

Mediterranean Diet

Natural and Cultural Landscapes

Mediterranean Diet: When brand meets people

<https://mdnet.interreg-med.eu>



Table of Contents

MEDITERRANEAN DIET - NATURAL AND CULTURAL LANDSCAPES	3
ABSTRACT	3
1. NATURAL AND CULTURAL LANDSCAPES OF THE MEDITERRANEAN: HISTORY AND TERMINOLOGY	4
1.1. A JOURNEY THROUGH TIME	4
1.2. MEDITERRANEAN DIET: A MULTIDISCIPLINARY APPROACH.....	12
1.2.1. The concept of Natural Landscape.....	13
1.2.3. The concept of Cultural Landscape	14
1.2.3. Vernacular architecture	16
2. NATURAL LANDSCAPES	17
2.1. CLIMATE AND GEOMORPHOLOGY	17
2.2. VEGETATION	22
2.3. COASTAL ZONE AND MARINE LIFE	26
3. CULTURAL LANDSCAPES.....	28
3.1. VERNACULAR ARCHITECTURE AND CULTURAL MANIFESTATIONS.....	30
3.2. NATURAL RESOURCES' MANAGEMENT, COPING WITH NATURE	35
4. MEDITERRANEAN LANDSCAPES IN THE REGIONS OF MD.NET PROJECT	38
Albania	38
Algarve.....	38
Andalusia	39
Catalonia.....	40
Crete	40
Cyprus.....	41
Dalmatia.....	41
Emilia-Romagna	42
Campania.....	42
Sicily	43
Herzegovina	43
Vzhodna	44
5. COMMON CHALLENGES IN THE MEDITERRANEAN AREA	45
SWOT analysis.....	45
Strengths.....	45
Weaknesses	45
Opportunities.....	46
Threats.....	46
Reading List.....	47

MEDITERRANEAN DIET- NATURAL AND CULTURAL LANDSCAPES

ABSTRACT

In this manual, Mediterranean Diet will be presented as a multidisciplinary concept. Some historical background will be provided, highlighting the strong link of Mediterranean Diet to Agriculture, and the contribution of past and present civilizations to the concept. The orography, climate features and biodiversity of the region will be presented, stressing its linkage to the Mediterranean culture and History. Mediterranean ways of coping with nature – the Cultural Landscapes of Mediterranean Diet will be defined and presented, as well as the concept of Mediterranean Diet itself. Current challenges, in times of climate change and in the Information Era, will be discussed and whenever adequate, concrete examples will be presented. Mediterranean Diet cannot exist out of the Mediterranean region, as it encompasses elements of geography and climate, agriculture, food habits, history, sociological aspects, culture, architecture and others. From one side, it is necessary to preserve such fragile equilibrium, which is the true Mediterranean Diet. On the other hand, the Mediterranean Diet calls for the reconnection of urban populations with seasonality and awareness on the realities of local agricultural and fisheries' sectors, addressing Sustainable Development Goals SDG2 (zero hunger), SDG13 (climate action), SDG14 (life below water), SDG15 (life on land). By cherishing the existing knowledge, skills and millenary wisdom, in the region, it will be possible to reinforce the Mediterranean sense of belonging, to improve the adherence scores to Mediterranean Dietary pattern, to revamp traditions, and to create value from sustainable innovations built on the Mediterranean Diet concept.

1. NATURAL AND CULTURAL LANDSCAPES OF THE MEDITERRANEAN: HISTORY AND TERMINOLOGY

1.1. A JOURNEY THROUGH TIME

With the advent of agriculture humankind started to shape nature in its favour, domesticating plants and animals, creating new species with suitable traits – such as cereals richer in starch, and sheep that provided more wool, milk and meat. Agriculture started by itinerant farming, which consisted in burning the existing vegetation in order to plant the seeds of chosen edible plants. After harvest, the human community moved to another suitable location, until seed productivity increased, and agricultural techniques improved to ensure the necessary food security for the populations to settled down.

The domestication of cereals, namely wheat, was of capital importance because the seeds could be stored (under suitable conditions) for many months. It is noteworthy that wheat bread (obtained from the grains milled into flour, fermented, or not, by a yeast, and baked), besides carbohydrates¹, supplies some protein, B vitamins, and minerals, in easily digestible forms, and soon became a staple food, and one of the pillars of the Mediterranean Diet. By this epoch, in the Neolithic, and in Europe, agricultural techniques diverged in two directions: in the North, of cold winters and warm summers, the melted snow from the mountains was enough to keep the large valleys watered and fertile during warmer times. Such populations specialized in creating cattle using all their resources (milk, meat, leather and even the blood), and the genetic evolution that allowed humans to use lactose (a sugar present in ruminant's milk) was crucial for population growth. Ruminant's milk and dairy became an important source of protein and vitamin D. In these northern regions, the short summertime, with long daylight periods was enough to growth cereals (notably barley and rye) to prepare for bread for humans, and silage to feed cattle during the long winters.

Peoples from the south were apparently blessed with a milder climate and a calmer sea. However, the irregularity of the terrain, the scarcity of water during summer, and the hidden dangers of the Mediterranean Sea, revealed otherwise, as valleys with abundant fresh water are rare in southern Europe and in the Maghreb. Thus, Mediterranean peoples adapted to this environment by carefully choosing crops and trees with reduced water demand and devising agricultural techniques and crafts aiming at using every little space of fertile soil, in steep hills, among rocks, or just nearby the sea. Instead of horses and cows, these peoples preferred small ruminants (as goats and sheep) and donkeys, which were able to find their own food in the hills. These two types of approaching agriculture in early times, in northern Europe and in the south, were probably in the root of the divergent lifestyles and later constraints to the economic growth in

¹ Carbohydrates are food constituents primarily responsible for supplying energy for metabolic functions; they encompass simple sugars (monosaccharides), oligosaccharides (consisting on a few sugar molecules attached to one another), starches (polysaccharides, with many sugar molecules attached to one another) and fibres (sugar polymers that are beneficial to bowel functions, namely gut microbiota – which are relevant bacterial symbionts mainly living in the colon)

the Mediterranean regions; the northern peoples, more prone to standardization and massive production vs the southern peoples more resourceful, resilient and adaptable.

For many centuries, the skills of the Mediterranean peoples and the milder climate were more favourable to population growth and development. Mediterranean societies increased in complexity as food security increased, allowing for task specialization that greatly increased efficacy. Food was so valuable that it was offered to the Gods and the association between certain foods (e.g. bread), religious rituals and symbolism persist until today.

Cities soon became the centre of civilizations, flourishing under collective beliefs and commonly accepted social organization, resulting in civilizations as Mesopotamia and Egypt, which prosperity was grounded in efficient agricultural techniques (e.g. plant and animal domestication, water management). Food preservation techniques, still used today, as fermentation (of bread, grapes and dairy, notably cheese and yogurt), as well as drying and salting, originated in the Mediterranean during the agricultural revolution.

Nowadays salt is mostly referred for its abuse and the associated global health issues. However, in the past, salt was a valuable asset allowing the preservation of fish and meat, as well as the supply of microelements to the diet. Artisanal salt extraction techniques are nowadays revamped businesses that may sustainably cope with the fragile ecosystems of wetlands (Fig. 1).



Figure 1: The photo (and detail) shows an artisanal technique of concentrating and extracting salt from brackish waters in shallow tanks. Sodium chloride (NaCl) plays key roles in human cells as well as an important food preservative. Salt was so valued in antiquity that the word “salary” (of Latin origin) derives from it. Sustainable salt extraction techniques are used nowadays in obtaining prime quality non-refined salt, which contains micronutrients as iodine. Artisanal facilities well-integrated in a natural park, can be observed at Castro Marim, Algarve, Portugal – for more details (in Portuguese) please see <http://www2.icnf.pt/portal/ap/r-nat/rnscmvrsa/hist-cult>; Photo by Prof. Nidia Braz, Universidade do Algarve.

Specialization and trade created wellness for other civilizations, as the Phoenicians, who travelled and settled along and across the Mediterranean, first leveraging the Mediterranean culture by disseminating goods (e.g. cereals, salt, dyes) and skills in both shores of the Mediterranean.

The use of metals and written language were important technical progresses although social cohesion was ensured by religious beliefs able to motivate the peoples to transcend themselves, as can be witness by the colossal art pieces and buildings, which were meant to last forever.

Nowadays societies (still) rely on human unique traits, such as imagination and abstract thinking that, when verbalized, allow building intersubjective constructs (ideals, concepts, stories), which are reinforced trough collective belief. Politics, Money, Philosophy and Religions soon became pillars of these civilizations, and such concepts are still ruling western culture, which is rooted in Mediterranean civilizations.

Much has been written about Greek and Roman influences on western culture. Ancient Greeks founded democracy, philosophy, developed the mathematics and other sciences as well as arts², which prevail and still amaze us today. Greeks established the link between mind and body, and Hippocrates, the father of medicine, first separated the discipline of medicine from religion, arguing that disease was not a punishment from the Gods but rather caused by environmental factors, diet, and living habits. He is often quoted with "*Let food be your medicine, and medicine be your food*" and "*Walking is man's best medicine*". Despite the uncertainty of the exact wording, Hippocrates' arguments are in line with the Greek word "Diaita", encompassing diet and lifestyle, which best describes the Mediterranean Diet concept. In respect to food habits, Greeks cultivated and valued vineyards and olives, appreciating wine and extracting olive oil to use in foods, to oil the athlete's body, in the treatment of some ailments etc.

The Roman Empire dominated for centuries the Mediterranean basin and surroundings. The map, in Figure 2 below, illustrates the Roman expansion at its maximum occupancy. The Roman Empire was the most extensive political and social structure in our civilization and according to Mark J.J. (2018)³, its influence was so profound that lasting contributions are found virtually in every aspect of western culture.

2 TED animation - Music and creativity in Ancient Greece, by Tim Hansen: <https://youtu.be/ibB-SvwhqKQ>

3 Mark, J. J. (2018). Roman Empire, Ancient History Encyclopedia. in https://www.ancient.eu/Roman_Empire/



Figure 2. The Roman Empire, which greatly contributed to the expansion of the Mediterranean Diet, at its greater extent, occupied the territories shown in this map, a 1925 reprint of the 1907 Atlas of Ancient and Classical Geography in the Everyman Library, published by J.M. Dent & Sons Ltd (digital reproduction by J. Vanderspoel, Department of Greek, Latin and Ancient History, University of Calgary, Canada)

First Roman Emperors expanded the empire by implementing effective political, economic and military systems in all provinces. Such governance, namely relied on a set of laws (e.g. land property), on the construction of roads and bridges, aqueducts and reservoirs (to manage and distribute water), and on keeping food security (e.g. by planting olive trees and vineyards). Augustus, by the end of his life, said about himself that he "*found Rome a city of clay but left it a city of marble.*"

A period of peace, known as the "Pax Romana" or "Pax Augusta" allowed for great prosperity and knowledge advancement during about 200 years. Romans were adepts of incremental innovation, adapting and improving any invention, tool or concept they may find useful among the colonised peoples. Slowly they imprinted the cultural landscape of the Mediterranean basin, disseminating the same crops, and food preserves, the same architecture and crafts. Romans implemented a homogenous culture, law and order. More information about the Roman Empire can be found in many reliable sources, including online⁴. Romans standardized food habits in the provinces by planting cereals (mostly wheat and barley), pulses (beans, lentils and peas),

⁴ Short movie on the Roman Empire (by the History Channel): <https://youtu.be/8ITVUBXVyR8>

vineyards and fruit trees (e.g. fig, apple, peach, almond, olive), and by introducing innovations in food manufacturing (olive mills and decanters for olive oil, cereal mills and sieves for better flours). Romans also greatly improved food preservation methods increasing food availability through the year (e.g. drying fruits, pickling vegetables, fermenting table olives). Fresh meat and fish were delicacies, and several preservation methods were used besides salting and drying, such as smoking and curing meats (chouriço/chorizo, ham, salami), and improving cheese making processes. Romans introduced fish farming, namely in brackish water tanks. Food supplies were carefully controlled by the state and, in times of peace, wide access to cereals, pulses, olive oil, pork and wine was granted to all⁵.

Attention was given to cooking, and recipes were based in mixing condiments in order to create tasty and unique foods and sauces (Fig. 3).



Figure 3. "Açorda/Gazpacho" is a kind of meal likely to have been inspired in Roman food recipes, containing bread, olive oil, aromatic herbs. Whenever available some fish or meat preserves were used as seasoning. Source: A. Freitas et al. (coord.) – Dimensions of Mediterranean Diet, World Cultural Heritage, Faro: Universidade do Algarve, 2015.

About 476 AD, and for multiple reasons, the western part of the Roman Empire collapses. In the Westside of the Mediterranean, the barbarian took over, soon forming several kingdoms. In the East side, it continued as the Byzantine Empire, centred in Constantinople, were a quite tolerant and advanced civilization prospered until 1452, when fall in the Orient, conquered by the Ottomans. Some of the Roman legacy was kept within the Catholic Church, which used Roman structural organization for dissemination of information and habits. During the Middle Ages, in Europe, religious orders became proprietaries of vineyards, olive orchards and other important crops. Later, in Renaissance such legacy was retrieved, with the support of the Church.

⁵ Cartwright, M. (2014). Food in the Roman World. Ancient History Encyclopedia. In <https://www.ancient.eu/article/684/>

It is relevant to note that the birth of the three main monotheist religions (Judaism, Christianity and Islam) occurred in the Mediterranean. Although the endless quarrels and often recalled disagreements, there are many similarities between the three religions. Notably they share: the same God, many sacred texts and ethical rules, the same symbolisms related to crops and foods (e.g. olive tree and olive oil, bread), their celebrations are related to harvests and aligned with the pace of nature, celebrations involve communal events where the food and socialization play central roles.

The diet in the Mediterranean has been enriched along times by new crops and foreign spices brought to the region by Arabs, Venetian merchants, the Romans (through the empire), and by the Portuguese and Spanish sailors that crossed the Atlantic Ocean in the XVI century. Sweet orange and tomato are two remarkable examples of foods nowadays taken as typically Mediterranean, but with origins as diverse as Asia and South America. The sailing expeditions of Portuguese and Spanish to the Americas, Africa and India, not only enriched the diet in the region, but also exported the Mediterranean culture to new lands, which are nowadays prone to consume olive oil and other Mediterranean delicacies. As Mediterranean peoples did before (the spaghetti was inspired in rice pasta), also Americans adapted Mediterranean foods to their own style (e.g. by creating fast-food pizza).

Despite the diversity of crops in the Mediterranean Basin, during many centuries, food scarcity was the rule among common peoples who lived in uncertainty, worried with hunger, epidemics and wars. Religion have been offering guidance, consolation and rewards for all those who follow the ethical codes of conduct and the reward comes in the form of happiness from good actions and the promise of wellbeing in afterlife. Same concepts and main ethic principles apply to all three monotheistic religions, with minor differences.

One cannot dissociate Mediterranean Diet from the influence of religions, as they are part of Mediterranean cultural landscapes (defined below) and they are still very much alive in the Mediterranean. However, nowadays, the human individual is the central figure and religious have been adapting narratives to cope with the new desires of individuals for happiness, as well as for a long and prosperous life, and even for environmental protection.

Science and beliefs may coexist peacefully, acting on two complementary fields – one proposing technological advancements (science & technology), and the other (religions & ideals) assessing its ethics, that is, the impact of adopting new practises and technologies on the wellbeing of humankind. Science provides recipes to longer life (recommended lifestyles, medicines), while beliefs⁶ (ideals or religions) provide the guidelines to happiness (ethics, behavioural rules).

A common Mediterranean identity and lifestyle emerged from all these common layers of History of cultural exchanges and population's fluxes. Migrations inside the Mediterranean and successive settlements refined a similar way of life, aligned with the pace of nature, encompassing convivial meals, identical food patterns, as well as similar architecture and materials (e.g. the same dyes), all grounded on similar natural resources, climate and orography, as well as similar social codes of conduct. Yet, this model allows and embraces regional specificities as based in the optimization of local resources and in the reinforcement of social bonds.

Such skills and lifestyle helped facing the harsh life conditions and food insecurity that persisted in the area until long after the industrial revolution, aggravated by the Second World War (WWII)

⁶ Beliefs, notably Ideals and Religions are herein viewed as constructs linked to ethics and to other philosophical disciplines

and the Spanish civil war. In the 1950' and 1960's, while North and Central Europe and the USA prospered, the old Mediterranean world did not experience economic growth.

After WWII, in order to face global food insecurity, major changes in agriculture and food industry took place in the countries that lead the Industrial Revolution. Due to many reasons, including the lack of coal and fossil fuels, the Mediterranean region hardly accompanied the industrial revolution. Even with investment and strategies prescribed from outside, the Mediterranean basin seemed to resist to progress, and no significant economic growth was observed. The main underlying reason most probably related to the inadequacy of the imposed model that did not fit to the geomorphology and to the environment of the Mediterranean: harbours, if any, were small and the sea floor was as irregular as the inlands and artisanal fishing could not compete with the new mass production' standards. Most agricultural fields were found inadequate to modern large machinery, due to the irregularity of terrains, and water scarcity during summer was an additional problem. Nevertheless, whenever possible, agricultural production have been intensified and autochthone plants and animal breeds have been replaced by standard and (allegedly) "improved" ones.

Cattle replaced the small ruminants, while broiler chicken and intensive pig farming were introduced in the region, and olive orchards were upgraded to monovarietal intensive production modes. The multiple olive cultivars and recipes to prepare table olives were just discontinued or replaced by one or two types of industrial processes.

Food industry experienced an unprecedented growth in post war, aiming at producing safe foods in enough quantity to feed a growing world population. Driven by the main goal of ending hunger, food industries increased the overall production and developed a wide range of new foods, combining knowledge in engineering, chemistry, microbiology and physics. The aim, at first, was supplying appealing processed foods to supply the necessary calories to all, at affordable prices, while observing safety rules. Despite good intent and, although the main goal has been largely achieved, important collateral damage remains to be resolved.

By implementing this model of industrialization, most Mediterranean foods were considered much diversified for homogeneous production on a large scale, due to the lack of scientific explanation for the processing stages and the reduced availability of raw materials (e.g. specific autochthone plants). In addition, traditional Mediterranean preservation methods (such as drying, salting and fermentation) were, at that time, considered old-fashioned and inadequate, and pressures persist to embrace global processed foods.

Higher intakes of milk and meat were encouraged, and margarines, sodas, beer and other industrial novelties were just penetrating the Mediterranean markets, when a medical Doctor, Ancel Keys, observed that blue-collar workers and peasants from Italy, following Mediterranean food habits and lifestyle, were healthier than wealthy men from USA. In order to confirm and to understand such scientific observation, Keys and his team conducted an extensive epidemiological study in seven countries, which allowed them to establish a statistically relevant correspondence between Mediterranean dietary habits and lower risk of cardiovascular diseases. Meanwhile, food industries grew into global and powerful corporations and Keys' study and other scientific evidences were ignored for decades. Despite many other studies confirmed these findings, despite the mounting evidence, and despite health claims have been granted to Mediterranean foods, discussions and many alternative dietary patterns have been proposed (the aspects related to food habits and health will be discussed in the next module of this course).

In short, for the sake of economic development only, on one side, intensive agriculture expanded all over, relying on a few homogenous seed varieties, on heavy use of agro-chemicals, fertilizers, water and energy. On the other side, the food industry evolved to produce high-calorie dense foods of poor nutritional content, using a reduced number of natural ingredients. The result of such a model is the disruption of balanced ecosystems, the loss of biodiversity, climate change, and the rise of obesity worldwide, surpassing malnutrition, including at the Mediterranean basin.

The peculiarities and the intrinsic value of Mediterranean Diet and Mediterranean ecosystems are now finally noted. Figure 4 shows the Mediterranean Basin as an important biodiversity spot, with identified endangered species of plants (including some autochthone agricultural varieties), terrestrial animals, birds and insects, amphibians and fish (particularly from freshwater streams).

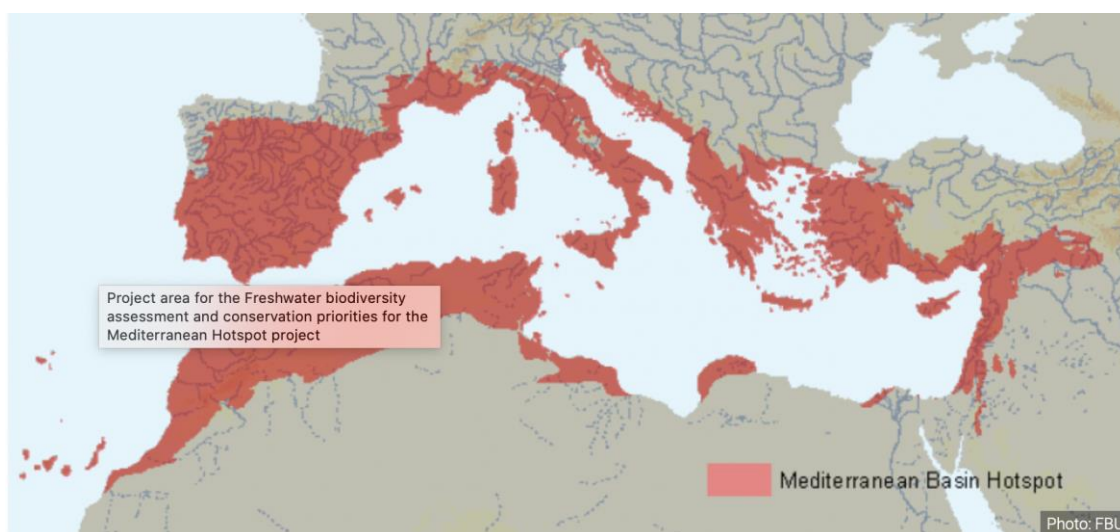


Figure 4. Mediterranean biodiversity hotspot; Key Biodiversity Areas for plants were identified in the south and east Mediterranean. (IUCN, 2017). Most of these sites are also vital for other species such as mammals, birds, freshwater fish and amphibians.

Nutrition transition, climate change and standardization of behaviours are threats not only to Mediterranean Diet but also for the health and well-being of humankind, social organization as we know it, and ultimately challenges the survival of our own species, as noted by many researchers and acknowledged by international organizations, namely by the United Nations⁷. The Sustainable Development Goals, established by the United Nations, are meant to ensure the necessary action in favour of sustainable wellness of human societies, while minimising the anthropogenic negative impact on our planet.

It is noteworthy that neurologists and sociologists as Damásio⁸ and Harari⁹ claim that humans continue to thrive due to their ability to create “fictions”, which provide a purpose for our actions and allow us to cooperate better. Without “fictions” that we all agree to believe on, such as money, states, companies, football rules or laws, our societies would not work at all.

⁷ <https://www.un.org/en/climatechange/reports.shtml>

⁸ António Damásio (2010) *O Livro da Consciência*; Círculo de Leitores; ISBN: 9789896441203

⁹ Yuval Harari (2015) *Homo Deus, A brief History of tomorrow*, Harvill Secker, ISBN: 978-191-070-187-4

Interpreted fictions and created narratives by experts from Humanities and Arts are meant to be subjective, discussable and adaptable (art is art, as long as it is proclaimed as so), while experts from the exact sciences' fields tend to describe reality objectively, reducing divergences through the examination and final approval from peers. Mediterranean Diet, as a holistic concept, calls for the dialogue between experts from different fields, from humanities to exact sciences, whom have therefore different approaches to the same reality. In short:

“The Mediterranean Diet, Intangible Heritage of Humanity, responds and clearly demonstrates the complexity of food and its social and symbolic significance. The Mediterranean basin includes the territories of southern Europe, northern Africa and the westernmost area of Asia. It is in these areas that the so-called Mediterranean civilizations developed, whose continuity in time is manifested to this day through a largely common culture, above and beyond deep political and religious differences.”

1.2. MEDITERRANEAN DIET: A MULTIDISCIPLINARY APPROACH

Mediterranean Diet results from the millenary accumulated knowledge and beliefs and it is translated into Material Heritage (e.g. temples, vernacular architecture) which is entangled with Intangible Heritage (e.g. food habits, festivities).

According to the United National Educational Scientific and Cultural Organization (UNESCO),

*“The **Mediterranean Diet** involves a set of skills, knowledge, rituals, symbols and traditions concerning crops, harvesting, fishing, animal husbandry, conservation, processing, cooking, and particularly the sharing and consumption of food. Eating together is the foundation of the cultural identity and continuity of communities throughout the Mediterranean basin. It is a moment of social exchange and communication, an affirmation and renewal of family, group or community identity. The Mediterranean diet emphasizes values of hospitality, neighbourliness, intercultural dialogue and creativity, and a way of life guided by respect for diversity. It plays a vital role in cultural spaces, festivals and celebrations, bringing together people of all ages, conditions and social classes. It includes the craftsmanship and production of traditional receptacles for the transport, preservation and consumption of food, including ceramic plates and glasses. Women play an important role in transmitting knowledge of the Mediterranean diet: they safeguard its techniques, respect seasonal rhythms and festive events, and transmit the values of the element to new generations. Markets also play a key role as spaces for cultivating and transmitting the Mediterranean diet during the daily practice of exchange, agreement and mutual respect.”¹⁰*

10 UNESCO: <https://ich.unesco.org/en/RL/mediterranean-diet-00884>

Mediterranean Diet was Inscribed in 2013 on the Representative List of the Intangible Cultural Heritage of Humanity of UNESCO by Cyprus, Croatia, Spain, Greece, Italy, Morocco and Portugal. Each one of these countries has a representative community that demonstrates and safeguard the Mediterranean Diet material and intangible elements. Representative or emblematic communities from the listed countries are respectively: Agros (Cyprus), Hvar (Croatia), Soria (Spain), Koroni (Greece), Pollica-Cilento (Italy), Chefchaouen (Morocco) and Tavira (Portugal).

The members of the representative list agreed that the concept of Mediterranean Diet is multidisciplinary, encompassing geography and climate, agriculture, food habits, history, sociological aspects, culture, architecture and others.

Such intangible cultural heritage is “traditional, contemporary and alive, at the same time”. The Mediterranean Diet concept is *inclusive*, as it aims at preserving the Mediterranean identity, from one generation to the next, sometimes influenced by migratory flows and by the inclusion of non-native elements. The Med Diet concept is *representative* because it encompasses the historical background, the knowledge on the communitarian rituals and behaviours and their adoption by other communities; it is *community-based* because of the conscious awareness of community members. In addition to those features, the sustainable dimension of the Mediterranean Diet was recently stressed by José Graziano da Silva, Director-General of FAO (Food and Agriculture Organization of the United States)¹¹, in the sequence of other previous press releases calling for action for its safeguard¹².

It is noteworthy that food systems have been referred by the UN¹³ as a crosscutting issue, due the broader impact on land use, water requirements and GHG emissions (ecological footprint). Encouragement of dietary changes towards plant-rich diets and less meat consumption, reduction of food waste, encouragement of sustainable agricultural practices and sustainable food processing have all been advocated. Will Mediterranean Diet (rooted in its millenary wisdom) be able to address the urgent and demanding 12th SGD, responsible consumption and production, in addition to other SGD?

1.2.1. The concept of Natural Landscape

Ideally, a natural landscape would be made by Nature and untouched by humankind. In another words, it would be nature in its pure state. The term “natural landscape” comes from the Dutch word “landschap”, the name given to paintings of the countryside. Geographers have borrowed the word from artists. Some geographers (as Otto Schluter¹⁴) claim that geography is the science of landscape. In this view, a natural landscape is made up of a collection of landforms, such as mountains, hills, plains, and plateaus. Lakes, streams, soils (such as sand or clay), and natural vegetation are other features of natural landscapes.

11 FAO Director-General calls for greater promotion of sustainable, local diets (2019):

<http://www.fao.org/news/story/en/item/1197746/icode/>

12 FAO News article, Preventing the Mediterranean diet from vanishing into the sea (2015):

<http://www.fao.org/news/story/en/item/293271/icode/>

13 UNEP (2019) Sixth edition of the global environment outlook report:

<https://content.yudu.com/web/2y3n2/0A2y3n3/GEO6/html/index.html?page=604&origin=reader>

14 (1872-1959) German geographer

Neither the “Collins” nor the “Merriam-Webster” online dictionaries display entries for the expression “Natural Landscape”. However, “Natural Area” is defined as “a geographical area (as in a city) having a physical and cultural individuality developed through natural growth rather than design or planning” (Merriam-Webster dictionary) and presented examples for “natural landscape” are such as “As far as possible the new buildings will be made to fit in the natural landscape” (Collins dictionary). In fact, truly natural landscapes do not exist anymore, because humans are driving major changes to the planet's ecosystems¹⁵. Geologists and other scientists consensually agree that these so noticeable changes at a global scale mean that we are living in a new epoch: “The Anthropocene”¹⁶.

Back in the 1990's, and in respect to World Heritage Sites, UNESCO stated that:

“A natural area is one where bio-physical processes and landform features are still relatively intact and where a primary management goal of the area is to ensure that natural values are protected. The term “natural” is a relative one. It is recognized that no area is totally pristine and that all-natural areas are in a dynamic state. Human activities in natural areas often occur and when sustainable may complement the natural values of the area” (UNESCO 15 April 1996: 3)¹⁷.

Currently, Natural Areas are viewed from a conservation point of view, translated in the UN Sustainable Development Goals, notably SGD14 - life below water (see infographic¹⁸) and SGD15 – life on land (see infographic¹⁹).

In conclusion, nowadays, natural landscapes or natural areas tend to be object of preservation. In the Mediterranean basin, birthplace of notable ancient human civilizations, nature has been shaped by humankind for millennia. Consequently, natural landscapes mainly became cultural landscapes (defined below) and this is one of the reasons why the Mediterranean Diet cannot be understood separately from human action.

1.2.3. The concept of Cultural Landscape

According to UNESCO, Cultural Landscapes are combined works of nature and humankind, expressing a long and intimate relationship between peoples and their natural environment. Cultural landscapes encompass sites that reflect specific techniques of land use, which are sustainable and support biodiversity, as well as sites that express a spiritual relationship of people with nature, associated with powerful community beliefs and/or artistic and traditional practices and rituals.

“Cultural landscapes testify to the creative genius, social development and the imaginative and spiritual vitality of humanity. They are part of our collective identity”.

As the term embraces a diversity of manifestations of the interaction between humankind and its natural environment, many "cultural landscape" exist worldwide, 114 of which are inscribed in

15 Read more from Smithsonian Institute: <https://www.smithsonianmag.com/science-nature/age-humans-living-anthropocene-180952866/#lbwSLSSxJgv20rbZ.99>; and from: Sustain Sci (2018) 13:119–128 <https://doi.org/10.1007/s11625-017-0513-6>

16 The present of radioactive isotopes in earth's atmosphere, impossible without man action, is one of the strong evidences: Scientific Reports | (2018) 8:3293 | DOI:10.1038/s41598-018-20970-5

17 <https://whc.unesco.org/archive/gloss96.htm>

18 https://www.un.org/sustainabledevelopment/wp-content/uploads/2019/07/E_Infographic_14.pdf

19 https://www.un.org/sustainabledevelopment/wp-content/uploads/2019/07/E_Infographic_15.pdf

the world's heritage list of UNESCO, and a substantial part of them is located in the Mediterranean basin.

The Mediterranean basin has been strongly changed by humankind along many centuries, testifying many of the ancient's world wonders, including some good examples of cooperation between humankind and nature. Several of these cultural landscapes may serve as inspiration to modern forms of sustainable land use, which is one of the reasons for their safeguard by UNESCO. The protection of traditional cultural landscapes is also helpful in maintaining biodiversity, namely traditional crops.

UNESCO classifies the cultural landscapes into three categories:

1. **Landscapes designed and created intentionally by man;** encompass gardens and parklands, which were built for aesthetic reasons often (but not always) associated with religious or other monumental buildings and ensembles. Botanical gardens, meant to preserve a wide variety of plant species, often originated from different places, are such examples.

2. **Organically evolved landscape;** is the result of an initial interaction of social, economic, administrative, and/or religious imperative and has evolved to the present form by association with nature and in response to the natural environment. Two sub-categories are considered by UNESCO:
 - a. **A relict (or fossil) landscape** is one in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form. Monuments that are preserved to keep the testimony of historical times fall into this category (e.g. Ruins of Phoenician settlements, Monasteries).
 - b. **A continuing landscape** is one that retains an active social role in contemporary society, and it is closely associated with the traditional way of life. Typically, an evolutionary process is still ongoing, and material evidence of its evolution over time can be observed. Temples in use, historic urban landscape, vineyards in terraces, and cultural landscapes of agro-pastoralism are examples in this subcategory.

3. **Associative cultural landscape;** in the view of UNESCO such landscapes are associated to the natural element in any indirect way, as material evidence of such association maybe insignificant or absent. These cultural landscapes are of religious, artistic or cultural nature, and valued for the interaction between man and nature.

The Fig. 5 represents the set of factors in bidirectional interaction between indigenous communities, of a given site, and their surrounding natural element. On one side, humans change nature to serve their purposes by implementing management systems according to their cultural values. On the other side, nature influences human communities through association to beliefs (legends, stories), religious links (e.g. pilgrimage site) and by transmitting a sense of belonging, which is vital in building a cultural identity.

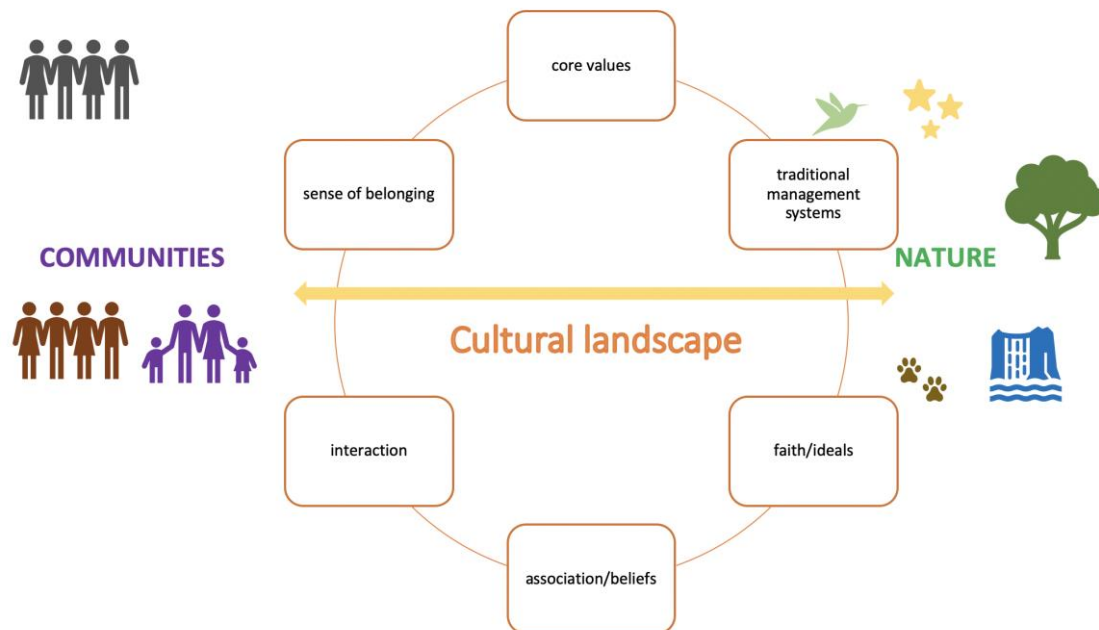


Figure 5. The interaction between humans and nature often involve cultural aspects thus resulting in different types of cultural landscapes. Human communities act on the environment according to their values, faith and associations. Nature is changed by the interaction of human communities, and human communities are, in turn, conditioned by Nature, which may strongly influence their identity and sense of belonging.

To summarize, in UNESCO’s view, the cultural landscapes are cultural assets representing “the combined works of nature and of man”. Still according to UNESCO “they are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.”

1.2.3. Vernacular architecture

Common peoples of the Mediterranean, generally had no formal education but developed the resourcefulness and wisdom to take advantage of the surrounding environment in adapting to it. Vernacular architecture is such a manifestation, mainly characterised by the use of local materials, skills and knowledge, usually without the supervision of experts. Vernacular buildings are typically simple and practical and may encompass residential houses, sheds, storehouses, small churches and others. Most of the built patrimony can be considered as Vernacular Architecture, however, it tends to be overlooked in the history of architecture and design, despite their excellent integration in the landscape. Vernacular buildings have specific purposes and are considered part of a regional culture due to the strong influence of the climate, the environment, and the availability of construction materials.

2. NATURAL LANDSCAPES

The Mediterranean Diet is a central pillar of the cultural, historical, social, territorial and environmental heritage of the Mediterranean countries, and a legacy to all humankind. Its territory, the Mediterranean basin, includes the Mediterranean Sea, part of the Atlantic Ocean near the strait of Gibraltar and the surrounding lands.

The Mediterranean area is consensually accepted as delimited by the habitat of the olive tree. In the words of Braudel (1987),²⁰ “It stretches from the first olive tree you see when you come down from the North to the first group of palm trees that appear in the desert”, which roughly corresponds, in the Mediterranean basin, to the Csa and Csb areas of the Köppen-Geiger climate classification (Fig. 6).

The Mediterranean Sea is almost enclosed by lands, both sea and lands of irregular orography; the sea includes many islands and an irregular coast, with marshlands, sandy beaches and cliffs. Protected bays served as fishing harbours for small villages, but were also accessed by pirates, frequent in the area until the XIXth century and caused many coastal populations to seek protection in the inlands, while large trading ports were protected by forts.

The Mediterranean lands are bordered and enclosed by high mountains; the Alps, the Atlas Mountains and the Balkans, and face the Atlantic Ocean at the west. That is, the Mediterranean basin includes the territories of southern Europe, northern Africa and the westernmost area of Asia. It is in these areas that the so-called Mediterranean civilizations developed, whose continuity in time is manifested until nowadays through a largely common culture, above and beyond political and religious differences.

As referred above, the Mediterranean is mainly a man-made landscape, “a civilization of stone”; from the stones used to build cities, palaces, monasteries and fortresses, to the stones extracted from the soil to divide rural properties and to sustain the terraces that allow agriculture in the hills. Such landscapes are an important common element and some of them are inscribed in UNESCO’s list of cultural landscapes or safeguarded at national level. Other common natural elements, besides specific agricultural techniques, encompass the climate, the reduced tidal variance and influence, the biodiversity, as well as the seafood and typical foods.

2.1. CLIMATE AND GEOMORPHOLOGY

The Mediterranean basin is located between about 30° and 45° latitude north of the Equator on the western sides of the continents it intercepts (Europe, Africa and Asia), and it is known for its mild climate. According to Encyclopaedia Britannica, Mediterranean climate²¹ is a major climate

20 Fernand Braudel (1987) O Mediterrâneo. O espaço e a História. Lisboa. Teorema

21 Enciclopaedia Britannica, Mediterranean climate: <https://www.britannica.com/science/Mediterranean-climate>

type of the Köppen classification²², characterized by warm to hot dry summers and cooler rainy winters, with moderate temperature ranges. It corresponds to Csa and Csb light green areas, of the Köppen-Geiger classification, observed in Fig. 6. Thus, the Mediterranean is characterized by its blue sky and luminosity, and the climate originality is due to the balance between the influence of sub-tropical anti-cyclones, and the westerlies. During winter, frontal cyclones cause rather irregular precipitation, sometimes quite heavy rainfalls. In summertime, the region is covered by air stable dry air masses.



Figure 6. Köppen-Geiger climate classification, in various regions of the globe, stressing the Mediterranean Basin. The light green colours correspond to moderate annual temperature range and warm to hot dry summers, key features of the Mediterranean climate. Source: Kottek et al. 2006: World Map of the Köppen-Geiger climate classification updated. Meteorol. Z., 15:259-263. DOI: 10.1127/0941-2948/2006/0130.

²² Köppen climate classification is widely used and was developed by German botanist-climatologist Wladimir Köppen. It is a vegetation-based, empirical climate classification system to define climatic boundaries in such a way as to correspond to those of the vegetation zones (biomes)

According to Köppen and other authors, in the Mediterranean region, the precipitation in driest month of summer (half of the year) is typically less than 30 mm and temperature of warmest month is 22 °C or above. Annual temperature ranges tend to be small. Since the western side of Mediterranean basin is not well positioned to receive the coldest polar air (which develops over land rather than over the ocean), fogs are not typical to the Mediterranean climate that tend to be dry. Snow, confined to the top of highest mountains, is not a Mediterranean element but night frost can be observed in some inlands. However, the climate can be very capricious, with sudden heavy rain or bouts of high winds such as the Sirocco and the Mistral.

In short, Mediterranean hot dry summers and humid cool winters profoundly influence the vegetation and wildlife of the region, which also depend on the orography. Such irregular orography includes mountains and rocky shores, thick scrub and semi-arid steppes, sandy beaches and coastal wetlands (Figs. 7 and 8) as well as partially submerged rocks and caves and a myriad of islands, of very diverse size.

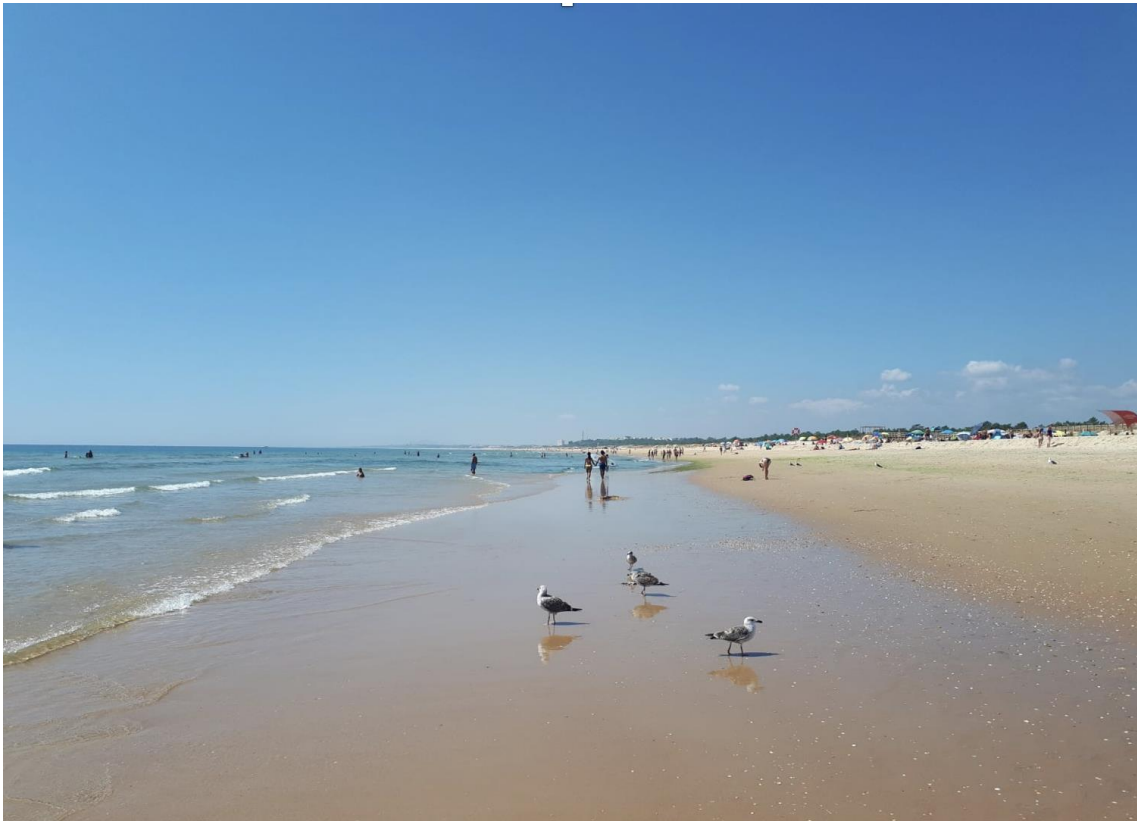


Figure 7. A golden sandy beach of warm waters and blue sky - a top rated destination for mass tourism, particularly during July and August. Such mass tourism is a seasonal source of income for locals but is also a source of high anthropogenic pressure on coastal areas' ecosystems and geomorphology. (Photo by the author)

Mostly limestone and clay, but also marble and volcanic rocks can be found in Mediterranean landscapes, which are profoundly shaped by man. Despite many soils are poor and fertile valleys are rare, the region harbours an immense number of endemic plant and animal species. Some of them are crops introduced long ago that evolved to adapt to particular niches, thus exhibiting specific features.



Figure 8. Mediterranean landscapes cannot be interpreted or understood without the presence of man, since they have been shaped by humankind through many centuries, and the way of life and culture of the peoples are shaped by the harsh natural geomorphology of their regions. Wetlands and rocky hills are abundant in the area and are often located nearby. Photo by Prof. Nidia Braz, Universidade do Algarve.

Coastal wetlands of brackish water are often used to extract salt or to farm bivalves and fishes (Fig. 8). Wetlands and river estuaries are important biodiversity spots. The distance from wetlands or marshes to lands, where droughts are common, can be short due to the irregular geomorphology. Consequently, controlled irrigation and traditional water management systems are key features of southern Europe and North African agriculture. The natural landscape is mainly an agricultural landscape.



Figure 9. Elements of rural Mediterranean landscapes. On the left, evergreen fruit trees and other xerophyte vegetation can be observed. Terraces were built along the hill to allow cultivation and grazing. A communal passage can be observed near the wall. Such paths often cross private lands and the rules underlying the passage are rooted in mutual respect. On the right, an element of vernacular architecture and wine grapes illustrate the linkage between natural and cultural features of rural landscapes. Source: A. Freitas et al. (coord.) – Dimensions of Mediterranean Diet, World Cultural Heritage, Faro: Universidade do Algarve, 2015.

Hills are broken into terraces supported by the abundant limestone' rocks, thus avoiding soil erosion. Low water demanding fruit trees are scattered along poor soils, notably olive, carob, almond and fig trees, as well as cork and holm oaks to feed the wandering small ruminants and pigs (Figs. 9 and 10).

The landscape changes with the season, becoming splendid and colourful in the spring, when many trees and shrubs flourish (Fig. 10). Even Mediterranean scrub, with its many flowers and aromatic plants is beautiful in the spring. It is the response of a resilient nature to centuries of human activities (livestock grazing, cultivation forest fires and clearances), which evolved into a complex and intricate mobile patchwork of habitats, home to an exceptionally rich biodiversity.

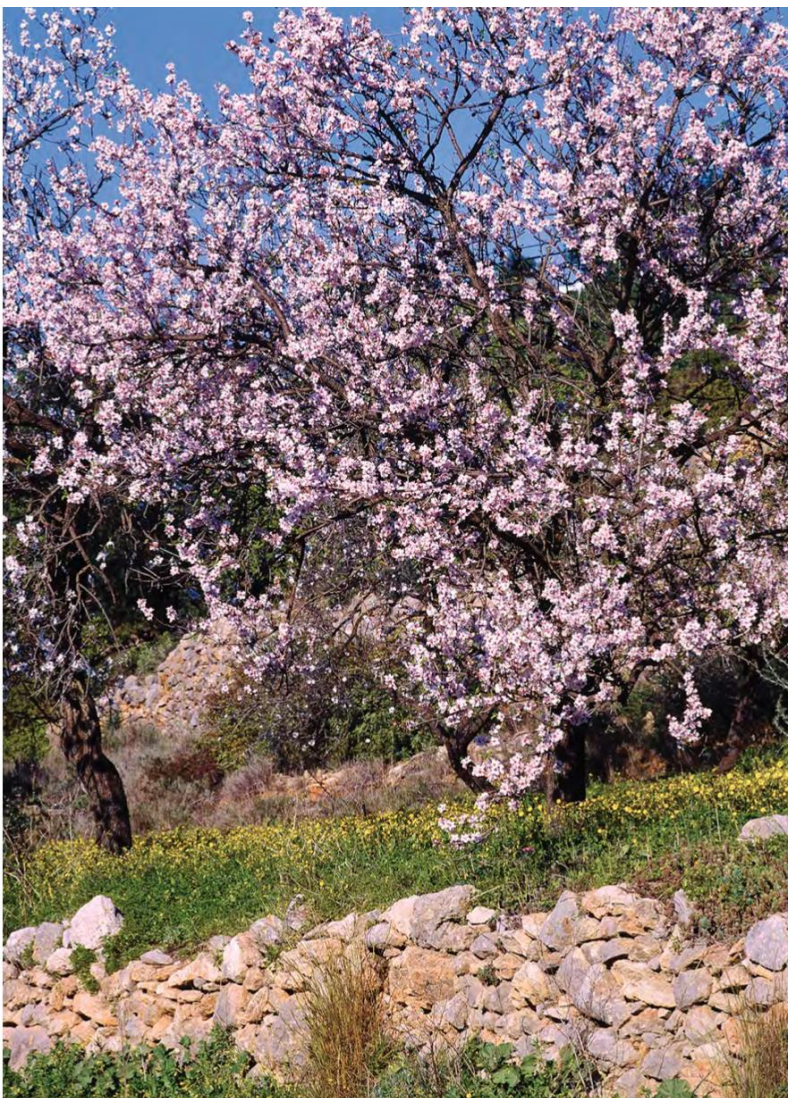


Figure 10. Poor soils have been traditionally used to plant fruit trees with the necessary robustness and drought resistance; this way a steady production of different fruits during each season was ensured. In addition, either another crop was planted at a lower level (e.g. chickpeas, lupine, cabbage) or wild plants were allowed to cover the soil to serve as feed to sheep and goats; some wild plant species are gathered to use in foods or in folk medicine. Rocks extracted from the soil were used to sustain terraces that help retaining water and also avoid soil erosion during winter's heavy rainfalls. Source: A. Freitas et al. (coord.) – Dimensions of Mediterranean Diet, World Cultural Heritage, Faro: Universidade do Algarve, 2015.

Climate is changing and such traditional systems that have been suitable in coping with a harsh nature can be a source of inspiration for innovative sustainable agricultural techniques addressing SGD 2 and 15²³. Regarding climate changes, several model scenarios have been disclosed by

²³ Sustainable Development Goals: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

scientific community and acknowledged by international organizations. The degree of uncertainty of such predictions is believed to be low, as current modelling tools rely on up-to-date technologies, include a wide range of factors/variables and corresponding measurements over time.

The risks and impacts of climate changes at the Mediterranean basin are predicted to be significant and can be summarized as follows²⁴:

- Annual mean temperatures are likely to increase more than the global mean, with maximum summer temperatures likely to increase more than the average, in southern Europe,
- Annual precipitation is very likely to decrease in most of the Mediterranean area,
- Risk of summer drought is likely to increase in the Mediterranean area.
-

Recently, UN General Secretary, António Guterres, called for global action to tackle this global threat.

UN reports²⁵ show that:

- “All countries are affected by global warming. But the impacts tend to fall disproportionately on the poor and vulnerable, as well as those least responsible for the problem”;
- “There are clear benefits to limiting warming to 1.5°C compared to 2°C: 420 million fewer people being exposed to severe heat waves, survival of some tropical coral reefs, loss of fewer plants and animal species, and the protection of forests and wetland habitats”;
- “Transitioning to a low-carbon, sustainable growth path could deliver a direct economic gain of US\$26 trillion through to 2030 compared to business-as-usual”.

2.2. VEGETATION

Mediterranean wildlife and habitats are very specific, as the region was not affected by the last Ice Age. The rate of endemism²⁶ is exceptionally high and the Mediterranean region is recognized as the second largest Global Biodiversity Hotspot, encompassing major terrestrial habitats such as **forests, maquis, garrigue, wetlands, coastal areas** and **grasslands** and/or **transitional areas to desert zones** (definitions and descriptions below).

Despite the Mediterranean basin covers only 1% of the Earth’s surface, yet, 10% of the world’s plants are found in it. Such richness was contributed by human action along the centuries, however, nowadays the anthropogenic pressure is a major cause of imbalances; 32 Mediterranean species are already known to be globally Extinct, or Extinct in the Wild, of which four plants.²⁷

24 Data sets and Interactive maps are available at: <https://www.eea.europa.eu/themes/climate/dc>

25 UN Climate action summit 2019 – The science - Key findings from the IPCC and The New Climate Economy Reports;
<https://www.un.org/en/climatechange/science.shtml>

26 Endemism is the condition of being restricted to a geographical location - additional information here:
<https://biologydictionary.net/endemism/>

27 For more information on threatened Mediterranean species please see leaflet:
https://www.iucn.org/sites/dev/files/content/documents/infografia_uicn_med_a3_nov29.pdf

According to IUCN (www.iucnredlist.org/regions/mediterranean) the main threat to terrestrial species comes from agriculture and aquaculture, which have been evolved towards intensive monoculture systems.

The Mediterranean region is poor in forests and woods, however, according to EC, while most central and northern European forests are dominated by about a dozen tree species, the Mediterranean forests are much more diverse, harbouring up to 100 different tree species²⁸. Coniferous forests are common and consist of *Pinus pinea* and *Pinus pinaster*, two species endemic to the region and commercially explored; the first produces a highly valued nut (pine nut), and the second is mainly used for timber. *Eucalyptus* sp. is also generally found (nowadays is often found in disproportionate numbers, given its rapid growth and high demand for cellulose by paper industries). Coniferous forests can be found near shore, helping control the advancement of sand to the inlands, or in mountain areas. Mediterranean forest ecosystems either have access to underground aquifers and/or freshwater streams that help creating suitable environments to harbour many relevant endemic species with the Pteridaceae and Ericaceae families, some of them rare. Mosses, lichens, and animals (from insects to birds) are also noteworthy.

The vegetation in the Mediterranean, reflects the variable orography and climate. The most emblematic vegetation is Maquis, in Italian Machia - a term used to describe the typical vegetation common to the lower slopes of mountains bordering the Mediterranean Sea²⁹. In areas of more arid and stony soils, the vegetation is less vigorous, and it is known as Garrigue; Grassland is the poorer form, typical of arid soils. In any of the cases the constant denominator is the high biodiversity, adapted to the mild climate described above (see Fig. 6). Figure 11 shows a transition of garrigue to maquis, with garrigue, the lower shrub vegetation dominating the drier hills, and the taller vegetation (including small trees) located near the water course (maquis).

Maquis (Italian macchia) is a scrubland vegetation area composed primarily of leathery, broad-leaved evergreen shrubs and small trees, less than 2.5 m tall. Many of the shrubs are aromatic, such as mints, laurels, and myrtles. Olives, figs, and other small trees are scattered throughout the area, often coexisting with human activities (traditional and/or sustainable agriculture).

One example is the “Barrocal” in Algarve (Portugal), a biodiversity hotspot with a well-documented flora of 1001 taxa, 461 genera and 101 botanical families. The area runs along the Algarve from Cape St Vincent to Castro Marim, and comprises an extensive range of mesozoic carbonated soils, located in the Central part of the Algarve coast, situated between the Serra and the coastal strip³⁰.

Garrigue is a poorer version of maquis, typical of soils that are more arid. It mainly consists in scrub of many flowers and aromatic plants. Garrigue is a direct result of centuries of human activities (livestock grazing, forest fires), where nature has evolved into complex and intricate habitats, yet home to a rich biodiversity.

Grasslands are even poorer than garrigue, consisting in terrains too dry to sustain trees, commonly semi-arid steppic areas, however harbouring appreciable levels of plant biodiversity and home to ground-nesting birds, such as the pin-tailed sandgrouse (*Pteroclidis alchata*). Their

28 European Commission, Environment, the Mediterranean Region:

https://ec.europa.eu/environment/nature/natura2000/biogeog_regions/mediterranean/index_en.htm#list_of_sites

29 Mediterranean maquis: <http://www.ortobotanicopd.it/en/macchia-mediterranea>

30 Data from MGAP, an association that is safeguarding plant species in their Barrocal's botanical garden:

<http://www.mediterraneangardeningportugal.org/botanicgarden.html>

plant species are highly resilient to grazing, despite some impact on species' composition. The distribution of water in these areas is critical for the maintenance and survival of vegetation patches. Typically, these semi-arid Mediterranean grasslands are located in transition zones to the desert, notably in North Africa and the Middle East.



Figure 11. Typical Mediterranean vegetation with no or little exploitation by man. The diversity of shrubs and other plants can be deduced from the observed range of colours and forms of vegetation. Source: A. Freitas et al. (coord.) – Dimensions of Mediterranean Diet, World Cultural Heritage, Faro. Universidade do Algarve, 2015.

Near the sea, different types of **coastal areas** can be found depending on orography: from cliffs yet harbouring vegetation and birds' nests, to fishing villages carved in the rocks, caves and golden sandy beaches. Some quite preserved dune ecosystems can be found, namely after the Gibraltar rock. They consist in three subsystems under permanent dynamic interchanges, due to many environmental factors: the submerged beach, the emerged beach and the dune. The dune is stabilized by vegetation which richness supports the establishment of insects, reptiles, and birds. Besides human activities, also the variability of the wind, both in the direction and in magnitude, can play an important role in the mobilization and landward transport of sediment, supporting or destroying the dunes.

The seaside of the Mediterranean basin is a world top tourism destination. As a result, much of the Mediterranean coastline has disappeared under concrete, and local peoples changed their traditional occupations by seasonal jobs in the mass tourism industry. Some regions have now

chronic water shortages and are at constant threat of forest fires. However, some examples of good practices of sustainable tourism do exist and they will be presented in the third module of this course. Efforts to mitigate the anthropogenic impact at seaside and in the oceans are on course.

Wetlands are important ecosystems near the shore, appearing at regular intervals, ranging from tiny coastal lagoons to vast deltas around the long coastline, and including little islands. They harbour hundreds of species of endemic fish, amphibians and insects, which, in turn, attract different species of birds, including ducks, especially during the migration season. Up to two billion birds migrate to, or through, the Mediterranean Region every year. Some merely stop over for a few days to refuel before crossing the Sahara, but others spend the entire winter here to escape the cold weather further north. Given its importance in preserving threatened, many wetlands are natural reserves under Natura 2000.

Examples of the co-existence of human activities while preserving biodiversity and the environment is shown in Fig. 12, and it will be commented in the ambit of this course.



Figure 12. Human explored wetlands. The co-existence of wild vegetation and animal life with man-made ponds can be observed in the photo; the human action on the Mediterranean landscape exists for many centuries and it is entangled with cultural aspects; most Mediterranean landscapes can be classified as cultural landscapes. Photo by Prof. Nídia Braz, Universidade do Algarve.

The list of Sites of Community Importance for the Mediterranean biogeographical region (SCI), updating the Natura 2000 network, can be found in the annex of the Commission implementing decision (EU) 2019/22 of 14 December 2018, and includes sites that contribute significantly to

the maintenance or restoration, at a favourable conservation status, of a natural habitat type in a certain region.

“To such an extent does nature delight and abound in variety that among her trees there is not one plant to be found which is exactly like another; and not only among the plants, but among the boughs, the leaves and the fruits, you will not find one which is exactly similar to another”

Leonardo Da Vinci.

2.3. COASTAL ZONE AND MARINE LIFE

Mediterranean originates from the Latin “Mare medi terraneum” meaning “sea in the middle of the land” because it is almost enclosed by land, connecting through the Strait of Gibraltar to the Atlantic Ocean in the west, through the Dardanelles to the Sea of Marmara and the Black Sea in the northeast, near Turkey. Finally, in the southeast, the Suez Canal links the Mediterranean to the Red Sea and the Indian Ocean.

The geological history is curious, including isolation from the world ocean, which led to its near drying out during the Messinian crisis (5.96 million years ago) and to drastic changes in climate, sea level, and salinity. Nowadays, a flow of cool, low-salinity water comes from the Atlantic across the Mediterranean basin. This water warms up to the east, where it becomes saltier and then sinks. The annual mean sea surface temperature shows a high seasonality and important gradients are formed, from west to east and from north to south. The marine biota in the Mediterranean Sea is primarily derived from the Atlantic Ocean, but the wide range of climate and hydrology have contributed to the co-occurrence and survival of both temperate and subtropical organisms, with high levels of endemism.

As the surrounding lands, the marine environment is also peculiar and complex. Despite representing only 0.7% of total ocean surface it is home of 7.5% of world marine fauna and 18% of global marine flora. Coastal ecosystems include many sensitive habitats as about 150 wetlands of international importance for marine and migrating birds, and some 5,000 islands and islets.

The Mediterranean is the main spawning grounds of bluefin tuna (*Thunnus thynnus*), home to sea turtles, sharks and rays, a variety of shellfish, molluscs, and school pelagic fish, as anchovies and sardines. Many of the lesser-known sponges, sea squirts and crustaceans can also be found herein. Taxonomical inventories started with Aristotle, and efforts continue in providing datasets of taxonomic groups for the entire basin. However, the marine biodiversity of the Mediterranean Sea is known to a lesser extent than its terrestrial counterpart. Freely available databases for macro-organisms are available from FAO (Species Identification Field Guide for Fishery Purposes) and other sources.

According Coll et al. (2010)³¹ the Mediterranean sea biodiversity was distributed as follows: within the Animalia, the greater proportion of species are from subphylum Crustacea (13.2%) and phyla Mollusca (12.4%), Annelida (6.6%), Platyhelminthes (5.9%), Cnidaria (4.5%); the subphylum Vertebrata represents 4.1% and Echinodermata, only 0.9%. Other invertebrate groups encompass 14% of the species, and Plantae include 5%. These figures only refer to the Mediterranean Sea and do not include the Atlantic Ocean basin of South Spain, Portugal, and Morocco.

The exploitation of marine bioresources started with the Phoenicians that extracted Tyrian purple, a highly valued dye, from several species of sea snails, for which purpose an ancillary production facility near Morocco was established. The Roman villas by the shore commonly had fish farms to enrich their diet and to manufacture preserves such as garum (an appreciated fish sauce) as well as salted fish.

Artisanal fishing activities having been supporting the peoples from the coast, in a sustainable way as in old times, most of the catch was sold locally or preserved by salting and drying (e.g. octopus, tuna fish, and sardines). In the XX century canning fish industries, allied to large-scale fishing flourished for some decades and are still important nowadays to Morocco's economy.

If combined natural and anthropogenic events shaped the biodiversity of the Mediterranean Sea in the past, the impacts of anthropogenic actions in the last few decades have reached incredible scales³². The coastal areas that are already highly populated, receive about 200 million tourists per year, causing a huge anthropogenic pressure. International Union for the Conservation of Nature (IUCN³³) registered, in 2017, 90 threatened marine species mainly because of overfishing and climate change.

Fish stock levels in the Mediterranean Sea are alarmingly low. According to European Environment Agency, more than 65% of all fish stocks in the region are outside safe biological limits, and FAO states that some of the most important fish stocks (albacore, bluefin tuna, marlin, swordfish, red mullet and sea bream) are threatened. The encouragement of sustainable aquaculture may help tackle fish stocks and better cope with extreme weather events caused by climate change.

³¹ Coll et al (2010) The biodiversity of the Mediterranean Sea: estimates, patterns, and threats. PLoSOne. 2;5(8):e11842. doi: 10.1371/journal.pone.0011842.

³² Plastics in the Mediterranean: http://www.wwfmmi.org/what_we_do/plastic/

³³ www.iucn.org/mediterranean

3. CULTURAL LANDSCAPES

Cultural landscapes can be Urban, Rural and Maritime.

Urban landscapes of the Mediterranean are among the most visited places in the world, for their cultural and historical relevance. Most Mediterranean cities were formed from ancient small human settlements that chose the place for their natural characteristics: the proximity to fresh water (rivers, lakes) and land that could be cultivated, the proximity to the shore, for commerce or fishing activities or the high visibility to watch for invaders. Layers of History have been added by the different civilizations that successively occupied Mediterranean cities. As was noted above, many Mediterranean cities harboured settlements at least from three different cultures, the Roman Empire was common to all. After which fall, the Western Europe was strongly influenced by the Arabs (Al-Andalus), entering sooner in the middle ages, while in Western Europe the Byzantine Empire retained some of legacy of the Roman Empire.

Rural landscapes encompass villages, fields, equipment and constructions related to agriculture and rural life (As with the cities, rural landscapes are also coined with the influence of past cultures, integrating their elements in the local traditions and crafts). South Europe rural landscapes are characterized by the presence of small churches on the top of hills and religious symbols along the ways. Abbeys are also common in the countryside, since in the Middle Ages, many agricultural properties were explored by the Catholic Church. Many pilgrimage sites still exist in countryside, generally in the top of a hill. Summer religious celebrations and fests are organized yearly by local peoples, which attribute themselves special organizing roles and tasks.

Maritime Landscapes, as urban landscapes include some world top mass tourism spots, from the old picturesque small fishing villages of Italy, the islands of Greece, and all the coastal sunny beaches of warm waters and golden fine sand (Fig. 7) and, more recently, also including recreational diving sites. The influence on the maritime environment in two Mediterranean cities can be deduced from the observation of Fig. 13, a satellite view of the trade port of Knossos (left) and of Faro, a coastal city based in local fishing and agricultural activities (right) (Fig. 13).

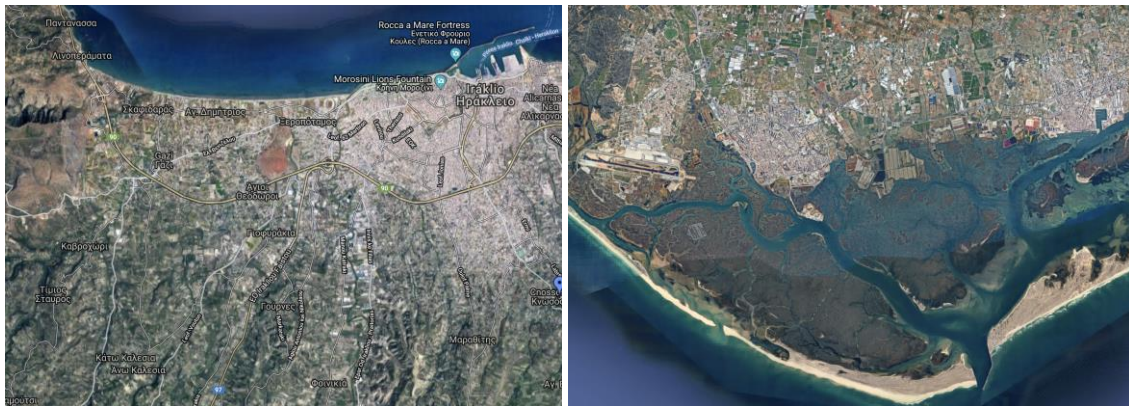


Figure 13. Satellite view of Knossos, Crete (Greece) and Faro (Portugal); two coastal cities implanted in different environments. In both cases, a densely populated centre with access to a protected access to the sea can be observed. In the case of the left photo (Knossos port, Crete), it can be deduced that the cliffs and the inland hills should have influenced the choice of the settlement. A port and fortifications have been built. In the second case (Faro), the natural existing barrier of wetlands probably acted as a labyrinth protecting the access from the sea. Source: google maps.

Knossos has developed as a trading port and Faro coastland is nowadays devoted to recreational maritime activities and to the gathering of shellfish. Faro still integrates both sides – the linkage to the sea and fishing activities and the linkage to the agricultural inlands for the supply of vegetables and fruits. Thus, traditional Mediterranean maritime landscapes include fishermen' sites, their boats, tools and houses and facilities dedicated to maritime life, ports and harbours, lighthouses. It also encompasses coastal cities and small communities, seaside touristic destinations as beaches and underwater landscapes (recreational diving sites).

It is noteworthy that Alexander the Great built the first lighthouse in the island of Pharos, near the Nile's delta, by 332 B.C. According to Arab historians it would have more than 100 m height and would hold a mirror during the day and a fire during the night, to guide ships in finding the right direction to the port, which was an intense trading site. The construction of lighthouses expanded later trough the Mediterranean, and was soon disseminated worldwide, with their heyday with the use of electricity. Lighthouses are placed in capes, peninsulas or small islands, varying in form and height, and often painted with coloured stripes. Although some lighthouses are still active, their function of ship guidance and navigation aid was replaced by other methods. They remain as elements of the maritime cultural landscape and potential points of touristic interest.

A recent touristic trend is scuba diving, which consists in observing underwater landscapes ideally with no interaction with the sea floor, wrecks, neither with the marine life. Notorious diving sites in the Mediterranean can be found in Croatia, Italy and Greek islands with very good water visibility and historic shipwreck (namely from WWII), while Malta and Portugal are noteworthy for the biodiversity of their protected marine areas. Recreational diving may help raising awareness on the underwater litter and the safeguard of marine biodiversity.

3.1. VERNACULAR ARCHITECTURE AND CULTURAL MANIFESTATIONS

Typical Mediterranean cities are historical urban landscapes with several layers of History, despite some cities are more prominent than others are. Ancient peoples had not much respect for previous societies and cultures and old constructions (e.g. roman bridges) were preserved if they could find good use for them, otherwise they changed it or destroyed it.

Notable changes and adaptations are referred in the section 1.3 and respective footnotes. One good example of such practice is the architectural and decorative adaptation of a mosque into a church. A notable example is the Great Mosque of Córdoba that exhibits changes through the epochs, integrating the UNESCO's World Heritage list (see 1.3, and footnotes).

Less notorious were adapted as residences, warehouses etc. The stones and other materials from unused constructions were removed and used for other purposes. Another common practice was the use of an existing wall (for example the exterior of a fortress) to save labour and materials in the construction of a house.

Commonly, in a Mediterranean city, a prominent visible element will be a castle or fortress (a legacy from the Middle Ages), which can be found on the top of the highest hill or placed nearby the sea - the best site for vigilance and defence. Historical city centres, converging to the castle, are generally small and intricate, yet the blend of architectural styles of different epochs and of different cultures is harmoniously interlinked and the city itself is in consonance with the surrounding natural environment. Narrow winding streets, some of which with dead ends, denoting Arab influence. Notable buildings, as palaces and noble houses, sometimes merging elements of style from different epochs or origins, can be found, as well as Archaeological sites with variable degrees of preservation, nowadays mostly kept under the supervision of museums. A cathedral and diverse small churches are typical elements of south European cities, as orthodox churches are in the Eastern part of the Mediterranean. Small gardens with flowers, trees and other perennial plants are placed in corners, and in city squares. The city's Roman influence (often retrieved in the Renaissance) will consist in parallel and perpendicular streets, converging to a main square where institutional buildings are located, and surrounded by streets once dedicated to specific workshops and named after them (goldsmith, blacksmith, tinsmith, shoemaker, tailor).

A common feature that contributes to the beauty and harmony of the Mediterranean cities is the use of local available resources and its vernacular architecture; common houses have terraces or large balconies, clay tile roofs, and wooden shutters in the windows to protect against the hot summer sun. In North Africa and in the Western Europe some doors have beautiful wood carven works. Houses evolve uphill in exquisite combinations of rectangular forms, many of them facing the ocean or the river and having a small backyard with a kitchen garden and at least a couple of fruit trees (Fig. 14).

Emblematic examples of preserved History and interaction with the surrounding environments are noted in the cities of Ferrara, Ravenna and Modena, in Emilia-Romagna Region, classified as World Heritage sites (see 1.3, and footnotes).

Before the expansion of Mediterranean cities into uncharacteristic suburbs, the countryside was nearby, and local fresh products were sold in open-air markets in a specific place dedicated for it (another Arab legacy).

There is no doubt on the marked and long-lasting influence of the Mediterranean elites on the foundations of western civilisation, from science to art. Mediterranean cities are themselves

monumental, and unavoidable from an intellectual point of view. However, it is in the rural dimension that the Mediterranean diet is grounded, as it evolved from rural civilizations, triggered by the agricultural revolution.

As the cities, the villages of southern Europe are centred on the church, which is placed in a large square where communal celebration take place. The houses are mostly built from local available materials, generally whitewash with colour strips bordering doors, and windows of indigo blue, ochre or purple-rose (dyes firstly introduced in the area by Phoenicians). The resemblances with the Mediterranean small towns of North Africa are enormous. By observing Fig. 15, is not easy to tell if the photo is from Greece, Portugal or Morocco.



Figure 14. Santorini, Greece. The houses evolve down the cliff, with their terraces, in an exquisite geometrical organisation. Small trees and other plants can be observed nearby the buildings. (Photo by Sarah Eskandarpour on Unsplash)



Figure 15. A street in Chefchaouen, Morocco. The resemblances to the villages of Southern Europe can be observed through the narrow streets and mats of natural fibres, to protect against the summer sun, in the houses with clay tiles and whitewash with blue strips... (Photo by Sergey Pesterev on Unsplash)

In Portugal, the abundance of limestone and black basalt resulted in an emblematic example of sustainable vernacular architecture, of a few centuries ago. Such art, for which the responsible worker included a personal sign or signature, can be appreciated in many widespread sidewalks (Fig. 16).



Figure 16. “Calçada Portuguesa”. The craftsmanship of pavement with limestone and black basalt rocks, of probable roman inspiration is widespread in Portugal. Although the wave motif dominates in both photos, many other motifs and details can be found. In the left, a street at Lagos, Algarve (Photo by Reiseuhu on Unsplash) and on the right, an old photo from Rossio, Lisbon (source: Arquivo Municipal de Lisboa, photo from Estúdio Mário Novais)

Vernacular architecture is most often observed in rural settlements, in small cities and other communities. It encompasses houses, warehouses, reservoirs for grain storage, small churches that are often pilgrimage sites, and decorated religious symbols along rural roads or associations (e.g. the sign that indicates “Camiño de Santiago”³⁴). The common features are more or less frequent across the Mediterranean basin, including:

- Simple construction from local materials, namely limestone, clay, wood and natural fibres;
- Fulfils a specific purpose;
- It is integrated in the landscape, taking advantage of the peculiarities (high insolation, dominant winds, and slope);
- Whitewash predominance, complemented with indigo blue, ochre and purple-rose – namely in buildings and in fishing boats;
- Small gardens with predominance of perennial xerophytic plants, and trees nearby the houses.

The optimized use of local materials and resources in achieving a practical purpose is notorious in agricultural structures and tools. Such example is the windmill for cereals that is thought to be originated in the Middle East and spread through Europe from the Aegean Sea, in the East, and from the Iberia Peninsula (introduced during the Al-Andalus domination period). Iberian

34 <https://www.pilgrim.es/en/routes/>

windmills (made famous from the novel by Cervantes) took advantage of climate features, as the absence of rainfalls in summertime and the existence of fixed direction dominant winds. They were simple and quite grotesque making use of common available materials (wood, clay and limestone), sometimes finished with whitewash and bearing strong white fabric sails. Windmills blend their impressive yet simple beauty with the countryside landscape (usually windy arid hills).

In southern Europe, some well-preserved traditional olive mills can be found aside modern stainless-steel equipment, as museum sites and important cultural spaces. Operational traditional olive mills with their heavy stones, mechanical presses and mats can still be found in the Maghreb.

Artisanal fishing still provides support for some coastal communities and it was much more relevant in old times. Nowadays most of the fishing is near shore, using small boats and sustainable practices, in the use of nets, or consists in the catching of shellfish in the sand and rocks at the beach, or even in catching octopus with small traps. A few decades ago, the use of trap devices and ingenious techniques of Arab origin could still be observed at Algarve, Portugal.

Fish preservation by drying and salting was a common practice that persists nowadays for some species. Salted codfish (Bacalhau/bacalao) is common in Portuguese and Spanish cuisine. Other types of fish preserves are nowadays exquisite and hard to find delicacies, as muxama from Algarve (see below), or salted sardines from Croatia (Fig. 17).



Figure 17. Artisanal techniques of fish preservation, as salting and drying, were important in ensuring food security of populations, by preserving the necessary animal-source protein during several months. The photo shows a typical process of preserving sardines by salting, in Croatia (Photo by Jelena Ivanišević, Institute of Ethnology and Folklore Research, Zagreb)

Markets provided important occasions for trades between fishermen and peasants, diversifying the diet populations with different occupations and resources. Such Markets still provide an important way of keeping the connection between rural and urban worlds by the direct contact between the producer (farmer, fisherman or artisan) and the consumer. A much richer interaction than at a supermarket or an online shopping platform allows the consumer to learn much more about the local products, their variability, biodiversity and seasonality, increasing the trust and help in making educated choices.

The market, often at open air (Fig. 18), facilitates direct sales of small productions of autochthone plant varieties, fresh seafood as well as fish and meat preserves, through proximity circuits, decreasing food miles, improving food sovereignty of the region, and lowering the Carbon footprint of food supply chains. Currently, some marketplaces embrace new and traditional businesses, side by side, in the same space that welcoming tourists and locals.



Figure 18. The Mediterranean still keeps the traditional open-air markets, where small producers sell local fruit and vegetables. Some marketplaces have been built for the purpose, organizing areas for fresh fish, meat, bread, traditional bakery and vegetables. On the left, an open-air market, in Algarve, Portugal (source: A. Freitas et al. (coord.) – Dimensions of Mediterranean Diet, World Cultural Heritage, Faro. Universidade do Algarve, 2015) and on the right, fresh local vegetables, in Sicily, Italy (Photo by Bertrand Borie on Unsplash)

The spirit of a place encompasses the location (climate, natural environment, geomorphology), the culture of the communities, and the interactions between them and the surrounding environments. Many Mediterranean cities still preserve a linkage to the rural world, translated in convivial festivities, aligned with the pace of nature and rural works, marked by solstices and equinoxes. Such celebrations are of religious nature (as Easter and Christmas and have some correspondence with Islamic celebrations by the same time of the year), or others (transhumance

of hundreds of sheep through Spain). In Europe, most celebrations are outdoors and involve the efforts of the neighbour communities (Fig. 19), strengthening the social bonds. In Islamic cultures, celebrations are generally of more intimate nature, involving the enlarged family and taking place indoors.



Figure 19. The preparation of religious celebrations involves the community in distributing the tasks during the rituals, and in preparing decorations, big bands for the procession, and the non-religious program, generally including pop music shows, small marketplace, and communal meals. These occasions are important in tighten social bonds and the sense of belonging (photo on the left). Opportunities to share experiences and to cooperate may arise out of the religious context (e.g. testing the new wine with the neighbours or celebrating a good harvest in a gastronomic confraternity). Source: A. Freitas et al. (coord.) – Dimensions of Mediterranean Diet, World Cultural Heritage, Faro. Universidade do Algarve, 2015.

3.2. NATURAL RESOURCES' MANAGEMENT, COPING WITH NATURE

The food habits of those Mediterranean common peoples aligned with the pace of nature, making the most out of the scarce local resources, with parsimony and millenary wisdom is no less richness than all the cultural legacy of past civilizations. Yet, these very same peoples are diverging away from the rural world and from everything that is linked to such way of life. On the other side, Mediterranean Diet has been catching more and more the attention of outsiders. However, such diversity is the result of the combined action of man and nature. Agricultural systems evolved in this mild climate by slowly changing ecosystems over time, through the introduction of new crops and animals, which evolved to adapt to their new niches. Thus, the Mediterranean still harbours a wide biodiversity of domesticated and wild plants, as well as local animal breeds. There is though a unity in this diversity, as the aim is the same: the obtainment of the most adequate foods in each season. The available variety of plants was commonly used to overcome scarcity, by replacing one resource by another.

Several common aspects have been identified all over the Mediterranean basin. Firstly, the olive tree shaping the landscape, to which stone olive mills were associated to - From North Africa to Croatia. The olive varieties poorer in oil have been used to prepare table olives, a nutritive snack and food ingredient almost forgotten in some regions. Many preparation styles can be found,

most of all involving the same steps and condiments. Secondly, the presence of cereals, the bread, a sacred food, mostly made from wheat (coarsely milled) with long fermentations and often baked in communal ovens. The sharing of the oven in a village is based in simple rules and mutual respect. The vineyards complete the triad, creating beautiful landscapes, some of which are classified as UNESCO's world heritage sites, namely in Italy, Spain and Portugal.

Small ruminants, poultry and pigs (in southern Europe), as well as fish (often salted and dried) ensured just the necessary animal protein, all year round. Sheep also provide wool for the weaving of coarse textiles, as blankets and carpets. Natural fibres (wicker, stubble straws) have been used in basketry and other crafts.

The presence of fruit trees nearby the houses and the reliance on a kitchen garden ensured the necessary supply of fruits and vegetables of the season. Some fruits, as figs and dates have been preserved by sun drying, in special apparatus, at the terraces of the houses. Jams and liquors were made from other fruits not suitable for drying.

Traditional agricultural techniques intended to save water namely by selecting autochthone crop varieties resistant to draught. Water has been a scarce resource, and private wells, deposits and tanks coexist with systems of communal management of water. The influences on crafts for water extraction and transportation/conduction resulted in a set of habits, crafts and artefacts of Arab and roman influence with later improvements and adaptations. In many villages, communal water management for the agricultural fields is a serious matter. Farmers agree on timescales and rules, which are strictly followed. In Spain, some "pueblos" have popular courts to deal with such matters (e.g. near Valencia). Any dispute that may arise is summarily judged by the chosen people from the community, which decision is respected and immediately applied, with no "buts".

In old times, artisanal fishing was an occupancy during peaceful times and expanded from about the XIX century onwards, when piracy and invasions ended. Near the shore, the peoples lived from seafood, an abundant variety of school fishes (e.g. sardines), large migratory fishes (e.g. tuna fish), cephalopods, and shellfish. The catches were traded with farmers from the inlands in the periodical markets (Fig. 18).

Fishing has many associated crafts, as mending the nets and building traps. Some of these crafts were introduced by the Arabs, as is the case of the traps to catch the tuna fish and the techniques of preparing the dry tuna fish, locally known as "muxama", at Algarve, Portugal (Figs. 20 and 21).



Figure 20. Artisanal fishing and catching shellfish in coastal areas has been ensuring the survival of the peoples living near the sea. Fishing boats are customized with colourful paints, detail drawings and symbols, and frequently named after a religious motif.



Figure 21. Dry and salting have been used for ages as preservation methods. The Portuguese still apply such preservation methods notably to cod fish and tuna. The art of cutting the tuna fish as well as the salting and drying is cherished and preserved by a confraternity. Muxama (on the right) looks like ham and is a delicacy of Algarve. Photos by Prof. Nídia Braz, Universidade do Algarve.

It is worth recalling the definition given by Braudel to the Mediterranean: “... A thousand things at the same time. It is not one landscape but numerous landscapes. It is not one sea, but a complex of seas. It is not one civilization, but a number of civilizations, piled one above the other.”

4. MEDITERRANEAN LANDSCAPES IN THE REGIONS OF MD.NET PROJECT

The richness of the Mediterranean goes far beyond its notable History, its key role in western culture, its fashion, and its fantastic landscapes. The richness of the Mediterranean rests on its diversity of environments, of landscapes, of genetics, of cultures. It relies on a blend of millenary wisdom of cooperation between man and nature, and such a heritage is invaluable as can be deduced by the brief summary of cases respecting each region that participates in MD.net project.

Albania

Albania is located near Greece with coastal Mediterranean areas (Adriatic Sea); these coastal regions, also called “Albanian Riviera” have a mild Mediterranean-type climate, partly due to the protection by the Albanian Alps and other inland mountains. Historically, the country has been inhabited by numerous civilizations including the Ancient Greeks, Romans, Byzantines, Venetians and Ottomans. As their neighbour countries, from WWII to the 1990’s, Albania was under the influence of Russian culture.

The country maintains a vibrant tradition of herbal and medicinal practices. At the minimum 300 plants growing locally are used in the preparation of folk medicines. The trees within the forests are primarily made up of fir, oak, beech and pine. A Natural Reserve of particular interest is Divjakë-Karavasta National Park³⁵ that extends along the central Albanian Adriatic Sea Coast and possesses one of the largest lagoons in the Mediterranean Sea, the Lagoon of Karavasta. These regions harbour vineyards and olive orchards. Olive oil production and consumption has increased in the country.

Algarve

Algarve, in Portugal, exhibits a blend of cultural influences resulting from the different settlements in the region (Phoenicians, Romans, Arabs). Different layers of History can be witnessed in archaeological sites, as the Roman Villas of Milreu and Abicada (agricultural properties relevant to the empire), fortresses used to defend the coast from pirates and invaders, generally of Arab origin and subsequently modified along the centuries (e.g. Paderne)³⁶. Tavira³⁷, the representative community of Portugal in UNESCO’s list of the Mediterranean Diet is located at Algarve. It encloses the same blend of cultural influences, the same type of landscape and many elements common to the other Mediterranean Regions, including important Natural reserves and Parks of Natura 2000 network (notably wetlands of Ria Formosa and Castro Marim, as well as Costa Vicentina’s Natural Park).

35 Divjakë-Karavasta National Park: https://www.parksdinarides.org/en/park/national_park_divjake_karavasta/

36 Algarve’s archaeological sites: <http://www.monumentosdoalgarve.pt/pt/monumentos-do-algarve/>

37 More about Tavira: <http://www.cm-tavira.pt/site/galeria>

The Algarve (together with Andalusia) bring an important dimension to the Mediterranean Diet concept. Firstly, by the location: Algarve and Andalusia are placed at the entrance to the “Mare Nostrum”, facing the Atlantic Ocean. Secondly, and most notably, in the XVI century, the Portuguese became game-changers by traveling to India by sea, setting up a new era of trades and globalization³⁸, and daring to sail around the globe (500 years ago)³⁹.

Portuguese and Spanish sailors dramatically enriched the diet of the Mediterranean peoples, implemented the western civilization model to the Americas, and paved the way for the expansion of next empires (e.g. the British Empire).

The cape of Sagres, with its fortress, is an icon to such endeavours⁴⁰. A tentative list “Sites of Globalization” as world heritage was submitted to UNESCO.

Andalusia

Andalusia, in Spain, is located in the south of the Iberian Peninsula and the capital is Seville; the coast adjacent to Algarve (Portugal) faces the Atlantic Ocean and the coastline after the Strait of Gibraltar faces the Mediterranean. Andalusia is the only European region with both, Mediterranean and Atlantic coastlines. The region sits in a warm temperate region however, its climate is peculiar; more temperate in the shore, it has dry summers influenced by the Azores anticyclone, but experiences quite high temperatures in some locations, as Seville and Granada, commonly surpassing 40°C. In the winter, the tropical anticyclones move south, allowing cold polar fronts to penetrate the region, and the same cities and surroundings experience minimum temperatures barely positive. Andalusia exhibits the typical irregular orography of the Mediterranean with several mountain ranges including Sierra Nevada, a sky resort in southern Europe, which contrasts with “Tabernas desert”, a confined area between mountains, near Almeria. The climate of the region is considered mostly Mediterranean, though.

The name "Andalusia" is derived from the Arabic word “Al-Andalus”, the Arab kingdom that occupied southern Europe and had their main cities in Cordoba and Granada. Regarding the historical influences and settlements, they were not much different from Algarve (Portugal) except in the scale. Andalusia forests or woodlands although much affected by anthropogenic actions, a high degree of biodiversity is still preserved. The trees are mainly of leafy xerophytic perennials, with the dominant species the holly oak (*Quercus ilex*), cork oak (*Quercus suber*), various pines, and Spanish fir (*Abies pinsapo*). Due to cultivation, olive (*Olea europaea*) and almond (*Prunus dulcis*) trees also abound. In respect to bushes and other plants, rosemary (*Rosmarinus officinalis*), thyme (*Thymus* sp.), and *Cistus* are abundant. Identical vegetation and identical problems with wildfires have been occurring also in the adjacent Portuguese regions, turning the degraded forest areas into shrubby and combustible garrigue. Ongoing planned reforestation is expected to mitigate such issues and further resist to climate change. The large biodiversity of the region is protected by several National Parks and reserves, notably Doñana National Park⁴¹, and Cabo de Gata-Níjar Natural Park⁴², the largest terrestrial-maritime reserve in the European Western Mediterranean Sea. In what concern cultural historical legacy sites, the

38 Infante Dom Henrique established the maritime route to India: <https://www.britannica.com/topic/European-exploration/The-Age-of-Discovery>

39 Fernão de Magalhães circumnavigation travel: <https://www.britannica.com/biography/Ferdinand-Magellan>

40 Cape of Sagres and fortress: <http://www.monumentosdoalgarve.pt/pt/monumentos-do-algarve/fortaleza-de-sagres>

41 Coto Doñana, natural reserve: <https://www.donanareservas.com/en/donana/>

42 Cabo de Gata-Níjar Natural Park: http://www.europeangeoparks.org/?page_id=489

Historic Centre of Cordoba, with its great mosque (later turned into a cathedral and a fortress)⁴³ and Alhambra, Generalife and Albayzín⁴⁴, Granada, a rich repository of Moorish vernacular architecture, vividly show the Arab influence in the Iberian Peninsula, and it harmoniously blend with traditional local architecture.

Catalonia

Catalonia, in Spain, is a wealthy region facing the Mediterranean with an almost rectilinear coast, with the notable exceptions of Cap de Creus and the Gulf of Roses to the north, and the Ebro Delta to the south. The capital is Barcelona. Its climate, fauna and flora, and habits are clearly Mediterranean, in the coastal area until the Pyrenees. Several National parks included in Natura 2000 network ensure the control of anthropogenic pressure on the region. As for historical influences, Catalonia was most prominently influenced by the Roman Empire and the middle Ages. More recently, Catalonia headed the modernist movement.

Catalonia has several sites inscribed in the UNESCO's World Heritage list, notably the Archaeological Ensemble of Tàrraco⁴⁵ that was one of the first Roman settlements in the Iberia Peninsula, and a major administrative and mercantile city of the Roman Empire. Another important World Heritage site is Poblet Monastery⁴⁶, a 12th-century majestic monastery, also a fortified royal residence (for the kings of Catalonia and Aragon. The abbey's complex encloses workshops, storehouses, housing for lay workers and other premises connected with the financial life of the community, including agricultural fields. Poblet Monastery is a vivid example of the importance of religious orders in managing some of the roman legacy during the middle ages. As other monasteries, it was a centre for the arts, culture, history and spirituality, and played a key role in agricultural exploitation of the region.

Crete

Crete, in Greece, is the largest and most populous of the Greek islands, together with surrounding islands and islets constitute the administrative region of Crete, of which capital is Heraklion. The island is mountainous, crossed by the Lefka Ori, which highest point is Mount Ida, which is noted in the program "Global Geoparks UNESCO". The Natural park of Psiloritis is also noteworthy.

Crete is an emblematic place, in respect to historical influences and in the ancient Greek mythology; Crete was home to an important early civilization, the Minoan, which was overrun by the Mycenaean civilization from mainland Greece. Crete was then occupied by Romans and was later part of the Byzantine Empire. Crete was also integrated in "Al-Andalus" Arabic kingdom, centred in the Iberian Peninsula, before falling to the Ottoman Empire. Although discussable, Crete has been referred by several authors as home to the "authentic Mediterranean food".

43 Great mosque of Cordoba, UNESCO's world heritage site: <https://whc.unesco.org/en/list/313>

44 Alhambra, Granada, UNESCO's world heritage site: <https://whc.unesco.org/en/list/314>

45 Archaeological Ensemble of Tàrraco, UNESCO's world heritage site: <https://whc.unesco.org/en/list/875>

46 Poblet Monastery, UNESCO's world heritage site: <https://whc.unesco.org/en/list/518>

Cyprus

Cyprus is an island country in the Eastern Mediterranean and one of the largest and most populous in the Mediterranean. The climate is of Mediterranean type, with warm to hot summers and mild rainy winters, except in the tallest mountains in the centre of the island, where it snows. Cyprus suffers from a chronic shortage of water, aggravated by the decrease in average yearly precipitation for the past 30 years. Dams remain the principal source of water both for domestic and agricultural use; Cyprus has a total of 107 dams (plus one currently under construction).

The earliest confirmed site of human activity on Cyprus is Aetokremnos, dated from around 10,000 BC. Cyprus keeps a well-preserved village from Neolithic age (from the 7000 - 4000 BC), Chirokoitia, which is granted World Heritage Site⁴⁷. The pre-Hellenic occupation can be testified in Paphos⁴⁸, also a World Heritage Site, this time dedicated to Aphrodite, whom legendary birthplace was on this island, where the Mycenaean erected her temple in the 12th century BC. Further settlements, in the antiquity, included Phoenicians, Assyrians, and the Roman, Byzantine and the Ottoman Empires. The Painted Churches in the Troodos Region⁴⁹ are a World Heritage site dating from Byzantine and after Byzantine epochs. The site consists on a large group of churches and monasteries from the Byzantine Empire. The monuments, ranging from small rural churches to monasteries are all richly decorated with murals and highly refined paints.

In respect to biodiversity, Cyprus is part of the “biodiversity hotspot” of the Mediterranean basin, mainly thanks to its many endemic birds, mammals and insects. It is also considered a centre of plant diversity having almost 2,000 taxa of which 143 are endemic⁵⁰. The Natura 2000 network, in Cyprus, includes 32 Sites of Community Importance, 21 Special Protected Areas, among other classifications.

Dalmatia

Dalmatia, in Croatia, namely its city Split, faces the Mediterranean and it is a link to the Adriatic islands and the Apennine peninsula. The city was founded as a Greek colony and later became the capital of a province of the Roman Empire, harbouring a palace for the Emperor. Upon the fall of the Roman Empire, Split became a Byzantine city. Olive orchards are cherished through the country.

More recently, and for some decades, Croatia was part of the post-war Socialist Federal Republic of Yugoslavia, with strong influence from Russian culture. In 1991, Croatia regained its independence and its Mediterranean identity.

Another relevant city in Dalmatia coast is Dubrovnik⁵¹, Once known as the 'Pearl of the Adriatic'. Dubrovnik became an important Mediterranean port from the 13th century onwards. The city holds Gothic, Renaissance and Baroque churches, monasteries, palaces and fountains, which are under repair and restoration supported by UNESCO. It is a cultural site inscribed in the World Heritage list of UNESCO. Paklenica National Park⁵², included in EU's Natura 2000 network,

47 Chirokoitia, UNESCO's world heritage site: <https://whc.unesco.org/en/list/848>

48 Paphos, UNESCO's world heritage site: <https://whc.unesco.org/en/list/79>

49 Byzantine Churches, UNESCO's world heritage site: <https://whc.unesco.org/en/list/351>

50 Cyprus' resources: <https://www.iucn.org/regions/europe/resources/country-focus/cyprus>

51 Old city of Dubrovnik, UNESCO's world heritage site: <https://whc.unesco.org/en/list/95>

52 Dalmatia most relevant National Park: <https://www.np-paklenica.hr/en/>

contains the largest and best preserved forest in Croatia's Dalmatia region, making it home to some unique fauna, including brown bears, wolves and lynxes.

Emilia-Romagna

The name Emilia-Romagna is the junction of “Emilia” derives from the via Aemilia, the Roman road connecting Piacenza to Rimini, and “Romagna”, which derives from Romània, the name that the Eastern Roman Empire applied to Ravenna. In the north, the region is a great plain (at sea level or shortly above) extending from the Po River southeast to Ravenna and Rimini, where the Apennine Mountains come down to the Adriatic coast. Lagoons and wetlands shape the landscape near the mouths of the Po river. Immediately to the southwest of the ancient Roman road called the Via Aemilia, the mountains begin to rise, culminating in the central chain of the Apennines. Emilia-Romagna’s southern boundary follows the summits of this mountain chain. With the exception of the Po, the region’s main rivers descend from these mountains. The affluents of the Po, the Reno, Ronco, Montone, and Savio are the most important rivers flowing to the Adriatic.

Emilia-Romagna, in Italy, has one of the highest GDP (gross domestic product per capita) in Italy. Its capital is Bologna where it is located the oldest university in the western world⁵³. This notable university, which name is associated to a recent European reform of university degrees, formed influent humanists and scientists as:

- *Francesco Petrarca* - one of the earlier humanists in Italian Renaissance.
- *Erasmus of Rotterdam*, a Dutch philosopher and Christian humanist who is widely considered as of capital influence on the northern Renaissance.
- *Nicolaus Copernicus*, a mathematician and astronomer, who formulated a model of the universe that placed the Sun rather than Earth at the centre of the universe.
- *Laura Bassi*, the world's first woman to earn a university chair in a scientific field of studies
- *Guglielmo Marconi*, pioneer in long-distance radio transmission systems, he shared the 1909 Nobel Prize in Physics with Karl Ferdinand Braun "in recognition of their contributions to the development of wireless telegraphy"

Just to name a few

The region is relevant to current global economy for it is a centre for food and automobile production (home of automotive companies such as Ferrari, Lamborghini, Maserati, and Ducati). Moreover, the relevance of Emilia-Romagna’s to western culture is unavoidable, as translated by the great number of world heritage sites inscribed in UNESCO’s list, including natural spots, diverse cultural landscapes, and three cities: Ferrara, Ravenna and Modena⁵⁴.

Campania

Campania, in Italy, is extremely rich from natural, historical and cultural points of view. The region harbours the Cilento and Vallo di Diano National Park (Italian acronym PNCV) where is located

53 UNIBO’s History - <https://www.unibo.it/en/university/who-we-are/our-history>

54 UNESCO World Heritage in Emilia-Romagna: <https://www.emiliaromagnaturismo.com/en/art-cities/cities-unesco-heritage.html>

Cilento, the Italian representative community in UNESCO's list for the Mediterranean Diet (see Mediterranean Diet definition, p. 13).

The Cilento is an outstanding cultural landscape; the PNCV with the Archaeological Sites of Paestum and Velia, and the Certosa di Padula are inscribed in the World Heritage list from UNESCO, combining a biosphere reserve, geoparks and important archaeological sites⁵⁵.

Also, notable in the region is the Vesuvius National Park, centred on the volcano, Mount Vesuvius⁵⁶. The prominent influence of the Roman Empire is vivid, if not for other reasons, at least in the remains of the city of Pompeii⁵⁷.

Sicily

Sicily, in Italy, is an autonomous region in the south that includes the largest island in the Mediterranean and surrounding minor islands, notably the volcanic archipelago located at the north of Sicily, Isole Eolie, an important cultural landscape granted with world heritage status by UNESCO⁵⁸. Sicily is separated from the mainland by the strait of Messina.

In respect to natural landscapes, Sicily is an often-quoted example of man-made deforestation, which has occurred since Roman times to use terrains for agriculture. Currently, Prominent Natural Reserves occur near Mount Etna (Parco dell'Etna Regional Nature Park), in the Sicilian Apennines, also encompass Bosco della Ficuzza's Natural Reserve, near Palermo, Zingaro Natural Reserve, and Marine protected areas, Isole Egadi, Isole Pelagi, Plemmirio, among many others listed in Natura 2000 network⁵⁹. The Zingaro Natural Reserve is one of the best examples of unspoiled coastal wilderness.

The most prominent natural site in Sicily is Mount Etna, an iconic active stratovolcano, lying above the convergence between the African Plate and the Eurasian Plate, as the Isole Eolie, or Lipari islands.

Sicilian rich culture is the blend of the many influences from the sequential settlements along times, especially with regard to the arts, and architecture. Several architectural sites and cities have been granted the status of world heritage, namely the Archaeological Area of Agrigento⁶⁰, Arab-Norman Palermo and the Cathedral Churches of Cefalú and Monreale⁶¹, and Late Baroque Towns of the Val di Noto (South-Eastern Sicily)⁶².

Herzegovina

Herzegovina, in Bosnia-Herzegovina harbours the coastal region of the country, about 20 kilometres long that surrounds the town of Neum and has a Mediterranean-type climate. The region was culturally influenced by the Ottoman Empire, under whose rule it remained from the mid-15th to the late 19th centuries. The Ottomans brought Islam to the region and altered much

55 Cilento, World heritage site: <https://whc.unesco.org/en/list/842>; <https://en.wikipedia.org/wiki/Cilento>

56 Vesuvius National Park: https://www.vesuvioinrete.it/e_parco.htm

57 A day at Pompei, recreation video from Melbourne museum (8 min): https://youtu.be/dY_3ggKg0Bc

58 Mount Etna, world heritage site: <https://whc.unesco.org/en/list/1427/>

59 National and Regional Parks and other Protected Natural sites in Sicily: <http://www.parks.it/regione.sicilia/Eindex.php>

60 <https://whc.unesco.org/en/list/831>

61 <https://whc.unesco.org/en/list/1487>

62 <https://whc.unesco.org/en/list/1024>

of the cultural and social outlook of the country. The city of Mostar was an Ottoman frontier and “Old Bridge Area of the Old City of Mostar” are included in UNESCO’s world heritage list⁶³.

As Croatia, Bosnia-Herzegovina was part of the post-war Socialist Federative Republic of Yugoslavia from WWII until 1992, during which period the country was under strong influence of Russian culture and went through several ethnic conflicts. The region is mountainous and most of the country has a clear Continental climate. Several orchards and vineyards can be found at Herzegovina. Main agricultural products are cow milk, maize and potatoes.

Vzhodna

Vzhodna, in Slovenia (or Eastern Slovenia) despite the presence of hilly areas with vineyards moderate continental climate dominates. In the Western side of the country, in the Coastal–Karst region, a small coastal area zone is related to the traditional and historical regions of Slovenian Istria, facing the Mediterranean Sea. This region has a sub-Mediterranean climate and some Italian influence. Its natural features enable the development of tourism, transport, and special agricultural crops. The recently created Debelirtič landscape park covers a 250 to 450 m wide sea belt between St. Jernej and Valdoltra bay and aims at protecting the land and marine area – landscape, and flora and fauna. This region also has a cultural landscape inscribed in the UNESCO’s world heritage list - Heritage of Mercury⁶⁴. Almadén and Idrija, the legacy is shared between Spain and Slovenia and notably refer to the first site from where mercury was extracted (in Slovenia), and a more recent mine in Spain. The sites relate in the testimony to the intercontinental trade in mercury, which generated important exchanges between Europe and America over the centuries.

63 Old Bridge Area of the Old City of Mostar, UNESCO’s world heritage site: <https://whc.unesco.org/en/list/946>

64 The use and transcontinental trade of mercury, UNESCO’s world heritage site: <https://whc.unesco.org/en/list/1313>

5. COMMON CHALLENGES IN THE MEDITERRANEAN AREA

SWOT analysis

According to keywords and ideas supplied by the actors from the participant regions, in the MD.net project, in what regards the natural resources and environment, and the cultural landscapes of the Mediterranean Diet a summarized overview of the identified strengths, weaknesses, opportunities and threats would certainly be helpful in capturing the essence of the Mediterranean challenges regarding the valorisation and safeguarding of MD, as also developing and programming future regional strategies and actions.

Strengths

Some actors refer to the quality of land, water and climate for agricultural production, as well as the existence of ecologically preserved environment and land adequate for organic production (karst fields). The existence of still preserved environment in rural areas is viewed as a valuable asset. In fact, the option for organic agriculture, is reported as successful (it is a growing market trend). Moreover, in general, organic agriculture allows for a more effective preservation of surrounding nature. In addition, it allows for a sustainable exploitation of soils, delivers more tasty and healthy products and it is compatible with the revitalization of autochthone crops and animal breeds, as well as developing the cultivation of aromatic herbs. Successful and profitable sustainable exploitation of natural resources has been reported. The existence, in some of the rural areas of already established activities, as well as traditional knowledge in culinary arts and crafts will certainly be a key for development. As generally acknowledged by international

In respect to cultural aspects, the fact that the Mediterranean is already a well-known and easy to reach location is referred as a plus. The enormous quantity and the quality of (material and immaterial) cultural resources is a major asset, complemented with the diversity and quantity of cultural events where MD already has a key role (festivals, fairs, religious celebrations). The pride of the local communities in belonging to the MD area is expected to boost future actions.

Weaknesses

Bureaucracy, unsatisfactory cooperation and coordination between stakeholders and lack of a coherent strategic plan to exploit the potential of the territory were pointed out as a major weakness. Improving the coordination and involvement of SME, Public bodies and Universities in

developing a strategic planning and in disseminating and raising awareness on MD is viewed as a way to mitigate such weaknesses.

The risk of cultural homogenization and the lack of a creative class, as well as the excessive dependency of the local economies on mass tourism may possible be mitigated by the above-referred actions.

Opportunities

The increase awareness and interest on MD of academic sectors, public administration and local population may contribute to prevent further degradation of rural areas, the development of sustainable and creative forms of tourism to best deal with and further value preserved nature and historical sites, local traditions and culture.

New communication technologies are expected to help promote and value the MD concept and products related to it. Creativity is a relevant keyword to unlock ways out of “business as usual”

Threats

Main identified threat is climate change and the fragility of ecosystems and the vulnerability of the territory, including the probability of suffering from severe drought in a near future. Related threats also mentioned were ocean pollution, and the impact in the quality and safety of fish. Loss of biodiversity, namely of autochthone climate resilient crops.

Urbanization and migration reduced the population in rural areas, which are mainly occupied by an ageing population. The continuous growth of mass tourism negatively affects the territories masking the unique features of the region. In addition, mass tourism industry is a major employer in the area leading to the abandonment of other activities, increase the abandonment of rural areas and enhance brain drain limiting the exchange of knowledge and knowledge spill-overs. The ageing population, particularly in rural areas, and the generalized local youth lifestyle - based on abuse of technologies and sedentary habits-may compromise the safeguard of MD cultural values and innovative approaches.

To summarize the Mediterranean Diet concept is of multidisciplinary nature and is rooted in the common features enclosed in such keywords as geography and climate, agriculture, food habits, history, sociological aspects, culture and architecture.

Reading List

- Barros, V. (2014). *Dieta Mediterrânica e Desenvolvimento Rural*. Lisboa, Animar.
- Buchanan, C., Vicente, P. & Vlacos, E. (Eds) (2009). *Making the Passage through the 21st Century- Water as a Catalyst for Change*. Lisbon, Luso-American Foundation.
- Braz, N. (2015). *Memories of Salt and Sea: Anchovies Made from Sardines*. In F. T. Barata & J. M. Rocha (Eds.), *Heritages and Memories from the Sea Conference Proceedings* (pp. 109–115). Évora: UNESCO Chair in Intangible Heritage and Traditional Know-How: Linking Heritage.
- Chatterjee, S. (2013). *The Changing Definitions of Global and Local in the World Heritage Properties and its Implication* In Bo G Jansson (Ed), *The Significance of World Heritage: Origins, Management, Consequences: The Future of the World Heritage Convention in a Nordic Perspective* (pp. 138-162). Hosgkolan, Dalarna University.
- Coll, M., Piroddi, C., Steenbeek, J., Kaschner, K., Ben Rais Lasram, F., Aguzzi, J., Ballesteros, E., Bianchi, C. N., Corbera, J., Dailianis, T., Danovaro, R., Estrada, M., Froglia, C., Galil, B. S., Gasol, J. M., Gertwagen, R., Gil, J., Guilhaumon, F., Kesner-Reyes, K., Kitsos, M. S., Koukouras, A., Lampadariou, N., Laxamana, E., López-Fé de la Cuadra, C. M., Lotze, H.K., Martin, D., Mouillot, D., Oro, D., Raicevich, S., Rius-Barile, J., Saiz-Salinas, J.I., San Vicente, C., Somot, S., Templado, J., Turon, X., Vafidis, D., Villanueva, R., Voultsiadou, E. (2010). *The Biodiversity of the Mediterranean Sea: Estimates, Patterns, and Threats*. PLoS ONE, 5(8): e11842. <https://doi.org/10.1371/journal.pone.0011842>
- Braudel, F. (1987). *O Mediterrâneo. O Espaço e a História*. Lisboa, Teorema.
- Freitas, A. (Coord.) (2015). *Dimensions of Mediterranean Diet, World Cultural Heritage*. Faro, Universidade do Algarve.
- International Union for Conservation of Nature, IUCN (2017). *The Mediterranean, a global priority for conservation*. Retrieved from: https://www.iucn.org/sites/dev/files/content/documents/infografia_uicn_med_a3_nov29.pdf
- Ribeiro, O. (2011). *Mediterrâneo – Ambiente e Tradição*. Lisboa, Fundação Calouste Gulbenkian.
- Romano, A. (Ed.). (2015). *A Dieta Mediterrânica em Portugal: Cultura, Alimentação e Saúde*. Faro, Universidade do Algarve.
- Romano, A., Gonçalves, S. (2015). *Plantas silvestres comestíveis do Algarve*. Faro, Universidade do Algarve.
- Queiroz, J. (2015). *The Mediterranean Diet – Ancient Heritage for Humanity*. Lisbon, Author & Althum.com
- Valagão, M. M., Braz, N., Célio, V. (2018). *Lives and Voices - the sea and the fish*. Lisbon, Edições Tinta-da- China Lda.
- United Nations. *Sustainable Development Goals. Why the SDGs matter*. Retrieved from: <https://www.un.org/sustainabledevelopment/why-the-sdgs-matter/>