HEALTHY LIVING: LET'S START FROM FOOD

Fondazione Barilla

il tuo cibo, la tua terra

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Chapter 1:
Global food challenges

The aim of this in-depth analysis is to examine the theme of food in relation to health. Eating habits and lifestyles can have a significant influence on people's wellbeing and quality of life, and this is true from a very tender age.

Nowadays, problems of hunger and undernourishment are mostly restricted to specific areas of the world, principally those regions still afflicted by wid esp read poverty, conflict and precarious situations linked to hostile climate conditions such as, prolonged periods of drought and flooding. Nonetheless, while more than 690 million people struggle with hunger, the world must also face up to a new, paradoxically opposite nutritional challenge, like none encountered before in the history of humanity: the **obesity epidemic**. For the first time ever, in fact, across the world people carrying excess weight now outnumber those who are malnourished, with over 2 billion adults classed as overweight, and over 650 million obese. Unlike hunger, however, this problem is not restricted to a few countries, as obesity is found everywhere: in developed as well as developing nations. For example, of the top twenty countries with the highest obesity growth rates among adults, eight are in Africa (FAO, 2018). The problem affects young children too, as recent figures reveal that 38 million under-5s are obese or overweight (FAO, 2020). We have reached a critical juncture: if we fail to make important lifestyle changes, for the first time in the history of humanity, young generations will have a shorter life expectancy than their predecessors. The problems of overweight and obesity are not confined to the individuals concerned but have a global impact with serious socio-economic repercussions. Indeed, overweight and obesity are a risk factor for many Non-Communicable diseases (NCDs), including heart attacks, strokes, several types of cancer, diabetes and chronic respiratory diseases. It is an established fact that these diseases today represent the leading cause of death amongst the population, not to mention a huge financial burden on society, for example due to the costs associated with treating diseases and their complications (medical and hospital care, healthcare services, drugs, etc.). The global economic impact of obesity has been estimated to be around US $2 trillion per year, or 2.8% of global GDP (Dobbs et al., 2014, Tremmel et al. 2017). These are huge figures that can be compared to the effects caused by smoking or armed conflicts.

The main reason for this surge in obesity is that our current food systems do not encourage people to follow a healthy diet. Since the latter half of the 20th century we have seen a gradual change in people's eating patterns that has developed into a veritable **nutrition transition**. The most evident aspect, and also potentially the most dangerous as this transition continues, is the significant change in diet and lifestyle towards a **reduction in physical activity, an increase in average calorie intake, a reduction in the consumption of legumes, vegetables, cereals and other plant-based products, coupled with an increase in the consumption of animal-based products and foods high in sugar, fat and salt**. The latter elements, in particular, are easy to combine, very inexpensive and quick to prepare compared to fresh products, especially in urban areas. This nutrition transition could also have extremely negative effects on future generations, who risk facing worse living conditions than those experienced by previous generations, thus blocking the path of constant human progress towards ever-higher levels of wellbeing and health.

Chapter 1.1:
The role of the 2030 Agenda in feeding our Planet

Combating malnutrition in all its forms, namely, the condition characterized by deficiencies and imbalances, due to either excess or insufficiency, is one of the key goals set by the United Nations 2030 Agenda. This is an undertaking signed in September 2015 by the governments of 193 member states of the United Nations, which sets 17 Sustainable Development Goals (SDGs) that together form an extensive plan of action, including 169 targets.

In this framework, the phenomenon of malnutrition is covered by two key goals:

Goal 2, *"Zero hunger. End hunger, achieve food security, improve nutrition and promote sustainable agriculture";*

Goal 3, *"Good health and well-being. Ensure healthy lives and promote well-being for all at all ages".*

Indeed, it is evident that it is not enough to focus on increasing food production (also because we already produce enough food to feed the planet, if we consider that the food wasted globally would suffice, in theory, to nourish those who are currently hungry, or on promoting accessibility and guaranteeing food security (i.e. the availability of sufficient food to meet people's basic needs, in other words, ensuring the provision of healthy, safe food for all, with equal access to food for everyone). To stem the problem of malnutrition, we also need to promote healthy diets and lifestyles. In other words, **political agendas, both national and international, must stop thinking exclusively in terms of food supply, and start thinking in terms of nutrition**. In fact, while in certain contexts these terms can be interchangeable and used as synonyms, there is a subtle difference between

them. Food represents above all calorie intake and the physiological act of eating, corresponding to the act of supplying the body with the micro and macronutrients it needs. The term **nutrition**, on the other hand, refers to the various biological processes which, based on energy and nutritional intake, allow living beings to survive, grow and develop properly; in short, to thrive. Therefore, nutrition is not just about the quantity of food, but also its quality, which is fundamental for staying healthy. In this respect, adopting and maintaining dietary and exercise habits suited to today's new socio-environmental demands, constitutes an essential prerequisite for the wellbeing of present and future generations.

Chapter 1.2: Good for us, good for our Planet

While academics and sector experts have been grappling for years with how to feed the entire world population in a healthy and sustainable way, recent studies have highlighted the importance of favoring a largely plant-based diet, meeting the calorie requirements of one and all while reducing the consumption of animal-based products. This is a good choice not just for our own health, but for that of the Planet too, reducing the emissions that contribute to climate change and reducing the amount of water and land used for animal farming[1] (Willett W, 2019). An example of a diet that favors the consumption of plant-based products is the **Mediterranean diet** (see section 3.1).

The **Double Food and Environmental Pyramid model**, (fig. 1), is a graphic illustration specifically created to communicate this message effectively: namely, that the foods recommended for our health are also those with a lower environmental impact. From a technical point of view, this graphic model juxtaposes the classic food pyramid with a new (upside-down) environmental pyramid.

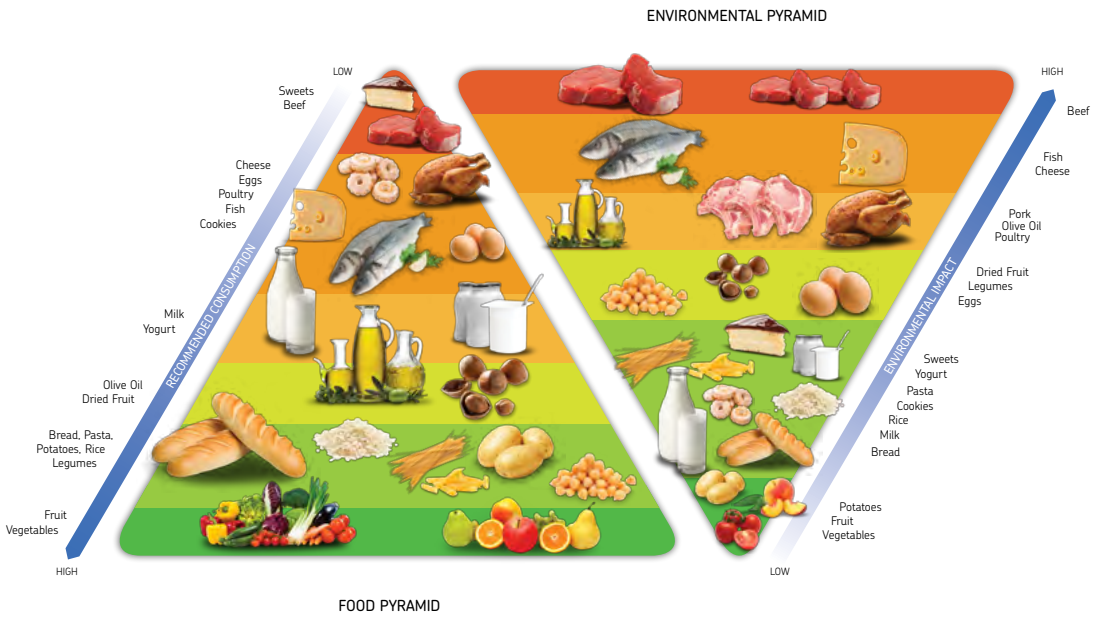


Fig. 1. Double Food and Environmental Pyramid model

1. More information about the environmental impact of agriculture is available in the first chapter of the "Food for a Sustainable Planet" Teaching Guide. Download it free of charge from the "insegnanti" section of the noiilciboilpianeta.it website.

The **food pyramid** summarizes the most important international guidelines on nutrition, inspired by the Mediterranean model. Foods are arranged within the pyramid based on consumption frequency. At the bottom, in green, are the foods that should be eaten every day (like fruit, vegetables, legumes and cereals, above all wholegrain). In the middle, in orange, are foods we should eat in moderation, alternating them over the course of the week, while at the top, in red, are foods we should eat only occasionally (like red meat, cured meat products and foods high in animal fats and sugar). **The environmental pyramid**, meanwhile, is shown upside down, with food which has the greatest environmental impact placed at the top, and that with the lowest impact at the bottom. The overall message is thus clear: what is good for us, is also good for the Planet[2].

2. *For supplementary material on the subject of the double pyramid, we recommend listening to chapter 9.1 of the online training course on sustainability by Professor Gabriele Riccardi (Health benefits of the Mediterranean diet and perspectives for its utilization as an educational tool for promoting diet sustainability). The course is available free of charge after registering on the http://www.educazionedigitale.it/noiilciboilpianeta/corso-formativo-online-sulla-sostenibilita/ website.*

Key words

According to the World Health Organization (WHO, 2016), malnutrition is a condition characterized by deficits and imbalances, due either to excess or insufficiency, in the amount of energy/nutrients that an individual consumes regularly. It is a very broad term that encompasses different conditions which, in English, have specific terminology.
Undernutrition: this is a general indicator that points to the lack of a healthy diet, caused by an insufficient supply of food or not eating sufficient quantities of foods containing those nutrients required for growth and health. This broad term encompasses four specific conditions: Stunting, Wasting, Underweight and Micronutrient Deficiencies. Children who fall into these categories are far more vulnerable than adults.

- **Stunting** (impaired growth or chronic malnutrition): this consists of retarded growth in children (lower than expected height-for-age). It can be serious or moderate, and is due to a deficiency in basic nutrients during the first 1000 days of a child's life (i.e. from birth up to 2 years of age).

- **Wasting** (severe acute malnutrition) is characterized by low weight-for-height and is the result of rapid weight loss or the inability/impossibility to gain weight in children. As with stunting, it can differ in intensity but when severe, it becomes highly life-threatening to children since they are nine times more likely to die than well-nourished children.

- **Underweight** is a label applied to both adults and children and indicates lower than expected weight-for-height, which can pose serious health risks. In adults, the term moderate underweight is applied when the Body Mass Index is below 18.5. The lower the number, the greater the risk of contracting diseases and being susceptible to heart problems.

- **Micronutrient Deficiencies**: this category indicates an abnormal nutritional state caused by a lack of intake/absorption of one or more vitamins or minerals. Globally, the main micronutrient deficiencies are: iron, zinc, vitamin A, folic acid, vitamin B12 and iodine. Overweight: malnutrition can also occur through excess, and this is the case with overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes and some types of cancer). Obese and overweight children are more vulnerable to the risk of illness over the course of their development and into adulthood.

Chapter 2:
Obesity and overweight

Overweight and obesity are conditions characterized by an **excessive accumulation of body fat** (adipose tissue) compared to lean body mass, mainly due to a combination of excessive calorie intake and insufficient energy expenditure (for example due to the lack of physical activity). In other words, eating more calories than we burn through exercise or routine daily activities.

An individual's body fat level is not directly quantifiable. Nonetheless, there are various methods that can indirectly provide a fairly accurate idea of the situation, ranging from skinfold thickness to waistline measurement, through to more sophisticated techniques like ultrasound, CAT and MRI scans. One of the most widely used and inexpensive tools is **Body Mass Index (BMI)**, which is internationally recognized. This index is the ratio of an adult person's body weight to his/her height squared. BMI is calculated using the following **formula: weight (in kg) divided by height (in meters) squared**. For example, if a person's weight is 65 kg and his/her height is 1.63m, their BMI will be approximately 24.5.

Standard Body Mass Index (BMI) categories

< 18,5	18,5 – 24,9	25 – 29,9	≥ 30
Underweight	Normal weight	Overweight	Obese

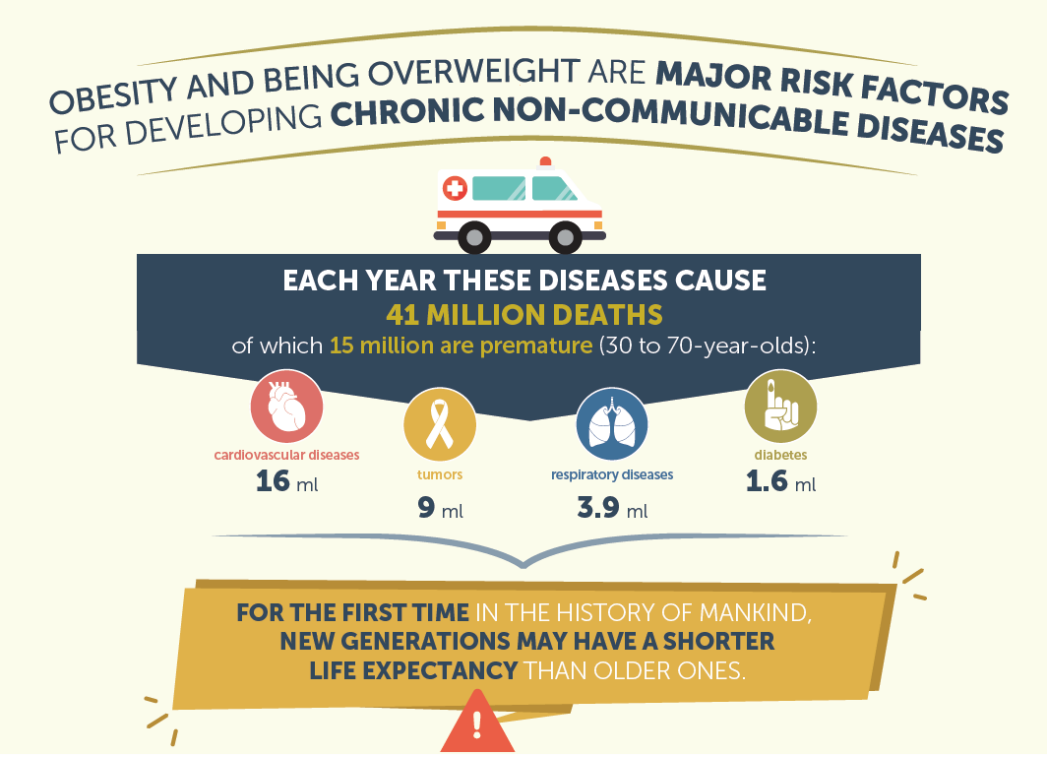
In the United States, the National Institute of Health (NIH) started defining the condition of obesity in adults in terms of BMI in the Eighties, and in 1998 established that a Body Mass Index of between 18.5 and 24.9 indicates a healthy weight, while a BMI of 25 or over indicates the overweight threshold and a value of 30 and above corresponds to obesity. It is worth remembering, however, that these values cannot be taken as absolutes. Indeed, BMI does not distinguish between fat and lean body mass, with the resulting risk of overestimating body fat in some individuals, like athletes, who have a muscular build (for example, looking at BMI alone, all very muscular athletes, such as swimmers, would be considered seriously obese, since muscle mass weighs a great deal more than fat), or of underestimating the body fat in individuals with less muscle mass, like the elderly. What's more, **this index must not be used with children**, for whom BMI is calculated using WHO growth charts together with the threshold values recommended by the International Obesity Task Force (IOTF), which takes into account the age and sex of the child.

It is important to consider not just the amount of body fat, but where the fat is located, since visceral fat has a much more significant impact on the risk of disease than fat located around the buttocks and thighs. A simple, albeit indirect and approximate, way to quantify abdominal fat is to measure the waistline using a standard tailor's tape measure. Values in excess of 102 cm for men and 88 cm for women indicate abdominal fat, which is associated with a higher risk of heart and metabolic diseases

Chapter 2.1:
Obesity and overweight as risk factors

In the past few decades, we have seen a significant, steady increase in levels of obesity and overweight worldwide. Since the Seventies, a general increase in BMI has been recorded in all countries and over time the figure has more than doubled. Overweight and, even more so, obesity (especially where body fat is largely abdominal) are considered **two of the greatest risk factors for health** and for the development of chronic non-communicable diseases, like cardiovascular diseases, diabetes, chronic respiratory diseases and some types of cancer. According to the World Health Organization (WHO), these diseases are responsible for the majority of deaths, approximately 41 million people every year, accounting for 71% of total deaths globally. Of these, 15 million are considered to be premature, as they involve individuals between 30 and 70 years of age. Cardiovascular diseases account for the majority of these deaths, killing around 44%, the equivalent of 17.9 million people every year, followed by cancers (9 million), respiratory diseases (3.9 million) and diabetes (1.6 million). Smoking, insufficient physical activity, alcohol abuse and unhealthy diet are considered the key risk factors for the development of these diseases (WHO, 2018).

A particularly serious problem is the development of **obesity and overweight in children and adolescents**, which makes them vulnerable from a young age to respiratory difficulties, joint problems and reduced mobility, but also digestive disorders and psychological problems. In addition, those who are obese in childhood often remain obese through adulthood: this brings an increased risk of early development of cardiovascular risk factors (like high blood pressure, heart dysfunctions, abnormal vascular reactivity) and abnormal metabolic conditions, like type 2 diabetes or high cholesterol.



Key words

The Italian language uses the general term malattia for a range of conditions diametrically opposed to health, but this term fails to take into account the personal and social dimensions of the phenomenon. The English language, on the other hand, overcomes this ambiguity by using a series of very specific terms:

- **Disease**: this term identifies a medical condition that has a negative impact on the physiological functioning or structure of a part or all of the body, and which is not attributable to an external injury.

- **Disorder**: this indicates functional abnormalities of the body. This term is considered more neutral and less stigmatizing compared to 'disease' or 'illness', and is the preferred choice in certain circumstances (for example, we talk about mental, physical, genetic and behavioral disorders, etc.).

- **Illness**: this term indicates the direct experience of the person affected, the existential/subjective aspect that generally prompts an individual to visit a doctor.

- **Sickness**: this represents the social dimension of a health condition, an acknowledgment by society (not by the medical world) that a person is sick.

Chapter 2.2:
A global problem

Worldwide, almost all countries are seeing an exponential increase in the phenomenon of obesity and overweight. In general, although not always, in low and middle-income countries overweight tends to occur in big cities and in the richer sections of the population. In higher-income countries, the problem tends to affect especially the poorest sections of society, due to the high cost and limited access to a healthy and varied diet. Cultural issues also play a role , as when people only find limited gastronomic satisfaction in the organoleptic qualities of food (aromas, colors, fragrance, freshness and contrasting flavors), their natural quest for pleasure associated with eating will shift from quality to quantity (binge eating takes precedence over select tasting). In addition, obesity and overweight are no longer phenomena that occur predominantly among adults and middle-aged individuals, but those are conditions that increasingly affect young people and children, painting a serious and steadily worsening picture. According to WHO data, globally, the number of obese and overweight children (0-5 years) rose from 32 million in 1990 to 41 million in 2016. The vast majority of these children lives in developing countries, where the rate of increase was 30% higher than that recorded in developed countries. If the current trends persist, this number is expected to reach 70 million by 2025 (WHO, 2017).


THE NUMBER OF OBESE AND OVERWEIGHT PEOPLE IS INCREASING WORLDWIDE
A HEALTHY LIFE STARTS WITH FOOD
SINCE 1975, OBESITY HAS NEARLY TRIPLED
1975
2019
Today, more than 2 billion adults in the world are overweight*
of which more than
650 million are obese**
* Overweight: body mass index (BMI) greater than or equal to 25
** Obesity: body mass index (BMI) greater than or equal to 30
CHILDREN (0-5 YEARS) ARE ALSO BECOMING INCREASINGLY OBESE AND OVERWEIGHT
32 million
41 million
70 million
1995
2016
2025
If nothing changes on a global level, this problem will affect 70 million children by 2025

A global problem

According to the findings of the **Food Sustainability Index** (FSI)[3] **2018** (whose index takes into account various health and nutrition related aspects, such as life expectancy and levels of malnutrition), the top scoring countries when it comes to **nutritional challenges** are Japan, South Korea and Denmark, showing that they are on the right track in tackling them. Conversely, Ghana, Sierra Leone and Mozambique are the countries facing the greatest difficulties, above all due to the very high poverty levels of their populations.

In this context, Italy is one of the countries with the longest-lived populations but, in terms of nutritional challenges, there is still a great deal of room for improvement. Indeed, Italy ranks 34th out of 67 countries evaluated by the FSI, 30th out of 35 high-income countries, 24th in Europe and 9th out of the 15 Mediterranean countries. The figures on overweight are particularly worrying, as 59% of adults and 37% of children and adolescents, aged 5-19 years, are carrying excess weight. The underlying reason is mainly a combination of poor eating habits and insufficient physical activity, which can lead to the early development of chronic and degenerative diseases. Only 59% of Italians actually get the recommended amount of physical activity (Guthold et al., 2018). The growth of the service sector, long working days and largely sedentary ways of life, coupled with high levels of urbanization and frequent car use, are all obstacles to a healthy, active lifestyle, which must be promoted through a coordinated public health plan that goes beyond educating citizens individually. At the same time, the analysis of Italians' eating habits reveals once again that the country is progressively drifting away from the traditional Mediterranean diet, as it increasingly embraces eating habits characterized by excessive consumption of animal fats, salt, sugar and red and cured meats. For example, the average daily intake of salt among adults (age of sample group 35-79 years) in Italy is around 10.6 grams for men and 8.2 grams for women, values well above the WHO recommended amounts, that is to say, less than 5 grams per day (ISS, 2019).

Therefore, **changing lifestyles for the better is the first step in tackling nutritional challenges in Italy**. At the moment, however, there is no national coordinated strategy for diet and health. However, programs and initiatives like *"Getting healthier: Making healthy choices easier."*, *"Fruit and vegetables in schools"* and *"Class Sport"* are good practices for promoting healthy lifestyles, through a joint effort by various stakeholders at different levels.

3. *The Food Sustainability Index is a quantitative and qualitative tool that ranks the performance of 67 countries based on the sustainability of their food system and their income. The end result is not a true ranking but a general overview of the food sustainability of the analyzed countries, calculated based on three pillars: food waste, sustainable agriculture and nutritional challenges. The countries considered by the Index account for over 90% of our global GDP and 4/5 of the world population. The Food Sustainability Index was developed by the Barilla Center for Food & Nutrition (BCFN) in collaboration with The Economist Intelligence Unit. The 2018 edition mainly focuses on the best practices in the field of food sustainability which contribute to the fulfilment of the 17 Sustainable Development Goals.*

Chapter 3:
Diet and wellbeing for a healthy lifestyle

The term 'health' implies not merely the absence of disease but a state of complete physical, mental and social wellbeing. Thus, a healthy lifestyle implies a way of living that seeks not only to reduce the risk of disease and premature death but, above all, to bring about this much-desired state of wellbeing. To achieve this, healthy eating habits and physical activity are two essential elements and their absence represents a primary risk factor for the development of the major non-communicable diseases.

Physical activity

All the studies conducted at international level show that one of the most important factors for the prevention of non-communicable diseases, above all for combating diabetes and cardiovascular diseases, is regular physical activity for at least 150 minutes per week for adults (18-64 years) and at least 60 minutes per day for children and adolescents aged 5-17 years (WHO, 2011). Physical activity does not necessarily mean going to the gym. Indeed, according to the WHO definition, it indicates *"any bodily movement produced by skeletal muscles that requires energy expenditure"*. This is quite a broad description that embraces not just sporting activities, but also simple everyday actions like walking, cycling, dancing, playing, gardening and doing housework. What is important is that these activities should be part of an active daily routine, and not restricted to just a few hours over the course of the week.

Diet

It is scientifically proven that healthy eating, based on a varied, well-balanced diet characterized by a carefully balanced intake of all the key nutrients, is essential for the prevention of non-communicable diseases and for increasing the wellbeing of individuals, whether they are children, youths or elder persons. Eating well does not mean simply choosing the right foods, since no food can be classed as entirely good, bad or "miraculous", even though some foods are obviously considered healthier (for example, fruit and vegetables) than others (like foods high in sugar, salt and/or animal fats). Instead, the benefits of healthy eating depend on how we combine foods during the day and over the course of our everyday lives. A balanced diet is not achieved with one meal, or in a single day, but progressively and continuously over time.

Similarly, although broadly in agreement, the guidelines and indications provided by leading international scientific organizations cannot be used to cobble together a supposedly perfect diet that will ensure healthy growth during childhood, maximum benefits in terms of health and disease prevention, and a long and healthy old age. There are, in actual fact, various reasons linked to the typical food products and the dietary traditions, customs and practices of every single country or region of the world that make it unrealistic and, in any case, wrong to contemplate promoting an ideal meta-diet. However, scientists do agree that an excellent diet is based on having the recommended number of servings or amounts per day from each of the main food groups (ISS, 2018 Willett W 2019):

- **The fruit and vegetables group**: this is comprised of foods that form the base of the food pyramid. They are rich in vitamins, especially antioxidants, as well as minerals and fiber, and play a positive role in the prevention of the leading chronic diseases associated with aging. A healthy diet should contain at least 5 portions[4] of fruit and vegetables per day.
- **The cereals, cereal products and tubers group**: starchy foods, like bread, pasta and rice, cereals like spelt and barley, and potatoes (potatoes should not be considered as vegetables!), should be eaten every day. Starchy foods are classed as complex carbohydrates and they are the main source of energy for the body, above all for the brain and red blood cells, which rely on glucose alone to "fuel" cell activities. Their consumption, in adults, varies depending on individual requirements, however they should account for approximately 45-60% of daily calorie intake. However, **they are not to be confused with sugars**. The carbohydrates group is quite complex and can be divided into three categories: sugars, starch and fiber. Unlike the latter two, which are complex carbohydrates, sugars are a source of simple, readily available energy; they are often added to processed foods, like sweets and sugary drinks but they do not provide the body with any other valuable nutrients. For this reason, their consumption should be strictly limited, not exceeding 10% of daily calorie intake (LARN, 2014). As regards starchy foods, guidelines issued by leading international scientific organizations recommend giving preference to products that are high in fiber, especially wholegrain cereals (at least 50% of the consumption of cereal-based products like bread, pasta, rusks, rice and barley), legumes (also rich in protein) and nuts (which also contain vegetable fats). Vegetable fiber helps to keep blood sugar levels under control after eating and increases the feeling of fullness, helping to limit the consumption of high-calorie foods between meals and preventing hunger pangs before the next meal.
- **The milk and dairy products group**: including yogurt, fresh dairy products and cheese, this group serves above all to provide calcium, in a highly bio-available format, which means it can be readily absorbed and used by the body. Foods in this group also contain protein of excellent biological value and several vitamins (especially B2 and A). However, particular attention needs to be paid to cheese, given its high fat content: cheese consumption should be limited and the product treated as a substitute for meat and fish, while the remaining dairy products can be consumed regularly but in moderation; in some cases, it could be useful to give preference to those lower in fat. Products like cream and butter, meanwhile, fall outside this group, since they are animal fats, consumption of which should be limited as much as possible. Lastly, we should bear in mind that calcium can be obtained not just from this group, but also from other sources, including water.
- **The meat, fish and eggs group**: this group's main task is to provide protein and trace elements (particularly zinc, copper and iron in highly bio-available form), plus B-group vitamins (especially vitamin B12). Consumption of these products should be alternated over the course of the week, minding to limit consumption of red meat and avoid cured meats (ham, salami, etc.) as much as possible. From a nutritional point of view, it is useful to include **legumes** (beans, chickpeas, peas, lentils, etc.) in this group too, because in addition to providing starch and fiber, they also contain iron, other trace elements and significant amounts of protein of high biological value.

4. A portion means the equivalent of about 80 grams

- **The fats and condiments group**: contrary to popular belief, fueled by a "fat-phobic" society, fats are an essential part of our diet and, in adults, their consumption should account for approximately 25-30% of daily calorie intake (for sedentary individuals) up to a maximum of 35-40% (for those with extremely active lifestyles). From a qualitative point of view, however, not all fats are equal. Their chemical composition, especially as regards fatty acids (which can be saturated, unsaturated or trans-unsaturated), has a great influence on our health. They are best obtained from foods like fish and nuts; as for condiments, preference should be given to vegetable oils (with the exception of palm and coconut oil), in particular extra-virgin olive oil, which is rich in anti-oxidants and also allows optimal absorption of fat-soluble vitamins (A, D, E and K), that is to say, those vitamins which, in order to be absorbed, need to bind themselves to fat molecules.

In conclusion, a balanced diet, together with an active lifestyle, helps to maintain a healthy body weight and prevent leading non-communicable diseases, thus helping individuals to live healthy lives (GBD LANCET 2019). However, we should bear in mind that, as well as combining the various food groups, in order to ensure a balanced diet we also need to vary the foods we eat as much as possible, drink plenty of water, reduce our consumption of sugar, sweets and sugary drinks, limit our salt intake (which should not exceed 5 g per day) and our consumption of alcoholic drinks, as well as animal fats and foods high in the latter (meat and high-fat cheeses).

Chapter 3.1:
The Mediterranean diet

One of the dietary models most acclaimed for its nutritional quality and its ability to help prevent non-communicable diseases is the Mediterranean diet. It is characterized by: high consumption of vegetables, legumes, fresh fruit and nuts, olive oil and cereals (approximately 50% wholegrain); regular but not excessive consumption of fish, especially oily fish; a moderate amount of dairy products; and an even more moderate consumption of meat (especially red meat and cured meats) and sweets (Trichopoulou et al., 2014).

The idea and concept of the Mediterranean diet were formulated in 1939 by the doctor and nutritionist Lorenzo Piroddi, who was the first to spot the link between diet and diabetes, bulimia and obesity. Later, in the Fifties, Ancel Keys, a physiologist and scientist at the School of Public Health of the University of Minnesota, came to Italy on vacation and noticed something that seemed very strange at the time: the poorest people in small towns and villages of southern Italy, whose diet consisted largely of bread, vegetables and tomatoes, were far healthier (especially as regards cardiovascular diseases) not only than the American population, but also than their own relatives who had emigrated to the United States years before.

The nutritional value of the Mediterranean diet was then scientifically demonstrated in the Seventies by Keys himself, through the "Seven Countries Study" (Keys et al., 1970; 1980). In it, he compared the diets of seven different countries (United States, Holland, Greece, Finland, Japan, Italy and the former Yugoslavia) to evaluate their benefits and limitations. It was precisely his scientific analysis that highlighted, for the first time, the existence of strong links between the dietary model adopted by people and their risk of developing chronic diseases, especially cardiovascular diseases.

In the years that followed, many other studies looked in detail at the relationship between diet and health, confirming that the adoption of a Mediterranean diet represents a **protective factor against the most common chronic diseases**, insomuch as it is linked to a low mortality rate, a lower incidence of cardiovascular diseases, metabolic disorders and some types of cancer. It is now more than thirty years since the first studies on the Mediterranean diet were carried out and no scientific evidence has yet emerged to contradict these positive effects (Dinu 2018).

Understanding Food Nutrition Labels

In Europe, nutrition labels are required by law and are a strategic tool for making better and more informed choices, as they provide us with all the information we need. With specific regard to nutrition, they must state the content (expressed as amount per 100 g or per 100 ml or per portion) of:

- calories (energy);
- fat (of which saturates);
- carbohydrate (of which sugars);
- protein;
- salt.

In addition, the label referred to the product must also provide the following information: the name of the food (what it is and what form it takes, for example "milk", "powder"), the list of ingredients, the product expiry date, conditions of use and storage, as well as the country of origin and place of provenance.

Knowing how to read labels can be a valuable ally for our health and for combating overweight and obesity as, for example, it can help us to manage our intake of sugar, excessive consumption of which can lead to an unbalanced and/or excessive diet in terms of calories, resulting in weight gain. Daily intake of sugar (not to be confused with complex carbohydrates) should be reduced to less than 10% of total energy consumption. For an average diet of 2100 calories, this corresponds to approximately 50 grams (LARN, 2014). It is worth stressing that this recommendation does not apply to sugar naturally present in fruit, vegetables and milk, but only to monosaccharides (glucose and fructose) and disaccharides (sucrose) found in sweets and sugary drinks, and to sugars naturally occurring in honey, syrups, fruit juices and/or concentrated fruit juices.

Chapter 4:
Promoting healthy lifestyles and eating habits

Given the evidence we have seen so far in this publication, it is safe to say that there is a growing awareness at every level of the importance of adopting a healthy lifestyle right from the earliest years of childhood, in order to enjoy good health throughout our adult lives. In general, the **summary of the key guidelines** reminds us to:

- Choose a healthy, balanced diet, alternating the main food groups.
- Avoid excess calories, like those from sugary drinks and snacks high in fat and sugars.
- Distribute food over the course of the day (for example, having three moderate-sized meals, plus two snacks).
- Control portion sizes and avoid eating in between the 5 recommended meals.
- Give preference to plant-based protein and fats.
- As regards starchy foods, choose those high in fiber, above all wholegrain cereals, legumes and nuts.
- Eat at least five portions of fruits and vegetables per day.
- Minimize salt intake to avoid developing high blood pressure.
- Do at least 30 minutes of physical activity daily.
- Combat a sedentary lifestyle by reducing screen time.

Moreover, evidence supporting the inestimable value of healthy eating habits from earliest childhood as a means of preventing non-communicable diseases, underlines the importance of taking action to promote good nutrition education and a culture of prevention. In this context, **school plays an important role**, working in partnership with families and paediatricians, etc. Ensuring that children adopt healthy eating habits requires a collective effort resulting from the contributions of the many different people involved in caring for children and young people at different moments of the day.

For example, the European Union (E.U.) considers the education system as a vital starting point, and over the years it has launched the initiative *fruit*, vegetables and milk in schools involving the distribution of these foods in E.U. schools, as part of a wider education program on European agriculture and the benefits of healthy eating[5]. In Canada, meanwhile, the government supports the *Farm to School* project, which offers learning opportunities on healthy diets in places like gardens, greenhouses, kitchens and schoolrooms, and during trips to local farms, woods and lakes.

Another example is the case of *Revolution Foods*, an American company that develops, produces and delivers meals to school cafeteria, according to a well-structured food program that is enticing to children, provides excellent nutrition and meets the requirements set by the federal government as regards reimbursement.

5. In Italy, this program is coordinated by MIPAAFT (the Italian Ministry of Agricultural, Food and Forestry Policies), in collaboration with MIUR (the Italian Ministry for Education and Research), the Ministry of Health, Agea, the Regions and Autonomous Provinces of Trento and Bolzano. The Program is intended for primary schools and is aimed at students aged 6 to 11, who participate free of charge. The aim is to encourage children to eat fruit and vegetables and support them in achieving healthy eating habits. For that purpose, teacher training initiatives are carried out on food education topics, along with recreational-educational initiatives to facilitate consumption and tasting of the products distributed. Over the years, the Program has involved an average of about 1 million students and since its activation the results show an increasing consumption of fruit and vegetables by families and children.

Today the company serves 2 million meals per week, distributed to 2500 schools and communities across 15 states, striving to combat obesity and malnutrition at school so that the young people can concentrate better, which in turn brings benefits in terms of academic performance and behavior. *Revolution Foods* is a good example of how it is possible to run a successful company based on a social mission, and to supply school meals that are healthy and affordable as well as tasty and nutritious.

In South Korea, meanwhile, the city of Seoul is committed to promoting the health of future generations through a multi-stakeholder project, called *Seoul Eco Public Plate* (SEPP) which, since 2015, has been transforming school cafeteria meals into "Eco Meals". Tailored to their nutritional requirements, the meals are provided free of charge to all elementary and middle school students, linking the urban districts of the city to the countryside through a supply system that mainly relies on environmentally friendly local agricultural areas.

Lastly, the role of physical exercise is not to be overlooked. One example in Italy is the *Sport di Classe* (Class Sport) project run by the Ministry of Education, Universities and Research (MIUR) in partnership with the Italian National Olympic Committee (CONI), promoting physical activity at school and rolled out in elementary schools across 8 Italian regions (Abruzzo, Basilicata, Calabria, Campania, Molise, Apulia, Sardinia and Sicily). It aims to increase the amount of time dedicated to physical exercise and sport by approximately 2 hours per week (60 hours over the school year).

Looking at initiatives that combine both diet and physical activity, one project worth mentioning is "Giocampus". The project is backed by a public-private educational partnership involving a number of public and private agencies from the city and surrounding province of Parma, whose entire approach is based on the scientifically-proven idea that a healthy diet, coupled with physical activity, is essential for guaranteeing a good future quality of life. The project, steered by highly qualified educational specialists (Activities Teachers and Taste Teachers), accompanies students throughout the year with three main phases: Giocampus School, Snow and Summer. The quality and effectiveness of the project are constantly monitored and supported by scientifically collected data, which shows significant improvements in both target areas (www.giocampus.it).

TO LIVE BETTER AND LONGER, WE NEED
TO REVOLUTIONIZE OUR LIFESTYLE.
HOW SHOULD WE START?

10 TIPS BY THE BARILLA FOUNDATION TO LIVE BETTER AND LONGER

1. **CHOOSE A HEALTHY AND BALANCED DIET** BY EATING DIFFERENT TYPES OF FOOD.


2. **AVOID EXCESS CALORIES:** EAT MODERATE PORTIONS AND DON'T EAT IN BETWEEN MEALS.


3. **DISTRIBUTE MEALS THROUGHOUT THE DAY:** 3 LIGHT MEALS AND 2 SNACKS.


4. **EAT SEASONAL FRUITS AND VEGETABLES** BUT ALSO LOCAL PRODUCE, FOR A MORE VARIED DIET.


5. **EAT BOTH ANIMAL PROTEIN** AND VEGETABLE PROTEIN.


6. **DRINK PLENTY OF WATER,** AT LEAST 6-8 GLASSES A DAY.


7. **REDUCE SALT CONSUMPTION TO A MINIMUM,** FOR EXAMPLE BY EATING LESS PRESERVED FOOD.


8. **ALWAYS READ PRODUCT LABELS** TO MAKE CORRECT, INFORMED CHOICES.


9. **EXERCISE EVERY DAY:** WALK OR CYCLE AT LEAST HALF AN HOUR A DAY.


10. **AVOID A SEDENTARY LIFESTYLE:** SPEND LESS TIME IN FRONT OF COMPUTERS AND ELECTRONIC DEVICES.


Suggestions for classroom activities

School can play an important role in preventing and combating overweight and obesity. However, these can be sensitive matters to deal with directly in class. Indeed, from a very young age children learn to be aware of their own bodies, but they have no direct control over their way of eating which, instead, reflects internal family dynamics. The same is true of adolescents, whose changing bodies are often the source of deeper conflicts and anxieties. For this reason, teachers are advised never to tackle the subject head-on, but to focus instead only on the benefits of the actions, namely, a healthy diet and physical activity. Talking about ideal weight should also be avoided, so as not to inadvertently put across the message that losing weight is the ultimate goal to aim for. Indeed, although healthy bodies come in all different shapes and sizes, which has a considerable bearing on final weight, acceptance of one's own body is a subject that falls outside the objectives of this teaching guide and the exercise booklet does not provide specific tools for navigating this issue. The focus here remains the promotion of healthy eating and healthy lifestyles.

1. Let's learn to read nutrition labels: Salt & Sugar

Recommended target: elementary school.

General goal: to understand the importance of healthy eating habits, promoting a varied, balanced diet, considered an essential factor for maintaining a healthy body weight. To this end, nutrition labels will be presented, focusing in particular on sugar and salt in a bid to help the children understand exactly how much sugar and salt is hidden in the various foods.

Preparation: Investigate the themes of a varied diet (chapter 3) and of food labels with specific reference to sugar (dedicated box, page 19) and salt (chapter 2.2).

Material: Blank posters, colored felt-tip pens, collage material, various types of packaged foods and beverages.

Exercise: After an introduction on the importance of a varied diet, the teacher introduces the food labels, explaining their function.
Afterwards, the students work in groups to understand how much sugar there is in the labels they have been given as examples. Teachers are advised not to restrict the selection to sweet products only, but to include foods considered "savory" or neutral (like ketchup, barbecue sauce, ready-made sauces etc.). Indeed, sugar can be present in foods, even when it is not immediately detected by the palate. In addition, this exercise is particularly effective if pupils are able to compare it with actual consumption, using a cup, kitchen scales and sugar, including in cube form. Pouring the sugar into a cup will make it easier for them to grasp how much sugar they might actually be consuming, especially in the case of sugary drinks. Lastly, the students produce a poster detailing their findings. It is a good idea to leave at least 10 minutes at the end for a class discussion, led by questions: which foods contain the most sugar? Where did you not expect to find so much sugar? How can I cut my sugar intake?
The same exercise can be repeated with salt. The same advice generally applies (especially to use a variety of foods, including sweet and neutral products) but, given that salt is used in much lower amounts, there is no need to weigh it directly in class. Lastly, depending on the time available to the teacher, the two exercises can be carried out simultaneously, dividing the class into two large groups and working on comparing their results. Alternatively, they can be done one after the other, ideally tackling sugar first (as it is easier to measure) and then salt.

Homework: ask the students to talk about what they learned during the class and to try to find out how much sugar there is in 3 sweet or savory products in their homes that they eat on a regular basis (the same exercise applies to salt). If the class exercise was carried out simultaneously, at home the students should add 3 sweet and savory products, and practice again with salt. Lastly, they should write a short report, answering the questions used in class to lead the discussion (which foods contain the most sugar/salt? Where did you not expect to find so much? How can I cut my sugar/salt intake?).

2. The animals race

Recommended target: elementary school.

General goal: to understand the importance and characteristics of an active lifestyle and to identify the main causes of a sedentary lifestyle.

Preparation: Investigate the various aspects of the role of physical activity in the prevention of non-communicable diseases (chapter 3).

Material: Schoolroom and clothing suitable for physical activity, notebook or blank sheets of paper.

Exercise: After an introduction on the importance of leading active lives and what it mean by that, we move on to analyze the causes of a sedentary lifestyle (this activity can be done as a brainstorming exercise) and the strategies that can be introduced to remedy that. Next, the teacher takes the students to the gym room (or outdoors, weather permitting) and explains the animals race game. The students have to run, without ever stopping, imitating the running style of the animal shouted out by the teacher. It is essential to alternate different animals. Include only one very fast animal (like a cheetah), which requires sprinting, and a few slow or very slow animals (like a tortoise or a sloth), so as to allow the children to get their breath back, and vary the pace with a few animals that don't run, but move in a different way (like a kangaroo, penguin or snake). Before starting, it's good idea to agree with the students on the pace to adopt, thus avoiding improvisation that could lead to confusion. In addition, in order to hold the children's attention, never keep the same animal going for more than 30 seconds at a time (for super-fast animals, a few seconds is long enough). When the game is over, before heading back to the schoolroom and to let the children rest a while, remember to leave 10 minutes for the students to discuss which animal they liked best and how they felt imitating the various animals. The goal is to lead children to the conclusion that exercise is an enjoyable activity that helps the body and mind to feel better.

Homework: Create a table for a physical activity diary as shown in the example.

Day	Type of physical activity	Duration
E.g. Wednesday	E.g. I walked up 3 flights of stairs	E.g. 3 minutes
	E.g. I cycled to my grandparents' house	E.g. 20 minutes

This table shows just a few essential elements, but it is a good idea to have the children personalize/decorate the table to get into the spirit of the homework. For a week (even 5 days is fine) they will be required to monitor their physical activity. The goal is to make them aware of how much exercise they get on a daily basis, and to indirectly encourage them to be active. In the interests of privacy, teachers are advised to avoid reading out the diaries in class at the end. The teacher checks that the homework has been done and organizes a group discussion with the children on possible solutions for staying active, outside organized sports activities. The list of ideas for staying active could also be turned into a mini-project, writing them on a poster or sheet of A4 that can be taken home to use as a reminder or displayed in the classroom for the benefit of all.

3. My food pyramid

Recommended target: middle school.

General goal: to understand the importance of a varied, balanced diet over the course of each day and to explore the mechanisms that regulate hunger and satiety.

Preparation: Investigate the themes of a varied diet (chapter 3). It is also a good idea to look at how food should be distributed over the course of the day and study the food pyramid (chapter 2 of the Teaching Guide[1]).

Material: Notebooks or blank sheets of paper, IT tool for projecting images (optional).
Exercise: After an introduction on the importance of healthy eating habits and a description of the macro food groups, the teacher asks the class to reflect on their own eating habits. The goal is to make them think about the type of foods they eat every day, those they alternate during the week and those they eat only occasionally. Below is an example chart (see exercise on p. 27) that can be projected on the interactive whiteboard (IWB), or with the available IT tools, or which can be photocopied and given as handouts to the class (see p. 27). The use of the pyramid is recommended (although not essential) because it makes it simpler to separate the three blocks and facilitates comparison with the food pyramid. Once the children have finished writing, they are asked to divide their sheet of paper into three sections (i.e. foods they eat every day, those they alternate over the course of the week and those they eat occasionally), which are collected separately and anonymously. The teacher then divides the children into three groups, tasked with analyzing the various foods and grouping them together based on food type. This will make it possible to represent the eating habits of the entire class, and not just individual eating habits. This is a very important aspect, which helps to prevent any potentially judgmental situations from arising. After the analysis phase, the teacher shows the class the food pyramid (see figure 3) and explains to the children how the basic foods are arranged according to frequency of consumption: at the bottom, in green, are foods that should be eaten every day, in the middle are those that should be alternated over the course of the week, and at the top, in red, are those foods that should be eaten in moderation. For an interactive explanation, teachers can use the pyramid game featured in the Open Mind® tool. After explaining the basic principles, the teacher can compare the eating habits of the class and allocate time to a group discussion to collect opinions and suggestions, if improvements need to be made.

Homework: Create a hunger clock. For a healthy diet, it is essential that young people learn to recognize the signals of hunger and satiety, that is, the feeling of fullness. Indeed, it is not unusual for people to eat when they are not actually hungry, or to confuse appetite signals with different emotions or moods (for example, anger or boredom). The teacher asks the children to create a simple chart (see figure 2 as an example) and to rate how hungry they feel at each hour of the day, on a scale from 1 to 5. The goal is to make them aware of their eating habits. In the interests of privacy, teachers are advised to avoid reading out the clocks in class at the end.

1. As an additional support to the explanation, the teaching guide can be downloaded (after registering) from the "insegnanti" section of the noiilciboilpianeta.it website. Chapter two provides a general overview of the subject of food in relation to people's well-being. In particular, we recommend viewing the section dedicated to nutrition for growing children.

The teacher checks that the homework has been done and, after appraising the overall situation, organizes a discussion with the children on what their homework reveals, helping them to reflect on possible strategies to better organize the distribution of their calorie intake over the course of the day.

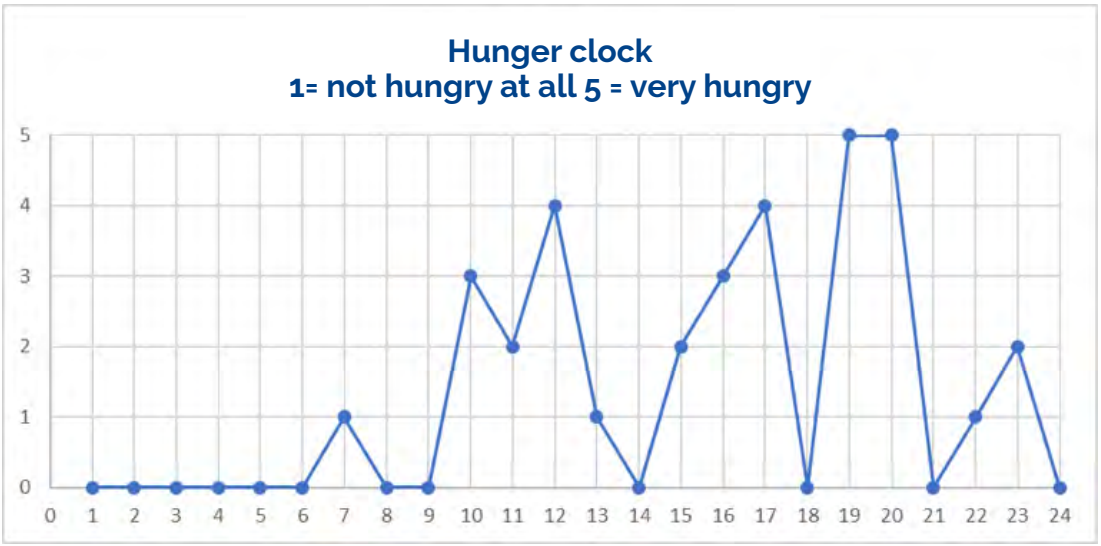


Fig. 2. Example of hunger clock

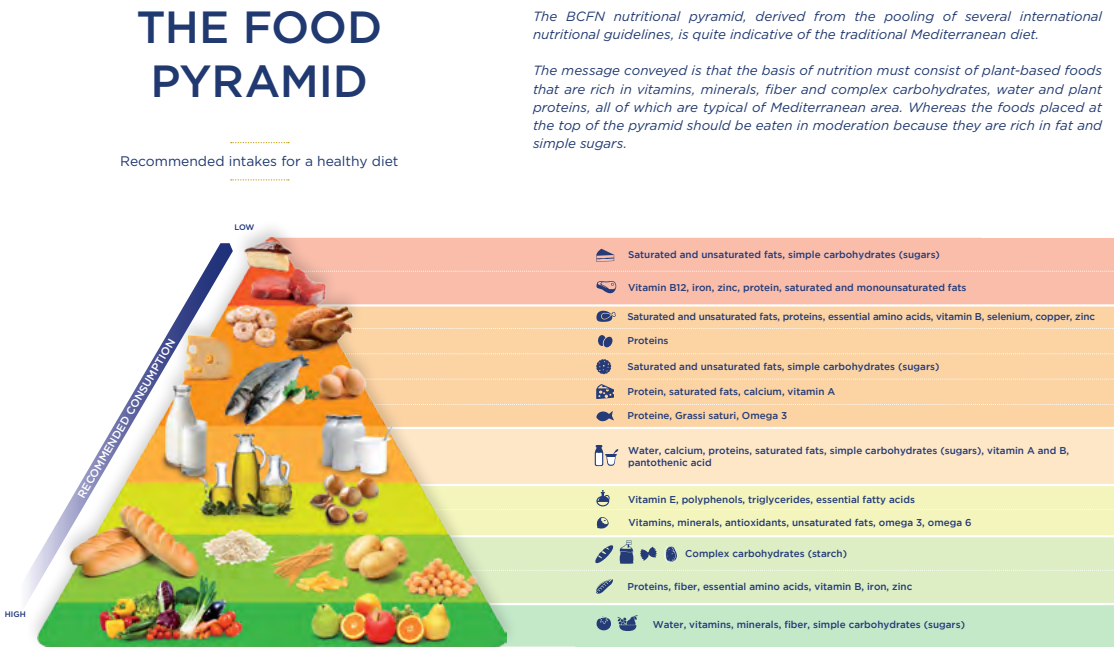


Fig. 3. Food pyramid

COMPLETE YOUR FOOD PYRAMID

RARELY EATEN FOODS

FOODS ASSUMED WEEKLY (ONCE OR MORE)

DAILY EATEN FOODS

4. Communicating healthy diets

Recommended target: high-school

General goal: to understand the importance of a varied, balanced diet and the elements that characterize it.

Preparation: Investigate the themes of healthy eating (chapter 3).

Material: notebooks or blank sheets of paper and pens for writing.

Exercise: given the age of the students, rather than a traditional lesson, teachers are advised to adopt a method that stimulates their curiosity and creates fertile ground for a class discussion on the content. After briefly explaining to the class the basic principles of a healthy diet and the elements that characterize it, the teacher divides the students into five groups, assigning each one a different food group (i.e.: fruit and vegetables; cereals, cereal products and tubers; milk and dairy products; meat, fish, eggs and legumes; fats and condiments). The students are required to work in their groups to write a brief report (maximum 500 words) on the characteristics and nutritional features of their food group, sharing their report with the class once they are finished. Once everyone has listened to the various reports, the teacher splits up the groups and forms new ones, including a representative of each category, so that each group has a member who worked on fruit and vegetables, one who worked on cereals, another on milk and dairy, one on meat and one on fats. The goal of these new groups will be to create advertisements that encourage young people like them to follow a healthy diet. At the end, it is a good idea to display the resulting projects in the classroom and encourage the other students to comment and provide constructive feedback. If the teacher deems feasible, the students can be encouraged to draw up a scoreboard featuring the best ideas put forward, using a very simple voting procedure that prevents them from voting for their own group.

Glossary

Carbohydrates: also called glucides (from the Greek, *glucùs*, meaning "sweet") are organic chemical compounds consisting of carbon, hydrogen and oxygen atoms. Carbohydrates form the basis of a balanced diet and are the main source of energy for the body, above all for the brain and the red blood cells, which rely on glucose alone to "fuel" cell activities. Their consumption, in adults, varies depending on individual requirements, however they should account for approximately 45-60% of daily calorie intake. Carbohydrates are a complex category which, depending on their molecular structure, can be simple (like sugars) or complex (like starch and fiber).

Diet: from the Greek, *diaita*, diet originally meant: habit, way of living; giving rise to the Latin, *diaeta*. The term diet indicates a set of eating habits/practices. Today, however, the term is increasingly associated with a period of more or less restricted eating, distorting the actual meaning of the word, which instead underscores the role of consistency and habit.

Fats: or lipids, are the nutrients highest in calories and, in an adult's diet, they should contribute to 20-35% of total energy, depending on individual energy expenditure. Not all fats are the same and they can be divided into saturated, polyunsaturated, monounsaturated, trans and hydrogenated fats. Cholesterol is also a type of fat and, together with saturated and trans fats, it affects the level of cholesterol in the blood. Nevertheless, unlike other fats, it is not an essential nutrient, since the body is capable of producing it in sufficient quantities to meet its needs (for hormone synthesis and bile production).

Body Mass Index: abbreviated as BMI, is a biometric measure, used as an indicator of whether an individual has an appropriate body weight, and is expressed by the ratio of an adult's body weight to height squared.

Non-communicable diseases: (NCDs), are quite a broad group of illnesses that mainly include heart diseases, stroke, cancer, diabetes and chronic respiratory diseases. These are chronic diseases, which often first develop when the patient is young, but take decades before clinical symptoms appear. Their development can be attributed to several common and modifiable risk factors, like a poor diet, smoking, alcohol abuse and lack of physical activity.

Malnutrition: is a condition characterized by deficiencies and imbalances, due either to excess or insufficiency, in the amount of energy/nutrients that an individual needs to consume on a regular basis. In general, it is a very broad term, which covers two macro-conditions: under-nutrition and over-nutrition.

Proteins: these can be defined as the body's "building blocks" and are comprised of a chain of 20 different, simpler elements called amino acids. Of these 20, 8 are classed as "essential" inasmuch as they need to be introduced through food, since the body itself is unable to "build them". Protein provides 10-15% of an individual's daily calorie intake and, in adults, should amount to 0.9 grams per kg of body weight per day, the equivalent of around 50-70 grams for a person of healthy weight with a moderate level of physical activity.

SDGs: the Sustainable Development Goals, (SDGs) set by the United Nations are a set of 17 goals, designed for the future of international development, which together form an extensive plan of action, including 169 targets. The Sustainable Development Goals replaced the Millennium Development Goals (MDGs) at the end of 2015 and were underwritten by the 193 member countries of the United Nations, for the period 2015-

2030. Unlike the MDGs, the SDGs are designed for all countries of the world, reminding us that sustainable development is a universal objective.

Food security: this refers to the availability of sufficient food to meet people's basic dietary needs, in other words, a situation in which everyone has equal and stable access to a sufficient quantity of affordable food. In Italian we must take care to avoid confusing the term with 'food safety'. The latter has the same translation in Italian, but concerns instead the safety of the food we consume on a daily basis in terms of health and hygiene and any risks it may pose to our health and the environment, which are constantly assessed.

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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.

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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.

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