



WE, FOOD, OUR PLANET

Teaching Guide



Barilla
Center
FOR FOOD
& NUTRITION



CONTENTS

Page 3 • Introduction: We, Food, our Planet

Page 9 • Chapter 1. Food for a Sustainable Planet

Page 17 • Chapter 2. Food and People's Wellbeing

Page 23 • Chapter 3. Food and Culture

Page 32 • Chapter 4. Food and Migration

Page 40 • The MOOC "Sustainable Food Systems:
a Mediterranean Perspective"

Page 41 • BCFN Extension Notes

Page 42 • Essential bibliography

Page 44 • How to Access and Use the Materials

Page 48 • Afterword

This guide was created by Dr. Elena Cadel, Barilla Center for Food and Nutrition Foundation, with the contribution of Katarzyna Dembska, MD and Dr. Marta Antonelli, Barilla Center for Food and Nutrition Foundation.

Suggested quote:

*Barilla Center for Food & Nutrition Foundation, 2018. We, food, our Planet.
ISBN: 9788894399462*

Guide updated in September 2021





INTRODUCTION

We, Food, our Planet: that close bond has always been linked to human survival and wellbeing, but today it is also key to environmental protection. Food is a factor that brings together different elements, such as nutrition and ecology, and interacts with global balances in different ways, such as through its political and economic impact.

This educational project attempts to provide a comprehensive picture of food, moving away from a narrow perspective focused on food production alone and tackling the topics of environmental sustainability and ecology (Chapter 1), health and diet (Chapter 2), the world of cultural values, wealth and diversity (Chapter 3) and issues related to fairness and food security (Chapter 4).

“We, Food, our Planet” clearly explains the critical areas and the solutions we need in order to encourage a far-reaching and widespread transformation. This is a multi-dimensional challenge aimed at raising awareness in order to develop systems that will enable us not only to improve the way we produce, process, distribute and consume food, but also to develop a **new mindset**. Today, more than ever before, food can be thought of as a language to teach the values of **global citizenship**.

The food we eat can be used to explain current food management systems, the problems in the food system and its effects on the planet. But it can also be useful for discussing cultural diversities and backgrounds and to engage local communities in sharing and participating. The diet of the future belongs to those who take a global view and adapt their tastes and demands to meet the need to manage resources for everyone while still maintaining a connection with their own culture. Teachers can play a **key role in this context** by going beyond the boundaries of the traditional teaching model and encouraging pupils to understand complex, global topics and develop their **critical thinking**.

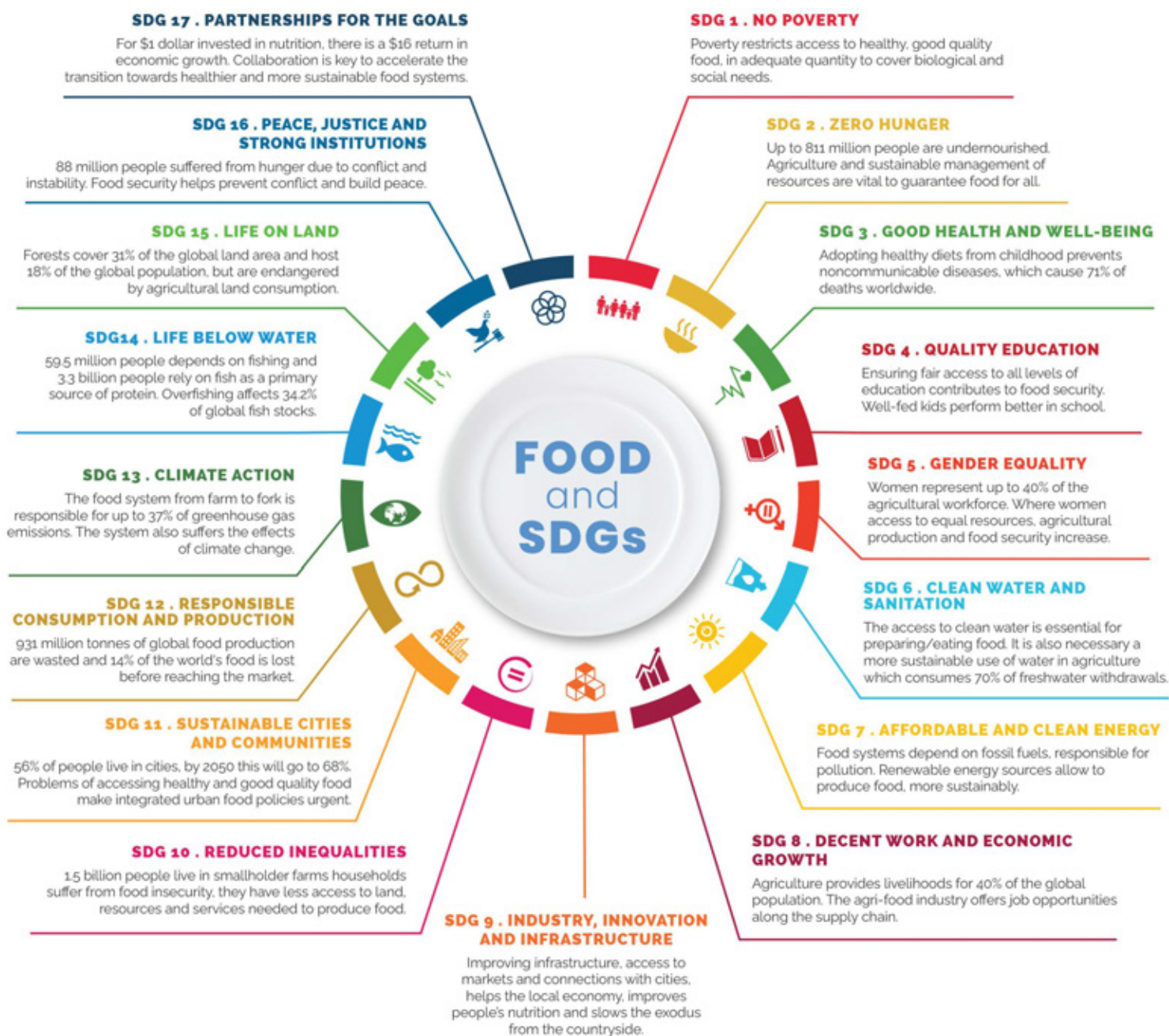
A framework of common objectives

Growing, distributing, processing and consuming healthy, safe and sustainable food is essential if we are to achieve the goals set by the 2030 Agenda for Sustainable Development, a plan of action for people, planet and prosperity, adopted in 2015 by 193 Member States of the United Nations. More specifically, the Agenda sets **17 Sustainable Development Goals (SDGs)** to create an extensive plan of action, which includes 169 targets. Food, nutrition and environmental protection are key elements of the programme, which can contribute both directly (e.g. SDG2 and SDG3) and indirectly (e.g. SDG10 and SDG13) to achieving the SDGs.



Food, nutrition and environmental sustainability constitute the reference framework of all BCFN initiatives. We need to take urgent action not only to find suitable solutions to climate change and promote sustainable agriculture, but also to improve nutrition in terms of access to safe and high quality food for everyone, and foster wellbeing in developing countries, while also tackling the phenomenon of food loss and waste.

Figure 1: The “wheel” model highlights how food and food systems are linked to all the SDGs.

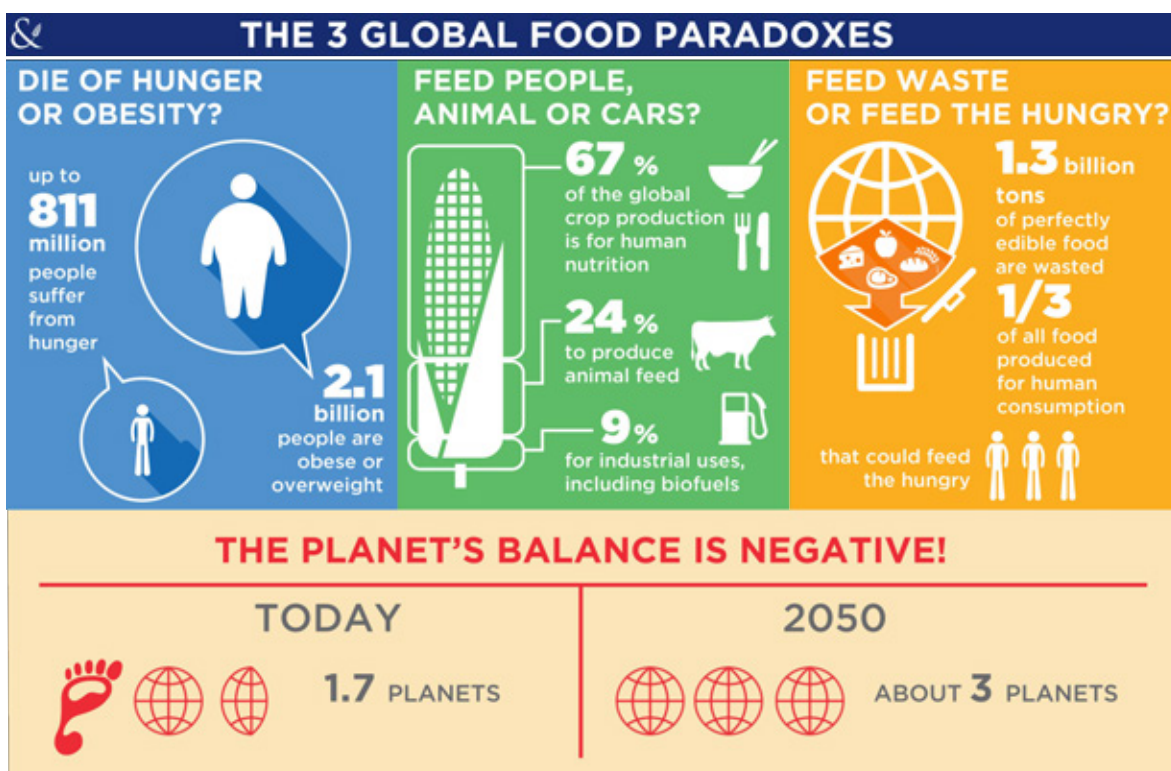




The 3 paradoxes of the global food system

The richest societies have never had so much food available as they have today. It is probably no surprise that nowadays, more people in the world fall ill and die from eating too much food than from hunger and privation. In fact, up to 811 million people throughout the world still go hungry, whereas over two billion are obese and overweight.

It is often said that by increasing production, we can find the solution to containing the problem of lack of food. However, we just as often forget to say that not all world's cereal production is actually used for human consumption. Over 30%, in fact, is produced to make biofuels and feed livestock. Lastly, as we seek new strategies to improve the balance and sustainability of this sector, we are wasting about 1.3 billion tons of food each year, which is lost along the production chain or at wasted at the end of the retail chain or thrown away directly from our tables. This adds up to one third of global food production, a significant figure, which would, in theory, be sufficient to feed tthe millions hungry today (between 720 and 811 million people). We therefore have to rethink our overall food system in order to address these paradoxes, not just for today's generations, but above all for those of the future.





#MoveTheDate WITH FOOD

ENERGY

Growing, processing, and transporting foods are energy demanding operations.

CITIES

The majority of food produced worldwide is consumed in cities.



FOOD

A healthy diet is a powerful lever for human and planetary wellbeing.



PLANET

Food production is an environmentally intensive process.



POPULATION

Food is a human right and necessary for growing populations to thrive.



Global Footprint Network®
Advancing the Science of Sustainability

www.footprintnetwork.org



EARTH
OVERSHOOT
DAY

www.overshootday.org



Barilla
Center
FOR FOOD
& NUTRITION

www.barillacfn.com



#MOVETHEDATE

IF WE HALVE



food **waste**

meat **waste**



EVERY YEAR

+11
days gained

+15
days gained



3 TIPS FROM THE BARILLA FOUNDATION

to save the planet when we choose what we put on our plate



INCREASE

our **plant-based food intake**: fruit, vegetables, cereals (especially wholemeal), dried fruit and legumes.



BUY

food in a **smart way**, deciding first what we want to eat: in this way, we will avoid waste.



EAT

animal protein in moderation.

REMEMBER:
**THE FOODS THAT ARE GOOD
FOR THE PLANET ARE ALSO GOOD
FOR OUR HEALTH**



CHAPTER 1: FOOD FOR A SUSTAINABLE PLANET

What is food sustainability?

The French translate sustainability with *durabilité*, a word which reminds us of duration - a concept that lies at the very heart of the meaning of sustainability. Let's imagine we have bought a lake full of fish and that the fishing licence sales are our sole source of income. How many can we sell a year? If we want to **secure sufficient earnings for our lifetime**, we will have to take great care not to exhaust our resources, i.e. the fish. That is sustainability: the characteristic of a process or state which can be maintained at a certain level for an infinite amount of time, keeping a constant balance between resources used and those consumed.

The experts consider food patterns **sustainable** when they have a limited impact on our planet's resources (e.g. water, land and air), and contribute not only to food and nutritional security but also to a healthy lifestyle for current and future generations (FAO, 2010). In other words, food can be considered sustainable when:

- it respects **biodiversity*** and the ecosystems,
- it is **affordable and accessible**,
- it uses natural resources and human capital appropriately,
- it is nutritionally healthy and safe,
- it is culturally acceptable.

There is no optimum diet without respect for our planet. Thus, food is sustainable when it respects the health of the individual, the environment and the economy.

The environmental impact of food.

Eating is a fundamental activity for mankind, and human survival closely depends on it. However, **food production has a significant impact** on the wellbeing of the planet, as livestock farming and agriculture are responsible for producing greenhouse gases, overexploiting our waters, polluting the soil and for deforestation, not to mention the problem of food loss and waste (see p.37).

Food waste is not just an ethical problem but also an environmental problem. For example, in 2017, **the greenhouse gas emissions associated with food losses and waste were estimated at 2.5 gigatons** which the emissions from post-harvest operations should be added to (Guo et al, 2020).



Globally, food systems account for between 21% and 37% of greenhouse gas emissions caused by humans (IPCC, 2019) and use 70% of our freshwater for irrigation (industry uses 22%, whereas 8% is for domestic use). At the same time, almost 38% of the earth's land surface is used for agriculture and livestock farming. About one-third of this is used as cropland, while the remaining two-thirds consist of meadows and pastures for grazing livestock. However, global cropland area per capita decreased continuously overtime², passing from about 0.45 hectare per capita to 0.21 hectare per capita. As the global population continues to grow, there is greater demand for food and concern for global food security (FAO, 2020).

How can we measure the impact of food on the environment?

There are various ways to calculate the impact of food on the environment, using specific indicators and analyzing the characteristics of the individual food chains, from the farming stage right through to cooking, if necessary. Of the existing assessment methods, **Life Cycle Assessment (LCA)** is that which has attracted the greatest interest, as it can calculate the impact of the entire food chain: from field to fork (e.g. cultivation, industrial processing, packaging, distribution and cooking). To make these studies easier to understand and communicate, **summary indicators** are used in order to provide a clear, overall picture of the environmental impact. In the case of agrifood supply chains, the significant impacts concern: **water, land and air**, and the indicators show greenhouse gas emissions, water usage and the land surface required to produce the resources.

- **The carbon footprint:** it represents the greenhouse gas emissions responsible for climate change and is measured in tonnes of CO₂ equivalent.³
- **The water footprint:** it calculates the volume of freshwater used directly and indirectly along the various stages of the chain to produce a given food. It distinguishes between the various sources (e.g. rainwater and groundwater have different values), the amount of water required to dilute pollutants and the abstraction site it was drawn from. It is measured in litres or cubic metres.
- **The ecological footprint:** it measures the amount of biologically productive land (or sea) area required to provide the resources and absorb the emissions associated with a given production system. It is measured in square metres or global hectares.

It is important to stress, however, that these three indicators offer only a partial view of the environmental impacts of food production, particularly at the local level, as they are unable to calculate other effects, such as the toxicity of fertilizers or Plant Protection Products (PPP).



2. Data framework: period between 1961 and 2016

3. **CO₂ equivalent:** is a unit of measurement that expresses the impact on global warming of a certain amount of greenhouse gas compared to the same amount of carbon dioxide (CO₂)

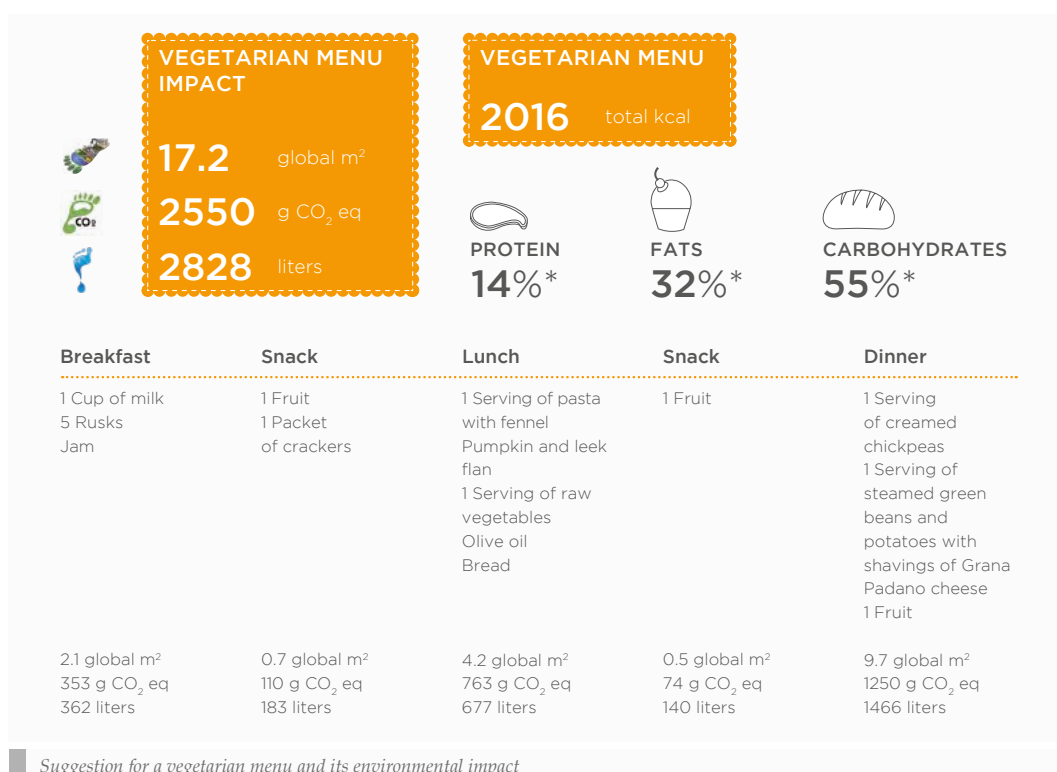
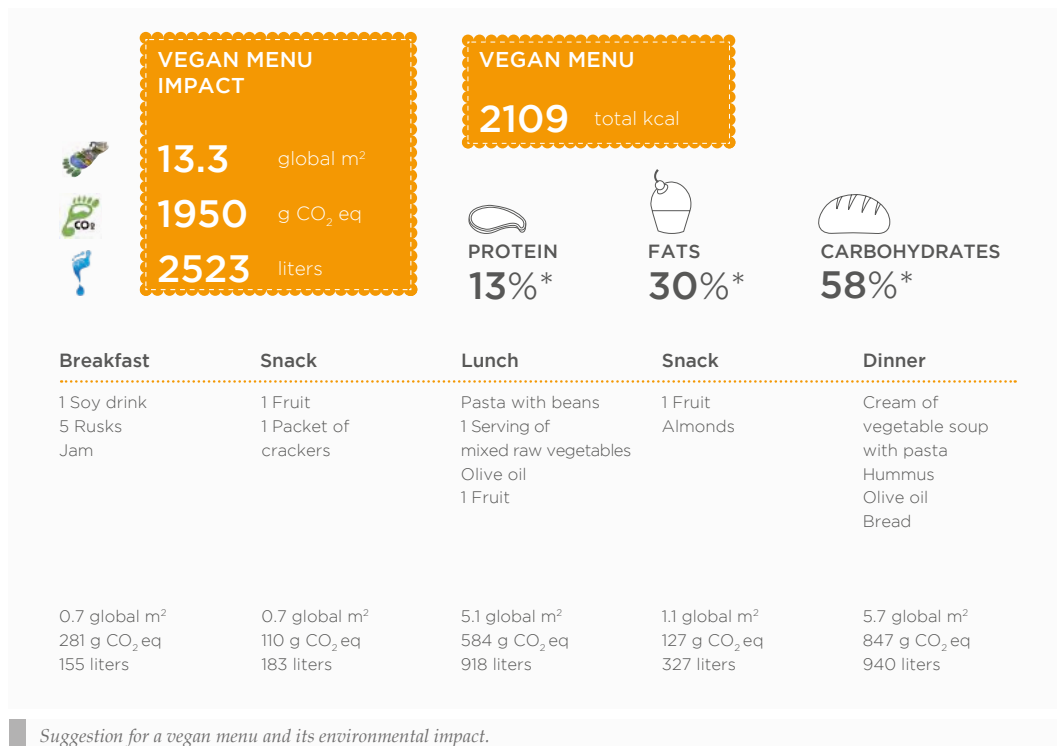


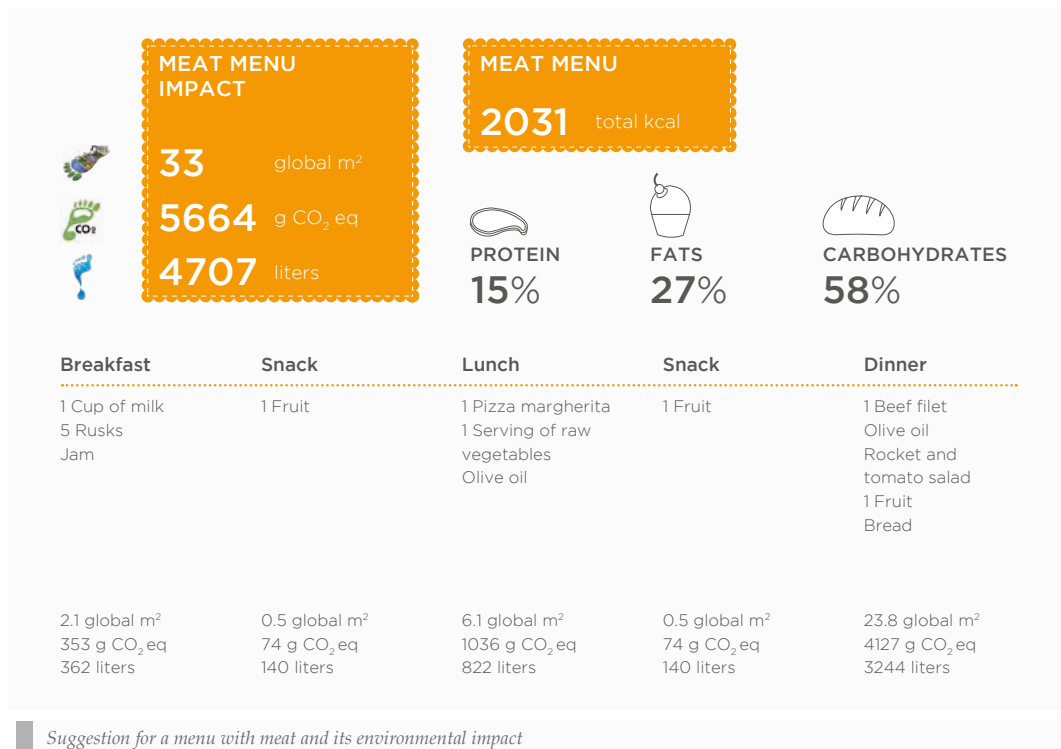
The water footprint

In the water footprint, water consumption for the production of goods or services is measured by summing the volumes of water used and/or polluted during the production stages of a given good or service. The term “**virtual water**”, on the other hand, refers to the fact that **most of this water is not actually found in the finished product itself, but was needed either directly or indirectly to produce it** through its entire life cycle. The type of water used (whether groundwater, surface water or rainwater) and the characteristics of the abstraction site (whether it is water-rich or water-poor) affect the impact of the water footprint. For example: 2,312 litres of water are required to produce a 150-gram portion of red meat, 477 litres for a 150-gram portion of cheese, 130 litres for a 100-gram sandwich and 50 litres for one tomato (*Hoekstra & Water Footprint Network, 2017*). Water is a vital commodity, but out of the total water resources, only 0.001% is fit, accessible as well as affordable for human consumption. Although it is a renewable resource, fresh, surface and underground water is a limited and vulnerable resource, and over 2 billion people in numerous countries across the world currently suffer from water shortage. As the global population continues to rise while resources are decreasing, **we need to produce more food using less water** per product unit. Likewise, we as citizens can help this process by choosing a diet with a smaller water footprint. For example, if we choose a sustainable and balanced diet by consuming meat only twice a week, we can save up to 980 litres of water a day (compared to diets that include meat every day).



Suggested menus and their environmental impact

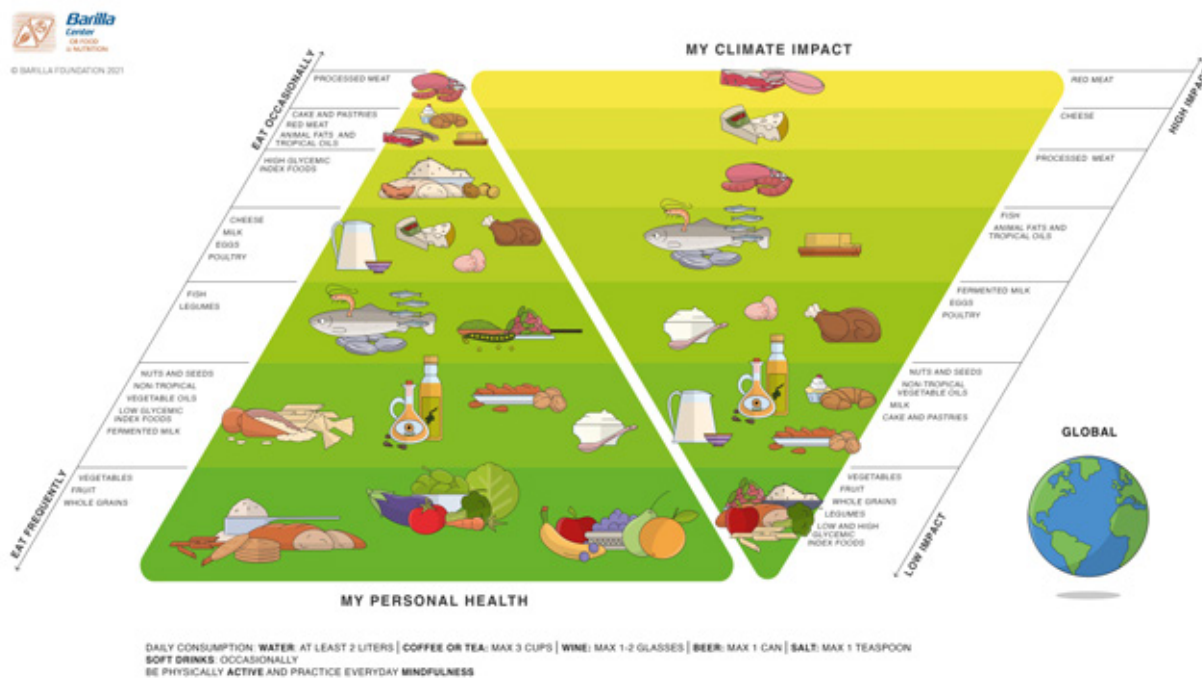




The double pyramid as a teaching aid

Nature never does things by chance, and the most highly recommended foods for our health are also those with the lowest environmental impact. The **Global Health and Climate Double Pyramid** (fig. 2) arose from the need to effectively communicate this intuition, providing an informational and educational tool for food choices. From a technical viewpoint, this graphic tool places a new Climate pyramid (upside down) alongside the Health pyramid.

Figure 2. The Global Health and Climate Double Pyramid





The **Health Pyramid** derived from a review of the scientific literature that correlates the consumption of certain foods by the adult population with the risk of contracting cardiovascular diseases. The perpetuation of incorrect food choices, in fact, can negatively affect the health and well-being of our cardio-circulatory system. **Within the health pyramid, the food that we should eat most frequently is shown in order of frequency, from bottom to top.** The message conveyed is that to prevent cardiovascular diseases and promote health, longevity and well-being, regardless of culture and geographical location, **human diets must be based above all on plant-based foods**, especially fruit, vegetables and whole grain cereals, which are at the bottom of the Health Pyramid. Conversely, the foods positioned at the top should be occasionally eaten, because they are rich in saturated fats and salt, and associated with a high cardiovascular risk.

The **Climate Pyramid** has been calculated according to the Life Cycle Assessment (LCA) method, using the anthropogenic greenhouse gas emissions (**Carbon Footprint**) as **indicator** (see page. 10). The LCA method determines the amount of greenhouse gas emitted considering the entire supply chain, from agriculture to distribution and consumption of a food, including cooking, whenever necessary. That creates an overall picture of the environmental impact of a food, which is expressed as the equivalent mass of carbon dioxide (CO₂ - eq). All the emissions from a particular food are converted into a CO₂ - eq value, as if the system emitted carbon dioxide only, using the fixed parameters established by the Intergovernmental Panel on Climate Change (IPCC).

To conclude, the Global Health and Climate Double Pyramid supports the message that through a varied and balanced diet we can improve our health, our longevity and our well-being, while reducing our carbon footprint. In fact, the foods that should be consumed more often for our health also have a low climate impact. The Double Pyramid shows that all the foods can be part of a healthy and sustainable diet (for this reason it has a green colour) but they should be consumed with the right amount and frequency. Finally, sustainable diets should reflect local tradition, culture and preferences.



Agriculture 5.0: a new way of thinking the future of agriculture⁴

Today, we are going through a major historical transition: the **fourth industrial revolution**, the main feature of which is the shift away from our dependency on oil and steam as our only sources of energy and towards electric power, and finally to the automation and digitalization of our production processes. Industry 4.0 is synonymous with Smart Factory, with the spread of production hubs, smart networks and the use of computer-aided design to optimize production lines. Agricultural methods must also follow this change, especially in the face of new demands resulting from exponential population growth, climate variability, the right to food, new lifestyles and the demand for non-traditional food. We therefore need **Agriculture 5.0**, to provide the necessary solutions for our generation to make another step forward. To achieve this, the following characteristics are required:

- **Interoperability:** in other words, agricultural production and processing centres must be connected within a network to optimize supply and demand by using new network technologies (e.g. the Internet of Things and the Internet of Services);
- **Decentralization:** to create a nationwide network of Smart Factories, especially in hinterland areas close to urban centres;
- **Cooperation:** to create interconnected production networks, capable of exchanging and sharing technological and marketing services;
- **Innovation:** to exploit cutting edge technologies for monitoring, climate forecasting, automation and resource efficiency improvement (for water, energy, fertilizers, pesticides, etc.) in order to reduce greenhouse gas emissions and create healthier products.

This is also the kind of agriculture that will enable the survival of young people, small companies and individual entrepreneurs, often the sole custodians of our regional biodiversity and typical local features, through the smart, sustainable and light-handed use of new technologies as well as human ingenuity, which have always been key in securing the future of our species (Valentini, 2016).



* **Key words: Biodiversity**

Bio (life) plus diversity (variety), biodiversity (or biological diversity) refers to the extraordinary variety of plants and animals living in nature, which interact with each other in their natural habitats and ecosystems. Biodiversity is not a fixed value, because the quantity of plant or animal species in the environment can increase or decrease over time, due to various factors, which can be natural and/or anthropic (i.e. caused by humans). There are three levels of biodiversity:

- **Genetic biodiversity:** the variety of genetic information carried by all the individual members of the same species.
- **Species or taxonomic diversity:** all the species (and the relationships between them) living in a particular region of the earth.
- **Ecosystem biodiversity:** all the natural environments in which life exists on our planet (e.g. forests, coral reefs, underground environments, deserts, and so on). The disappearance of these environments means that the species living there are at risk of extinction.

Biodiversity mitigates the risks for ecosystems, whether farmland, forests or the sea, and the loss of biodiversity contributes to food insecurity as it impoverishes the ecosystems and leaves them more vulnerable. In other words, they may no longer be able to withstand alone any sudden changes or upheavals, as in the case of climate change or natural disasters.



CHAPTER 2: FOOD AND PEOPLE'S WELLBEING

Food for a healthy life

To lead a healthy life, we need a **diet*** - i.e. a dietary pattern - that provides enough energy to maintain a balance between our intake of calories and the amount of energy we use. A correctly balanced diet must be rich in fruit, vegetables, cereals (preferably wholegrain), legumes and extra virgin olive oil, and should include moderate amounts of fish, white meat and dairy products, and very moderate amounts of sweet products and red meat. That provides us with the energy, fibre, micro-nutrients and proteins we need. On the other hand, we need to restrict (which does not necessarily mean eliminate) our intake of added sugar, salt, saturated fats and trans-fatty acids. Furthermore, a diet has to be varied to be considered healthy. That is, we need to eat a wide variety of foods from different food groups, in order to maximize our intake of all the essential nutrients.

(WHO, 2015)

As different parts of the world have different foods and different diets, any advice should always take into account the main agricultural and cultural practices in any specific context and favour locally available products.

Mediterranean countries, such as Italy, enjoy a type of climate that has enabled a particular dietary pattern to develop, now recognized by UNESCO and included in its List of Intangible Cultural World Heritage since 2010: the **Mediterranean diet**. However, new markets and lifestyles have led to a gradual shifting away from traditional diets, with considerable impacts on health and the environment.



The Mediterranean Diet

The Mediterranean diet followed in Mediterranean countries is varied and **exceptionally well-balanced**.

It is based on high consumption of vegetables, legumes, fresh fruit, nuts, olive oil and cereals (50% of which are wholegrain); moderate consumption of fish and dairy products; and even more moderate consumption of red meat, white meat and sweet products (*Trichopoulou et al., 2014*). The nutritionally balanced character of the Mediterranean diet first emerged during the Seventies, in the "Seven Countries Study" conducted by biologist and physiologist Ancel Keys (*Keys et al., 1970; 1980*). He compared the diets of seven different countries (United States, Holland, Greece, Finland, Japan, Italy and former Yugoslavia) to verify their benefits and critical points. His scientific analysis was the first to reveal the strong correlation between people's dietary pattern and their risk of developing chronic diseases, especially cardiovascular diseases.



The spread and trends of chronic diseases

In recent decades, there has been a significant and steady increase worldwide not only in obesity and overweight, but also in the spread of chronic non-communicable diseases, such as cardiovascular diseases, diabetes, chronic **respiratory diseases** and certain types of cancers. According to the **World Health Organisation**, these diseases are responsible for the majority of deaths, approximately 41 million people each year, equal to 71% of all global deaths. Cardiovascular diseases account for the majority of these deaths, with approximately 17.9 million people every year, followed by cancer (9.3 million), respiratory diseases (4.1 million) and diabetes (1.5 million) (*WHO, 2021*). In particular, food choices are the most important factor undermining health and well-being, for example, leading to 9.1 million premature deaths from cardiovascular diseases worldwide every year, which account for as much as 50% of all cardiovascular deaths. This picture highlights the optimization of dietary patterns as a powerful tool to subdue the burden of heart diseases globally and, more generally, to reduce the impact of non-communicable diseases on the population's health (Riccardi et al., 2020). A healthy diet - focused on fruit, vegetables, nuts, legumes, whole grains, fish and non-tropical vegetable oil - can, in fact, prevent both malnutrition and non-communicable diseases.

The problem of child obesity and child development

Obesity is an actual medical condition characterised by excess adipose tissue, due to the increased volume and number of **adipocytes**, the cells that form adipose tissue. Over the last 40 years, the number of obese children and adolescents (between the age of 5 and 19) has increased considerably worldwide, and in Italy the percentage of obese children and adolescents in 2016 almost tripled compared to 1975 (*Abarca-Gómez, Leandra et al., 2017*). In Italy, data from the national observatory OKkio alla Salute (2019) shows that 20.4% of the children are overweight and 9.4% are obese. Overweight in childhood is a risk factor as it is frequently associated with the following problems (*Sahoo et al., 2015*):

- Fatty liver disease;
- Insulin resistance (possibly becoming type 2 diabetes);
- Increase in cholesterol and/or triglyceride levels;
- Hypertension;
- Respiratory problems (e.g. night apnoea);
- Orthopaedic problems;
- Psychological disorders (e.g. anxiety and low self-esteem).



Lastly, let's not forget that adolescence is also a critical period for overweight as this is when the number of adipose cells are established. From a physiological viewpoint, the number of adipose cells increases significantly during adolescence, which then remains unchanged throughout adulthood. In fact, adipocytes cannot disappear. They can only increase or decrease in volume, which is why it is important to prevent them from increasing in number.

A balanced diet and a **correct life style**, which includes **physical exercise**, are all considered the most effective strategy to avoid an excessive accumulation of body fat.

Diet for a growing child

Diet plays a key role in the healthy development of children and adolescents, and the scientific literature provides robust evidence that the Mediterranean diet is optimal in this respect.

(Institute of Medicine of the National Academic Press, 2005)

The various stages in child development have specific requirements. During **early childhood**, **carbohydrates** (starches and sugars) constitute the first and most important source of energy for the organism in terms of quantity. They supply energy to the tissues, especially to the brain and red blood cells, which use only glucose as "fuel" for cell activity. In a child, **fats** are a source of energy and essential fatty acids, and their intake should be via food, such as fish and nuts. Fat-soluble vitamins (A, D, E and K) need to combine with fatty molecules in order to be absorbed, so we should choose vegetable oils as condiments, especially extra virgin olive oil, which enables optimal absorption of those vitamins. The main structural component of all body cells are **proteins**: they also act as enzymes, membrane receptors, carriers and hormones. The best sources of protein are eggs, milk, meat, fish, cheese and some products of plant origin, such as soya, legumes and wheat by-products, albeit in smaller quantities. Lastly, alongside the main macro-nutrients above, the essential elements of a correct diet for pre-school and school-age children are **vitamins** and **minerals**.

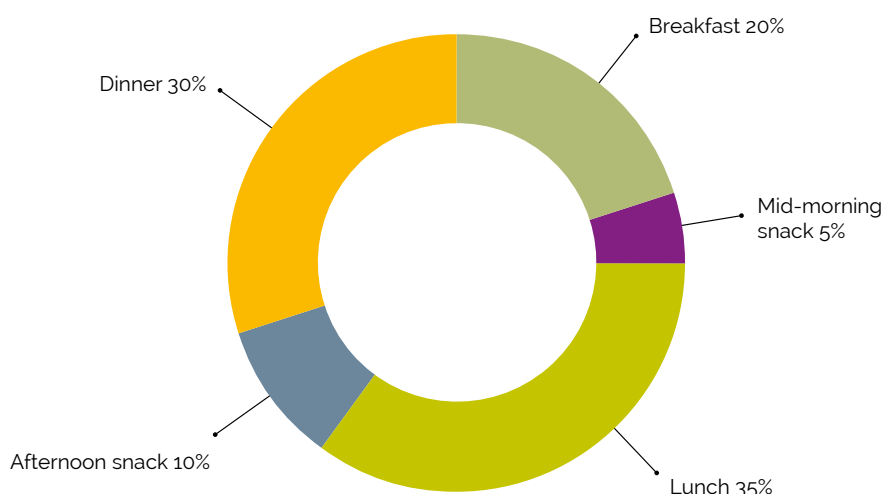


Fig 3. Recommended daily calorie distribution for children and adolescents (Source: BCFN according to data from the Italian Society of Human Nutrition, 2011)



Adolescence, however, is the period when a young person transitions from pre-puberty to adulthood. It is characterised by many physical, psychological and social changes, accompanied by the need for a greater quantity and better quality of nutrients, vitamins, mineral salts, fibre and water, as dietary needs grow closer to those of adults. During this stage, iron and calcium deficiencies can easily occur. It is thus important for adolescents to consume food rich in iron, such as lean meat and fish, legumes, dark green vegetables and nuts. **Calcium** also plays a key function in the adolescent's rapidly developing body, as it is a component of bones and teeth. It is, therefore, important for young people to choose food rich in calcium and **Vitamin D**, especially young girls who may be at future risk of osteoporosis at the onset of the menopause.

A summary of the main guidelines for a growing child

1. Divide the food between the 5 moments of the day: three meals and two snacks.
2. Reduce salt intake to the minimum to avoid developing hypertension.
3. Avoid excess calorie intake, e.g. from sugary drinks and sweet snacks.
4. Avoid eating outside the 5 meals indicated above and keep portions moderate.
5. Distribute daily nutrients evenly to ensure a good equilibrium between the intake of animal and plant proteins, simple and complex sugars, and animal and plant fats.
6. Take part in **physical activity** for at least an hour a day (e.g. doing a sport or playing).
7. Choose a healthy, balanced diet, alternating everyday among the main food groups.
8. Reduce the time sitting in front of the computer or electronic devices.

The importance of food safety

Lastly, we should remember that our health depends on the safety of what we eat (*food safety* and *food security* - see Chapter 4, p. 32 for further details). That is why there are independent authorities, whose task is to check that the food and drink we consume will not harm our health.

Nowadays, **nutrition labels** are full of information that enables the consumer to be more aware and to **make better choices**. First and foremost, the label provides **nutrition information** on the product. It has existed for years, but its application has only been mandatory in Europe since late 2016. It specifically includes information on calories (energy), fats (saturated and unsaturated), carbohydrates, sugars, proteins and salt, all expressed in quantities per 100 g or per 100 ml or per portion. The product is also required to display the following additional information: the name (i.e. what it is and what state it is in, e.g. "milk", "powdered"), the list of ingredients, the use-by date, the use and storage conditions, as well as the country and place of origin



Knowing how to read the labels can be very useful for our health.

It helps us manage our sugar intake as an excess consumption could lead to an unbalanced and/or excessive diet in terms of energy efficiency, which would make it easier to gain weight. We should reduce our daily intake of sugars (not to be confused with complex carbohydrates - starch) to below 10% of our total energy consumption. In an average diet of 2100 calories, that corresponds to approximately 50 grams (LARN, 2014). The recommendation does not concern the sugars found in fruit, vegetables and milk. We are talking **exclusively** about monosaccharides (glucose and fructose) and disaccharides (sucrose), natural sugars found in honey, syrups, fruit juice and concentrated fruit juices, which can be added to food and drink.

We need to distinguish, however, between different kinds of sweet foods. Some products (e.g. bakery foods) also provide us with complex carbohydrates (starch) and other nutrients in addition to sugars. Others, however, consist mainly of sucrose (e.g. sweets or sugary drinks) and we should carefully monitor our consumption of these products.



* **Key word: Diet**

From the Greek *diaita*, diet originally meant: habit, way of living; hence the Latin *daeta*. The term **diet** actually refers to a set of habits/food practices. Nowadays, however, the term is more often associated with a more or less intense period of food restriction that alters, among other things, the original meaning of the word which, on the contrary, stresses the role of regular practices and habits.

Modern times have increasingly seen the development of the culture of **dieting**, a term which defines the trend to follow a low-calorie regime. It is thought that media exposure to excessively thin role models and the spread of the dieting culture is one of the main causes of a rise in Eating Disorders. Indeed, cases of anorexia nervosa and other Eating Disorders are increasingly frequent among young girls, but also among a growing number of boys from as young as eight to ten years old.



CHAPTER 3: FOOD AND CULTURE

The cultural dimension of food

Culture is the most significant result of human activity, although it is a very difficult concept to pin down objectively, as it is an invisible environment within which all individuals are completely immersed from birth. Although often unaware of it, in observing the world, we all adopt a certain perspective that amounts quite simply to our culture.

Culture affects all aspects of human activity and eating is no exception; on the contrary, preparing food is an activity which, millions of years ago, allowed us to set ourselves apart and evolve compared to other living creatures. Indeed, from a symbolic point of view, the discovery of fire and **cooking** marked the transition between nature and society, given that while raw food is purely natural in origin, cooked food involves a shift towards a cultural and social era (*Lévi-Strauss & Weightman, 1986*).

The omnivore's dilemma

Omnivores, by definition, have a diet that includes food of animal as well as plant origin; in other words, they eat any food. For Man, being omnivorous has been an advantage as well as a challenge over the course of evolution. Unlike other animals that have a very specific diet, written and dictated by their genes, Man has constantly found himself having to decide whether a certain substance was edible and whether it was good or bad for him. This inherent difficulty in choosing has been called: the **omnivore's dilemma** (*Rozin & Fallon, 1987*). For animals, no thought or emotion goes into deciding what to eat and what not to eat. Their instinct is hard-wired to work perfectly and their digestive system extracts everything their body needs from a small variety of foods. In contrast, omnivores like humans have to devote a considerable amount of time to figuring out which of the countless foods in nature's pantry can be eaten safely, without jeopardizing their health. All the same, this absence of specialized eating allowed human beings to evolve and colonize every terrestrial habitat on Earth, adapting to very different types of food and environment.

Delicious or disgusting: the cultural classification of the edible

In our modern age, with shops and supermarkets, the problem of finding edible food no longer exists. Over the course of the centuries, culture has codified the rules of safe eating in an elaborate structure of taboos, rituals, recipes, rules and traditions. Who decides what is good to eat today? Mostly, it is our heads that decide, based on the market offering, although we must not forget the role of social influence, above all that of traditional media and social media, where food is a constant, extremely pervasive presence.



Eating has thus become a **mental act**, rather than a purely gustatory and sensory act. We eat first with our eyes, then there is our sense of smell (indeed, when we have a cold we can no longer taste flavours), taste, touch (to judge consistency and temperature) and lastly our sense of hearing, as we often appreciate foods, especially crisp or crunchy ones, for the sound produced when we chew them. The range of potentially edible foods is much vaster than that which we habitually prepare because our eating habits by now have become strongly influenced by the mental images of that which we and our culture deem good to eat. One example is insects, which are a source of nutrients and valuable protein, comparable to that provided by meat and fish (FAO, 2013), but which in the Western world are often viewed with horror and disgust because they are not considered to be food.



Culture and safety

If cooked long enough, wild animal meat (“bush meat”) poses no health risk to humans. The Ebola virus for example, which was originally transmitted by bats, is inactivated through cooking (WHO, 2014).

However, the trade of live animals and their slaughter in inadequate hygienic conditions and in the presence of other animals (often still alive) can trigger old and new zoonoses (i.e., diseases transmitted from animals to humans). The problem stems mainly from two concurrent factors:

- first of all, the gathering of many different animals that can potentially lead to the spread of old and new pathogens (the close proximity of different species facilitates genetic recombination of different viruses and consequently the *spillover*, i.e. the ability to infect new species);
- furthermore, direct contact with parts of animals, through the exchange of liquids, excrements, or other bodily fluids, in inadequate hygienic conditions (for example, without the possibility of frequently washing hands), directly exposes humans to viruses or other pathogens possibly hosted by animals.

Therefore, the trade of wildlife, parts of animals and plants is not only a primary cause of biodiversity loss (just think of the illegal trade in rhino horn or pangolin), but can also be a significant mechanism for spreading zoonoses which, in turn, can have major health, social and economic impacts on all the communities involved, as in the case of COVID-19.

Finally, the destruction of forests and/or the proximity to once uncontaminated places can lead to new forms of contact between humans and microbes, also through the wild species that host them. In fact, viruses, especially those with a RNA genome, which makes them prone to mutations, adapt well and quickly to new conditions and new hosts (WWF, 2020).



The symbolic meaning of foods

Eating is our most basic of all human needs, which is why food and **power** are inextricably linked. In human society, as in the animal kingdom, the highest ranking individuals, that is to say those with the most power, have privileged access to food resources. In our society, control of food has historically been one of the main sources of power, and today there is still a great deal of competition in agriculture and animal farming, not just to obtain more land and water resources, but also to have exclusive access to techniques and tools for food production and storage.

In addition, food can be an expression of power on a social level too, especially in terms of prestige. Indeed, cyclically, certain foods have been characterized as denoting exclusivity and excellence, above all as a result of their price or scarce availability.

Examples today are truffles and caviar, while in the past, chocolate was the food that was truly the preserve of the rich. In addition, we should bear in mind that, in principle, food has no precise social boundaries. Chestnuts, for example, once referred to as the bread of poor mountain communities for whom they were the main staple, are today a seasonal food that is highly prized in gastronomy. Many foods can become part of so-called elite cuisine using various strategies, such as removing the ingredient from the main dish to make a secondary element of the meal, or using it in elaborate recipes. Chestnuts are one such example, if we consider marrons glacés.

Food also plays a crucial role in terms of its ability to act as a catalyst for **meanings and symbols**, so as well as being linked to the dimension of power, food is used across the world to mark many cultural moments in our lives with rituals, ceremonies and religious celebrations. For example, in Judaism, numerous *mitzvot* (precepts), which guide the life of practising Jews, relate to food and take their cue from important passages of the Old Testament. One such example is bitter herbs accompanied by unleavened bread, served with lamb during the Jewish feast of Passover. The herbs symbolize the bitterness of bondage while the bread must be unleavened, recalling the Jews' haste in fleeing from captivity.



Indeed, this bread is made very quickly, and is neither leavened nor soft. In this sense, the Jewish tradition directs the faithful in the act of eating, to acknowledge a meaning that teaches choice and constant vigilance, while at the same time it defines Man's relationship with nature and the sacred. However, **food not only accompanies moments of celebration but also plays a role in the sharing of grief.** In ancient times it was customary to leave supplies of food in a tomb to sustain the dearly departed on their journey to the afterlife⁵, and funeral meals are also still common in many religions throughout the world. Food is also prepared to commemorate and remember the deceased. For example, among Orthodox Christians it is still customary to prepare koliva (spelling and pronunciation vary depending on linguistic and geographic origins), a dessert of boiled wheat sweetened with honey, plus various other ingredients depending on the particular recipe. However, the basic ingredients, that is to say wheat and honey, are chosen for their symbolic value linked to death and resurrection (wheat which springs from the earth and honey which reminds us of the sweetness of the afterlife). Another example is food placed on household altars during the annual Buddhist celebration of Obon (お盆), like rice and/or vegetables: this is traditionally a vegetarian offering because, according to this religion, with the end of our earthly life, we also stop eating animals.

Within religious practises, however, what stands out most of all are **bans** on particular foods. Such prohibitions may seem arbitrary and devoid of logic but, from an anthropological point of view, these rules are based on careful historical considerations of the nutritional, economic and environmental impacts.

Take, for example, the case of the sacredness of cows in India, which is a principle that ensured Hindus had calves, milk and cultivated fields. Alive, these animals in actual fact brought many advantages, whereas the benefits to be had from their meat were strictly short-term, as it could not be preserved for any great length of time. In addition, the prohibition prevented the few wealthy individuals from managing the entire meat market, thus monopolizing the population's only source of livelihood. Considering all of these intrinsic qualities, there is no animal in India, other the zebu, which can still provide its owner with so many benefits, and for this reason it must be protected at all costs. So, in view of these considerations, the sanctity of religious ban offers the best defence for this truly invaluable animal (Harris, 1990).

5. For example, ancient Egyptian burial paraphernalia has been found to include objects of everyday use, as well as food and drink, as it was believed that the soul still needed to eat and drink and would also require all the items formerly used in daily life. It is thanks to this important ritual that today we have some insight into the eating habits of the ancient Egyptians.



The world peace diet

History teaches us that the most important food bans include, for the most part, **whole categories of products of animal origin**. Take, for example, the Muslim ban on pork, the Hindu ban on beef, but also Jewish laws on milk consumption and various types of fish and shellfish. Nonetheless, many taboos linked to meat exist regardless of the religious framework. For example, North American cuisine, despite its abundance of meat dishes, includes no horsemeat. Horses (but rabbits too), are not seen as just another animal, but as pets and, as such, eating them would be horrific. The English expression *"I am so hungry I could eat a horse!"* is generally taken by native English speakers to mean not that they are simply "very hungry", but that they are "starving" to the point where they would contemplate disregarding the rules that lay down what it is normal or permissible to eat.

From this perspective, a diet that favours plant-based foods allows greater dialogue with more cultures.

Plant-based foods, like wholegrain cereals, legumes, fruit and vegetables and oilseeds are not only recognized and recommended by all nutritional models for their health benefits, but are also the foods that often have a lower impact on the environment, as well as being those least subject to religious and cultural taboos. They can therefore play a key part in resolving the great paradoxes of nutrition (see page 6), becoming, at the same time, a symbol of peace and sharing between different peoples.



Traditions and dietary styles around the world

There is a very close bond between food and culture. On the one hand, food has a significant effect on people's lives, on the other hand dietary styles reflect and are conditioned by habits and the relationships that people form with one another.

Over time, in certain regions of the world, the interaction between these variables led to the development of **very specific gastronomic traditions and dietary approaches** with unique, distinctive characteristics. Some famous ones are: the **cuisine of the Mediterranean basin, Asian cuisine and North American cuisine**. These traditions differ in terms of style, specific food availability and environmental needs, but all three are the product of a continuous series of innovations and adjustments, which have modified and deeply shaped how these populations nourish themselves and adopt food habits.

MEDITERRANEAN CUISINE. The countries around the Mediterranean basin differ greatly in terms of geographical conformation, historical experience and lifestyle, but traditionally they share the availability of the same foods obtained from agriculture, animal farming and fishing. At the dawn of civilization, the Middle East and North Africa always supplied this geographical region with cereals like wheat, barley and spelt, initially used to make bread and a kind of porridge (for example, the Carthaginians introduced porridge made from different cereals and served it mixed together with cheese, honey and eggs). The dish would be completed with legumes such as peas, lentils, chickpeas or broad beans, and dressed with oil produced in Syria and Palestine from as early as the third millennium (BC). There was also a plentiful supply of fruit, vegetables and oilseeds, with apples, pomegranates, almonds, pistachios, dates and figs. Vines were cultivated, with grapes also used to make wine. It is worth noting that the diet also included meat from cattle, sheep and poultry farming and from hunting, plus milk from dairy cattle, and fish.

Nonetheless, the dietary pattern we currently refer to as the "Mediterranean diet" is the result of a vast geo-culinary movement that also benefited from foods from the Far East and Africa, highlighting the role of the Mediterranean basin as a melting pot of civilizations, beliefs and ways of life. **Creolization*** is one reason behind its diversity, as well as its specific cultural features.

Indeed, the Mediterranean diet is much more than a dietary pattern, it is also an expression of a whole cultural system based on healthy, high quality foods with a strong regional identity, but also on conviviality and love of food.



Indeed, “**social eating**”, the act of gathering around a table to eat with others, sharing the same food, has always played a central role in the social lives of Mediterranean populations. Naturally, social eating is by no means exclusive to this geographic area but in the majority of cultures that have developed around the Mediterranean basin it has become particularly well established, as shared meals are the basis for social customs and shared festivities and have given rise to a significant body of knowledge, songs, sayings, tales and legends.

ASIAN CUISINE. Asian cuisine (for example, Chinese, Japanese, Thai and Vietnamese cuisine) is the result of a cultural and historical tradition that can be compared to that which developed in the Mediterranean basin. Indeed, certain parallels can be drawn between the two cuisines, above all in the value both attribute to food, as well as the care and creativity devoted to the preparation of dishes. Furthermore, in Asia too the social aspect of eating is very important. Indeed, Asian cuisine shares the Mediterranean love of food, which translates into a propensity for eating together with other people, as a source of pleasure and social interaction. For example, the Chinese actually share plates of food with fellow diners, as dining tables are traditionally round in shape and food is placed in the centre, allowing diners to serve themselves using their own chopsticks. Unlike Mediterranean cuisine, however, Asian and above all Chinese cuisine is very closely linked to philosophy and medicine. Indeed, cuisine is considered to be a key element for **staying healthy**. For example, in China food is prepared according to the principle of *Yin and Yang* (female and male, dark and light, hot and cold) which are by no means merely theoretical principles, but actual practical aspects of life applied to diet too.

Indeed, the Chinese believe that a balanced diet that observes the laws of harmony is one of the main ways to improve health and pursue longevity.

On that point, another important element of Chinese tradition worth remembering is the central role of food in festivities and the symbolic meaning of certain dishes. To mark birthdays and New Year, for example, the Chinese eat noodles because their long, slender shape symbolizes longevity. Lastly, when it comes to beverages, compared to the Mediterranean tradition with its fondness for wine, in China tea is the drink of choice, deemed so important that is one of the seven necessities of life, together with firewood, oil, rice, salt, soy sauce and vinegar.

NORTH AMERICAN CUISINE. As the biggest “melting pot” in the world, the United States of America (USA) are home to a mixture of different origins, religions and cultures, which nonetheless manage to build a shared and widespread identity. The Country's cultural wealth is associated with its geographical wealth, as the USA is the third biggest Country in the world.



However, some recurring (non-exhaustive) patterns can be found, despite the growth in meals being eaten away from home, to adapt to the demands of modern life. For example, breakfast is traditionally large and includes both sweet and savory foods, such as fruit juices, muffins, milk cereal, donuts, pancakes with maple syrup, American-style coffee, eggs and bacon. Lunch is often replaced by a quick snack or a sandwich, while dinner is usually the time when people come together and dishes can be influenced by many culinary styles, often connected with the origins of the individual families. In general, however, single-course meat dishes, accompanied by vegetables, potatoes or salad, tend to be preferred.

Today's food: challenges and future prospects

Food culture is the most effective lever to redefine the relationship between man and food in concrete terms.

Only by developing a food culture that is more attentive to the **values of health and sustainability in all its forms** can the great food emergencies of our century be successfully addressed, from access to food to preventing a wide range of diseases and respecting the environment.

Today, We are witnessing a turning point within food and diet. Solutions, however, must not be limited exclusively to the technological sphere, since innovations alone, unsupported by culture and knowledge, would end up providing only short-term quick fixes, without tackling the deep-rooted causes of the present crisis. Hence, we can only hope that the future focus will shift increasingly from "what" to "how" we eat: it is the choice of "how" we eat, of the value we attribute to food, and of its importance in our personal and social lives that constitutes a potential turning point for embracing healthy dietary styles and establishing good quality, accessible supply systems.



* Key word: Creolization

From a social point of view, creolization is a **phenomenon of cross-fertilization and fusion of different forms of cultural expression** from various peoples. The great geo-cultural movements that swept across the Mediterranean basin enabled the emergence and evolution of what we refer to today as the "Mediterranean diet". Indeed, this diet did not originate as a stand-alone entity but was the fruit of a long series of internal and external changes.

For example, products absorbed into Mediterranean cuisine that originally come from the Islamic world (which in the past boasted more advanced agricultural techniques), include sugar cane, rice, citrus fruits, aubergines, spinach and spices, but also the use of rose water, orange water, lemon water, almond water, and pomegranate water. The discovery of America was another event that had a tremendous impact on Mediterranean food, as it led to the introduction of new products such as potatoes, tomatoes, maize, peppers and chilli peppers, as well as several varieties of bean. It is strange to think that tomatoes, so symbolic of Mediterranean cuisine, and Italian food in particular, were initially just an exotic novelty, an ornamental fruit, and that many years went by before they were considered edible.



CHAPTER 4: FOOD AND MIGRATION

What are food safety and food security?

The terms food safety and food security relate to different aspects of the food system and are linked by the basic need of human beings to eat enough food without damaging their health. The main aspects, which are concerned with the availability and healthiness of foods, are defined very clearly by the terms *food security* and *food safety*:

- **Food security** refers to the availability of enough food to meet people's dietary needs, in other words, a situation in which everyone has equal access to a sufficient quantity of affordable food;
- **Food safety** refers instead to the food we eat daily, that is, the safety of the food we consume and any risks it may pose to our health and the environment, which are constantly assessed (see page 21).

This chapter will focus on food security, especially in the countries around the Mediterranean basin.

A multidimensional approach to food (in)security

Considering all the people in the world who are affected by moderate and severe levels of food insecurity and it is estimated that more than 2 billion people do not have regular access to safe, nutritious and sufficient food. Nearly 40% of those people (928 million) faced food insecurity at severe levels with an increase of 148 million more people compared to 2019 (FAO, 2021).

The global population is projected to reach nearly 10 billion in 2050, and ensuring that everyone has access to enough healthy and nourishing food to meet their dietary needs and preferences for an active, healthy lifestyle has become a top priority of international agendas. However, to understand the complex issue of access to food, we need to adopt a **multi-dimensional approach** that considers the different aspects of the phenomenon, which are linked to four basic areas: economics, policy, the environment and society.

1. **Economics and food security.** The roots of hunger lie in poverty and in order to eradicate it, we need tools to secure fair and sustainable economic development, especially in agriculture. The role of the financial markets is also key, as open markets are essential for trading the food products required to achieve an adequate level of food security. Protectionist systems, by contrast, make it difficult to achieve food security in various countries around the world.



2. **Policy and food security.** Policy-makers play a fundamental role in governing the economic, social and environmental dimensions of our world. Addressing the causes of poverty and **malnutrition*** is only possible if states adopt a common and mutually complementary policy. Policies that lead to development and wellbeing, enabling people to move beyond mere subsistence, can only be implemented through the coordinated action of policy-makers. Patchy, uncoordinated political interventions are in fact hardly ever effective.
3. **The environment and food security.** Natural resources are essential for food production, rural development, sustainable growth and people's wellbeing. These resources, such as land and water, are not inexhaustible and must be managed wisely to ensure that they last. Finally, we should not forget climate change and its complex impacts on the ability to produce food.
4. **Society and food security.** The effects of food availability on society can be broadly classified into three main areas: human health, demographic phenomena and the social-political dimension regarding conflicts and migration.

The topics of society and the environment are discussed in more detail in the next sections, in relation to migration.

Society, climate change and human migration

The relationship between food security and **health** mainly affects developing countries, where there are often chronic and/or critical levels of malnutrition. Malnutrition affects the immune system of individuals, their susceptibility to contracting diseases and the severity and duration of the illnesses. This link is strengthened by a set of other conditions typically associated with situations of malnutrition, such as unhygienic conditions and poor access to drinking water and basic medicines. This situation is usually made worse by a series of economic and social conditions, such as lack of educational qualifications and unemployability, leading to social and economic exclusion.

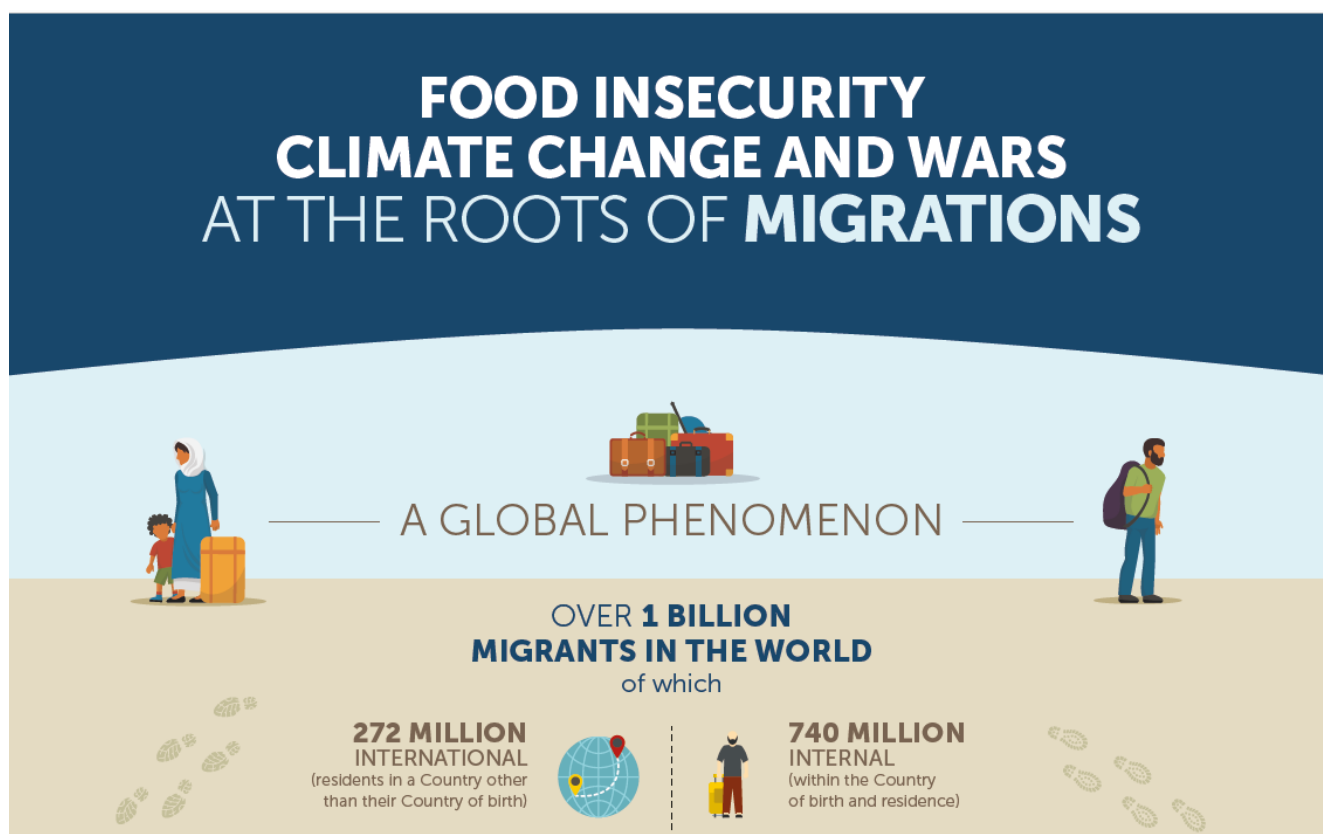
The main challenge to food security is the exponential rise in the demand for food as a result of the **increase in the world population**, which mainly affects developing countries. Moreover, in these regions, we are also witnessing a significant increase in the phenomenon of urbanization, with the progressive abandonment of rural areas and a population explosion in built-up areas, together with a change in people's eating patterns, which are increasingly adopting the worst habits of the Western world (for example, more animal protein, fats and sugar). This is putting more pressure on water resources and reducing people's ability to produce their food independently.



Food security also depends on social stability. **Conflicts**, for instance, have a negative influence on food availability. The main forms of conflict/challenges for food security that are specifically associated (directly or indirectly) with the availability of food and natural resources include: social tensions linked to access to and control over agricultural resources (such as land and water), the phenomena of migration linked to dire living conditions (especially malnutrition and water shortage) and situations of political and social instability and of bad governance in relation to the growing needs of the population.

Lastly, we should not forget **climate change**, which has serious repercussions on food security. It has been estimated that, in 2017, environmental disasters, such as floods and droughts, triggered serious food crises in 23 countries around the world, with two thirds of these in Africa, throwing 39 million people into a state of serious food insecurity (*FSIN, 2017*). These phenomena are partially responsible for the increase in world hunger which, having steadily fallen for over a decade, is now on the rise again. In 2019, up to 811 million people suffered from hunger in the world (*FAO, 2021*).

In conclusion, environmental factors and climate change, food insecurity, growing demographic pressure, wars and conflicts, and economic and social problems (such as poverty, lack of employment and poor social security) all contribute to the increase in migration.





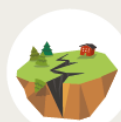
IN 2019, **33.4 MILLION OF INTERNAL DISPLACEMENTS**
of which

23.9 MILLION (7 OUT OF 10) DUE TO METEOROLOGICAL DISASTERS



IT IS THE HIGHEST NUMBER SINCE 2012

MIGRATIONS ARE CAUSED BY MULTIPLE FACTORS



ENVIRONMENTAL FACTORS AND CLIMATE CHANGE



WARS AND CONFLICTS



ECONOMIC AND SOCIAL PROBLEMS
(POVERTY, LACK OF WORK, INADEQUATE SOCIAL PROTECTION)



GROWING DEMOGRAPHIC PRESSURE



FOOD INSECURITY

DEMOGRAPHIC PRESSURE

	AFRICA	EUROPE
POPULATION IN 2020	1,3 BLN	748 MIO
MEDIAN AGE	19,7 YEARS	42,5 YEARS
FERTILITY (CHILDREN PER WOMAN)	4,4	1,6
POPULATION IN 2050*	2,5 MLD	710 MIO

* IN MANCANZA DI CAMBIAMENTI NEI MEGATREND IN ATTO

FOOD INSECURITY

FOOD INSECURITY COMES FROM



SCARCITY AND PRESSURE ON NATURAL RESOURCES

(WATER AND LAND) WORSENER BY CURRENT CLIMATE CHANGE (DROUGHT, DESERTIFICATION, FLOODS, ETC.) AND STRONG COMPETITION AMONG DIFFERENT ECONOMIC INTERESTS

INCREASING WATER DEMAND

CAUSED BY

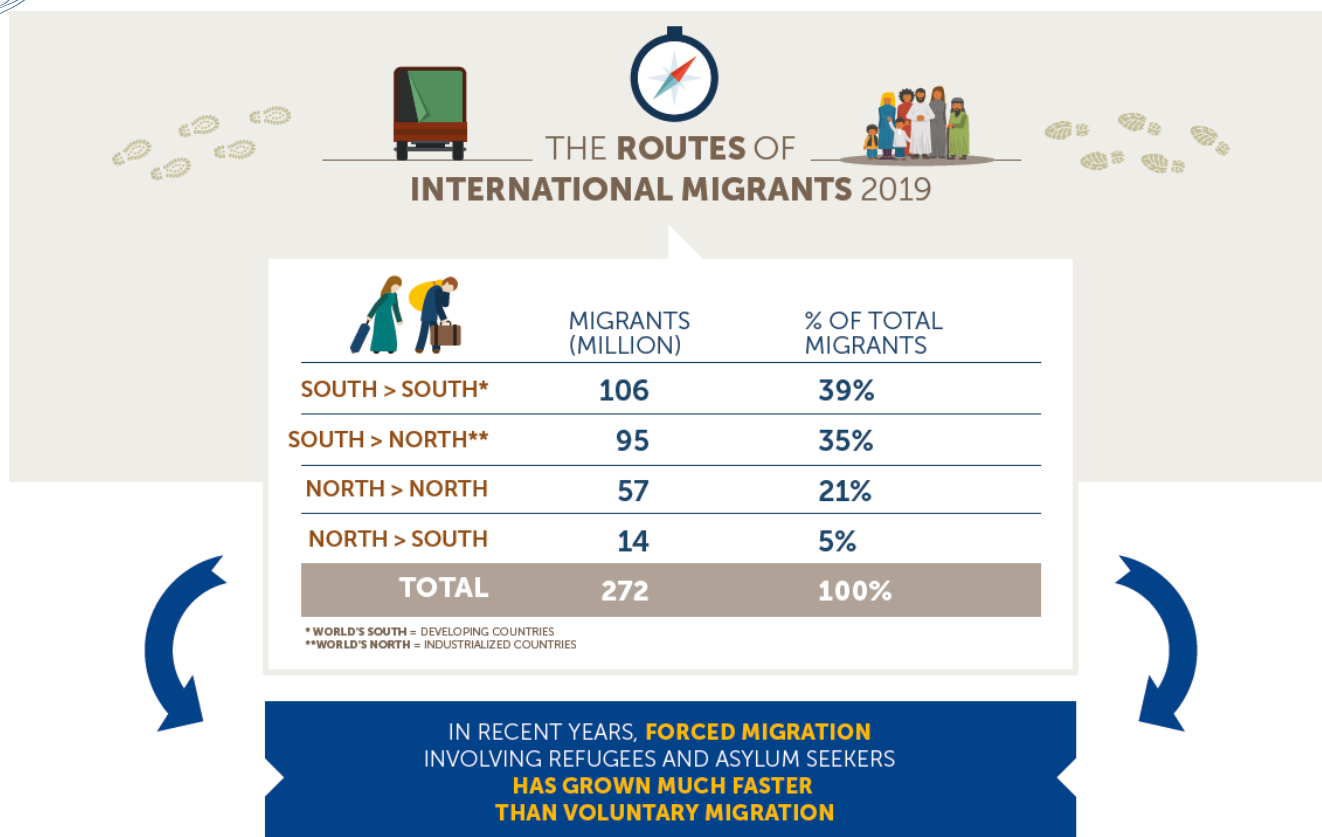
- DEMOGRAPHIC GROWTH
- URBANIZATION
- GROWING COMPETITION BETWEEN SECTORS
- CHANGES IN DIET PATTERNS



ECONOMIC AND SOCIAL FACTORS
(POVERTY, LAND/WATER GRABBING)

WARS AND CONFLICTS





SOURCES: UN DESA, POPULATION FACTS (2019) - IDMC/NRC, GLOBAL REPORT ON INTERNAL DISPLACEMENT (2020) - MACROGEO E BARILLA CENTER FOR FOOD AND NUTRITION

Society, climate change and human migration: The case of Africa

There are approximately 1 billion people “on the move” in the world today. Some are moving within their own country of origin and residence (740 million), and others because they can settle officially in a different country from that in which they were born (272 million). The African population, in particular, experiences large-scale migrations, but most of these migrants remain within the African continent, as in the case of West Africa, for instance, where 84% of the migrating population has moved within the boundaries of the **Economic Community of West African States**⁶. In recent decades, most migratory flows have been caused by wars but also by the disintegration of traditional food systems as a result of climate change and drought (as in the countries of the Sahel region in the 1970s), by “inadequate” food policies (as in Ethiopia in the 1980s) or by “controversial” trading agreements (as in many West African countries since the 1990s). Additionally, **demographic pressure** continues to rise with a very young and rapidly growing population, insufficient **economic development** to absorb the workforce, increasing urbanization and changing lifestyles and dietary patterns. Migration becomes not only a chance to seek protection and food and economic security but also a way to find relief from the scarcity of natural resources, such as land and water.

6. The following countries belong to the Economic Community of West African States: Benin, Burkina Faso, Cape Verde, Ivory Coast, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo..



Food loss and waste

Every year, 1.3 billion tonnes of edible food, roughly one third of global food production, are wasted (FAO, 2011b).

This is a significant amount which would potentially suffice to feed between 720 and 811 million people in the world who are hungry today. Food wastage is not all the same, and technically speaking, it can be divided into **food waste and food loss**. In developed countries, food waste occurs mainly at the point of sale and when food passes into the hands of consumers, whereas in developing countries, food loss occurs mostly during farming and before being put on sale, due to drought, natural disasters, poor road systems and lack of refrigerated storage facilities. Food losses during the harvesting and storage stages lead to loss of income for small farmers and higher prices for poorer consumers, increasing the risks of malnutrition. **Strengthening the production chain to prevent these losses is one of the strategies that needs to be implemented in order to combat malnutrition in developing countries.**

Italy has been significantly committed to tackling food loss and waste, especially on a political level by introducing the "Gadda" law (no. 166 of 2016), which has made it its main goal to limit waste while promoting the redistribution of surpluses and unused goods for social solidarity purposes, allocating them to those who need them most. However, there is still much to be done, especially by individuals, since Italians throw away approximately 67 kg of food a year per capita, mainly fresh produce, bread, fruit and vegetables, bagged products and cold cuts.



Examples of food and integration

Food has the potential to act as a driver for inclusion and can help us address the major challenge of food security and migration. Based on this idea, BCFN has selected a number of good examples and case studies involving migrants' countries of origin as well as transit and destination countries, which help us get a better focus on the issue thanks to past experience while offering lessons for the future (the full texts and more case studies are available on the BCFN website in the publication *Food and Migrations*, 2017).

- Case study 1. Comun'Orto project.** Community agriculture as a tool for integration and a meeting point between asylum-seekers, society and organic agriculture. Comun'Orto was conceived as an alternative form of hospitality for welcoming asylum-seekers, promoted by a network of organizations that has managed and energized two community allotments in the Brione neighbourhood of Rovereto. In this particular context of urban organic agriculture, five asylum-seekers at a time participate twice a week in a two-month-long internship which aims to introduce them to the world of employment in Italy, and teach them key aspects of the European employment laws and standards. (www.comunorto.org)
- Case study 2. MUMM project.** An Egyptian start-up which uses an online platform to home deliver meals cooked by refugees. MUMM is an Egyptian online platform that puts a group of women cooking in their own homes, known as "Food Partners", in contact with customers in their area who seek affordable, healthy and nutritious home delivered meals. This start-up, in collaboration with an NGO from Cairo, the Fard Foundation, also employs Syrian, Iraqi and Sudanese refugees, offering them the training required to become Food Partners. By putting cooks working from home in touch with the market, MUMM enables local women and refugees to earn a living thanks to their culinary talents and some delicious traditional recipes. (www.getmumm.com)
- Case study 3. REFOODGEES project.** Food as a tool for legitimizing asylum-seekers. This is a German project that started out as a cooking group that met every two weeks to cook and dine with migrants. It was attended by more than 40 people, half of whom were Germans and half asylum-seekers, mainly from Syria, but also Nigerians and Kurds. The initiative has become a start-up enterprise made up entirely of volunteers, half of whom are German and half are asylum-seekers. Basically, it carries out two activities: organizing or contributing to culinary events throughout Germany and offering an excellent catering service. The latter should not be seen as an ordinary catering service as its main goal is to bring people together, so the events it organizes are highly interactive. During these evening events in Cologne and Düsseldorf, the chefs have the chance to meet their customers, introduce themselves and tell their stories. (www.laden-ein.com/refoodgees)



* **Key word: Malnutrition**

According to the World Health Organization (WHO, 2016), **malnutrition** is a condition characterized by deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients. In general, it is a very broad term that covers two conditions: undernutrition and overnutrition. The first includes "stunting", defined as the slowing down of the development process (low height-for-age), "wasting" (low weight-for-height), "underweight" (low weight-for-age) and micronutrient deficiencies or insufficiencies in the diet (a lack of important vitamins and minerals). But malnutrition can also occur in cases of excess, including overweight, obesity and non-communicable diet-related diseases (such as heart disease, heart attack, diabetes and some kinds of cancer).



The MOOC "Sustainable Food Systems: a Mediterranean Perspective"

The "Sustainable Food Systems: a Mediterranean Perspective" MOOC (Massive Open Online Course) is a free online course designed to provide an overview of the global challenges and opportunities of the agrifood sector, focusing specifically on the Mediterranean.

It is divided into **10 interactive modules**, taught by university professors from various countries in the Euro-Mediterranean area. The modules contain a series of pre-recorded lessons, quizzes, discussions and other activities, which can be used at any time (for more information and suggestions on how to use them, see page 46 or visit the website <http://www.educazionedigitale.it/noiilciboilpianeta/corso-formativo-online-sulla-sostenibilita/>)

→ CHAPTER 1. FOOD FOR A SUSTAINABLE PLANET

- Module 04: Fisheries and Aquaculture
- Module 05: How to achieve the SDGs in the Mediterranean - The way forward I. Water resources and Fisheries Management
- Module 06: How to achieve the Sustainable Development Goals (SDGs) in the Mediterranean - The way forward II. Sustainable farming systems under environmental and climatic constraints

→ CHAPTER 2. FOOD AND PEOPLE'S WELLBEING

- Module 09: How to achieve the Sustainable Development Goals (SDGs) in the Mediterranean - The way forward V. Nutrition and Education

→ CHAPTER 3. FOOD AND CULTURE

- Module 02: History of agriculture in the Mediterranean basin and the Mediterranean diet
- Module 10: New professional profiles in a Mediterranean context

→ CHAPTER 4. FOOD AND MIGRATION

- Module 03: Poverty alleviation, economic and social rural development
- Module 07: How to achieve the Sustainable Development Objectives (SDGs) in the Mediterranean - The way forward III. Food value chain for regional and local development
- Module 08: How to meet the Sustainable Development Goals (SDGs) in the Mediterranean - The way forward IV. Reducing food waste and enhancing by-product innovations



Further reading

→ MAIN PUBLICATIONS:

- **Food and migration:** understanding the geopolitical nexus in the Euro-Mediterranean (2017).
<https://www.barillacfn.com/en/publications/bcfn-food-and-migration/>
- **Food in the city:** Urban food policies for people and the planet (2020).
<https://www.educazionedigitale.it/noiilciboilpianeta/approfondimento-cibo-in-citta/>
- **Healthy living:** let's start from food (2019).
https://www.educazionedigitale.it/noiilciboilpianeta/wp-content/uploads/2019/09/HEALTHY-LIVING-LETS-START-FROM-FOOD_0919.pdf
- **Food is culture** (2021).
<https://www.educazionedigitale.it/noiilciboilpianeta/insegnanti/>
- **A diet that respects the health of people and the Planet** (2020).
<https://www.educazionedigitale.it/noiilciboilpianeta/insegnanti>
- **Learning and acting for change.** 10 words for sustainable development (2020).
<https://www.educazionedigitale.it/noiilciboilpianeta/insegnanti/>
- **Right to food, food security and food sovereignty** (2020).
<https://www.educazionedigitale.it/noiilciboilpianeta/approfondimento-diritto-al-cibo/>
- **Waste not, want not!** A teaching guide on food waste and food loss (2019).
<https://www.educazionedigitale.it/noiilciboilpianeta/wp-content/uploads/2019/09/WASTE-NOT-WANT-NOT.pdf>

→ PLAYLIST EDUCATION:

- https://www.youtube.com/watch?v=L4grW1XXeds&list=PLdtmE6jl26WZg1nvLiVNnckCO772E6_Iz&ab_channel=BarillaCFN

→ ANIMATED INFOGRAPHICS:

- **Sustainable Development Goals (SDGs):**
<https://www.youtube.com/watch?v=9w23SMx3hi8>
- **Common Agricultural Policy (CAP):**
<https://www.youtube.com/watch?v=aCWqA7DktgA>



→ **ESSENTIAL BIBLIOGRAPHY**

- **Abarca-Gómez, Leandra et al. (2017).** Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *The Lancet*, Vol. 390, Issue 10113, 2627-2642.
[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(17\)32129-3/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)32129-3/fulltext)
- **FAO (2010).**
<http://www.fao.org/ag/humannutrition/25918-0f89629169d179b29a284d08802cf9e89.pdf>
- **FAO (2011a).**
<http://www.fao.org/nr/solaw/solaw-home/en/>
- **FAO (2011b).**
<http://www.fao.org/docrep/014/mb060e/mb060e00.pdf>
- **FAO (2013).**
<http://www.fao.org/docrep/018/i3253e/i3253e.pdf>
- **FAO (2018).**
<http://www.fao.org/3/I9553EN/i9553en.pdf>
- **FAO (2020).**
<http://www.fao.org/sustainability/news/detail/en/c/1274219/>
- **FAO (2021).** The State of Food Security and Nutrition in the World 2021.
<http://www.fao.org/publications/sofi/2021/en/>
- **FSIN (2018).** 2018 Global Report on Food Crises.
<http://www.fsincop.net/resource-centre/detail/en/c/1110426/>
- **FAO (2020).** The State of Food Security and Nutrition in the World 2020.
<http://www.fao.org/publications/sofi/2020/en/>
- **Guo, X., Broeze, J., Groot, J. J., Axmann, H., & Vollebregt, M. (2020).** A Worldwide Hotspot Analysis on Food Loss and Waste, Associated Greenhouse Gas Emissions, and Protein Losses. *Sustainability*, 12(18), 7488.
- **Harris, M. (1990).** *Good to Eat: Riddles of Food and Culture*. Long Grove, IL: Waveland Press.
- **Hoekstra & Water Footprint Network, (2017).**
<http://waterfootprint.org/en/resources/interactive-tools/product-gallery/>
- **Institute of Medicine of the National Academic Press (2005).**
<https://www.nap.edu/read/10490/chapter/1#vi>
- **IOM (2015).**
<http://gmdac.iom.int/global-migration-trends-factsheet>
- **IPCC (2019).** IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse gas fluxes in Terrestrial Ecosystems.
https://www.ipcc.ch/site/assets/uploads/2019/08/4.SPM_Approved_Microsite_FINAL.pdf



→ **ESSENTIAL BIBLIOGRAPHY**

- **Keys, Ancel et al. (1970).**
Coronary heart disease in seven countries. *Circulation*, 41.1: 168-195.
- **Keys, Ancel, et al. (1980).**
Seven countries. A multivariate analysis of death and coronary heart disease. Harvard University Press.
- **LARN (2014).**
<http://www.sinu.it/html/pag/05-CARBOIDRATI-E-FIBRAALIMENTARE.asp>
- **Lévi-Strauss, C., & Weightman, J. (1986).** The raw and the cooked: Introduction to a science of mythology. London: Penguin Books.
- **OKkio alla Salute (2019).**
<https://www.epicentro.iss.it/okkioallasalute/indagine-2019-dati>
- **Riccardi, G., Vitale, M. & Vaccaro, O. (2020).** Are Europeans moving towards dietary habits more suitable for reducing cardiovascular disease risk? *Nutr. Metab. Cardiovasc. Dis.* 30, 1857-1860.
- **Rozin, P., & Fallon, A. E. (1987).** A perspective on disgust. *Psychological review*, 94(1), 23.
- **Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS (2015).** Childhood obesity: Causes and consequences. *J Fam Med Primary Care*, 4: 187–192
- **Trichopoulou A, Martinez-Gonzalez MA, Tong TY, Forouhi NG, Khandelwal S, Prabhakaran D, Mozaffarian D, de Lorgeril M (2014).** Definitions and potential health benefits of the Mediterranean diet: Views from experts around the world. *BMC Med* 12:112
- **Valentini, R. (2016).** Eating Planet. Eating Planet. Food and Sustainability: Building our Future. Edizioni Ambiente
- **WHO (2014).**
<https://www.who.int/csr/disease/ebola/note-ebola-food-safety/en/>
- **WHO (2015).**
http://www.who.int/nutrition/publications/nutrientrequirements/healthydiet_factsheet/en/
- **WHO (2016).**
<http://www.who.int/features/qa/malnutrition/en/>
- **WHO (2017).**
<http://www.who.int/en/news-room/fact-sheets/detail/noncommunicable-diseases>
- **WHO (2021).**
<https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
- **WWF (2020).**
Pandemie, l'effetto boomerang della distruzione degli ecosistemi



HOW TO ACCESS AND USE THE MATERIALS

Education as a key factor for change: the role of teachers

The **culture of the teacher**, with their **humanistic knowledge** and ability to interpret historical and scientific phenomena and to observe **social and cultural ones**, makes them a privileged **observer** of the **changes in the Planet** and of the links between anthropic, economic and governance activities and the state of the Earth. Families and society expect many things from school, but no other **theme** has become so **interdisciplinary** and such a founding value for the development of the individual as the sustainability of the Planet: today, school is the formative context in which sustainability must establish itself as an **educational priority**. In fact, sustainability is found in geography, science, geometry, chemistry and, naturally, in **life skills**.

Humankind will only have a sustainable Planet if it develops a sufficiently **critical mindset** and understands the key importance of **medium to long term planning**, and if people succeed in overcoming the logic of *I and immediately*. No educational objective is more challenging and has ever been as necessary in the teaching of the *knowledge* and *know-how* of modern times.

A tool for teacher development

To launch the process of transferring knowledge to the student, it is essential for **teachers** to pursue activities that will foster their own **growth and development**, to provide them with the knowledge, awareness and **competences** they need.

The Barilla Center for Food and Nutrition foundation is an active player in the field of scientific research and contributes to the international dialogue on the subject. Thanks to its activities, it has been able to develop a variety of tools to support educators in performing their task.

Through the "We, Food, our Planet" project teachers have access to a series of scientific materials that help them to provide **interdisciplinary training** with the potential to influence the behaviours of the future citizens of the world, in the hope that the **purchasing and consumer choices** made by individuals will succeed in **impacting economic and production models**, but also to shape the thought of a professional class increasingly focused on the sustainability of the Planet.



THE METHODOLOGICAL APPROACH

The methodological approach of the "We, food, our Planet" project is based on the use of **new Information and Communication Technologies (ICT)**, in line with the **European demands of digital education**. The tools proposed by the BCFN educational program are functional to both face-to-face and remote lessons. They promote critical reflection and behavioural orientation aimed at sustainability. Each resource is based on a highly innovative methodology and balances notions, data, practical advice and insights, generating immediate interaction and respecting the psycho-pedagogical characteristics of digital natives and their new ways of learning.

Teachers are increasingly required not only to adapt to mindsets that differ from traditional ones, by associating the text book with the many different opportunities offered by **digital education**, but also to share this way of learning first hand, by providing a type of education that is consistent with the technological evolution of knowledge.

"We, Food, our Planet" offers teachers a **dual possibility**, with **online training** on topics related to food sustainability as well as **digital teaching tools for their class work**, developed for three different age groups and including lab-based activities designed to promote more dynamic and practical learning.

The **digital world** becomes the link between teaching and learning, a chance to create a new relationship between teacher and student that is more fruitful and with shared participation, based on the **active engagement of the students** and on the teacher regaining the **leadership role**, thereby also fostering important social changes.

The educational activities associated with this type of teaching are generally complementary to traditional school education and focus on topics that teachers of different subjects, including English teachers, can address in synergy with their own subject, using the materials as part of the **CLIL (Content and Language Integrated Learning) methodology**.



The platform

The "We, Food, our Planet" project can be used on the [www.educazionedigitale.it/ noiilciboilpianeta/](http://www.educazionedigitale.it/noiilciboilpianeta/) a source of **training, information and guidance** for teachers and a valuable **teaching aid**, helping to ensure that they have a strong and ongoing relationship with evolving knowledge in their own field and in extra-curricular subjects. To access the training course, teachers must log in to the platform and register free of charge by completing a simple procedure.

Once registered, they can then participate in the various online training sessions and view the tools available in **online mode**, or download them on to a computer or a storage device (e.g. pen drive) so that they can be used **offline** without an Internet connection.

Online teacher training

"We, Food, our Planet" is a project that invests in teacher training, offering several tools to teachers free of charge. Foremost among them is the Teaching Guide, containing all the essential information about the broad themes of health and food sustainability, in all their various aspects.

Teachers who wish to go into more depth on these subjects can choose from several **free options**. The main ones are as follows:

The online training course on sustainability "**Sustainable Food Systems: A Mediterranean Perspective**" MOOC (Massive Open Online Course), divided into 10 independent modules offering a global **overview of the challenges and opportunities of the agrifood sector**, with a specific focus on the Mediterranean.

The single-theme studies that cyclically arise during the school year (for example, the study on food waste or that on health). They consist of a dedicated monograph, a video lesson held by an expert in the field, as well as tools and exercises for classroom activities.

The teaching aids

The ICT **teaching aids** offered to teachers by the "We, Food, our Planet" project are tailored for three different **age groups** (young children, older children and teens) and divided accordingly, so that teachers have appropriate **support tools** that are also as accessible as possible to the students.

They provide the following:

- **For 6-7 year old children**, the **illustrated fables** by Gunter Pauli, to bring them closer to the important theme of food sustainability using imaginary events and characters, and with a medium mainly consisting of images. The teacher can **move from the imaginary event to its underlying metaphors**, stimulating the **children's interest and encouraging discussion**, and inspiring them to change their own individual habits for the sake of their health and the future of their Planet;



- **For students from 8 to 12 years old**, an **Open Mind®** multimedia educational kit created to encourage older children to actively internalize contents and competences. Children are no longer passive recipients of knowledge delivered by the teacher in a traditional classroom setting. Instead, they now learn by **working together, thinking and discussing in a group, addressing shared questions, holding double interviews, gradually exploring the subject in more depth, playing educational games and practising what they have learned**;
- **For students from 13 to 18 years old**, **We, the food, the Planet: the digital game-based learning activity**. This platform allows players to dialogue with our Planet to understand the impact of human activities on the environment, starting with food. We, the food, the Planet provides quizzes and interactive games, and players can discover global problems and practical solutions that are both healthy for humans and respectful of the planet.
- **For students from 13 to 18 years old**, **the Focus Unit©**: a digital awareness unit to introduce the class to food and environmental sustainability issues and to explain the United Nations Sustainable Development Goals (SDGs);
- **For students from 13 to 18 years old**, **a unit exploring in depth the Sustainable Development Goals (SDGs)**, and specific online modules, offering an overview of the challenges and opportunities of the global agrifood sector, with a specific focus on the Mediterranean. The quality of the speakers and the direction and editing of these modules make them an effective tool for making an impact on the user's emotional sphere and helping them deeply internalize the topics. In addition, depending on the training program, a shorter course focused on three specific modules is available, complete with slides on the various topics and specific guidelines for teachers.

Teacher's Resource Pack. Finally, for every chapter of the Teaching Guide, there are Teacher's Notes with class activities ready-to-use, divided into the various age groups.

Using the aids: a technical guide

The operation is very simple: having selected the chosen aid and accepted the terms and conditions for the legal use of the materials, click on the button "DOWNLOAD" and follow the instructions to download the folder.

Using the educational tools is easy and user-friendly and can be done by activating the play controls on the interface as follows:

- the **arrow keys** to go forward or back;
- the **"audio" icon** to pause and/or reactivate the sound;
- the **"menu" button** to choose a specific area without having to view the whole course in the set sequence;
- the **"EXIT" icon** to leave the application.

Remember that all the aids can be used online and offline and that, for normal use, it is important to have a **monitor and a speaker system connected to the computer**.

Additionally, teachers are advised to view the resources themselves before the lessons, so that they can test their potential and personalize their delivery, integrating the contents with their own personal experiences and knowledge.





AFTERWORD

The Barilla Center for Food & Nutrition Foundation (BCFN) is a think tank and research center which analyzes the complexity of current agri-food systems and, through a variety of initiatives, fosters change towards healthier and more sustainable lifestyles in order to achieve the Goals set by the United Nations 2030 Agenda for Sustainable Development (SDGs). With its scientific research and public initiatives, the BCFN Foundation promotes an open dialogue between science and society both nationally and internationally. It addresses today's major food-related issues with a multidisciplinary approach and from the environmental, economic and social perspective, to secure the wellbeing and health of people and the planet.

Advisory Board

Million Belay, Barbara Buchner, Danielle Nierenberg, Livia Pomodoro, Gabriele Riccardi, Camillo Ricordi, Gerry Salole, Riccardo Valentini, Stefano Zamagni

SDSN Mediterranean is the regional Sustainable Development Solutions Network of the United Nations which promotes the 2030 Agenda and the Sustainable Development Goals (SDGs) throughout the Mediterranean region through research, innovation and new teaching methods and is coordinated by the University of Siena.

The role of SDSN Mediterranean includes many activities, such as: mobilizing the relevant bodies, coordinating the activities of the network, disseminating the regional and global initiatives, also with policy makers, the private sector and NGOs, promoting initiatives that offer regional and global solutions, as well as forging close-knit communities of young academics with a strong awareness of the greatest challenges posed by sustainable development.

FOLLOW US ON SOCIAL MEDIA



Barilla
Center
FOR FOOD
& NUTRITION

