



# MODELS OF HEALTHY AND SUSTAINABLE DIETS STARTING FROM TRADITIONAL DIETS

CCM PROJECT- CENTRAL ACTION 2019 OF THE MINISTRY OF HEALTH  
(General secretary)

PLATFORM TO FIGHT MALNUTRITION IN ALL ITS FORMS  
[“triple burden”: overweight and obesity, undernutrition and micronutrient deficiencies]



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(“triple burden”: overweight and obesity, undernutrition and micronutrient deficiencies)

Collaboration agreement between Umbria Region and the Local Healthcare Centre of the City of Turin

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# 1. THE DOCUMENT

The Document was drawn up for CCM Project (*National Centre for disease prevention and control*) on the “**Platform to fight all forms of malnutrition**”, conceived to implement ONU Resolution of the Agenda 2030 and Decade of action on nutrition (issued in April 2016). The Decade foresees a collective and global effort with actions also at national level aimed at fighting all forms of malnutrition (triple burden: overweight and obesity, undernutrition and micronutrient deficiencies) and guided by the Member States of the United Nations with FAO, WHO and in collaboration with WFP, IFAD and UNICEF.

It is important to engage stakeholders in the Decade, who are invited to present programs in

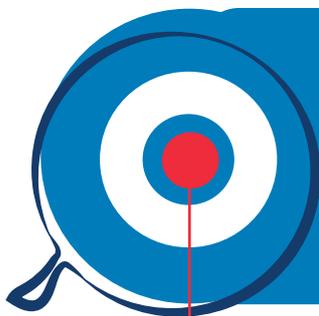
line with the “*six pillars*” identified during the International Conference on Nutrition (ICN2)<sup>(1)</sup>, in particular:

1. suitable food systems for healthy diets;
2. aligned health systems that ensure universal coverage of the essential actions on nutrition;
3. social protection and nutritional education;
4. commercial exchanges and investments to improve nutrition;
5. create favourable environments for local food systems, also favouring breastfeeding;
6. review, strengthen and promote “governance” in the field of nutrition.

UNITED NATIONS DECADE OF  
**ACTION ON NUTRITION**



2016-2025



## GENERAL SCOPE OF THE DOCUMENT

Diffuse guidelines that can homogenise the promotion of health by implementing healthy and sustainable diets all over the national territory, also with impact at international level.

## SPECIFIC SCOPES OF THE DOCUMENT

- 1 Define and diffuse, within the actions on nutrition, a model of healthy and sustainable diet that is accessible, inclusive, ethically and culturally acceptable, inspired to the principles of the Mediterranean Diet and that keeps in consideration the local reality, respecting traditions and habits, social and religious aspects, the local biodiversity and the resources available.
- 2 Suggest key actions to implement to follow a model of healthy and sustainable diet, providing a practical and informative tool addressed to the adult population and children.

# 1.1 WHO ARE THE RECIPIENTS?



## INSTITUTIONS

So they can make the population aware on the topic of nutrition, healthy diet and sustainable development through policies and programs complying with national guidelines.



## MAYORS / CITY ADMINISTRATORS

So they can implement virtuous actions of urban food policy aimed at guaranteeing healthy foods accessible to everybody, following the examples of the cities who joined the *Milan Urban Food Policy Pact*.

## CITIZENS



So they are aware of the spin-offs that their food choices have on the health and the environment.



## PRODUCERS

In quality of conceivers of production models aimed at environmental sustainability.



## HEALTH PROFESSIONALS

So they can train and in turn, train their Colleagues and educate the population to follow a healthy and sustainable lifestyle

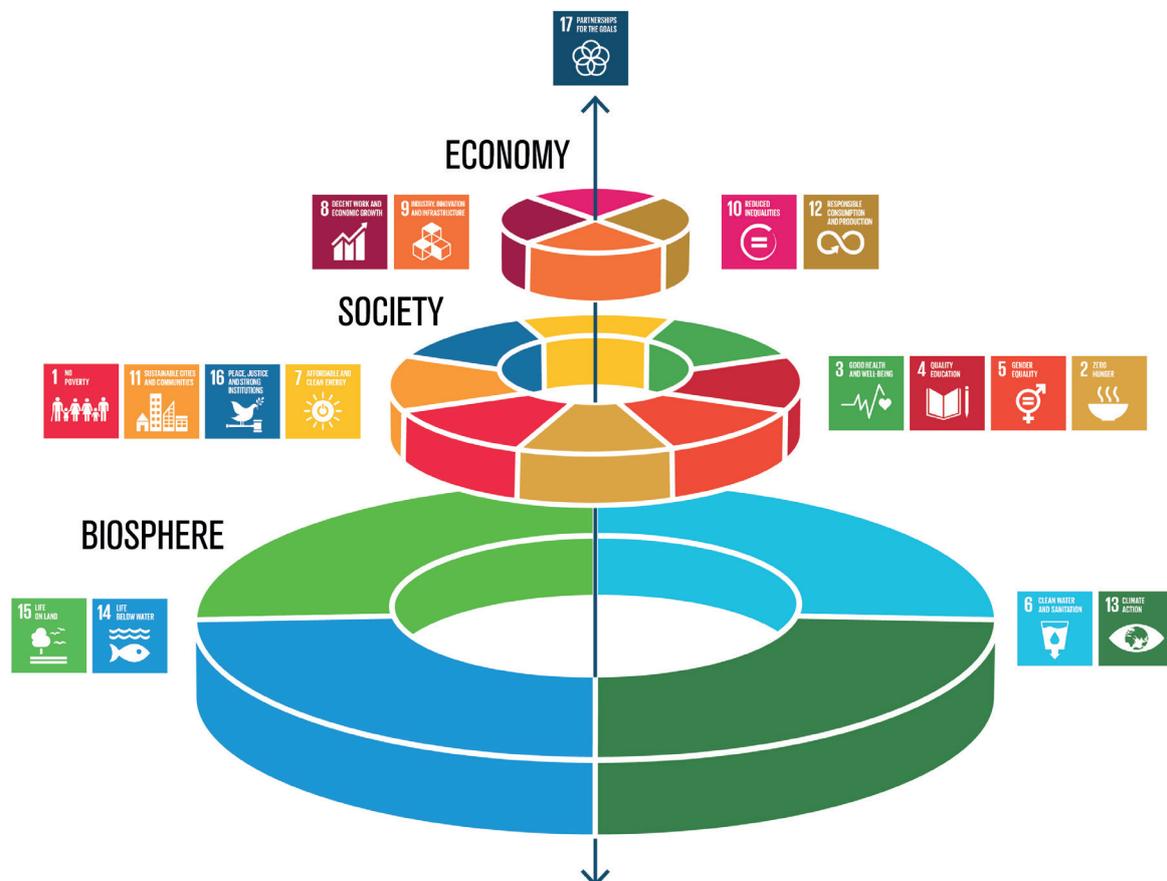
## 2. HEALTH: A CONCEPT IN CONSTANT EVOLUTION

Health is a concept in constant evolution: the absence of an illness is not only linked to physical, mental and social wellness of the single person introduced within its context (definition of health established in 1948 by the WHO)<sup>(2)</sup>, but it is essential to consider the world population in its whole, influenced by specific social-economic, political, social-geographic, juridical and environmental factors.

The concept of “**global health**” is becoming more popular<sup>(3)</sup>, which is one of the key points of the “*Sustainable Development Goals*” (SDG’s), the 17 goals to reach by 2030 approved by the Member States of the United Nations (UN)<sup>(4,5)</sup>. *Sustainable development* must be taken into account in order to attain the goal of global health<sup>(5,6)</sup>, intended as the

ability to satisfy the needs of present and future generations with fairness and dignity for everybody, without compromising the natural systems that produce the resources to live. This is essential to preserve the human health and the environment, entities strictly related to each other in the concept of *One Health*.

Food is one of the means through which man and the environment enter in contact with each other; if produced and consumed responsibly and in a sustainable way, it is able to preserve both.



*Imagine:* Azote Images for Stockholm Resilience Centre - 2016

<http://www.stockholmresilience.org/research/research-news/2016-06-14-how-food-connects-all-the-sdgs.html>

### 3. A THREAT FOR GLOBAL HEALTH

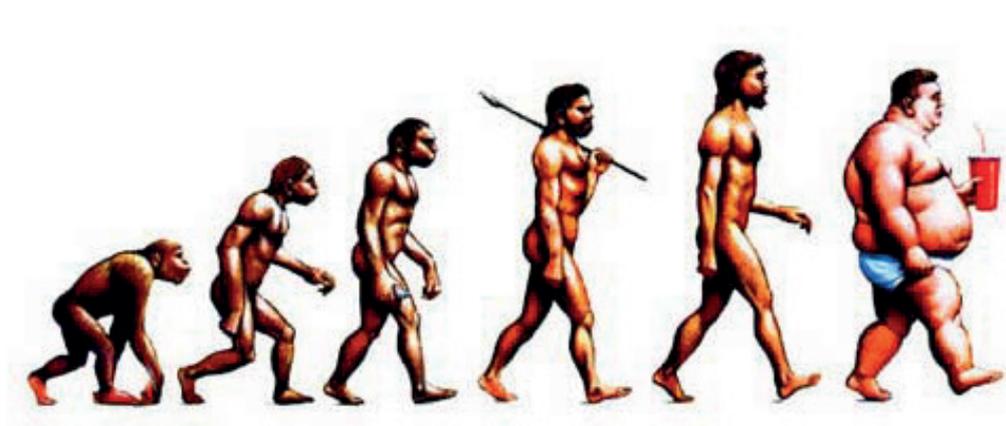
Starting from the second half of the 20th century, following the phenomenon of industrialization, globalization, urbanization and increase of income, the food models and production systems have radically changed, causing significant spin-offs on global health<sup>(7)</sup>.

In the last decades, the production chain from the field to the table has lengthened and diversified and the production system has been remarkably intensified. The greater use of production means, industrial processing and long-haul transports made refined foods rich in fats easily accessible from an economic point of view, and available worldwide. Hence, we went from consuming local and seasonal foods, especially vegetables rich in fibres, to consume processed foods with high calories, typical of the **Western-Diet**, characterised by a high content of refined starches, sugars, saturated fats, trans fats and salt.

THIS FACT LED TO THE IMPOVERISHMENT AND HOMOGENISATION OF DIETS AT GLOBAL LEVEL



The most important contribution was determined by the higher individual income in emerging countries of the world. With wealthier populations, non-processed traditional products were replaced by processed foods with higher calories and proteins. Nowadays, cooking at home is less frequent and consumers, particularly in urban areas, rely more often on supermarkets, fast-food, street-food and take-out restaurants. Unhealthy diet combined to a sedentary life style have become so diffused such to outweigh smoke as the main cause of death and non-transmissible illnesses (cardiovascular illnesses, diabetes and some types of tumours)<sup>(7)</sup>.



*Image:* <https://montevogliotransizione.wordpress.com/progetto-alimentazione-sostenibile>

The intensification of food production due to poverty, economic depression and the two catastrophic world wars, has also caused damages to the environment: remarkable quantities of greenhouse gases and deep alterations of eco-systems (loss of biodiversity, erosion, deforestation, chemical contamination, lack of water resources) led to a degradation process of the planet<sup>(7)</sup>. In turn, this all negatively influenced the state of health of the world population, in particular that of poor populations that live from natural resources<sup>(8)</sup>.

## 3.1 THE PRICE FOR MAN: "TRIPLE BURDEN"

With the introduction of new diet and eating models, we assisted in the last decades to a quick expansion of **overweight and obesity**. Despite in some Countries overweight and obesity affect mortality more than hunger, the number of people afflicted by chronic deprivation of food is increasing again, such that **undernutrition** is still a big problem today.

In a paradoxical "obese world that dies of hunger", there are many people that suffer of "hidden hunger", a third form of **malnutrition due to micronutrient deficiencies** (vitamins and mineral salts) that, even if not as obvious as the first two forms, prevents conducting a healthy life.

WE ARE ASSISTING AT  
A REAL PANDEMIC.

The three different forms of malnutrition can co-exist within the same country, and also within the same family and even during the life span of a person; moreover, they can be transmitted from one generation to the other, through an epigenetic mechanism<sup>(9)</sup>.

They represent a triple burden for man, an obstacle to social-economic development, one of the greatest challenges of our times.

1 person  
over 3 is  
**MALNOURISHED**



1

2

3

### OVERWEIGHT AND OBESITY<sup>(9)</sup>

>670 million adults

>120 million young people  
between 5 and 19  
years old are



**OBESSE**

40 million children are  
**OVERWEIGHT**

### UNDERNUTRITION<sup>(9)</sup>

>800 million people  
suffer from  
**HUNGER**



149 million children  
below 5 years old  
are **UNDERWEIGHT**

49 million children  
are chronically  
**MALNOURISHED**

### MICRONUTRIENT DEFICIENCIES



(e.g. iron, iodine, vitamin A,  
vitamin B12 and zinc)

Obesity-related pathologies  
affect medical budgets  
worldwide for:

**2000** billion  
dollars a year<sup>(9)</sup>

## 3.2 THE PRICE FOR THE PLANET

The intense food production and radical change of diet models led to a significant impact on the environment, which lost its natural characteristics to acquire those of a progressively “humanised” environment, with visible signs of human intervention. In particular, the following occurred:

### 1 GLOBAL WARMING



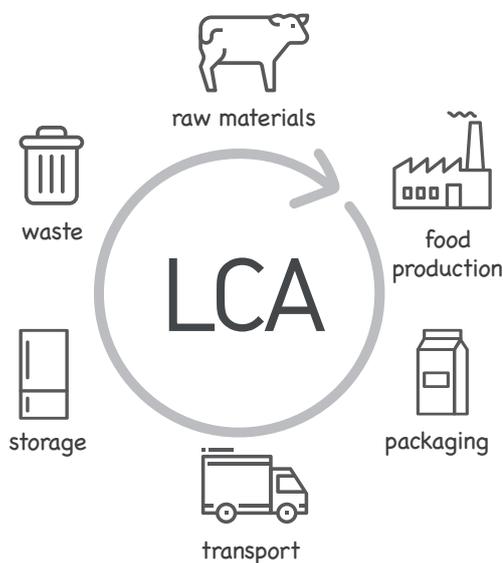
Global warming led to a concerning increase of the earth’s temperature by about 1°C compared to pre-industrial levels. If the temperature keeps rising, it will reach 1.5°C

between 2030 and 2052<sup>(10)</sup>.

This phenomenon is linked to catastrophic atmospheric events (flooding, drought, melting of glaciers, rising of sea levels, etc.) which negatively affect, especially, small local producers and poor populations, who live from agricultural systems highly sensitive to precipitations and temperature changes. The damage to the agricultural production also affects the availability of food, with chain effects that cause the increase of food prices and loss of income, reducing access to food<sup>(11)</sup> and consequently increasing the malnutrition rate due to defect, in these populations.

The scientific community links the climatic change to the emission of higher quantities of greenhouse gases in the atmosphere (the global carbon monoxide increased by 50% between 1990 and 2012<sup>(5)</sup>) and other factors ascribable to human activity<sup>(12)</sup>.

According to some estimates, food production has a significant contribution, generating about 30% of the global greenhouse gas emissions<sup>(13,14)</sup> compared to other sectors like home heating and transports.



FOOD PRODUCTION

**30%**  
GHG  
EMISSIONS

In addition to the production sectors, there are all the other activities that are part of the life cycle of each food (*Life Cycle Assessment - LCA*), meaning the processes involved in the production of a product along the entire food chain, from collecting the raw materials to the end of the product life cycle; this includes transport, packaging, wrapping, cooking and food waste, even if the processing phase of the raw materials is the one that mostly affects the environment<sup>(14)</sup>.

## 2 OVER-EXPLOITATION OF ENVIRONMENTAL RESOURCES



The over-exploitation of environmental resources by the agricultural sector, today mainly destined to the production of feeds for cattle, remarkably increased the scarcity of water, using up to 70%, also leading to deforestation and alternative use of lands<sup>(14)</sup>. Indeed, in the last 50 years, our ecological footprint has increased by 190%, directly affecting the use of soil<sup>(15)</sup>, such that the earth's balance is now negative, meaning the consumption of resources by the world population has surpassed the regeneration ability of eco-systems<sup>(5)</sup>. In addition, the excessive exploitation of the oceans led to many issues, like posing a great threat for the biodiversity<sup>(5)</sup>.

**The earth's exploitation is a danger for man and future generations that will have less resources available for their subsistence.**

## 3 POLLUTION OF SOILS AND WATER



The massive use of fertilizers and agro-chemicals (pesticides, herbicides, etc.) in intensive agriculture, compromised the food safety, making cultivations and water unsafe for consumption<sup>(16)</sup>.



The increase of waste disposed in the sea, especially plastic, significantly contributed to polluting the oceans and jeopardizing marine species that feed on said waste, raising concerns due to the presence of micro-plastics and nano-plastics in foods<sup>(17-19)</sup>.

## 4 DISAPPEARANCE OF BIODIVERSITY



The disappearance of biodiversity is the result of climatic change, the partial transformation of lands and seas, the pollution and excessive exploitation of living species. In particular, over the course of human history, about 6,000 plant species have been cultivated for food purposes, but only eight of them (among which wheat, corn and rice) provide over 50% of our daily calories<sup>(7)</sup>. Moreover, the intensive exploitation of all green areas in order to create new lands to cultivate is leading to a dramatic reduction of woods and forests, with the consequent increase of greenhouse gases, loss of natural eco-systems and loss of sustenance for many poor rural populations, including indigenous and local communities which are particularly affected<sup>(5)</sup>.

As a consequence of the exploitation of the oceans, the quantity of fish available has also been diminished, especially in the Mediterranean sea, jeopardizing marine eco-systems and the fishermen's livelihood, thus contributing to the issue of having fewer marine resources in the future in view of a world population in continuous growth<sup>(5)</sup>.

**Preserving the biodiversity is crucial for the survival of humanity.**

**The environmental damages caused by the food system could increase from 50% to 90% in Countries with low and medium income, due to the increasing consumption of processed foods and meat, that have a higher environmental impact<sup>(7)</sup>.**

## 4. THE PARADOXES OF NUTRITION

Despite the world population is suffering from malnutrition more and more, the age we are living is characterised by some serious inconsistencies: these paradoxes are linked to food production and distribution.

1



**On one hand, there is the problem to “access” food and on the other hand, there is a problem of food “excess”<sup>(20)</sup>.**

Despite enough food is produced for the entire world, there are extreme and opposite malnutrition forms<sup>(20)</sup>.

2



**About one third of the food production is used to feed cattle and produce fuels<sup>(20)</sup>.**

Despite the available resources are getting scarcer, raising concerns, (in particular soil and water) and the global food condition is uncertain, 40% of the world resources of cereals is used to support farming and fuels. In addition, there is the urgency to feed the world population that is constantly growing (it is estimated that in 2050, the world population will exceed 9 billions)<sup>(20)</sup>.

3



**Every year, over one billion tons of food are wasted<sup>(20)</sup> (about one third of the world production<sup>(21)</sup>).**

Along the entire chain, food quantities four times higher than what is needed to feed millions of undernourished people worldwide are wasted, hence the waste contributes to cause food uncertainty<sup>(20)</sup>.

Food waste represents a waste of **economic, environmental** and **human resources**. Just think at the work required to produce food, the costs incurred and quantity of soil, water and energy used in vain; and also the useless emissions of greenhouse gases derived from it<sup>(21)</sup>. The following are used every year worldwide to produce food that is wasted<sup>(22)</sup>:



**250.000 billion litres of water**

*amount sufficient to satisfy the water domestic consumption of a city like New York for the next 120 years.*



**1,4 billion hectares of soil**

*about 30% of the agricultural area available in the world.*



**3,3 tons of equivalent CO<sub>2</sub> (CO<sub>2</sub>eq)**

*If food waste was a country, it would be the third emitter worldwide after USA and China.*

Today, food waste and losses have become unacceptable, especially considering that millions of people suffer from hunger in the world.

**Fighting this issue is therefore a top priority in order to guarantee greater food safety, more available resources and to protect the planet.**

## 4.1 FOOD LOSS / FOOD WASTE

Food waste can occur at different levels of the supply chain, in particular the greatest losses occur in three phases: the production and distribution phase (pre-consumption) and the actual consumption phase. Depending when these occur, we can talk about *food loss* or *food waste*.

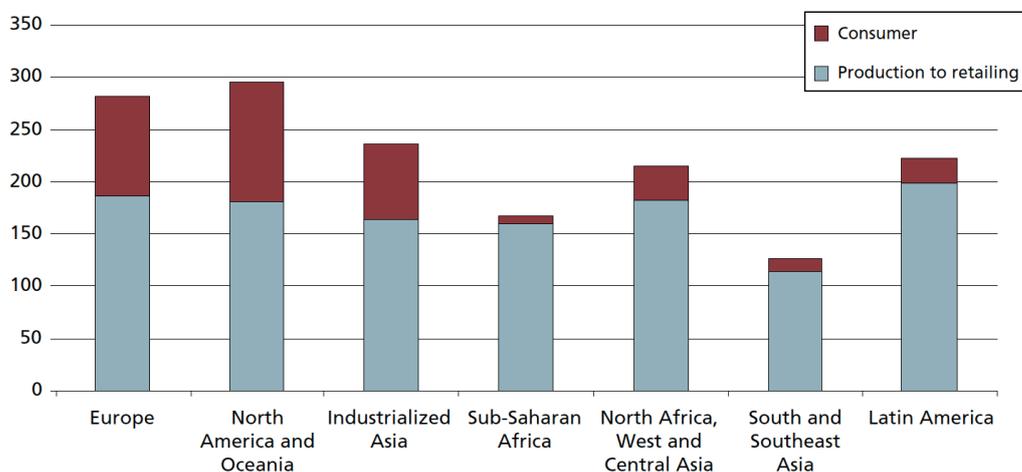


Image: <http://www.fao.org/platform-food-loss-waste>

FOOD LOSS occurs during the production, post-harvest and processing phase of the products, for example when the food is not harvested or is damaged when being processed, stored or transported, hence it is disposed; this scenario describes the main causes of food losses in developing Countries, where home waste is more contained due to the low family income<sup>(21)</sup>.

FOOD WASTE mainly concerns intentional discards of comestible products, mainly by retailers and consumers. This phase foresees more consistent wastes in rich Counties, where the problem is mainly focused in the final phase of the food chain<sup>(21)</sup>.

Per capita food losses and waste (kg/year)



Graphic: Global food loss and food waste - Food and Agricultural Organization of the United nations (FAO), 2011

## 5. SUSTAINABLE DIETS: A RESOURCE FOR MAN AND THE PLANET

Due to the expected depletion of resources and environmental decay, demographic increase of the world population and increasing demand and consumption of processed foods, meats and other products of animal origin (with higher environmental impact compared to fresh, local and seasonal vegetable products<sup>(23)</sup>),

THE CURRENT FOOD SYSTEM DOES NOT HAVE THE ASSUMPTIONS TO BE **SUSTAINABLE**.

It is therefore necessary to take urgent action to ensure that future generations do not inherit a seriously degraded planet in which a large part of the population is increasingly suffering from malnutrition and preventable diseases.



*Image: Healthy Diets for Sustainable Food System - Food, Planet, Health - Summary Report of the EAT-Lancet Commission, 2019*

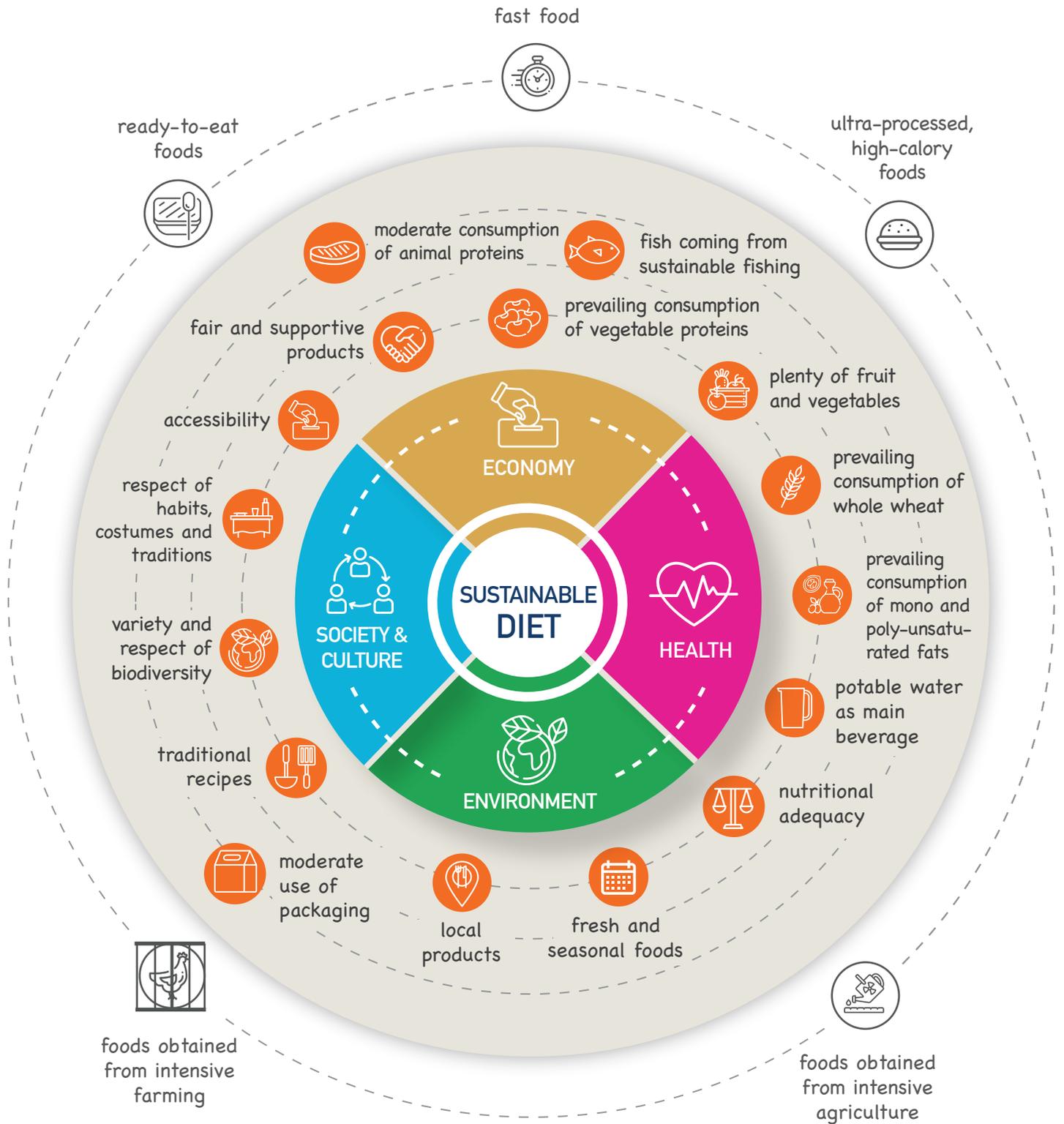
The implementation of HEALTHY AND SUSTAINABLE DIETS in various contexts worldwide, is the solution to restructure the global food system, re-addressing the food habits and consequently the food demand on one hand, and production and distribution on the other hand, in order to obtain favourable effects on human health and the environment at the same time.

### DEFINITION OF SUSTAINABLE DIETS - (FAO 2010)

*“diets with low environmental impact that contribute to food and nutritional safety and a healthy lifestyle for present and future generations. Sustainable diets concur to protect and respect biodiversity and eco-systems, they are culturally acceptable, economically fair and accessible, suitable, safe and healthy in terms of the nutritional aspect and they also optimise natural and human resources”<sup>(24)</sup>.*

Hence, the concept of sustainability is linked to the concept of TIME. Indeed, it consists in the ability to preserve the balance of an eco-system over time. Due to this reason, **sustainability means being responsible towards the environment and new generations.**

# 5.1 MODEL OF SUSTAINABLE DIET: FOUR BENEFITS





## THE ROLE OF INSTITUTIONS

1

It prevents any form of malnutrition

2

Friendly for the environment and planet

3

It adapts to the social-cultural context

4

It contributes to sustain local producers and prevents the costs required for chronic, non-transmissible illnesses.

**In order for a greater number of people to adopt healthy and sustainable diets, the support of Institutions is needed, which should<sup>(9)</sup>:**

- allow consumers to make aware food choices by offering awareness campaigns, sustainable food education programs starting from early childhood and initiatives for communities;
- conceive and implement policies and programs geared to nutrition, in line with national guidelines;
- implement and improve the regulations for food marketing, labelling and advertising through voluntary agreements with Associations of Producers, some of which are already being implemented.



## THE ROLE OF CONSUMERS

**In order to adopt a healthy and sustainable diet, consumers should be more aware of the spin-off that their food choices can have on their health and environment, aiming at<sup>(9)</sup>:**

- increasing the consumption of whole wheat cereals, fruit, vegetables, legumes and oleaginous fruit;
- limiting the consumption of foods that require an excessive use of natural resources to be produced;
- limiting the consumption of foods and beverages rich of sugar, saturated fats and/or salt.
- choosing diversified and traditional foods to support local biodiversity;
- choosing local and seasonal foods, their nutritional values and cooking and preservation techniques;
- reducing food waste for example by making a detailed grocery list, purchase from local producers, use left overs when cooking and eat moderate portions.



## THE ROLE OF PRODUCERS

To favour the diffusion of healthy and sustainable diets, producers should be fully aware of the environmental impact they have in the various production phases, in order to improve their sustainability. In particular, the following is required<sup>(9)</sup>:

- re-address the food production towards a large variety of foods of vegetable origin like fruit, vegetables, legumes and oleaginous fruit, in respect of eco-systems and seasons;
- if possible, prefer the local production based on small-scale fishing, as source of income for local communities and economic and nourishing food;
- manage natural resources in a sustainable and efficient way, according to climatic changes and producing more foods with the same amount of land and water;
- reduce food losses and waste along the entire chain, from harvest to distribution;
- re-formulate the levels of saturated fats, trans fats, added sugars and salt in the products;
- provide clear information to consumers easy to understand, on the quality of products and nutritional and environmental impact. For this purpose, some innovative labelling methods have been elaborated to provide additional information to consumers, in addition to those compulsory by law.

### THE ITALIAN PROPOSAL: BATTERY LABELLING

The Italian Government brought forward an informative labelling proposal which is alternative to the French Nutri-score, which scientific base was worked on by four administrations (Health, MISE, MIPAAF, MAECI), assisted by ISS and Crea, with the collaboration of 57 nutritionists and representatives of all entrepreneurial associations of concerned categories. La proposta italiana prevede l'indicazione dei valori di energia e nutrienti relativi ad una singola porzione di prodotto consumata (e non 100g), rappresentati graficamente da singole "batterie". The Italian proposal foresees the indication of the energy values and nutrients relative to a single portion of product consumed (and not 100gr of product), graphically represented by single batteries. Inside the "battery" symbol there is a percentage of energy, fats, saturated fats, sugars and salt contained in each single portion in relation to the suggested daily quantity. The graphic format allows to quickly understand how the food portion contributes to the daily energy intake and relative nutrients; the charge level of the battery exactly corresponds to the reference percentage.<sup>(25)</sup>.

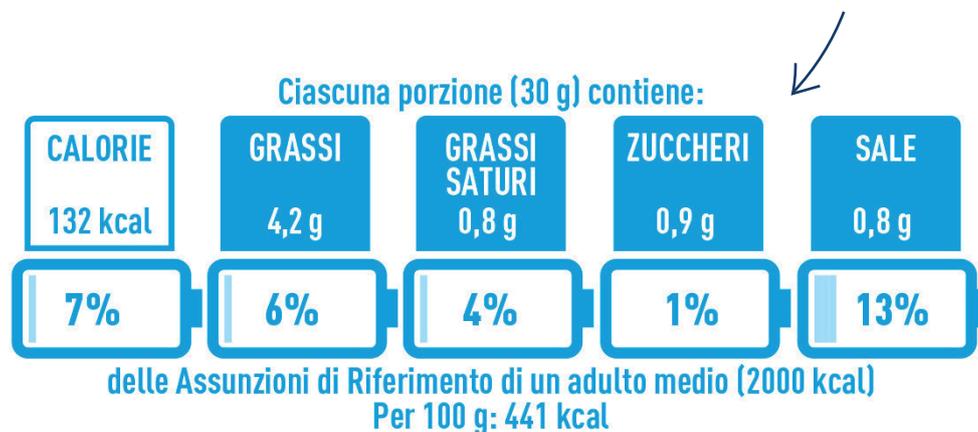
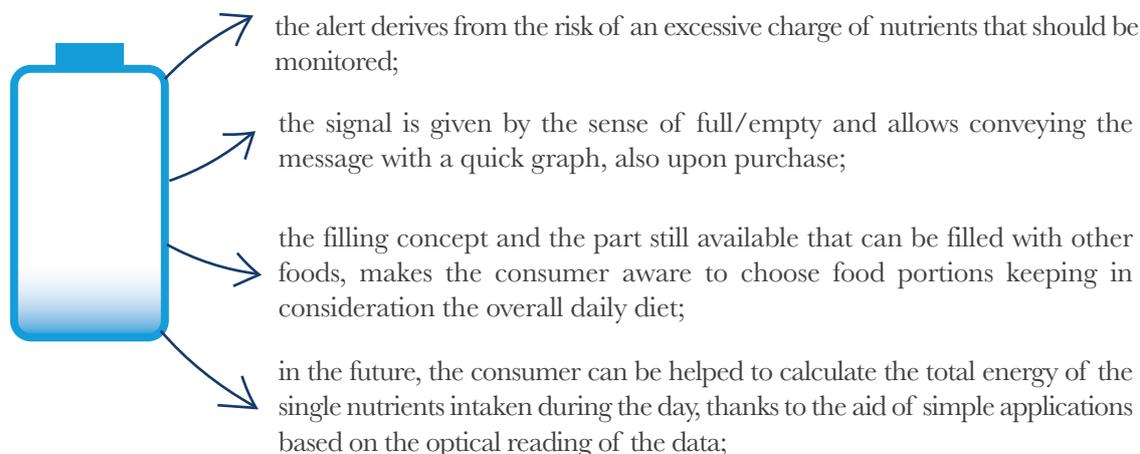


Image: <https://www.foodweb.it/2020/01/litalia-adotta-letichetta-a-batteria>

## THE ITALIAN PROPOSAL: THE CHARACTERISTICS



To better understand the quality of a product, instead, a complex analysis is required which not only considers the bromatological and nutritional characteristics but also everything else behind the product itself, along its entire life style, evaluating if the latter is achieved in respect of the environment and social justice.

### THE DESCRIPTIVE LABEL

To convey this information to consumers, the Slow Food Foundation has conceived a new label so called “descriptive” which does not replace the nutritional characteristics set forth by law, but adds to it. It tells about the producers of the territory of origin of the product, the cultivation, farming techniques, work methods implemented etc, giving a clearer idea to consumers of the quality and impact that a specific food product may have on the environment<sup>(26)</sup>.

The descriptive label has already been adopted for some Italian and international products declared Slow Food presidiums, which are described in terms of their quality characteristics. Indeed, it has been demonstrated that by analysing their chemical and bromatological composition and comparing it with the products belonging to the same category and commonly consumed, vegetable

products boast a higher quantity of fibre and micro-nutrients, a favourable aromatic profile and a lower content of simple sugars. With regards to products of animal origin, these boast a higher quantity of fatty acids omega-3 and a reduced quantity of saturated fats and cholesterol<sup>(27,28)</sup>. Moreover, the sustainability of these Presidiums was evaluated in relation to: environmental impact (protection of biodiversity, more sustainable food production), economic impact (producers’ income, increase of employment, development of local activities) and social-cultural impact (role of producers and boosting of their cultural identity, organisational skills and promotion of production areas).

Also considering these aspects, it stands out that the Slow Food Presidiums comply with a higher quality standard<sup>(27,28)</sup>.

**These innovative labelling methods can provide a clearer, more transparent and complete picture of the product to the consumer, allowing him to make more aware and responsible choices.**

## 6. SUSTAINABLE DIETS IN THE WORLD: A RESOURCE FOR LONGEVITY

As already demonstrated in the Literature, food habits, the quality of foods and life styles play a crucial role on the health, affecting also people's life expectancy. The average life expectancy in the world is currently higher today, with obvious differences in Countries where poverty affects it significantly; however, the years of life gained are often characterised by illness or disability<sup>(29)</sup>, also due to the radical change of food habits and life style, causing related human and economic costs.

Fortunately, there are still some virtuous examples of communities that were not touched by these changes and which boast a higher life expectancy with health compared to the world average, with a high concentration of people over one hundred years old. These are five geographic areas called "Blue Zones"<sup>(30)</sup>.

The analysis of the food habits of these communities led to collect some information on their diets, despite not being comparable to recommendations based on scientific evidence.

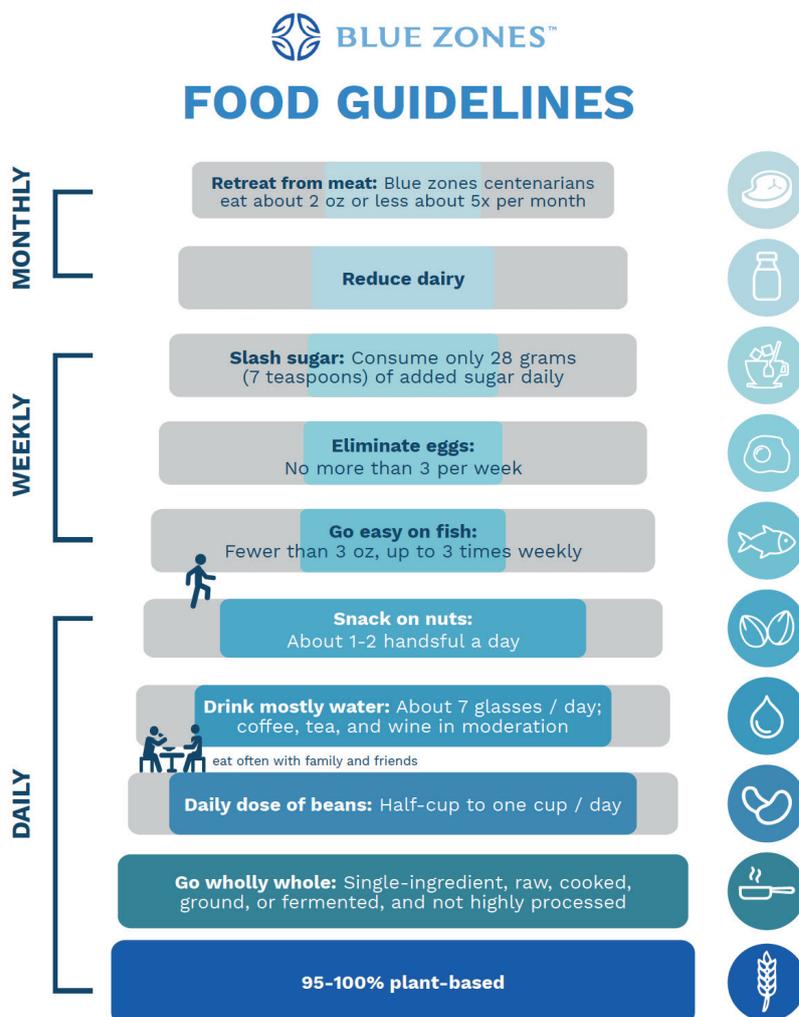


Image: <https://www.bluezones.com/recipes/food-guidelines>



**LOMA LINDA**  
California

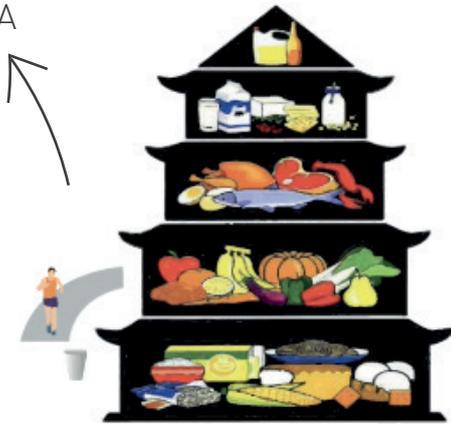


Image: <https://www.slowfood.it/buono-a-sapersi/cibo-salute/>

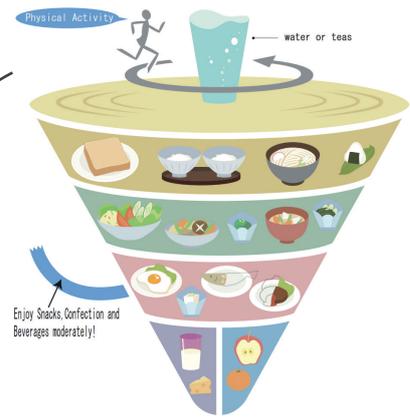


# COUNTRIES AND CULTURES VARY

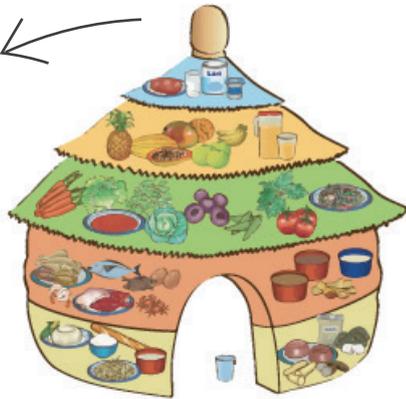
CHINA



JAPAN



BENIN



HONDURAS



## MEDITERRANEAN DIET

**Piramide Alimentare Mediterranea: uno stile di vita quotidiano**  
Linee Guida per la popolazione adulta

Porzioni frugali e secondo le abitudini locali  
Vino con moderazione e secondo le abitudini sociali



Edizione 2010

Image: Fundación Dieta Mediterránea

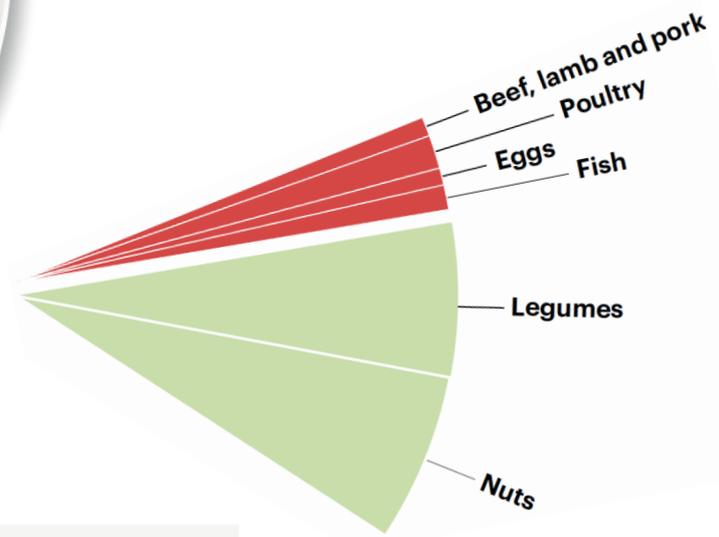
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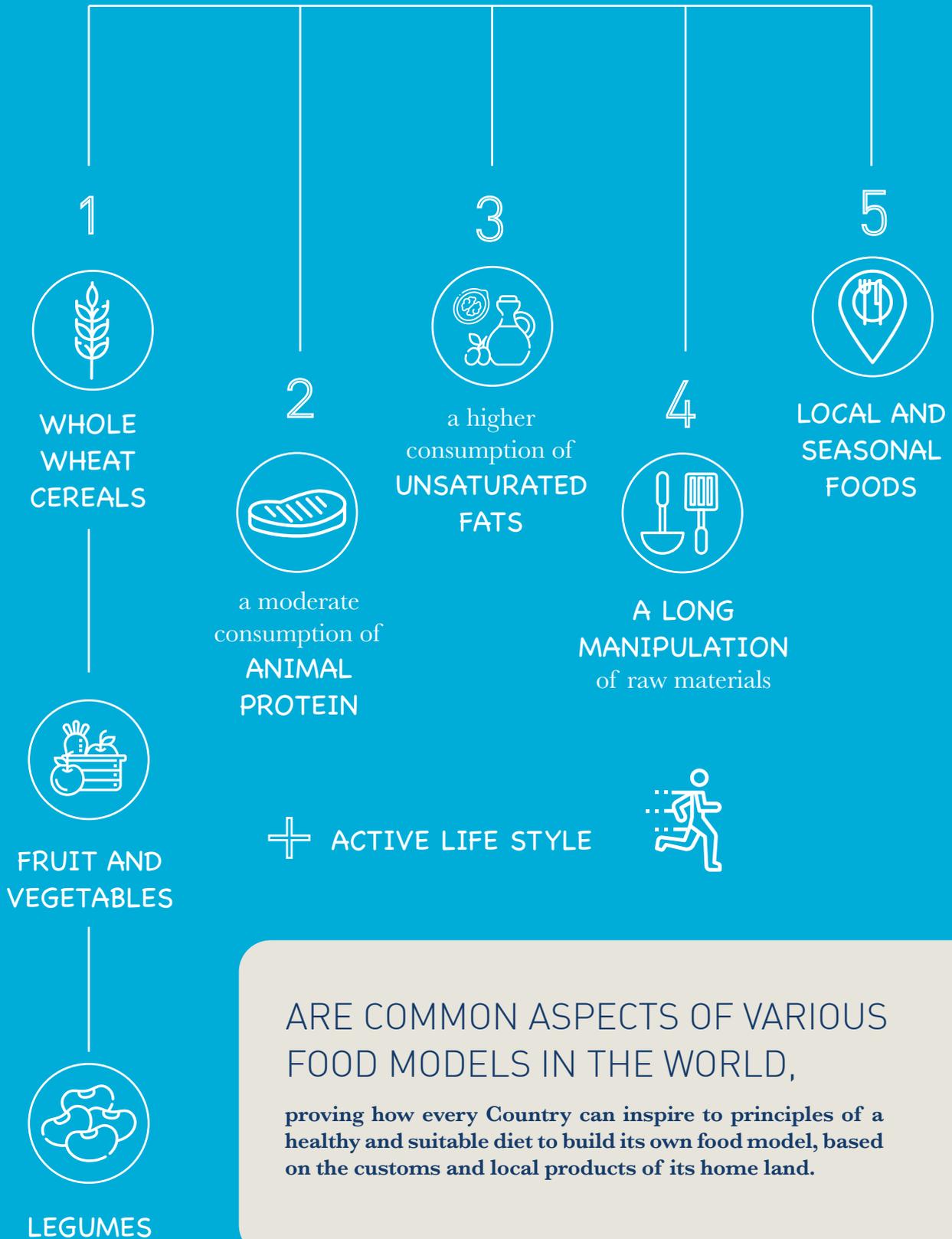
## PLANETARY DIET

*Images: Healthy Diets for Sustainable Food System - Food, Planet, Health - Summary Report of the EAT-Lancet Commission, 2019*



	Macronutrient intake grams per day (possible range)	Caloric intake kcal per day
<b>Whole grains</b> Rice, wheat, corn and other	232	811
<b>Tubers or starchy vegetables</b> Potatoes and cassava	50 (0-100)	39
<b>Vegetables</b> All vegetables	300 (200-600)	78
<b>Fruits</b> All fruits	200 (100-300)	126
<b>Dairy foods</b> Whole milk or equivalents	250 (0-500)	153
<b>Protein sources</b>		
Beef, lamb and pork	14 (0-28)	30
Chicken and other poultry	29 (0-58)	62
Eggs	13 (0-25)	19
Fish	28 (0-100)	40
Legumes	75 (0-100)	284
Nuts	50 (0-75)	291
<b>Added fats</b>		
Unsaturated oils	40 (20-80)	354
Saturated oils	11.8 (0-11.8)	96
<b>Added sugars</b>		
All sugars	31 (0-31)	120

# ...HOWEVER A DIET MAINLY BASED ON



ARE COMMON ASPECTS OF VARIOUS FOOD MODELS IN THE WORLD,

proving how every Country can inspire to principles of a healthy and suitable diet to build its own food model, based on the customs and local products of its home land.



# 7. MEDITERRANEAN DIET

## 7. THE MEDITERRANEAN DIET: A SUSTAINABLE FOOD MODEL

The Mediterranean Diet represents the best model of healthy and sustainable diet, since it embodies the scientifically proven ability to bring benefits in terms of health and prevent some chronic pathologies (cardiovascular illnesses, diabetes, obesity and some types of tumours) and, at the same time, cause positive effects on the social-cultural, economic and environmental sphere<sup>(31,32)</sup>.

The Mediterranean Diet, since 2010 recognised as *Immaterial Cultural Heritage of Humanity* by UNESCO, is a cross-border food and cultural model adopted in seven Countries: **Cyprus, Croatia, Spain, Greece, Italy, Morocco and Portugal.**

The Mediterranean Diet goes beyond the concept of food, it is intended from an etymological point of view of the term as “*life style*”. The definition taken from the Candidature Dossier presented to UNESCO for its recognition, indeed, presents it as follows:

*The origin of the term derives from the Greek word “diaita”: life style, meaning social practice based on customs, knowledge and traditions that range from the landscape to the cuisine and concern in the Mediterranean Basin, cultivation, harvest, fishing, conservation, processing, preparation, cooking and above all, the way the foods are eaten”<sup>(33)</sup>.*

It represents a precious cultural heritage linked to the territory, based on conviviality, social, gastronomic practices and celebrations where food becomes a medium for social relations, gathering and sharing, able to reunite people of all ages and social classes.



## 7.1 HISTORY OF THE MEDITERRANEAN BASIN

The Mediterranean is a closed basin where numerous water streams flow. The territories that are part of it, constitute a well-defined eco-region characterised by a remarkable diversity of landscapes, geology and climate. In particular, the flora boasts numerous varieties of endemic essences thanks to the isolation of vegetable populations due to natural barriers that formed after fragmenting the continental areas in small and large islands.

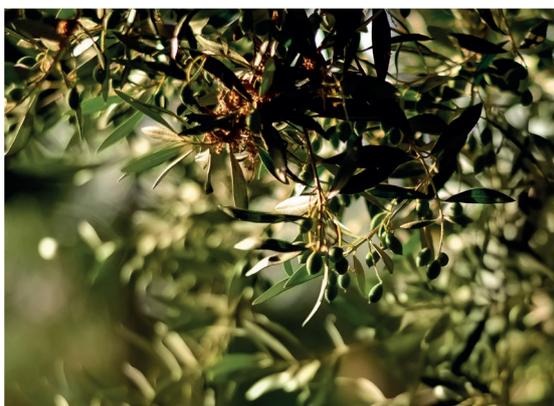
Most of the northern-centre European flora disappeared during the last glacial era, while in the Mediterranean area, less cold, species of very ancient origin were preserved intact, such as the carob tree, myrtle, vine, olive, mastic tree, used by man in all phases of civilization.

THE MEDITERRANEAN LANDSCAPE IS THE RESULT OF THE INTERACTION BETWEEN GEO-ENVIRONMENTAL CHARACTERISTICS AND ANTHROPIC ACTIVITIES<sup>(34)</sup>.

The sea, more than constituting a partition element, has represented a medium to diffuse contacts among populations, boosting that process of common experiences based on the evolution of civilizations<sup>(35)</sup>. The rapid technological progress that brings together the most ancient Mediterranean cultures is based indeed, not only on the autonomous inventions developed in the single contexts, but also on the diffusion of ideas and techniques between societies; this explains how the progress was quicker in those areas with less environmental obstacles to contacts among populations.

Agriculture was introduced after the improvement of the climatic conditions at the end of the last glacial era. Starting from this phase, the Mediterranean coasts were gradually characterised by a milder climate, that reached its optimal temperature about 6000 years ago, however agriculture was diffused throughout the European continent in a timeframe of 4000 years. The agricultural model diffused rapidly in south-eastern Europe and along the coasts, in most Mediterranean Europe (Italy, France, southern Spain, Northern Africa). The development of agriculture in Europe saw the gradual cultivation of new plants: spelt or *Triticum spelta*, originally from Caucasus and suitable for cold climates, naked barley (*Hordeum vulgare*), rye (*Secale cereale*), millet (*Panicum miliaceum*), Foxtail millet (*Setaria italica*), coming from China and, lastly, oat (*Avena Sativa*), cultivated in Europe since the 2nd millennium B.C.

**The coasts along the Mediterranean sea, thanks to a favourable climate and fertile soils, have become the cradle for cultivations that constitute the base for a particularly virtuous and healthy cuisine.**



## 7.2 THE FOUR BENEFITS OF SUSTAINABILITY IN THE MEDITERRANEAN DIET MODEL

### IMPACT ON HUMAN HEALTH

The health potentials of the Mediterranean Diet stood out in the early 1960, when scientist Ancel Keys detected a reduced mortality linked to cardiovascular disorders of a certain population living in the Mediterranean basin: data that was extensively described in a study called “**THE SEVEN COUNTRIES STUDY**”<sup>(36)</sup>.

Following this discovery, the protective role of the Mediterranean Diet was identified in relation to coronary heart disease and other morbid conditions.

Many other works followed this study that showed a reduction of some tumours and some chronic-degenerative illnesses in populations that were implementing the Mediterranean diet. One of these works is the **PREDIMED** study (prevention with Mediterranean diet), a randomized multi-centric trial with a sample of 7447 participants of age between 55 and 80 years old (57% women) with high cardiovascular risk but without heart pathology known upon enrolment. The high cardiovascular risk was intended as the presence of diabetes mellitus of type 2 or with at least three main risk factors: smoke, artery hypertension, low levels of HDL cholesterol, high levels of LDL cholesterol, over-weight or obesity, family history of cardiovascular illness at a young age. The enrolled patients were invited to perform physical activity and they were assigned one of the following diets without limitation of calories:





# HEALTH



## PREDIMED STUDY OBJECTIVES AND RESULTS

The primary endpoint of the study consisted in evaluating the development of greater cardiovascular issues (heart attacks, stroke or death due to cardiovascular causes). From the results of this study, it stood out that the people who were following the Mediterranean diet with the addition of extra-virgin olive oil or dry fruit were at lower risk to develop cardiovascular issues for a follow-up period of five years compared to patients who were assigned the controlled low-fat diet: the relative difference was 30%, while the absolute difference was 1.8 and 2.1 percentage points. Moreover, this difference was increasing if both groups were following the diet more strictly<sup>(37)</sup>.



## THE “FLUID QUOTA” OF THE MEDITERRANEAN DIET

Other studies attributed particular importance to what is defined the “**fluid quota**” of the Mediterranean Diet to prevent cardiovascular illnesses, meaning **olive oil** and **red wine**<sup>(38)</sup>. While the centrality of olive oil is the common aspect of all lands facing the Mediterranean Basin, the red wine is linked exclusively to the Christian tradition because the Countries in the Mediterranean Basin with Islamic region prohibit consumption. Despite wine is one of the most debated topics with regards to cardiovascular prevention, we shall remind that the European Code against Cancer suggests to reduce the consumption of alcohol to prevent cancer<sup>(39)</sup>.

It is renowned that the consumption of alcoholic beverages has an important role in developing certain tumours, in particular of the liver, oesophagus, stomach, oral cavity, colon-rectal and breast cancer<sup>(40)</sup>.



However, we shall specify that drinking a glass of red wine per meal is a small amount of alcohol, hence the minimal quantity does not increase the risk of tumours.

**Image:** <http://www.reteoncologica.it/codice-europeo-contro-il-cancro>

The Mediterranean Diet has become known for the obvious correlation with low levels of LDL cholesterol in the blood and reduced risk of heart diseases. Indeed, the following benefits are obtained from following this diet model:

- **a high intake of polyphenols** present in the foods of vegetable origin like fruit, vegetables, olives, whole wheat cereals, tea, coffee, extra-virgin olive oil and red wine<sup>(41)</sup>, which are the main anti-oxidants of our diet<sup>(42)</sup>;
- **a minimal and irrelevant intake of trans fatty acids**, mainly present in baked products and highly industrialized products, in favour of **an increased consumption mono-unsaturated fatty acids** mainly derived from olive oil, and **a suitable intake of poly-unsaturated fatty acids** (omega-3 and omega-6), mainly derived from the consumption of fish, vegetable oils, oleaginous dry fruit and some

meats. Fatty acids omega-3 and omega-6 are defined essential because they must be derived from the diet as our body is not able to produce them. From the literature, it stood out that a suitable intake of polyunsaturated fats from vegetable oils (flax oil, canola oil, soy oil and nuts) in the form of 18 carbon atoms (alpha-linolenic acid or ALA) and above all, from fish in the form of 20 or 22 carbon atoms (eicosapentaenoic acid and docosahexaenoic acid, EPA and DHA respectively) is linked to a significant reduction of the risk of heart attack and sudden death. In general, the preventive effects derived from the intake of “good” fats are due to the benefits they have on triglycerides, platelet count, blood pressure and production of proteins of adhesion and pro-inflammatory by the arterial wall or by an indirect antiarrhythmic effect<sup>(43)</sup>.

## THE ROLE OF THE MEDITERRANEAN DIET IN CANCER PREVENTION

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The relation between the Mediterranean Diet and cancer is probably due to the high content of anti-oxidant substances and nutrients with anti-inflammatory action present in many foods that are part of this diet model (legumes, dry fruit and oleaginous dry fruit, vegetables, fish and olive oil, in particular extra-virgin olive oil), because they are able to prevent and fight cellular decay and proliferation of tumoral cells<sup>(44)</sup>.

In the last few years, in particular, utmost attention was paid to the relation between cancer and certain foods, such as extra-virgin olive oil, wine and some vegetables, due to the presence of substances that are able to prevent the proliferation of tumoral cells and protect the cellular membrane from metastasis<sup>(45)</sup>. In particular:

- **vitamin C, E and folates**, together with some protective substances like **carotenoids and flavonoids** contained in high quantity in fruits and vegetables, which boast an anti-oxidant action and are able to prevent damages to the DNA<sup>(46)</sup>;

- **polyunsaturated fatty acids of the omega-3 series** contained in large quantity in certain types of fish (sardines and mackerel) and oleaginous dry fruit (especially nuts, almonds and pumpkin seeds, which help to slow down the development of carcinogenic cells, preventing their proliferation and survival, angiogenesis, inflammation and formation of metastasis<sup>(47)</sup>;

- **a low consumption of meat** that contributes to limit the harmful effects caused by cooking at high temperatures and reduce the intake of saturated fats<sup>(48)</sup>.

In general, different studies have proven that the high adherence to the Mediterranean Diet is often linked to a lower risk of neoplasia<sup>(49,50)</sup>, despite cellular decay is a very complex mechanism derived from the combination of various risk factors (multi-factor pathology).



## BIO-CHEMICAL AND METABOLIC EFFECTS OF THE MEDITERRANEAN DIET

Considering the Mediterranean Diet as *food pattern* and not as expression of single foods, it stood out that this diet model is able to produce the following benefits<sup>(51)</sup>:

- **lowers the content of lipids and modulates their negative metabolic effects;**
  - **anti-inflammatory, anti-oxidant and anti-platelet effects;**
  - **modulates the factors that produce cancer** (hormones or growth factors);
  - **reduces the stimulation of hormones and other extra-transmission and intra-cellular routes involved in cancer**, by changing the content of amino acids;
  - **modulates the intestinal microbiota** thanks to the favourable production of bacterial metabolites.
- 

## CHARACTERISTICS OF THE MEDITERRANEAN DIET PATTERN

The benefits that the Mediterranean diet has on health are not only linked to the type of foods characterising this diet model, but also to their consumption frequency, some selection criteria and preparation and conservation practices of the food. These effects are particularly derived by:

- **a high intake of fibre daily;**
- **a choice geared to a large selection of vegetable seasonal products;**
- **the use of aromatic herbs and spices to season the foods instead of salt;**
- a prevailing consumption of **mono-unsaturated fats** and the right and balanced intake of **poly-unsaturated fats** of the omega-3 and omega-6 series;
- **a frequent consumption of fermented foods**, in particular bread, pickled vegetables, fermented milk among which yogurt;
- **a moderate consumption of milk-dairy products with a high content of fats, meat and derivative products**, because characterised by a high content of saturated fats, cholesterol and salt;
- **a moderate consumption of wine;**
- **consumption of frugal portion, a regular physical activity and suitable intake of water** to satisfy the daily water demand.

# THE MEDITERRANEAN DIET PATTERN

- **Fruit 1-2p/vegetables  $\geq$  2p**  
Variety of colours and consistency (cooked/raw)  
*Water, fibre, vitamins, minerals, anti-oxidants, simple sugars*
- **Cereals and derivative products 1-2p**  
preferably whole wheat  
*Complex carbohydrates, vitamin B, minerals, fibre (whole wheat cereals)*
- **Olive oil 1-2 spoons**  
*Mono or poly-unsaturated fats, vitamin E, polyphenols*

- **Olives, nuts, seeds 1-2p**  
*Mono and poly-unsaturated fats, proteins, vitamins, minerals, anti-oxidants, fibre*
- **Herbs, spices, garlic, onions**  
(less added salt), variety of flavours  
*Vitamins, minerals, anti-oxidants*
- **Dairy products 2p**  
Preferably with low content of fats  
*Proteins, saturated fats, simple sugars, calcium, vitamins A and B*

- **Fish/seafood  $\geq$  2p**  
*Proteins, saturated and unsaturated fats, EPA and DHA, vit A, D and B, iron*
- **Legumes  $\geq$  2p**  
*Proteins, carbohydrates, fibre, vitamin B, iron, zinc*
- **White meats 2p**  
*Proteins, saturated and unsaturated fats, vitamin B, iron, zinc*
- **Eggs 2-4p**  
*Proteins, saturated fats, cholesterol, vitamin A and B, iron*
- **Potatoes  $\leq$  3p**  
*Complex carbohydrates with high glycaemic index*
- **Red meats  $<$  2p**  
*Proteins, saturated fats, vitamin B, iron, zinc*
- **Processed meats  $\leq$  1p**  
*Proteins, saturated fats, vitamin B, iron, zinc, salt*
- **Sweets  $\leq$  2p**  
*Simple sugars, saturated and unsaturated fats*



Taken and modified from the: *Piramide Alimentare Mediterranea: uno stile di vita quotidiano* - Edizione 2010 - Fundación Dieta Mediterránea<sup>(52)</sup>



### ROLE OF SEASONALITY

Following the seasonality and changing the type of vegetables of various colour is a crucial choice in order to obtain the utmost benefits of all phytochemical, anti-oxidant substances. Indeed, vegetables, if cultivated in the right ripening season and in natural environmental and atmospheric conditions, can produce these substances.

### ROLE OF FIBRE

fibres has important functions: it helps to moderate the calory intake thanks to the high satiating power; it slows down the absorption of sugars and reduces the absorption of fats; it performs a mechanical role at intestinal level and a metabolic role on the microbiota, helping overall to prevent some chronic illnesses<sup>(53)</sup>.

### ROLE OF FERMENTATION

fermentation is an ancient technique used to conserve food. It improves the digestibility of foods, thanks to the partial digestion of some nutrients by fermenting bacteria; moreover, it improves the nutritional profile by reducing the substances that prevent the absorption of certain micro-nutrients and lastly, it has potential benefits on the intestinal microbiota<sup>(54)</sup>.

## 7.2 THE FOUR BENEFITS OF SUSTAINABILITY IN THE MEDITERRANEAN DIET MODEL

### IMPACT ON THE ENVIRONMENT

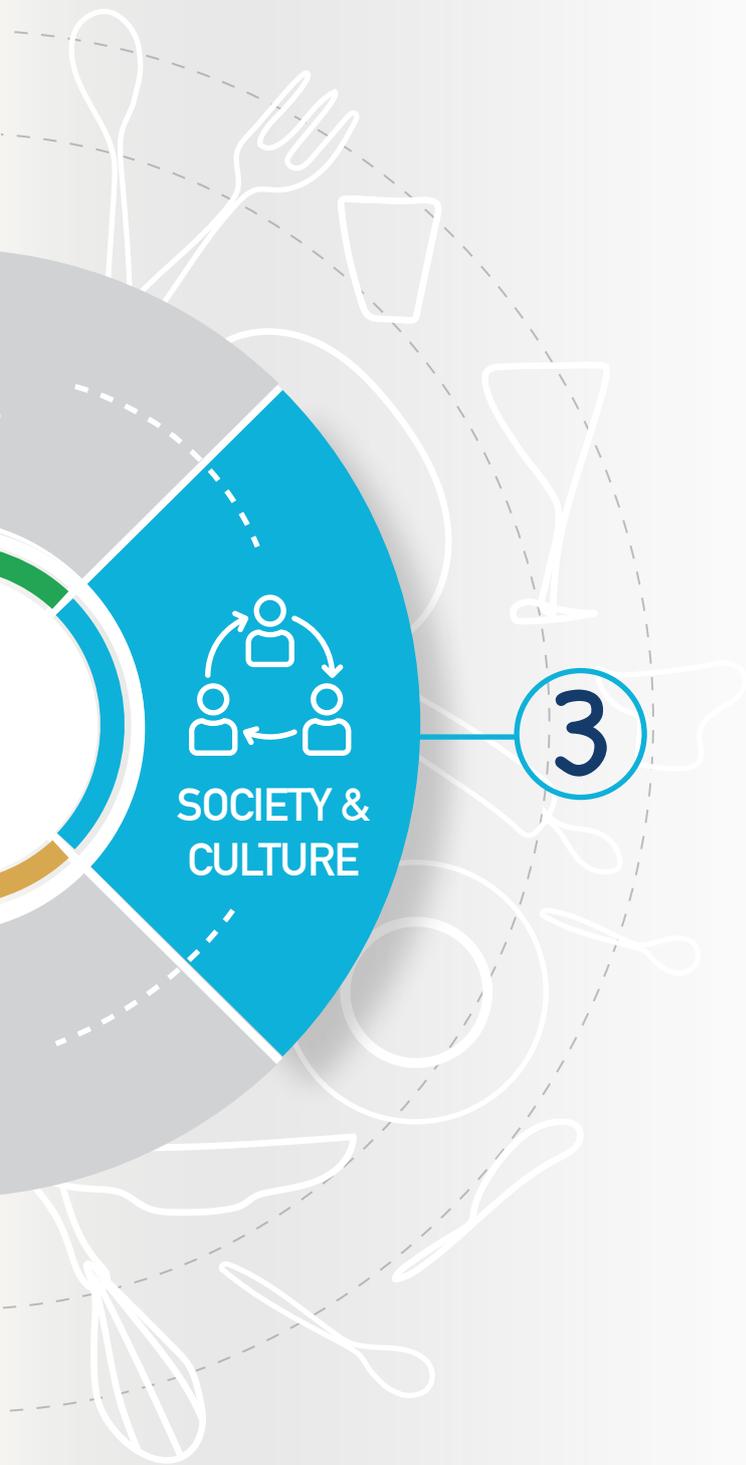
The Mediterranean Diet, in addition to be an exemplary diet model to preserve human health, is also sustainable for the environment. Indeed, it is estimated that, in average, obtain 100 calories, this type of diet causes an environmental impact about 60% lower compared to Northern-European or North-American diets mainly based on meats and fats of animal origin, rather than vegetables and cereals.

The positive effects on the environment are linked to<sup>(32)</sup>:

- **a lower use of natural resources** thanks to the high consumption of cereals, fruit, vegetables and legumes, which production requires a less extensive exploitation of soil and water and determines lower emissions of greenhouse gases compared to a diet model based on the consumption of mostly foods of animal origin;
- **respect of seasonality that translates** into a reduction of greenhouse cultivations and relative environmental impacts, as well as a reduction of stocks and transport costs from far-away countries (*food miles*);
- **preservation of biodiversity** by using different sowing methods in each area and rotation of cultivations in order to ensure also food safety. Indeed, the genetic diversity may bring a remarkable contribution to the subsistence of populations in terms of nutrition and health, awareness of the marginal ranks of the population, health of the eco-system and culture;
- **consumption of frugal portions and genuine foods**, intended as whole wheat, fresh and slightly processed foods. The lower quantities of food consumed and less food transformations contribute to reduce environmental impacts.



## 7.2 THE FOUR BENEFITS OF SUSTAINABILITY IN THE MEDITERRANEAN DIET MODEL



### IMPACT ON SOCIETY

The Mediterranean Diet, which goes beyond a simple list of foods and embodies a life style, social, traditional and agricultural practices of Countries facing the Mediterranean Sea, is able to bring numerous benefits also to society, especially thanks to<sup>(32)</sup>:

- **a daily ritual** which consists in preparing the table, arranging the foods and dishes, preparing the favourite recipes (in some cases related to some celebrations, anniversaries, etc.). These are precious moments that characterise the family, its culture and habits. It is not a mechanical repetition of gestures but the evocation of values and life styles;
- **the role of conviviality** given by social interaction and common dishes typical of celebrations and traditions;
- **greater food awareness** thanks to the bond with the territory, knowledge of seasonality, biodiversity and genuineness of foods;
- **strong identity** that characterises this food model, historic and cultural expression of the Mediterranean. Indeed, it is a millenary food tradition handed down to generations, promoting not only the quality of foods and local origin, but also the dialogue among populations.

## 7.2 THE FOUR BENEFITS OF SUSTAINABILITY IN THE MEDITERRANEAN DIET MODEL

### IMPACT ON THE ECONOMY

Adopting a model of healthy and sustainable diet like the Mediterranean model has benefits on the health, society and the environment, and it also has economic benefits. Indeed, the following benefits are obtained from following this diet model<sup>(32)</sup>:

- **a reduction of the medical costs** thanks to the benefits on the health brought by this diet model;
  - **a reduction of costs for families** by mainly consuming vegetables and seasonal products, more economic compared to foods out-of-season and of animal origin;
  - **benefits for companies** thanks to the consumption of typically Mediterranean foods (oil, wine, pasta, bread, etc.), creating income and employment for enterprises and small local producers.
  - **benefits for the territory** thanks to the large agricultural-wine-food offer.
- Indeed, there are numerous foods linked to our territory. These are typical products obtained in a particular environment and produced according to traditional methods that confer them unique and inimitable characteristics beyond the specific territorial context. Hence, the concept of “typicality” of a product is linked to the strictly environmental characteristics of the territory, as well as the geographic features, traditional production techniques and specific gastronomic preparations of the territory of origin.

### PDO AND PGI CERTIFICATIONS: A TRIBUTE TO QUALITY AND UNIQUENESS OF ITALIAN PRODUCTS

The European Community, in order to preserve the character and specificity of the agri-food products, has adopted certain measures to regulate the quality and protect typical products. Through the implementation of (EC) Regulation no. 2081/90 and no. 2082/92 and subsequent amendments, the DPO (protected designation of origin) and PDO (Protected Geographical Identification)





# ECONOMY

certifications have been introduced<sup>(55)</sup>. All these products are regulated by European laws that foresee the following measures for each typical product<sup>(56)</sup>:

- elaboration of the production guidelines;
- recognition of the guidelines at European level;
- application of the rules contained in the guidelines by operators;
- operators' certification.

Both PDO and PGI certifications underscore a bond with the territory, however the main difference between the two lies in the fact that, in order to obtain the PDO brand, the entire production cycle from raw materials to finished product, shall be carried out in the geographic area of origin, while for the PGI brand, only a production, transformation or elaboration phase of the product shall be carried out in the territory of origin, thus offering greater flexibility to the production system<sup>(55)</sup>.

In order to obtain a PDO or PGI certification, the law defines the general characteristics that a

product must have and that shall be listed and described in the production guidelines, which must include various elements, among which<sup>(57)</sup>:

- the **name** of the PDO or PGI agricultural or food product;
- the **description** of the agricultural or food product by indicating the raw materials, if applicable, main physical, chemical, microbiological and/or organoleptic characteristics;
- delimitation of the **geographic area** and elements that prove the bond of the agricultural or food product with the reference geographic area;
- description of the **method to obtain** the product and/or local, traditional and constant methods and elements that prove the bond or origin with the geographic environment;
- specific **labelling** elements related to the PDO or PGI certification, according to the cases, or similar captions;
- potential **conditions to respect** in force of EC and/or national provisions.



**A further proof of the great quality of our productions and above all, the strong link between Italian agri-food products and the territory of origin, which depends on the safeguard of eco-systems and biodiversity and social adhesion of the entire community.**



From the peculiarities that characterise the Mediterranean diet model, it stands out that this is the cradle of an extremely important cultural and gastronomic heritage.

Nonetheless, despite the *health, environmental, social-cultural* and *economic benefits*, this diet model is exposed to **REMARKABLE THREATS**.



Indeed, the Mediterranean is the area exposed to main problems linked to environmental damages: *climatic change, demographic growth, loss of biodiversity, exploitation of natural resources, scarcity of water resources*.

In addition, the food habits have been ‘westernized’, thus **JEOPARDIZING THE MEDITERRANEAN DIET**<sup>(58)</sup>.

HENCE, IT IS NECESSARY TO REVALUE THIS FOOD-CULTURAL HERITAGE AND HAND IT DOWN TO FUTURE GENERATIONS IN ORDER TO RECONSTITUTE THE PERFECT BALANCE BETWEEN MAN, ENVIRONMENT AND SOCIETY.

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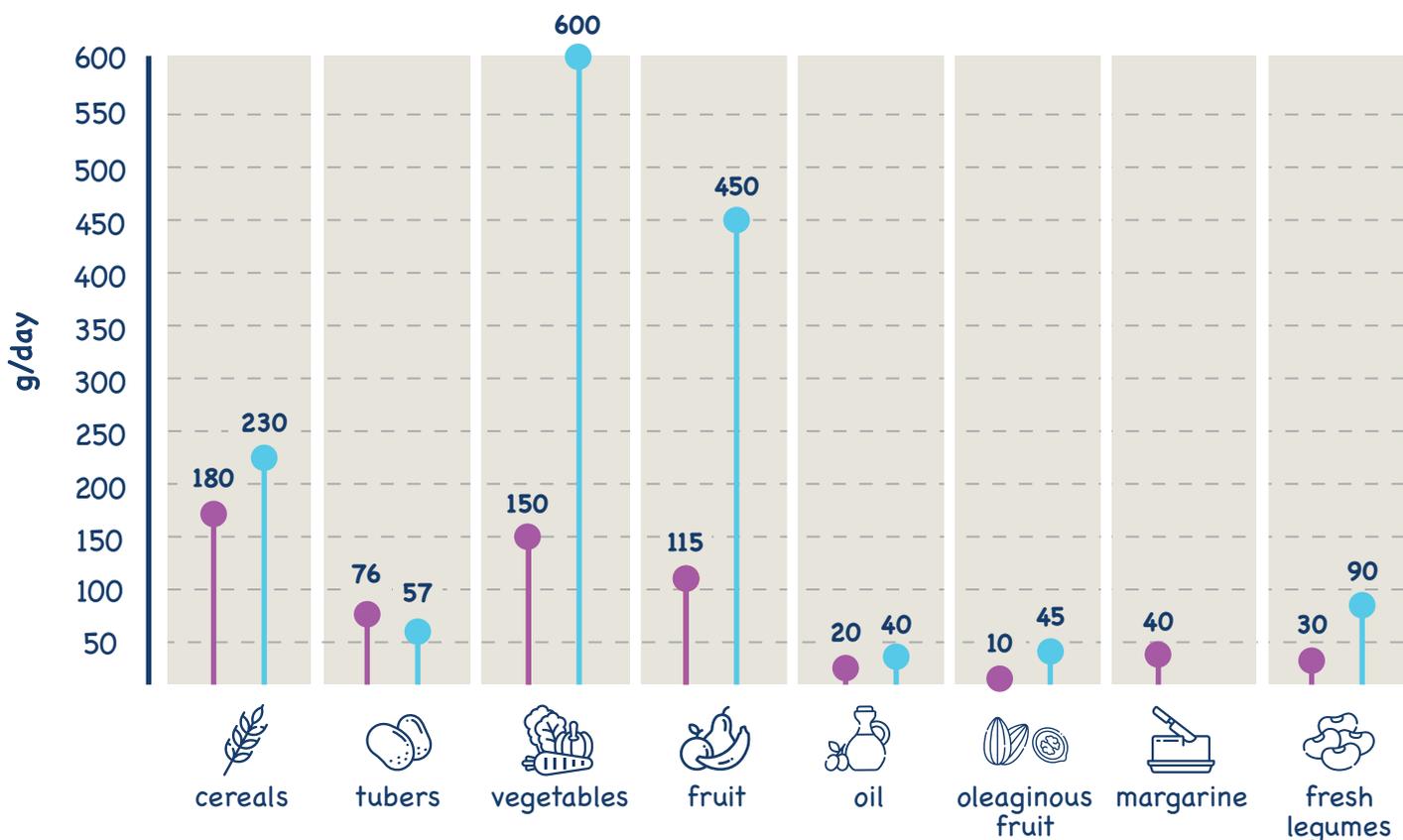
# **8. FOOD PATTERNS COMPARED**

## 8. FOOD PATTERNS COMPARED: WESTERN DIET AND MEDITERRANEAN DIET

In order to understand thoroughly the need to guide food choices towards local and sustainable diet models, regardless of a unique “western” diet model, a practical comparison must be carried out on the impact that the two different food patterns may have on health, the environment and society. This is essential to further understand the advantages and/or disadvantages of these two diets, raising awareness when making choices.

To carry out a comparison, the entire food pattern shall be considered, meaning the quantity, portion, type, variety and frequency according to which foods and beverages are consumed daily and weekly, instead of comparing single foods.

Differently from the Mediterranean Diet that is as well specified and defined diet model, a “western” food pattern only stands out from consumer surveys and a detailed market analysis, since it is not a reference diet model. Indeed, it is not based on any rules and principles, but simply on the impulsivity towards an “appealing”, quick, “handy” food ready to eat, limiting the action of eating to the simple need to satisfy a primary biological demand.

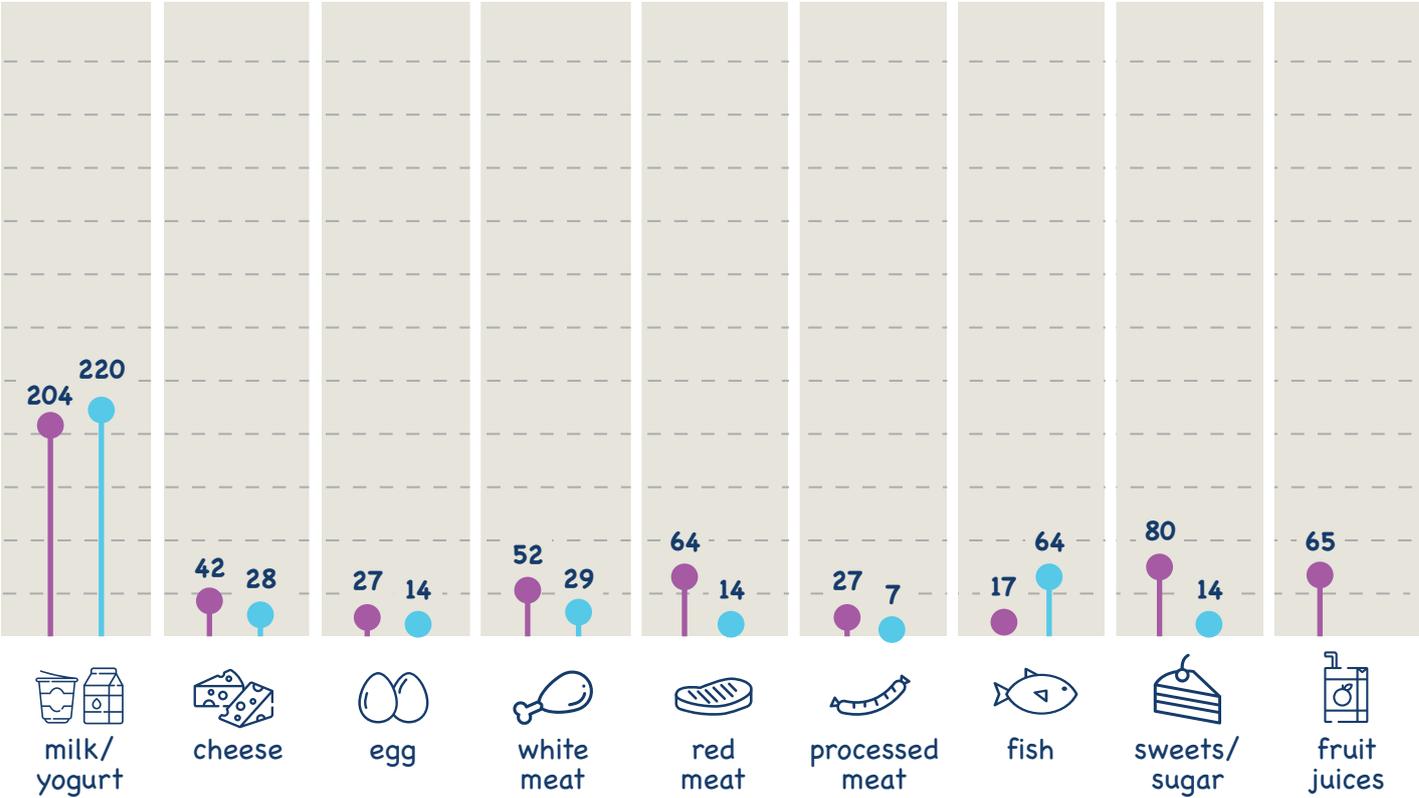


### FOOD PATTERN COMPARISON:

● WESTERN DIET (Data taken from: *What We Eat in America* - WWEIA, food survey 2015-2016, USA<sup>(59)</sup>)

● MEDITERRANEAN DIET (Consumption frequencies taken from: *Piramide Alimentare Mediterranea: uno stile di vita quotidiano* - Edizione 2010 - Fundación Dieta Mediterránea<sup>(52)</sup>; portion estimated from *LARN IV Rev.*<sup>(60)</sup>)

From the quantity analysis, it stands out how a “western” food pattern is characterised by a high consumption of meat, especially red and processed meat, seasoning like margarine, dairies with a high content of fats, eggs, sugars and starchy vegetables; these foods are often eaten processed, hence with more calories and lower nutritional quality. On the other hand, this food pattern is characterised by a low consumption of foods of vegetable origins, such as fresh fruit, vegetables, legumes, whole wheat cereals, and foods containing unsaturated fats like oil and fish. The western diet model is therefore remarkably different from the Mediterranean model.



## 8.1 WHY THE WESTERN DIET IS NOT SUSTAINABLE

Despite its diffusion, the **Western Diet** is not a healthy and sustainable food model because it has negative impacts on sustainability (*Health, Society and Culture, Economy, Environment*).

### IMPACT ON HUMAN HEALTH

If the Mediterranean diet model was associated to numerous benefits in terms of health, on the other hand, the “western” food pattern is related to various chronic, non-transmissible pathologies known as “**diseases of civilization**”. The excessive body fat is mainly due to a sedentary life style and food characteristics of the Western Diet, which favours the development of insulin-resistance, diabetes mellitus of type 2, dyslipidaemia, cardiovascular diseases, hyper-tension, hepatic steatosis and some types of tumours<sup>(61)</sup>. This fact can be explained if considering that the major changes that occurred in the life style of the world population took place too quickly in relation to men’s ability to adapt, hence causing a discrepancy between human biology, still linked to primitive man, and the new food and sedentary trends of contemporary man, causing a pandemic of obesity and global emergency.

A “western” diet is also linked to a greater incidence of chronic renal diseases. It is known that a combination of nutritional substances typical of this diet compromises the renal function, causes hepatic steatosis and inflammation, hypertension and it alters the renal hormone regulation.

In addition, these food habits cause *low-grade chronic inflammation* involved in all phases of development of atherosclerosis, more often known to cause many illnesses, like autoimmune disorders, some neoplasia and osteoporosis<sup>(62)</sup>.

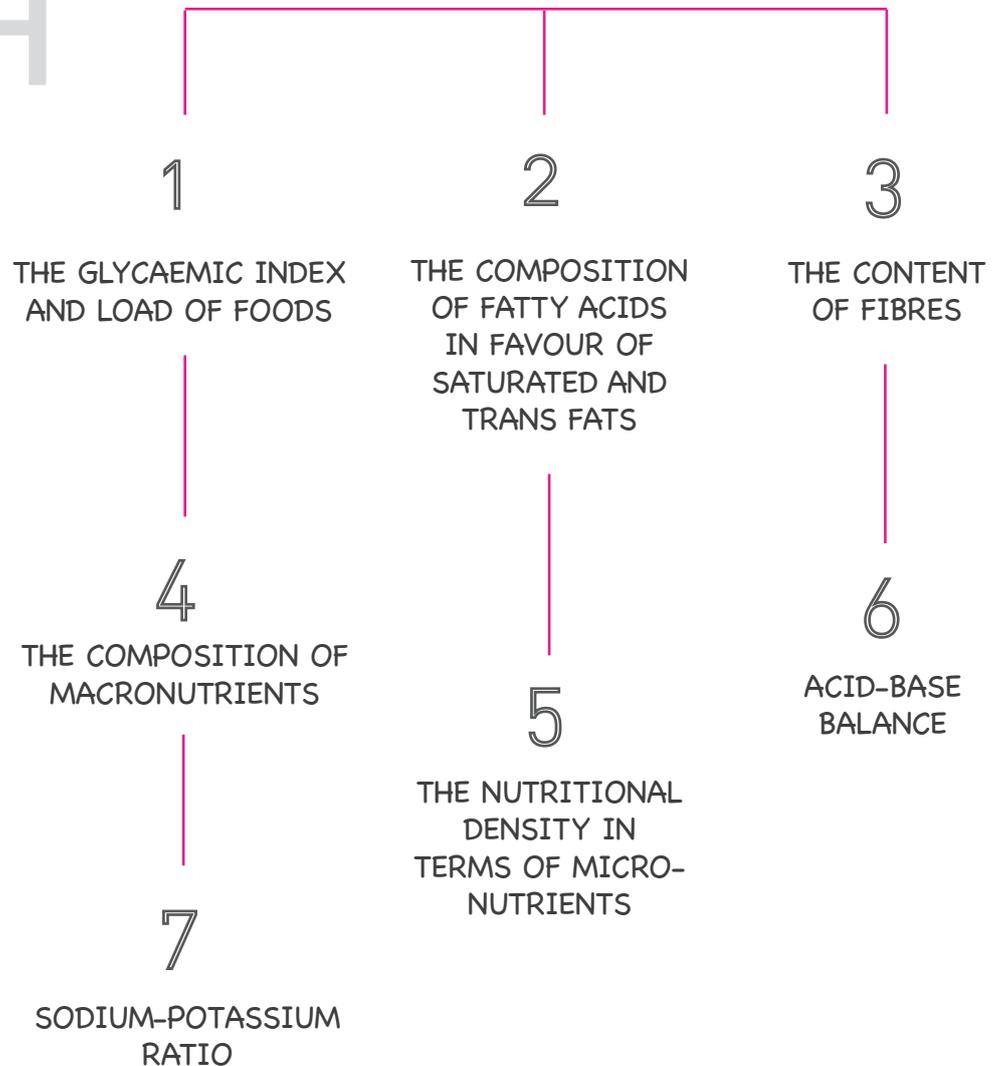




## THE CONTRIBUTION OF THE FOOD INDUSTRY

The change of food choices geared towards foods with high calories, rich of saturated fats, sugars and salt, and also the different processing methods of foods introduced with industrialization, contributed to determine this pandemic of obesity and significantly modified seven nutritional characteristics of ancient diets<sup>(63)</sup>:

# HEALTH



## 8.1 WHY THE WESTERN DIET IS NOT SUSTAINABLE

### IMPACT ON THE ENVIRONMENT

The Western Diet, in addition to negatively affect human health, can also remarkably impact the environment.

To measure the environmental impact, the entire life cycle of each food should be considered, starting from the raw materials until the disposal of waste generated by the same system.

Three indicators have been considered to estimate the environmental impact:

#### 1 WATER FOOTPRINT



expressed as total volume in litres (L) of water resources used to produce a kg of food or a litre of beverage. It includes water taken from rivers, lakes and water tables (surface and underground water) used in the agricultural, industrial sectors and at home, and rain water used in agriculture<sup>(64)</sup>.

#### 2 CARBON FOOTPRINT



expressed as grams of equivalent CO<sub>2</sub> (g CO<sub>2</sub> eq.) emitted to produce a kg of food or a litre of beverage. The greenhouse gases taken in consideration are: carbon dioxide (CO<sub>2</sub>), from which the name “carbon footprint” is derived, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride<sup>(65)</sup>.

#### 3 ECOLOGIC FOOTPRINT



expressed as square metres (m<sup>2</sup>) of natural resources exploited (soil or water) to produce a kg of food or litre of beverage, in relation to the Earth’s ability to regenerate them<sup>(66)</sup>.





# ENVIRONMENT

- WESTERN DIET
- MEDITERRANEAN DIET

## ESTIMATE OF THE ENVIRONMENTAL IMPACT

Estimating the weekly and annual environmental impact of the “western” diet model, it stands out that, with the same calory intake, more natural resources are used and more greenhouse gases are emitted compared to the Mediterranean food pattern. This factor stands out in the estimate of all three environmental footprints, as shown in the graphs.

\*Environmental footprints estimated starting from: *Double Pyramid 2016, BCFN*<sup>(67)</sup>

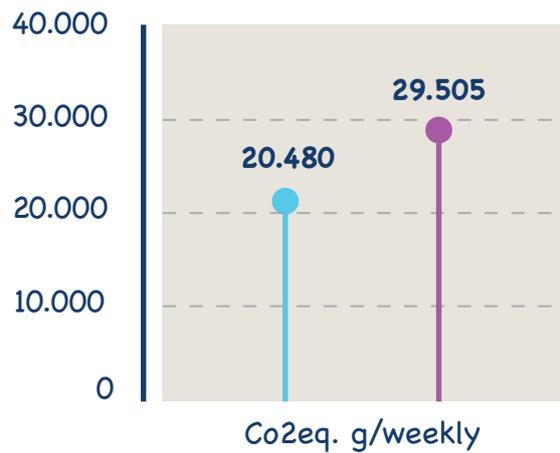
### 1

#### WATER FOOTPRINT\*



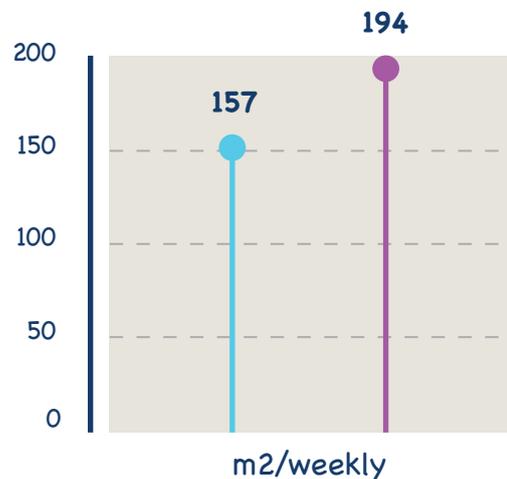
### 2

#### CARBON FOOTPRINT\*



### 3

#### ECOLOGIC FOOTPRINT\*



# FOLLOWING A “WESTERN” FOOD PATTERN, MEANS...

## 1 WATER FOOTPRINT



**25.518 L/weekly**  
of WESTERN DIET

Consume every year **the amount of water of about one minute and a half of the Marmore Falls.**

## 2 CARBON FOOTPRINT



**29.505 Co2eq. g/weekly**  
of WESTERN DIET

Travel **about 4348 km a year**  
with a medium-size car

## 3 ECOLOGIC FOOTPRINT



**194 m2/weekly**  
of WESTERN DIET

cut at least **one olive tree a day**

If we consider that the foods included in the environmental calculation were considered as raw materials instead of processed foods, probably derived from farming or intensive agricultural systems, the difference between the two diet models is even under-estimated. In this case, it is even more obvious the difference if we consider the impact of the production and processing methods of foods typical of the Western Diet, especially with regards to the emissions of greenhouse gases.

## 8.1 WHY THE WESTERN DIET IS NOT SUSTAINABLE



### IMPACT ON SOCIETY

The social-cultural benefits derived from the Mediterranean life style, such as conviviality, greater food awareness and strong identity, are totally lacking in the “western” society. Indeed, the latter has caused:

- **homogenisation of diets** at global level, thus losing food awareness and the historical-cultural bond with the territory;
- **reduction of times to prepare meals**, in favour of already prepared food or eating outside home, limiting family meals to rare occasions;
- **reduction of times to eat meals**, especially at work and at home, thus abandoning the idea of shared meal as a usual moment of “dialogue”<sup>(68)</sup>;

In a society focused on the quick consumption of food and fast-foods, we are hence assisting at a detachment from the principles of the Mediterranean diet, such as conviviality, traditions, festivity, gastronomic practices and cuisine. Therefore, a westernised society like today’s society is based on a food model lacking historical and cultural identity, driven by the simple need to satisfy a primary biological demand and result of an era based on speed.

## 8.1 WHY THE WESTERN DIET IS NOT SUSTAINABLE

### IMPACT ON THE ECONOMY

Adopting a western diet model in Italy is particularly favourable in economic terms compared to the adoption of a Mediterranean Diet (about 36 Euros a week compared to 45 Euros a week per-capita), especially if considering processed and low-quality foods, which are even cheaper than the price estimated.

- WESTERN DIET
- MEDITERRANEAN DIET

WEEKLY EXPENSE ESTIMATE\*



\*Weekly expense estimated starting from:  
*The Economic Pyramid 2016, BCFN<sup>(67)</sup>*

Nonetheless, considering the consequent effects on the healthcare expense and single citizen that needs medical treatments, **the economic advantage is just apparent**. Moreover, the purchase of food products typical of the Western Diet contributes to impoverish local enterprises and small producers, with strong spin-offs on employment and on the tourist and gastronomic offer of the territory.



Numerous disadvantages are linked to the “*western*” diet model, if compared with the positive effects on health, environment and society that could be obtained by following a **HEALTHY AND SUSTAINABLE DIET MODEL**.



Hence, each Country should exploit **ITS TERRITORIAL AND CULTURAL RESOURCES** to build its own health and sustainable diet model, following the example of the **MEDITERRANEAN DIET**.

VARIOUS LEVELS SHOULD BE INVOLVED, ENGAGING ALL POTENTIAL STAKEHOLDERS CONCERNED IN THE CHANGE: **PRODUCERS, INSTITUTIONS, HEALTH PROFESSIONALS AND CITIZENS.**



# **9. THE CITIES INVOLVED IN THE CHANGE**

## 9. THE CITIES INVOLVED IN THE CHANGE

By exploring the roots of many diet models worldwide, not only the Mediterranean Diet, it stands out that, when talking about food and nutrition, this is a topic that goes beyond the simple list of foods, but embodies a life style and the identity of a Country and a Community. Indeed, food influences the life of people at various levels:

### Food is...

HEALTH

NUTRITION

CULTURE

CONNECTION

DIALOGUE

Just think that in the past, food was considered a very precious good that, in excess, it was exchanged with someone else who needed it; the simplicity, the care for the territory, the interest for other people, attention to real commodities are therefore the key for a healthy, responsible and aware life style.

However, today our communities are too complex and complex food policies are required to manage them, based on ancient values. Food Policies were created for said purpose.

*Food policy: institutional actions aimed at acting, with a systemic vision and approach, on the components of the food system of a city: production, processing, logistics, distribution, consumption and waste, to guarantee healthy foods for everybody.*

Indeed, **the right to food** is currently known as a fundamental right: all human beings boast the right to have food available in sufficient quantity, suitable from a nutritional and cultural point of view, physically and economically accessible. The right to food can be guaranteed only by ensuring to every individual, access to production resources (e.g. soil, water, fishing, etc.), to work and social protection systems that protect the most vulnerable<sup>(69)</sup>.



Cities, which house over half of the world population, perform a strategic role in developing sustainable, inclusive, resilient, safe and diversified food systems with the aim to reach the highest level of food safety. This role constitutes one of the key points of the *Milan Urban Food Policy Pact*, an international pact undersigned among 209 cities worldwide that engages mayors to work in this direction. The action spheres foreseen in the pact are six<sup>(70)</sup>:

## 1 GOVERNANCE

layout a favourable context for an effective action by mapping the existing local realities, exchange information and engage all stakeholders of the local food system.

## 2 SUSTAINABLE DIETS

promote sustainable diets (healthy, safe, culturally adequate, eco-sustainable and based on rights) through activities such as development of guidelines on healthy and sustainable diet, educational programs, promotion of health and communication.

## 3 SOCIAL AND ECONOMIC JUSTICE

support the weakest ranges of population by opening public canteens and kitchens, food banks and by promoting social inclusion activities, like shared gardens.

## 4 FOOD PRODUCTION

support short food chains and small producers, use fertilizers derived from food waste, recycled waste water and energy generated by waste.

## 5 FOOD DISTRIBUTION

ensure access to fresh and economically accessible food in low-income districts with fewer services by planning logistic systems with low environmental impact and develop policies and programs in support of public municipal markets (e.g. agricultural, informal, wholesale, retail markets, restaurants, etc.).

## 6 FOOD WASTE

reduce excesses and losses along the entire food chain, raising awareness on the need to reduce waste and allow recycling and redistribution of safe and nutritional foods in the social solidarity circuit.



MILAN  
URBAN  
FOOD  
POLICY  
PACT

209  
cities



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# ● APPENDIXES



**GUIDE TO A  
SUSTAINABLE  
DIET**

1

CHANGE YOUR DIET BY OPTING FOR **FRESH, LOCAL AND SEASONAL FOODS**

2

INCREASE THE CONSUMPTION OF FRUIT AND VEGETABLES, LEGUMES, OLEAGINOUS FRUIT, MINIMALLY PROCESSED STARCHES AND WHOLE WHEAT CEREALS

3

FAVOUR **BIOLOGICAL, BIODYNAMIC PRODUCTS OR DERIVED FROM AGRICULTURE WITH LESS ENVIRONMENTAL IMPACT**

4

EAT A REDUCED QUANTITY OF SELECTED AND LOCAL MEAT, OBTAINED FROM ANIMALS BRED OUTDOORS AND FREE-RANGE

5

REDUCE THE CONSUMPTION OF **PROCESSED AND READY-TO-EAT FOODS**  
(rich of saturated fats, sugar and salt)

6

CHOOSE FISH COMING FROM SUSTAINABLE FISHING  
Opt for less known types like bonito, bluefish and seabream. More economic but very tasteful

7

PREFER **EXTRA VIRGIN OLIVE OIL, LIMITING ANIMAL FATS AND TROPICAL FATS**  
(palm, coconut, rapeseed...)

8

CHOOSE **COFFEE, CHOCOLATE AND TROPICAL FRUIT FROM FAIR AND SOLIDARITY-BASED TRADE**  
The kilometres are inevitable, but ensure a fair economic treatment to producers

9

PLAN THE **GROCERY LIST AND FREEZE FOOD PORTIONS THAT YOU ARE NOT PLANNING TO EAT IN THE SHORT TERM**

10

**SPEND TIME TO PURCHASE FOODS:**  
read carefully the nutritional information, the origin of the product and expiry date

11

WHEN POSSIBLE, **PURCHASE FROM THE MARKET OR FARMERS**  
Choose bulk foods, bringing a grocery bag from home

12

CHOOSE **"IMPERFECT" FOOD** because it is often discarded due to its aesthetic defects

13

**SPEND MORE TIME IN THE KITCHEN**  
rediscover traditional recipes, reproduce them, hand them on and share the meal with other people

14

OUTSIDE HOME, CHOOSE PLACES WHERE THE **MEALS ARE COOKED ON THE SPOT**

15

**TAKE WATER FROM THE SINK** using recyclable bottles

# ECO-SUSTAINABLE FOOD EDUCATION

The Local Healthcare Unit of the city of Turin and the students of the degree course in Dietetics of the University of Turin have studied and validated some guidelines implemented at “*Casa della Salute dei Bambini e dei Ragazzi*”, a dedicated structure opened in March 2019 as complex organisational form of poly-functional and multi-professional primary assistance with the aim to identify health needs outside hospitals, with particular reference to chronic pathologies with greater social impact. The following themes are studied:

- Theme “Life styles”
- Theme “Postural alterations”
- Pink theme: “Childhood gynaecology”
- Neuro-development disorders, in particular learning
- Activities typical of blood test centres and clinics

## “FERMATI E FERMENTA”



### Laboratory for young and older children (between 5 and 9 years old)

- Laboratory aimed at preparing a fermented self-produced product using the available material (glass jars, cabbage, julienne-cut cap, salt, water, raffia to decorate the jars). Every child worked the raw material by first observing short-term modifications during the laboratory and then long-term, by bringing the sauerkraut jar at home;
- Intermediate theoretical section;
- Sensorial tasting laboratory of some products derived from milk fermentation (yogurt and kefir). Before the tasting sessions, they were educated to good practices and tasting techniques to adopt when dealing with a food product; the products were thus observed and analysed with all senses before proceeding with aware tasting. With reference to each tasting, the public had the opportunity to express their impressions and sensations they felt when tasting the fermented product.

### Laboratory for adults

- Frontal lesson foreseeing the compilation of a questionnaire to investigate previous and acquired knowledge with regards to food fermentation;
- Sensorial tasting laboratory of lacto-fermented vegetables offered by small local producers, foreseeing the compilation of a sensorial analysis sheet.

The “*Life style*” theme foresees informative counters for parents, grandparents, relatives or tutors and practical-experiential laboratories to raise awareness on the effects of food choices on individual and public health and future of the planet. All laboratories foresee parallel activities for children and parents/tutors with a final feedback and comparison phase between the two groups. In addition to specific topics (through playing activities for children and guided discussions for parents), foods in line with the topic discussed, are manipulated and tasted.



## “BUONE FORCHETTE PER IL PIANETA”

### Laboratory for young and older children (between 5 and 9 years old)

- Interactive presentations (with educational posters specifically conceived and other educational supports that favour the interaction with the audience), to convey the main messages to contain environmental impact by adapting the food habits;
- Play activity with the aim to associate the right environmental impact to each food (measured as “clouds”) and visually compare it with others.

### Laboratory for adults

It consisted in providing proofs on the opportunities to change mentality in managing the diet of a child.

A play activity was carried out also in this case.

The project was concluded with a final activity that combined the themes treated by the two groups.

## LEARNING BY DOING

The **learning-by-doing** technique, together with the professionalism of nutrition experts allows children and adults to acquire knowledge and experience with regards to healthiness and sustainability of the diet in a clear and interactive manner.

The project highlighted the need to create an educational model specifically aimed at promoting sustainable nutrition. The educational model proposed to children and their parents proved to be useful to acquire knowledge on the food pyramid, comply with sustainable diets and promote adequate life styles, also by changing diets, in view of scarce food education programs proposed by schools. Applied systematically, with its strong scalability and reproducibility potential, the project may play an important role in promoting healthy and sustainable life styles within school policies aimed at promoting a correct diet with low environmental impacts.

## THE NARRATION

**The tale as narration tool offers the possibility to make children reflect and engage in important topics for the health of humans and the planet, by rendering these topics simpler and more comprehensible.**

### "CAMILLA E IL MAGICO MONDO DI NUTROPOLIS"

Food education project "*Camilla e il magico mondo di Nutropolis*" was conceived within the degree course in Dietetics of the University of Turin, starting from the idea to engage and introduce children of primary schools to proper nutrition, not only to prevent and promote healthy life styles, but also make children and teachers reflect on how our food choices and, in general our diet, can significantly impact the environment and the planet.



"*Camilla e le sette creature del bosco*": the tale aims at conveying information about the numerous nutritional properties and seasonality of vegetables, represented indeed by seven different creatures. The playful theme of the tale aims at engaging children, attracted and more aware on the topic of diet, because it is renowned that children do not like vegetables, often perceived as acid, sour foods of unpleasant taste. Moreover, the tale aims at bringing children closer to the world of vegetables, also through flavourful and simple recipes.



"*Camilla e il Re Sugar*": the tale aims at bringing children closer to the consumption of seasonal fresh fruit, another food that is scarcely present in their diet. In this case, the message to convey is not only highlighting the benefits that fruit has on our body, but also the negative consequences derived from a diet rich of processed foods, sugary beverages and sweets. The tale also highlights the difference between a natural food containing sugar like fruit, and an artificial food.

# MEDITERRANEAN ADEQUACY INDEX (MAI)

The Mediterranean Adequacy Index (MAI)<sup>(71)</sup> was formulated from the analysis of a long series of studies elaborated from the *Seven Cities* study, which indicates the level of adherence of a meal to the Mediterranean diet, comparing calories, therefore the energy, brought by the different classes of food in a dish.

$$\text{MAI} = \frac{\% \text{ Energy CARBOHYDRATES} + \% \text{ Energy PROTECTIVE FOODS}}{\% \text{ Energy ANIMAL DERIVED} + \% \text{ Energy SWEETS}}$$

If the value of the fraction of MAI index is equal or higher than 15, the adherence of the meal to the Mediterranean diet is 100%. Maintaining daily values near 100% of compliance, according to relative scientific studies, reduces the risk of chronic, non-transmissible illnesses<sup>(72)</sup>.

## Complex carbohydrates



cereals, pseudo-cereals, bread, pasta, corn



potatoes

## Protective foods



fruit and vegetables



dry fruit



olive oil



fish



red wine

## Derivati animali



meat



milk and dairies



cheese



eggs



other animal fats

## Dolci



cakes, sweets, biscuits, milk chocolate, sugar



sugar beverages

