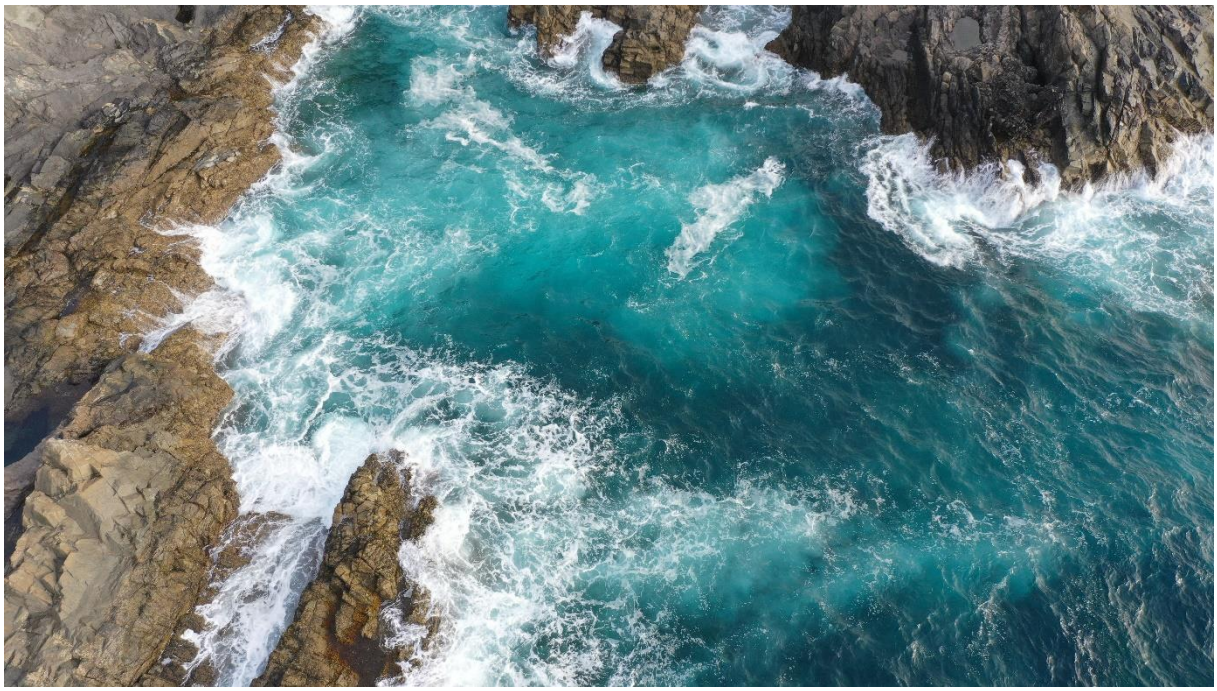
MEDITERRANEAN STRATEGY FOR SUSTAINABLE DEVELOPMENT

Quantitative evaluation for the MSSD implementation period 2016 - 2025

Investing in environmental sustainability to achieve social and economic development



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I. General introduction and scope of the revision

As an integrative policy framework and a strategic guiding document for all stakeholders and partners to translate the 2030 Agenda for Sustainable Development at the regional, subregional and national levels, the MSSD in its second phase of implementation over the period 2016-2025 allowed to:

- bridge borders to address sustainable development across the Mediterranean
- elevate experiences
- and maximize momentum in making possible bringing together experts from different countries

However, there remains significant discrepancies in development levels and living standards between countries, which, together with the conflicts in the region continue negatively affecting investment and development, and pose also challenges for envisioning a sustainable future of the Mediterranean basin.

As a semi-closed sea, in which water renewal is limited by the narrow connection to the ocean, and therefore particularly sensitive to pollution, the fragility of the region is further aggravated by its sensitivity to climate change: IPCC and MedECC have identified Mediterranean ecosystems among the most impacted by global climate change drivers.

Achieve sustainable development goals and measure the sustainability of human activities and the state of the environment and development stays of key importance for the Mediterranean.
The Mediterranean Strategy for Sustainable Development 2016-2025

A. THE MEDITERRANEAN STRATEGY FOR SUSTAINABLE DEVELOPMENT 2016-2025

The Strategy follows a structure based on six objectives that lie in the interface between environment and development, and were chosen to provide scope for an integrated approach to address sustainability issues.

The three first objectives reflect a territorial approach:

1. Ensuring sustainable development in marine and coastal areas
2. Promoting resource management, food production and food security through sustainable forms of rural development
3. Planning and managing sustainable Mediterranean cities. While the other objectives are cross-cutting ones, addressing key policies and areas, as follows:
4. Addressing climate change as a priority issue for the Mediterranean
5. Transition towards a green and blue economy
6. Improving governance in support of sustainable development.

Table 1. Links between MSSD objectives and SDG targets

MSSD objectives / SDG targets	General Indicators	Obj n°1: Sea & Coast	Obj n°2 : Rural areas & resources	Obj n°3: cities	Obj n°4 : climate change	Obj n°5 : Green & blue economy	Obj n°6 : Governance
4	1						
6			3				
7					2		
8	1				1		
9							1
11				2			
12				1		1	
14		2					
15			2				
16							1
Nb of indicators	2	2	5	3	3	1	2

The MSSD is structured around six Objectives that feed into the Sustainable Development Goals (SDGs):

MSSD Objectives	SDGs
1. Ensuring sustainable development in marine and coastal areas	14
2. Promoting resource management, food production and food security through sustainable forms of rural development	2, 15, 6
3. Planning and managing sustainable Mediterranean cities	11, 7
4. Addressing climate change as a priority	13
5. Transition towards a green and blue economy	8, 9, 12
6. Improving governance in support of sustainable development	16, 17

A set of strategic directions is formulated for each of the six overall objectives. The strategic directions are complemented by national and regional actions, as well as flagship initiatives and targets. The sustainability dashboard allows to monitor the targets.

B. THE SUSTAINABILITY DASHBOARD

A comprehensive monitoring system and relevant indicators are necessary for the implementation of the Strategy.

The sustainability dashboard allows monitoring the progress of sustainable development issues in relation to the objectives defined by the contracting parties.

The selection of the sustainability indicators has been done through a participative collaborative process in 2014 in which the Mediterranean Commission on Sustainable Development played an advisory role as well as county's representatives and national and internal experts.

Strategic direction 7.4: "*Ensure the regular monitoring of the Mediterranean Strategy for Sustainable Development 2016-2025*" contains four actions to ensure the regular monitoring of the Strategy:

1. The first being for national governments and regional organizations to support the monitoring process through regular and timely provision of regular data. Although much data is found through international databases, there is also the need for national governments and other stakeholders to provide some information directly.
2. A second action highlights the potential of meetings of the Mediterranean Commission on Sustainable Development to assist with monitoring the implementation of the Strategy through discussions in breakout groups.
3. A third action concerns the need to ensure that the Strategy monitoring systems are built taking into account the existing and planned data-sharing and information systems of the MAP.
4. The final action focuses on the development and population of a dashboard of sustainability indicators for the Mediterranean, with the Mediterranean Commission on Sustainable Development playing an advisory role in the selection process though a sub-committee.

II. State of the sustainable development of the Mediterranean Sea and coasts, capitalizing the regular updates of the MSSD dashboard over the past 10 years

The section presents a state of play regarding regional sustainable development achievement (sub section A), the evaluation of the MSSD implementation per indicator (subsection B) and a cross sectoral analysis (sub section C).

A. STATE OF SUSTAINABLE DEVELOPMENT IN THE MEDITERRANEAN BASIN ACCORDING TO THE SDGS

Main fact: Mediterranean countries are not on track to achieve the SDGs

At global level, 8 years after their adoption and 7 years before their end, the 17 Sustainable Development Goals (SDGs) and the 2030 Agenda as a whole are not in good track. Indeed, their implementation considerably slowed down by the overlapping, everywhere in the world, environmental, economic and geopolitical crises and their impact on societies. In this context, the need for structural transformations, already present in 2015, is even more so today. The Mediterranean is no exception to this observation.

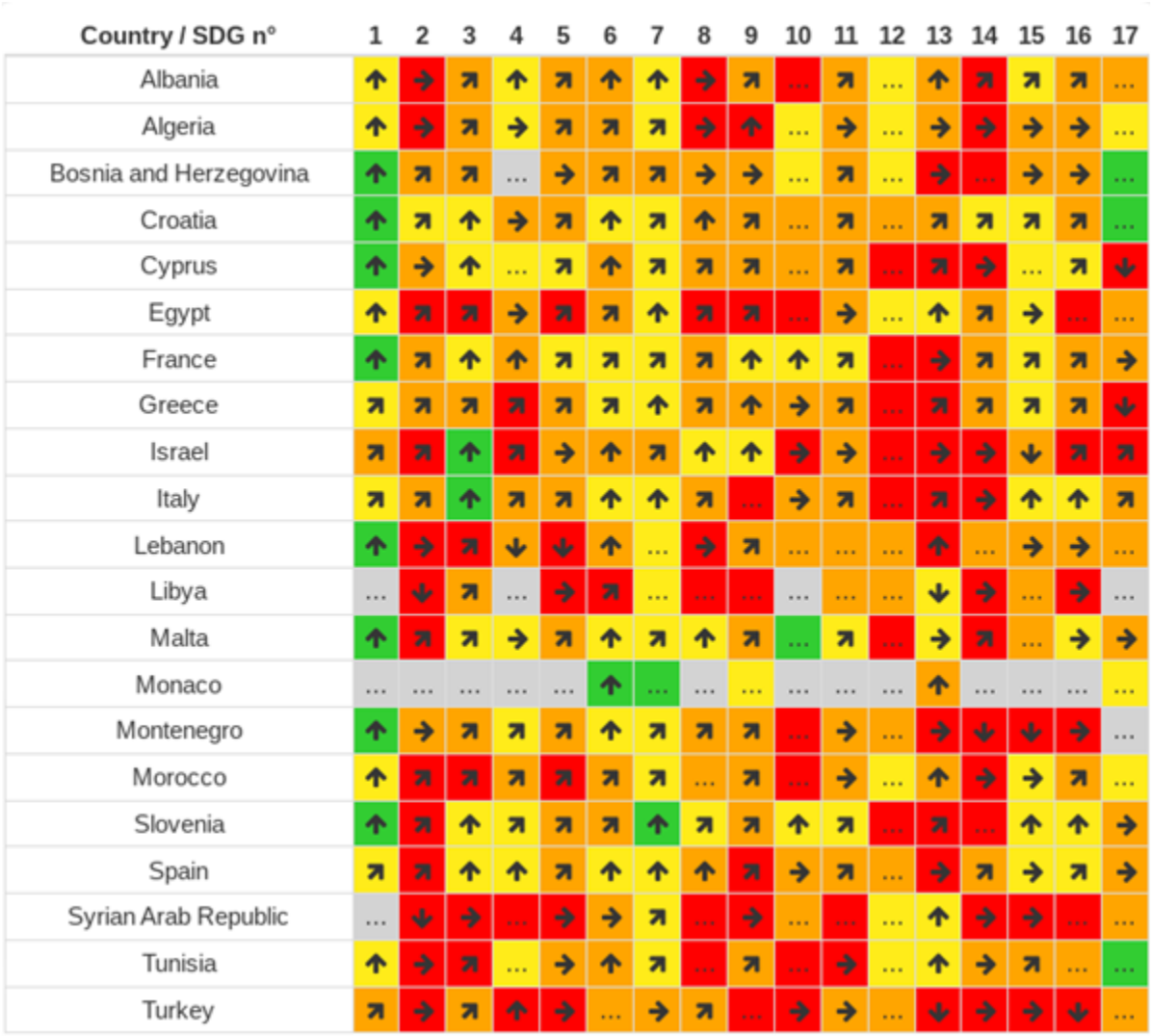
Three sources of information have been compiled to draft the subsection

1. The SoED 2020
2. the SDSN report (Sachs et al. 2019). SDSN Mediterranean is the regional sub-network of UN SDSN that aims to boost knowledge on the Agenda 2030 and the SDGs in the Mediterranean area, promoting research, innovative teaching, youth leadership, and engaging in a wide array of projects and partnerships with over 70 Universities and research institutions from the Mediterranean countries.
3. the update of the MSSD dashboard on WESR/MapX in 2022 (direct link: Evolution rate of SDG score between 2019-2022 (from SoED 2020)

The Sustainable Development Solutions Network (SDSN) report shows that all Mediterranean countries are currently far from achieving the SDGs and that no promising trend can be identified in any Mediterranean country that suggests they will be achieved by 2030 (Table below).

SDG's titles:

Evolution rate of SDG score between 2019-2022:



Source: MapX - Plan Bleu observatory

In 2019, 9 of the 21 countries had not achieved any of the SDGs, and for almost two thirds of the SDGs, significant or major challenges remain for their achievement.

In most situations, efforts undertaken since 2015 have brought about positive developments, but changes have occurred at a level and/ or pace that is insufficient for achievement of the SDGs by 2030.

The situation is particularly critical for SDG 2 on hunger, nutrition and sustainable agriculture, SDG 5 on gender equality, SDG 11 on sustainable cities and communities and SDG 14 life below water - which is most relevant to the Barcelona Convention - for which none of the Mediterranean countries are considered to be on track to reach the SDG targets by 2030.

Northern Mediterranean countries (NMC) are generally closer to achieving the SDGs than Southern and Eastern Mediterranean countries (SEMC). France obtained the highest 2019 SDG score (a score of 81.5/100 but still only one SDG had been achieved, with promising trends for the achievement of 4 other SDGs by 2030), while the Syrian Arab Republic has the greatest difficulty (score of 58.1/100, no SDG achieved so far and only one SDG on track for achievement by 2030) and Libya has too large of a data gap to calculate its SDG score.

Level of SDG achievements at the Mediterranean scale:

	SDG achievement	Challenges remain	Significant challenges remain	Major challenges remain	Data not available
Total n° of occurrances	17	92	134	93	19
Above/n° of coloured (non-grey) cells	5%	26%	38%	26%	5%

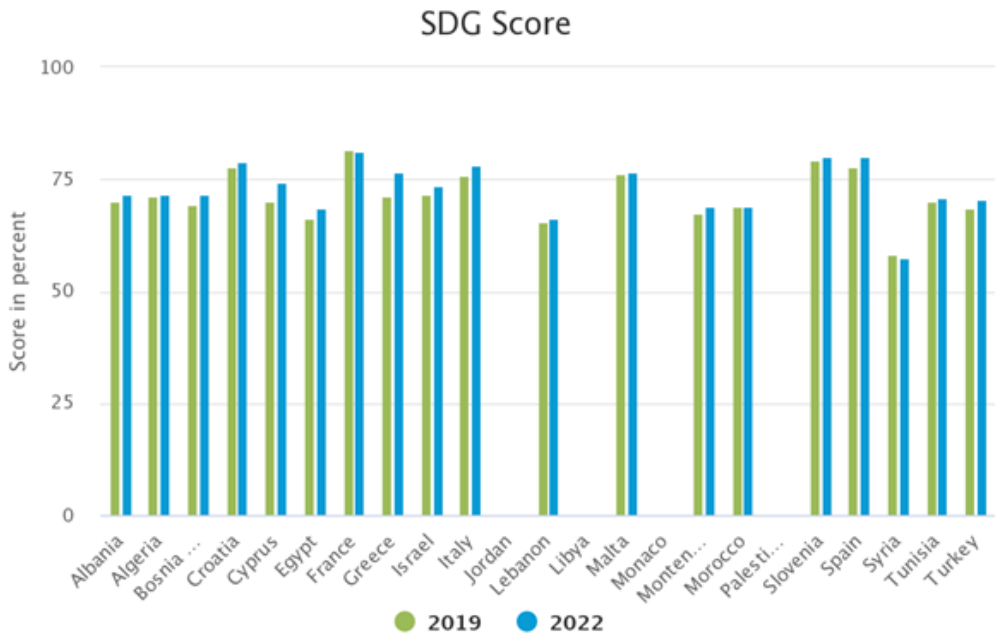
On track (increases at the rate needed to achieve the SDG by 2030 or performance has already exceeded SDG achievement threshold)	Moderately increasing (at a rate above 50% of the required growth rate but below the rate needed to achieve the SDG by 2030)	Stagnating (score remains stagnant or increases at a rate below 50% of the growth rate needed to achieve the SDG by 2030)	Decreasing (i.e. country moves in the wrong direction)	Data not available
↑	↗	→	↓	…
62	123	71	12	87
17%	35%	20%	3%	25%

Source: MapX - Plan Bleu observatory

Focus on a "spillover score":

The SDSN report also presents a "spillover score", which measures a country's impact on the ability of other countries to meet the SDGs. Mediterranean high-income countries generate significant socioeconomic and environmental spillover effects by exporting a large amount of pollution, waste and other negative externalities. These can limit the ability of other countries to achieve sustainable development (Sachs et al. 2019). Critical issues that especially affect lower-income countries in and outside of the Mediterranean region include: international demand for palm oil and other commodities which fuel tropical deforestation, tax havens leading to difficulties raising public revenue to finance the SDGs, and tolerance for poor labor and environmental standards in international supply chains, etc.

Overall SDG score between the years 2019 and 2022 for each Mediterranean country:



Source: MapX - Plan Bleu observatory

The overall score measures the total progress towards achieving all 17 SDGs. The score can be interpreted as a percentage of SDG achievement; a score of 100 indicates that all SDGs have been achieved.

B. STATE OF SUSTAINABLE DEVELOPMENT IN THE MEDITERRANEAN BASIN ACCORDING TO THE MSSD - 28 THEMATIC ANALYSIS

28 indicators are part of the sustainability dashboard and are populated. Some are index (composite indicators), meaning that more than 1 factsheet is available but sometimes 2 (the case of indicator 2) or 3 (the case of indicator 16) ...

Each indicator factsheet presents;

- a title
- a definition
- an analytical part (text description associated with a map, a temporal slider, a graph)
- a section (sometimes) with precautions / notes
- a source

Indicators	MSSD Topic
1 to 8	5 general indicators + 3 sea and coast
9 to 17	Rural and resources
18 à 23	Cities; climate change; Green economy
24 à 28	Governance

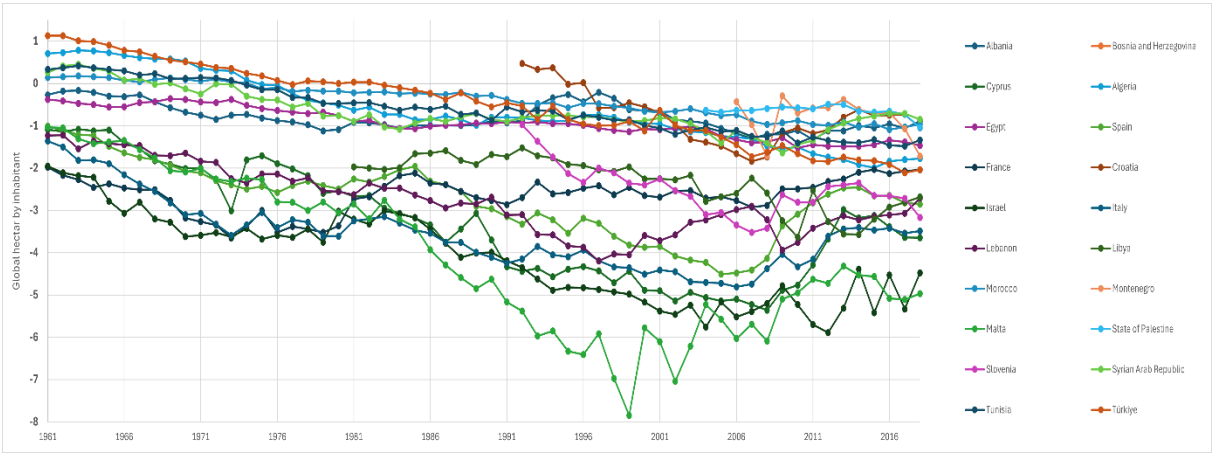
1. General Indicators

a) Indicator 1a: Ecological deficit per capita (Biocapacity) - Period 1961 - 2018

Definition:

1. Ecological deficit / reserve: the difference between the Biocapacity and Ecological Footprint of a region or country.
2. Biocapacity: ecosystems' capacity to produce biological materials used by people and to absorb waste material generated by humans, under current management schemes and extraction technologies.

Analytical part :



- The Mediterranean's Biocapacity Deficit (-2.28 gha/cap) is almost two times higher than the world's Biocapacity Deficit (-1.2 gha/cap).

- From 2010 to 2008, the Mediterranean's Biocapacity Deficit per capita increased in most Mediterranean countries and reached 2.7 gha/cap. From 2009 to 2013 the Ecological Footprint per capita decreased to reach 2.15 gha/cap (same as 1995). Since 2014, Ecological Footprint per capita has increased again.
- The Mediterranean's Biocapacity Deficit of the northern Mediterranean countries started to decrease in the last few years. This is mostly due to the effects of the economic crisis, which slowed down resource consumption and, primarily, CO_2 emissions.
- The Ecological Footprint is used to assess the level of the consumption of available resources connected to human activities. Compared to the Biocapacity, this indicator offers the possibility to calculate the Ecological Deficit or Reserve in a region or country.

Source: Global Footprint Network, National Footprint and Biocapacity Accounts, 2022 Edition.

b) Indicator 2: Human Development Index - 2021

Definition: The Human Development Index (HDI) is a composite index, developed by UNDP, that measures the evolution of a country according to three basic criteria:

- Health and longevity, measured by life expectancy at birth.
- Knowledge and education, measured by the mean years of schooling and the expected years of schooling.
- Standard of living, indicated by the GNI per Capita (PPP not constant US dollars).

The HDI is standardized and used to classify countries by values between 0 and 1. The human development index (HDI) with its three components (health, education and income) enables us to identify and understand the social component of sustainable development.

The average HDI in 2021 was 0.773 points for the Mediterranean region, less than the last update in 2018 with 0.794. With an average HDI of 0.773 in 2021, the Mediterranean region was above the world value of 0.723 (based on 184 countries).

However, there are great differences between countries:

- 11 countries have high HDI, greater than 0.8: Israel (ranked 22nd out of 184 worldwide), Malta, Slovenia, Spain, France, Cyprus, Italy, Greece, Croatia, Türkiye, Montenegro (49th worldwide).
- 9 countries (7 in 2018) have HDI between 0.7 and 0.8: Albania, Bosnia and Herzegovina, Algeria, Tunisia, Libya, State of Palestine and Lebanon (110th worldwide).
- 4 countries have HDI lower than 0.7: Morocco and The Syrian Arab Republic with 0.57 (144th worldwide).

The years of schooling have constantly increased since 2010. It slightly decreased in 2021 in some Mediterranean countries.

The difference is 11 years between The Syrian Arab Republic (9.1) and Greece (20).

The Mediterranean average (14.4 years) of years of schooling remains above the global average (8.7 years).

c) Indicator 2a: Expected years of schooling

The years of schooling have constantly increased since 2010. It slightly decreased in 2021 in some Mediterranean countries.

The difference is 11 years between The Syrian Arab Republic (9.1) and Greece (20).

The Mediterranean average (14.4 years) of years of schooling remains above the global average (8.7 years).

Precautions / Notes: An HDI value greater than 0.8 is generally considered high. A value below 0.55 is considered low. The calculation methodology was changed in 2013 and had the effect of decreasing the HDI values (with a small impact on country rankings).

Source: United Nations Development Programme Database and report, 2021.

d) Indicator 2b: Life expectancy at birth

Definition: The Human Development Index (HDI) is a composite index, developed by UNDP, that measures the evolution of a country according to three basic criteria:

- Health and longevity, measured by life expectancy at birth.
- Knowledge and education, measured by the mean years of schooling and the expected years of schooling.
- Standard of living, indicated by the GNI per Capita (PPP not constant US dollars).

The HDI is standardized and used to classify countries by values between 0 and 1. The life expectancy at birth, which accounts for one third of the HDI, shows a gap of 13.6 years between Egypt (70.2) and Malte (83.8).

Precautions / Notes: An HDI value greater than 0.8 is generally considered high. A value below 0.55 is considered low. The calculation methodology was changed in 2013 and had the effect of decreasing the HDI values (with a small impact on country rankings).

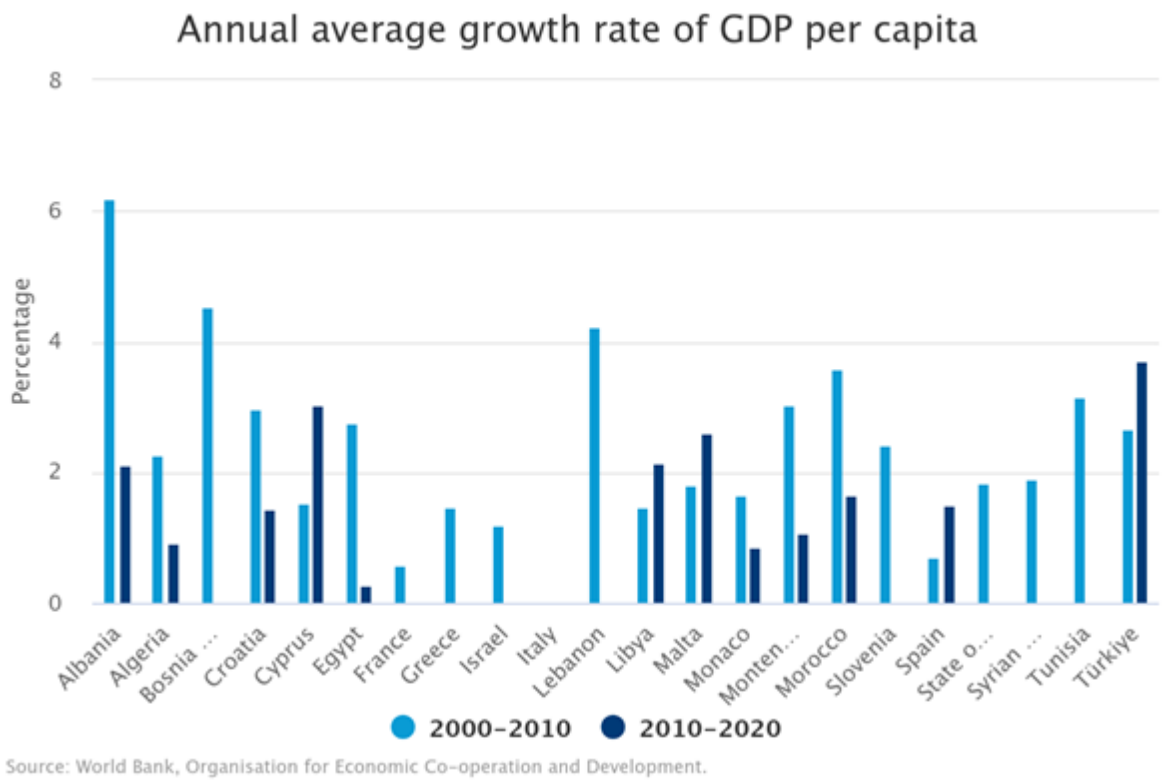
Source: United Nations Development Programme Database and report, 2021.

e) Indicator 3: Annual growth rate of real GDP per capita (SDG Indicator 8.1.1)

Definition: SDG Indicator 8.1.1: Annual growth rate of real GDP per capita

- The Gross Domestic Product (GDP) is the value of all the goods and services produced in a country in a year. The GDP can be calculated by adding up all the items of income – salaries, interests, profits and rents – or by calculating the expenditure – consumption, investment, public purchases, net exports, (exports less imports) – of an economy.
- Annual growth rate of real Gross Domestic Product (GDP) per capita is calculated as the percentage change in the real GDP per capita between two consecutive years. Real GDP per capita is calculated by dividing GDP at constant prices by the population of a country or area.

The data for real GDP is measured in constant US dollars to facilitate the calculation of regional and global aggregates.



Analytical part: Although insufficient to measure the development level of a country, the GDP per capita remains an unavoidable indicator for comparing economic situations in terms of income. The GDP growth rates in the south and east Mediterranean countries are higher than those of the EU Mediterranean countries. However, they are considered low when compared to the population growth rates, as the demographic growth is still high in the southern

Mediterranean countries. In 2021, the average income per capita in the South and East Mediterranean countries (10 000$) is more than 4 times lower than the average income in the EU Mediterranean countries (40 000$). The share of the Mediterranean GDP in the world GDP is decreasing: from 14.1% in 2000 to 12.6% in 2010, 11.3% in 2018 and 8% in 2021. This value is to consider with attention because the GDP per inhabitant has increased since 2018 for all of the Mediterranean countries (except for Lebanon, Libya and The Syrian Arab Republic) but less than the other countries in the world. Meanwhile, the share of the Mediterranean population remains constant in the world population (about 7%).

Precautions / Notes:

- By using PPP rather than the exchange rate, the GDP per capita of a country, calculated in units of national currency, can be converted into GDP per capita in dollars, while taking into account the differences in domestic prices for the items being considered (PPP gives the value of a typical basket of goods in different countries).
- Figures are based on constant 2010 USD for the period 2010-2015 and constant 2015 USD for the period 2015-2021.

Source: World Bank national accounts data and Organisation for Economic Cooperation and Development National Accounts data files, 2021.

f) Indicator 4: Youth literacy rate

Definition: Literacy rate between ages 15 to 24 is presented as a percentage of the total population of this age group. People are considered literate when they can read, write, and understand a short simple article concerning their daily life (Millennium Indicator n°8). This indicator is linked to the SDG Indicator 4.6.1: Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex.

Analytical part : Access to primary education is a key issue for the UNESCO « Education for All » programme as well as for the Sustainable Development Goal 6*.The literacy rate of young adults reflects the primary education received in the previous decade. This objective has been taken up in the MSSD for all the young adults, by stressing its importance in rural areas and for girls in order to reduce the disparities yet significant in the Mediterranean. Since 1990, the literacy rate of young adults has increased significantly in all of the southern and eastern Mediterranean countries and is satisfactory in most of the northern Mediterranean countries. The ratio of the literacy rate of girls compared to boys less than 1 indicates a lack of education for girls. The rate is less than 0.99 in Egypt and The Syrian Arab Republic.

Precautions / Notes: Measurement of literacy can vary from a simple question “Can you read and write?” to various evaluation tests to assess the levels of literacy. In some cases, literacy is roughly measured in censuses with self-report or by estimating the population not attending school or uneducated. The definitions of literacy used in the national surveys often differ from that of UNESCO. The types of survey carried out in different countries to estimate the literacy rate are also different from one another and from year to year. The data resulting from these surveys should, therefore, be considered with caution.

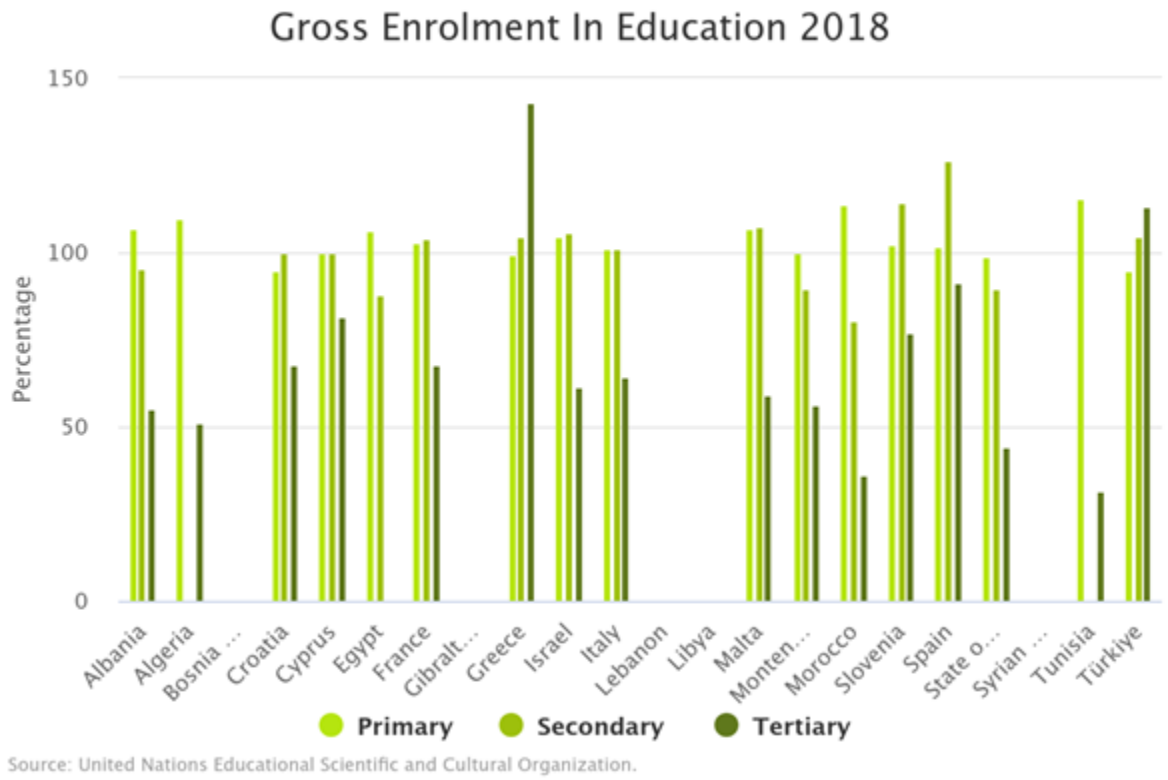
*This indicator is no longer a priority criteria put forward by UNESCO. Only 9 Mediterranean countries are covered by this indicator in 2021, whereas in 2019 the data existed for 20 countries.

Source: United Nations Educational, Scientific and Cultural Organization Institute for Statistics, 2021.

g) Indicator 5 : Girl/Boy primary, secondary and tertiary school registration ratio

Definition : This indicator is the parity index between girls and boys for the gross enrolment rate (primary, secondary and combined) defined by UNESCO. It refers to the number of girls enrolled in primary and secondary schools, in public and private schools compared to the number of boys.

The gross enrolment rate is the ratio of the number of students enrolled in schools at different grade levels (such as elementary, middle school and high school), regardless their age, and is expressed as a percentage of the population in the official age group corresponding to this level of education.



Source: United Nations Educational Scientific and Cultural Organization.

Analytical part: Education and gender equality are central concerns in the new sustainable development agenda. The Education 2030 Framework for Action, agreed by the global education community in November 2015 to accompany the SDG agenda, recognizes that gender equality is inextricably linked to the right to education for all, and that achieving gender equality requires an approach that « ensures that girls and boys, women and men not only gain access to and complete education cycles, but are empowered equally in and through education». In 2018, the enrolment rate in primary education is over 99% in most Mediterranean countries except in The State of Palestine (98.6%), Türkiye (94.9%) and Croatia (94.6%). In secondary education the gross enrolment rate is over 95% in 11 countries.

In 2020 the terminology changed: from “primary, secondary, tertiary” to early “childhood, pre-primary, tertiary”. The analysis is not possible.

Précaution /notes: This indicator is not an accurate measurement of school access for girls because the improvements of the report may reflect an increase enrolment of girls receiving education or a decrease in the case of boys. The gross enrolment rate could be over 100% because of late admission and/or because of repletions.

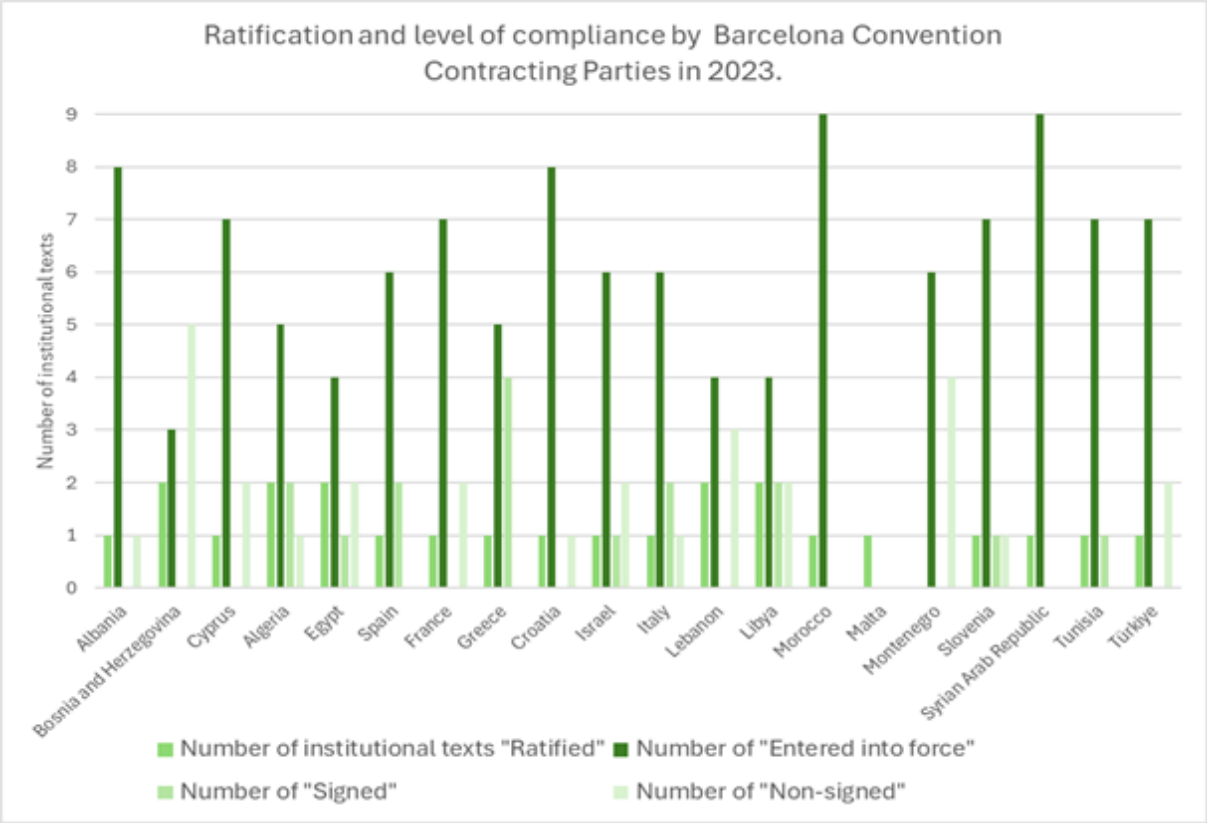
Source: United Nations Educational, Scientific and Cultural Organization Institute for Statistics, 2020. United Nations Educational, Scientific and Cultural Organization, Global education monitoring report summary, 2020: Inclusion and education: all means all.

2. Sea and Coasts

a) Indicator 6: Number of ratifications and level of compliance as reported by Barcelona Convention Contracting Parties

Definition: The signature qualifies the signatory state to proceed to ratification, acceptance or approval. It also creates an obligation to refrain, in good faith, from acts that would defeat the object and the purpose of the convention. Ratification defines the international act whereby a state indicates its consent to be bound to a convention if the parties intended to show their consent by such an act. Entry into force of an international convention takes place when it becomes legally binding on the parties. The parties have to decide to apply for the convention.

Analytical part:



The Convention for the Protection of the Mediterranean Sea Against Pollution was adopted on 16 February 1976 and entered into force on 12 February 1978. The original Convention has been modified by amendments and the "Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean" was adopted on 10 June 1995 and entered into force on 9 July 2004.In 2023 (compare to 2019):

- 1 Contracting Party (Malta) has signed and entered into force the ICZM protocol (in 2019)
- 1 Contracting Party (B & H) has signed and entered into force the Barcelona Convention (in 2020)

Precautions / Notes: This indicator is very complex and provides only an overview of the status. All details can be found in the official documents of the Convention. A country can implement a protocol without signature and it can take more protective measures.

Source: United Nations Environment Programme/Mediterranean Action Plan, 2023.

b) Indicator 7: Coverage of protected areas in relation to marine territorial waters (SDGs indicator 14.5.1)

Definition: Indicator 14.5.1: Coverage of protected areas in relation to marine areas shows temporal trends in the mean percentage of each important site for marine biodiversity (i.e., those that contribute significantly to the global persistence of biodiversity) that is covered by designated protected areas. In the Mediterranean, "Marine Protected Area" (MPA) is understood as any marine and/or coastal area (including lagoons that are permanently linked to the sea) that has been put under protection generally by legal means for the conservation of natural habitats, species or specific natural features as its prime purpose. It thus includes a wide range of areas, established under various designations, at various levels (subnational, national, regional or even international), and providing various degrees of protection. "Other Effective area-based Conservation Measures" (OECMs), originates from the Convention on Biological Diversity to also indicate protection designations, although there is no clear international guidance as to how the term applies.

Analytical part: The 1,233 MPAs and OECMs cover 9% (226,665 km²) of the Mediterranean (2,516,900 km²) through a large variety of conservation designations. Over 70% of the surface covered is located in the Western Mediterranean. Designations cover more than 10% of European waters due to national MPAs and to the Natura 2000 at sea network which rarely affords strict restrictive measures. The declaration of the Spanish Cetacean Corridor MPA, on 30 June 2018, has revitalized the process of protecting Mediterranean marine areas. One of the main objectives of this MPA of 42,262.82 km² along the east coast of Spain is to avoid, mitigate and reduce anthropogenic underwater noise. The enlargement of the Cabrera National Park (43,070.55 km², also in Spain), officially recognized in January 2019, extends the dynamic of protecting the Mediterranean. Now to reach the quantitative Aichi Target of 10% coverage, an additional 25,025 km² (1% of the Mediterranean) would need to be placed under strong protection designations. Beyond the coverage figures, clear action plans must accompany the establishment of MPAs and OECMs in order to improve their management effectiveness.

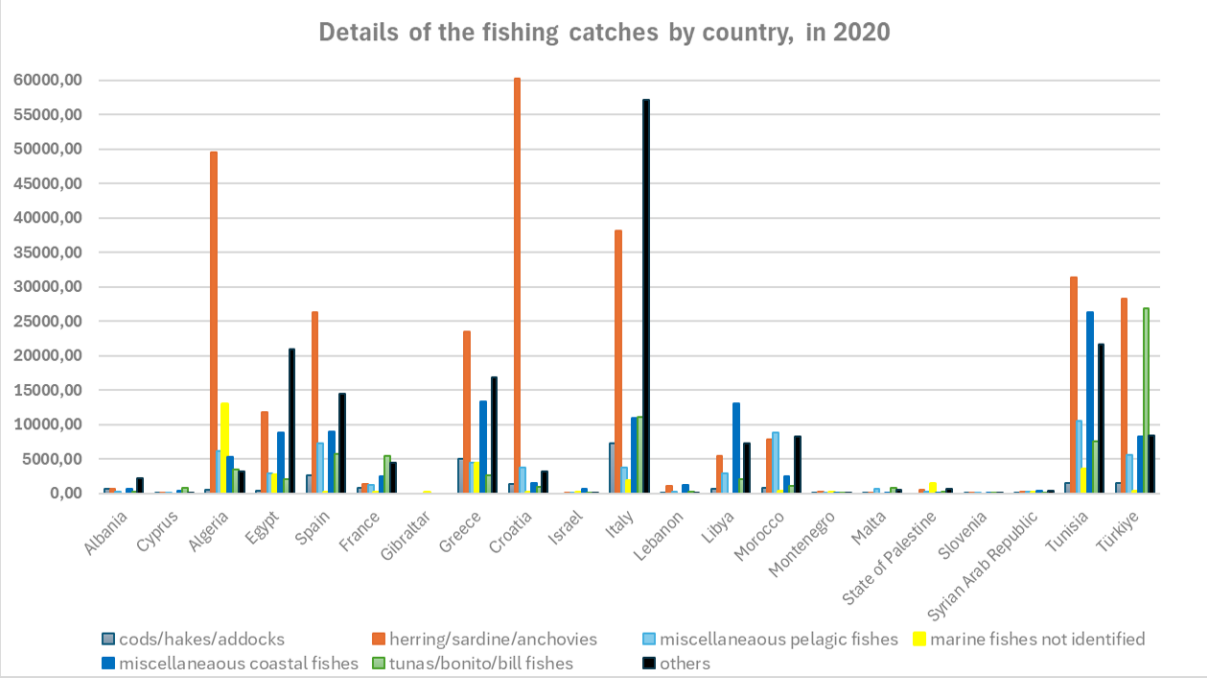
Precautions / Notes: The indicator is used to track progress towards the 2011–2020 Strategic Plan for Biodiversity and was used as an indicator towards the Convention on Biological Diversity's 2010. Some discrepancies could be due to the numerous types of protected areas and their overlapping.

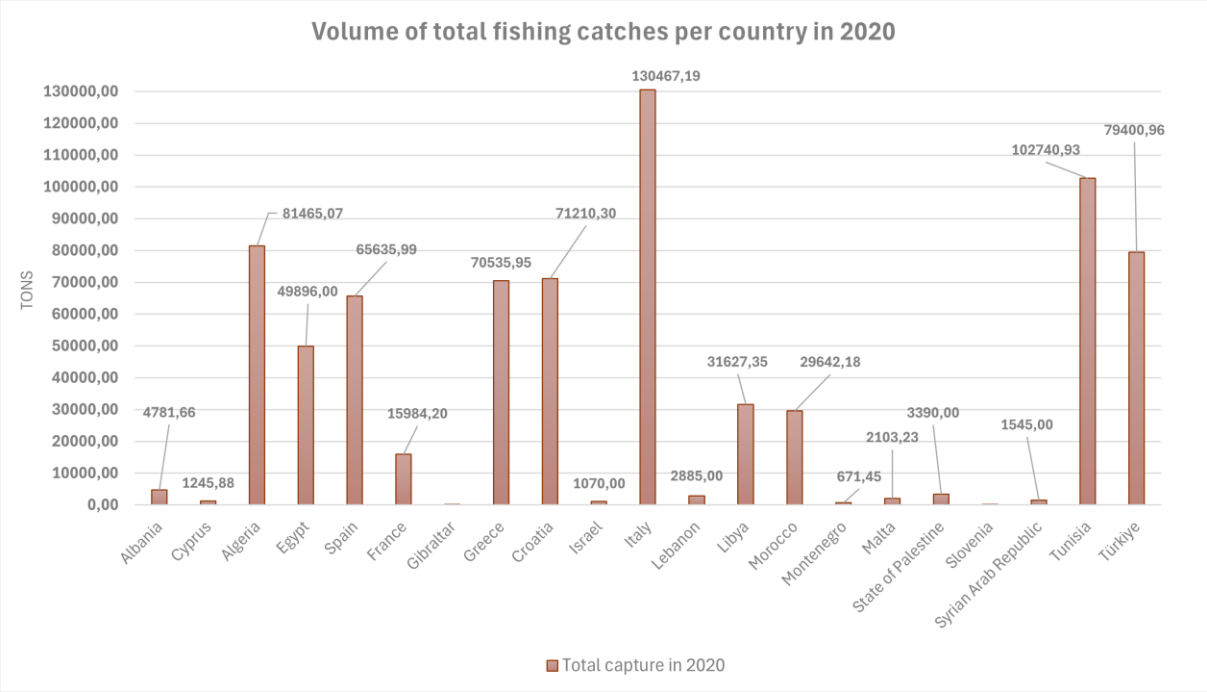
Sources: MAPAMED, the database on Sites of interest for the conservation of marine environment in the Mediterranean Sea. MedPAN, UNEP/MAP/SPA-RAC. 2019 release. United Nations Environment Programme/Mediterranean Action Plan and Plan Bleu (2020), State of the Environment and Development in the Mediterranean, Nairobi.

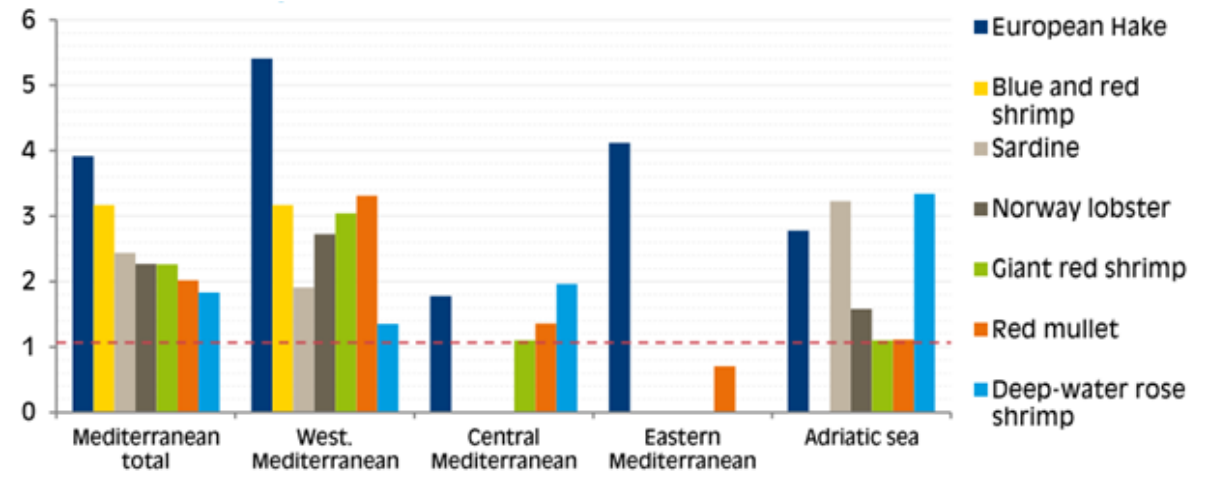
c) Indicator 8: Proportion of fish stocks within biologically sustainable levels (SDG Indicator 14.4.1)

Definition: Indicator 14.4.1: Proportion of fish stocks within biological sustainable levels (not overexploited). This indicator measures the sustainability of the world's marine capture fisheries by their abundance. It is classified Tier I (conceptually clear, internationally established methodology and standards are available, and data are regularly produced by countries). A fish stock of which abundance is at or greater than the level that can produce the maximum sustainable yield is classified as biologically sustainable. The maximum sustainable yield (MSY), is the highest theoretical equilibrium yield that can be continuously taken (on average) from a stock under existing (average) environmental conditions without significantly affecting the reproduction process.

Analytical part:







Source: GFCM, SoMFI 2020, 2020. (Based on assessments realized between 2007 and 2019)
(1 = fishing mortality rate allowing maximum sustainable yield; Higher value = overexploited stock)

Most stocks for which validated assessments are available continue to be fished beyond biologically sustainable limits. Nevertheless, in the Mediterranean (and Black Sea), recent trends continue to show a consistent decrease of overexploited stocks, especially since 2014:

- The **overexploitation of stocks** has decreased over the past decade, with an accelerated reduction of fishing pressure in the last two years, particularly for key species under management plans. However, most commercial species are still overexploited, and fishing pressure is still double what is considered sustainable.
- Status of Mediterranean and Black Sea **commercial marine living resources and vulnerable species groups**: most commercial stocks (73%) are fished outside biologically sustainable limits, and fishing pressure is still twice the level considered sustainable (F/FMSY = 2.25). However, fishing pressure in the Mediterranean and the Black Sea has decreased on average by 21% over the last decade and, for certain priority species subject to management measures, by as much as 75%.
- Although it continues to improve, scientific advice on the status of resources in relation to biomass is scarcer than advice with respect to fishing mortality.

In the Mediterranean, the total capture decreased from 801,000t to 746,000t between 2019 and 2020. Among the 10 major fishing countries in the Mediterranean Sea (annual catch > 20,000 tonnes), Türkiye has seen the largest increase in tons* (+42%) in 1 year (2019-2020), while Italy has seen the largest decrease (-26%). Half of the Mediterranean countries caught* less than 5,000t in 2020, while Italy captured 130,000t, Tunisia 103,000t and Algeria 81,000t (-19.000t in 1 year).

Precautions / Notes: The number of GFCM's assessments validated differs a lot depending on years and Geographical Subareas (GSA) (e. g.: 27 in 2007 and 53 in 2018 for the entire Mediterranean). This could lead to misleading exploitation ratio means. "Priority species" are important species in terms of landings and/or economic value at the regional and subregional levels. On the map, the "Other" category represents all fish species whose catches from 1970 to 2018 represent less than 500,000 tonnes in total. Fisheries catches are considered as the total live weight caught during fishing, whereas landings represent the weight landed as recorded at the time of landing. The difference between both can be explained by discarded catch, losses in handling or other reasons.

d) Indicator 8b

Definition: Indicator 14.4.1: Proportion of fish stocks within biological sustainable levels (not overexploited). This indicator measures the sustainability of the world's marine capture fisheries by their abundance. It is classified Tier I (conceptually clear, internationally established methodology and standards are available, and data are regularly produced by countries). A fish stock of which abundance is at or greater than the level that can produce the maximum sustainable yield is classified as biologically sustainable. The maximum sustainable yield (MSY), is the highest theoretical equilibrium yield that can be continuously taken (on average) from a stock under existing (average) environmental conditions without significantly affecting the reproduction process.

Precautions / Notes: The number of GFCM's assessments validated differs a lot depending on years and Geographical Subareas (GSA) (e. g.: 27 in 2007 and 53 in 2018 for the entire Mediterranean). This could lead to misleading exploitation ratio means. "Priority species" are important species in terms of landings and/or economic value at the regional and subregional levels. On the map, the "Other" category represents all fish species whose catches from 1970 to 2018 represent less than 500,000 tonnes in total.Fisheries catches are considered as the total live weight caught during fishing, whereas landings represent the weight landed as recorded at the time of landing. The difference between both can be explained by discarded catch, losses in handling or other reasons.

Sources: United Nations Food and Agricultural Organization/General Fisheries Commission for the Mediterranean, Capture production database, 2022; FAO/GFCM, The State of the Mediterranean and Black Sea Fisheries 2020, 2022.

3. Rural and Resources

a) Indicator 9a: Number of protected areas participating in the Green List initiative

Definition: The IUCN Green List is one of the flagship initiatives included in the MSSD to measure the effectiveness of the protected areas management in the Mediterranean region. The IUCN 'Green List of Protected and Conserved Areas' (GLPCA) is a global programme to encourage, achieve and promote effective, equitable and successful protected and conserved areas. To be added to the Green List, protected and conserved areas have to show that they meet the indicators of the GLPCA Standard by means of an independent evaluation.

Analytical part: The Green List of Protected and Conserved Areas has been recognized as a Flagship Initiative under the Mediterranean Strategy for Sustainable Development 2016- 2025, adopted during the 19th meeting of the Contracting Parties to the Barcelona Convention. To integrate the Green List, sites have to demonstrate fair and transparent sharing of the costs and benefits of conservation, effective management and long-lasting conservation outcomes. Since 2019 to date (2023), 7 protected areas from North Africa were proposed for the Green List of Protected Areas:

- 2 in Morocco (National Park of Toubkal, National Park of Ifrane)
- 2 in Algeria (Habibas Island, Theniet El Had National Park)
- 3 in Tunisia (National Park of El Feija, National Park of Jebel Serj and Kuriat Islands).

In 2021, in France 7 new sites have been listed and 9 have been proposed (candidates) while in Italy 3 new sites have been listed and 3 have been proposed (candidates). In 2021, out of the 61 (13 more than in 2019) sites worldwide, 29 (10 more than 2019) are in countries with a Mediterranean shore, 11 (4 more than in 2019) sites are located within

the 100-km coastal strip and only 2 sites are located on the Mediterranean coast (Marine natural reserve of Cerbère – Banyuls and Côte Bleue Marine Park, both in France).

Precautions / Notes: At the moment, only a few Mediterranean countries are concerned by the IUCN Green List Programme, which was launched in 2013. The map and graph summarize the situation of all Green List sites of the Mediterranean countries (except 3 overseas French sites). The analysis should be focused on Mediterranean sites but there are only few at the moment.

Sources: International Union for Conservation of Nature, Green List areas, 2021. International Union for Conservation of Nature, centre for Mediterranean cooperation, Annual report 2021.

b) Indicator 9b: Green List Initiative project phases

Definition: The IUCN Green List is one of the flagship initiatives included in the MSSD to measure the effectiveness of the protected areas management in the Mediterranean region. The IUCN 'Green List of Protected and Conserved Areas' (GLPCA) is a global programme to encourage, achieve and promote effective, equitable and successful protected and conserved areas. To be added to the Green List, protected and conserved areas have to show that they meet the indicators of the GLPCA Standard by means of an independent evaluation.

The « pilot phase » of the Green List Programme began in 2013, to test the Green List in 8 countries including France, Italy and Spain. The second phase of the Programme, called « Development phase » began in mid-2015.

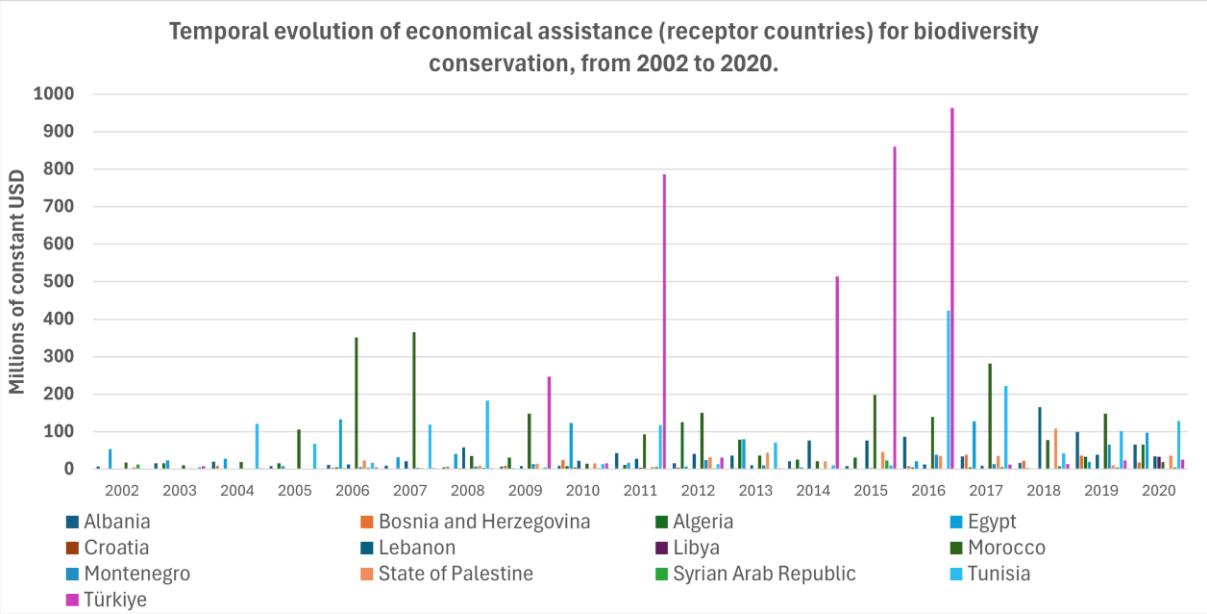
Precautions / Notes: At the moment, only a few Mediterranean countries are concerned by the IUCN Green List Programme, which was launched in 2013. The map and graph summarize the situation of all Green List sites of the Mediterranean countries (except 3 overseas French sites). The analysis should be focused on Mediterranean sites but there are only few at the moment.

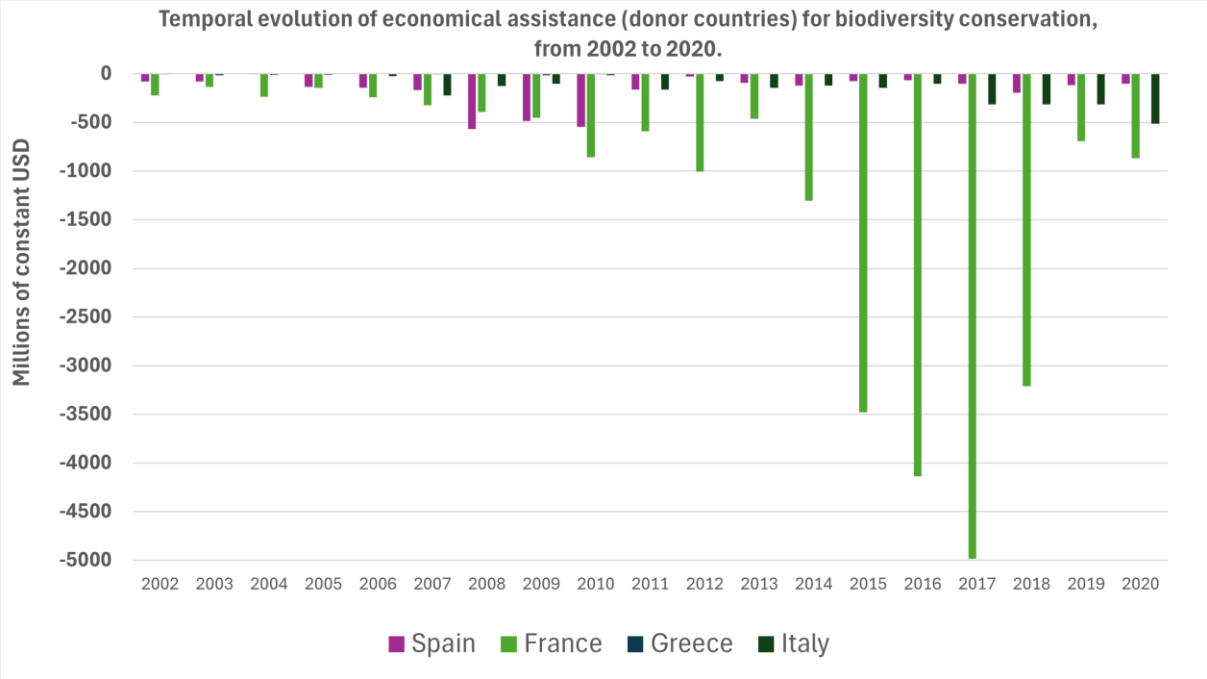
Sources: International Union for Conservation of Nature, Green List areas, 2021. International Union for Conservation of Nature, centre for Mediterranean cooperation, Annual report 2021.

c) Indicator 10: Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems (SDG Indicator 15.a.1)

Definition: SDG Indicator 15.a.1 deals with official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems. The goal is to mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.

Analytical part:





Development assistance and public expenditure for biodiversity and ecosystem protection vary largely across time and space. These variations can be explained by the fact that funding is made available mostly on a project basis which is limited in time. Thus, large budgets can be available for a country during a limited period of time but are usually not sustained in the long term. In 2020, total official development assistance for biodiversity received in the Mediterranean region (9 countries) was about 459 million constant 2020 US dollars (in 2018 it was about 350 million constant 2018 US dollars), equivalent to 1.4 dollars per capita (1.1 dollars per capita in 2018).Tunisia received about a quarter of this amount (129 million of dollars), equivalent to 10.60 dollars per capita, and The Syrian Arab Republic received about 4.7 million dollars (0.04 dollars per capita). 5 EU Mediterranean countries are donors for about 1.483 million US dollars (in 2020) and the amount for France accounts for 58% (867 million dollars).

Precautions / Notes: This indicator is available for recipient countries and for donor countries. The information shown for the monitoring of this indicator refers to the "Total official development assistance for biodiversity". The official development assistance for biodiversity is covered by irregular time series and needs to be analyzed over a period of time. The current data does not allow us to make an assessment of the spatial distribution of funds in comparison to the spatial distribution of pressures on biodiversity and ecosystems (are the funds allocated at the right places?). This indicator should be further explored and improved with additional information in order to allow deducting indications about the effectiveness of the funds (what level of protection is achieved with the available amounts?) and to be able to assess the capacity of the available funding to safeguard Mediterranean ecosystems and biodiversity (are the amounts sufficient?).

Source: The Organisation for Economic Co-operation and Development (OECD), Creditor Reporting System database, 2020.

d) Indicator 11: Global Food Security Index

Definition: The 1996 World Food Summit defined food security as the state in which « all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life ». The Global Food Security Index (GFSI) was developed by the experts of the Economist Intelligence Unit in order to measure food security considering 3 core issues: affordability, availability and quality of food:

- Affordability measures « the ability of consumers to purchase food ».
- Availability measures « the sufficiency of the national food supply».
- Quality and safety measures « the variety and nutritional quality of average diets, as well as the safety of food ».

Analytical part: Physical access to food products depends on their availability as well as their affordability. However physical access is not sufficient to guarantee food security, which also depends on the quality of people's diet. Good or satisfactory levels of food security have been reached mainly in the North. Nevertheless, external food dependency is still important in the South and East. Limited natural resources (available water and soil resources), population growth and climate change pressures (more severe drought and storms) are preventing self-sufficiency. Moreover, regional conflicts threaten national stability (internal production and international trades) and price volatility can harm vulnerable economies with limited public finances. In 2022, in most Mediterranean countries (except in France, Spain, Israel, Italy, Greece), food affordability rates are higher than availability rate. In these countries, improving food production and farmers income is necessary for better food security. On the contrary, where food affordability is lower, improving employment and income should have a positive effect on food security. Food quality is also an issue in the Mediterranean area, due to several factors, such as poor access to potable water, low diet diversification, progressive abandonment of the traditional Mediterranean diet, or lack of nutrients in people's diet:

Precautions / Notes: Data is available for 11 Mediterranean countries. Across all indicators used for the construction of the Global Food Security Index, where data is missing, the Economist Intelligence Unit has estimated the scores. The global calculation methodology of the indexes changed from 2019, and comparison must be done with care.

Source: Global Food Security Index, The Economist Intelligence Unit, 2022.

e) Indicator 12: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (SDG Indicator 6.4.2)

Definition: SDG Indicator 6.42: The level of water stress: freshwater withdrawal as a proportion of available freshwater resources is the ratio between total freshwater withdrawal by all major sectors and total renewable freshwater resources, after taking into account environmental water requirements. Main sectors, as defined by International Standard Industrial Classification (ISIC) standards, include agriculture; forestry and fishing; manufacturing; electricity industry; and services. This indicator is also known as water withdrawal intensity.

Analytical part:

SDG Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. The total renewable water resources in the Mediterranean region amount to 1,085,24 Km^3 (Aquastat database. FAO, 2019). The distribution and availability of these freshwater resources are uneven between the sub-regions of the Mediterranean, as 80% are located in the Northern sub-region, 20% in the South and the East part of the Mediterranean, of which 19.4% in Turkey or France. The range of the water stress in the Mediterranean countries is wide: from 10% (even less) in the Balkans to 100% and more in the Southern countries. In Libya, the water stress is over 817% (more than 8 times the available resources). The situations within countries are also very diverse, it is essential to provide a clear picture of the Mediterranean watersheds, which requires data from national institutions.

Precautions / Notes: Differences might occur due to the following, amongst others: For national estimates incoming water is counted as being part of the country's available water resources, while global estimates can only be done by adding up the internal renewable water resources (water generated within the country) of all countries in order to avoid double counting. Non-official withdrawals, especially for agriculture use which could represent a large part of the total withdrawals, are not considered.

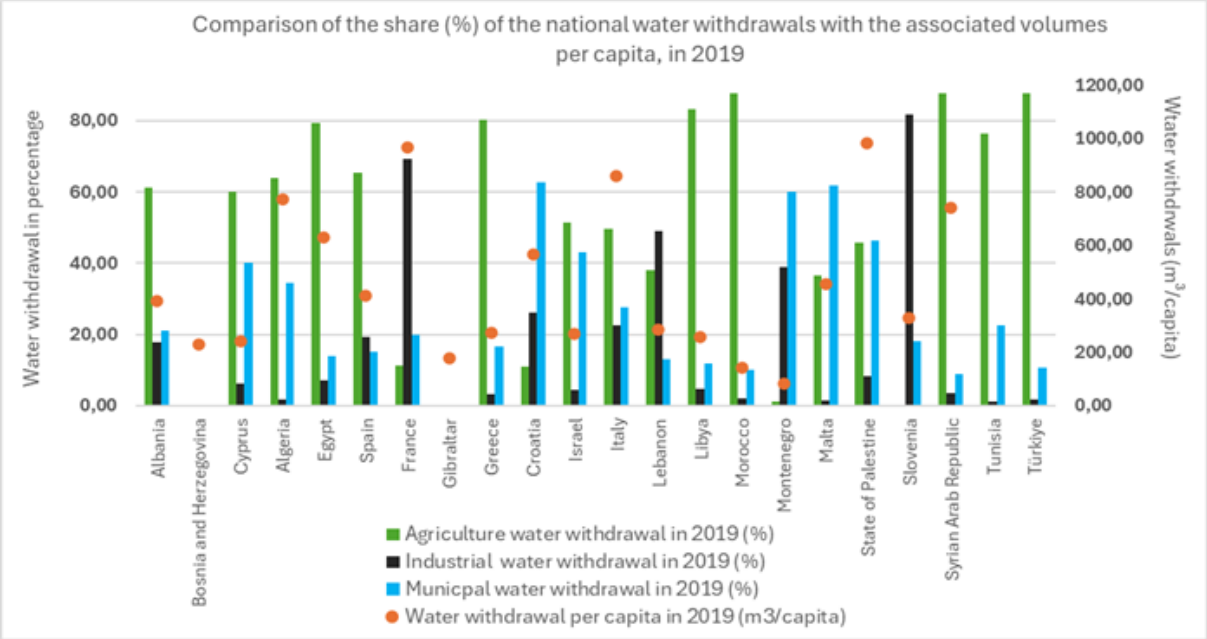
Source: FAO. 2020. AQUASTAT Main Database - Food and Agriculture Organization of the United Nations (FAO), United Nations Global SDG Database, 2020 update.

f) Indicator 13: Water withdrawal per capita in 2019

Definition: Total water demand is defined as the sum of the volume of water mobilized to meet the various uses, including the quantities lost in production, transport and use of water. It corresponds to the sum of the water withdrawals, of non-conventional production (desalination, reuse of water, etc.) and of imports less exports.

Water productivity is an indication only of the efficiency by which each country uses its water resources. Given the different economic structure of each country, this indicator should be used carefully, taking into account a country's sectorial activities and natural resource endowments.

Analytical part:



Water use has been increasing worldwide by about 1% per year since the 1980s and Agriculture (including irrigation, livestock and aquaculture) is by far the largest water consumer, accounting for around 70% of annual water withdrawals globally. Industry (including power generation) accounts for around 20% and households for around 10%.Better water demand management, especially for agriculture, is one of the priority actions recommended by the Mediterranean Strategy for Sustainable Development. This means stabilizing water demand (decrease in the north and a controlled increase in the south and the east). Moreover, the water demand and the growth in GDP should also be decoupled by increasing the water productivity. From 2002 to 2019, only 40% of the Mediterranean countries have increased their water productivity. In 2019, 5 countries were over 100 dollars per cubic meter whereas 12 countries remained under 50 dollars. The share of water for agriculture remains high, often higher than 50% in half of the Mediterranean countries and between 83 and 87% in The Syrian Arab Republic, Morocco, Türkiye, Libya. In some Balkan countries and in France the relative water demand for agriculture is low. The share of water for industry stays low, less than 20% in most countries. Except in Slovenia (81%) and France (69%, mainly for cooling water) have the highest rates. Mediterranean water withdrawals will be increasingly affected by climate change in multiple ways. Sustainable management of water resources, already under severe pressure in the region, will be more challenging. That could lead to major threats for societies as risks for energy production, food security, economic development and social inequalities.

Precautions / Notes: The most recent year available for each country was kept. Water withdrawals are used as estimates of water demand when water demand data is not available in international sources. Support from national institutions dealing with water is required to improve data collection and allow refining the indicator for the Mediterranean watersheds. For agriculture, the indicator could be refined by calculating the ratio between irrigation water demand and the value added of irrigated production.

Source: Food and Agriculture Organization-Aquastat, Main Database, 2020; UNWATER: UN World Water Development Report 2020: Water and climate change.

g) Indicator 14: Proportion of population (in %) using safely managed drinking water service (SDG Indicator 6.1.1)

Definition: SDG Indicator 6.1.1: Proportion of population using safely managed drinking water services is currently being measured by the proportion of population using an improved basic drinking water source which is located on premises, available when needed and free of fecal (and priority chemical) contamination. 'Improved' drinking water sources include: piped water into dwelling, yard or plot; public taps or standpipes; boreholes or tubewells; protected dug wells; protected springs; packaged water; delivered water and rainwater.

Analytical part:

- SDG Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- The WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene is in charge of the data compilation for this indicator in continuation of the Millennium Development Goals.
- In 2020, 74% (71% in 2017) of the global population (5.8 billion people) used a safely managed drinking water service; that is, one located on premises, available when needed and free from contamination.
- Estimates for the proportion of population using safely managed drinking water are available for around 125 countries.

Estimates are available only for 16 countries in the Mediterranean region and there is no data for most of the Southern and Eastern countries. Among the 16 countries where data is available, 96% to 100% of 8 countries' population have access to safely managed drinking water services in 2020.Lebanon is the country the most at risk since only 48% of the population has access to safely managed drinking water services in 2020.

Precautions / Notes: With regards to the years 2000, 2010 and 2017 the data shows the proportion of population (in thousands of inhabitant) without access to safely managed drinking water service while with regards to 2020 the data shows the proportion of population (in %) using safely managed drinking water service. In order to meet the standard for safely managed drinking water, a household must use an improved source type that meets three criteria:

- the facility should be accessible on premises (located within the dwelling, yard or plot);
- Water should be available when needed (sufficient water in the last week or available for at least 12 hours per day);
- Water supplied should be free from contamination (compliant with standards for fecal and priority chemical contamination).

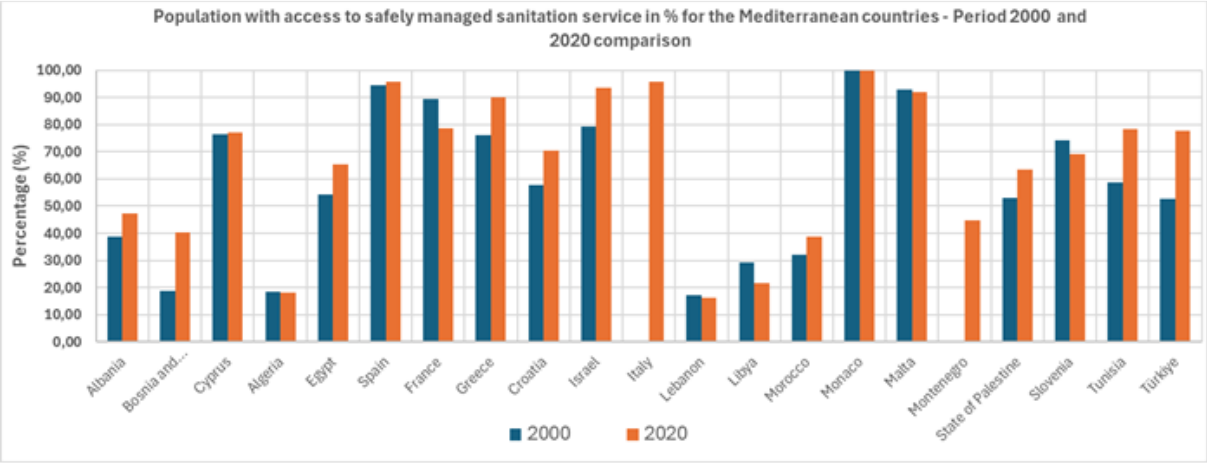
Joint Monitoring Programme (JMP) updates have also highlighted inequalities between rural and urban areas, between rich and poor, and between other groups and the general population.

Source: World Health Organization/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (2020).

h) Indicator 15: Proportion of population using safely managed sanitation services (SDG Indicator 6.2.1)

Definition: SDG Indicator 6.2.1: The Proportion of population using safely managed sanitation services is currently being measured by the proportion of the population using a basic sanitation facility which is not shared with other households and where excreta is safely disposed in situ or treated off-site. 'Improved' sanitation facilities include: flush or pour flush toilets to sewer systems, septic tanks or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets.

Analytical part:



- SDG Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.
- The WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene is in charge of the compilation of this indicator in the continuation of the Millenium Development Goals. JMP will continue to track the proportion of the population with access to a basic sanitation system for disposal of human excrement of households or the immediate neighborhood (public wastewater network, septic tanks, etc.).

- Worldwide, in 2021, 46% of the global population (3.6 billion people) lacked “safely managed sanitation” – meaning access to a toilet or latrine that leads to treatment or safe disposal of excreta.
- In 2020, estimates are available for 20 countries in the Mediterranean region. The population using safely managed sanitation services was less than 22% in Algeria, Lebanon, Libya and less than 50% in Albania and Morocco.

Wide disparities still exist in 2020. 5 countries have at least 90% of their population using safely managed sanitation services whereas 2 others have less than 50% (in Albania and Morocco) and even 3 others have less than 22% (in Algeria, Lebanon, Libya). The percentage of population with safely managed sanitation services increased from about 58 % in 2000 to reach about 67% in 2020.

Precautions / Notes: This data, however, may reflect installed treatment technology rather than actual performance, overestimating safe management. Furthermore, not all excreta from households with sewer connections actually connect with a sewer line and reach a wastewater treatment plant.

Source: World Health Organization/United Nations Children's Fund (UNICEF), Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, 2020

i) Indicator 16a: Proportion of agriculture quality products and Share of the agricultural land area used by organic farming

Organic farming growth rate

Definition: This indicator measures the evolution of the number of organic farms in the Mediterranean countries, as well as the share of agricultural land used by organic farming. Organic areas: certified organic land/areas that are fully converted as well as land under conversion. “Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved." (IFOAM). Sustainable agriculture allows guaranteeing food security, protecting human health and preserving ecosystems. Organic farming is an efficient way to assess the path of countries toward SDG Target 2.4 (sustainable food production systems, resilient agricultural practices, ecosystems maintained, adaptation to climate change, land and soil quality improved).

Analytical part:

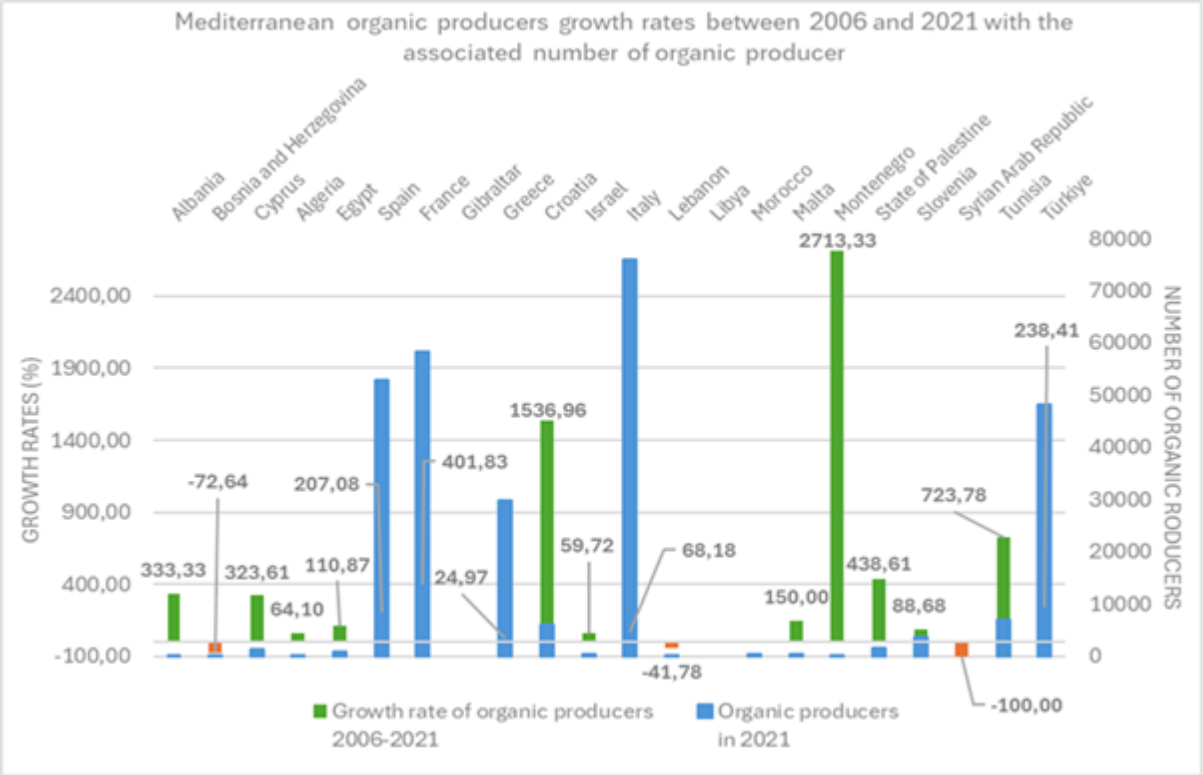
Proportion of agriculture quality products

Besides, organic farming has become one of the most dynamic agricultural sectors in the European Union, with 14,7 million hectares in 2020 (+0.9 billion of hectares since 2018), i.e. 9.36% of agricultural land (+1.6% since 2017). Organic farming area is unprecedentedly booming (more than x 4 times since 2000, in a majority of countries) but still only covers less than 5% of the agricultural land in 2020. In 2019, France and Spain were among the world’s top ten countries with the highest increase of organic land.

Source: Research Institute of Organic Agriculture FiBL, The World of Organic Agriculture 2021.

j) Indicator 16b - Organic producer

Definition: This indicator measures the evolution of the number of organic farms in the Mediterranean countries, as well as the share of agricultural land used by organic farming. Organic areas: certified organic land/areas that are fully converted as well as land under conversion. “Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved." (IFOAM). Sustainable agriculture allows guaranteeing food security, protecting human health and preserving ecosystems. Organic farming is an efficient way to assess the path of countries toward SDG Target 2.4 (sustainable food production systems, resilient agricultural practices, ecosystems maintained, adaptation to climate change, land and soil quality improved).



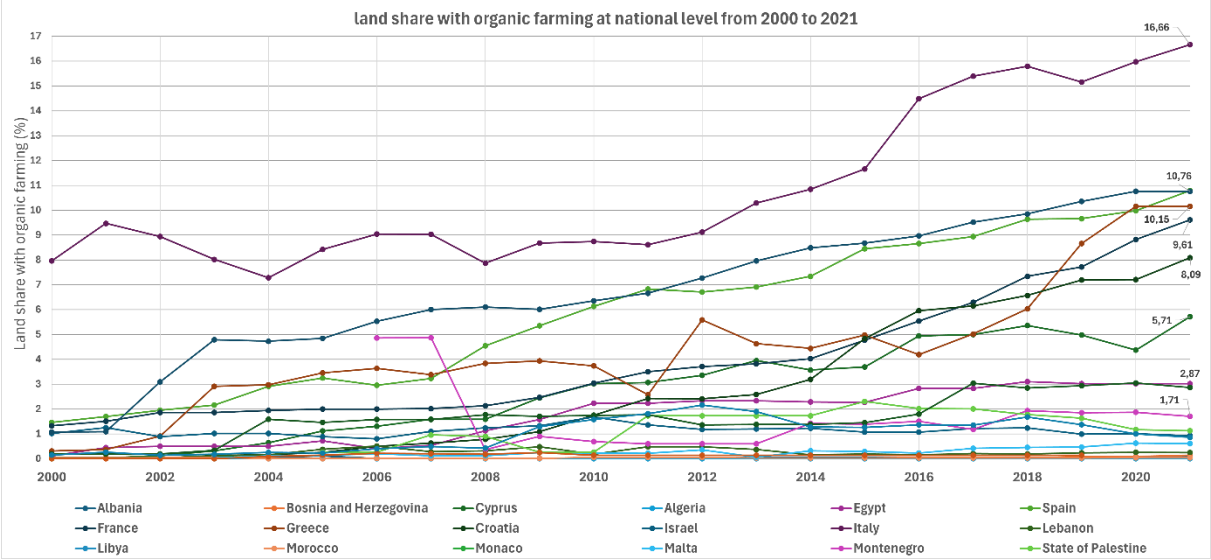
The number of organic producers continues to increase with about + 5000 from 2018 to 2021 reaching 287,588 producers in 2021. Italy is in the worldwide top ten countries. Some countries have seen the numbers of their organic producers increasing significantly (France, Spain, Italy, Croatia) but others faced significant decreases like Tunisia, Slovenia but above all Türkiye (-35% from 2018 to 2021).

Precautions / Notes: The number of producers is probably higher than the published number because the number of small producers is not reported by some countries.

Source: Research Institute of Organic Agriculture FiBL, The World of Organic Agriculture 2021.

k) Indicator 16c - Land share of organic farming

Definition: This indicator measures the evolution of the number of organic farms in the Mediterranean countries, as well as the share of agricultural land used by organic farming. Organic areas: certified organic land/areas that are fully converted as well as land under conversion. “Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved." (IFOAM). Sustainable agriculture allows guaranteeing food security, protecting human health and preserving ecosystems. Organic farming is an efficient way to assess the path of countries toward SDG Target 2.4 (sustainable food production systems, resilient agricultural practices, ecosystems maintained, adaptation to climate change, land and soil quality improved).



Analytical part:

The share of agricultural land used by organic farming is rising in most Mediterranean countries. In 2021, in Italy, this share reached up to more than 16.5% while it is lower than 4% in 4 countries and even less than 1% in 8 countries. Italy, Slovenia, Spain and Greece are in the first positions in the Mediterranean region for their share of organic farming, and ranked respectively 9 th, 15 th, 19th and 20th worldwide in terms of proportion of agricultural land used for organic farming.

Source: Research Institute of Organic Agriculture FiBL, The World of Organic Agriculture 2021.

l) Indicator 17a: Red List Index

Definition: SDG Indicator 15.5.1 Red List Index: It measures change in aggregate extinction risk across groups of species. It is based on genuine changes in the number of species in each category of extinction risk on The IUCN Red List of Threatened Species (IUCN 2015). It is expressed as changes in an index ranging from 0 to 1. A Red List Index value of 1 would indicate that biodiversity loss has been halted. A decreasing Red List Index value would indicate that extinction risk is increasing.

SDG Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species. The Red List Index represents an index of aggregate survival probability (the inverse of extinction risk) for all birds, mammals, amphibians, corals and cycads occurring within the region, weighted by the fraction of each species' distribution occurring within the region. It shows how adequately species are conserved or not in the region relative to its potential contribution to global species conservation. *In 2022, the value of the Red List Index in the Mediterranean countries is above the world value 0.83 except for Israel, Monaco and Montenegro. The Red List Index is above 0.9 in 10 Mediterranean countries. From 2010 to 2022, the Red List Index is decreasing mainly in 4 countries: Albania, Algeria, France and a little bit in Malta, Libya, Lebanon, Montenegro.*

Precautions / Notes: The main limitation of the Red List Index is related to the fact that the Red List Categories are relatively broad measures of status, and thus the Red List Index for any individual taxonomic group can practically be updated at intervals of at least four years. As the overall index is aggregated across multiple taxonomic groups, it can be updated typically annually. In addition, the Red List Index does not capture particularly well the deteriorating status of common species that remain abundant and widespread but are declining slowly.

Source: International Union for Conservation of Nature (www.iucn.org), The IUCN Red List of Threatened Species. Version 2020-2, 2022.

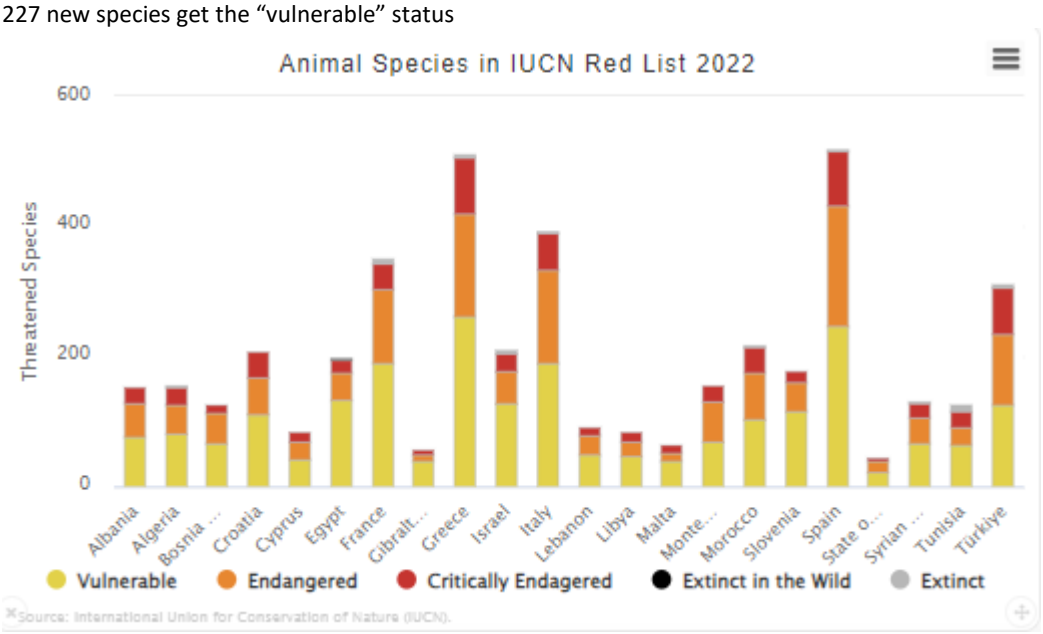
m) Indicator 17b: Animal species in IUCN Red List

Definition: SDG Indicator 15.5.1 Red List Index: It measures change in aggregate extinction risk across groups of species. It is based on genuine changes in the number of species in each category of extinction risk on The IUCN Red List of Threatened Species (IUCN 2015). It is expressed as changes in an index ranging from 0 to 1. A Red List Index

value of 1 would indicate that biodiversity loss has been halted. A decreasing Red List Index value would indicate that extinction risk is increasing

The total number of animal species listed in the IUCN red list (gathering extinct, critically endangered, endangered or vulnerable) has increased in all the Mediterranean countries from 2018 to 2021. Countries with the highest increasing total number of species listed in the IUCN red list are Spain and France with 81 new species listed followed by Greece and Italy with respectively 63 and 66 new species. France is the country with the most species listed. From 2018 to 2021:

- 1 more specie extinct in Tunisia and 2 more in Morocco
- 130 new species get the "critically endangered" status
- 381 new species get the "endangered" status
- 227 new species get the "vulnerable" status



Source: International Union for Conservation of Nature (www.iucn.org), The IUCN Red List of Threatened Species. Version 2020-2, 2022.

4. Sustainable Cities

a) Indicator 18a: Proportion of urban population living in slums, informal settlements, or inadequate housing (SDG Indicator 11.1.1)

Definition: SDG Indicator 11.1.1: Proportion of urban population living in slums, informal settlements, or inadequate housing. This indicator measures the proportion of urban population living in informal settlements and deprived housing conditions (lack of access to improved water, access to improved sanitation, sufficient living area, and durability of housing). It takes into account slums, informal settlements and inadequate housing. It is a key indicator measuring the adequacy of the basic human need for shelter (housing). An increase of this indicator is a sign for deteriorating living conditions in urban areas.

Analytical part (in %):

SDG Target 11.1 is about "adequate housing": By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums. The proportion of slum dwellers in urban areas across all developing regions has reduced since 1990, but the absolute numbers have increased gradually. Worldwide the proportion of the urban population living in slums decreased from 28% in 2000 to 23.5% in 2018 but increased up to 24,2% in 2020. Meanwhile, the global absolute number of slum dwellers is increasing and reached over 1.05 billion people in 2020 compared to around 1 billion people in 2018 and 800 million in 2000. Some national social housing programs allowed reducing the part of the population without access to an adequate dwelling and living in districts without essential services: e.g. this part fell from 28.1% to 5.2% in Egypt between 2000 and 2018 (14.2 million persons concerned). In Türkiye, the population living in slums in 2018 is approximately 6.9 million (8.6%), compared to 12 million in 2000 (17.9%). From

2000 to 2020 the situation also improved in Albania to less than 3% of inhabitants living in slums (28% in 2000). On the other hand, the situation in Lebanon, The State of Palestine and The Syrian Arab Republic is getting worse with an increasing rate of population living in inadequate housing. Because data is available for only 9 countries in 2018 and 6 in 2020, data needs to be completed in several countries including some EU countries.

Precautions / Notes: The Information needed for the computation of this indicator is not currently available for all Mediterranean countries. This indicator is approximated by the proportion of urban population living in slums. The data is collected in the framework of the United Nations Human Settlements Programme.

Source: United Nations Human Settlements Programme (UN-HABITAT), World Cities Report 2020, 2022.

b) Indicator 18b

Definition: SDG Indicator 11.1.1: Proportion of urban population living in slums, informal settlements, or inadequate housing. This indicator measures the proportion of urban population living in informal settlements and deprived housing conditions (lack of access to improved water, access to improved sanitation, sufficient living area, and durability of housing). It takes into account slums, informal settlements and inadequate housing. It is a key indicator measuring the adequacy of the basic human need for shelter (housing). An increase of this indicator is a sign for deteriorating living conditions in urban areas.

The view shows the number of inhabitants living in slums in thousands **per inhabitant.**

Precautions / Notes: The Information needed for the computation of this indicator is not currently available for all Mediterranean countries. This indicator is approximated by the proportion of urban population living in slums. The data is collected in the framework of the United Nations Human Settlements Programme.

Source: United Nations Human Settlements Programme (UN-HABITAT), World Cities Report 2020, 2022.

c) Indicator 19: Status of UNESCO world heritage sites

Definition: The 1972 World Heritage Convention links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two. The World Heritage Committee defined the criteria on the basis of which a property belonging to the cultural or natural heritage may be included in either of the lists:

- The World Heritage List: a list of properties forming part of the cultural heritage and natural heritage which it considers as having outstanding universal value.
- The List of World Heritage in Danger: the list may include only such property forming part of the cultural and natural heritage as it is threatened by serious and specific danger.

Analytical part:

The heritage conservation is one of the objectives of UNESCO: “Based on a strong appeal from national and local stakeholders, the 2030 Agenda adopted by the UN General Assembly integrates, for the first time, the role of culture, through cultural heritage and creativity, as an enabler of sustainable development across the Sustainable Development Goals” (UNESCO). The List of World Heritage sites constantly progressed in the Mediterranean. The number of sites inscribed has increased from 29 in 1980 to 266 in 2021 (4 new sites since 2019), including 9 transboundary sites. More than half (56%) of these 266 sites (148 sites) are located on the Mediterranean coast (within 100 km of the coastline).

In Mediterranean countries: 91% are cultural sites, 6% are natural sites, 3% are mixed sites. However, there are great differences among countries:

- 3 countries have many sites: Italy (51), Spain (45) and France (40). Greece (18) and Türkiye (19) are lagging far behind.
- 13 countries have less than 10 sites each. *In 2019, in the World, 53 sites are in danger and 28% (15) of these sites are in Mediterranean countries. All sites located in The Syrian Arab Republic, Libya and The State of Palestine are inscribed on the List of World Heritage in Danger.*

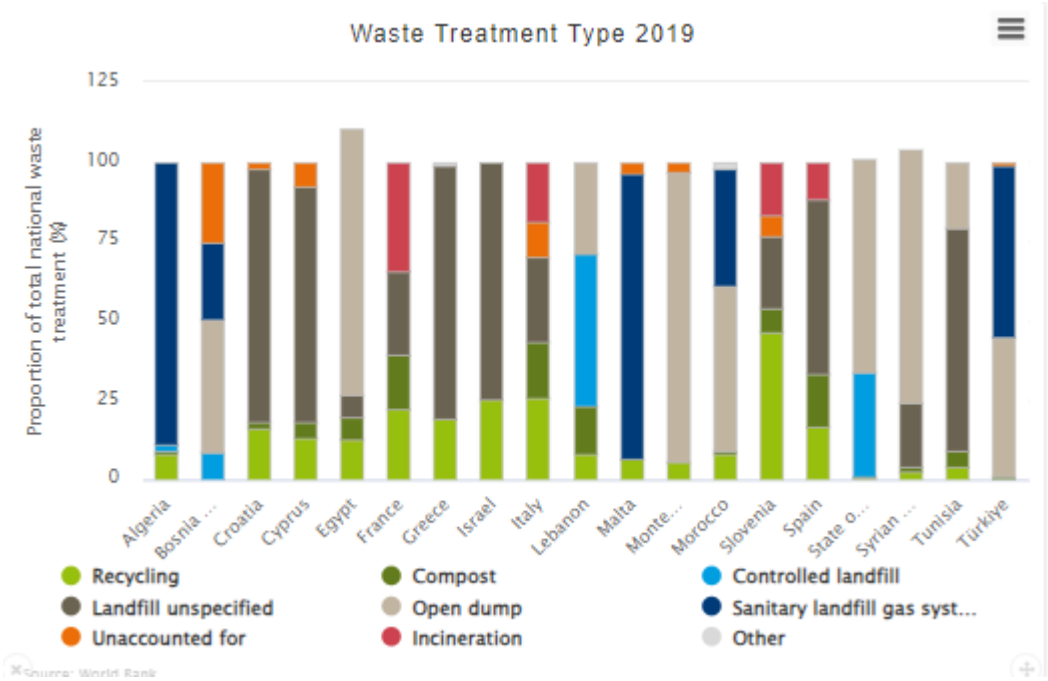
Source: United Nations Educational, Scientific and Cultural Organization, World Heritage centre, 2021.

d) Indicator 20: Waste generated and treated by type of waste and treatment type

Definition: This indicator is one of the H2020/ ENI SEIS II South Support Mechanism project and it is also linked to the SDG Indicator 11.6.1 (Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities) and to SDG Indicator 12.5.1 (National recycling rate, tons of material recycled). Municipal Solid Waste (MSW) is waste generated by households, and waste of a similar nature generated by commercial and industrial premises, by institutions and from public spaces. Waste treatment and disposal includes the following categories: recycling, composting, anaerobic digestion, incineration, landfilling, open dumping.

Analytical part:

In the Mediterranean region the waste generation and management practices vary widely. *In 2019, in the Northern countries, the range of value is from 1.1 to 1.9 kg/cap/day. In the southern countries, the amount generated is from 0.5 kg/cap/day in Morocco to 0.9 in Lebanon. The highest values are for Cyprus and Israel and above EU countries average (1,34 kg/cap/day) with 1,76 kg/cap/day. In the Northern countries (inc. Israel), the percentage of Food & Organic waste is between 25% and 60% while this rate in the Southern countries is from 49% in The State of Palestine to 70% in Libya). In 2020, the recycling rate is also widely varying*. In the northern countries, the recycling rate rises to 46% in Slovenia, except in Bosnia and Herzegovina with a rate close to 0 (the rate for Israel is 25%). France, Italy and Greece are around 20 to 25%. Croatia, Spain and Cyprus are around 10-17%. Algeria, Lebanon, Malta, Montenegro, Monaco and Morocco are around 5 to 10%. In the southern countries, Egypt has the highest recycling rate (12.5%) and the rate is especially low in the Syrian Arab Republic (2,5%). In the Mediterranean, E-Wastes and hazardous wastes respectively represent 8 billion tonnes and 28 billion tonnes. France and Italy are the biggest producers in the Mediterranean region.



Precautions / Notes: Compared to 2016, in 2019 data is available for Industrial, medical, hazardous, electronic, and construction and demolition waste but is not reported in total national waste generation. These variables are considered as "special wastes". Unfortunately, differences in data production methods between the countries can lead to distortions in the analysis.

Source: What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. World Bank.

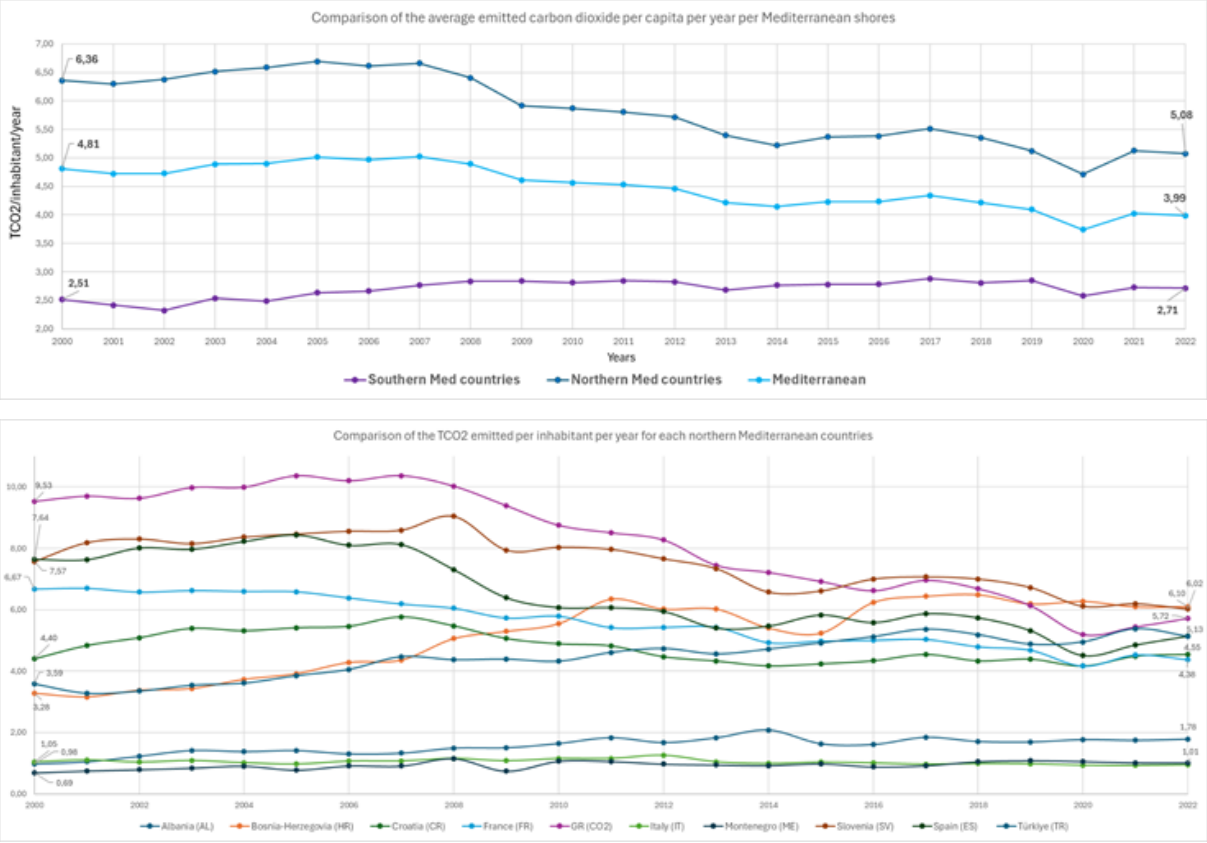
5. Climate Change

a) Indicator 21: Green House Gas emissions per capita (related to GDP)

Definition: Greenhouse gases correspond to the aggregate annual national emissions of human origin of the main greenhouse gases: Carbon dioxide (CO_2), Nitrogen dioxide (N_2O), Methane (CH_4), Hydrofluorocarbons (HFC), Fluorocarbon (PFC) and Sulfur hexafluoride (SF_6). This fact sheet only focuses on carbon dioxide emissions.

Analytical part:

Figure 1. Evolutions of the territorial carbon dioxide emissions per capita from 2000 to 2022 with in a), the comparison between Mediterranean shores and in b), the evolution for each southern country



All the Contracting Parties to the Barcelona Convention have ratified the Paris Agreement (Turkiye was the last one in October 2021). These countries are officially committed to achieve global peaking and 'climate neutrality' by the second half of the century. The rise in CO_2 emissions from 2000 to 2017 was higher than the national objectives in most countries except in France. Since 2018, CO_2 emissions have decreased in most of the Mediterranean countries except Libya, Morocco, Malta, Algeria and less in Tunisia and Türkiye. The COVID-19 period contributed to reducing CO_2 emissions but since 2021 the trend is again rising. Since 2017, Libya increased by 40% its CO_2 emissions per capita while Bosnia & Herzegovina decreased its emission by around 38%. In 2022, Mediterranean average per capita emissions were at 3.99tons of CO_2 per inhabitant per year (4.23 tons in 2016). In 2021, Mediterranean countries contributed to 1,2% of the global CO_2 emissions while China contributed to 6,2%. In the South, the CO_2 emissions per capita are extremely diverse: from 1.16 tons per capita in Morocco to 9.46 tons in Israel, in 2021. The differences in CO_2 emissions per capita are also significant in the southern and eastern Mediterranean countries: from 1.25 tons in the Syrian Arab Republic to 11,04 tons in Libya, in 2022.The analysis of CO_2 emissions is more detailed in section 2.3, for which "CO_2 emission" is considered as a core indicator of the MSSD.

Precautions / Notes: For the monitoring of this indicator, only carbon dioxide emissions from solid fuels, cement and the gas flaring are taken into account. This is explained by their good data availability and the fact that those emissions, on average, account for 80% of the emissions of greenhouse gasses of human origin. Only national territorial emissions

are taken into account. A conversion in CO_2 (conversion factor of 3.664) has been applied to the raw data extracted from the Global Carbon Project. The value was then converted from megatonnes to tonnes and divided by the historical population values of each Mediterranean country. For example, those due to the manufacture of imported products are not shown. National carbon dioxide emissions do not cover the full responsibility of a country.

Source: Integrated Carbon Observation system (Global Carbon Project, 2021).

b) Indicator 22a: Energy intensity measured in terms of primary energy and GDP (SDG Indicator 7.3.1)

Definition: SDG 7.3.1 Indicator: Energy intensity is defined as the energy supplied to the economy per unit value of economic output. Total energy supply, as defined by the International Recommendations for Energy Statistics (IRES), is made up of production plus net imports minus international marine and aviation bunkers plus stock changes.

Analytical part: SDG Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all:

- SDG Target 7.3: By 2030, double the global rate of improvement in energy efficiency
- SDG Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix

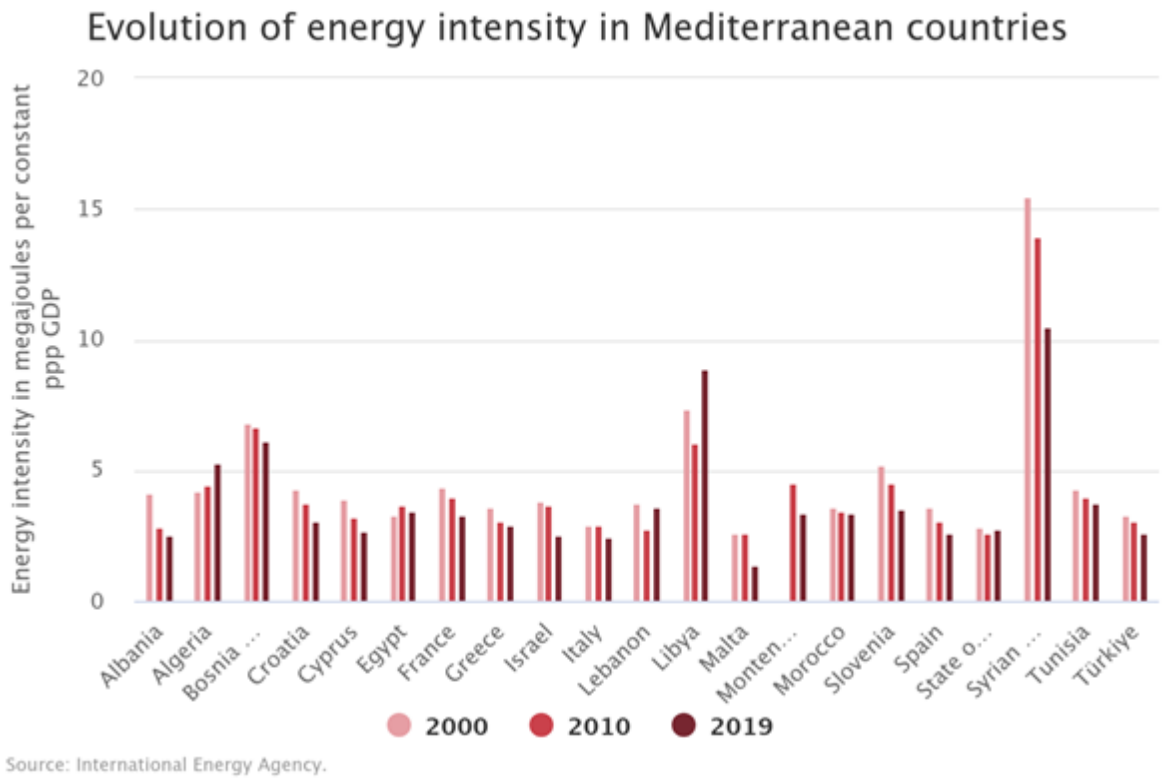
In Mediterranean countries, the energy intensity and the share of renewable energy are improving at different speeds. In 2019, the average energy intensity of the Mediterranean countries (3.8 MJ megajoules per GDP constant 2017 PPP dollar) was above the European average (3.1 MJ). However, disparities among countries remain significant, even among countries with equivalent income levels. Energy intensity in Bosnia and Herzegovina, Croatia, Slovenia and Montenegro is over 3 MJ while it is lower than 1.4 MJ in Malta.

Precautions / Notes: The very high values should be interpreted with caution for the countries in economic crisis (with low GDP). PPP: Purchasing Power Parity, MJ: megajoules. The basis changed for value in 2019, from per GDP constant 2011 PPP dollar until 2017 and since 2019 per GDP constant 2017 PPP dollar. A mistake has been detected in the provider's database. In the description of the variables the unit is in "MJ per constant 2017 PPP GDP" while in the dataset the unit is in "MJ per constant 2011 PPP GDP".

Source: International Energy Agency (2019), World Energy Balances; Energy.

c) Indicator 22b: Renewable energy share in the total energy consumption (SGD Indicator 7.2.1)

Definition: SDG 7.2.1 Indicator: The renewable energy share in total final consumption is the percentage of final consumption of energy that is derived from renewable resources. Renewable energy consumption includes consumption of energy derived from: hydro, solid biofuels, wind, solar, liquid biofuels, biogas, geothermal, marine and waste. Total final energy consumption is calculated from national balances and statistics as total final consumption minus non-energy use.



Analytical part: In Mediterranean countries, the share of renewable energy in total final consumption varies widely in 2019: from 0.16% in Algeria to 40% in Albania. Italy, France, Spain, Greece the share of renewable energy in total final consumption varies between 15 to 18%. In Morocco, Tunisia the share of renewable energy in total final consumption varies from 10 to 12%. In the Balkan countries, the share is between 20% and 40% while it is very low (below 3%) in the Southern countries, especially in the Oil & Gas producing countries.

Source: International Energy Agency (2019), World Energy Balances; Energy.

6. Green and blue Economy

a) Indicator 23a: Domestic material consumption

Definition: SDG 8.4.2 Indicator: Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP. Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy. It is measured for several types of materials. For the monitoring of this indicator, the DMC is shown for raw materials. The DMC is measured in kg per constant 2015 US dollars.

Analytical part: The comparison of material consumption with economic performance provides an insight in trends of material intensity and material productivity (the reciprocal value of material intensity) as well as of decoupling of the global economic system over time. For instance, in the EU Roadmap to a Resource-Efficient Europe the main indicator used is GDP divided by Direct Material Consumption (DMC). Domestic material consumption declined from 2007 to 2017 but slightly increased from 2017 to 2019, GDP has also continued to grow (indicator 3). *From 2017 to 2019, tons of domestic material consumption have decreased in Greece and Lebanon with (-11%), Slovenia (-9%) Italy, France while in Bosnia & Herzegovina (+8%) Spain the DMC increased about +4%. In the southern shore, tons of domestic material consumption has decreased in Tunisia (-7%) and The Syrian Arab Republic (-17%) while it increased in Egypt (+9%), Morocco about +6%. In the period 2017–2019, the Mediterranean economy achieved a "relative decoupling" of economic growth from resource use (fossil fuels, metal ores, industrial and construction minerals, biomass): income or GDP of most Mediterranean countries increased faster than the amount of materials used in the Mediterranean countries.*

Precautions / Notes: The indicator does not take into account the consequences of outsourced material-intensive extraction and production which dislocates environmental pressures. Water and air consumption are, apart from the water content of materials, not included. DMC cannot be disaggregated to economic sectors which limits its potential to become a satellite account to the System of National Accounts (SNA). The UN Environment International Resource Panel Global Material Flows and Resource Productivity working group compiles data from countries and from other sources.

Source: UN Environment Programme International Resource Panel Global Material Flows Database, 2020. Available at: www.materialflows.netUN SDG portal.

b) Indicator 23b : Domestic material consumption per GDP

Definition: SDG 8.4.2 Indicator: Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP. Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy. It is measured for several types of materials. For the monitoring of this indicator, the DMC is shown for raw materials. The DMC is measured in kg per constant 2015 US dollars.

Analytical part:

In the EU Med countries in 2019, the DMC - total or no breakdown - per constant 2015 US dollars is lower than 1. It decreased about 0.04 points compared to the situation in 2017. It is between 1 and 2.8 in most southern countries and reached 2.8 and 2.6 respectively in The Syrian Arab Republic and Bosnia & Herzegovina. *From 2017-2019, domestic material consumption per capita has slightly decreased in Greece and Slovenia (gross rate of change around -10%), Italy, State of Palestine and Tunisia (about -8%). In the meantime, Türkiye domestic material consumption per capita has increased significantly +30%.*

Precautions / Notes: The indicator does not take into account the consequences of outsourced material-intensive extraction and production which dislocates environmental pressures. Water and air consumption are, apart from the water content of materials, not included. DMC cannot be disaggregated to economic sectors which limits its potential to become a satellite account to the System of National Accounts (SNA). The UN Environment International Resource Panel Global Material Flows and Resource Productivity working group compiles data from countries and from other sources.

Source: UN Environment Programme International Resource Panel Global Material Flows Database, 2020. Available at: www.materialflows.net UN SDG portal.

7. Governance

a) Indicator 24: Number of NSSD adopted or updated

Definition: The proposed indicator is “Number of National Strategies for Sustainable Development (NSSD) adopted or updated [and number of updates since first edition]” Waiting for updated data directly provided by the national institutions, this factsheet shows an Assessment of National Green Economy (GE) and Sustainable Development (SD) Strategies published in Mediterranean Countries issued from the report referenced hereafter. The Simplified Peer Review Mechanism (SIMPEER) is a framework promoting dialogue and experience sharing on NSSD. It supports the preparation and follow-up of the Voluntary National Reviews (VNRs) presented to the UN High-level Political Forum (HLPF). The SIMPEER pilot edition was carried out by Plan Bleu in 2016-2017 with the voluntary participation of France, Montenegro and Morocco. Albania, Egypt and Tunisia joined the second edition in 2018-2019.

Analytical part: An assessment has been made according to the quality and consistency of the national strategies reviewed. Countries’ strategies have been labeled as “Good”, “Moderate” or “Weak”, and there is one “No Data” for the case of Libya, given that the country doesn’t have a NSSD nor any sectoral plans that integrate the principles of sustainable development.10 countries perform as “Good” in 2023 (Bosnia and Herzegovina, Croatia, France, Greece, Italy, Malta, Montenegro, Morocco, Slovenia and Spain) have NSSD that are complete and relevant documents, with clear goals and monitoring indicators. In 2016, 4 countries performed as “Good” (France, Italy, Morocco and Tunisia). From 2016 to 2023, 7 additional countries have adopted or updated a comprehensive NSSD. 7 countries perform as “Moderate” in 2023 (Albania, Algeria, Cyprus, Israel, Monaco, Tunisia and Türkiye) don’t have a formal NSSD as such, or the document is outdated as of 2023. However, these countries incorporate SDGs in several strategic plans and undertake monitoring of national indicators. In 2016, 9 countries performed as “Moderate” (Algeria, Croatia, Greece, Israel, Lebanon, Malta, Montenegro, Spain and Türkiye). Finally, there are 4 countries whose national strategies have

been considered "Weak" in 2023 (Egypt, Lebanon, the State of Palestine and Syria), either because the country lacks a comprehensive and unified planning and progress monitoring framework (and therefore is considered weak), or because there is a legitimate assumption that the country lacks capacity to implement its strategy effectively. In 2016, 6 countries performed as "Weak" (Albania, Bosnia and Herzegovina, Cyprus, Egypt, Slovenia and the State of Palestine). Also, as of 2023, all countries of the Barcelona Convention have presented Voluntary National Reviews (VNR) of the 2030 Agenda. The State of Palestine submitted its first VNR in 2018. In 2023, 3 countries presented a new VNR (Bosnia and Herzegovina, Croatia and France).

Precautions / Notes: This report includes data up to June 2016, published by national governments and publicly available. It reviews only written documents, not the implementation of them. Updated information needs to be provided by the countries.

Source: Eco-union, MIO-ESCDE & GEC, Towards a Green Economy in the Mediterranean, 2016 with an update in 2023.

b) Indicator 25: Proportion of bank credit allocated to the private sector

Definition: Multiple indicator:

- Share of bank credit allocated to the private sector
- Existence of alternative credit systems other than bank credit Domestic credit for the private sector refers to the financial resources provided for the private sector, such as credits, purchase of non-participating securities, trade credits and other accounts that establish a repayment obligation. Public credit is included in some countries.

The alternative finance systems of bank credit may concern investments in venture capital and micro-credit allocated to those that are excluded from the conventional banking system.

Analytical part:

The development of Small and Medium Enterprise finance systems for productive and innovative activities (micro-credit, venture capital, incentives, etc.) is one of the objectives for setting up efficient banking services. In the Mediterranean region, the share of domestic credit allocated to the private sector in 2020 and trends over time varied across countries, from 16,5% in Libya to 108% in Cyprus and reached about 119,5% in France. Cyprus increased by 1 percentage point while France and Spain (93% to 107%) increased by 14 percentage points.

Precautions / Notes: Alternative finance is not well defined and it could be financing from external sources other than banks or stock and bond markets. It can include fundraising via online platforms.

Source: International Monetary Fund, World Bank Database and OECD, 2022. International Finance Statistics, Global Findex database, 2021.

c) Indicator 26: R&D expenditure as a proportion of GDP

Definition: SDG Indicator 9.5.1: Research and development expenditure as a proportion of GDP. Research and development expenditures include the operating expenditures and investments (including overheads) for creative and system-based activities dedicated to increase knowledge. This amount includes both fundamental and applied research as well as experimental development work leading to new devices, products or processes

Analytical part:

SDG Target 9.5: Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending. The Mediterranean Strategy for Sustainable Development 2016-2025 promotes education and research for sustainable development (strategic direction 6.4) and in particular to strengthen research capabilities in the area of sustainable development, as well as the science - policy interface.

On average, Mediterranean countries spent 1.6% of their GDP on research and development in 2020 (1.3% in 2019). The expenditure in EU-Mediterranean countries is about 1.3% of GDP in 2020 (1.15% in 2018). These expenditures are increasing quite constantly (+0.12% per year).

But data of 2 countries with low rates is not considered. In Israel, where Research and Development expenditure was 5.4% of GDP in 2020 (4.79% in 2018), this percentage is between 1% and 2.5% in Croatia, Greece, Italy, Slovenia, Spain, Turkiye. In the other Mediterranean countries, it is less than 1%.

Precautions / Notes: Research and development expenditures are not necessarily oriented to the sectors supporting sustainable development or contributing to SDGs and MSSD goals. This indicator could be refined to focus on sustainable development aspects and include resource mobilization by the private sector for Research and development as well as innovation. Data is missing for 13 countries (2 more than in 2019).

Source: UNESCO Institute for Statistics, 2022. World Bank national accounts data. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition. Rev. 1.

d) Indicator 27: Public participation & public access to environmental information

Definition: SDG Indicator 16.10.2. Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information. The focus of this indicator is thus on the status of adoption and implementation of constitutional, statutory and/or policy guarantees for public access to information. The definition relates directly to "public access to information", which is wider than, but is also very much based upon, the established fundamental freedoms of expression and association. Conversely, these freedoms also both impact the environment for public access to information.

Analytical part:

SDG Target 16.10: Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements. UNESCO's reports to the UN on global monitoring of 16.10.2 have accordingly been compiled and submitted by the International Programme for the Development of Communication secretariat. According to UNESCO's preliminary assessment, Indicator 16.10.2 seeks to establish the state of public access to information in terms of three key variables:

1. Whether a country (or at the global level, the number of countries) has constitutional, statutory and/or policy guarantees for public access to information.
2. The extent to which such national guarantees reflect 'international agreements' (such as the Universal Declaration of Human Rights).
3. The implementation mechanisms in place for such guarantees, including the following variables:

- Government efforts to publicly promote the right to information.
- The capacity of public bodies to provide information upon request by the public

Precautions / Notes: This indicator does not assess the totality of the "public access to information" component of the SDG Target 16.10. Nevertheless, it focusses on a key determinant of the wider information environment. This indicator is still classified as Tier II Indicator: conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.

Source: UNESCO World Trends in Freedom of Expression and Media Development (raw research records); Global Right to Information Rating (Access Info & Center for Law and Democracy) http://www.rti-rating.org/by-section/; Freedominfo; Article24. UN SDG website

e) Indicator 28: Education for Sustainable Development

Definition: Number of countries that have National Strategies/Action Plans on Education for Sustainable Development in place. The Mediterranean Strategy on Education for Sustainable Development (MSESD) was unanimously endorsed on 13 May 2014 by the UfM Ministers of Environment & Climate Change and accepted as an integral part of the "Mediterranean Strategy for Sustainable Development" (2016-2025) in the Barcelona Convention's COP19 (Athens, February 2016). Then, the Action Plan of the MSESD was developed, and endorsed in December by Mediterranean Ministers of Education, in Cyprus. The overall aim is to encourage the countries to develop and incorporate ESD into formal, non-formal and informal education. The Mediterranean Education and Environment Ministers met on the 6th of October 2022 in a High-Level Meeting within the EfE9 Conference in Nicosia (Cyprus) and adopted the "Action Plan towards 2030 of the MSESD". The revised Action Plan took into consideration the key provisions and updates of the international and regional frameworks that the MSESD is closely linked to, such as the Mediterranean Strategy for Sustainable Development (2016-2025) of the Barcelona Convention, UfM GreenerMedAgenda, the UNESCO ESDfor2030, the Recommendation on learning for environmental sustainability of the Council of the EU and the UNECE Framework for the implementation of the Strategy for ESD (2021-2030).

Analytical part: In October 2022, 16 (73%) Mediterranean countries had a legal framework for ESD. 1 more country since June 2019. UNESCO's reports to the UN on global monitoring of SDG 4 indicators. SDG Target 4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including,

among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development." The global indicator used for monitoring this Target: Indicator 4.7.1: Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment. Latest UNESCO Report with recent data for this indicator is available. Most countries have already or are in the process of elaborating National Strategies or Plans on ESD in accordance with the provisions of the Action Plan of the MSESD.

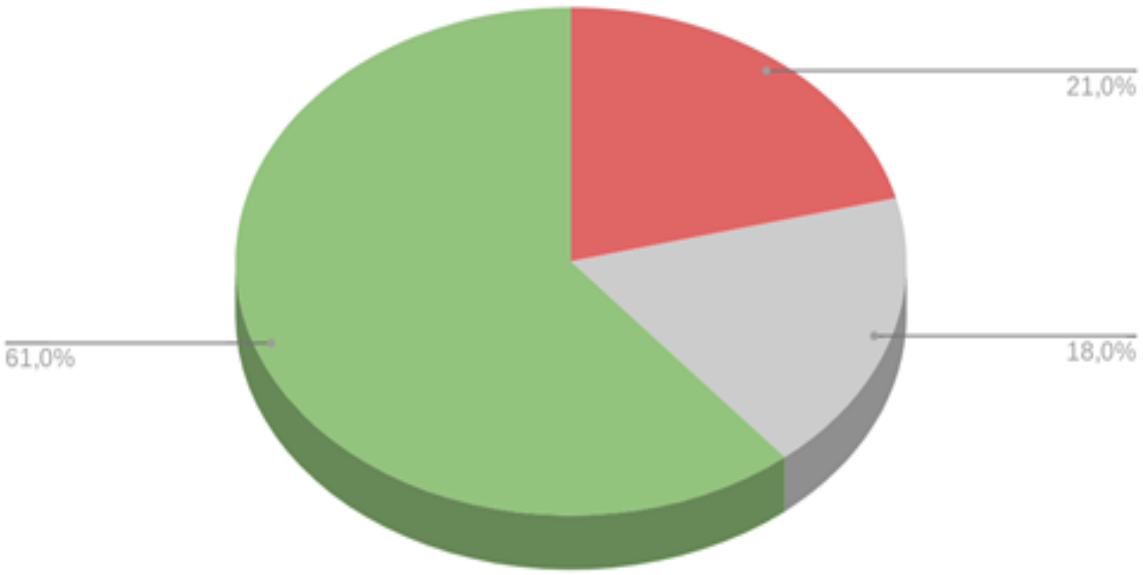
Precautions / Notes: The existence of a strategy or a plan does not automatically imply efficient Education for Sustainable Development in the country. Other indicators are necessary to monitor Education for Sustainable Development.

Source: High-Level Event of Education and Environment Ministers on the Mediterranean Strategy on Education for Sustainable Development and its Action Plan towards 2030, 6 October 2022 Mediterranean Preparatory Webinar for #ESDfor2030, 20 April 2021, by the Mediterranean Committee on ESD Learn for our planet- A global review of how environmental issues are integrated in education, UNESCO 2021

Main facts with regards to the state of sustainable development in the Mediterranean basin according to the MSSD dashboard

- For some of the 2015 Strategy's objectives such as sanitation and access to electricity, the situation was improving, while for others such as climate change, energy intensity, water and sustainable tourism (particularly the environmental objectives), the situation was worsening.
- Climate change is now confirmed as a key driver of environmental change in the region.
- Sharp income disparities still exist among countries, and in some cases growth figures conceal deterioration in regenerative natural capital.
- The economic growth in the Southern and Eastern countries was accompanied by significant improvements in key social indicators as represented by the Human Development Index.
- The economic growth in the Southern and Eastern countries was accompanied by significant improvements in key social indicators as represented by the Human Development Index.
- Even if there is a lack of data for this indicator (n°18), within the region, poverty continues to affect many.

Summary of the evaluation in terms of sustainable development (stable - grey, increase - green, decrease - orange) according to the 28 indicators over the period 2015-2024 per indicator:



MSSD Indicators their evolution (stable - grey, increase - green, decrease - orange) over the period 2015 - 2024
1- Ecological footprint of the economy and ecological deficit
12- Level of water stress
13- Water withdrawal per capita
17- Animal species in IUCN Red List
20- Waste generated and treated by type of waste and treatment type
21- Green House Gas emissions per capita
2- Human Development Index (Life expectancy at birth increase but expected years of schooling decrease)
5- Girl/Boy primary, secondary and tertiary school registration ratio
8- Proportion of fish stocks within biologically sustainable levels
22- Energy intensity and renewable energy (Energy intensity measured in terms of primary energy and GDP increased as well as the Renewable energy share in the total energy consumption)
23- Domestic material consumption per GDP
3- Annual growth rate of real GDP per capita
4- Youth literacy rate
6- Number of ratifications and level of compliance as reported by Barcelona Convention Contracting Parties
7- Coverage of protected areas in relation to marine territorial waters
9- Number of protected areas participating in the Green List initiative
10- Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
11- Global Food Security Index
14- Proportion of population (in %) using safely managed drinking water service
15- Proportion of population using safely managed sanitation services
16- Agriculture quality products & share of the agricultural land
18- Proportion of urban population living in slums, informal settlements, or inadequate housing
19- Status of UNESCO world heritage sites
24- Number of NSSD adopted or updated
25- Proportion of bank credit allocated to the private sector
26- R&D expenditure as a proportion of GDP
27- Public participation & public access to environmental information
28- Education for Sustainable Development

- The Strategy should put more emphasis on emerging priorities, such as climate change adaptation and the green economy. New indicators, such as those related to population flows caused by climate change, among others, would allow the monitoring of adaptation processes in greater detail. Air Temperature and sea surface temperature could also be of interest.
- Tangible targets for indicators' measurement should be elaborated.
- The implementation of the Strategy had been strongly affected by the existing governance framework. A different organization of the roles and organization framework concerning the UNEP/MAP for the Barcelona Convention, including the role and expectations of national focal points, is required to create the channels for effective implementation of the Strategy. MAP should create and adapt existing work units to provide a monitoring service for the existing programmes and push forward activities of technical assistance, knowledge sharing, capacity building, information exchange and monitoring.

- The Strategy should include, as far as possible, opportunities for synergies with other programmes, organizations and initiatives and, when feasible, indicate timing and modalities by which those synergies might arise. The business community, local authorities or their representatives, academics and non-governmental organizations should be more involved at the national level and at the level of the Mediterranean Commission on Sustainable Development. Improving synergies between international and regional organizations operating in the Mediterranean region would also be appropriate in order to maximize the results of initiatives and reduce uncertainties.
- An explanation of the procedures, resources and organization for the transformation of the Strategy into actions at the national level is needed, as the passage from a regional strategic framework to national policies is neither automatic nor straightforward, especially taking into account the interlinkages between different sectors and levels of administration and governance in the countries.

C. EMPHASIZE ON CORE INDICATORS

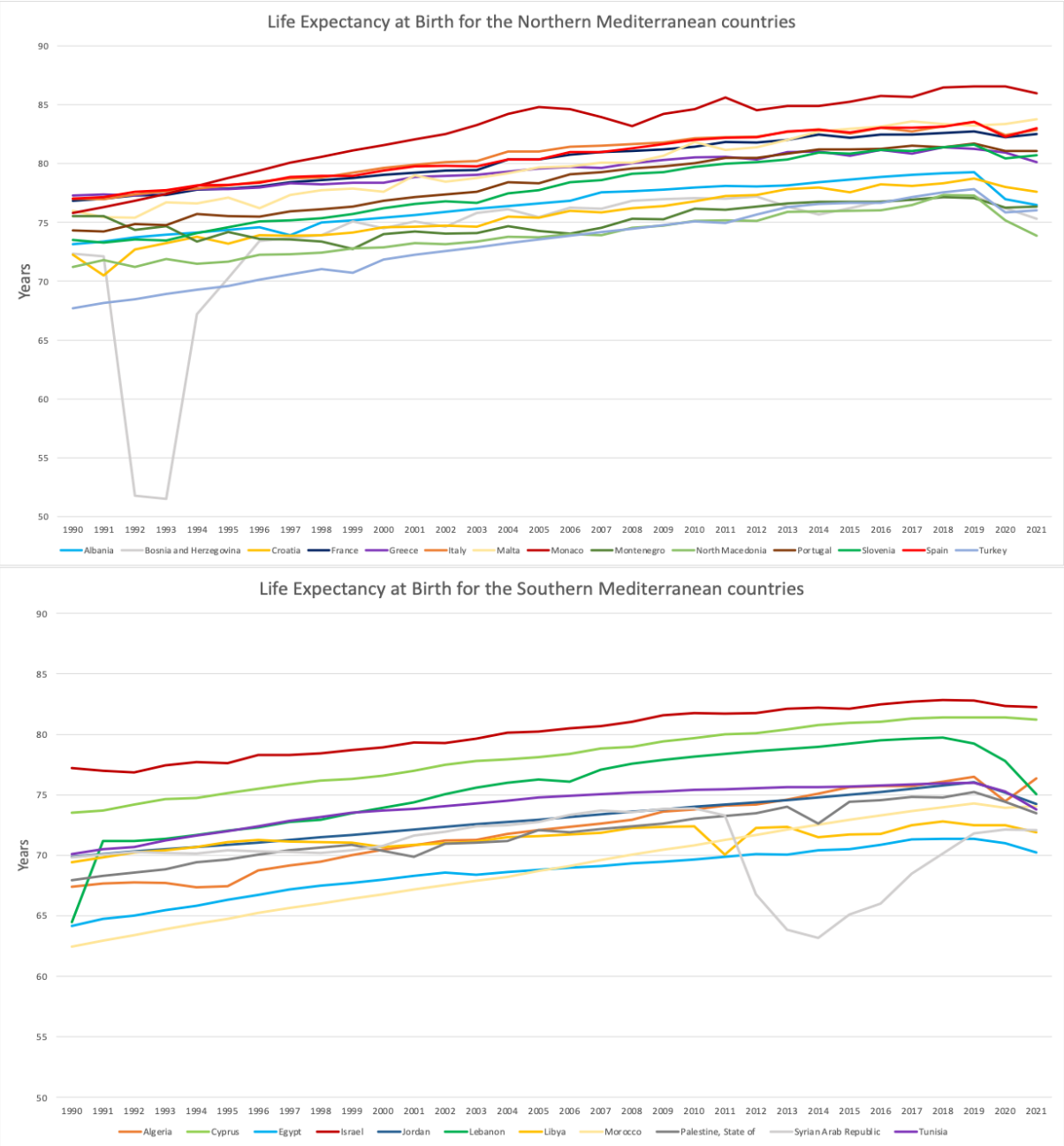
In our complex and changing world, where social, economic, and environmental challenges are multiplying and intensifying with climate changes, the need for reliable, comprehensive, and relevant indicators to assess progress and challenges towards sustainable development in the Mediterranean region is more pressing than ever. In these regards, the Mediterranean Strategy for Sustainable Development provides a broad range of indicators which play an important role in measuring the progress made by the Contracting Parties towards the SDGs set by the United Nations 2030 Agenda. Therefore, this document delves into eight "core indicators" that shed light on the region's progress and challenges over the past three decades. These indicators include the average years of schooling, life expectancy at birth, real GDP per capita, the evolution of protected marine areas, territorial carbon dioxide emissions per capita, surface temperatures (atmospheric surface temperature and sea surface temperature), drought (through water withdrawal per inhabitant per year) and plastic leakages in aquatic environments, at national level for each Mediterranean country (when data were available). Each of these indicators offers a perspective on the Mediterranean's evolution, reflecting the links between education, health, economic vitality, environmental stewardship, and sustainability. As we navigate through the data, it is therefore important to recognize the geographical and temporal nuances and complexities that underpin these figures, acknowledging the disparities within and between the northern and southern shores of the Mediterranean. This analysis aims to provide a comprehensive overview of the region's trajectory, while also highlighting the importance of context and caution in analysing these indicators.

a) CORE IDD 1: Life expectancy at birth

Definition: Life expectancy at birth is a statistical measure of the average number of years a newborn is expected to live, assuming that current mortality rates at each age will remain constant throughout the life of the newborn. This indicator is often used as a measure of a country's health and well-being. It's a part of the Human Development Index (HDI)

Analytical part:

Figure 2. Life expectancy at birth for the southern Mediterranean countries from 1990 to 2021

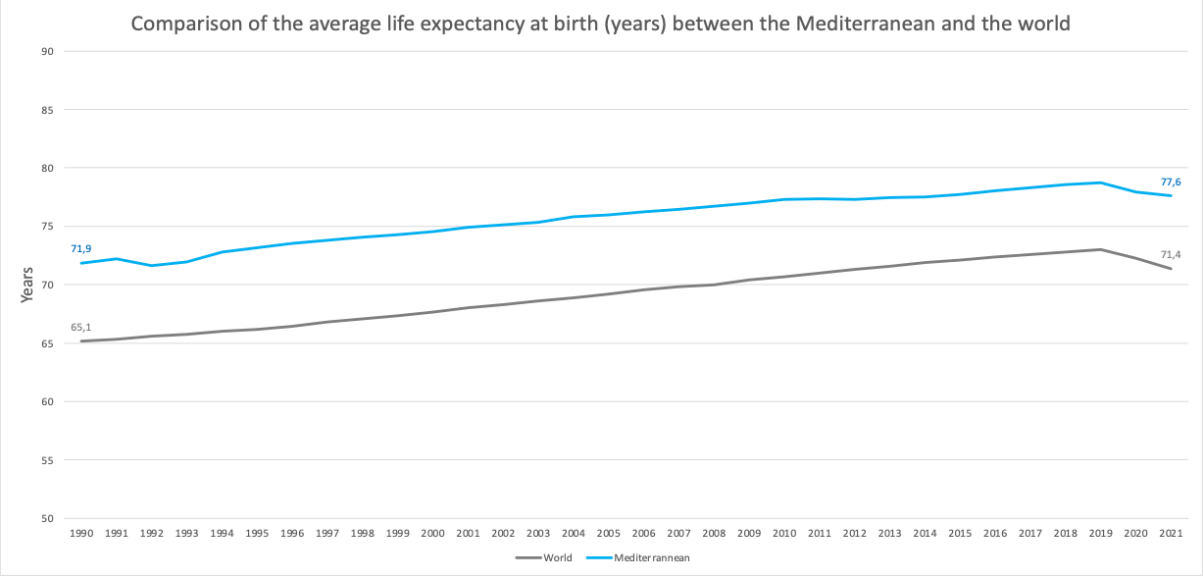


There is a general trend of improvement in life expectancy across all the listed Mediterranean countries over the 31-year period, indicating improvements in health and longevity. But there are some significant drops observed for some countries. For instance, Bosnia and Herzegovina experienced a dramatic drop in life expectancy during the early 1990s, likely due to the Bosnian War. It fell from 72.3 years in 1990 to approximately 51.5 years in 1993. Since then, there has been a robust recovery, with life expectancy reaching 75.3 years by 2021. In the same way, Croatia's life expectancy has generally increased, from 72.3 years in 1990 to 77.6 years in 2021, despite a slight dip in the early 1990s, possibly due to the Croatian War of Independence. As expected, Libya's life expectancy has seen fluctuations with a slight dip in 2011, possibly due to the Libyan civil war and the Arab Spring. The Syrian Arab Republic also experienced a dramatic drop in life expectancy between 2011 and 2014, likely due to the Arab Spring and the civil war. From a global point of

view, a general inflection is observed by 2020, potentially due to the worldwide Covid pandemic19, but more specific data should be analyzed to confirm such a negative evolution of the annual average life expectancy per country.

However, there is still a gap between the southern Mediterranean countries and the northern Mediterranean countries with a gap of 15.7 years between Egypt (70.2) and Monaco (85.9) in 2021. On average, northern Mediterranean countries (79.7 in 2021) have 4.7 years more life expectancy than southern Mediterranean countries (75 in 2021).

Figure 3. Comparison of the average life expectancy at birth between the Mediterranean and the world from 1990 to 2021



Mediterranean countries, on average, have higher life expectancy than the world average and maintained a generally higher level throughout the period (1990-2021). Globally, since 1990 the Mediterranean countries have followed the same positive trend of life expectancy as the world.

Precautions / Notes:

- Life expectancy is influenced by a range of factors that may not be captured in the data, such as income inequality, education levels, gender inequalities, and lifestyle choices.
- Life expectancy is an average that does not account for disparities within countries, such as those due to socioeconomic status, gender, ethnicity, or region.
- Events like pandemics or wars can cause temporary or long-term declines in life expectancy, which may not reflect the general trend.
- Changes in the age structure of a population, such as an ageing population, can affect life expectancy figures. Thus, comparing life expectancy across countries requires caution due to differences in demographic profiles.

Source: United Nations Development Programme Database and report, 2021.

b) CORE IDD 2: Years of schooling

Definition: The indicator Years of Schooling refers to the average number of years of education received by people ages 25 and older, within a particular geographic area. This metric is often used to assess the educational attainment level of a population, which can influence economic development, employment opportunities, and social outcomes. It's a part of the Human Development Index (HDI).

Analytical part:

Figure 4. Average years of schooling for the northern Mediterranean countries from 1990 to 2021

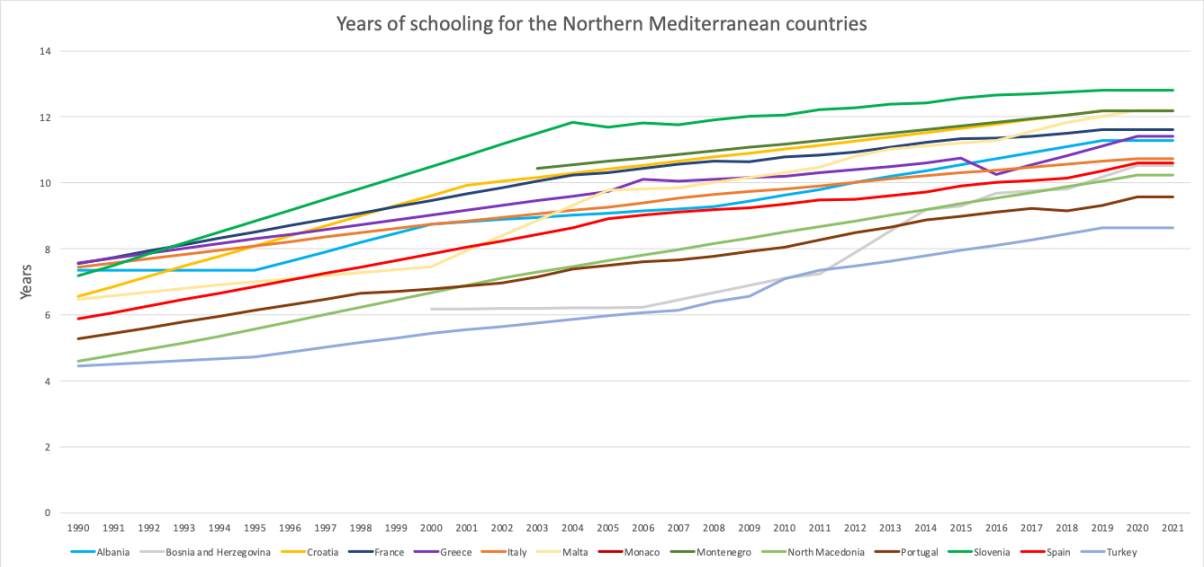
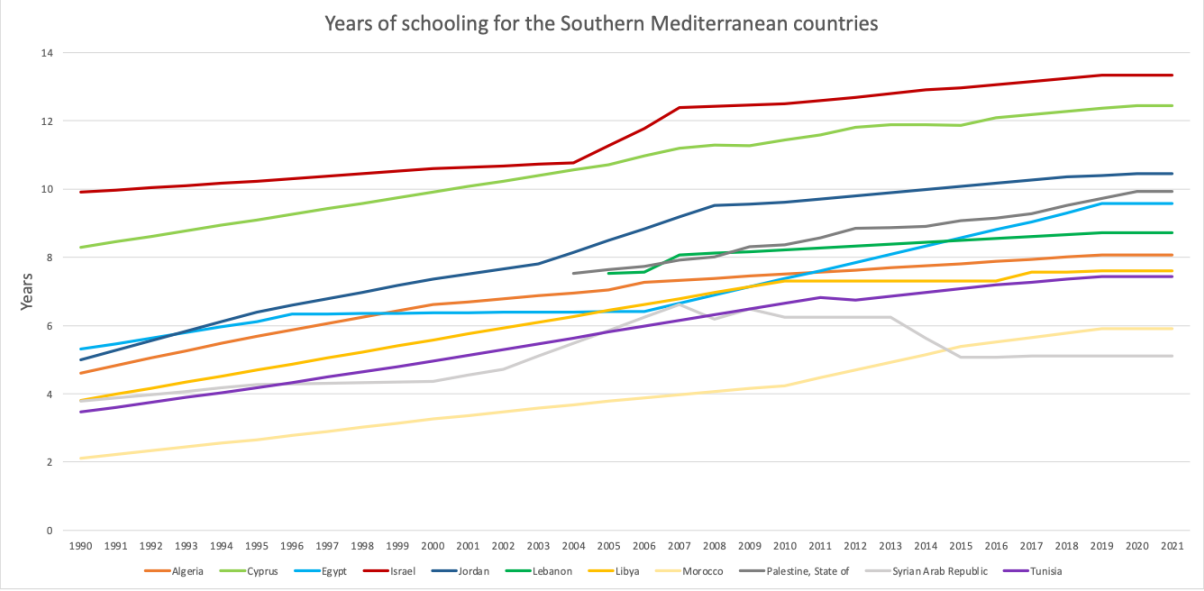


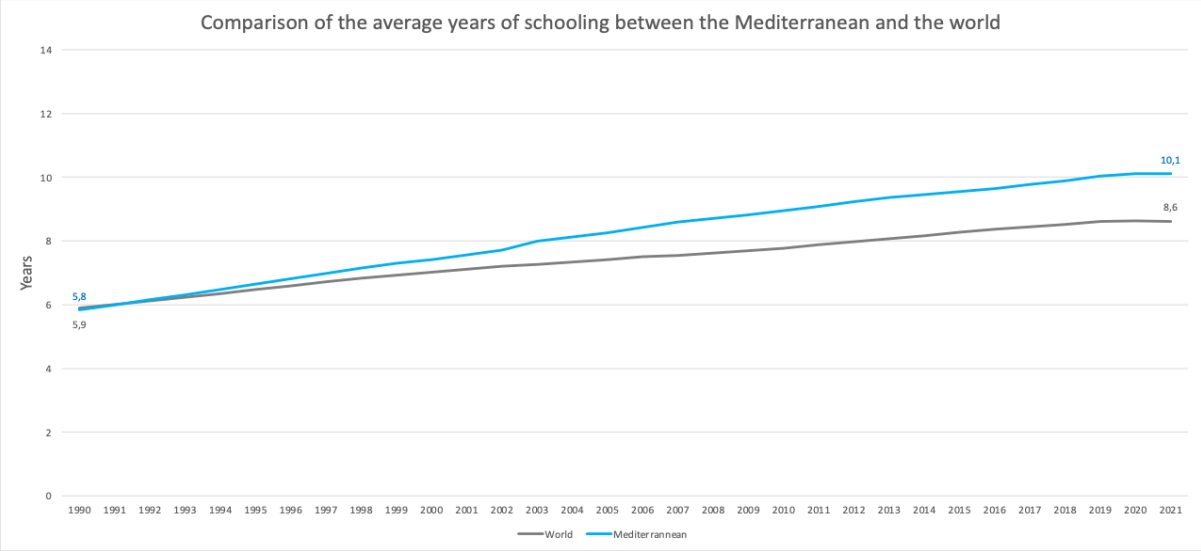
Figure 5. Average years of schooling for the southern Mediterranean countries from 1990 to 2021



The years of schooling of Mediterranean countries, on average, have constantly increased since 1990 and maintained a generally higher level throughout the period up to 2021.

Northern Mediterranean countries (e.g., France, Italy, Spain) generally started with higher years of schooling in 1990 and maintained a growth trend, ending with higher averages in 2021 compared to their southern counterparts (e.g., Egypt, Algeria). On average, northern Mediterranean countries (11.1 years in 2021) have 2.1 years more years of schooling than southern Mediterranean countries (9 years in 2021). Moreover, there's significant variability in educational attainment across the region, with countries like Israel and Cyprus showing high levels of schooling, while others, such as the Syrian Arab Republic and Morocco, exhibit lower averages. To note that the drop of years of schooling for the Syrian Arab Republic is likely due to the Arab Spring and the civil war.

Figure 6. Comparison of the average years of schooling between the Mediterranean and the world from 1990 to 2021



By comparing the average trends of years of schooling from 1990 to 2021 between the world and the Mediterranean, we can highlight that the Mediterranean region is highly diverging from global average since 1990: in 1990, it was almost the same average, while in 2021 the Mediterranean average was 1.5 years higher (10.1 years) than the global average (8.6 years).

Precautions / Notes :

- Years of schooling is a quantitative measure that doesn't account for the quality of education or cultural, economic, and political factors influencing educational systems. Each country's educational system is influenced by its unique historical, cultural, and socio-economic context, which should be considered when interpreting the data.
- Years of schooling is an average that does not account for disparities within countries, such as those due to socioeconomic status, gender, ethnicity, or region. Likewise, it does not take into account employability after these years of schooling.
- The analysis covers up to 2021. Thus, recent changes in educational policies, economic conditions, or significant events (e.g., the COVID-19 pandemic) may not be fully reflected.

Source: United Nations Development Programme Database and report, 2021.

c) CORE IDD 3: Real GDP per Capita

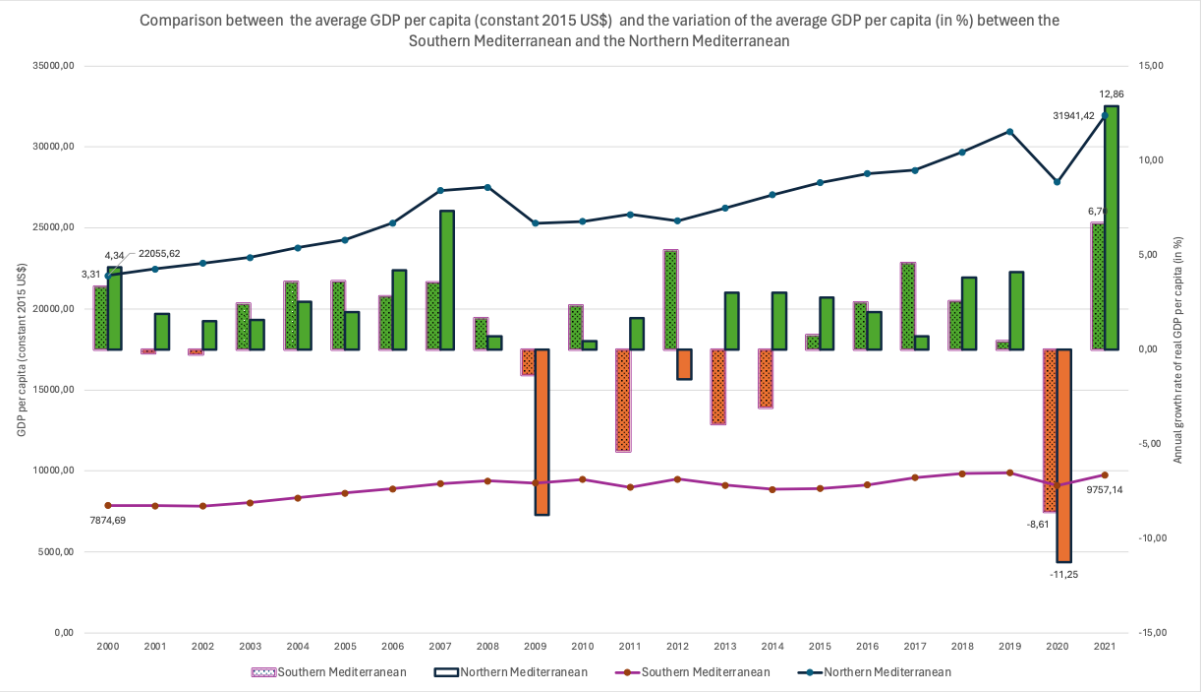
Definition: Gross Domestic Product (GDP) is the total market value of all final goods and services produced in a country in a given year. Real GDP per capita is a measure that divides the GDP of a country at constant prices by its population. It's an important indicator used to gauge the economic performance of a country. Annual growth rate of real GDP per capita is calculated as the percentage change in the real GDP per capita between two consecutive years.

The data is presented in constant 2015 US dollars to provide a clearer picture of economic performance by removing the effects of inflation and allowing for a more accurate comparison of economic output over time. Indeed, inflation can significantly distort the true picture of an economy's growth. By adjusting GDP figures to a constant dollar value, analysts can remove the effects of inflation, providing a clearer view of real economic growth or decline. In this regard, for long-term economic analysis, such as examining trends from 1990 to 2022, using constant dollars is essential for accuracy. It ensures that the data reflects real changes in economic activity, rather than changes in price levels.

Analytical part:

While GDP does not fully capture the quality of life or distribution of wealth within a country, it remains an important indicator used to gauge the economic performance of a country.

Figure 7. Comparison of the average GDP per capita and the annual growth rate of GDP per capita between the southern Mediterranean and the northern Mediterranean from 2000 to 2021

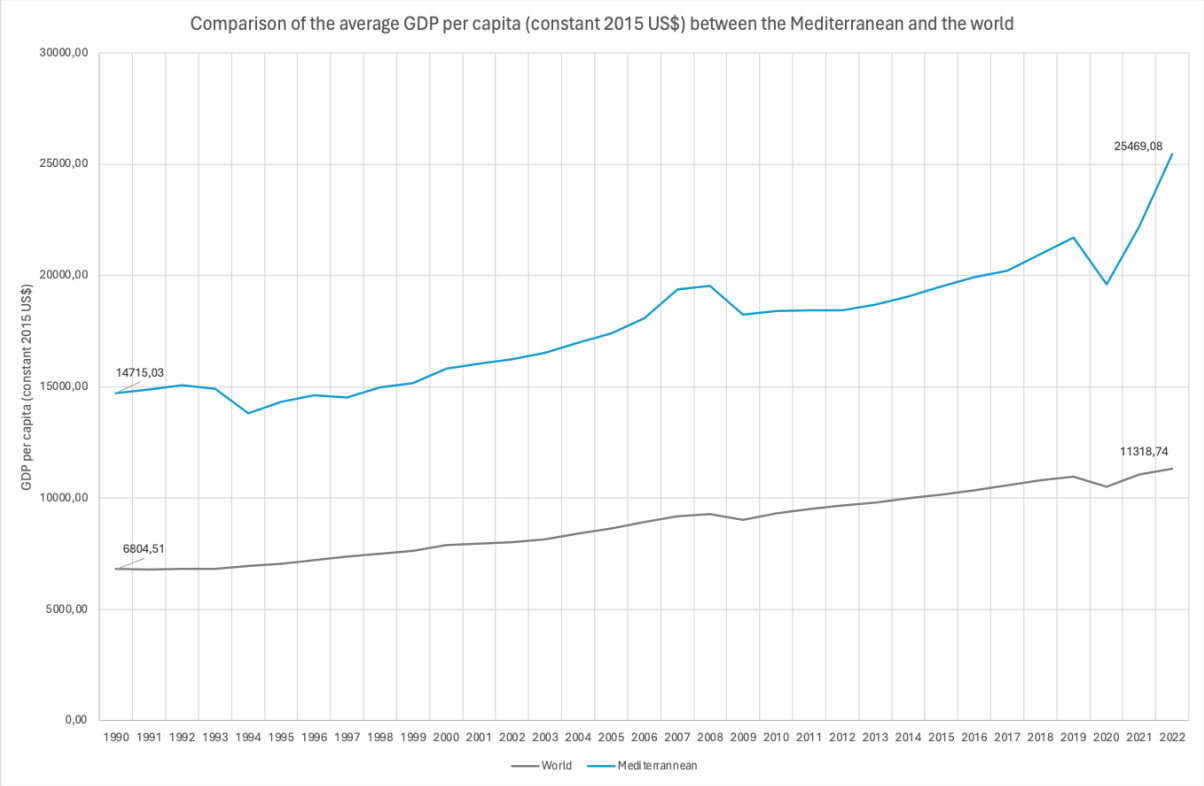


The Mediterranean region is diverse, with countries varying significantly in economic development. Northern Mediterranean countries tend to have higher GDP per capita compared to their Southern counterparts, reflecting differences in economic structure, stability, and integration into the global economy.

The southern Mediterranean countries' data show fluctuations in GDP per capita over the years, with periods of growth and decline influenced by various factors such as political instability, oil prices, and global economic conditions. For example, the Arab Spring (2011) is reflected in the data through the decline in GDP per capita and in the GDP growth rate (-5,38% compared to 2010).

The northern Mediterranean countries show higher GDP per capita and GDP growth rate levels compared to their southern counterparts. More precisely, the gap between the northern Mediterranean GDP per capita and the southern Mediterranean GDP per capita is increasing: in 2000, the GDP per capita of the northern Mediterranean was 2.8 times higher (14 181$ higher) than that of the southern Mediterranean, while in 2021 it was 3.3 times higher (22 184 $ higher). However, they too have faced economic challenges, particularly during the European debt crisis (2009), which is reflected in the data through the decline in GDP per capita and in the annual growth rate of real GDP per capita (-8,75% compared to 2008). Moreover, the COVID-19 crisis (2020) is clearly highlighted in the data through the decline in GDP per capita and the GDP per capita growth rate for both sides of the Mediterranean, with a substantial impact for the northern Mediterranean countries (annual growth rate of real GDP per capita for 2020 for northern Mediterranean countries is -11,25% compared to -8,61% for the southern Mediterranean countries).

Figure 8. Comparison of the average GDP per capita in constant 2015 US$ between the Mediterranean and the world from 1990 to 2022



By comparing the trends of GDP per capita from 1990 to 2022 between the world and the Mediterranean, we can highlight that the Mediterranean region is slightly diverging from global economic development patterns (especially since the recovery of COVID-19 crisis): in 1990, the GDP per capita of the Mediterranean was 2.16 times higher (7910$ higher) than that of the world, while in 2022 it was 2.25 times higher (14 150 $ higher). Globally, for 32 years the Mediterranean region has followed the same patterns of global economic development as the world.

Moreover, events such as the global financial crisis and the COVID-19 crisis have impacted more significatively the Mediterranean than global averages: for instance, in 2020, the average GDP per capita decreased 4.8 times more in the Mediterranean (-2097$ between 2019 and 2020 with GDP growth rate of -10,71%) compared to the world (-441$ between 2019 and 2020 with GDP growth rate of -4,20%). On the other hand, the substantial recovery from the COVID-19 crisis provides insights into the resilience of the Mediterranean economies compared to the global average: GDP per capita in 2022 for the Mediterranean is 25 469$ (GDP growth rate of 12,91%) compared to 11 319$ for the world (GDP growth rate of 2,23%).

Precautions / Notes:

- Due to a lack of data for certain Mediterranean countries from 1990 to 2000 and for 2022, we compared the economic performances between the northern Mediterranean countries and the southern Mediterranean countries from 2000 to 2021.
- The data is presented in constant 2015 US dollars to account for inflation. However, currency fluctuations and changes in purchasing power parity (PPP) can also affect the accuracy of comparisons over time. Indeed, adjusting for inflation to constant dollars does not account for changes in PPP across countries. Yet, PPP adjustments are necessary for international comparisons to reflect differences in price levels across countries. In addition, over long periods, the structure of an economy can change significantly. Industries may rise or fall, and new technologies can alter productivity. Constant dollar measures may not fully capture these structural changes.
- GDP per capita is influenced by population growth or decline. In this regard, we need to keep in mind that a rapid population change can skew the interpretation of economic growth or decline and that the high demographic growth of the southern Mediterranean countries impacts our interpretation.

- The world and Mediterranean average can mask significant disparities between countries.
- While GDP per capita is a useful economic indicator, high GDP per capita does not necessarily mean high living standards for all citizens. Indeed, the increase in the share of GDP allocated to the 10% richest between the northern Mediterranean countries and the southern Mediterranean countries is not considered in this analysis.

Source: World Bank national accounts data, and OECD National Accounts data files, 2022.

d) Core IDD 4: Carbon dioxide emissions per capita

Definition: Carbon dioxide emissions per capita measure the total amount of carbon dioxide emissions produced within a country, divided by the country's population within a given year. It is expressed in tonnes per person. This indicator is crucial for understanding the environmental impact of a country's production processes and lifestyle on a per-person basis, reflecting the efficiency and sustainability of its economic activities.

Analytical part:

Figure 9. Comparison of the average CO_2 production emissions in tonnes per capita between the southern Mediterranean and the northern Mediterranean from 1990 to 2021

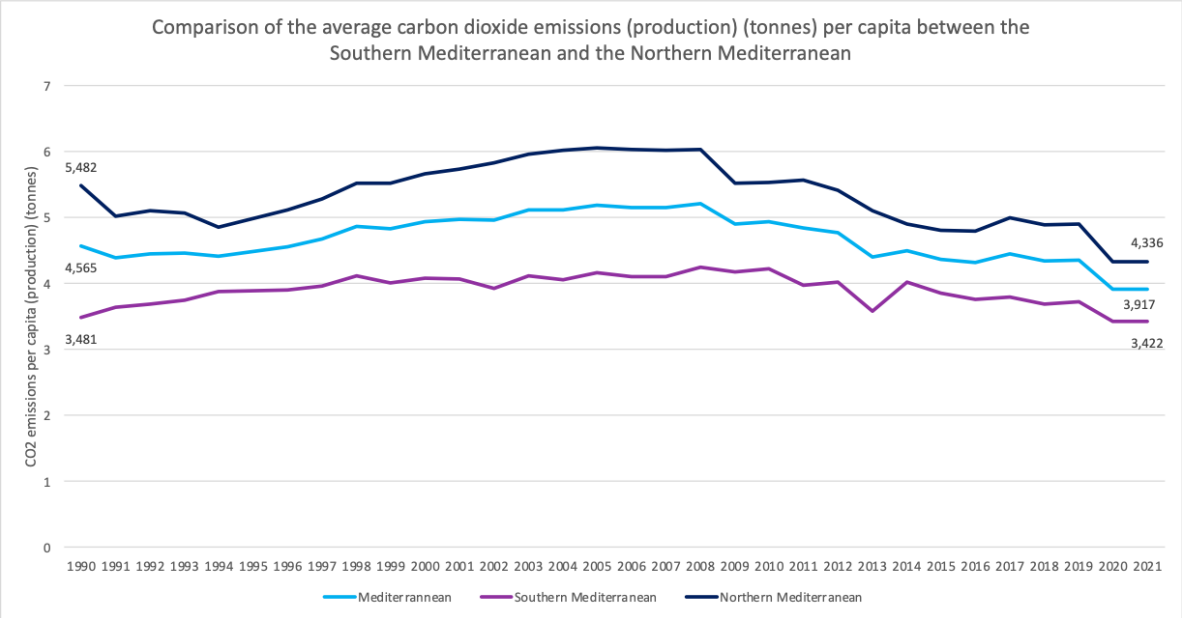


Figure 10. Average CO_2 production emissions in tonnes per capita for the northern Mediterranean countries from 1990 to 2021

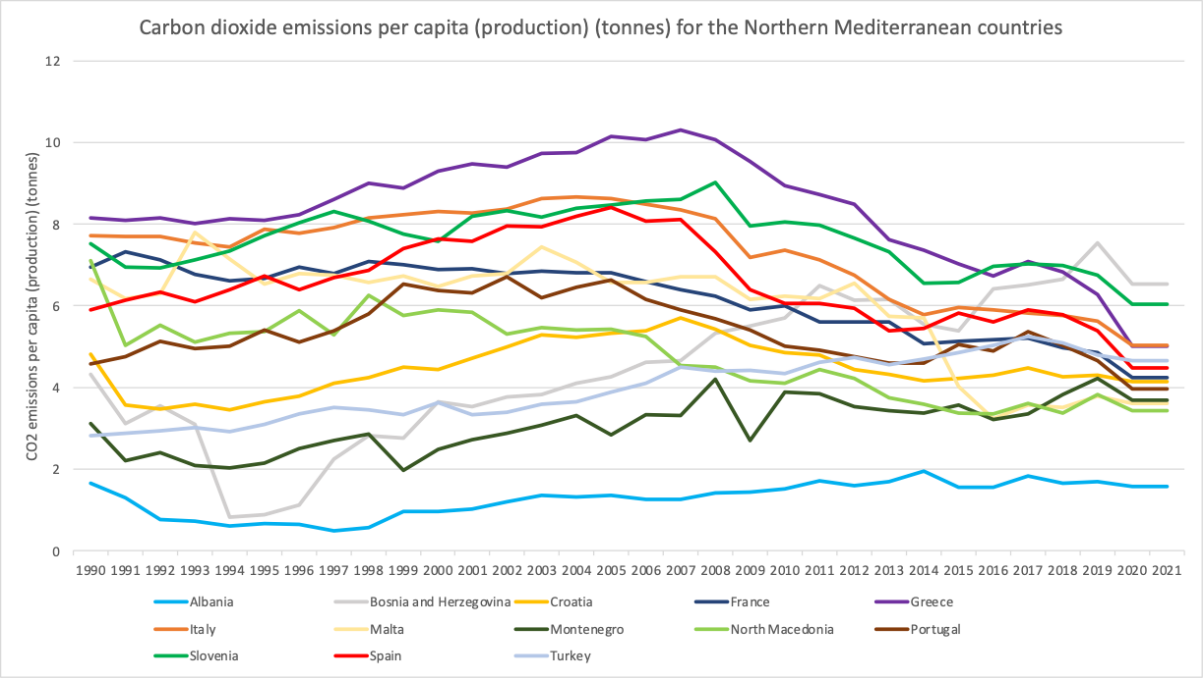
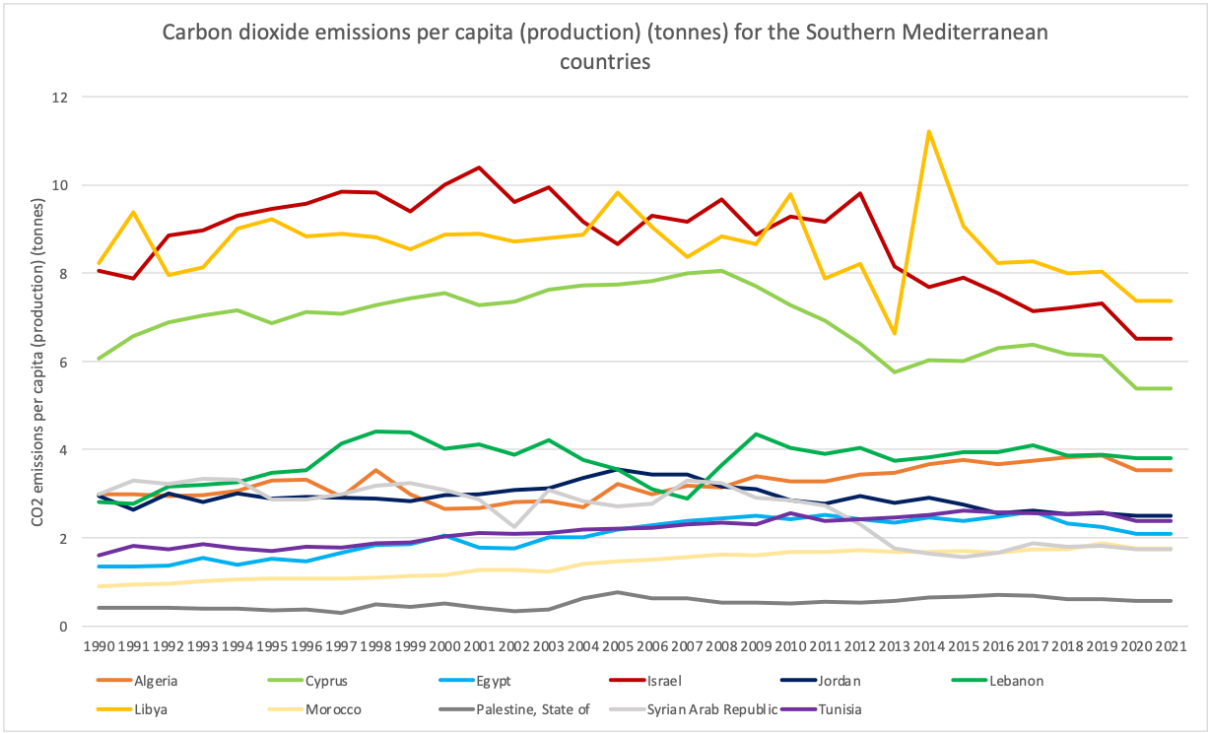


Figure 11. Average CO_2 production emissions in tonnes per capita for the southern Mediterranean countries from 1990 to 2021



Since 2008, CO_2 emissions have decreased in most Mediterranean countries, but more significantly in the northern Mediterranean countries. Globally, from 1990 to 2022 the southern Mediterranean seems to follow the same trend of carbon dioxide emissions per capita as the northern Mediterranean, but less pronounced.

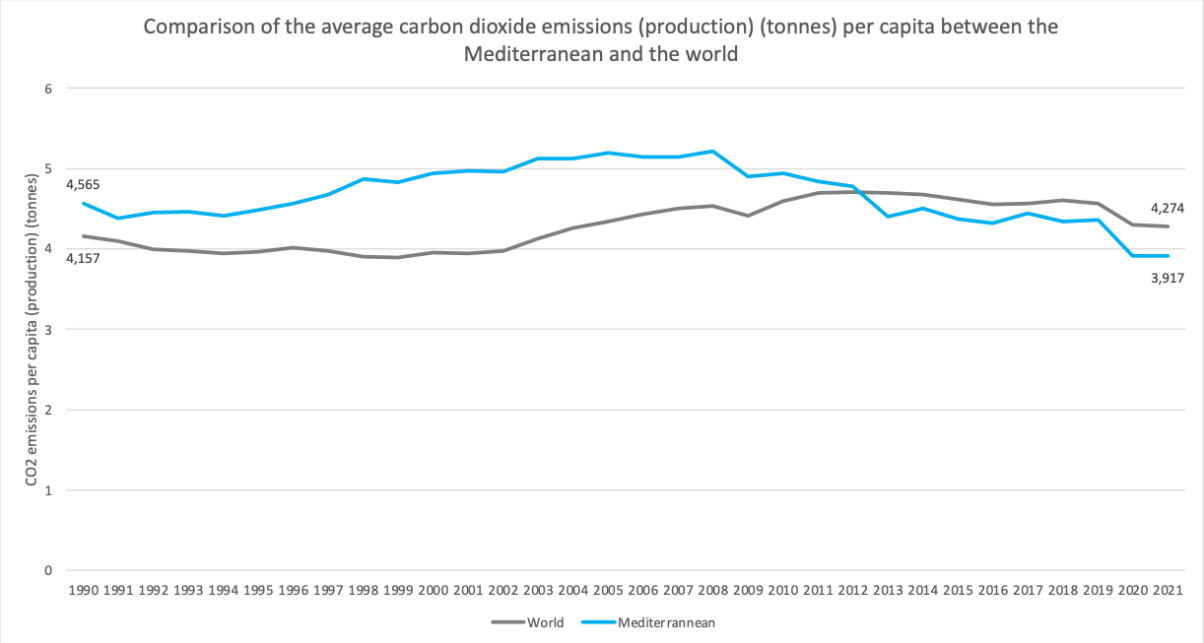
Some countries, like France, Italy and Greece, show a general decrease in CO_2 emissions per capita over the period (10.31 tonnes of CO_2 per capita for Greece in 2007 compared to 5.01 tonnes in 2020).

Conversely, countries like Egypt, Syrian Arab Republic and Jordan initially show an increasing trend, possibly due to industrial development and increased fossil fuel consumption without equivalent efficiency gains or shifts to cleaner energy sources. But since 2011, these countries show a decreasing trend, especially concerning the Syrian Arab Republic (2.74 in 2011 vs. 1.14 in 2020), probably due to the consequences of the Arab Spring. On the other hand, some countries like Morocco, Tunisia or Algeria show a constant increasing trend since 1990.

Moreover, Bosnia and Herzegovina, North Macedonia, Montenegro, Croatia, and Slovenia exhibit significant fluctuations, likely due to the political and economic transformations following the dissolution of Yugoslavia in the early 1990s. Indeed, we notice a significant drop in emissions from 1990 to 1994 with a minimum of emissions reached by Bosnia and Herzegovina in 1994 with 0.81 tonnes of CO_2 per capita. This corresponds to a period of war in the former Yugoslavia marked in particular by the Bosnian War (1992-1995) and the Croatian War of Independence (1991-1995).

Furthermore, the data highlights substantial peaks for Libya with, for example, a dramatic increase after 2011 (with a maximum of emissions reached in 2014 with 11.22 tonnes of CO_2 per capita), which could be attributed to the political instability and conflict affecting production and energy use patterns following, corresponding to the first Libyan civil war and the military intervention of armed forces.

Figure 12. Comparison of the average CO_2 production emissions in tonnes per capita between the Mediterranean and the world from 1990 to 2021



Mediterranean countries, on average, started with higher CO_2 emissions per capita than the world average in 1990 (4.57 vs. 4.16 tonnes) and maintained a generally higher level throughout the period up to 2012. But the average CO_2 emissions per capita for Mediterranean countries fell below the world average since 2012 (4.77 vs. 4.71 tonnes in 2012 and 4.40 vs. 4.70 tonnes in 2013).

Several factors that could influence such a shift. Economic downturns, such as the global financial crisis that began in 2008, can lead to reduced industrial activity and energy consumption, which in turn can lead to lower CO_2 emissions. The effects of the crisis may have lingered in the Mediterranean region, leading to a slower recovery and reduced emissions. Indeed, since 2008, CO_2 emissions have decreased in most Mediterranean countries, but more significantly in the northern Mediterranean countries *(more impacted by this crisis as shown in the CORE IDD 3 GDP per capita)*. In the same way, political events, such as the Arab Spring, which began around 2011, could have led to disruptions in economic activity in North African Mediterranean countries, potentially contributing to lower emissions, as highlighted

by the data of Libya, Egypt and Syrian Arab Republic, for instance. Moreover, by 2012, many countries around the world, including those in the Mediterranean region, may have implemented more "aggressive" policies aimed at reducing carbon emissions in order to respect the Paris agreement to achieve "climate neutrality" by 2050. In this regard, some Mediterranean countries may have undergone structural changes in their economies, moving away from heavy industry and toward services and technology sectors that typically have lower CO_2 emissions.

Precaution / Notes:

- The accuracy of CO_2 emissions data can vary by country due to differences in data collection methods, reporting standards, and the inclusion (or exclusion) of various sources of emissions. In this regard, this core indicator, although similar to the indicator 21 of the MSSD, presents many differences due to the use of a different database because data on periods and countries was missing for the base of indicator 21.
- Economic growth, industrial policies, energy sources, and political instability can significantly affect CO_2 emissions, making it essential to consider these factors when interpreting the data.
- When comparing CO_2 emissions across countries, it's crucial to consider differences in population size, economic structure, and energy mix. These factors can significantly influence emissions per capita.
- This indicator focuses on production-based emissions within a country's borders. It does not account for emissions associated with the consumption of imported goods and services, which can lead to an underestimation of the environmental impact of a country's lifestyle and consumption patterns.
- While per capita emissions provide insight into the average emissions attributed to an individual within a country, they do not account for the total impact of a country's emissions on global climate change. High per capita emissions in a country with a small population may have a smaller global impact than lower per capita emissions in a highly populous country. In the same way, the CO_2 emissions of 1% richest between the northern Mediterranean countries and the southern Mediterranean countries is not considered in this analysis.

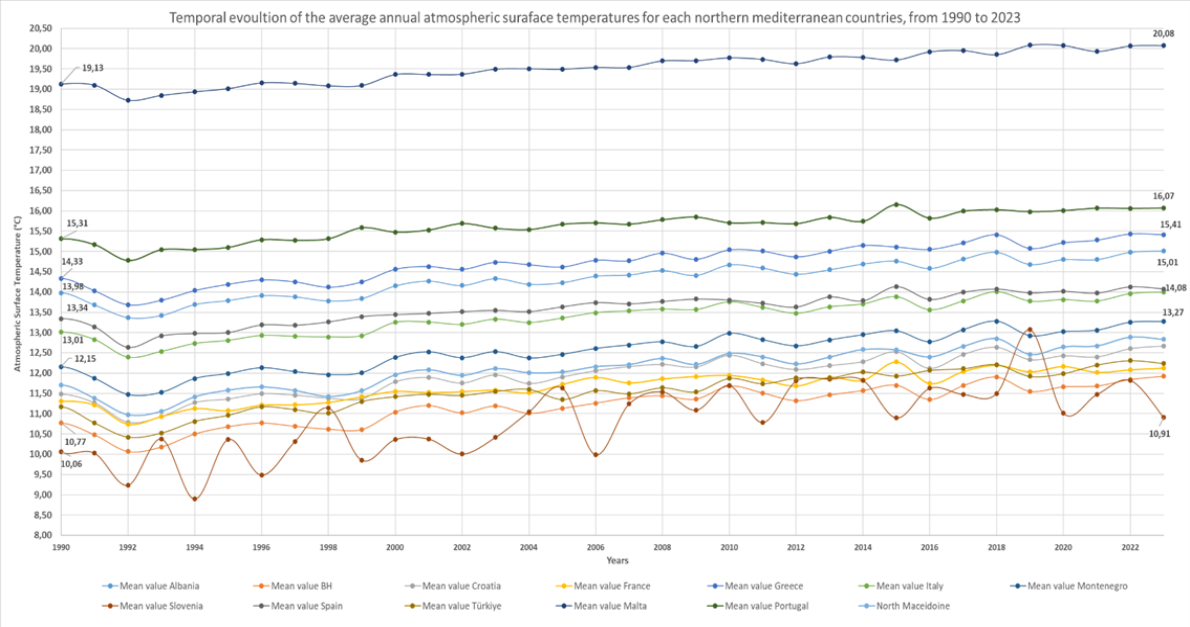
Source: United Nations Development Programme Database and report, 2021.

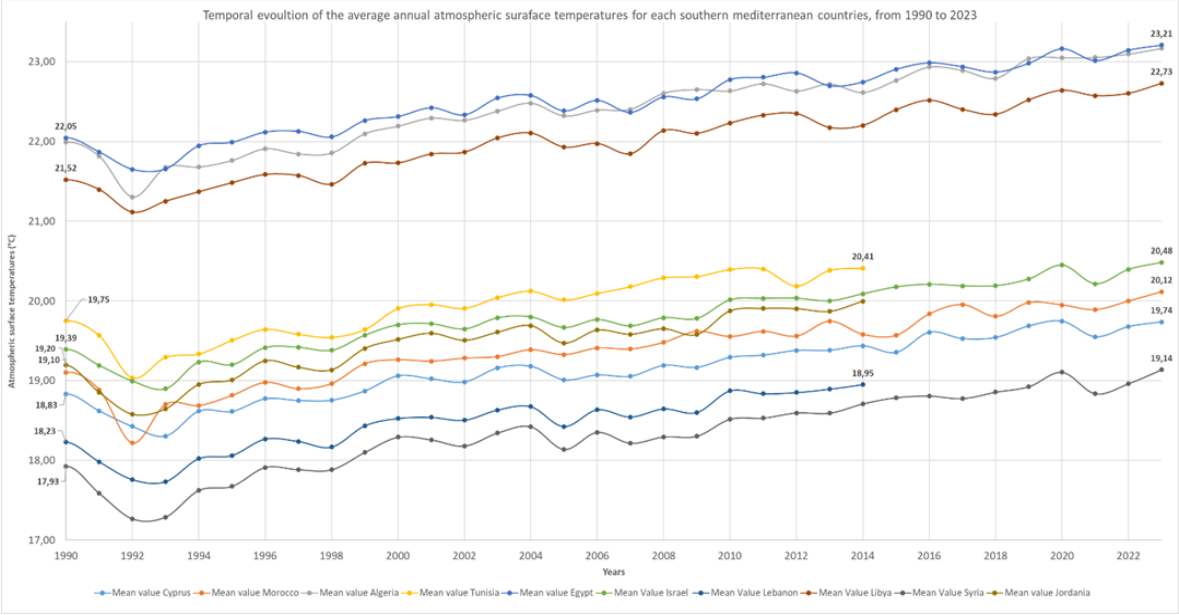
e) CORE IDD 5-a: Atmospheric Surface Temperature (AST)

Definition: The atmospheric surface temperature is defined as the air temperature (in °C) at 2m from the ground surface. The sea surface temperature is defined as the temperature 5m below the sea surface (which receives and absorbs a major part of solar radiations). This indicator is a key environmental drivers, which in a sense, has direct and indirect impacts on all biogeochemical processes (chemical reactions, chemical speciation, environmental persistence of the chemical species, etc.) and all related living things (physiological and metabolic modifications, behavioral changes, life cycle stage modifications, etc.). Moreover, such a physical indicator is linked to the whole atmosphere ecosystem and may vary drastically on short temporalities. The AST indicator displays the temporal evolution since 1850 at different geographical scales, from national level to Mediterranean shores comparison. For the SST, the temporal evolutions are also considered between the different Mediterranean sub-basins (West basin including gulf of Ligurian sea, gulf du Lyon and Alboran sea, Adriatic basin, the central Mediterranean basin and the eastern basin). For the AST, the annual variations have been calculated and represented in order to propose a better analysis of the evolution.

Analytical part:

Figure 13. Temporal evolution of the average annual atmospheric surface temperatures for each northern (a) and southern (b) Mediterranean countries

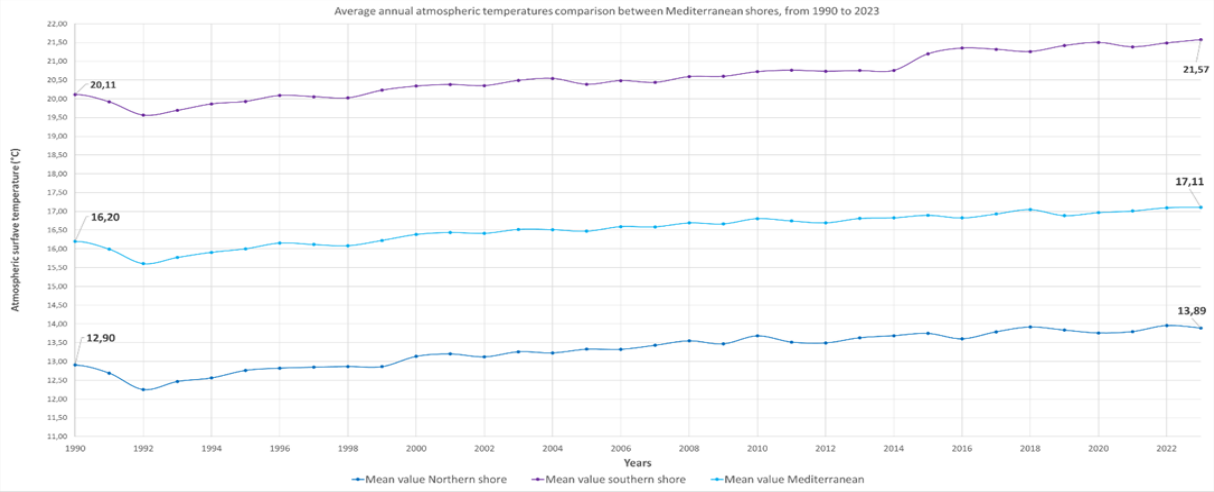




These graphs show highly contrasted temporal and geographical variations between Mediterranean countries, as well as within the same shores. Indeed, in 2022, the average annual AST for the northern countries range between 10,98 °C and 20,08 °C respectively for Slovenia and Malta. For southern countries, the AST varies between 19,14 °C and 23,21 °C respectively for Syria and Egypt. For the northern countries of the Mediterranean, the AST evolutions since 1990 follow approximately linear and positive trends except for Slovenia which display highly contrasted AST between each year, exposing a respective standard deviation of 0,84 °C. Moreover, all the continental countries show AST between 10,91°C for Slovenia and 15,41°C for Greece. For the northern countries, the average annual AST between 1990 and 2000 has increased between +0,73 °C for Spain and 1,15 °C for Bosnia Herzegovina.

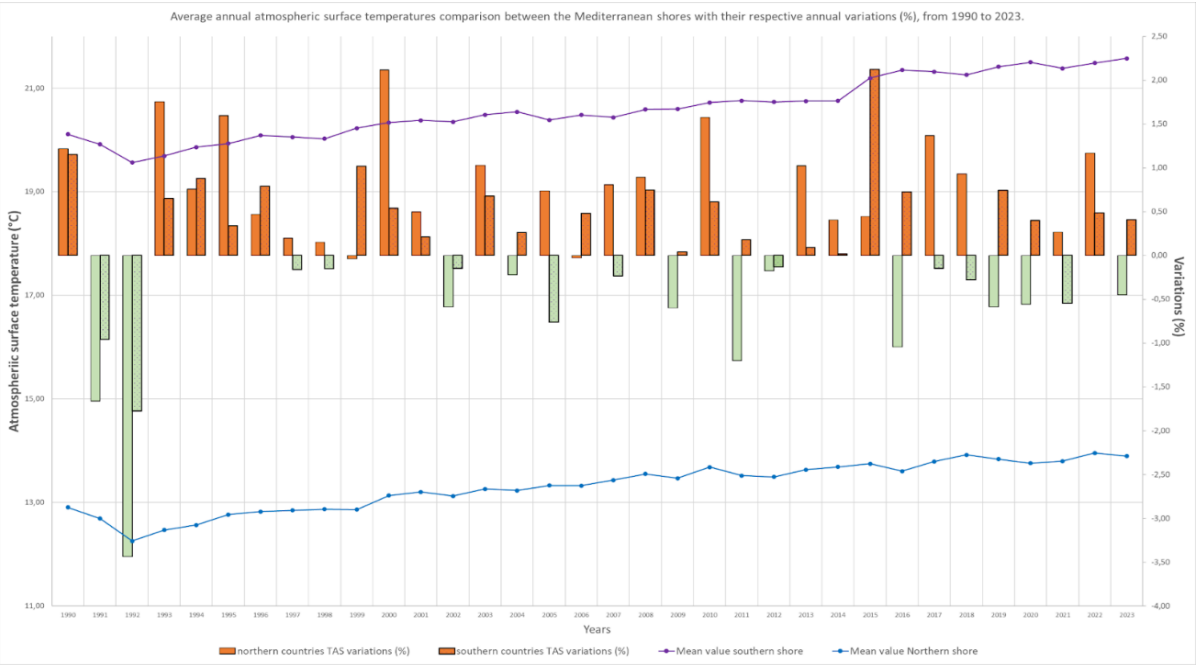
Interestingly, the northern countries are more contrasted than the southern ones. Indeed, in 2023, there is a 9,17 °C difference between the hottest (Malta) and coldest (Slovenia) countries in terms of average annual AST whereas there is only a 4,07 °C difference between Syria and Egypt. On the other hand, between 1990 and 2023 the highest standard deviation for the southern Mediterranean countries is for Algeria with 1,18 °C. What's more, there is a clear temperature gap (+2,25°C) between Algeria, Libya, Egypt and the other southern Mediterranean countries.

Figure 14. Average annual atmospheric surface temperatures comparison between Mediterranean shores and the whole basin



This graph provides a more general view of the AST variations by integrating a larger geographical coverage, the Mediterranean shores. Therefore, the overall increase since 1990 is more significant for the southern shore (+1,46°C on average in 33 years) than the northern one (+0,99 °C on average in 33 years). The has overcome an average AST increase of 0,91 C since 1990.

Figure 15. Temporal evolution since 1990 of the AST compared between the Mediterranean shores with their respective variations (%) per year



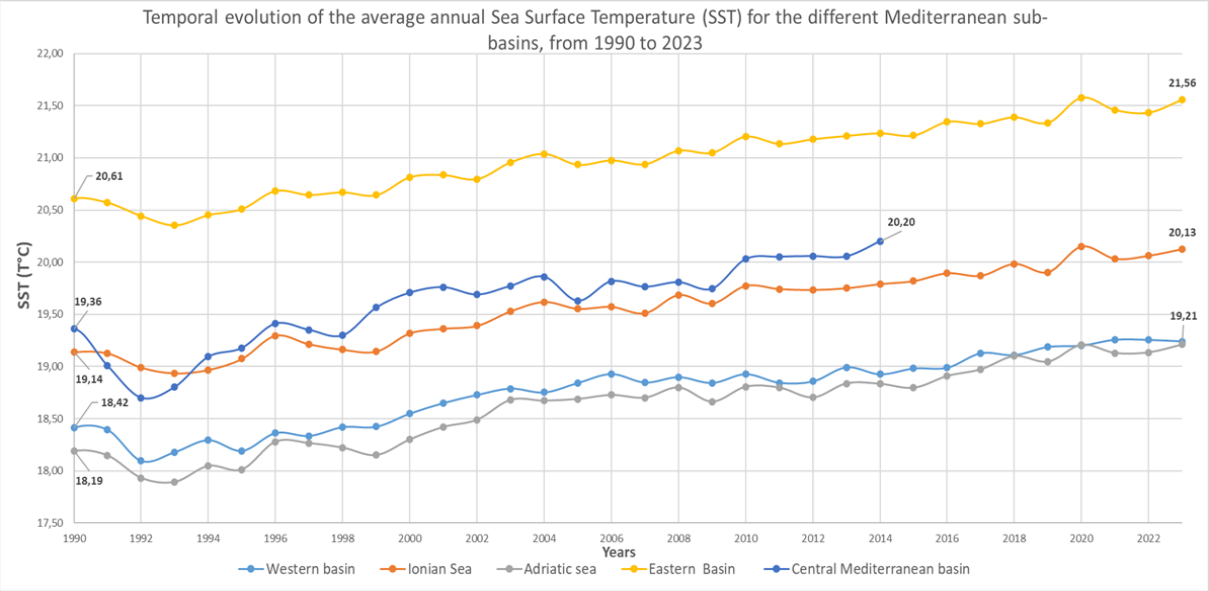
This combined graph brings more detailed information about temporal AST variations. Although the trends are positive, both the south and north shores have seen negative variations in their respective average annual AST, ranging from -0,03% to -3,44% for the northern shore and from -0,13% to -1,77% for the southern shore. In total, the southern shore exposed 11 negative variations of its AST while the northern shore displayed 13 negative AST variations. On the contrary, the southern shore shows 20 positive AST variations against 21 positive ones for the northern shore. Thus, such results support the idea that the southern shore faces a more intense warming in terms of the number of AST increases than the northern shore of the Mediterranean.

f) CORE IDD 5-b: Sea Surface Temperature (SST)

Definition: The sea surface temperature is defined as the temperature 5m below the sea surface (which receives and absorbs the major part of solar radiations). This indicator is also a key environmental driver, which in a sense, has direct and indirect impacts on all biogeochemical processes (chemical reactions, chemical speciation, environmental persistence of the chemical species, etc.) and all related living things (physiological and metabolic modifications, behavioural changes, life cycle stage modifications, etc.). For the SST, the temporal evolutions are also considered between the different Mediterranean sub-basins both in terms of °C values (Figure 16) and variations (Figure 20) around the annual mean for a given year. Same as for the AST, the annual variations have been calculated and represented in order to propose a sharp analysis of the evolution.

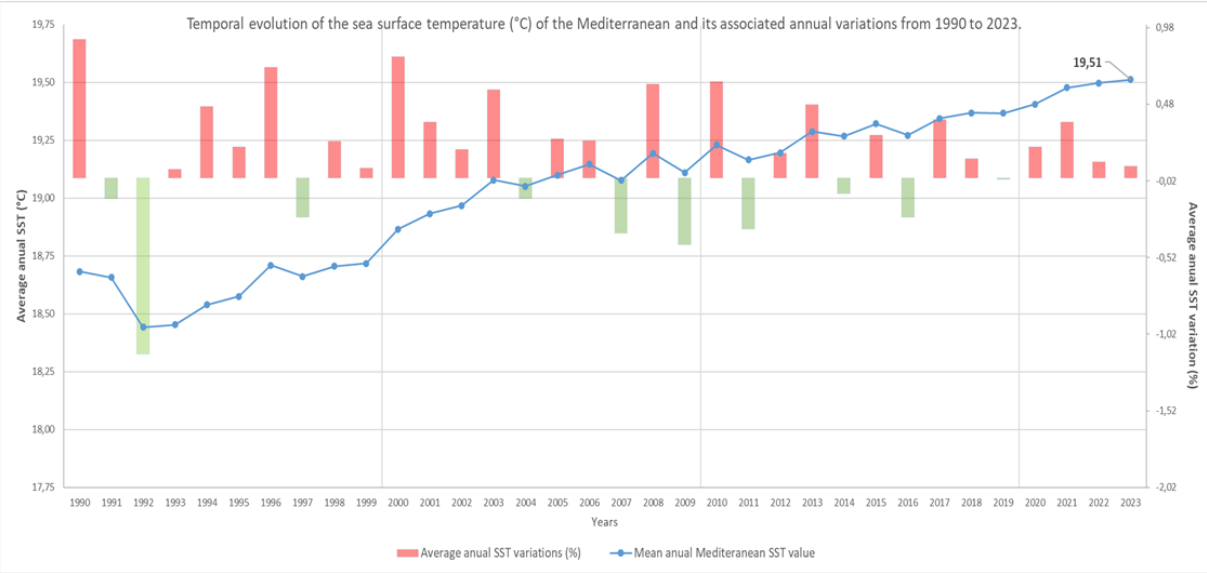
Analytical part:

Figure 16. Temporal evolution of the Sea Surface Temperature (SST) since 1990 for the different Mediterranean sub-basins



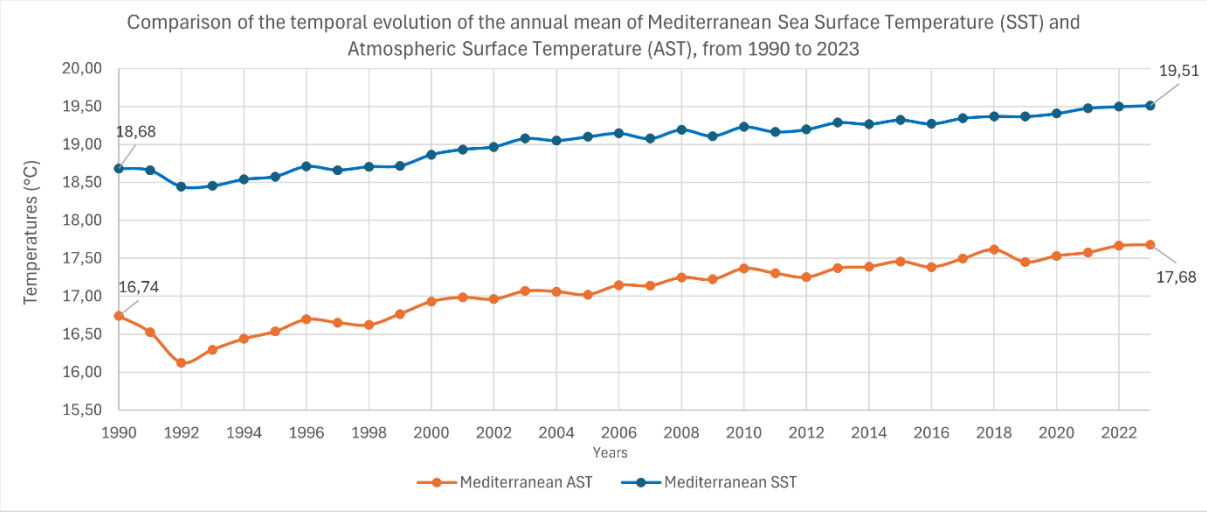
Regarding the SST, the warming of the sea surface seems to be more accentuated than the AST since 1990. The Eastern basin is the hottest with an SST of 21,56°C in 2023 when the Western and Adriatic basins are approximately around 19,21°C. Moreover, it's important to notice the warming of the Adriatic basin towards the western's basin temperature. Since 1990, the basin which has overcome the greatest SST increase is the Western Mediterranean, with a +1,71°C warming.

Figure 17. Temporal evolution of the sea surface temperature (°C) of the Mediterranean basin from 1990 to 2023



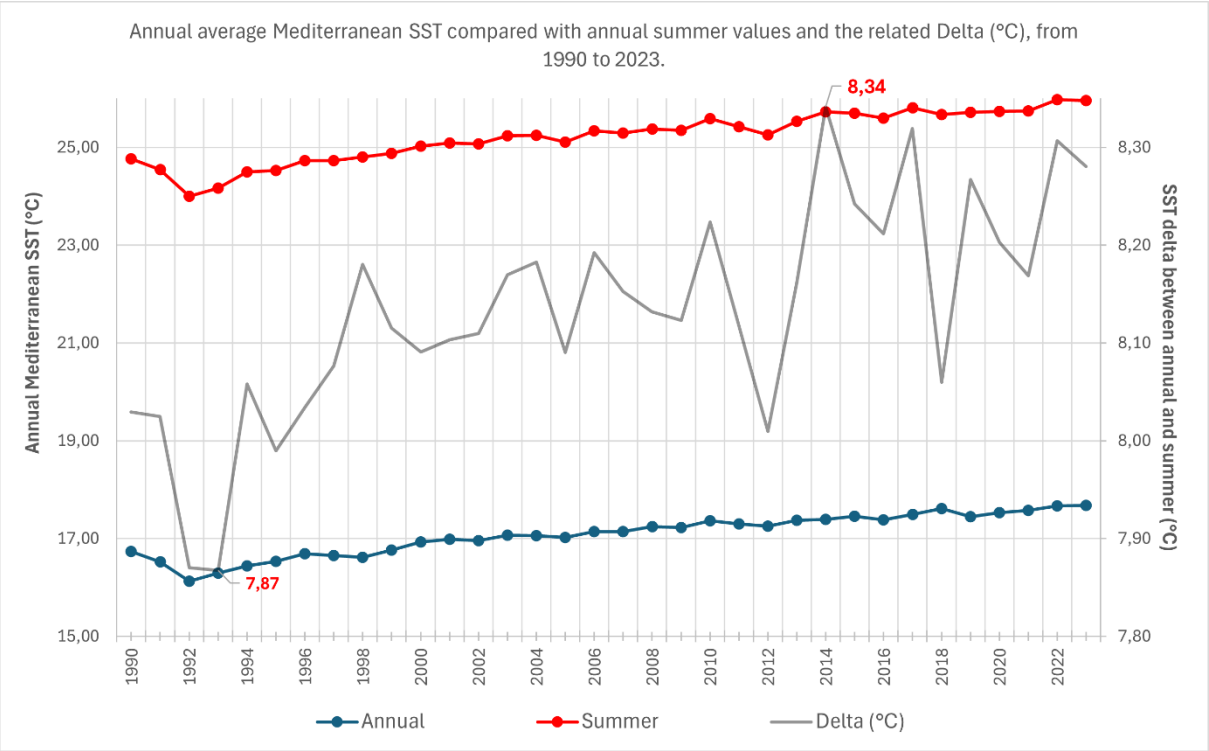
Since 1990, the average annual Mediterranean SST variations ranged between -1,15% in 1992 and +0,90% in 1990. Even if the positive variations (related to SST increases) seem minor, their frequencies are elevated. In fact, since 1990, there have been 30 positive variations (8,46% increase in total).

Figure 18. Comparison of the temporal evolution of the Mediterranean SST and AST from 1990 to 2023



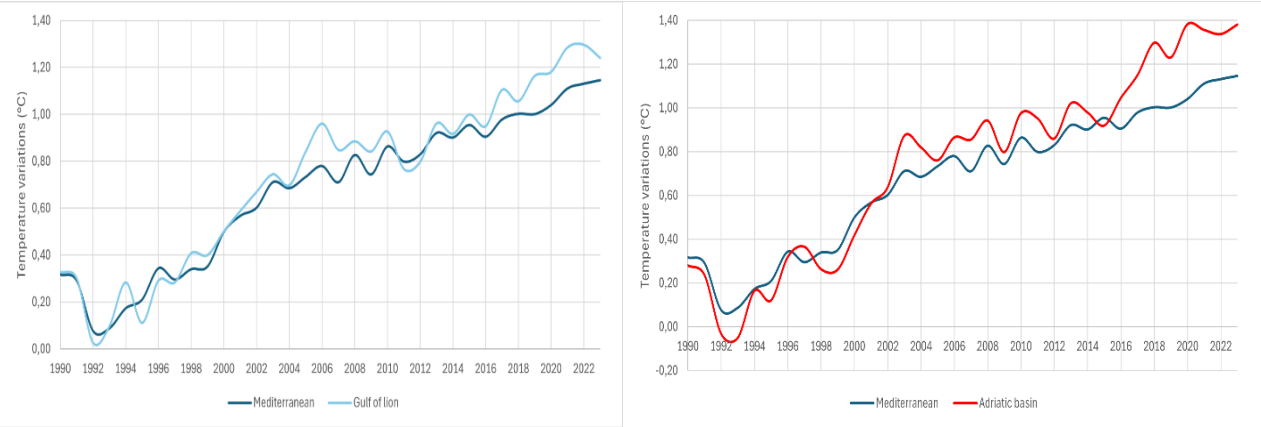
The relationship between the SST and the AST is clearly highlighted through this graph. Indeed, the positive and negative trends seem to be correlated. Nevertheless, the average annual warming of the Mediterranean SST seems more intense. In 2023, the SST temperature was 2.4°C higher than the AST temperature for the same year. Comparing the graphs above therefore confirms the calorific property of seawater, which means that seawater heats up slowly but retains its temperature for longer.

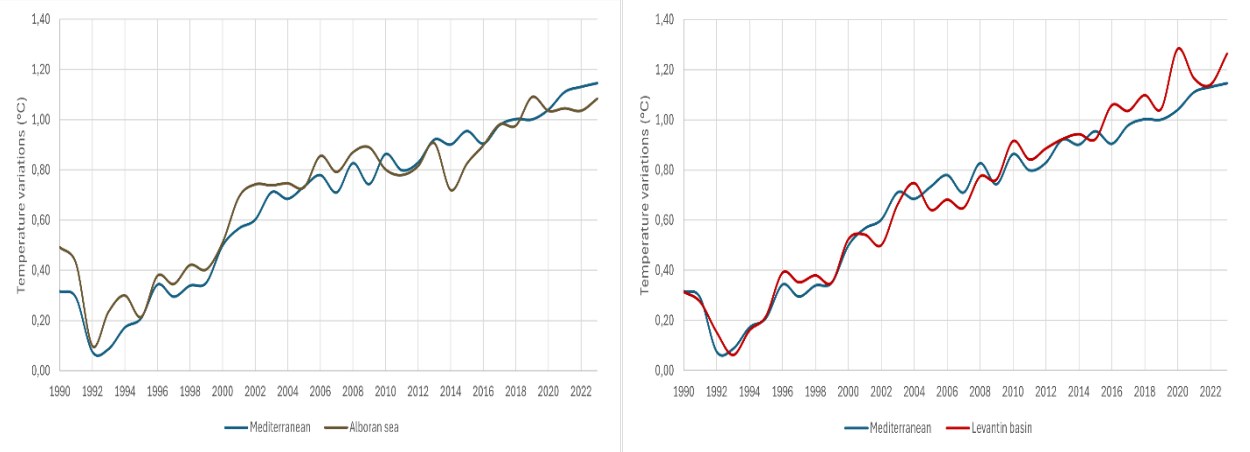
Figure 19. Annual average Mediterranean SST compared with annual summer values and the related Delta (°C), from 1990 to 2023



The annual and seasonal patterns of SST changes are displayed in Figure 19. It's striking how the seasonality, here the summer season, displays its own evolution. From 1990 to 2023, the average summer ST has been much more intense than the annual SST. Indeed, it shows a delta temperature ranging from + 7.89 °C (in 1993) to +8.34 °C (in 2013). The delta is the difference between the two means: annual mean summer and annual mean SST. More importantly, the delta variation is more and more dispersive compared to the annual Mediterranean SST. This number is critical and does not represent extreme SST anomalies which are more intense than the recorded SST. On the other hand, more local variations can be highlighted, notably at the sub-basins scale.

Figure 20. Annual mean SST of the different sub-basins compared to the Mediterranean basin evolution (the annual SST mean variation), from 1990 to 2023





Indeed, the SST anomalies can be monitored and analyzed at smaller scales. The sub-basins approach allows us to scale down the analysis. Indeed, as exposed on the Figure 20, each sub-basin displays its own SST change's pattern. For instance, in 2006, the Gulf of Lion displayed more intense SST changes (+0.20°C compared to the Mediterranean average) while the Levantine basin showed a lower variation (-0.15°C compared with Mediterranean average). However, an overall trend can be noticed from 1990 to 2023. Between 1990 to 2000, the curves of the sub-basins were in phase with the one of the Mediterranean. Then, we can observe a graduated disconnection between the Mediterranean basin evolution and its related sub-basins. If we take a closer look at the 2020-2023 period, drastic positive changes are observed for each sub-basin. The Adriatic, the Gulf of Lion and the Levantine basins present the highest SST annual changes within the Mediterranean. On the other hand, the Alboran basin displays the lowest annual SST changes compared to the Mediterranean basin. Indeed, such local patterns in the SST variations can be explained by the associated local sea surface currents. For instance, the Alboran sea receives daily Atlantic water flows (colder seawaters than those of the Mediterranean). Moreover, the cyclonic circulation of the Mediterranean basin induces SST differences. When seawater reached the eastern and northern sides of the Mediterranean basin, surface water had more time to warm up.

Precautions/ Notes for 5a and 5b:

All datasets used for this core indicator have been extracted from the Copernicus Interactive Climate Atlas. Both for the AST and the SST, the raw data were downloaded from the Coupled Model Intercomparison Project Phase 6 (CMIP6) calculation outputs. This project was created by the World Climate Research Programme (WCRP) providing worldwide climate projection to analyze past, present and future climatology for varied environmental drivers. Common numerical models have provided a large number of datasets but with a 100km spatial resolution for all European countries.

- For the AST of southern Mediterranean countries, the data have been extracted after having created geospatial polygons (based on administrative national borders) which integrated the historical model's results for the given period (1990-2023). Same for data extractions for the SST variations of each sub-basin. Therefore, potential user biases can be linked to data extraction.
- Moreover, all the presented analysis comes from extracted data which display average annual values without taking into account the seasonal variability, except for summer SST values. However, the other season could be addressed in more detail, both in terms of temperature evolution and variations. Such seasonal overview could bring more insights to the indicators 5a and 5b, notably regarding the climate change dimension which not only induces a global warming but also a climate disruption with significant shifts and accentuated extreme values.
- The data resolution can be also criticized from a geographical and temporal point of view. Some Mediterranean countries exposed temporal gaps for the AST, notably Lebanon, Jordania. For the SST, the central basin also displays temporal gaps (values in °C) starting from 2014.
- Finally, the data represent average and annual temperature values at national level for the AST and Mediterranean and sub-basin scale for the SST, whereas greater variability is constantly occurring on smaller spatial scales (regional climates, microclimates, etc.), particularly for SST, which is associated with a very dense physical domain with varied surface current movements and energy transfers. Actually, these superficial layers of the water column regularly overcome drastic and punctual water temperature anomalies due to water masses stratification

changes. Indeed, down-welling and up-welling currents (cold water masses) can cool down sea water surfaces. Extreme events (marine storms, oceanic eddies) can also directly affect the SST locally.

Source: Copernicus Climate Atlas, 2024

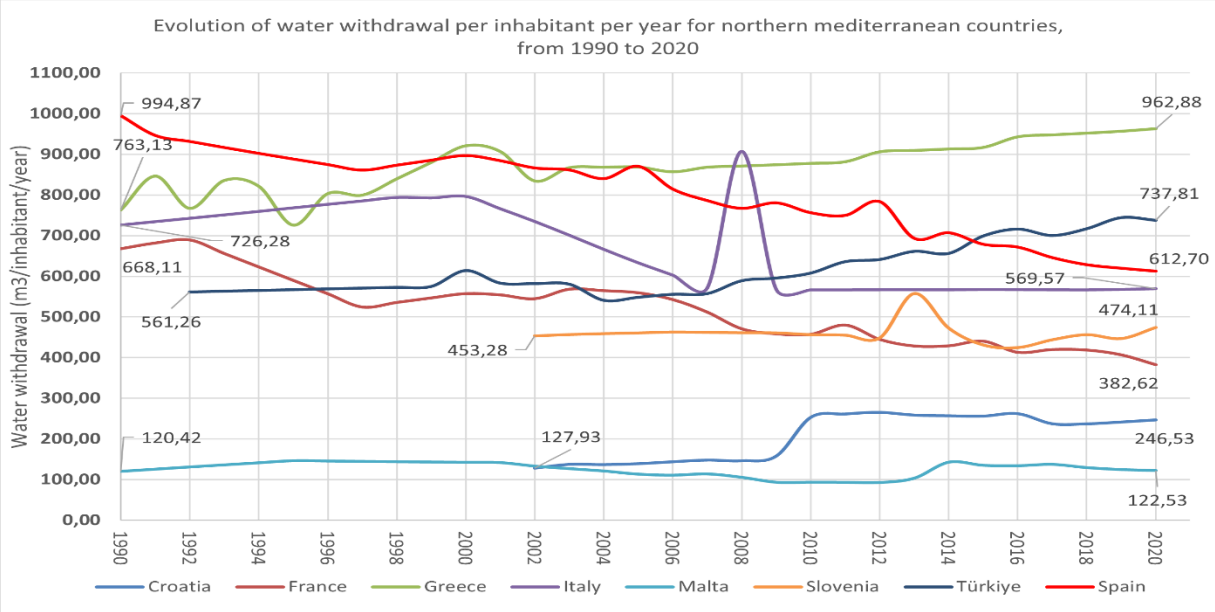
g) CORE INDICATOR 6: Evolution of water withdrawal per inhabitant

Definition: Water stress can be defined with many indicators and is often related to drought indicators. However, the drought's pressure can be misunderstood and can integrate diverse composite indicators. Indeed, it can be tackled with a precipitation index which gives metrics information on quantities of precipitated water for a given geographical area. On the contrary, the evaporation index represents the amount of evaporated water. The soil shallow moisture content and the water flows are also used to characterise the water inputs and water volumes in a given ground. Therefore, assessing water quantitative and qualitative depletions may be tricky.

In fact, water volume availability is more adapted to such water stresses analysis and is more commonly used. Indeed, it can be seen as the freshwater taken from ground or surface water (lakes, rivers, aquifers), either permanently or temporarily and transported to a place of use (OCDE, 2020). Moreover, the water withdrawal per capita is very useful when we want to qualify water availability per inhabitant. The indicator displays the available annual water volumes per inhabitant (m^3/inhabitant/year).

Analytical part:

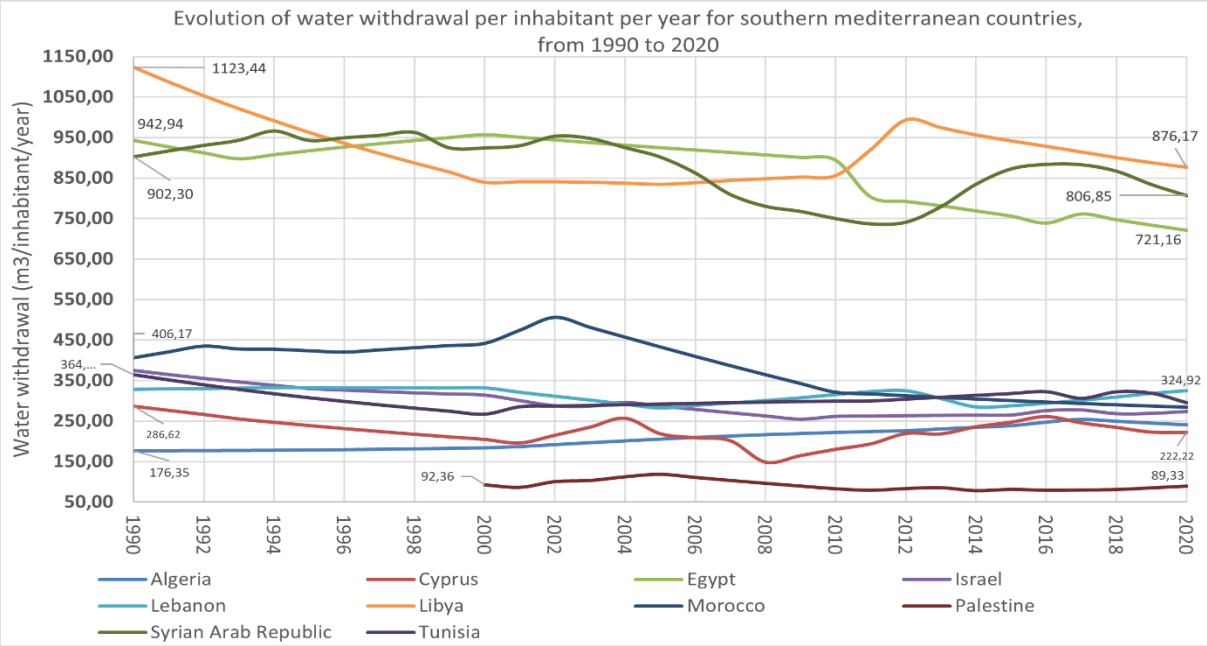
Figure 21. Evolution of water withdrawal (m^3) per inhabitant per year for northern Mediterranean countries, from 1990 to 2020 (modified from AQUASTAT, 2024)



It's interesting to observe the heterogeneity between northern Mediterranean countries. Indeed, even if they gather 67% of the total renewable water resources (RED, 2020), temporal differences are highlighted in the water withdrawal per capita for each country. Moreover, these differences are accentuated with specific national population growth (FAO, 2020).

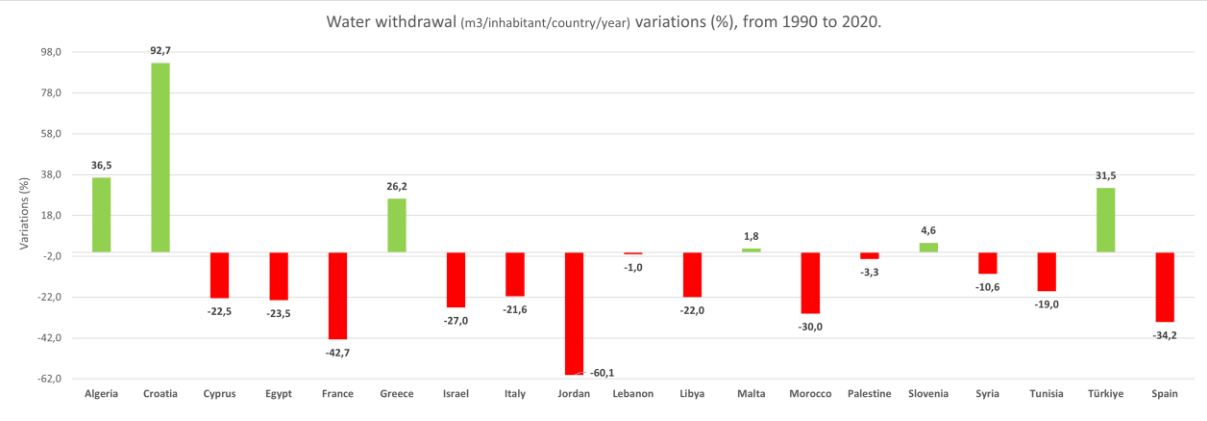
In 1990, Spain displayed the highest water withdrawal (994,87 m^3/inhabitant/year) followed by Greece (763,13 m^3/inhabitant/year), Italy (726.28 m^3/inhabitant/year) and France (668.11 m^3/inhabitant/year). In 2020, we observed a shift in the national water withdrawal patterns. Greece arrives in first position followed by Türkiye and Spain, which was initially at the top. Three northern countries (Spain, Italy and France) overcame significant decreases for their respective national water withdrawal per capita. In 30 years, France displayed a diminution of 42.7% for its water withdrawal capita when Spain and Italy showed water withdrawal reductions of 38.4% and of 21.57% respectively. On the other hand, Malta, Croatia, Slovenia, Türkiye and Greece recorded significant increases in their respective water withdrawals.

Figure 22. Evolution of water withdrawal per inhabitant per year for southern Mediterranean countries, from 1990 to 2020



The temporal evolution of the water withdrawals for southern Mediterranean countries has been represented on Figure 22. Same for northern Mediterranean countries, the water withdrawals display non-linear evolutions with trays, hollows and peaks. What's more, two distinct groups are identified. Indeed, three countries (Libya, Egypt and Syria) display higher water withdrawals than the remaining southern countries. In fact, in 2020 there was a gap of 396.24 m^3/inhabitant/year between Egypt (721.16 m^3/inhabitant/year) and Lebanon (324.92 m^3/inhabitant/year). All southern countries have recorded drastic diminutions in their respective water withdrawals since 1990. Indeed, the majority of southern Mediterranean countries present lower water withdrawals than the third lowest water withdrawal of the northern Mediterranean countries (France), in 2020.

Figure 23. Water withdrawal variations (%) for all Mediterranean countries (+Jordan) between 1990 and 2020



Instead of looking at the annual change in national water withdrawals per inhabitant, the change over the thirty-year period associated with the latter can provide additional information. As suggested by the temporal evolution curves, the majority of Mediterranean countries recorded water withdrawal decreases over the 1990-2020 period. The negative variations range from -1.0% for Libya to -42.7% for France (and -60.1% for Jordan). Algeria is the only southern Mediterranean country which displays a positive variation (+36%) in its annual water withdrawal. It's important to notice the variations of the two Mediterranean island countries, Malta and Cyprus. Indeed, such countries are initially confronted with water scarcity compared to continental countries. Malta recorded a slight increase in annual per capita

water withdrawal (+1.8%) over the 30-year period, while Cyprus fared less well, posting a 22.5% drop over the same period.

Precautions / Notes:

- This indicator is a good representation of water availability facing rising water stresses. However, more punctual and pronounced water scarcities occur in the Mediterranean basin and are not necessarily taken into account in the indicator analysis.
- What's more, economic and social factors are not taken into account in the water abstraction indicator, despite the fact that many Mediterranean societies have difficulty gaining access to drinking water. On the other hand, climate change and anthropogenic activities not only affect quantitative water dimensions, but also qualitative ones. Indeed, many natural water tanks are more and more contaminated and may be dangerous for human consumption.
- The seasonal water demand (generally more intense during summer) could be added to the analysis due to its direct effects on temporal water withdrawal per capita balance. Finally, the observed variations can't totally be explained. It could be interesting to cross the analysis with other factors which may induce direct changes on water availability, notably non-conventional water resources development.
- Moreover, water distribution between customers (municipalities, industries, tourism activities, etc.) could be integrated into the analysis of water withdrawal evolution, notably for assessing the direct and indirect influences between customer water requirement and potential water distribution imbalance.

Source: FAO AQUASTAT, 2024

h) Core IDD 7: Evolution of Mediterranean protected areas and their associated surfaces

Definition: This indicator encompasses the total marine extent of protected sites (MPAs, Other Effective area-based Conservation Measures (OECMs) and Site of conservation interest) in square kilometres (km^2) within the Mediterranean region, distinguishing between the northern and southern Mediterranean countries.

Marine Protected Areas (MPAs) are defined as marine and/or coastal areas, including lagoons permanently linked to the sea, the oceanic water column and its underlying seabed, that are recognized, dedicated, and managed through legal or other effective means to achieve the long-term conservation of nature with associated ecosystem services and cultural values. These areas are designated to protect and preserve the biological diversity and natural and cultural resources within their boundaries. MPAs vary widely in their objectives, which can range from strictly prohibiting all extractive activities to allowing sustainable use of marine resources.

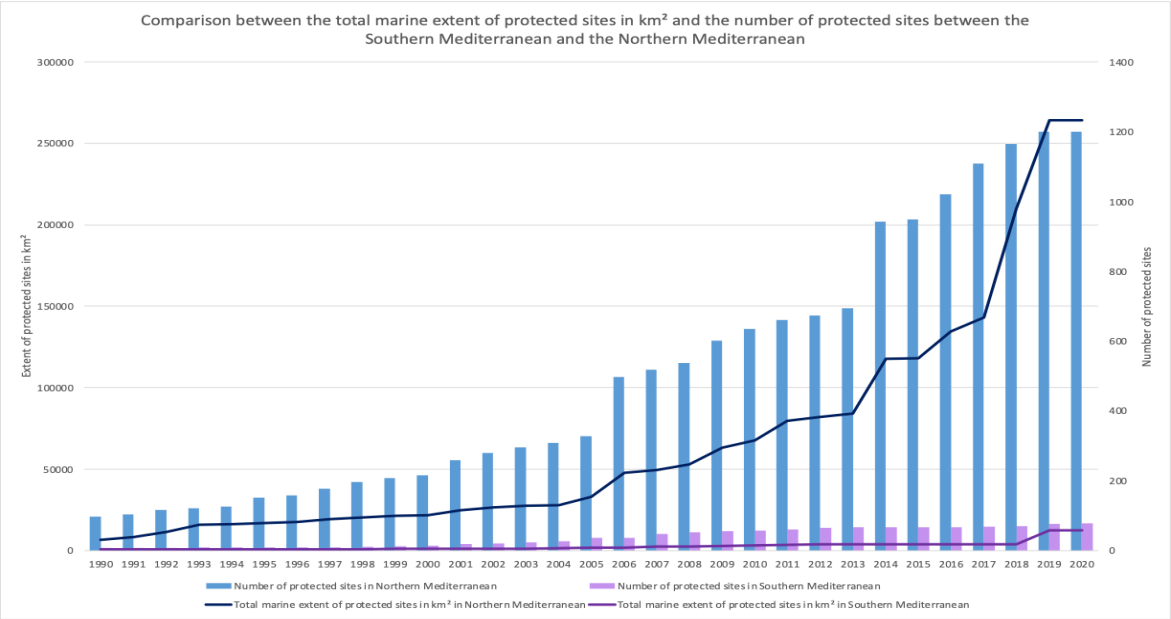
OECMs are a relatively new concept introduced by the Convention on Biological Diversity (CBD). They are geographically defined areas other than MPAs that are governed and managed in ways that achieve positive and sustained long-term outcomes for the conservation of biodiversity, with associated ecosystem functions and services, and where applicable, cultural, spiritual, socio-economic, and other locally relevant values. OECMs may not have been primarily designated for conservation but achieve significant conservation outcomes through their management.

Sites of Conservation Interest are specific areas identified for their unique ecological, biological, cultural, or scenic values that contribute significantly to the global, regional, or national conservation of biodiversity. These sites might not be formally protected as MPAs or recognized as OECMs but are important for biodiversity conservation efforts. They can include habitats critical for endangered species, areas with high biodiversity, and regions that provide essential ecosystem services.

Analytical part:

Across the Mediterranean, there has been a clear trend towards the establishment and expansion of marine protected areas, with important variations in the approach between northern and southern countries. The data shows a significant increase in the extent of protected sites over the period from 1990 to 2022 for the Mediterranean, especially in the northern Mediterranean. In the southern Mediterranean, the growth in protected areas is also present but very less substantial compared to the northern Mediterranean.

Figure 24. Comparison of the total marine extent of protected sites with the number of protected sites between the Southern and the northern Mediterranean from 1990 to 2020

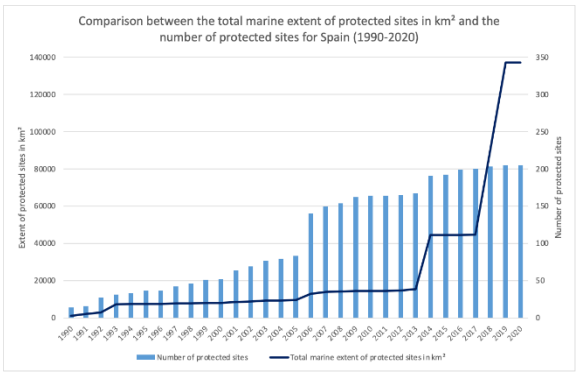


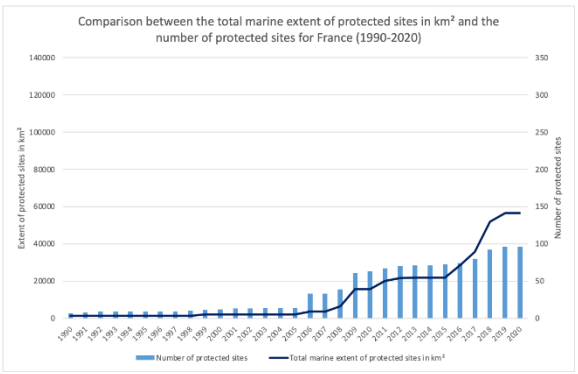
In 2020, the Mediterranean has 1278 protected sites including 1112 MPAs, 162 Sites of Conservation Interest and 4 OECMs. Here, the sites not reported, numbering 34, and the sites shared between several countries, numbering 8, are not taken into account because these cover very large areas. For instance, the Pelagos Sanctuary (France, Italy and Monaco) with 87658,83 km² represents approximately 3.5% of the Mediterranean. Among these 1278 protected sites, 1200 are located in the northern Mediterranean and 78 in the southern Mediterranean. Thus, 94% of protected sites are located on the northern side of the Mediterranean.

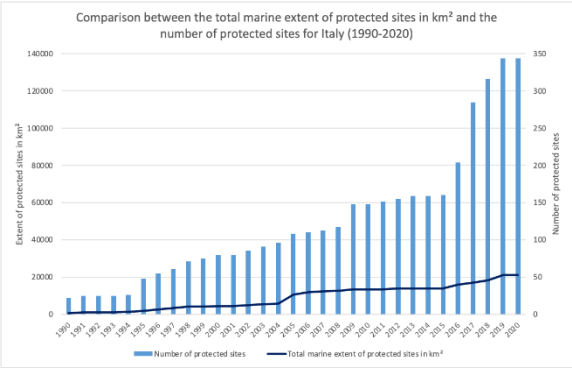
The 1,112 MPAs cover 8.9% (224,144 km²) of the Mediterranean (2,516,900 km²) through a wide variety of conservation designations and different levels of protection. If we add the 4 OECMs (4,647 km²) and the 162 Sites of Conservation Interest (47,510 km²) we reach a coverage of 11% of the Mediterranean, 10% in the northern Mediterranean (264,002 km²) and 1% in the southern side (12,298km²). In this regard, 95,5% of the extent of protected sites are located in the northern side of the Mediterranean. This distinction is very important in view of Aichi Target 11 aimed at conserving 10% of coastal and marine areas by 2020. Note that we are also probably far from completing Target 3 of the Kunming-Montreal global biodiversity agreement to conserve 30% of Land, Waters and Seas since if we take into account that the AMPs only cover 8.9% of the Mediterranean.

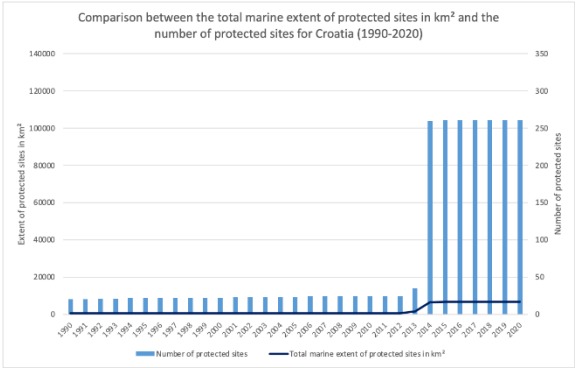
There are therefore significant disparities between the northern Mediterranean and the southern Mediterranean as well as between the number of protected sites and the surface area.

Figure 25. Comparison of the total marine extent of protected sites with the number of protected sites between some northern Mediterranean countries (Spain, France, Italy and Croatia) from 1990 to 2020





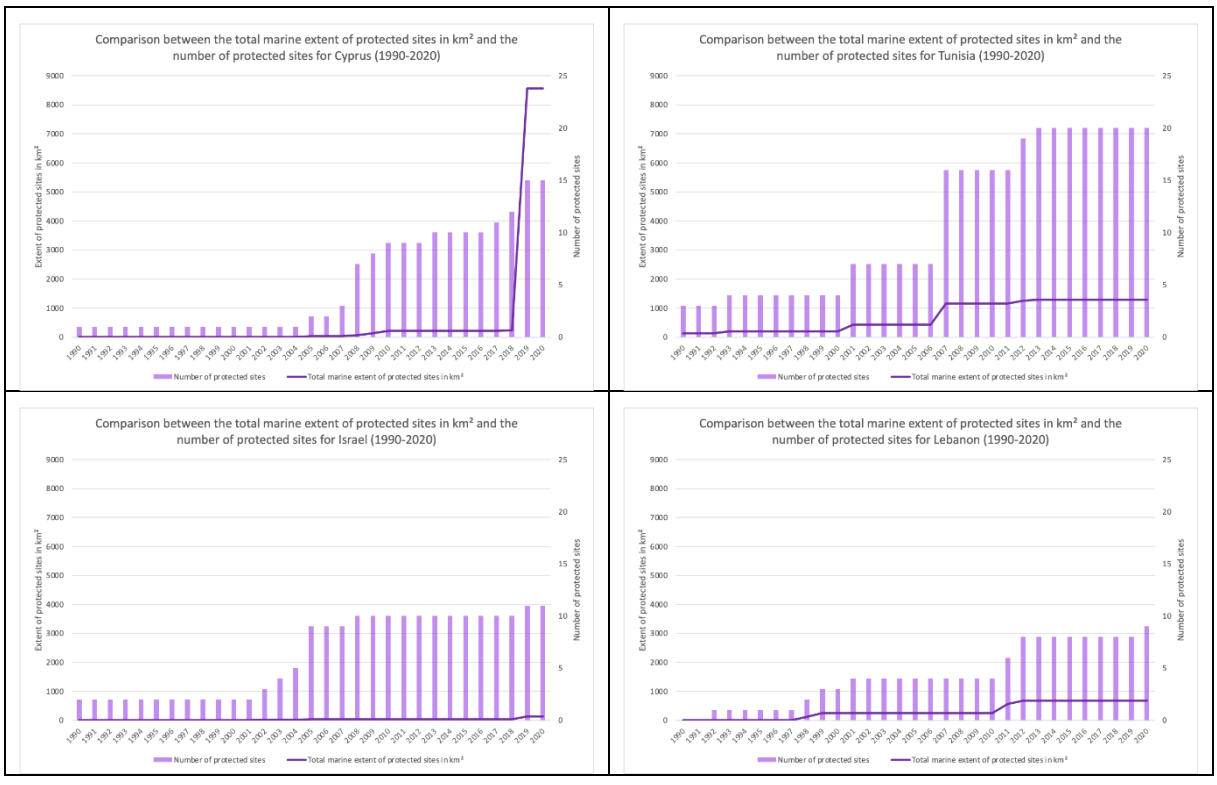




For instance, Croatia has shown remarkable growth, from 20 protected sites in 1990 to 261 by 2020 (with a peak in 2014 with 225 new protected sites, probably due to its entry into the European Union), but with a total marine extent increasing only from 463.62 km² to 6557.2 km². In the same way, Italy saw a consistent rise in the number of protected sites, reaching 344 by 2020. Yet, the total marine extent increased from 443.8 km² in 1990 to 20952.75 km² in 2020.

On the other hand, France saw an increase in the number of protected sites from 7 in 1990 to 96 by 2020, with the total marine extent growing significatively from 1353.39 km² to 56,401.08 km². Spain has also shown remarkable growth in the extent of protected sites, from 1019.57 km² in 1990 to 137,215.54 km² in 2020 with only 205 protected sites in 2020. Note that the Mediterranean Cetacean Migratory Corridor is taken into account here for Spain, with its 46353,27 km² (approximately 1.8% of the Mediterranean).

Figure 26. Comparison of the total marine extent of protected sites with the number of protected sites between some Southern Mediterranean countries (Cyprus, Tunisia, Lebanon and Israel) from 1990 to 2020



Southern Mediterranean countries have smaller numbers of protected sites compared to the northern countries mentioned.

Indeed, even if Cyprus also demonstrated significant progress, with the number of protected sites growing from 1 in 1990 to 15 by 2020, and the total marine extent expanding dramatically from 6.03 km² to 8563.6 km² (Note that the

Proposed Site of Community Importance (Habitats Directive) called Oceanid is taken into account here with its 8331,62 km² in 2019), countries like Tunisia, Lebanon, Israel show smaller numbers and total marine extent of protected sites. For instance, Lebanon's number of protected sites grew from zero in 1990 to nine by 2020, with a corresponding increase in marine extent from zero to 679.58 km² during the same period. Tunisia also shows small numbers with an increase from 3 in 1990 to 20 by 2020 and with the marine extent expanded from 131.62 km² to 1286.7 km². Israel maintained a relatively small number of protected sites over the years, with an increase from two in 1990 to eleven by 2020. The marine extent also expanded from 0.31 km² to 130.16 km² during this period.

Thus, it is not because there are more and more protected sites, as in Croatia for example, that the protection coverage of the Mediterranean is more extensive. It is therefore important to think in terms of the total marine extent of protected sites. In the same way, the designation of an area as an MPA, OECM, or Site of Conservation Interest does not guarantee its effectiveness in conserving biodiversity.

Precautions / Notes:

- The analysis might be affected by the completeness and accuracy of the reported data. Missing data or inaccuracies can skew the results and interpretations. Moreover, some discrepancies could be due to the numerous types of protected areas and their overlapping. Therefore, in numerous instances, a site categorized under one designation may coincide with other sites carrying either a distinct or identical classification. Consequently, certain geographical regions may exhibit numerous instances of overlapping designations, introducing a governance and operational complexity that proves challenging to grasp without a deep understanding of the area. These overlaps complicate rigorous and accurate analyses of areas based solely on attribute data, as combining surfaces yields results significantly divergent from reality.
- The mere designation of an area as an MPA, OECM, or Site of Conservation Interest does not guarantee its effectiveness in conserving biodiversity. Other factors such as the level of protection, enforcement, biodiversity levels, and management practices are crucial for a comprehensive understanding of conservation outcomes.
- The establishment and management of protected areas can be influenced by geopolitical and socioeconomic factors, which might affect the pace and scale of conservation efforts in different countries.
- The Mediterranean is an ecologically diverse region. The significance and impact of MPAs, OECMs, and Sites of Conservation Interest can vary widely depending on the ecological context, making it challenging to generalize findings across the entire region. Indeed, the levels of protection and the specific features associated with a designation, such as marine reserves or national parks, can vary considerably between different countries. Furthermore, it's important to recognize that the extent and execution of conservation efforts may differ even among sites bearing the same designation, both at national and regional levels. These discrepancies could stem from variations in historical precedence, local stakeholders' intentions, available resources, or other contextual differences. Hence, merely relying on the official status of a site is insufficient for evaluating the efficacy of its management.

Sources: MAPAMED, the database on Sites of interest for the conservation of marine environment in the Mediterranean Sea. MedPAN, UNEP/MAP/SPA-RAC. 2022 release.

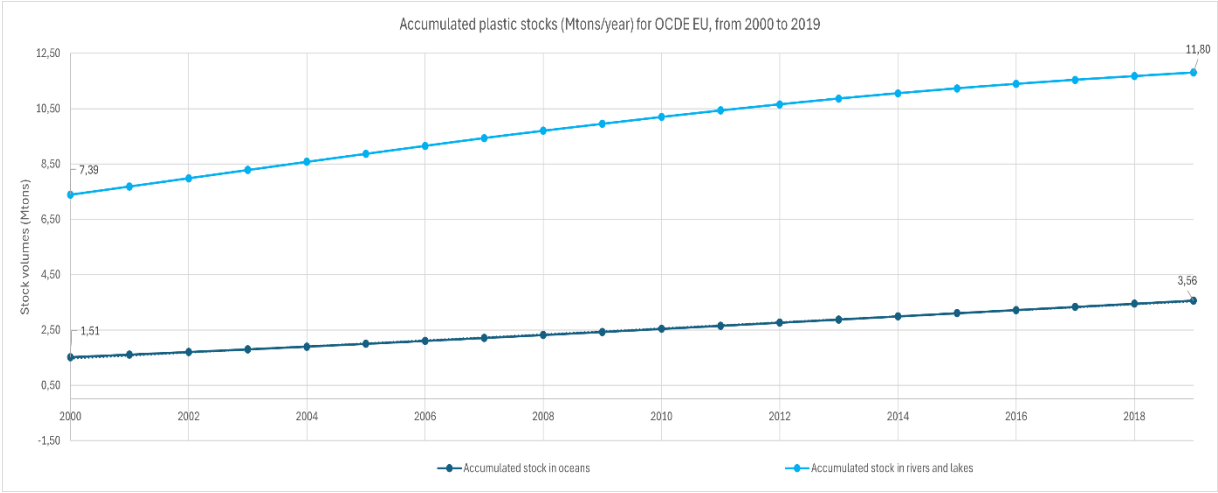
i) Core Indicator 8: Plastic leakages in aquatic environments

Definition: Plastic pollution is one of the worst human environmental footprint. Indeed, the quantification of plastic volumes emitted by human societies is a tricky exercise which may presents qualitative and quantitative gaps. Therefore the “great plastic family” is categorized under different sub-classes related to the type of plastic (polymer composition) and the associated scales (microplastic and microplastic). Here, the indicator measures the annual plastic stocks (million tons/year) released at sea. Moreover, the data have been calculated at interregional level. Therefore, in the aim of proposing a Mediterranean region approach, data from European-Union and Middle-East & North Africa (MENA) regions have been selected and analyzed. The indicator has been analyzed on the 2000-2019 time period. Moreover, two stock sub-classes (accumulated stock in oceans and accumulated stock in rivers and lakes) have been compared as follows:

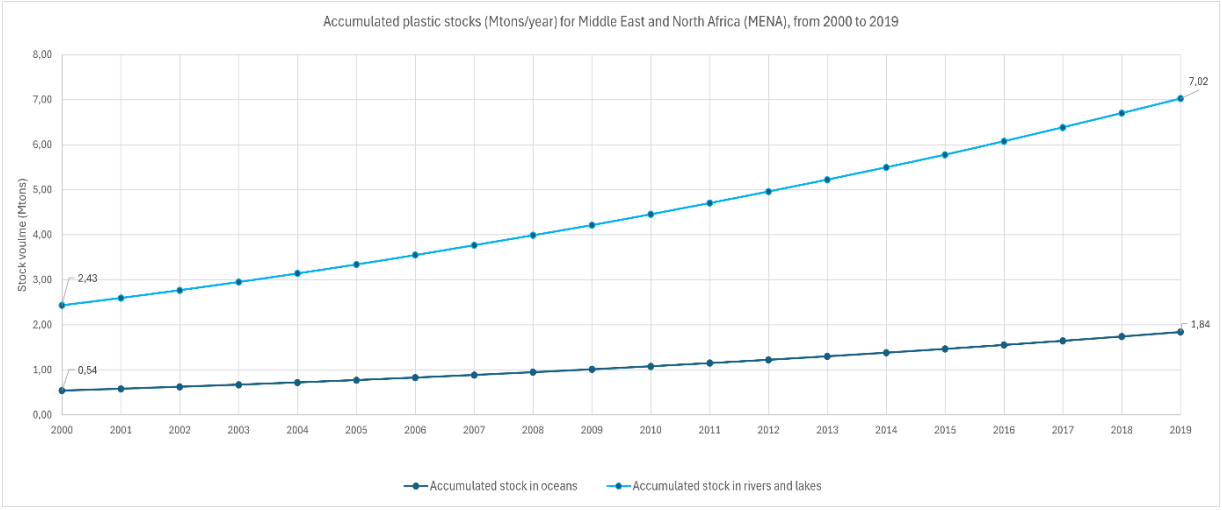
Analytical part:

Figure 27. Accumulated plastic stocks (tons/year) for Europe, Middle East and North Africa, from 2000 to 2019, for OECD EU in a), and MENA in b)

a)

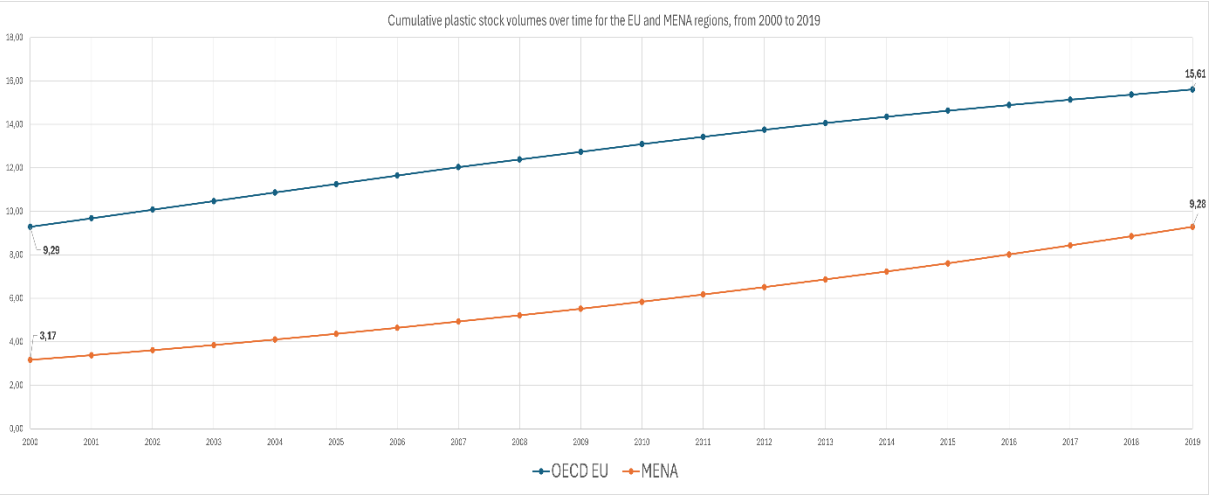


b)



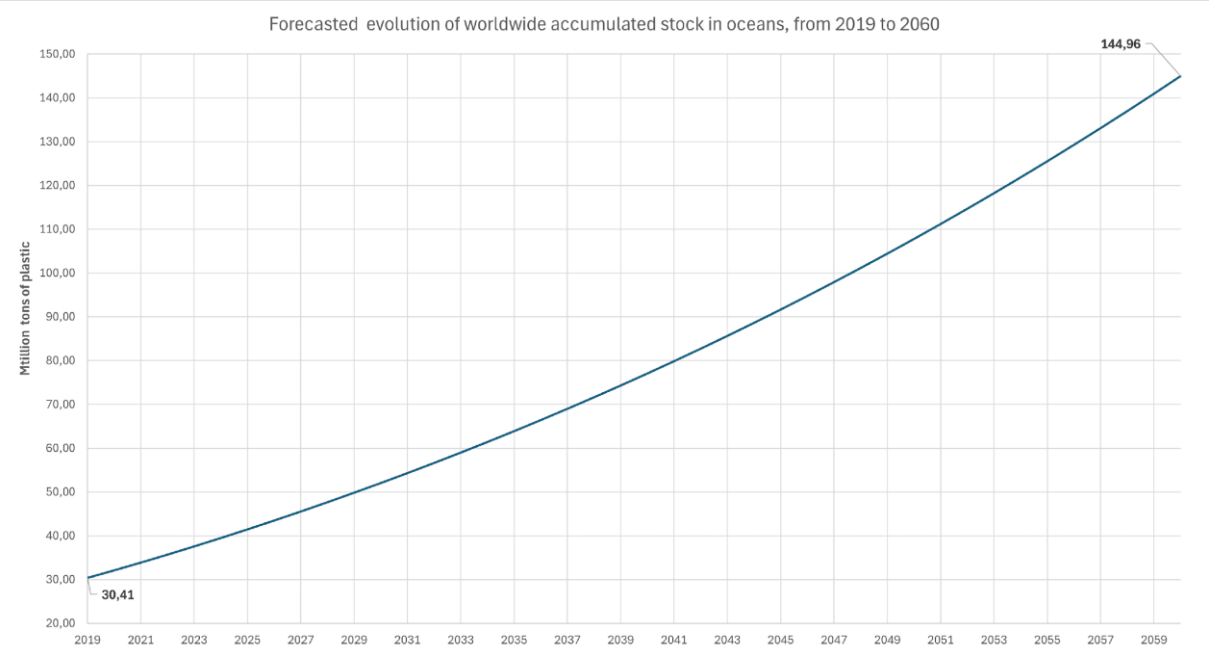
The amount of plastic dumped at sea depends on geography and type of stock. Indeed, through Figure 27, we observed significant differences between regions and between stocks. For both regions, it seems that stocks in rivers and lakes are the largest. Moreover, the European region displays the highest stock volumes but with a lower increase compared to the Middle East & North Africa. Indeed, in 2000 the stock accumulated in oceans by the EU was 3 times higher than the one emitted by the MENA region. The MENA region recorded an increase of 188% in its plastic stock volumes measured for rivers and lakes whereas the EU shows a slight increase of 56%. Both for the EU and MENA region, the stock volumes of the river and lakes are higher than the one in the oceans. However, such stocks display more intense variations in this twenty-year period. In fact, the plastic stocks which end-up in the ocean have largely increased compared to the other stocks. For MENA, it shows an increase of 240% and a positive variation of 69% for the EU. It's therefore interesting to look in more detail at the volumes of stocks linked to regulatory frameworks and implemented directives in both regions. Concretely, it could be useful to assess the impacts of such management tools on plastic leakages in aquatic environments.

Figure 28. Cumulative plastic stock volumes over time for the EU and MENA regions, from 2000 and 2019



From an overall perspective both regions are displaying increases when we sum all the plastic stocks. Moreover, the MENA curve seems to reach the EU one. Therefore, for all Mediterranean basins, the plastic leakages are increasing from 2000, even if regulatory frameworks and directives are more and more implemented to reduce plastic productions, consumptions and wastes.

Figure 29. Global forecasted (from 2019 to 2060) evolution of plastic volumes emitted in aquatic environments



Although there are geographical differences in the volumes of plastic emitted into aquatic environments, the general trend is assumed to be as shown in Figure 29. Indeed, the volumes of plastic discharged into aquatic environments are not expected to slow down; on the contrary, a sharp increase is forecast for the 2060 horizon.

Precautions / notes:

- These indicators tackle a tiny part of the issue. First of all, the analyzed datasets are geographically and temporally biased, notably for Mediterranean basin analysis. Indeed, the available datasets are not declinable at national scales and report for a wider geographical data range. However, each country should at least provide national estimates on this subject.

- On the other hand, the technical side of the issue has been largely simplified, notably regarding the types of plastic emitted and the related sizes. Depending on their composition, they persist in different ways in aquatic environments.
- The notion of “stock” has been simplified. For instance, plastic leakage flows (inputs and outputs) in the different aquatic environments could be brought to the analysis.
- There are other gaps in the data, particularly with regard to plastic volume flows, which in a sense are closely linked to the water cycle. In this sense, the volumes emitted could be compared according to the different sources of emission (households, industry, tourism, etc.).
- Underground water sources such aquifers haven’t been included whereas such natural water tanks are more and more exposed to plastic pollution.
- Moreover, the stock classes should embed the “living stock” category. In fact, what is more important than the abiotic stocks themselves is their capacity to transfer their plastic volumes into living beings (through consumption, respiration, etc.). Indeed, more and more animals, ecosystems and biospheres are affected by plastic.
- Microplastic is a rising problem under this topic’s scope. However, no database gathers such exhaustive information (both on qualitative and quantitative sides) due to the data integrity and measurement challenges (at geographical and temporal scales).

Source: OECD.Stat, 2024.

III. Sustainability dashboard

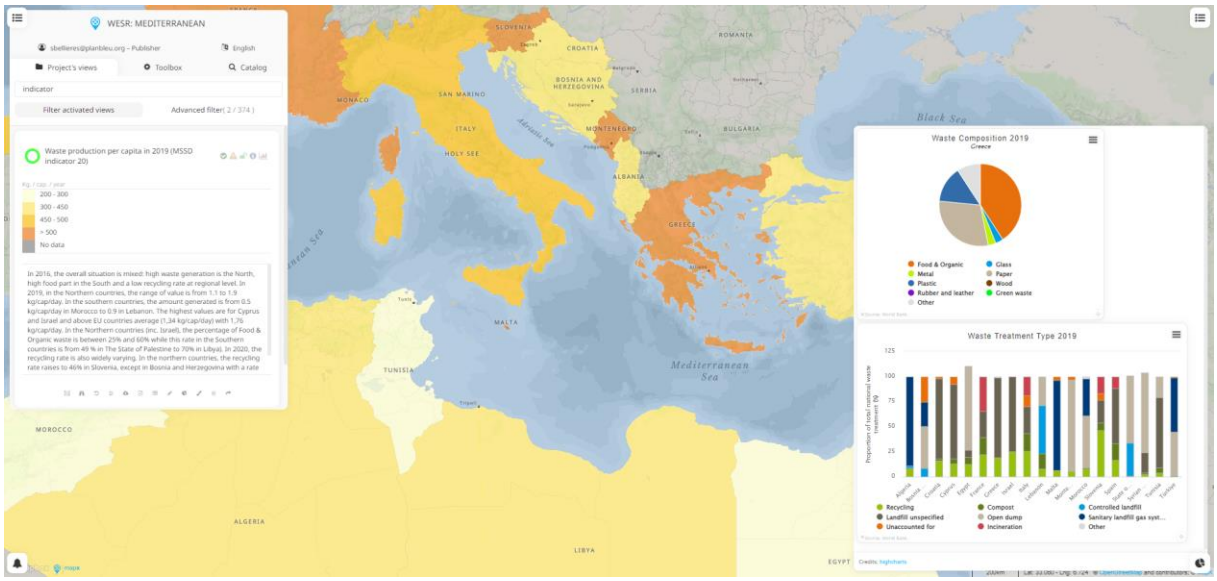
A comprehensive monitoring system and relevant indicators have been established for the implementation of the Strategy. Those indicators are temporally and geographically fluctuant and are very sensitive to the socio-economic and environmental variations constantly occurring in the Mediterranean. Therefore, such a Mediterranean strategy for sustainable development requires rigorous qualitative and quantitative visualization and monitoring tools, adapted to each MSSDs indicator. Through its innovative, interactive and open-access cartographic tool MapX, the Plan Bleu's observatory is supporting the MSSD data dashboard.

In fact, each indicator displays its own symbology which facilitates its understanding and its association visualization. According to the indicator, the qualitative and/or quantitative data are represented on different temporal and spatial scales. On the other hand, the MapX users can interact with the geospacialized data related to the MSSD's indicator. Without any geographical information system's skills, the user can take the advantage of MapX's dashboard. Once the user has found the MSDD indicator of interest, he can activate the latter by clicking on it. Thus, the activated data is represented at Mediterranean level for at least national comparisons. The spatial resolutions of the indicators can be more detailed regarding the different MSSD's categories and the nature and type of the associated indicators. For instance, it's coherent that the "UNESCO world heritage sites" (19th indicator of the MSSD) doesn't represent the same geographical resolution that the "Water withdrawal per capita" (13th indicator of the MSSD).

In addition, MapX improves the user experience of the awareness and knowledge transfer aspects of MSSD by presenting synthetic and clear abstracts, legends, related units and metrics and the associated metadata, for each visualized indicator. Indicator representations can also incorporate various dashboard tools to make it easier for users to document them. Such tools simplify the understanding of large datasets related to the MSSD's indicators. For instance, a 100-year temporal evolution can be represented through a "time slider" (Figure 30). By interacting with it, the mapped symbology of the indicator will be modified. Pie charts provide useful information on the share of a finite quantity for a given indicator (Figure 30). Other statistical representations such as histograms and array inputs (Figure 31) bring relevant and comprehensive information for the related indicators understanding.

Figure 30. Example of MapX dashboard tools (sectoral pie charts, histogram and time slider) through two representations of MSSD indicators, with in the 1st MSSD indicator

Figure 31. Example of MapX dashboard tools (sectoral pie charts, histogram and time slider) through two representations of MSSD indicators, with in the 20th MSSD indicator



What's more, the dashboard tools can be combined for a given indicator which may embrace all the indicator's dimensions (geographical, temporal, proportions, etc.).

A. COMMON AND SPECIFIC PRECAUTIONS REGARDING MSSD'S INDICATORS UPDATE

1. The need for updating the MSSD's indicator through a revision of the dashboard

The MSSD's indicators are built through on regular data acquisition following respective measurement methodologies. Moreover, these metrics vary over time and space. More than the discrete analysis for an identified space and date, indicator trends may shift from a pattern to another. Therefore, from a monitoring perspective, the update of the different datasets related to the MSSD's indicators is compulsory. These updates may contrast with the indicators in space and time to a greater or lesser extent. More importantly, the assessment of the indicator itself is required regarding the constant evolution of the Mediterranean context. Therefore, the MSSD's indicators update induce the following questions:

- Is the indicator still relevant in the current Mediterranean context?
- Is the measurement methodology of the indicator the same?
- Are the associated datasets still of good quality?
- If this is not the case, what general and specific precautionary measures should be included in its representations?
- What are the possibilities for improving its temporal and spatial representation in the MapX dashboard?

Common precautions:

- Even if the indicators can be differentiated and visualized separately in the Dashboard, the interconnection between them and the related side effects has to be taken into account in their analysis. The MSSD categories should also be revised and be assessed following this state of mind. Maybe that sub-categories should be implemented and may provide a better relationship between the indicators. However, such reflection goes beyond the scope of this report.
- The access to the datasets varies among indicators. Sometimes the datasets are very simple and well structured, sometimes they are very complex (notably for composite ones) which makes the data extractions and the resulting analysis more difficult (huge and not harmonized databases; unsupported file formats; access with a required password; user requests for data acquisition...).
- Each MSSD's indicator visualization has to carefully consider the associated temporal ranges and geographical coverage and resolutions (see part 2: Technical precautions related to MapX Dashboard, page 68).

- The indicators do not all benefit from the same update (temporal coverage). In 2023, the last update dates vary from 2019 (for indicators 7, 12, 20, 23) to 2023 (for indicator 6).

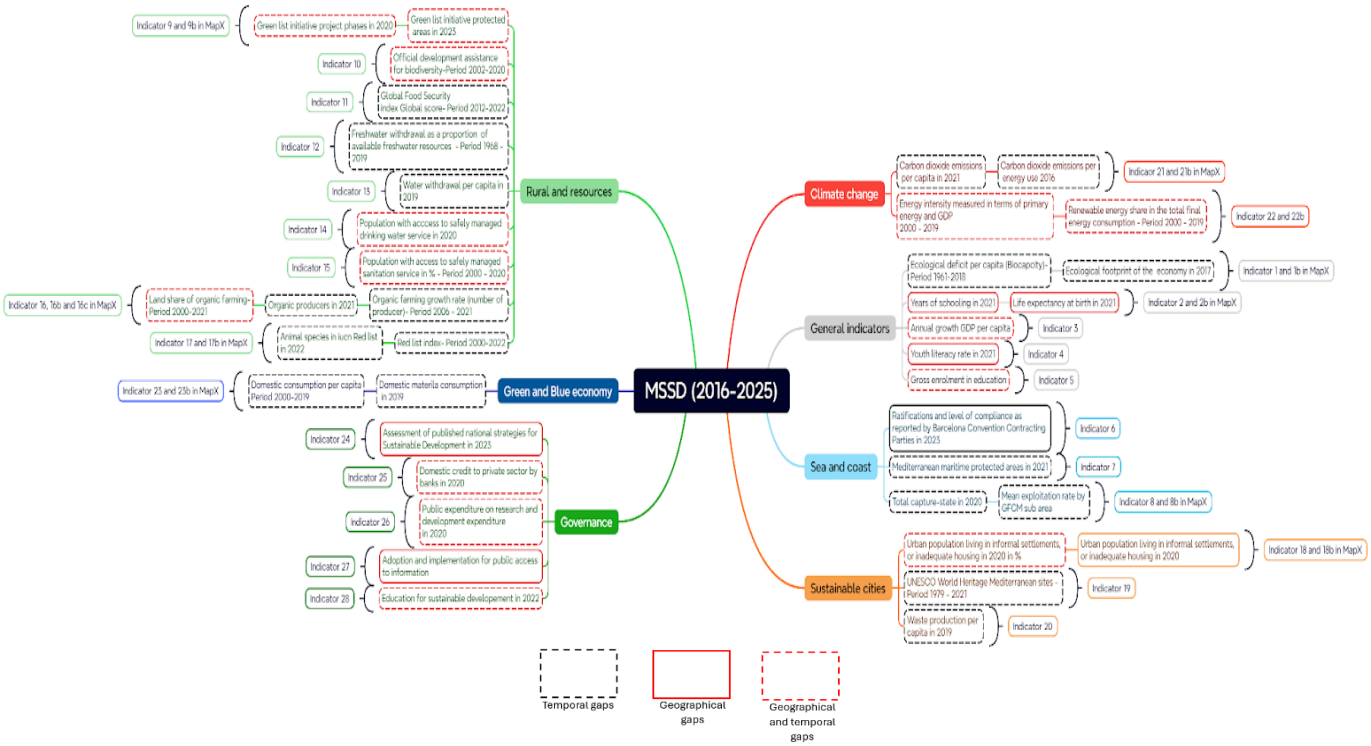
Specific precautions on indicator's content:

- Indicator 2 ("years of schooling in 2021") only indicates the mean **value** and not the estimated one.
- Indicator 3 ("Annual growth of GDP per capita") faced a change of its **calculation method** from 2021.
- Indicators 4 ("Youth literacy rate in 2021") and 27 ("Adoption and implementation for public access to information") don't have new **data** for this round of update.
- Indicator 5 (Gross enrolment in education) **title's changed** compare to 2021
- Indicators 8 ("Total capture-state in 2020", "Mean exploitation rate by GFCM sub-area") and 10 ("Official development assistance for biodiversity-Period 2002-2020") faced an "a posteriori" reassessment of their **values**. They have been redesigned based on the new datasets.
- Indicator 20 ("Waste production per capita in 2019"): the **unit changed** (from "kg/cap/year" to "% or ton per year").
- Indicator 11 "Global food security index Global Score" cannot be updated on the basis of the initial **database**, which is no longer supplied.

2. Technical precautions related to MapX dashboard

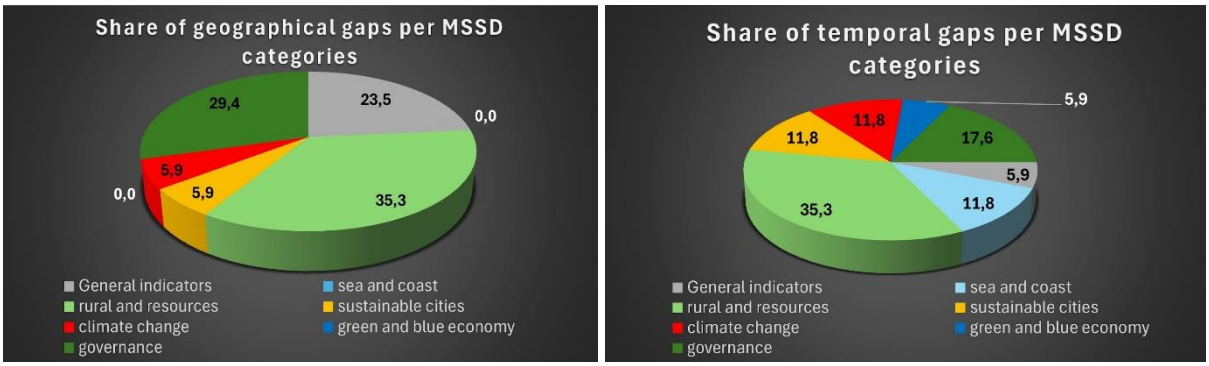
As presented in the previous section, the MapX dashboard needs to be regularly updated in order to be as accurate as possible. The following graphs and tables are screening the current MapX dashboard from a temporal and spatial perspective in the aim of preparing its revision. All MSSD categories are presented and detailed in this way. On the other hand, the following gaps have been identified for each indicator and related databases. Systematically, the potential data and dashboard tool updates are quoted in the following paragraphs.

Figure 32. Mind map presenting all the current MSSD indicators, with identification of the temporal and geographical gaps for each of them



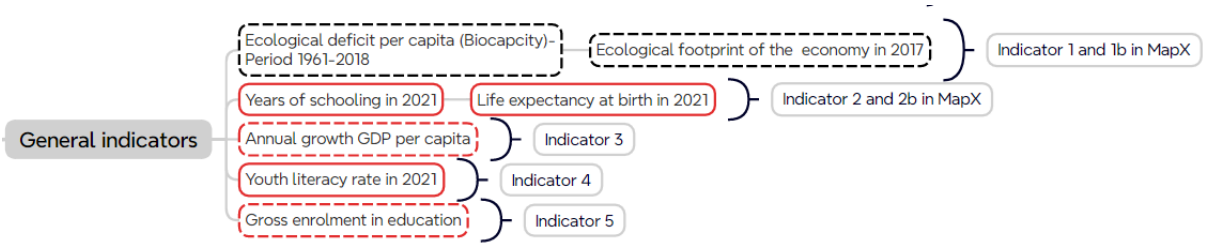
All the MSSD's indicators categories are presenting technical lacks in terms of spatial coverage and temporal ranges.

Figure 33. Pie charts representing for each MSSD category the proportion (%) of geographical and temporal gaps



The pie charts display the contrasts in terms of temporal and spatial gaps for each category. From a global l perspective, the temporal gaps are less contrasted than the geographical ones. The "rural and resources" category shows the highest proportion of gaps both for temporal and geographical point of view. The "general indicators" are in second position, but only with regards to the geographical gaps. "The governance" category is in second position for its associated temporal gaps.

Figure 34. Temporal and spatial gaps identification of the"General indicators" MSSD category



Thematic	Indicator number in MapX	Name of the IDD	Lacking data
General indicators	1	Ecological deficit per capita (Biocapcity)-Period 1961-2018	**Temporal gaps:** stops in 2018
	1b	Ecological footprint of the economy in 2017	
	2	Years of shooling in 2021	**Geographical gaps:** Egypt and Libya for the 2b
	2b	Life expectancy at birth in 2021	
	3	Annual growth GDP per capita	**Geographical gaps:** Spain and Syria
	4	Youth literacy rate in 2021	**Geographical gaps:** Spain, France, Italy, Slovenia, Greece, Malta, Tükiye, Lebanon, Palestine, Israel, Libya, Algeria
	5	Gross enrolment in education	**Geographical gaps:** Lebanon, Egypt,Libya, Tunisia, Algeria

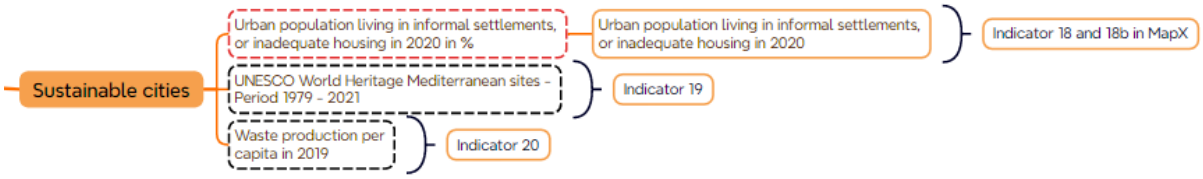
For the general indicators, the main gaps are geographical, notably for the southern Mediterranean countries. More complete temporal ranges could be uploaded for the indicator 1 (1968 to 2022), the indicator 3 (data up to 2022), the indicators 4 and 5 (data up to 2023). For the geographical lacks, the indicators 1,2 and 3 could cover all Mediterranean countries with the extraction and the implementation of the updated data coming from the associated databases.

Figure 35. Temporal and spatial gaps identification of the "Rural and resources" MSSD category

Rural and resources	**9**	Green list initiative protected areas in 2023	**Geographical gaps:** Israel, Morocco, Tunisia, Türkiye, Greece, Albania, Malta, Bosnia-Herzegovia, Greece, Montenegro, Cyprus, Slovenia, Sirya, for IDD 9;
	9b	Green list initiative project phases in 2020	
	10	Official development assistance for biodiversity-Period 2002-2020	**Geographical gaps:** Croatia for IDD 9b **Temporal gaps:** stops in 2021 for the
	11	Global Food Security index Global score- Period 2012-2022	**Geographical gaps:** Libya, Albania, Cyprus, Bosnia-Herzegovia, Lebanon, Morocco, Malta, Monaco, Palestine, Slovenia
	12	Freshwater withdrawal as a proportion of available freshwater resources - Period 1968 - 2019 (MSSD indicator 12)	**Temporal gaps:** Lacking data for different represented time periods between 1968 and 2020.
	13	Water withdrawal per capita in 2019	**Temporal gaps:** stops in 2019
	14	Population with acccess to safely managed drinking water service in 2020	**Geographical gaps:** Tükiye, Syria, Libya, Egypt, Croatia
	15	Population with access to safely managed sanitation service in % - Period 2000 - 2020 (MSSD indicator 15)	**Geographical gaps:** Syria and Montenegro **Temporal gaps:** lacking data for different represented time periods between 2000 and 2022
	16	Organic farming growth rate (number of producer) - Period 2006 - 2021 (MSSD indicator 16)	**Geographical gaps:** Libya and Morocco for **th IDD 16** **Temporal gaps:** lacking data for different represented time periods between 2000 and 2021
	16b	Organic producers in 2021	
	16c	Land share of organic farming-Period 2000-2021	
	17	Red list index- Period 2000-2022	**Temporal gaps:** stops in 2022 for the IDD 17 and 17b
	17b	Animal species in iucn Red list in 2022	

This MSSD category gathers the highest number of indicators (9 indicators including 3 composite indicators). However, it displays the same number of temporal and spatial gaps for all the associated indicators. The indicator 13 and 17b expose temporal gaps while the indicators 9, 11 and 14 show geographical gaps. The indicators 10, 15 and 16 display both temporal and spatial gaps.

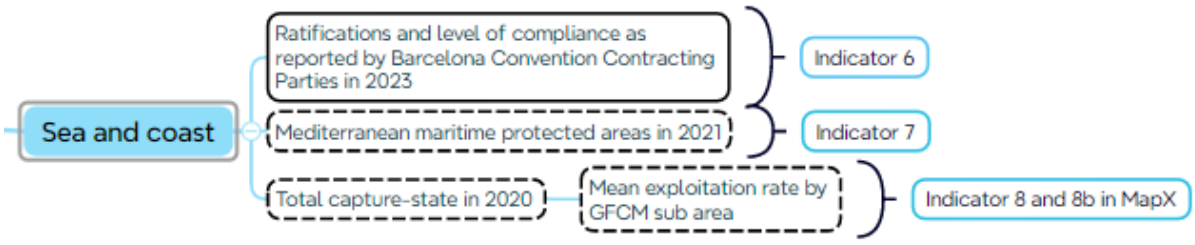
Figure 36. Temporal and spatial gaps identification of the ”sustainable cities” MSSD category



Sustainable cities	**18**	Urban population living in informal settlements, or inadequate housing in 2020 in % (MSSD indicator 18)	**Geographical gaps:** Spain, France, Italia, Slovenia, Bosnia Herzegovia, Croatia, Greece, Türkie,Cyprus, Lebanon, Libya, Egypt, Monaco, Montenegro for the IDD 18
	18b	Urban population living in informal settlements, or inadequate housing in 2020 (MSSD indicator 18)	
	19	UNESCO World Heritage Mediterranean sites - Period 1979 - 2021 (MSSD Indicator 19)	**Temporal gaps:** stops in 2021
	20	Waste production per capita in 2019	**Temporal gaps:** stops in 2019

For this category, the 19th and 20th MSSD indicators have temporal gaps, while the 18th MSSD indicator has geographical gaps. However, for the 18th MSSD indicators, the geographical gaps are significant excluding 14 Mediterranean countries from the analysis.

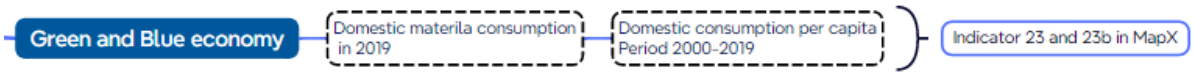
Figure 37. Temporal and spatial gaps identification of the ”Sea and coast” MSSD category



Sea and coast	**6**	Ratifications and level of compliance as reported by Barcelona Convention Contracting Parties in 2023 (MSSD Indicator 6)	**no lacking data**
	7	Mediterranean maritime protected areas in 2021	**Temporal gaps:** stops in 2021
	8	Total capture-state in 2020	**Temporal gaps:** stops in 2021
	8b	Mean exploitation rate by GFCM sub area	

This category exposes few gaps in the current dashboard, only the indicator 7 and 8 are displaying temporal gaps. The 6th MSSD indicator is up to date from its spatial and temporal dimensions.

Figure 38. Temporal and spatial gaps identification of the "Green and blue economy" MSSD category



Green and blue economy	**23**	Domestic material consumption in 2019	**Temporal gaps:** stops in 2019 for the 23 and 23b
	23b	Domestic consumption per capita Period 2000-2019	

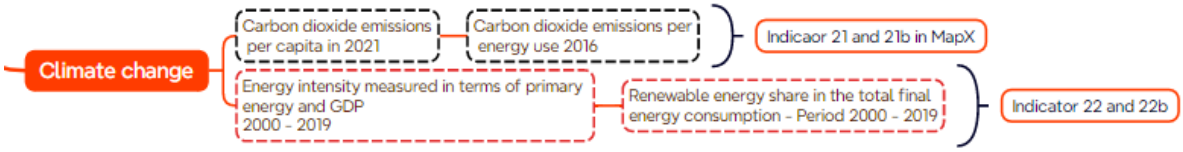
This category, which integrates the lowest number of indicators (only one composite indicator) displays temporal gaps. The related datasets are outdated since 2019.The associated database could provide a more complete dataset from 1974 to 2024.

Figure 39. Temporal and spatial gaps identification of the "Governance" MSSD category

Governance	**24**	Assessment of published national strategies for Sustainable Development in 2023 (MSSD Indicator 24)	**Geographical gaps:** Libya and Syria
	25	Domestic credit to private sector by banks in 2020	**Geographical gaps:** Syria **Temporal gaps:** stops in 2020
	26	Public expenditure on research and development expenditure in 2020	**Geographical gaps:** Morocco, Albania, Palestine, Israel, Montenegro, Alegeria, Libya, Syria **Temporal gaps:** stops in 2020
	27	Adoption and implementation for public access to information	**Geographical gaps:** Palestine, Israel, Alegeria, Libya, Egypt
	28	Education for sustainable developement in 2022	**Geographical gaps:** Libya, Albania and Syria **Temporal gaps:** stops in 2022

This category embeds 5 which all expose gaps both on geographical and temporal scales. The indicator 24 and 27 displays geographical gaps for southern Mediterranean countries. The three other indicators (25, 26 and 28) show both temporal and spatial gaps.

Figure 40. Temporal and spatial gaps identification of the "climate change" MSSD category

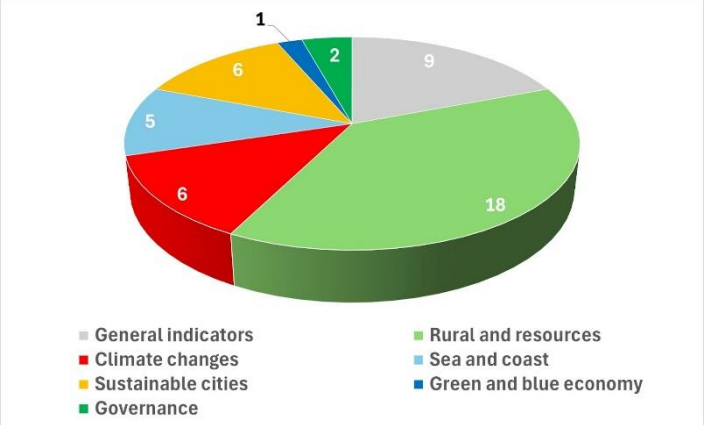


Climate Change	21	Carbon dioxide emissions per capita in 2021	**Temporal gaps:** stops in 2021
	21b	Carbon dioxide emissions per energy use 2016	
	22	Energy intensity measured in terms of primary energy and GDP 2000 - 2019 (MSSD Indicator 22)	**Geograhical gaps:** Italy and Albania for the IDD 22; **Temporal gaps:** stops in 2019 for the 22 and 22b
	22b	Renewable energy share in the total final energy consumption - Period 2000 - 2019 (MSSD Indicator 22b)	

This category embeds two composite indicators which both integrate temporal gaps (which stops in 2021 for the 21b and 2019 for the 22). Two northern Mediterranean countries (Italy and Albania) are missing from the 22th MSSD indicator.

On the other hand, the number of dashboard functionalities is heterogeneous between MSSD categories. Indeed, according to the indicator types and related spatialized data, the associated dashboard tools aren't the same. The only functionality that is common to each indicator is the map viewer provided by MapX allowing to visualize a georeferenced dataset.

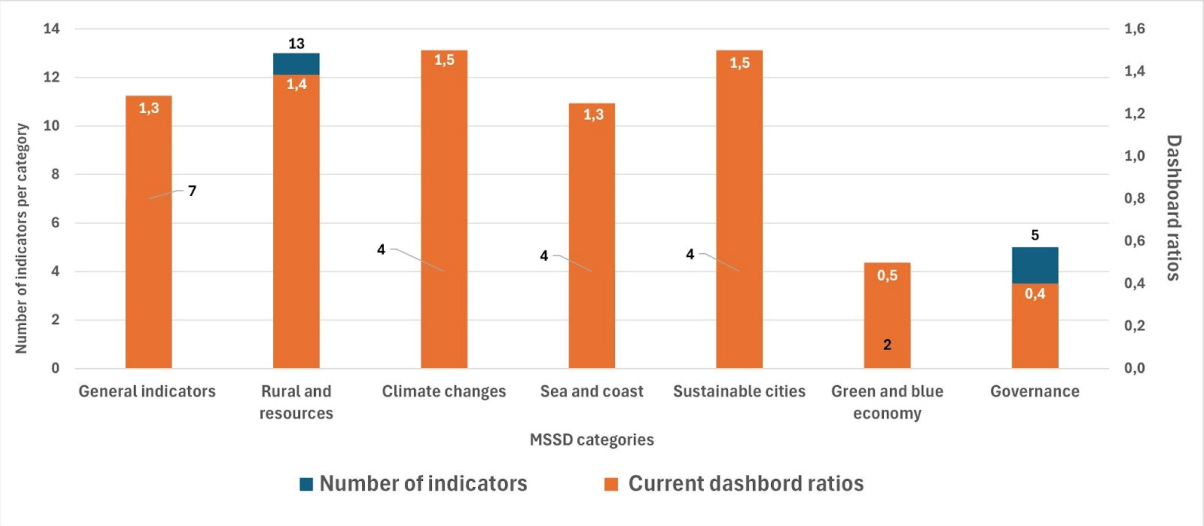
Figure 41. Comparison of the number of dashboard tools per MSSD category



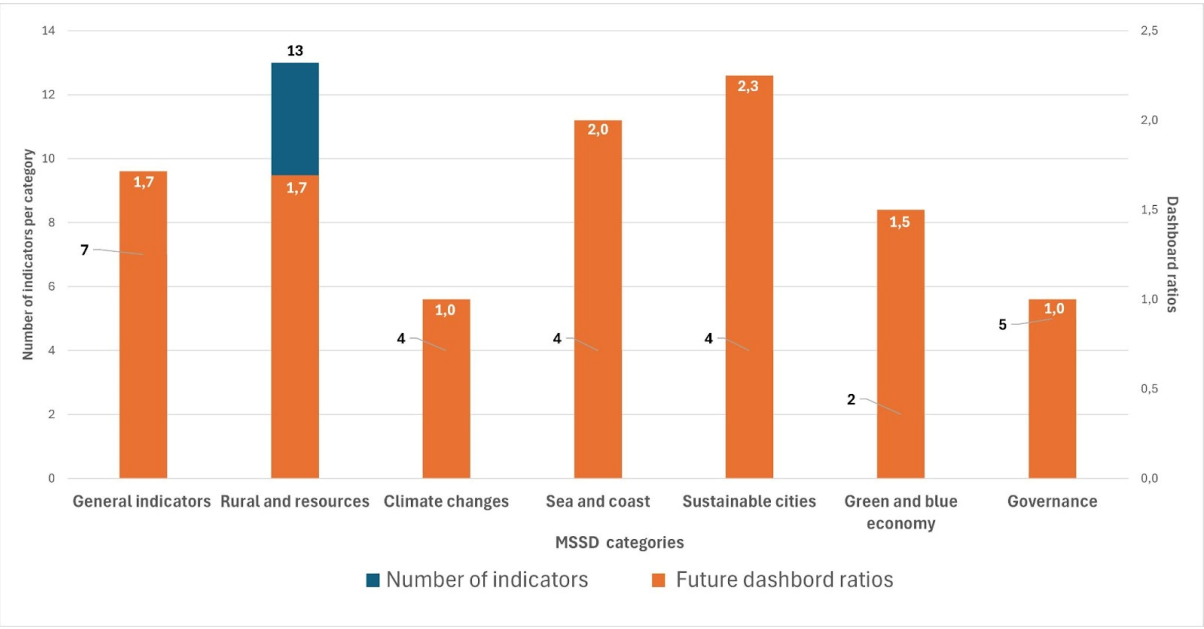
The "Rural and resource" category integrates the largest number of dashboard tools (18) while the "General indicators" category is following (9). In the third place, the "Sustainable cities" and "Climate changes" categories are equal with 6 dashboard tools. The "Governance" and "Green and Blue Economy" categories came fourth and fifth respectively. In

order to get a more detailed view of such dashboard tools distribution among MSSD categories, it can be useful to calculate a ratio between the number of tools per category and the related indicators number.

Figure 42. Current dashboard ratios for each MSSD category



Actually, through the ratio analysis we observe shifts between MSSD categories, notably for the “Rural and resources” category which previously presented the largest number of tools. Once compared with its number of indicators, the ratio is lower (1,3). All MSSD categories have a ratio greater than one, with the exception of the "green and blue economy" and "governance" indicator classes, respectively 0,5 and 0,4. The “Sustainable cities” and “Climate changes” classes show the highest ratios of 1,5. This assessment of the ratios is particularly useful for identifying the categories of the MSSD that should benefit from more dashboard tools. Such exercise has been developed on the basis of what the current and associated databases can provide us in terms of additional data. It lead to the following graph:



Without adding new indicators to the current MSSD, lots of dashboard tools can still be added in the aim of improving the user experience. In addition, these potential future inflows will lead to ratios greater than 1 for all categories. The potential dashboard tools inputs aren't detailed here, it's beyond the scope of this quantitative analysis but they can be further explored for the next Mediterranean strategy revision.

Conclusion

The Mediterranean Strategy for Sustainable Development 2016-2025 provides a strategic policy framework, built upon a broad consultation process, for securing a sustainable future for the Mediterranean region consistent with Sustainable Development Goals. Through its dashboard composed of 28 indicators, it aims at achieving 6 objectives to support UNEP/MAP to measure the sustainability of the region. The indicators cover 12/17 dimensions of the sustainable development (SDGs). The MSSD and its dashboard have been designed with continuous improvement, which is the main goal of this report.

The 28 indicators have been updated from a temporal and geographical coverage perspective. Almost all the indicators have significant spatial and temporal gaps. Because of the current Mediterranean context, some of them could be removed or replaced by other ones. It is directly linked to the diversity of databases on which the MSSD's indicators rely. For instance, for one indicator, three databases exist with their own measurement methods for the related data. The approach is more complex since we're interested in aggregated indicators such as the human development index.

Regarding the data resolution in terms of temporal evolution and geographical accuracy, the Mediterranean socio-ecosystems are sometimes not well represented and may integrate more specific and cross-sectorial indicators. On the other hand, the representations of these quantitative and qualitative indicators have been reviewed since 2023 to be on track with an interactive cartographic tool used by Plan Bleu, called MapX, the cartographic tool of the UNEP-driven World Environment Situation Room.

These innovative tools allow users to visualize in a simplified way the complex structuration of the MSSD's indicators, but cartographic and statistical representations for each MSSD's indicator have to be adapted to the targeted audience.

The report proposed two ways of assessing the current MSSD. The first one was by reviewing all the indicators through their nature and associated representations. Because they represent a piece of Mediterranean reality and to avoid misinterpretation, common and specific precautions have been described for each of the indicators.

Common precautions mainly deal with the data accessibility, harmonization and representation per indicator and per MSSD category when specific precautions are more detailed notions linked to the indicator itself such as the associated measurement methods (data acquisition through on the ground sampling or model projections, replicability, data resolutions, etc.), units and data monitoring (monitoring methods, associated frequencies).

The MSSD also needs to be more communicative on the main states and trends with regards to environment, society and development that's why six core indicators have been identified. These 6 core indicators complement the initial MSSD's core set of indicators to highlight more in-depth states and trends of some specific key regional issues.

Monitoring the state of the environment and development at national and regional levels is a continuous work that needs to be done including national offices of statistics and observatories to address gaps in monitoring the sustainability of the Mediterranean region and answer countries' concerns.