT OF INDUSTRIAL FOOD	19
3.2. WHAT IS ORGANIC FOOD?.....	22
3.3. WHAT IS A SUSTAINABLE FOOD SYSTEM?.....	23
3.4. WHY SHOULD WE ADOPT SUSTAINABLE FOOD PRACTICES IN THE FOOD INDUSTRY?	25
3.5. THE SUSTAINABLE DIET	27
EXERCISE 3: <i>HEALTHY AND SUSTAINABLE MENU</i>	35
CASE STUDY.....	36
HOST TABLE FORESTO	36
EXTRAS	40
5.1 SUMMARY OF THE CHAPTER	40
5.2 FURTHER READINGS	41
5.3 GLOSSARY.....	42
5.4 ACKNOWLEDGMENTS.....	43
5.5 BIBLIOGRAPHY	43

INTRODUCTION

Welcome to the SSPICE IT! training! We hope you will enjoy this spicy journey into the delectable world of sustainable food. In this first chapter, you will learn the basics about the main topics covered in our training: climate change, sustainability of the food system, healthy and eco-friendly diets, etc. The objective of this chapter is to give you the necessary context to understand the stakes of this training. Thus, in order to gain a better grasp on sustainability issues, we will focus our attention on three key actors and their interactions: the people, the environment, and the global food system. We hope that this module will engage you to make the world a better place, one spoonful at a time!

CHAPTER 1: Humans and the environment



Fig. 1 – Illustration. Source : <https://www.pexels.com/fr-fr/photo/moulin-a-vent-blanc-414837/>

1.1. Introduction: a brief history of the human – nature relationship

If we could summarize the relationship between human societies and the environment in a general way, we could say that it is the story of a constant attempt by humans to break free from natural constraints. The early stages of human history were marked by a dependence on natural uncertainties. The primary means of subsistence relied on gathering and hunting. Nature was like a mystical force, a source of life, but also of death for humans. With the development of agriculture (around -8,000 years ago) and the gradual advent of property, we transitioned to a more regular and consistent exploitation of natural resources. As centuries passed, land ownership became a source of wealth, not just a means of subsistence. Consequently, nature was no longer just an uncontrollable given imposed on humans; it became a space where their will extended, a space at their disposal for enrichment.

However, it was not until the two industrial revolutions in Europe, particularly in the 19th century (around 1830), that the use of natural resources transformed into large-scale exploitation. The extraction and transformation of resources were driven by economic ambitions, and there were no longer ethical limits to this exploitation in the collective imagination. Nature seemed boundless. The two world wars and the period of growth during the "Trente Glorieuses" (thirty prosperous years between 1945 and 1975) only reinforced this productive model of "more and faster."

Nevertheless, the 1970s marked the beginning of an awareness of the detrimental impact of human activity on nature. It was the start of the first scientific reports and international conferences, such as the 1972 Stockholm Conference, initiating the idea of environmental protection as a social concern. Today, the concepts of climate change and ecology have been integrated by a significant portion of the population, leading to actions of varying effectiveness.

1.2. Impact of the people on the environment

Over the last five decades, scientific data on the effects of human activity on the environment have multiplied significantly. These effects are truly visible and undeniable. The primary consequence of human modes of production and lifestyles is climate change. This is primarily due to the emission of greenhouse gases (CO₂, methane, etc.). In 2019, the average global temperature was 1.1°C above pre-industrial levels, and this temperature increase is not a natural phenomenon. Humanity has indeed become a geological force, capable of altering global environmental balances, such as temperatures.

Concretely, this warming leads to the proliferation of extreme climate events, such as hurricanes/storms, floods (especially in Southeast Asia), droughts, and incredible forest fires. In the European Union, nearly 400,000 hectares of forests have gone up in smoke. This is accompanied by the disappearance of many animal species, driven by human encroachment on wild habitats. Between 1970 and 2018, 68% of wild vertebrate populations have vanished (measured by numbers, not species - WWF). This can be explained by the deterioration of natural spaces, including deforestation for agriculture, pollution (waste, plastic, wastewater, etc.), urbanization, overfishing, and more.

1.3. Impact of the environment on the people

All the environmental repercussions and modifications attributed to humans do not come without consequences for them. By 2030, there could be 230 million climate refugees, and up to 1.2 billion by 2050, according to estimates from the United Nations High Commissioner for Refugees. Several phenomena are responsible for this. Climate change is causing rising sea levels and the disappearance of certain territories. Moreover, droughts make some areas uninhabitable, with an inability to access proper food and even clean drinking water. The increasing number of refugees raises questions about their reception, which can be problematic. Furthermore, as freshwater reserves dwindle, agricultural needs will become increasingly difficult to meet. Ocean acidification and declining oxygen levels in certain areas lead to a decrease in animal populations, not to mention overfishing. Consequently, food shortages are expected, as well as conflicts over resource exploitation.

Finally, due to global warming, natural disasters are becoming more frequent and more intense, resulting in a higher number of victims. For example, in March 2029, Cyclone Idai killed over 1,000 people in Zimbabwe, Malawi, and Mozambique, not to mention the victims of the food shortages it caused. In 2022, it is estimated that floods in Bangladesh affected more than 7.2 million people. It is important to note that the first victims of global warming are often the most vulnerable and precarious individuals.

In conclusion, climate change is not just an environmental catastrophe but also a social catastrophe.

1.4. Solutions and perspectives

1.4.1 The European Green Deal

In light of the climate and environmental urgency, both states and international organizations are taking proactive steps to change course and limit global warming and the destruction of natural spaces.

At the European level, one illustrative example of this is the Green Deal launched in April 2021. The Green Deal consists of a set of legally binding measures committing the European Union (EU) to achieve climate neutrality by 2050 and to reduce greenhouse gas (GHG) emissions by 55% by 2030. These initiatives span across all economic sectors, from agri-food to transportation to energy. GHG reduction will be achieved

through actions such as building renovations, reforming the carbon market, and promoting the development of green energy sources. The goal is to encourage environmentally sustainable economic growth and development.

The Green Deal succeeds the Climate package, which was initially adopted in December 2008 and revised in 2014 as a plan to combat climate change. It also included GHG emission reductions and energy efficiency targets, with deadlines set for 2020 and 2030. Today, the Green Deal appears to be more comprehensive than the Climate package, but its effectiveness will ultimately be judged based on its future implementation and long-term impact.

1.4.2 On an economic level: social entrepreneurship, the circular economy, and sustainable food

To contribute to the fight against climate change, private economic actors in the food sector can embrace the philosophy of a just transition. This framework combines sustainable food, social entrepreneurship, and the circular economy with the aim of creating an economy that is greener, more sustainable, and fairer.

- **Sustainable food:** A sustainable food system is one that uses Earth's resources in a reasonable manner, allowing the Earth sufficient time to replenish the resources we consume each year. It is also a system that considers a range of issues such as food supply security, health, safety, accessibility, quality, a strong food industry in terms of jobs and growth, and simultaneously, environmental protection in terms of climate change, biodiversity, water quality, and soil quality.
- **Social entrepreneurship:** Social entrepreneurship is a form of entrepreneurship that pursues objectives of general interest, such as combating climate change, and reinvests the majority of its profits in support of this mission. You will learn more about it in Modules 5 and 6.
- **Circular economy:** The circular economy is an economic model that aims to minimize the waste of natural resources by promoting recycling, the use of renewable energy, sharing, repairing broken products, short supply chains, and more. It operates in a closed-loop fashion, where waste is no longer seen as waste but as a potential resource that can be reused. You will learn more about it in Modules 2 and 3.

These concepts will be further developed in the subsequent training, which will explain how to apply them at the level of a company in the food sector as well as at an individual level.

Exercise 1: <i>Becoming aware of ecological issues</i>	
Pre-requisites	/
Time	3 hours
Tools	PC or Smartphone, internet connection
Objectives	1. Understand current ecological issues and their consequences on human societies
Instructions	
<p>1. Step 1: Choose one of the following topics:</p> <ul style="list-style-type: none"> • Climate change • Deforestation • Loss of Biodiversity • Pollution • Ocean acidification • Natural habitat destruction • Overfishing • Water scarcity • Invasive species <p>2. Step 2: Do some research on the chosen topic.</p> <p>3. Step 3: Write a short dissertation (between one and two pages) about it. In your essay, highlight:</p> <ol style="list-style-type: none"> a. The causes of the phenomenon. b. The mechanism behind it (in a simplified way). c. The consequences for human societies. 	

CHAPTER 2: Societal challenges of food accessibility

2.1. Introduction: the complexity of the food system

By "food system," we mean all the stages related to the act of feeding a population: production, processing, distribution, promotion, and sale of food; consumption by citizens (at home or outside); public policies related to these actions; and all the domains that are impacted by the food sector and, in turn, impact it (health, technology, economy, environment, demographics, etc.).

To better understand the complexity of this system, we can observe this diagram produced by the HLPE¹:

¹ HLPE stands for the High-Level Panel of Experts on Food Security and Nutrition, which is a scientific panel established by the United Nations to provide guidance and policy recommendations on food security and nutrition issues.



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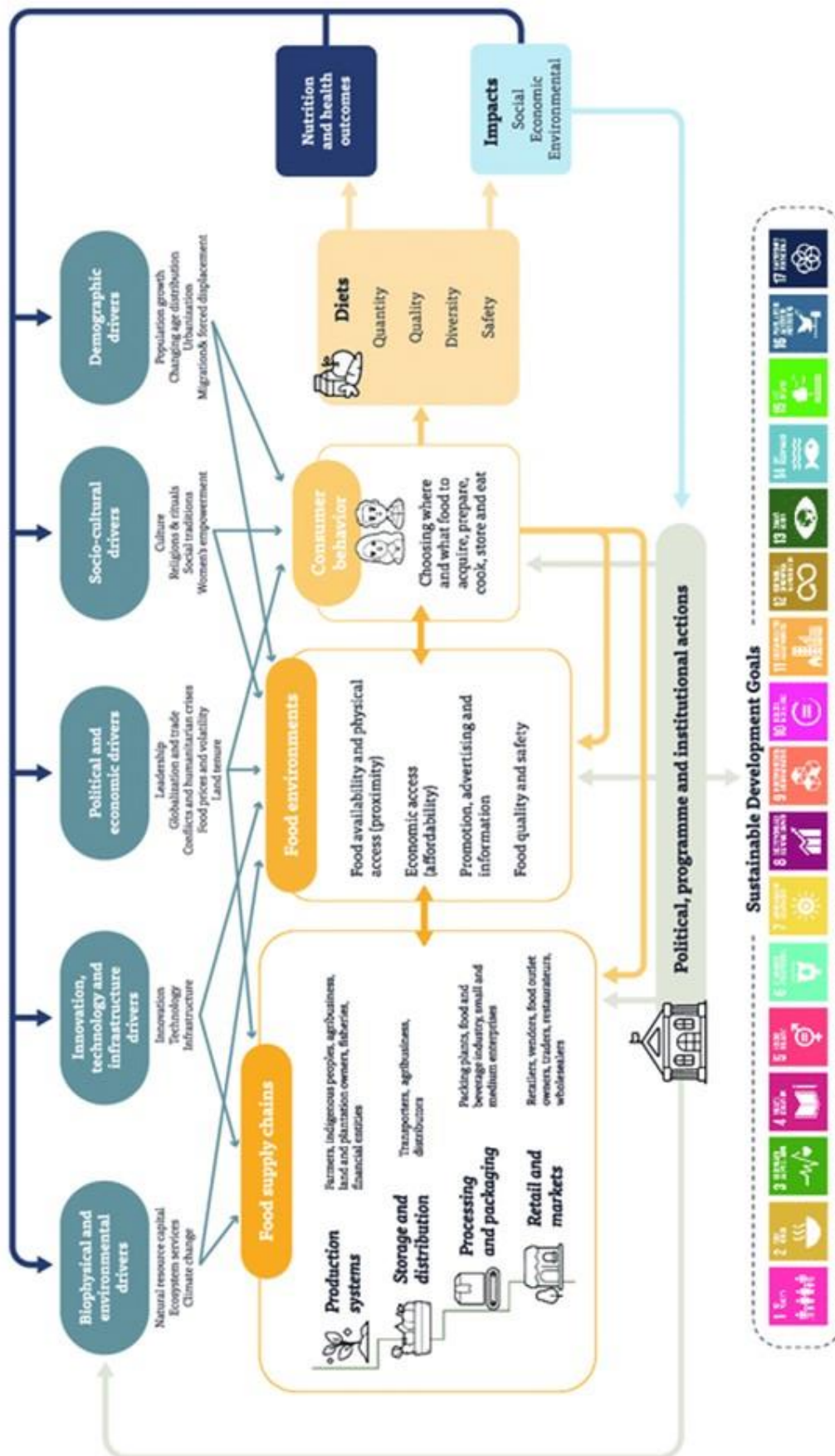


Fig. 2 – High Level Panel of Experts on Food Security and Nutrition (HLPE-FSN)²

In this diagram, food touches upon various sectors of society, and everything is interconnected.

Let us consider a hypothetical example: the recent emergence of artificial intelligence technologies (labelled as "Innovation, technology, and infrastructure drivers") may impact how companies in storage and distribution transport their goods, such as favouring the use of AI-driven trucks (depicted in "Food supply chains" and "Storage and distribution"). These AI-driven trucks, not requiring human drivers, can operate for longer periods (as they do not need to stop for drivers to rest) and therefore arrive at their destinations faster, improving the freshness of goods (in "Food environments"). Additionally, if the technology advances sufficiently, it may be more cost-effective for a company to use AI-driven trucks than human drivers, potentially reducing their operating expenses and lowering the prices of goods in stores (in "Food environments"). Perhaps this would make previously expensive foods more accessible, leading to a trend of Japanese square watermelons in our restaurants in a few years (in "Consumer behaviour").

However, this transition to AI-driven trucks could also lead to job losses for many people who were previously truck drivers, leaving them unemployed (as depicted in "Impacts", "Economic", and "Social" sections). With reduced income compared to their previous employment, these individuals and their families may not be able to afford as much food or food of the same quality as they could when they were employed, affecting their overall health (in "Nutrition and health outcomes"). All these elements will influence the economic landscape (in "Political and economic drivers") and the adoption of new public policies (in "Political, program, and institutional actions").

² HLPE. (2020). *Food security and nutrition: building a global narrative towards 2030 (Report No. 15)*. High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Retrieved from <https://www.fao.org/3/ca9731en/ca9731en.pdf>, p.31. Please check this link to obtain a higher-resolution version of this diagram.

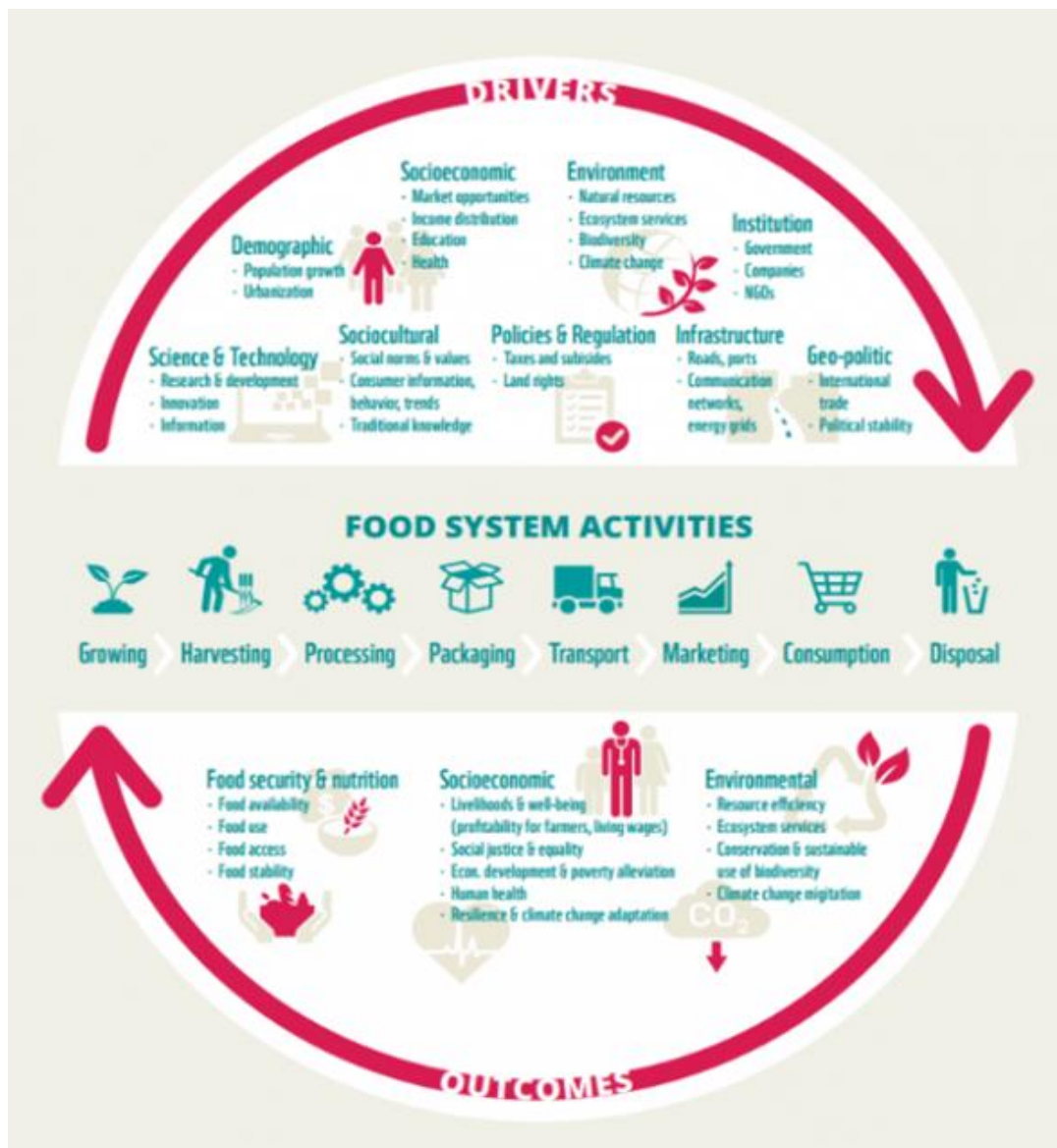


Fig. 3 – Elements of the food system³

³ WWF Germany & WWF Food Practice. (2020, August). ENHANCING NDCS FOR FOOD SYSTEMS: RECOMMENDATIONS FOR DECISION-MAKERS. Retrieved from https://wwfint.awsassets.panda.org/downloads/wwf_ndc_food_final_low_res.pdf, p.6. Please check this link to obtain a higher-resolution version of this diagram.

2.2. Food and Nutrition insecurity: a European overview

For human beings to be healthy, they need to nourish themselves. And to nourish themselves, they require that food is available in sufficient quantity and quality, at an affordable price, and diverse enough to meet all their nutritional needs in order to lead an active and healthy life. Food security is how societies ensure that each of their citizens has the opportunity to meet these needs⁴.

The opposite of food security is food insecurity, which is understood as an outcome of social and economic processes that result in a lack of food availability. This issue is a global concern, including in Western countries. According to the results of a global survey by the FAO (Food and Agriculture Organization of the United Nations), in 2020, one in three human beings did not have access to healthy and nutritious food. In its latest report, the GNAFC (Global Network Against Food Crises) observes that food insecurity has been on the rise worldwide since 2017. The COVID-19 pandemic has exacerbated this situation, including in countries that are typically less affected by malnutrition, such as EU member states, particularly in the regions of the Mediterranean, central, and eastern Europe. Between 2018 and 2020, a total of 59.7 million people suffered from moderate to severe food insecurity across the entire European continent. Furthermore, in 2019, within the EU itself, it was estimated that more than thirty million people could not afford a quality meal every other day, accounting for 6.7% of the population.

The factors that contribute to food poverty vary depending on the context. While in developing countries, problems are related to all four traditional conditions—availability, accessibility, usability, and stability of food—in developed countries, food-related issues are primarily linked to economic conditions and the transformation of poverty into a multidimensional phenomenon, as well as the proper utilization of food. In wealthy nations, food problems do not stem from a shortage of available resources but rather from their unequal distribution. This phenomenon is known as the "paradox of scarcity within abundance" (Campiglio and Rovati, 2009⁵), where certain segments of the population cannot access sufficient resources for sustenance despite the overabundance of food in their environment.

⁴ The 1996 World Food Summit established that Food Security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This widely accepted definition emphasises the multidimensional nature of food security, encompassing the level and stability of food access and availability, as well as the adequacy of food use and nutritional status.

⁵ Campiglio L., Rovati G. (2009). *La povertà alimentare in Italia: prima indagine quantitativa e qualitativa*. Guerini e associati, Milano.

There are social situations of marginalization that have similar consequences in all countries, so food insecurity may vary in terms of quantity and the number of affected people but does not differ in terms of quality. There are households and age groups constantly at risk everywhere, such as isolated mothers, which can lead to issues like stunted growth and underweight children. Situations like the Ukrainian war, which drive inflation and food prices across all of Europe, affect people's ability to purchase food and particularly increase the pressure on low-income households. In essence, food insecurity is fundamentally a socioeconomic problem.

2.3. Right to food

In response to these inequality situations, the concept of the "**right to food**" has emerged. It is defined by the CESCR (Committee on Economic, Social, and Cultural Rights, a body of the UN) as follows: "*The right to adequate food is realized when every man, woman, and child, alone or in community with others, has physical and economic access at all times to adequate food or means for its procurement.*"⁶.

While the discussion about the Right to Food dates back quite far, in recent years, the right of every person to have access to healthy and nutritious food has been increasingly reaffirmed, in line with the right to proper nutrition and the fundamental right of every human being not to suffer from hunger. In 2015, the United Nations adopted **the 2030 Agenda**, where the second goal is "Sustainable Development - Zero Hunger by 2030," with the ambitious aim of ending world hunger by 2030.



⁶ UN Committee on Economic, Social and Cultural Rights (CESCR), *General Comment No. 12: The Right to Adequate Food (Art. 11 of the Covenant)*, 12 May 1999, available at: <https://www.refworld.org/docid/4538838c11.html>.

Fig. 4 – UN SDG2 logo

The "right to food" is different from the "right to be fed." It is the right to be fed with dignity and **without creating dependency**. Individual needs should and can be met through individual efforts and individual and collective resources, meaning that everyone must have the conditions that allow them to produce food and/or purchase food, including access to land, seeds, water, money, markets, and more.

The right to food is **an inclusive right**, encompassing not only the right to a minimum calorie and nutrient ration but also all the nutritional elements a person needs for an active and healthy life, along with the means to obtain them fully. It is **a human right** that is interdependent, interrelated, and indivisible from other human rights such as health, education, life, water, housing, information, etc. Importantly, it is **a non-negotiable right**.

2.4. Beyond Europe: The Concept of Food Sovereignty

Around the same time as the FAO World Food Summit in 1996, the global movement of peasants and rural people, Via Campesina, declared that **Food Sovereignty** is the fundamental precondition for real Food Security and that the Right to Food can be the tool to achieve it (Document WFS 96/3, FAO, Rome, 1996). Today, Food sovereignty is recognized in national and international law, albeit with certain limitations (e.g., *land grabbing*).

According to the Nyeleni 2007 Declaration, "*Food Sovereignty is the right of peoples to healthy and culturally appropriate food produced through socially just, ecologically sound, and sustainable methods, and their collective right to define their own policies, strategies, and systems for food production, distribution, and consumption.*"⁷ It aims to shift control of the food system from corporations and market institutions (which currently have a strong hold on it) to local populations who produce and consume these food products. Food Sovereignty is generally seen as a concept that promotes an alternative model of agriculture and fisheries, trade, and market policies through practices that ensure **safe and sustainable food** in the long term, both from health and environmental perspectives.

⁷ Nyéléni. (2007). *Declaration of Nyéléni*. Retrieved from <https://nyeleni.org/IMG/pdf/DeclNyeleni-en.pdf>

While the concept of Food Sovereignty is not without criticism, it illustrates that other approaches to local and global food systems can exist, emphasizing principles other than the pursuit of profit. As we will see in the next chapter, the concept of sustainable food aligns with the goal of making food accessible to as many people as possible in a socially just and environmentally responsible manner.

Exercise 2: Understanding the intricacies of the food system	
Pre-requisites	Having closely observed and understood the HLPE diagram in the section 2.1
Time	1 hours
Tools	Pen and paper
Objectives	1. Understand the complexity of the food system and the interconnectedness of its components.
Instructions	
<ul style="list-style-type: none"> • Step 1: Choose one of the following scenarios: <ol style="list-style-type: none"> a. <i>"Overnight, all humans became vegetarians. No one wanted to consume animal products anymore."</i> b. <i>"After a series of diplomatic tensions, a war finally broke out in Distantland. Overnight, the prices of the most common fertilizers on the market skyrocketed, leading to a significant increase in the cost of plant-based products."</i> c. <i>"Following an exceptionally strong solar eruption, terrestrial telecommunication networks (including the Internet) ceased to function. Restoring them will take months, if not years."</i> d. <i>"A revolution erupts in the heart of one of the world's largest oil-exporting countries, causing fuel prices to soar."</i> • Step 2: Take the HLPE diagram that we saw in section 2.1. What consequences would the scenario you have chosen to have on the food system? First, identify in the diagram where your main factor is (is it in the production process? In the consumer behaviour? etc.). Then, imagine as many consequences as possible for the following points: <ol style="list-style-type: none"> a. Food supply chains <ol style="list-style-type: none"> i. Production systems ii. Storage and distribution iii. Processing and packaging iv. Retail and markets b. Food Environments <ol style="list-style-type: none"> i. Availability and physical access ii. Affordability iii. Advertising 	

- iv. Food quality and safety
- c. Consumer behaviour
- d. Diets
 - i. Quantity
 - ii. Quality
 - iii. Diversity
 - iv. Safety
- e. Impacts
 - i. Social
 - ii. Economic
 - iii. Environmental

- Step 3: Finally, imagine you are a leading politician of your country. What are the three main decisions you would take to manage the consequences of the fictional scenario?

1. _____

2. _____

3. _____

CHAPTER 3: Investigating the Intersections of Food, Health, and the Environment

3.1. Introduction: The ecological footprint of industrial food

Two studies “*Enhancing NDCS for food systems*”, published in August 2023 by WWF, UNEP and Climate Focus, and “*Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets*”⁸ published in November 2022 by the journal Science have reached the same conclusion: the food system – that refers to all the activities linked to products growing, harvesting, processing, packaging, transport, sale, consumption and finally to the management of produces waste – significantly pollutes the planet.

According to the first of these two studies, the agriculture and the use of soil and forests are responsible for about **24% of the global greenhouse gas emissions** – against 25% generated by electricity and heat production, 21% by the industry, 14% by the transports and 16% by the buildings and other energetic uses (IPCC, 2014).

⁸ Clark, M. A., Springmann, M., Hill, J., Tilman, D., & Fraser, H. (2020). Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets. *Science*, 370(6517), 705-708. Retrieved from: <https://www.science.org/doi/full/10.1126/science.aba7357>

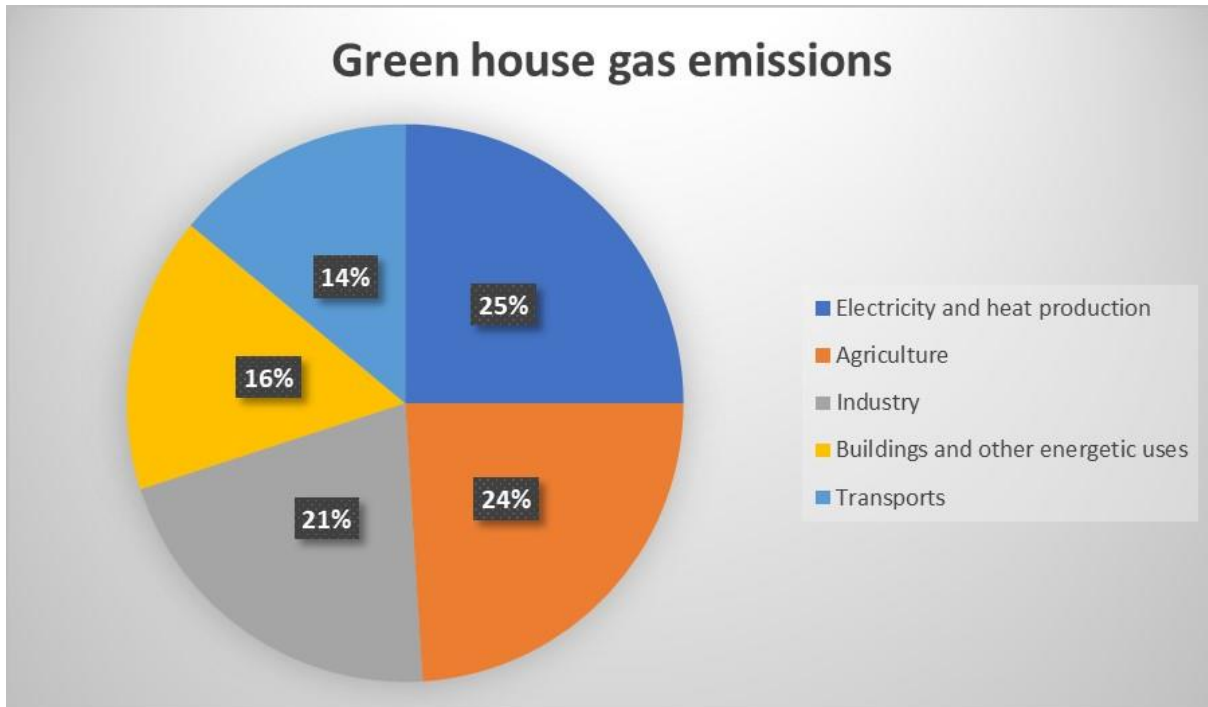


Fig. 5 – Greenhouse gas emissions

However, if we consider the *entire* food system, so including the emissions arising from agriculture and use of soil, transport, packaging, processing, detail sale and consumption, including food wastage and generated waste, it is responsible for **from 21% to 37%** of the human-caused greenhouse gas emissions each year. These figures raise the question to know why the food system have such an impact on the environment.

Intensive Agriculture is a system of agricultural intensification and mechanization aimed at maximizing land yields through various means, such as the extensive use of pesticides and chemical fertilizers. This intensification and mechanization have also been applied to livestock farming and aquaculture, where animals are raised indoors and in special tanks. This is what we refer to as industrial agriculture and farming.

While these industrial agricultural practices have allowed for increased food production at lower costs, thereby helping to feed a growing human population (while preventing the need to convert more land into farmland), they have become one of the largest global environmental threats due to factors such as:

- **The use of chemicals:** Conventional agriculture relies heavily on chemical pesticides and synthetic fertilizers, which can leach into water sources, degrade soil health by depleting organic matter, and have detrimental effects on ecosystems, including non-target species, pollinators, and soil organisms.
- **Land Use and Deforestation:** Conventional agriculture often involves large-scale monocultures, which require extensive land clearing. This contributes to deforestation and habitat destruction, leading to the loss of biodiversity and disruption of ecosystems. The conversion of natural habitats to agricultural land also reduces the planet's capacity to absorb carbon dioxide, exacerbating climate change.
- **Greenhouse Gas Emissions:** Conventional food production contributes to greenhouse gas emissions, primarily through the use of synthetic fertilizers, livestock emissions, and energy-intensive machinery. Furthermore, with economic globalization, many food products involve assembly that spans multiple countries and tens of thousands of kilometers of transportation. Finally, food waste in landfills generates methane, a potent greenhouse gas.
- **Genetic Diversity Loss:** Conventional agriculture often favors a limited number of high-yielding crop varieties, leading to a loss of genetic diversity, which impoverishes local producers and weakens biodiversity.
- **Food waste:** Intensive production depletes agricultural land. Food produced and not consumed occupies 30% of cultivated land on its own. Food waste can be observed at all stages of the food chain, from production to consumption.

Moreover, there is an impact on human health: Through the industrialization of staple products like flour, sugar, oils (by removing fiber, wheat germ, heating oils, etc.), products become nutritionally depleted, resulting in decreased vitamin and fatty acid content and the presence of toxic substances.

The impact of all these elements on the environment is calculated using the concept of "environmental footprint," which we will explore more in depth in Module 3 of this course.

In summary, intensive agriculture kills beneficial plants and insects, degrades, and depletes the soils it relies on, leads to the runoff of polluted water, increases the risk of flooding, causes genetic erosion of crops and species worldwide, reduces biodiversity, destroys natural habitats, and significantly contributes to the accumulation of greenhouse gases in the atmosphere. These environmental impacts underscore the need for more sustainable and regenerative approaches to food production that prioritize biodiversity conservation, soil health, water conservation, reduced chemical inputs, and lower carbon emissions. Transitioning to more sustainable agricultural practices can help mitigate these environmental impacts and promote a healthier and more resilient food system. As we will see in the following sections, organic farming and sustainable food systems constitute potential solutions to the issues raised by industrial farming.

3.2. What is organic food?

The term "organic" refers to a food or product that comes from organic farming. The mode of agricultural production is natural and does not use any synthetic chemicals, such as pesticides, chemical herbicides, artificial fertilizers, or growth hormones. According to the FAO, organic farming contributes to food security, mitigates the effects of climate change-related issues, protects biodiversity and sustainable food, enhances nutritional sufficiency, and promotes rural development by generating income and employment in less-developed areas.

Organic farming is closely related to agricultural policies that determine choices regarding exports and imports, hence economic, environmental, and social objectives. However, from a social perspective, organic food is not as precise as sustainable food.



Fig. 6 – EU organic logo

From a commercial perspective, for a product to be considered "organic," it must be certified by an official label. However, a product can be certified organic even if it comes from a distant region of the world and has travelled thousands of kilometers using **polluting transportation methods**. Labelling also does not guarantee the **working conditions** of the labour force. Therefore, having an "organic origin" label does not necessarily ensure that its origin can be considered sustainable.

3.3. What is a sustainable food system?

According to the FAO⁹, a sustainable food system (SFS) is a food system that delivers food security and nutrition for all in such a way that the economic, social, and environmental bases to generate food security and nutrition for future generations are not compromised. This means that:

- A sustainable food system is profitable throughout (*economic sustainability*).
- A sustainable food system has broad-based benefits for society (*social sustainability*); and
- A sustainable food system has a positive or neutral impact on the natural environment (*environmental sustainability*)

⁹ Food and Agriculture Organization of the United Nations. (2018). *Sustainable food systems: Concept and framework*. Retrieved from <https://www.fao.org/3/ca2079en/CA2079EN.pdf>, p.1.

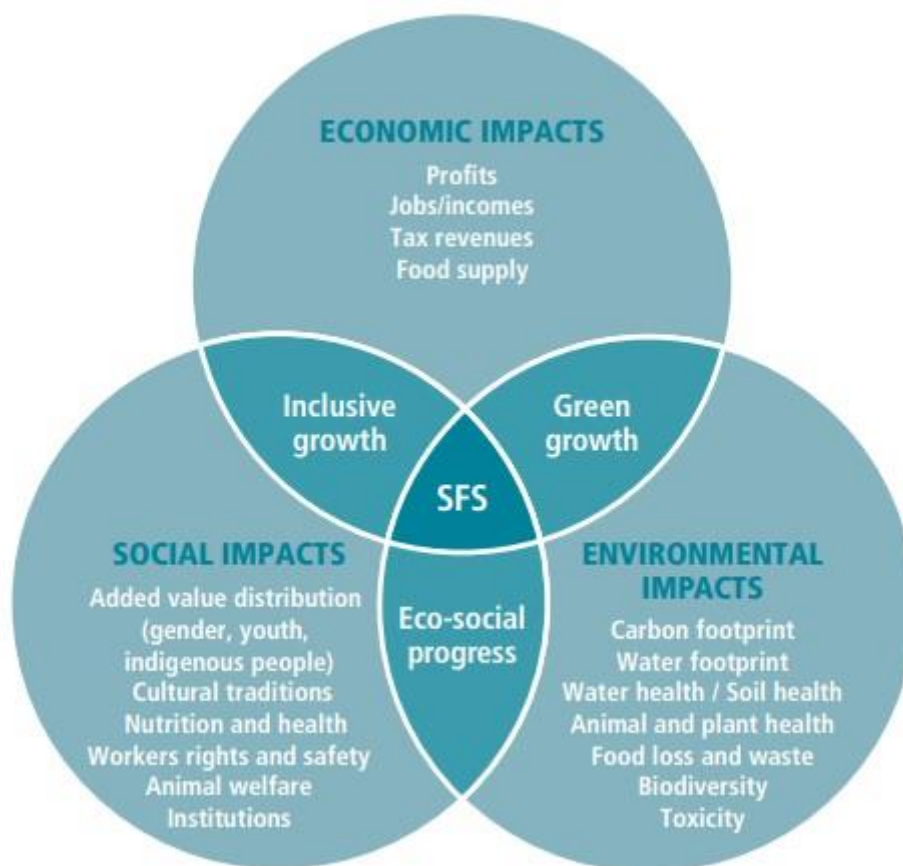


Fig. 7 – Sustainable food system¹⁰

Moving towards a sustainable food system implies reorganizing the food cycle into a more circular one:

¹⁰ Food and Agriculture Organization of the United Nations. (2018). *Sustainable food systems: Concept and framework*. Retrieved from <https://www.fao.org/3/ca2079en/CA2079EN.pdf>, p.4.

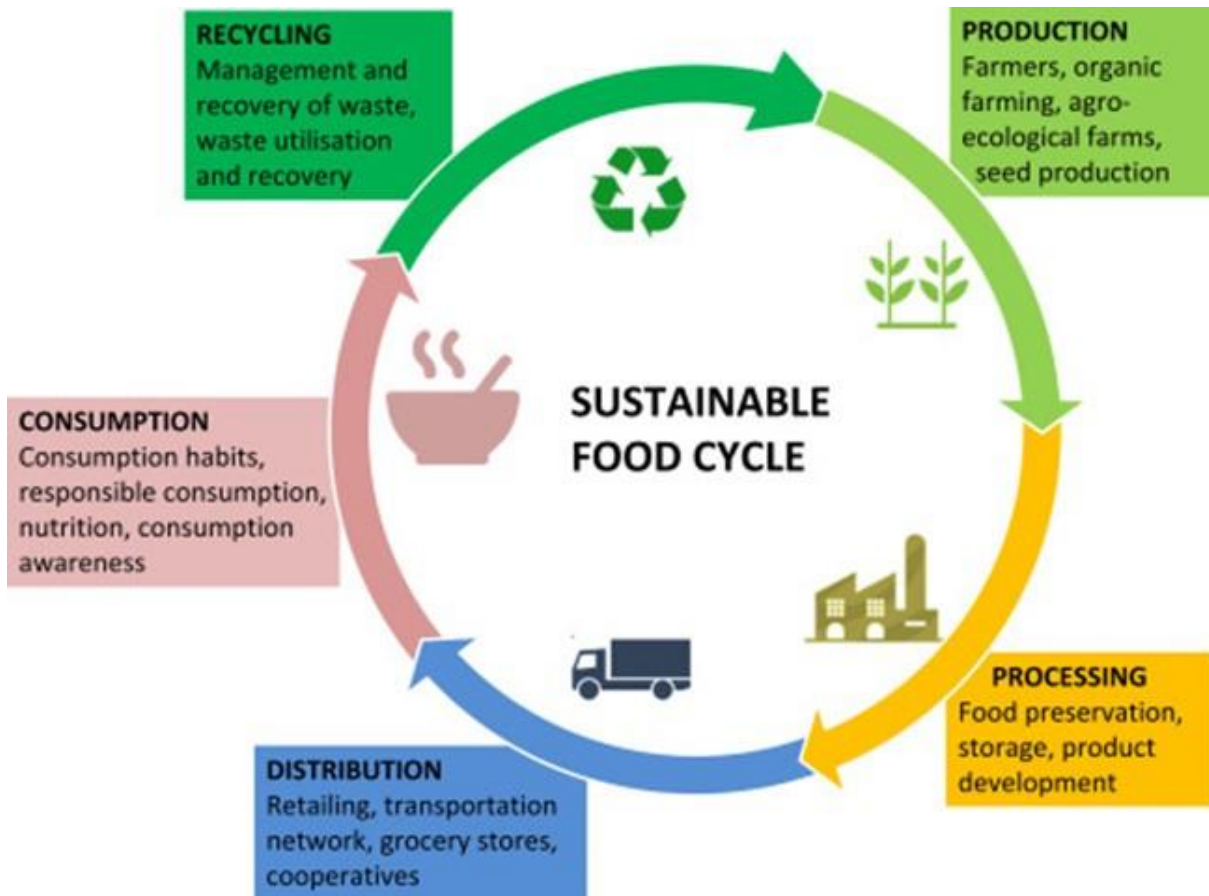


Fig. 8 – Sustainable food cycle

These changes can begin at the scale of small businesses. In fact, adopting sustainable food practices can be beneficial for the economic growth of such businesses. We will delve deeper into the philosophy of the circular economy in Module 2 of this training.

3.4. Why should we adopt sustainable food practices in the food industry?

Overall, sustainable food practices are vital for businesses in the food industry to meet consumer expectations, comply with regulations, achieve cost savings, build resilience, drive innovation, ensure long-term viability, and engage stakeholders. By embracing

sustainability, businesses can create value not only for themselves but also for the environment and society as a whole.

- **Consumer Demand:** There is a growing demand for sustainable and environmentally friendly products among consumers. By adopting sustainable food practices, businesses can meet this demand, attract environmentally conscious customers, and enhance their brand image and reputation in a rapidly changing business landscape.
- **Regulatory Compliance:** Governments and regulatory bodies are implementing stricter regulations and standards related to sustainability and environmental impact.
- **Cost Savings:** Implementing sustainable food practices can lead to cost savings in the long run. Energy-efficient equipment, waste reduction measures, and sustainable sourcing can help lower operational costs, improve efficiency, and reduce waste disposal expenses.
- **Supply Chain Resilience:** Sustainable food practices promote stronger and more resilient supply chains. By diversifying sourcing, supporting local and regional producers, and prioritizing sustainable agriculture, businesses can reduce dependence on fragile global supply chains and enhance their ability to withstand disruptions.
- **Innovation and Competitive Advantage:** Embracing sustainable food practices encourages businesses to seek innovative solutions and adopt cutting-edge technologies. This drive for innovation can lead to the development of new products, improved processes, and more efficient operations.
- **Stakeholder Engagement and Collaboration:** Embracing sustainable food practices allows businesses to engage with stakeholders, including suppliers, customers, employees, and communities. This engagement can lead to new business opportunities, increased customer loyalty, and stronger relationships with stakeholders.

In the rest of our training, we will explore various ways to implement sustainable food practices in a business. For the remainder of this chapter, we will focus on the individual scale, specifically the contents of our plates, through the concept of a sustainable diet. Indeed, beyond the societal dimension, our individual dietary habits can also have an impact on our environmental footprint.

3.5. The sustainable diet

In recent years, we have been faced with a new challenge: how to align human health with the health of the planet?

While the questions are straightforward, the answers are not. Are we eating too much meat? What is the right quantity? Are dairy products good for our health? And for the planet? Should humans have a predominantly plant-based diet? Should it be the same everywhere? What about fish? And what are the consequences for the environment?

a) What is a sustainable diet?

The FAO defines sustainable food consumption as: "*Sustainable diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.*" Below is a summary of the key elements of a sustainable diet:

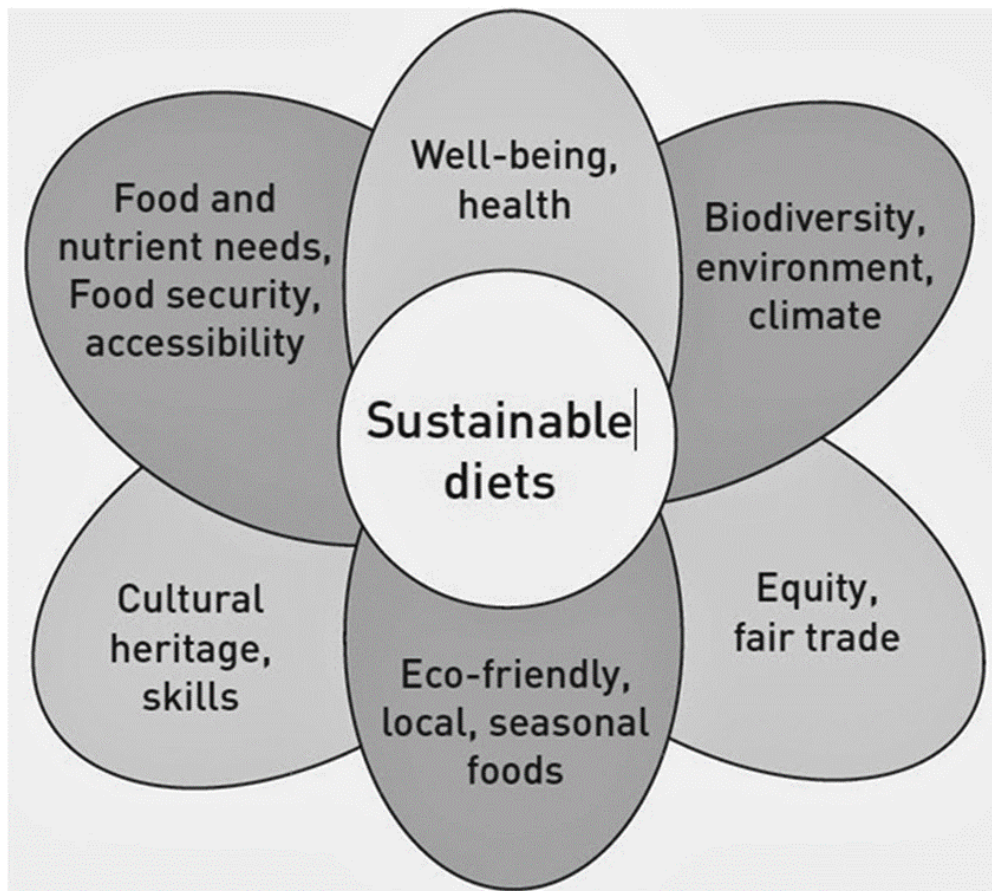


Fig. 9 – Key elements of a sustainable diet¹¹

Talking about sustainable food is addressing the question of access to quality food that respects health, the environment, and humanity. However, there is no official European certification for "sustainable" food. Here are the principles of sustainable consumption:

1. **Fight food waste**, which involves using appropriate storage techniques for products, using leftovers in the fridge, cooking whole vegetables, and more.
2. **Buy local and seasonal products**, prioritize local producers, and consume

¹¹ Burlingame, B., Dernini, S. (Eds.). (2010). *Sustainable diets and biodiversity: Directions and solutions for policy, research, and action. Proceedings of the International Scientific Symposium Biodiversity and Sustainable Diets United Against Hunger*, Nutrition and Consumer Protection Division, FAO. Retrieved from <https://www.fao.org/3/i3004e/i3004e.pdf>, p.34.

- seasonal fruits and vegetables through short supply chains.
3. **Favor plant-based proteins**, which means consuming more grains and legumes and reducing meat consumption.
 4. **Choose high-quality fats** and use cold-pressed **vegetable oils**, eat fatty fish, and more.
 5. **Use and consume whole or semi-processed products** such as grains, pasta, rice, and artisanal bread.
 6. **Use fresh, unprocessed products**, which means buying non-industrial vegetables, meats, fish, etc., and taking the time to cook them.
 7. **Eating homemade dishes** helps avoid processed, industrial products that are detrimental to health and enrich agro-food industries.

b) The benefits of a sustainable diet

Consuming sustainably and making responsible food choices require changes in habits. Sustainable food has benefits at different levels: health, social, environmental, and economic.

- In terms of health, our diet has evolved significantly in recent decades. Industrial, processed food bought in supermarkets has contributed to the development of diseases like obesity, cardiovascular problems, diabetes, and food allergies.
- From a social perspective, access to sustainable and quality food is a fundamental right that is not yet recognized for everyone. Several studies show that low-income households tend to choose less expensive, low-nutrient foods. The challenge of sustainable food is also to ensure that everyone has access to quality, healthy, and balanced food at socially acceptable prices. It is necessary to raise awareness and guide consumers toward socially responsible choices.
- Regarding environmental issues, sustainable food helps mitigate the negative consequences of industrial agriculture, as we discussed earlier.
- Economically, the right to sustainable food implies ensuring decent incomes for producers in both the Global South and the Global North. It means supporting economic actors who produce services based on local, ecological, and sustainable production.

c) What is a healthy diet?

Diet has a significant impact on health. An optimal diet leads to increased life expectancy, a significant reduction in the risk of chronic diseases, and improvements in gene expression. It is proven that a diet that is minimally processed, close to nature, and plant-based can prevent diseases, improve health, and align with different dietary approaches¹².

One of the most important international sources of information related to diet and nutrition is The Nutrition Source from the Harvard T.H. Chan School of Public Health. According to Harvard, a healthy diet is primarily plant-based, with half the plate consisting of fruits and vegetables, a quarter consisting of whole grains and their by-products, and a quarter consisting of proteins like beans, nuts, fish, and lean meats.

¹² Katz D., Meller, S. (2014), *Can We Say What Diet Is Best for Health?*, Annual Review of Public Health; 35:1, 83-103. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/24641555/>

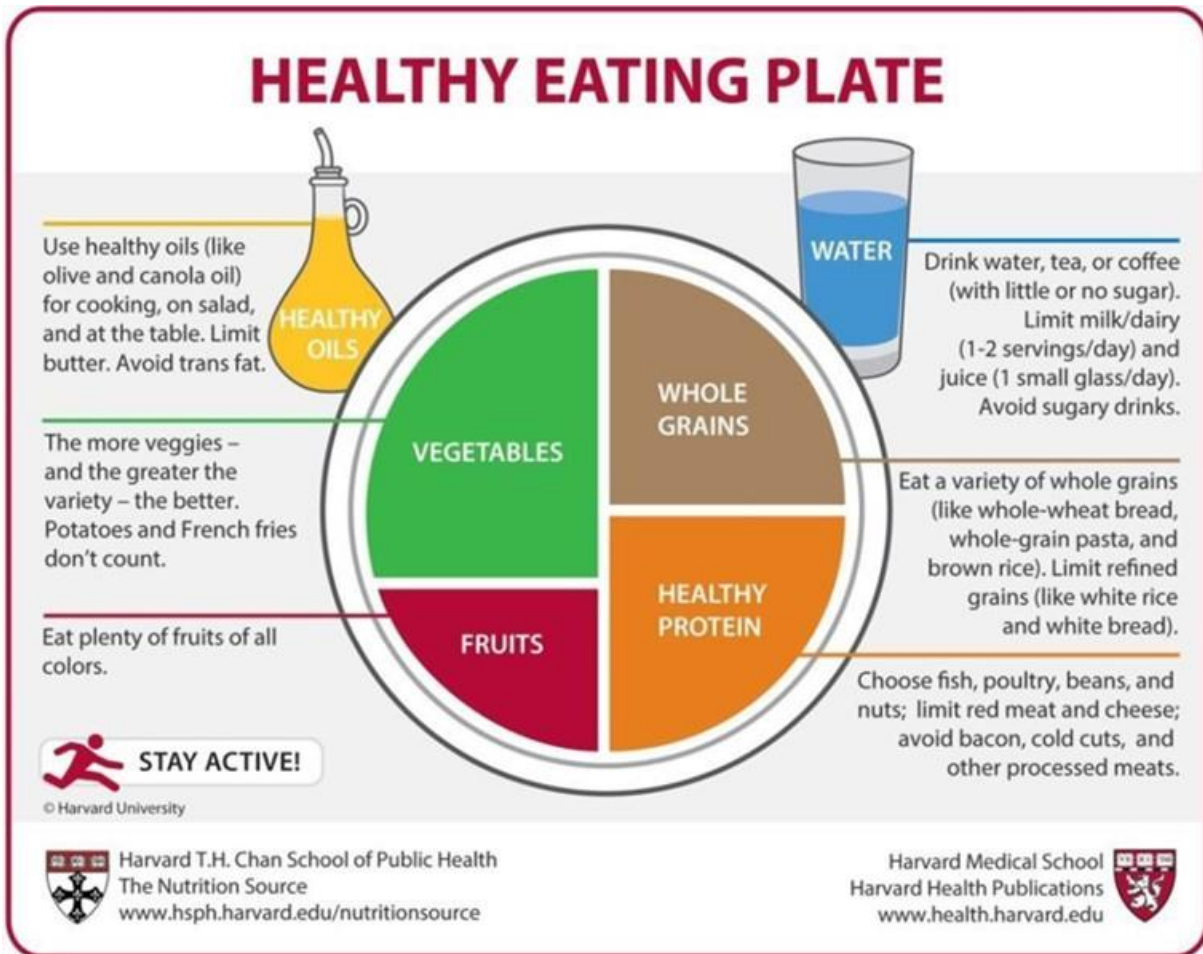


Fig. 10 – A healthy eating plate

Adopting a **diet low in meat** is an ideal solution for both our health and the planet. In fact, the main contribution we can make to combating climate change through changes in our diet is to substantially reduce the amount of meat we consume.

A report from the United Nations (UN) in 2010 stated, "A *substantial reduction of impacts* [on the environment] *would only be possible with a substantial worldwide diet change, away from animal products.*"¹³ According to the UN and the Food Climate Research Network

¹³ United Nations Environment Programme, & International Resource Panel (2010). *Assessing the Environmental Impacts of Consumption and Production: Priority Products and Materials - Summary*. <https://wedocs.unep.org/20.500.11822/8572>.

(FCRN) at the University of Oxford, current food systems and habits jeopardize food production and fail to adequately nourish the population¹⁴.

Another area of research¹⁵ explores dietary recommendations from both a nutritional and environmental sustainability perspective. The study compares six diets and concludes that **a vegan diet** is the healthiest and most environmentally sustainable, making it the most sustainable choice.

In its conclusions and to propose a compromise acceptable to the general public, the study suggests promoting **a strict Mediterranean diet**, which is based on plant-based foods, eggs, dairy, fish (twice a week), and meat (on occasion).

d) Sustainable and healthy: the Mediterranean diet

Thus, at this point the best choice could be the Mediterranean Diet, a sustainable diet model for the environment and health. It is based on foods traditionally consumed in the Mediterranean: pasta, bread, legumes, lots of vegetables and fruits, little meat, fish, cheese, eggs, olive oil. It is also scientifically proven that it reduces the risks of cardiovascular disease, obesity, diabetes.

On the basis of the findings that correlate food and the environment, the same food pyramid of the Mediterranean diet can be read backwards to illustrate how the environmental impact of foods that are good for health (placed at the base of the food pyramid) is lower, while the impact of the consumption of foods most harmful to health (top of the food pyramid) is the highest.

¹⁴ Gonzalez Fischer C., Garnett T. (2016) *Plates, pyramids, planet Developments in national healthy and sustainable dietary guidelines: a state of play assessment*. Food and Agriculture Organization of the United Nations and The Food Climate Research Network at The University of Oxford. Retrieved from <https://www.fao.org/3/I5640E/i5640e.pdf>.

¹⁵ Van Dooren C., Marinussen M., Blonk H. et al. (2014), *Exploring dietary guidelines based on ecological and nutritional values: A comparison of six dietary patterns*, Food Policy, Vol. 44. <https://doi.org/10.1016/j.foodpol.2013.11.002>.



Fig. 11 – Food pyramid proposed at the first world conference on the Mediterranean Diet as a healthy and sustainable model.

The Mediterranean diet, as well as being certified by UNESCO for its cultural value, is now also recognized as a model for sustainable development.

The principles of sustainability on which the Mediterranean diet is based are essentially linked to the fact that producing fruits, legumes, vegetables, and cereals requires a use of natural resources and greenhouse gas emissions lower than the production of meat and animal fat.

It is estimated that, in order to obtain one hundred calories, the Mediterranean diet has an environmental impact of about 60% lower than a diet based to a greater extent on meat and animal fat, such as the northern European diet.

Also, the themes of seasonality, consumption of local products and biodiversity are concretely translated into sustainable behaviours such as the reduction of crops in greenhouses, zero transport costs for incoming goods from distant countries or crop rotation.

In addition to environmental benefits, a sustainable diet must also bring health, economic and social benefits.

The first are soon said. The adoption of dietary models and lifestyles such as the Mediterranean one improves the state of health resulting in a reduction in national health spending. Not only: by favouring seasonal and low-cost ingredients (such as legumes and cereals), "Mediterranean spending" is also economic for families.

The consumption of local and seasonal raw materials, therefore, involves the enhancement of companies and territories with the relative gastronomic offer. Among the social benefits, in addition to health, food awareness and the link with the territory, the Mediterranean diet promotes social integration. Given the positive effects on the social, economic, and environmental spheres, this can be considered a highly sustainable model and therefore choose the Mediterranean diet, marrying its lifestyle in its entirety, means to become aware of the planet and take care of it.

Exercise 3: Healthy and sustainable menu	
Pre-requisites	Knowledge of the bases of healthy diet and sustainable diet.
Time	2 hours
Tools	Pc, internet connection, optional kitchen tools
Objectives	<ol style="list-style-type: none"> 1. To recognize factors, habits and food choices influencing our health, our planet, and our community. 2. To be informed about alternative ingredients and unconventional food. 3. To recognize well balanced diets according to nutritional needs. 4. To recognize proper information about health and nutritional food.
Instructions	
<p>After reading the module and the suggested links about healthy and sustainable diet, create a menu.</p> <p>Create and optionally cook a menu according to your country with both sustainable and healthy ingredients composed of 4 starters, 4 main courses, 4 "desserts".</p> <p>All the ingredients and cook techniques must be healthy and, according to the country, as more sustainable as possible.</p>	

CASE STUDY

Host table Foresto



Fig. 12 – Picture of the FORESTO restaurant

The main objective is promoting the use of local and seasonal products and to develop civic awareness.

In 2017, the Brussels asbl For.e.t., desirous to be an active player in sustainable food, decided to open a neighbourhood restaurant offering menus and products using essentially food of short circuits to promote agriculture, reasonable and sustainable farming, and local producers.

The host table is working to avoid food waste: reduced card, unpacked fresh food, minimum storage, no processed or industrial product. In order to reduce energy consumption, the association has also promoted a low-fitted kitchen.

With this project, Foresto also organizes work training for a public excluded from the employment market, mostly from sub-Saharan Africa and automatically far away from the European eating habits. By this training, and thanks to the restaurant, the project combines employment creation, learning, and development of sustainable food.

The key points of the project are:

- Support to small local producers (farmers, cooperatives, Belgian breweries).
- Financial profitability: turnover allows to cover expenses and provides a financial bonus.
- Limit consumption of fossil fuels: low consumption of electricity and gas, little storage space.
- No waste: fresh products in bulk, rotation of the food so no loss, orders limited to weekly consumption.
- Job creation for a vulnerable public excluded from the labour market.

The impact of the project at several levels:

- Development of a social economy project.
- Outreach to the customer to the theme of sustainable and local food.
- Commitment of little qualified staff excluded from the labour market.
- Use of fresh and seasonal products processed in-situ.
- Establishment of a local area network (from producers to consumers).
- Suggesting a healthy diet with a net added value on the level of nutritional qualities.



Fig. 13 – Interior of the FORESTO restaurant.

To develop this project of social and sustainable economy model in other regions or countries, it is necessary:

- To find resources for the staff: supervisors and learners (for students, it is either necessary to seek approval from Government, or to establish partnerships with employment services).
- To find suitable premises, purchase materials and equipment (grants or private funds)
- To create a methodological program aimed at learners far away from the employment market and poorly trained learners, but also aimed at the commercial aspect to welcome properly the clients to the restaurant.
- To ensure the good management of the project (horeca, pedagogy, social control, management) properly human resources.

The partnership was developed as follows:

- Governments through labour contract targeting a disadvantaged public and the approval of the project.
- Local producers: Walloon farmers' cooperatives, organic brewers, Brussels bakers, etc.
- Customers are sensitive to the concept and the values.

Website: <http://foret-asbl.be/>



EXTRAS

5.1 Summary of the chapter

The SSPICE IT! training unfolds with an introductory chapter immersing readers in the realm of sustainable food. This module establishes a foundation by exploring critical themes like climate change, food system sustainability, and eco-friendly diets. It traces the historical evolution of human-nature relationships, laying the groundwork for understanding current sustainability challenges. The narrative delves into the repercussions of human activities, emphasizing the impacts of climate change on extreme weather, habitat loss, and biodiversity decline.

Chapter 2 shifts focus to societal challenges of food accessibility within the complex food system. It unravels the interconnectedness of sectors, exploring relationships between innovation, technology, and societal impacts. The potential consequences of AI-driven trucks on food accessibility are discussed, alongside an examination of food and nutrition insecurity in Europe. The chapter introduces the "right to food" concept, emphasizing dignity and independence in securing nourishment. Beyond Europe, it introduces food sovereignty as a precondition for real food security, advocating for socially just and sustainable food systems.

Chapter 3 delves into the intricate connections between food, health, and the environment, emphasizing the substantial environmental impact of the global food system. It scrutinizes industrial farming practices, such as intensive agriculture, for their contributions to greenhouse gas emissions and deforestation, posing threats to both the environment and human health.

The imperative for businesses in the food industry to adopt sustainable practices is underscored, citing reasons like meeting consumer expectations, regulatory compliance, and cost savings. The chapter culminates by addressing the challenge of aligning human health with planetary health through sustainable diets, presenting the Mediterranean diet as a model. It concludes with an exercise guiding readers to create a healthy and sustainable menu, encouraging proactive engagement in ecologically conscious practices. The overarching narrative aims to inspire positive change, fostering awareness of ecological issues and encouraging sustainable practices—one spoonful at a time.

5.2 Further readings

General documents:

- ✓ What is Climate change? By the United Nations – a nice introduction about the topic of climate change: <https://www.un.org/en/climatechange/what-is-climate-change>
- ✓ “The State of Food Security and Nutrition in the World 2023” by the Food and Agriculture organization of the United Nations – an update on global progress towards the targets of ending hunger and all forms of malnutrition: <https://www.fao.org/3/CC3017EN/online/CC3017EN.html>
- ✓ “Man, and the Environment: A General Perspective” by Nico Stehr – An history of the changing relations between human and nature, and man perception of it.
- ✓ “An inconvenient truth” by Davis Guggenheim - a documentary film exposing that sensibilize on pollution and climate change caused by man.
- ✓ “Les algues vertes (The Green Algae)” by Pierre Jolivet – a french film showing the repercussions of industrialized agriculture and pesticides/insecticides in Brittany.
- ✓ “What is Climate Change? | Start Here” by Al Jazeera English, a seven-minute YouTube video explaining the basics of climate change: <https://www.youtube.com/watch?v=dcBXmj1nMTQ>

Non-profit organizations:

- ✓ Greenpeace: Provide articles on climate change, human damages to the environment. Fight against ecosystems destruction, fossil energies across the world: <https://www.greenpeace.org/international/>
- ✓ Oxfam International: Produce resources on climate change and disasters and food inequalities. Promote social justice: <https://www.oxfam.org/en>
- ✓ Friends of the Earth Europe: fighting for social and environmental justice and an equal access to found while preventing ecological disasters: <https://friendsoftheearth.eu/>
- ✓ Food and Agriculture organization of the United Nations: A specialized agency of the United Nations that leads international efforts to defeat hunger: <https://www.fao.org/home/en>

Documentaries:

- ✓ Food Security - a Growing Dilemma (documentary): a 30 min documentary that address the future of an agriculture, food production along with sustainability and sovereignty concerns:
<https://www.youtube.com/watch?v=wu7PjKawjwI>
- ✓ Human Impact on the Environment : A playlist of short videos questioning the consequences of the human activity on our planet:
<https://www.youtube.com/playlist?list=PLL4ByIaW73wgSuZyfdxJUnhhOjDanFteu>
 - Other videos from National Geographic about climate change can be found there:
<https://education.nationalgeographic.org/resource/resource-library-climate-change/>

5.3 Glossary

FAO: The Food and Agriculture Organization of the United Nations (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger and improve nutrition and food security.

Green Deal: The European Green Deal, approved in 2020, is a set of policy initiatives by the European Commission with the overarching aim of making the European Union (EU) climate neutral in 2050.

HLPE: HLPE stands for the High-Level Panel of Experts on Food Security and Nutrition, which is a scientific panel established by the United Nations to provide guidance and policy recommendations on food security and nutrition issues.

UN: The United Nations (UN) is an intergovernmental organization whose stated purposes are to maintain international peace and security, develop friendly relations among nations, achieve international cooperation, and serve as a center for harmonizing the actions of nations.

WWF: The Worldwide Fund for Nature (WWF) is a Swiss-based international non-governmental organization founded in 1961 that works in the field of wilderness preservation and the reduction of human impact on the environment.

5.4 Acknowledgments

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