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Regional Analysis on Nationally Determined Contributions

The UfM Secretariat is co-funded by the EUROPEAN UNION

FINAL 2020 REPORT

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Contents

Introduction

The Mediterranean basin is one the most impacted region by climate change in the world. There is an urgent need for greenhouse gas (GHG) emission mitigation as well as for the implementation of adaptation actions to cope with climate change impacts. A collective response, embracing both mitigation as well as adaptation aspects, could lead to a limited impact of climate change in the region.

In 2019, the United Nations Environment Program (UNEP) Gap report [1] stated that, globally, GHG emissions must drop by 7,6% every year between 2020 and 2030 to get in line with the Paris Agreement and keep global warming below +1,5°C in 2100 compared to preindustrial levels. The 2020 Gap report[2] states that even if all commitments (conditional and unconditional) from the Nationally Determined Contributions (NDCs) submitted by the Parties to the UNFCCC at COP-21 in 2015 are achieved, global warming will reach +3°C in 2100. This figure accounts for the impact of the Covid-19 pandemic on global GHG emissions, which is expected to cause a decrease up to 7% in 2020. This is expected to translate in a 0,01°C reduction of temperature rising by 2050.

According to the Mediterranean Experts on Climate and Environmental Change (MedECC)[3], the average temperature in the Mediterranean region have risen by 1,54°C compared to the 1860-1890 levels. This increase is 0,4°C greater than the global average change.

It shows that towards the next NDC update taking place in 2021 at COP-26 in Glasgow, climate ambition needs to be enhanced, and particularly in the south and eastern Mediterranean region.

Citepa has been mandated by the Union for Mediterranean (UfM) to analyse the state of progress regarding the Nationally Determined Contributions updating process towards COP-26 for the Southern and Eastern Mediterranean (SEMed) region. The SEMed region covers the Mediterranean basin countries: Albania, Algeria, Bosnia-Herzegovina, Egypt, Israel, Jordan, Lebanon, Mauritania, Morocco, Montenegro, Palestine, Tunisia and Turkey.

This report aims to provide an analysis at the regional level for the environmental and economic contexts as well as national level to assess the state of progress regarding the NDC update.

[1] UNEP, Emissions Gap report 2019, December 2019
[2] UNEP, Emissions Gap report 2020, December 2020
[3] MedECC, Climate and Environmental Change in the Mediterranean Basin - Current Situation and Risks for the Future, September 2020

Objective and methodology

The objective is to provide a detailed, objective analysis based on reports and describe the situation regarding the environment and development at the regional level, as well as the expected impacts of climate change.

After definition of the regional context, Citepa will analyse the state of progress regarding the next NDC update. The starting point will be the 2015 NDC submission of the different Parties to the UNFCCC to evaluate the implementation of the first actions included in the NDC, and to understand better the possible barriers for raising ambition for the next update and provide recommendations to enhance ambition for the next submission, regarding both mitigation and adaptation.

To gather information at national level, Citepa sent a survey with questions including matters such as the ambition (regarding greenhouse gas (GHG) emission mitigation as well as adaptation to climate change) to be targeted by the countries with the next NDC submission, capacity needs, or monitoring, reporting and verification (MRV) frames used in the country. Finally, the path to the 3rd NDC update towards 2025 is investigated with the survey. The survey has been developed in collaboration with United Nations Development Programme (UNDP) and UfM. To allow for better understanding of the questions, an online meeting was held on December 14th, 2020 under the co-presidency of UfM and the EU DG Clima, with national focal points from Israel, Jordan, Mauritania, Morocco, Palestine and Tunisia. By March 23rd, 2021, the countries that provided an answer to the survey are: Albania, Israel, Lebanon, Morocco, Palestine, Tunisia and Turkey.

I. Climate-related challenges in the Mediterranean region

This section relies on MedECC's report Climate and Environmental Change in the Mediterranean Basin - Current Situation and Risks for the Future, as well as on Plan Bleu's report State of the Environment and Development in the Mediterranean to present the region's environmental context and future impacts due to climate change and human activities.

MedECC's First Mediterranean Assessment Report (MAR1) presents the current state of the environment in the Mediterranean as well as the expected impacts of climate change in the region - more than 500 million people exposed, with several hot spots in terms of high density and presence of vulnerable anthropogenic activities (tourism, agriculture, industries for instance).

1.1. Climate trends

In the Mediterranean region, it is expected that average warming by the end of the century will be 20% higher compared to the global average value, and 50% higher in summertime[4].

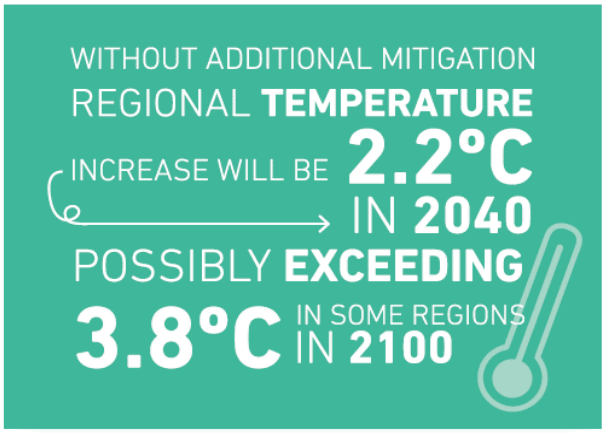


Figure 1 – MedECC MAR1: Risks associated to climate and environmental changes in the Mediterranean

The decrease in precipitation is another change expected by the end of the century, causing more intense and extreme events, notably longer droughts. The report indicates with medium confidence that the mean rate of land precipitation will decrease by 4% with degree of global warming[4].

1.2. A water issue

Water is an important matter and issue for the region, as the resource's availability is already low, with uneven distribution (72 to 74% of renewable water stocks are in the north shore). Growing population in the region, agriculture intensification (increase in the land use for agriculture in the south shore is expected, increase in water demand for irrigation expected by 4 to 18% by 2100), or water pollution are among the drivers that will put pressure on the availability of the resource. Combined with the fact that 180 million people in the SEMed countries are suffering from water scarcity (less than 1 000 m^3 per capita per year), and 80 million people from extreme water shortage (less than 500 m^3 per capita per year), it is expected that different sectors (agriculture, tourism, domestic use, biodiversity conservation) will compete to get access to fresh water. This situation could lead to conflicts between these sectors[4].

The figure below displays the water usage rates for four sectors in three sub-regions of the Mediterranean.

[4] *MedECC, 2020, First Mediterranean Assessment Report (MAR1)*

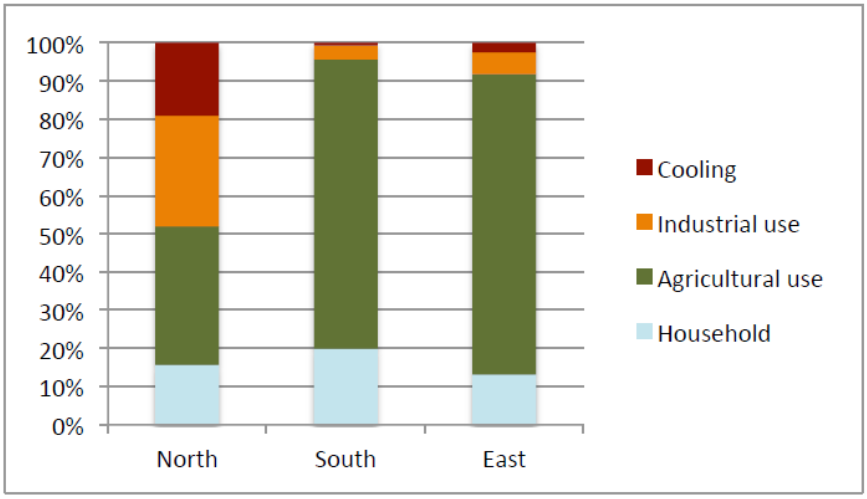


Figure 2 - Total water consumption rates across four main sectors and three sub-regions (source: MedECC MAR1, 2020)

The intensive use of water for agricultural purposes in the south and eastern regions shows that the resource is critical for ensuring the food security of the region. Crop productivity is endangered and can be reduced in the future due to climate change impacts (soil salinization, loss of arable lands for instance). In this case, adaptation actions have a potential to reduce expected impacts. One of the actions mentioned in the report is the change of agricultural practices (improved irrigation techniques, reduction of wastewater volume, improved water use efficiency for instance). On the other hand, sustainable water management is difficult, as 18% of renewable water sources come from outside the southern Mediterranean territories and the figure rises to 27% for the countries in the eastern Mediterranean[4].

1.3. A food security issue

Regarding alimentation and food security, the Mediterranean region is facing several challenges. As climate conditions will be hotter and dryer, extreme events will occur more frequently and more intensely. Among them, the report names the intensification of land salination, seawater acidification, land degradation, or sea level rise. The agricultural sector is particularly vulnerable as crop yields are expected to decrease, access to freshwater will be limited and CO_2 atmospheric concentration is rising. The tripling of irrigation water salinity combined with sea level rise will provoke loss of agricultural lands (in coastal zones as well, in Egypt for instance). Considering global impacts of climate change, there is a possibility that access to imported alimentation goods will become limited. MedECC indicates that crop diversification (with new varieties, adapted to the new conditions) is one of the possible adaptation options in the region. Regarding emission mitigation, it is stated that the terrestrial food production system has the capacity to contribute to greenhouse gas mitigation strategies by optimizing nitrogen fertilization, improving water management, soil organic carbon storage and carbon sequestration and by managing crop residues and agroindustry derivatives. The N_2O mitigation potential with an adapted fertilization is estimated between 30 and 50%.

1.4. An energy issue

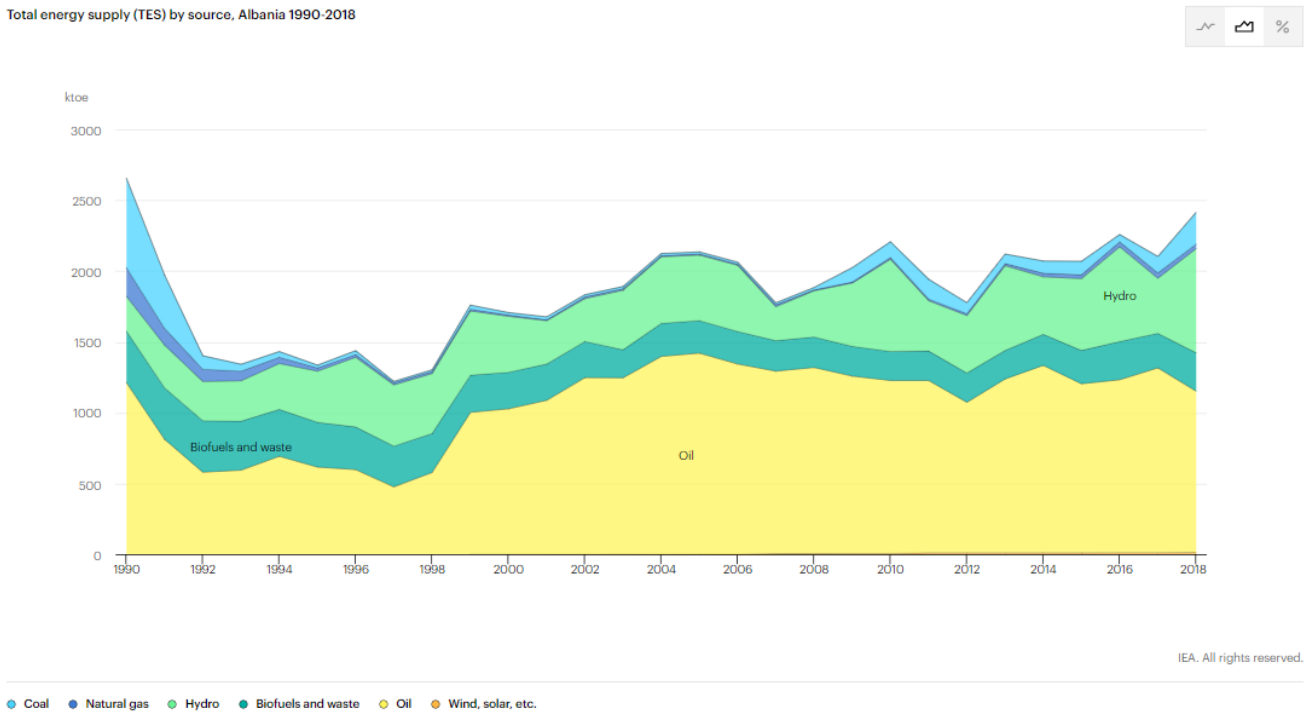
Regarding energy, the primary consumption in the region has increased at a rate of 1,7% per year between 1980 and 2016. As economic as well as demographic growth is expected to continue in the southern part of the Mediterranean, this may result in an increased demand for energy between 55% and 118% in 2040 compared to 2005[4].

Fossil fuels are still most widely use in the region as illustrated in the graphs below, despite significant and recent improvements in renewable energy sources use and production. Therefore, the energetic transition is a great stake for these countries, as the potential for emission mitigation is very important.

Energy mix

The charts below provide an overview of energy supply sources per SEMed country, as well as their evolution; they summarize the energy supply by source for Albania, Bosnia-Herzegovina, Egypt, Israel, Jordan, Lebanon, Morocco, Montenegro, Tunisia and Turkey. These data come from the International Energy Agency (IEA) -no data from IEA are available for Mauritania and Palestine.

Albania[5]

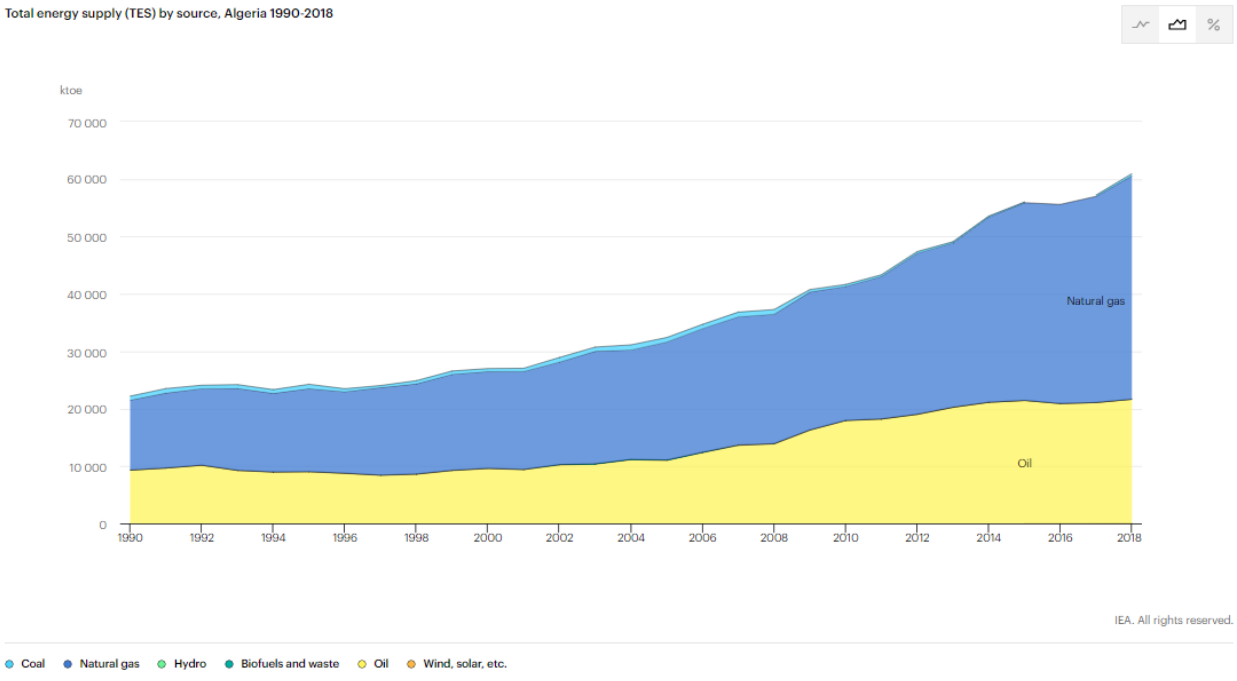


[5] *https://www.iea.org/data-and-statistics?country=ALBANIA&fuel=Energy%20supply&indicator=TPESbySource*

	Coal	Natural gas	Hydro	Biofuels and waste	Oil	Wind, solar, etc.
1990	24%	8%	9%	14%	46%	0%
1995	1%	2%	27%	24%	46%	0%
2000	1%	1%	23%	15%	60%	0%
2005	1%	0%	22%	11%	66%	0%
2010	5%	1%	29%	9%	55%	0%
2015	5%	1%	25%	11%	58%	1%
2018	9%	1%	30%	11%	47%	1%

We can see that in Albania that hydro power replaced coal in the 1990s, while the total energy supply decreased by 9% between 1990 and 2018. In 2018, fossil fuels contribute to 58% of the total energy supply compared to 77% in 1990.

Algeria[6]

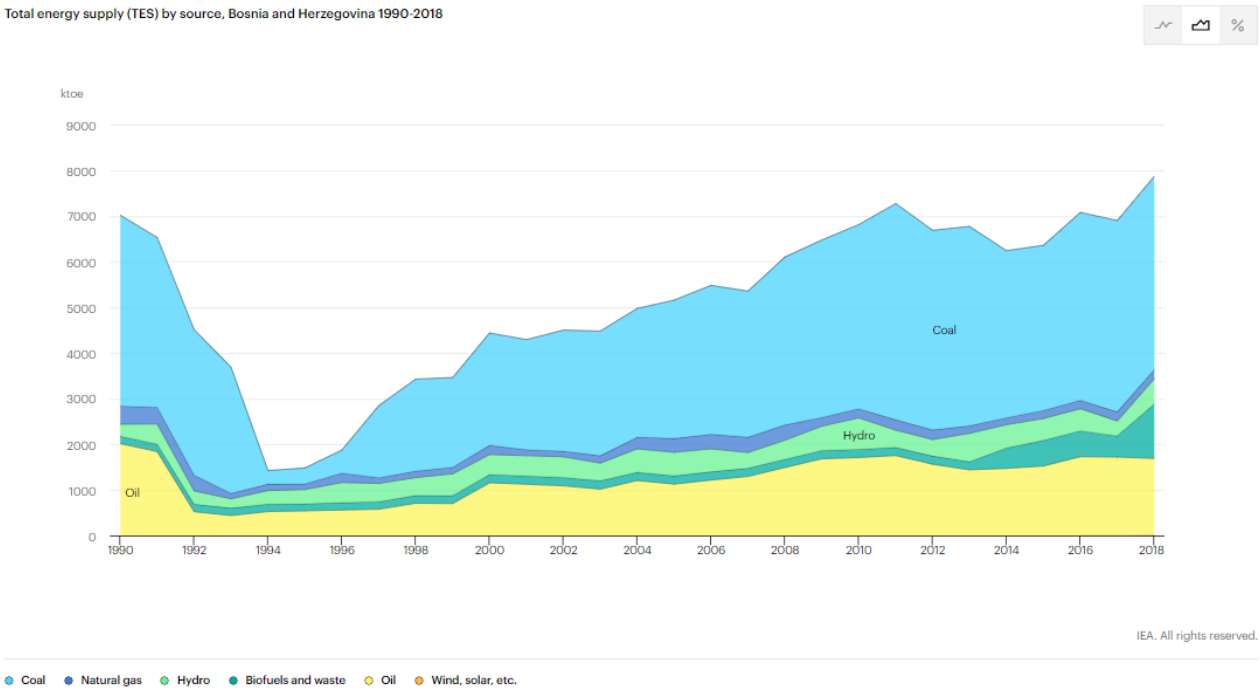


	Coal	Natural gas	Hydro	Biofuels and waste	Oil	Wind, solar, etc.
1990	3%	55%	0%	0%	42%	0%
1995	3%	59%	0%	0%	37%	0%
2000	2%	62%	0%	0%	36%	0%
2005	2%	63%	0%	0%	34%	0%
2010	1%	56%	0%	0%	43%	0%
2015	0%	61%	0%	0%	38%	0%
2018	1%	64%	0%	0%	35%	0%

In Algeria, the energy supply is mainly ensured by natural gas. The share of oil has decreased to be replaced by natural gas. Over the last 30 years, the total energy supply grew by 175%.

[6] *https://www.iea.org/data-and-statistics?country=ALGERIA&fuel=Energy%20supply&indicator=TPESbySource*

Bosnia-Herzegovina[7]

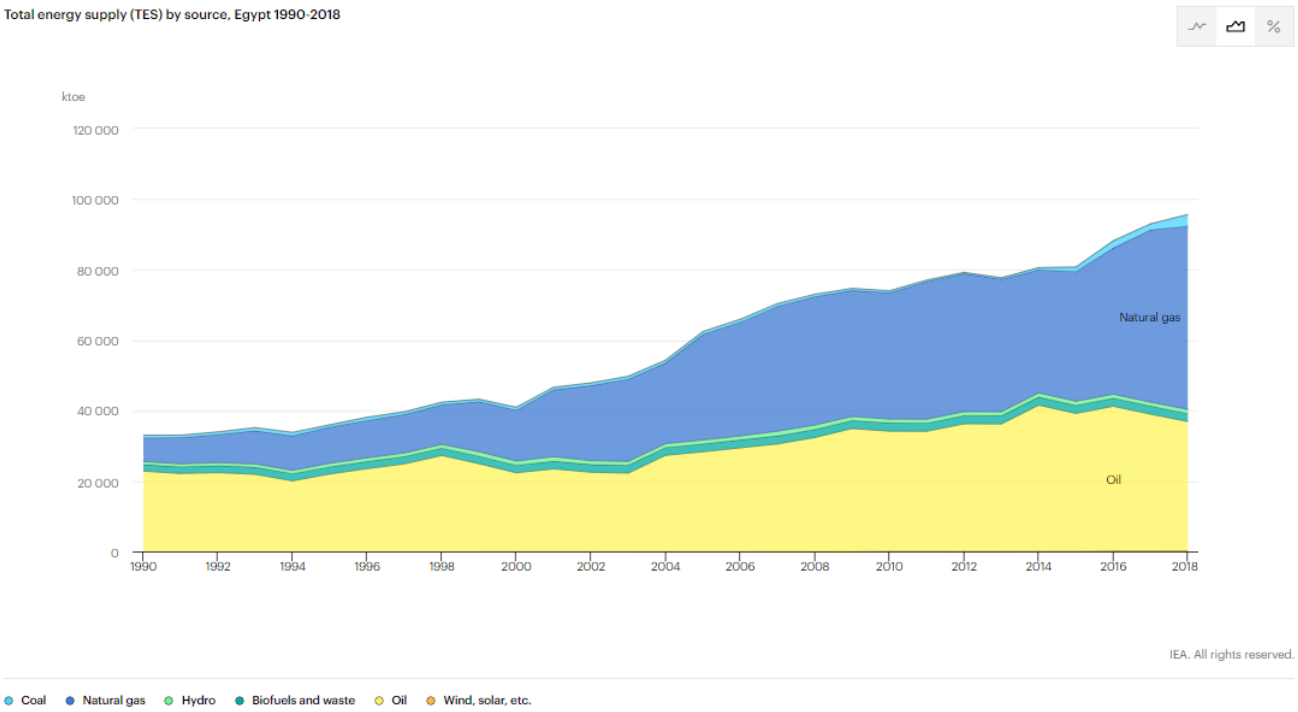


	Coal	Natural gas	Hydro	Biofuels and waste	Oil	Wind, solar, etc.
1990	60%	6%	4%	2%	29%	0%
1995	23%	8%	21%	10%	37%	0%
2000	55%	5%	10%	4%	26%	0%
2005	59%	6%	10%	4%	22%	0%
2010	59%	3%	10%	3%	25%	0%
2015	57%	3%	8%	9%	24%	0%
2018	54%	3%	7%	15%	21%	0%

In Bosnia-Herzegovina, coal remains the principal source of energy production. The use of biofuels and waste has increased since 2015. Hydro power accounted for more than 20% of the total energy supply in 1995, but the share has been decreasing ever since. The share of oil remains rather high, but the decreased is worth noting, from 37% in 1995 to 21% in 2018. Overall, the energy supply increased by 12% since 1990. The share of renewable energy sources has grown from 6% in 1990 to 22% in 2018.

[7] *https://www.iea.org/data-and-statistics?country=BOSNIAHERZ&fuel=Energy%20supply&indicator=TPESbySource*

Egypt[8]

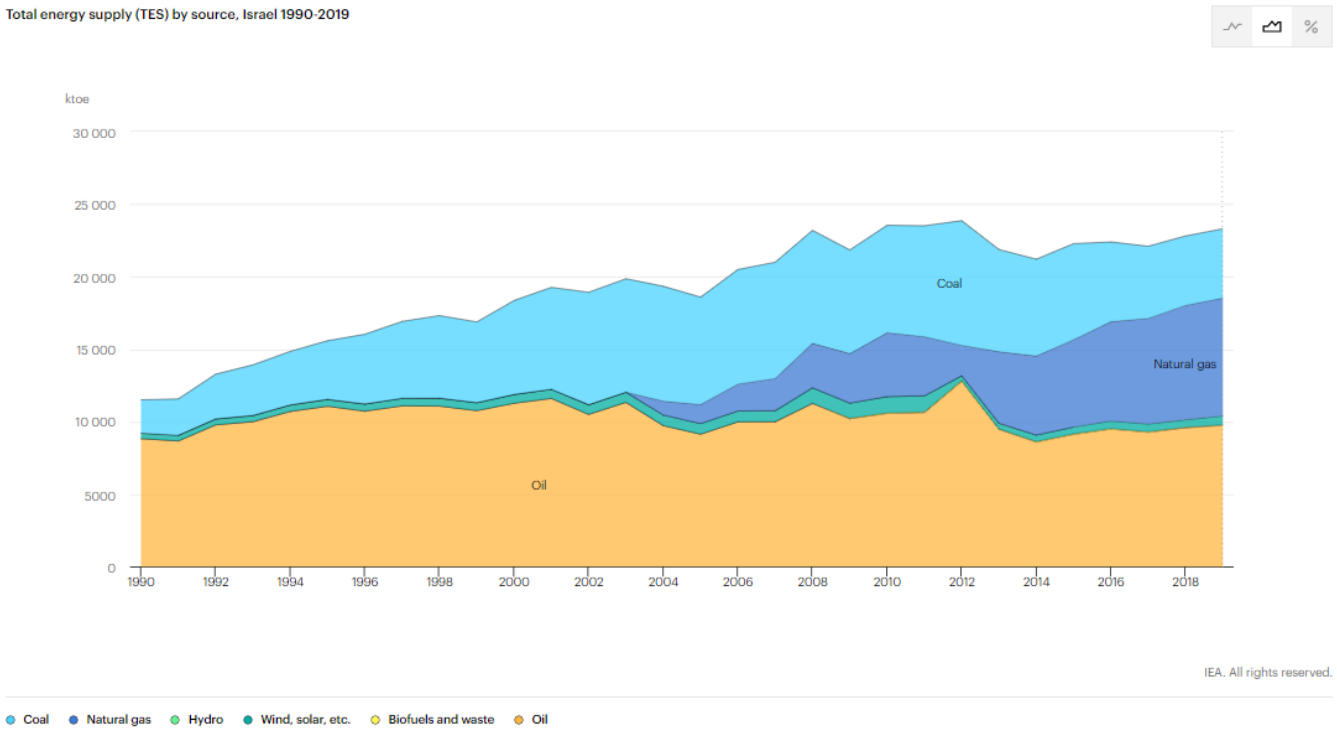


	Coal	Natural gas	Hydro	Biofuels and waste	Oil	Wind, solar, etc.
1990	2%	20%	3%	6%	69%	0%
1995	2%	29%	3%	6%	61%	0%
2000	2%	35%	3%	5%	55%	0%
2005	1%	48%	2%	4%	45%	0%
2010	1%	48%	2%	3%	46%	0%
2015	2%	46%	1%	3%	48%	0%
2018	3%	54%	1%	2%	38%	0%

Egypt's energy supply mainly comes from the use of fossil fuels (92% in 1990, 96% in 2018), but a switch from oil to natural gas has been made. The total energy supply grew over the last 30 years by 189%. It should be noted that in 2019, Egypt launched the Benban Solar Park as a part of an ambitious national solar plan. This will help scale up transition to clean energy in Egypt.

[8] *https://www.iea.org/data-and-statistics?country=EGYPT&fuel=Energy%20supply&indicator=TPESbySource*

Israel[9]

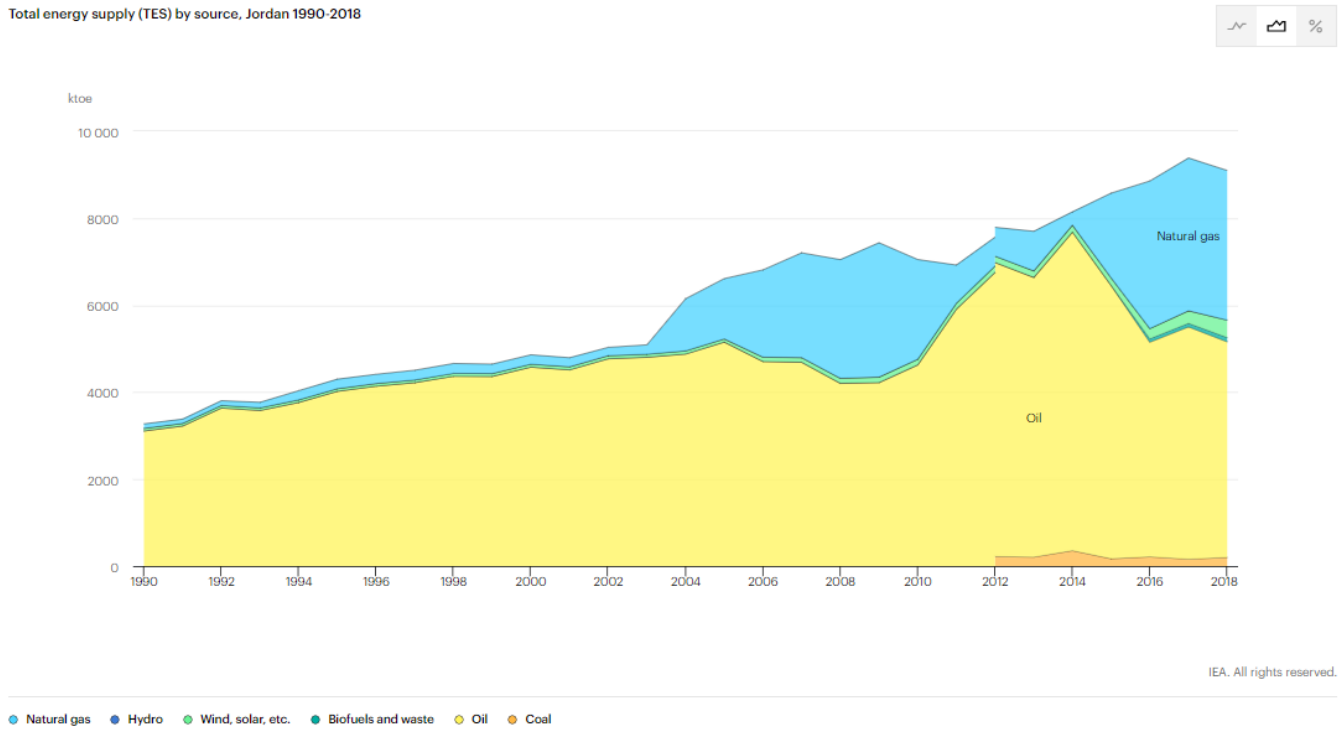


	Coal	Natural gas	Hydro	Wind, solar, etc.	Biofuels and waste	Oil
1990	20%	0%	0%	3%	0%	77%
1995	26%	0%	0%	3%	0%	71%
2000	35%	0%	0%	3%	0%	61%
2005	40%	7%	0%	4%	0%	49%
2010	31%	19%	0%	5%	0%	45%
2015	30%	27%	0%	2%	0%	41%
2019	20%	35%	0%	3%	0%	42%

Israel's energy supply has doubled since 1990 (+103%). The share of oil has significantly decreased, being replaced by natural gas, which was deployed between 2000 and 2005 (already slightly use since 1990). The share of coal has doubled between 1990 and 2005. But in 2019, the share of coal returned to the 1990 level. Israel has announced that coal will be phased-out by 2025, replaced by natural gas.

[9] *https://www.iea.org/data-and-statistics?country=ISRAEL&fuel=Energy%20supply&indicator=TPESbySource*

Jordan[10]

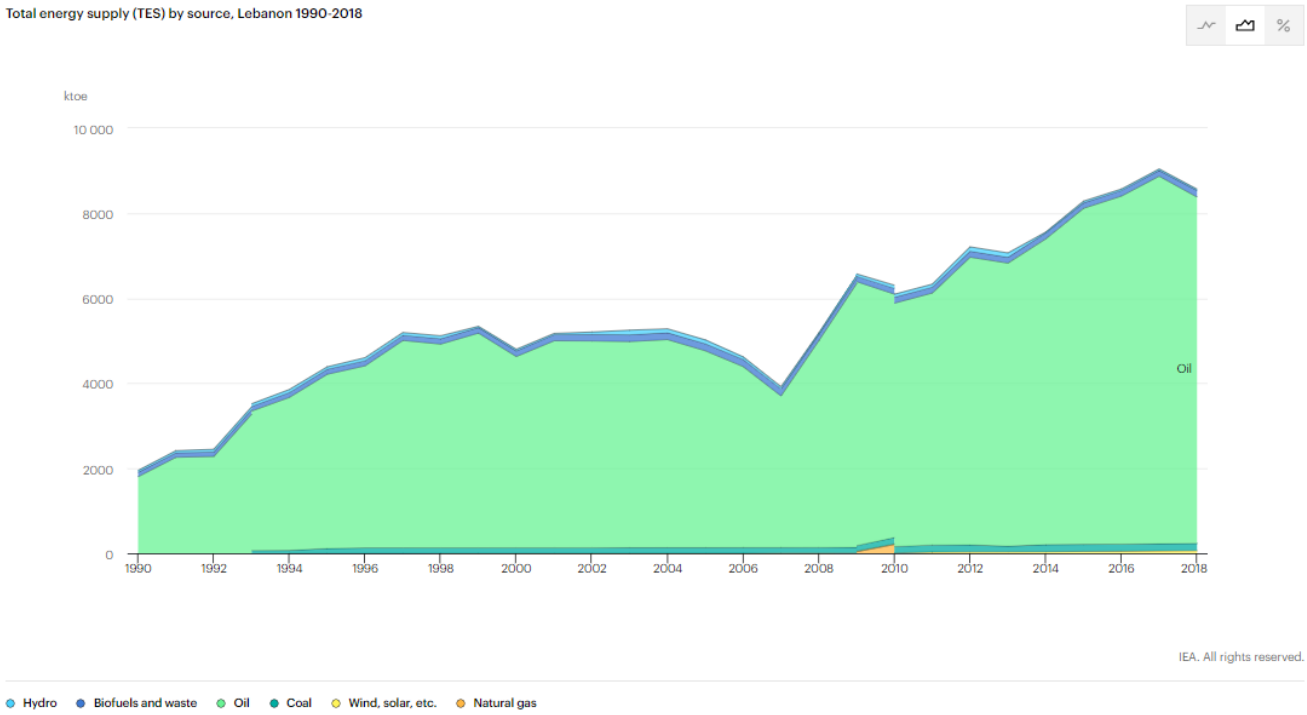


	Natural gas	Hydro	Wind, solar, etc.	Biofuels and waste	Oil	Coal
1990	3%	0%	2%	0%	95%	0%
1995	5%	0%	1%	0%	93%	0%
2000	4%	0%	1%	0%	94%	0%
2005	21%	0%	1%	0%	78%	0%
2010	32%	0%	2%	0%	66%	0%
2015	23%	0%	2%	0%	73%	2%
2018	38%	0%	4%	1%	54%	2%

Jordan relies mainly on fossil fuels for its energy supply (98% in 1990, 94% in 2018), and has increased by 178% since 1990. Over the last 30 years, natural gas has gradually replaced oil, which still remains the principal energy supply source (54% in 2018). Jordan has made significant progress introducing and implementing the net metering scheme and the electricity pricing alongside supporting polices which altogether helped accelerate increasing investments by private sector.

[10] *https://www.iea.org/data-and-statistics?country=JORDAN&fuel=Energy%20supply&indicator=TPESbySource*

Lebanon[11]

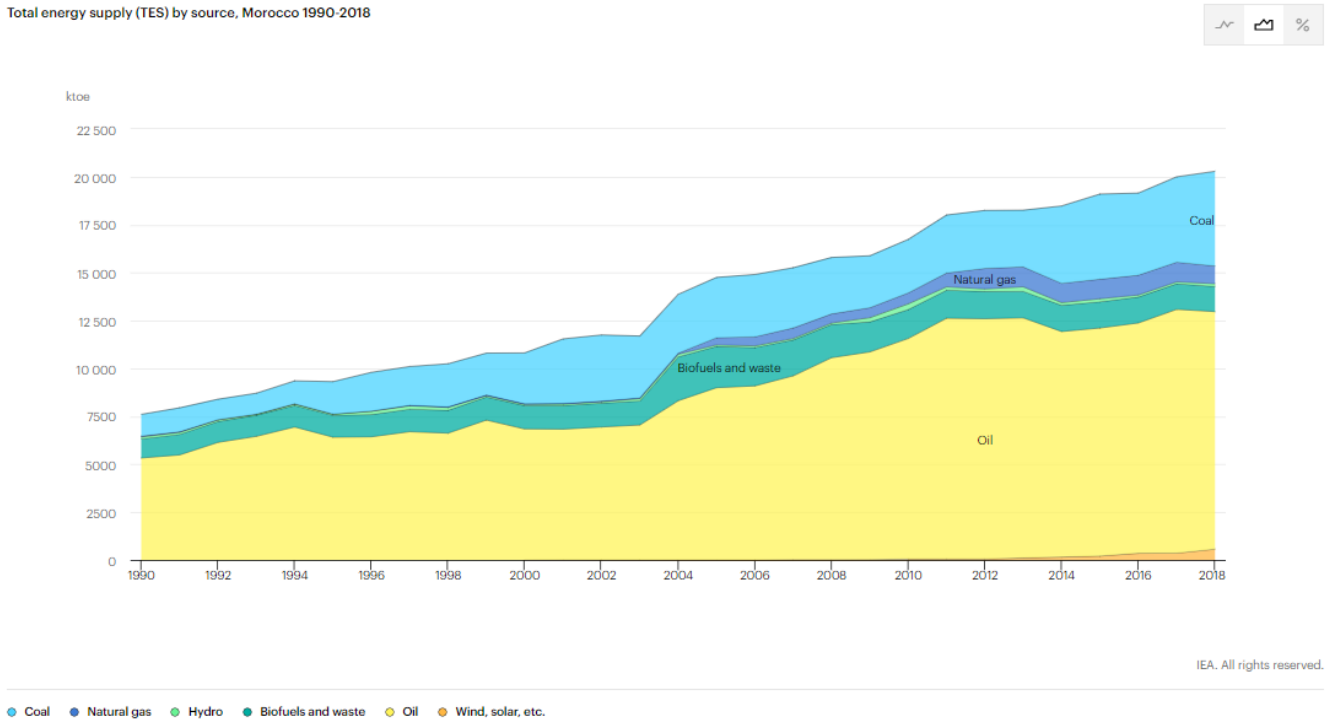


	Hydro	Biofuels and waste	Oil	Coal	Wind, solar, etc.	Natural gas
1990	2%	5%	93%	0%	0%	0%
1995	1%	3%	93%	3%	0%	0%
2000	1%	3%	94%	3%	0%	0%
2005	2%	3%	92%	3%	0%	0%
2010	1%	2%	91%	2%	0%	3%
2015	0%	2%	95%	2%	1%	0%
2018	0%	2%	95%	2%	1%	0%

Lebanon's total energy supply has increased by 338% between 1990 and 2018. The share of the different sources has remained stable, oil being the predominant one (more than 90%). In 2021, Lebanon has submitted an update to its NDC, setting an ambitious unconditional GHG emission reduction target of 20% by 2030 compared to BAU scenario (conditional target : -31% in 2030 compared to BAU scenario). This target will be achieved through transition to more sustainable energy sources.

[11] *https://www.iea.org/data-and-statistics?country=LEBANON&fuel=Energy%20supply&indicator=TPESbySource*

Morocco[12]

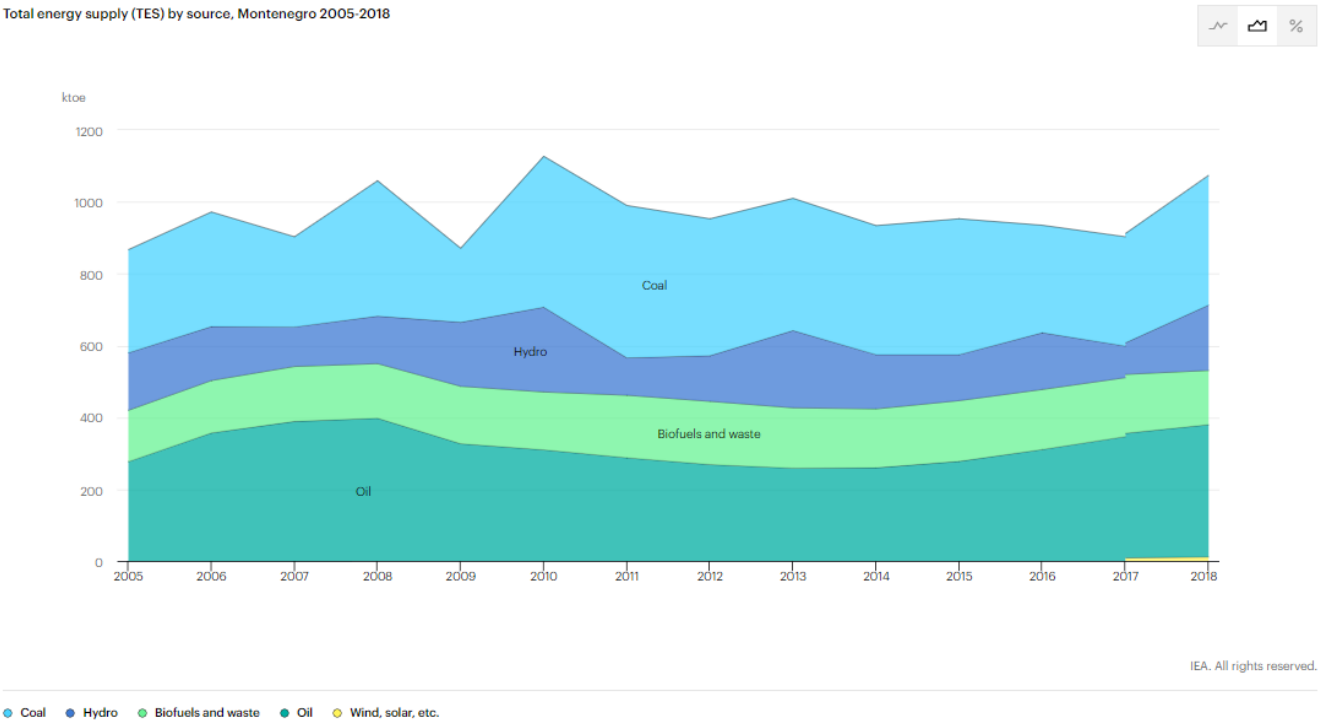


	Coal	Natural gas	Hydro	Biofuels and waste	Oil	Wind, solar, etc.
1990	15%	1%	1%	13%	70%	0%
1995	18%	0%	1%	12%	69%	0%
2000	24%	0%	1%	11%	63%	0%
2005	21%	3%	1%	15%	61%	0%
2010	17%	3%	2%	9%	69%	0%
2015	23%	5%	1%	7%	62%	1%
2018	24%	5%	1%	6%	61%	3%

Morocco's total energy supply has increased by 167% since 1990, and is ensured by fossil fuels at 90% in 2018. The decreased of oil's share has been replaced by coal. As stated in table 1, Morocco will set the target to reach 52% of the installed electric power from renewable sources by 2030 in its next NDC. Projects like Noor Solar Plants I, II and III will allow to achieve this target and enhance the mitigation ambition.

[12] *https://www.iea.org/data-and-statistics?country=MOROCCO&fuel=Energy%20supply&indicator=TPESbySource*

Montenegro[13]

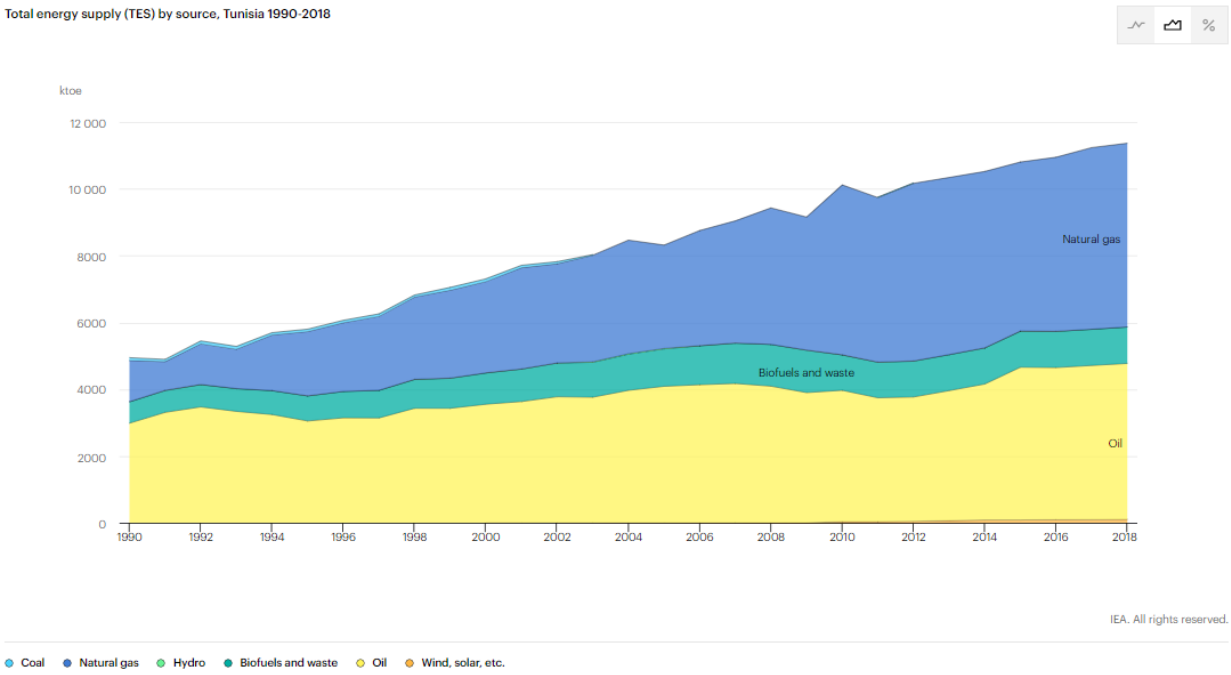


	Coal	Hydro	Biofuels and waste	Oil	Wind, solar, etc.	Natural gas
2005	33%	18%	16%	32%	0%	0%
2010	37%	21%	14%	28%	0%	0%
2015	40%	13%	18%	29%	0%	0%
2018	34%	17%	14%	34%	1%	0%

Regarding Montenegro, data is only available since 2005. Energy supply has increased by 24%. The share of each sources has remained stable. Energy supply is ensured by renewable energy sources at one third.

[13] *https://www.iea.org/data-and-statistics?country=MONTENEGRO&fuel=Energy%20supply&indicator=TPESbySource*

Tunisia[14]

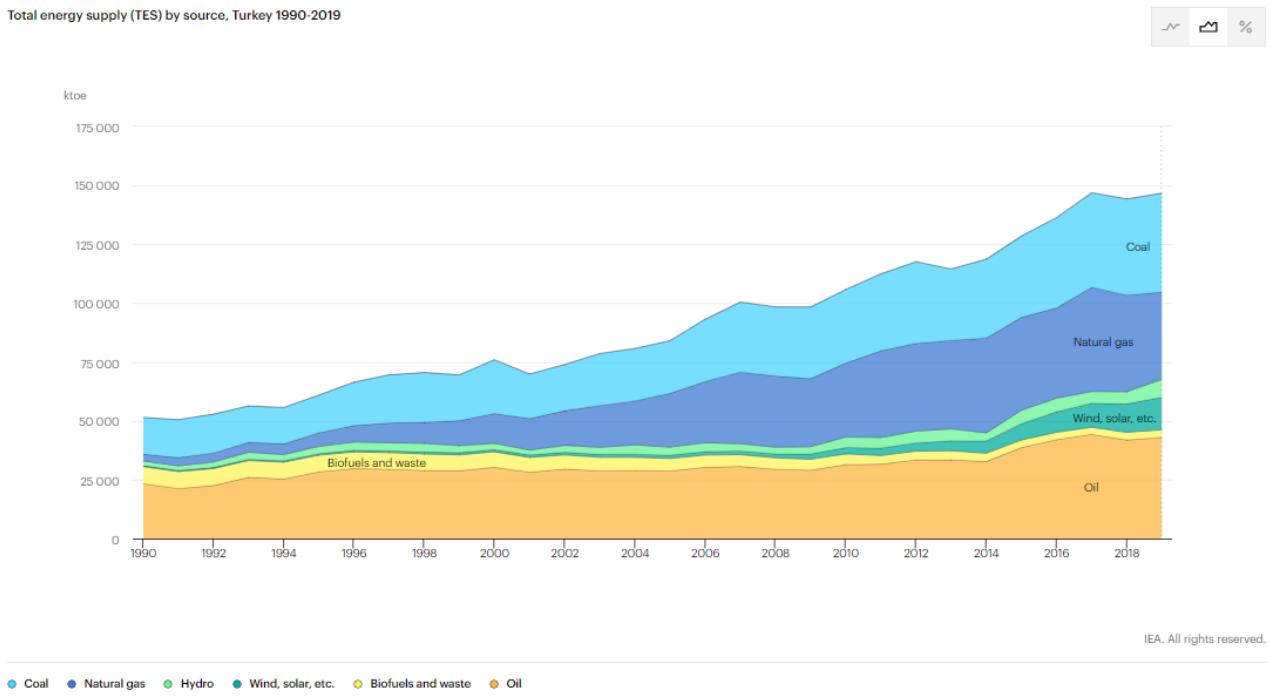


	Coal	Natural gas	Hydro	Biofuels and waste	Oil	Wind, solar, etc.
1990	2%	25%	0%	13%	60%	0%
1995	1%	33%	0%	13%	53%	0%
2000	1%	37%	0%	13%	49%	0%
2005	0%	37%	0%	13%	49%	0%
2010	0%	50%	0%	10%	39%	0%
2015	0%	47%	0%	10%	42%	1%
2018	0%	48%	0%	10%	41%	1%

Tunisia's energy supply has increased by 130% over the last 30 years. Fossil fuels provide 90% of this supply. The share of oil has decreased from 60% in 1990, to 41% in 2018, replaced by naturel gas (25% in 1990, 48% in 2018).

[14] *https://www.iea.org/data-and-statistics?country=TUNISIA&fuel=Energy%20supply&indicator=TPESbySource*

Turkey[15]



	Coal	Natural gas	Hydro	Wind, solar, etc.	Biofuels and waste	Oil
1990	30%	6%	4%	1%	14%	45%
1995	26%	9%	5%	1%	12%	47%
2000	30%	17%	3%	1%	9%	40%
2005	27%	27%	4%	2%	6%	34%
2010	30%	30%	4%	3%	4%	30%
2015	27%	31%	4%	5%	3%	30%
2019	29%	25%	5%	9%	2%	29%

Turkey's energy supply has increased by 185% since 1990 and the share of fossil fuels in 2019 is 83%. Oil's share has been reduced (45% in 1990, 29% in 2019), replaced by natural gas (6% in 1990, 25% in 2019).

Mauritania and Palestine

As IEA does not provide data for Mauritania and Palestine, other sources were use to assess the energy capacity of these two countries. The organization *World Data* provides data received from the US Office of Public Affairs. The installed production capacity from fossil fuels in Mauritania is 65%, 16% for water power (hydroelectric production) and 20% from renewable energy sources[16]. In Palestine, all installed production capacity is powered by fossil fuels[17].

[15] *https://www.iea.org/data-and-statistics?country=TURKEY&fuel=Energy%20supply&indicator=TPESbySource*
[16] *https://www.worlddata.info/africa/mauritania/energy-consumption.php*
[17] *https://www.worlddata.info/asia/palestine/energy-consumption.php*

Mitigation potential

The charts and tables displaying the energy sources used by SEMed countries show that fossil fuels are still most widely use, despite significant and recent improvements in renewable energy sources use and production. Therefore, the energy transition is a critical challenge for these countries to help achieve emission mitigation targets, as the potential for emission mitigation is very important (see table below). For instance, Israel has set a coal phase out towards 2025, and Israel's Prime Minister announced at the Climate ambition summit on December 11th 2020 that there will be no more fossil fuels by 2050. This shows great political will to engage in energetic transition.

The table below presents the share of greenhouse emissions from energy consumption in each SEMed countries (except for Mauritania, for which data are not available) over the total national emissions, in 2016. Data come from the organization *Our World in Data*, or directly for the answers stated in the survey. These numbers aim to present an overview of the potential for emission mitigation in SEMed countries. To estimate the share of GHG emissions, we summed the following categories: "Energy in manufacturing and construction", "Transport", "Electricity and heat", "Buildings", "Fugitive emissions from energy production", "Other fuel combustion" and "Bunker fuels". The remaining categories are: "Agriculture", "Land-use and forestry", "Waste" and "Industrial processes". We compare these figures with the objectives which will be set in the 2021 updated NDC, from the answers to the survey that was sent.

Country	***Share of GHG emissions from energy consumption (2016)***	***Objective stated in the survey***
Albania	44% (46,5% in 2016*)	Energy is one of the sectors targeted by the unconditional mitigation target for the next NDC (no figure provided), with qualitative objectives: • Deployment of low-carbon energy sources • Enhancing energy efficiency
Algeria	80%	
Bosnia and Herzegovina	84%	
Egypt	72%	
Israel	76% (81% in 2018*)	Energy is not one of the sectors targeted by the unconditional mitigation target. However, several targets will be included in the next NDC, regarding energy: • Coal phase out by 2025 • Increased targets for renewable energy sources
Jordan	69%	
Lebanon	75%	Energy is one of the sectors targeted by the unconditional mitigation target for the next NDC (no figure provided)
Montenegro	71%	
Morocco	71% (41%*)	Energy is not one of the sectors targeted by the unconditional mitigation target. However, several targets will be included in the next NDC, regarding energy:

Country	*Share of GHG emissions from energy consumption (2016)*	*Objective stated in the survey*
		• Reach 52% of the installed electric power from renewable sources by 2030. • Reduce energy consumption by 15% by 2030. • Significantly reduce public subsidies for fossil fuels, following on from reductions already undertaken in recent years. • Substantially increase the use of natural gas through infrastructure projects allowing the import of liquefied natural gas.
Palestine	62%*	Energy (Renewable energy sources, energy efficiency) is one of the sectors targeted by unconditional the mitigation target (no figure provided)
Tunisia	70% (73%*)	Energy is not one of the sectors targeted by the unconditional mitigation target.
Turkey	89%	Energy is one of the sectors targeted by the unconditional mitigation target (no figure provided)

Table 1 – Share of energy GHG emissions for SEMed countries, and targets to be included in the next NDC. Source: authors' survey to SEMed countries.

**answer from the survey*

1.5. Prospective trends

Mediterranean countries and stakeholders have demonstrated a constant need for and interest in updated information and analyses on the environment and development, including data, maps, graphs, lessons learned and more generally support for decision making. To contribute to knowledge improvement accordingly, 2020 Plan Bleu's report *State of the Environment and Development in the Mediterranean* is presenting a comprehensive and update assessment of the status and main sustainability issues related to environment and development in the Mediterranean region. The report aims to increase awareness and understanding of environment and development status and trends in the Mediterranean, their driving factors and impacts, provide a benchmark for improved decision-making at all levels (individual, national governments, international organizations, NGO's, civil society, businesses, academics), facilitate the measurement of progress towards sustainable development and enhance the delivery of the Mediterranean Strategy for Sustainable Development 2016-2025 (MSDD). This strategy provides "*an integrative policy framework for all stakeholders to translate the 2030 Agenda for Sustainable Development and the Sustainable Development Goals at the regional, sub-regional, national and local levels in the Mediterranean region*"[18].

[18] *UNEP, https://www.unep.org/unepmap/what-we-do/mediterranean-strategy-sustainable-development-mssd#:~:text=The%20Mediterranean%20Strategy%20for%20Sustainable,national%20and%20local%20levels%20in*

Main findings are summarized below, allowing to have a broad and detailed overview of the Mediterranean situation.

Growing population, especially in the southern and eastern Mediterranean countries, is a major concern. Indeed, the increasing pressure on urban and coastal areas are endangering economic activities such as tourism, agriculture or fisheries. Mediterranean economies are therefore heavily dependent of coastal areas integrity. Mediterranean countries remain the world's leading tourism destination, with around 30% of international tourist arrivals, and absolute numbers having doubled in 20 years, with a large part in coastal zones. Marine resources play a role to create wealth in the Mediterranean, by providing jobs and contributing to local developments.

The countries of the Mediterranean rely heavily on international trade and imports of agricultural goods. This might prove itself a problem, as Mediterranean countries are therefore sensitive to the volatility of international prices. The report provides ratios (import/consumption) for cereals in Egypt (42%), Tunisia (60%), Algeria (72%) and Lebanon (86%). These ratios show that there is a strong dependency on importation for cereals. The Mediterranean accounts for one third of the world's imports for cereals, for only 7% of the population. Food security is also threatened because of the scarcity of arable lands (8,3 million hectares of arable land have been lost since 1960, -13% over the 1995-2015 period) and water resources, combined with low land productivity and water efficiency. Climate change is also accelerating land degradation as well as water scarcity, which will endanger sustainability of Mediterranean agriculture. To reduce this impact, countries like Algeria (higher producer of desalinated water in the Mediterranean), Egypt or Israel have engaged into seawater desalination to reduce the impact of water scarcity on development and food security.

The environmental integrity of the Mediterranean basin is threatened by human activities. These activities include the expansion of residential, tourist, commercial and industrial areas, or infrastructure spreading, land use intensification (causing soil degradation), expansion of intensive farming techniques. The main consequences quoted by the report are water and wind erosion, salinization, sealing and compaction, loss of organic matter and the permanent loss of vegetation cover, impacting biodiversity and ecosystem services.

In the SEMed countries, air and water pollution are putting at risk human health. For instance, levels of particulate matter ($PM_{2,5}$) in urban areas are above the world average and the World Health Organization in two thirds of Mediterranean countries. Climate change impacts are also a risk to human health, as extreme events may happen more frequently (heat waves, droughts), and food and water availability may decrease.

Plan Bleu points out some major responses in addressing regional issues. One of them being the regional cooperation and territorial approaches around common objectives. The integration of the environment into sectoral policies is also a major progress, made possible under the Barcelona Convention with the establishment of integrated tools (ICZM Protocol, the Ecosystem Approach, the Mediterranean Strategy for Sustainable Development, or the Sustainable Consumption and Production Action plan). This approach is consistent with our recommendation to form country clusters, to gather countries that share similar

issues and objectives, to allow for synergies to be built upon and optimize the use of resources – see the table below.

Leading regional synergies

Gathering countries sharing common issues, as well as a common ambition, is a powerful approach when it comes to obtain sustainable results, sharing the burden of investments, sharing knowledge. Opportunity for "Pooling efforts to create economies of scale" has for instance been stressed by ECOWAS[19].

Several existing initiatives convey powerful synergies in the Mediterranean region:

Initiative	Countries covered	Activities
MedECC	All SEMed countries	• Scientific risks assessment of the Mediterranean region • Support decision-making • Contribution to policy improvement • Identify the gaps in the current research on climate change and its impact in the Mediterranean • Interaction with funding agencies for the development of new research programs
UfM	All SEMed countries	• Unique platform to facilitate and promote regional dialogue and cooperation • Create effective links between the policy dimension and its operational translation • Enhance partnerships and interactions in the region
Clima-Med	• Algeria • Egypt • Israel • Jordan • Lebanon • Morocco • Palestine • Tunisia	• Support sustainable climate and energy policies and strategies • Provide technical assistance • Identifying concrete pilot actions to be implemented by national and local authorities • Facilitating climate investments and the setup of finance mechanisms
United Nations Sustainable Development Solutions Network Mediterranean (SDSN Mediterranean)	• SEMed countries (except Jordan and Mauritania) • Croatia • Cyprus • France	• Providing collaborative research and joint networking solutions initiatives for the promotion and implementation of the UN Agenda 2030 • Developing innovative and quality teaching and training on Sustainable Development • Enhancing dissemination, exploitation and outreach of thematic results among the

[19] *ECOWAS, M. Sékou Sangare, 2019, Mise en œuvre de l'Accord de Paris sur le climat en Afrique.*

	• Gibraltar • Greece • Italy • Libya • Malta • Monaco • Slovenia • Spain • Syria	Mediterranean countries, universities, policy makers, businesses, private sector and NGOs • Supporting and encouraging the youth engagement on the SDGs • Implementing Education for Sustainable Development tools
The Arab Climate Finance Mobilization and Access Strategy (UNFCCC initiative)	Middle East and North Africa (MENA)	• Assess climate finance barriers in Arab countries • Prioritize climate finance and investment needs for the region, considering structural differences and opportunities • Develop an all-inclusive "Arab Climate Finance Mobilization and Access Strategy", in a country-driven manner • Endorsement of the strategy at the highest political level • Support the translation of finance needs into finance action • Investment in the region and beyond
NDC Partnership	Countries all over the world (including Albania, Jordan, Lebanon, Morocco, Palestine and Tunisia)	• Global network of knowledge and resources to support members' work in climate action • Targeted technical assistance and capacity building • Knowledge products to fill information gaps • Enhance financial support
Nature, Climate and Energy Cooperation by United Nations Development Programme (UNDP)	Supporting all countries in the Arab region	UNDPs Nature, Climate and Energy Practice supports over eighty country projects in the Arab region contributing to implementation of the SDGs, Paris Agreement and related agreements. This includes mobilization of over $500m of grant assistance for implementation and local action.
SDG Climate Facility Regional Project by United Nations Development Programme (UNDP)	Regional activities and country grants in Jordan, Iraq, Palestine, Egypt, Tunisia and Yemen	The SDG-Climate Facility is regional inter-agency and multiparter project in the Arab States led by UNDP and in partnership with UNEP-FI, WFP, UN Habitat, UNDRR, League of Arab States and Arab Water Council, which helps advance integrated solutions for climate actions with co-benefits across priority SDGs on poverty, gender and peace, and capacities to scale up finance to this end.

Climate Promise by United Nations Development Programme (UNDP)	Seven countries in the Arab region, including UfM countries including Tunisia, Morocco, Lebanon, Jordan	Five key services provided under the Climate Promise for NDC Enhancement: 1: Build Political Will & Societal Ownership at National/Sub-National Levels 2: Review, Align & Update/Enhance Current NDC Targets, Policies & Measures 3: Incorporate Additional Sectors &/or GHGs 4: Assess Costs & Investment Opportunities 5: Monitor Progress & Strengthen Transparency

Table 2 – Leading synergy initiatives in the Mediterranean

Plan Bleu, through its initiative MED 2050, is doing a prospective exercise to anticipate how the Mediterranean basin will be affected by development trends and by climate change towards 2050. Its objective is to confront several possible visions of the future of the Mediterranean by 2050 (with an intermediate stage in 2030) and co-construct solid and realistic transition paths towards common objectives, in consistency with other strategic frameworks such as the roadmap (see box below). The MED 2050 prospective network brings together thematic experts in foresight, regional actors and decision-makers at different scales and members of civil society from the three Mediterranean shores.

A regional roadmap for cooperation and sustainability

SDSN Mediterranean published a report containing a roadmap for cooperation and sustainability in the Region, leading to the establishment of **6 geographical centres**, defined **"Mediterranean Hubs"**, divided by thematic competences according to the principles of the great transformative processes outlined by the 2019 Sustainable Development Report from UN SDSN[20]. The 6 Mediterranean Hubs will deal with: education and social and gender inequalities (SDSN France); health and well-being (SDSN Spain); energy, decarbonisation and sustainable production (SDSN Greece); **food, soil, water and sea (SDSN Mediterranean); sustainable cities and communities (SDSN Turkey);** digital revolution (SDSN Cyprus). The 2020 Report[21] defines a set of recommended policies for each of the main challenges – a roadmap – aimed at governments, companies and stakeholders. *"The work of the Union for the Mediterranean is based on the 2030 UN Agenda and its SDGs"* said **Nasser Kamel**, Secretary General of the Union for the Mediterranean – *"The implementation of these global commitments requires appropriate partnerships between all stakeholders, such as SDSN, and aggregated data for the clear vision needed to advance dialogue and positive action. This year marks the 25th anniversary since the launch of the Barcelona Process and it offers a special opportunity for evaluating the state of our region, including in light of the COVID-19 crisis".*[22] It demonstrates that the work carried out by the Union for the Mediterranean is critical to support countries to achieve their climate ambition.

[20] *Sustainable Development in the Mediterranean, 2019, https://s3.amazonaws.com/sustainabledevelopment.report/2019/2019_sustainable_development_report.pdf*
[21] *Sustainable Development in the Mediterranean, 2020, https://sdsn-mediterranean2.wp.unisi.it/wp-content/uploads/sites/30/2020/11/MED_SDG2020-def_compressed.pdf*
[22] *https://www.sdsn-mediterranean.unisi.it/2020/11/11/sustainable-development-goals-in-the-mediterranean-still-a-long-way-to-go/*

II. The NDC process: **State of progress**

2.1. The Paris Agreement framework

The Paris Agreement signed in 2015 at COP-21 sets long-term objectives to follow the path to maintain global warming below 2°C or 1,5°C in 2100 compared to pre-industrial levels, enhance resilience, and improve adaptation capacities to climate impacts. The objectives are also to increase investments for low-carbon and climate resilient developments.

The article 4 of the Paris Agreement establish a binding commitment from signing Parties, to "prepare, communicate and maintain successive nationally determined contributions (NDC) that they intend to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions". The first NDCs were submitted after COP-21, regarding long-term targets for mitigation as well as adaptation. In 2016, the United Nations Framework Convention on Climate Change (UNFCCC) published the Synthesis report[23] on the aggregate effect of INDCs published before April 4th, 2016, for 161 NDCs from 189 Parties, representing 95.7% of greenhouse gas emissions in the world. Given the announced levels of emissions in the NDCs, 2030 level was estimated to reach 56.2 Gt CO_2e worldwide, compared to the maximum level of 41 Gt CO_2e necessary to set GHG emissions on a path compatible with a +2°C global warming objective towards 2100. NDCs have to cover mitigation and adaptation.

It is required within the Enhanced Transparency Framework (ETF) that Parties to the UNFCCC examine adaptation and mitigation hands in hands[24]. Through its Article 13, the Paris Agreement established a framework of enhanced transparency (ETF) to regularly measure the progress made by countries to strengthen the global response to the threat of climate change. The purpose of the framework for transparency of action is to provide a clear understanding of climate change action in the light of the objective of the Convention as set out in its Article 2, including clarity and tracking of progress towards achieving Parties' individual NDC under Article 4, and Parties' adaptation actions under Article 7, including good practices, priorities, needs and gaps, to inform the global stocktake under Article 14.

The objective of the new international adopted framework is to enable the implementation of mitigation, adaptation and support actions as well as their monitoring over time. This monitoring will be reported on a regular basis as part of the BTR (Biennial Transparency Report), which will replace the BUR (Biennial Updated report) by 2025. In this context, national GHG emissions inventories as well as climate action indicators are essential for monitoring nationally determined contributions (NDCs) and for evaluating impact and instilling confidence within the international community. Rigorous monitoring systems will

[23] *https://unfccc.int/resource/docs/2016/cop22/eng/02.pdf*
[24] *Fader M, Cranmer C, Lawford R, Engel-Cox J 2018 Toward an Understanding of Synergies and Trade-Offs Between Water, Energy, and Food SDG Targets. Front. Environ. Sci. 6, 1-11. doi: 10.3389/fenvs.2018.00112*

allow for countries to build mutual trust between each other, while enhancing climate ambition of mitigation and adaptation policies.

At COP 24, the UNFCCC adopted the rules and procedures for implementing the Paris Agreement gathered in the "Paris Rulebook". Decision 18 / CMA.1 adopts the modalities, procedures, and guidelines (so-called MPGs) for the transparency framework for action and support set out in its annex.

The informational elements to be provided by Parties when tracking progress made in implementing and achieving their NDCs (Annex to decision 18/CMA.1, section III) include information on:

- National circumstances and institutional arrangements (Annex to decision 18/CMA.1, Section III.A)
- A description of the Party's NDC (Annex to decision 18/CMA.1, Section III.B)
- Information necessary to track progress made in implementing and achieving NDCs (Annex to decision 18/CMA.1, Section III.C), including in a structured summary
- Information on mitigation policies and measures (Annex to decision 18/CMA.1, Section III.D)
- GHG projections (Annex to decision 18/CMA.1, Section III.E)

According to the MPGs, within the structured summary, a Party "shall" provide information on "indicators that it has selected to track progress towards implementation and achievement of its NDC under Article 4. Indicators shall be relevant to a Party's NDC under Article 4 and may be either qualitative or quantitative." (Annex to decision 18/CMA.1 III.C paragraph 65). In addition to information on indicators, Parties are to provide a description of the indicators used, of each methodology and/or accounting approaches.

In 2020, Parties were required to submit an updated NDC to enhance climate ambition; due to the Covid-19 pandemic, this deadline has been delayed to 2021. The third NDC update will occur in 2025. Regarding adaptation, actions will be described either within next NDC (that is third version) or as a stand-alone report such as national Adaptation Plans; it is stipulated that first Biennial Transparency reports, to be published no later than 31st of December 2024, must indicate which adaptation actions are going to impact mitigation actions in a beneficiary way.

2.2. Overall progress of the NDC process

On March 31st, 2021, 81 countries have stated their intention to enhance ambition in a new or updated NDC before COP-26, representing 47,2% of global emissions and 76 countries (including European Union as a party) have already submitted a new or updated NDC, representing 27,9% of global emissions. These figures are reported by the World Resources Institute, through its NDC Tracker[25].

The state of progress around the world is summarized in the following infographic, provided by Climate Watch[26]:

[25] *https://www.climatewatchdata.org/2020-ndc-tracker*
[26] *https://www.climatewatchdata.org/ndcs-explore?category=unfccc_process&indicator=submission&showEUCountries=true*

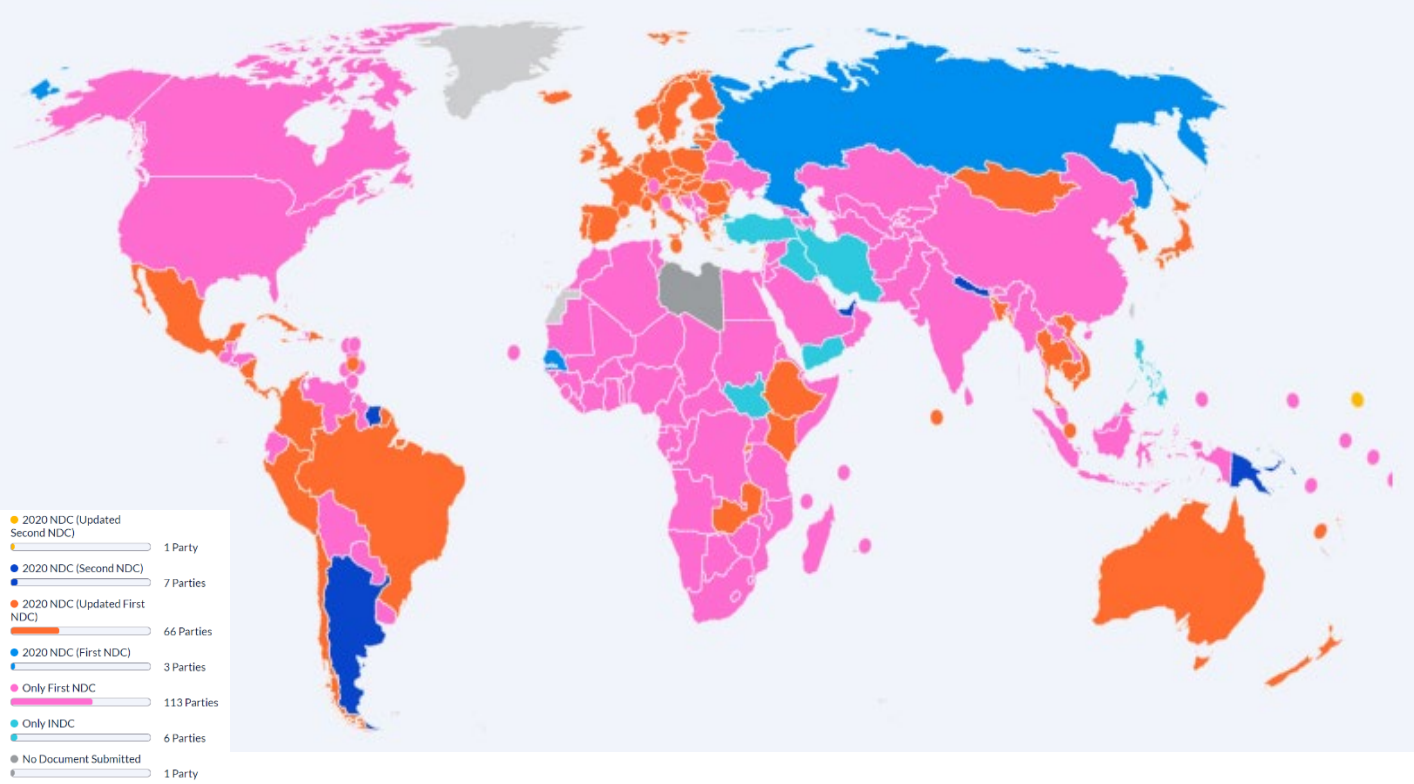


Figure 3 – NDC update state of progress in the world. Source: Climate Watch

A majority of countries has not yet submitted its second or updated NDC, representing more than 68% of global GHG emissions. It is worth noting that 3 Parties (including Senegal and the Russian Federation), representing 4,2% of global GHG emissions, submitted their first NDC in 2020. It is expected that in the coming months, many NDCs will be updated.

Differences in methodological approaches

When reviewing the NDC design process applied by the countries, significant differences may be highlighted as introduced below. In particular, we can see that methods and indicators used to define the emission reduction to achieve by the countries can vary a lot; a uniformization of these indicators could help to have more transparency for the global targeted emission reduction.

The PBL Netherlands Environmental Assessment Agency provides an assessment of the type of baseline used by the countries to define their climate targets[27].

[27] *https://themasites.pbl.nl/o/climate-ndc-policies-tool/#:~:text=PBL%20Climate%20Pledge%20NDC%20tool&text=The%20PBL%20Climate%20Pledge%20NDC,climate%20policies%20up%20to%202030.*

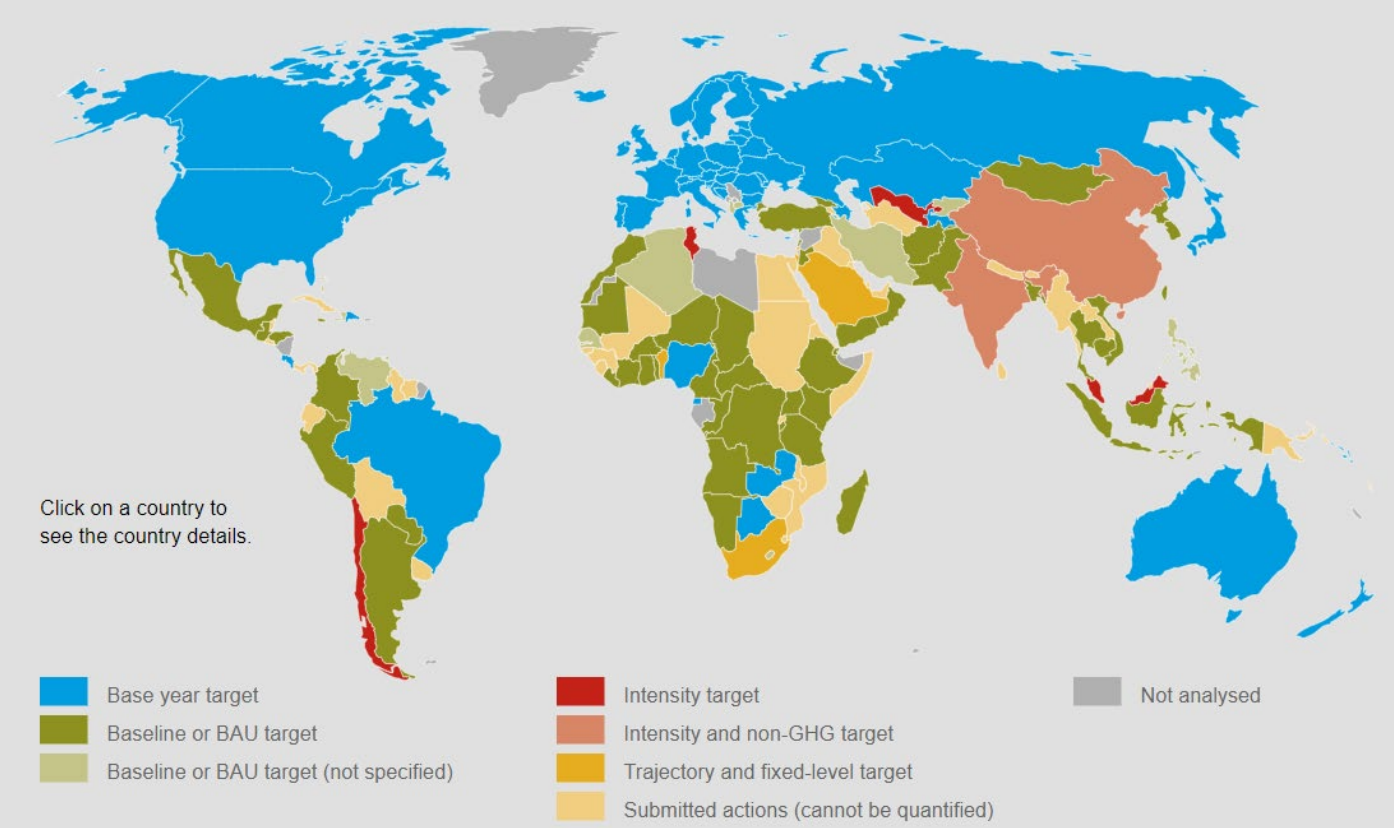


Figure 4 - PBL Climate Pledge NDC tool

In 2018, the World Resource Institute (WRI) carried out an analysis[28] of the different types of targets targeted by the Parties and sought to assess the possibility, for an analyst or external observer, to dispense or calculate the reductions proposed for the target year in absolute value. This analysis can be summarized as follows.

Different types of targets used in NDCs and modalities for quantifying emissions reductions for the target year

Target types	Description – reduction quantification	Countries concerned, examples
Fixed-level targets	• This is the easiest type of target to quantify because it specifies an absolute level of emissions (or a target trajectory). • Carbon neutrality targets, which are designed to achieve net zero emissions by a certain date, are also fixed level targets.	• Countries that have adopted this approach: Argentina, Armenia, Bhutan, Costa Rica, Ethiopia, Oman. For example, Argentina specified in its first NDC that it would not exceed 483 MtCO2e of net emissions by 2030.
Base year emissions target	• This type of target is generally expressed as a percentage relative to a historical reference year or "base year". The target level of emissions can be calculated easily	• For example, Albania (base year: 2016), Algeria (2009), Bosnia and Herzegovina (1990), Israel (2005) and Montenegro (1990) have committed in their NDC to

[28] *https://www.wri.org/blog/2018/11/more-one-third-national-climate-plans-arent-easily-measured*

Target types	Description – reduction quantification	Countries concerned, examples
	when the country provides data on base year emissions.	reduce their emissions by a certain percentage below the base year levels by 2030.
Baseline scenario targets	• Calculating the objective of a baseline scenario is only straightforward if the country provides information on the projected level of emissions for the target yearIf the baseline scenario target is dynamic, the target year emissions will change as the baseline is recalculated making the calculation uncertain.	• Jordan, Lebanon, Mauritania, Morocco and Turkey have submitted a target of reducing their GHG emissions in 2030 compared to a BAU scenario. Palestine targets the year 2040. Their NDC include projections for BAU emission levels which facilitates the calculation of the target level of GHG emissions for 2030 (2040 for Palestine).79 countries submitted targets against a baseline scenario but only 57 provided the baseline projections needed to calculate an absolute emissions level in 2030.
Intensity targets	• This type of target proposes the reduction in the intensity of emissions per unit of a variable (GDP, population) compared to a historical reference year. It is not designed to limit emissions to any given level. Estimating the reduction in emissions with this type of target involves conducting an in-depth analysis using secondary data.	• Eight countries have submitted intensity targets as part of their NDCs including Tunisia. Only China provided sufficient information to allow the calculation of an absolute emission level in 2030.

Table 3 - Source: Enerdata based on WRI analysis from November 2018 (More than One-Third of National Climate Plans Aren't Easily Measured)

WRI's analysis of 197 countries shows that only 45% of countries report enough data and information in their NDCs to calculate the level of emissions for the target year. For the remaining countries, it is necessary to have recourse to secondary official sources such as preparatory reports (20%) or additional hypotheses and analyses (16%). Finally, 18% of countries did not provide any emission targets.

Distribution of the number of CDNs according to the type of target and of information provided

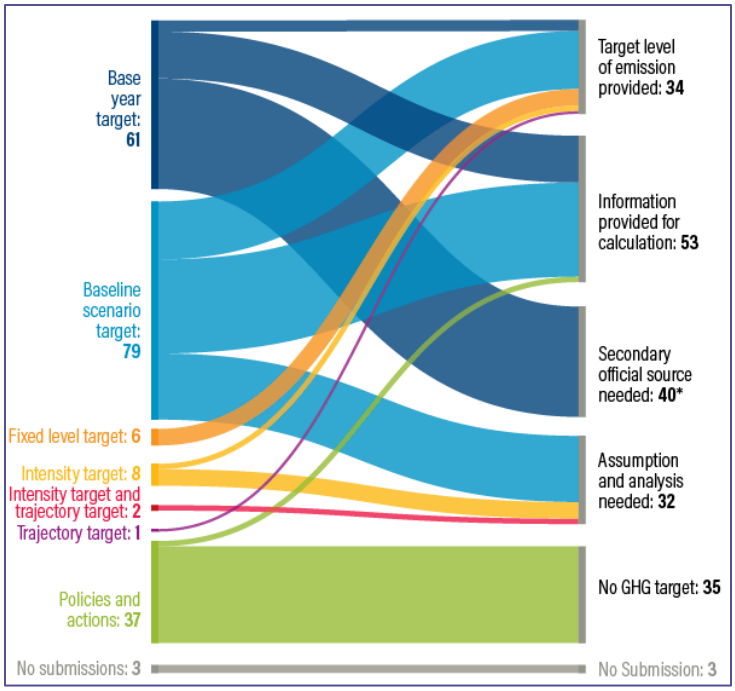


Figure 5- WRI, "More than One-Third of National Climate Plans Aren't Easily Measured," November 2018

This state of play therefore results in a lack of transparency making it difficult for third parties to monitor and evaluate emissions from countries as well as to monitor emissions at the global level.

2.3. Towards a 1.5°C path ?

The 2019 UNDP and UNFCCC report *The Heat is On*[29] takes stock of the global climate ambition and compares is with the Paris Agreement objective to keep global warming below +1,5°C by 2100 compared to preindustrial levels.

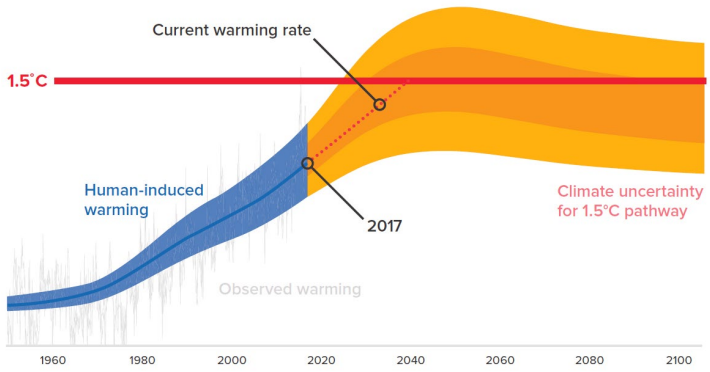


Figure 6 – Global warming trend. Source: UNDP and UNFCCC, *The Heat is On*, 2019[29]

[29] *UNDP and UNFCCC, 2019, The Heat Is On - Taking Stock of Global Climate Ambition*

From the figure above, we can see that global GHG emission trend does not allow to keep global warming below +1,5°C. The 2020 Gap report[30] states that even if all commitments (conditional and unconditional) from the Nationally Determined Contributions (NDCs) submitted by the Parties to the UNFCCC at COP-21 in 2015 are implemented, global warming will reach at least +3°C in 2100. This shows that climate ambition needs to be enhanced to achieve the objective set by the Paris Agreement. It should be recalled that SEMed countries are likely to be even more impacted than average by the consequences of climate change in all aspects (pollution, land and sea use, water and food security, energy supply, ecosystems, health) as stated, for instance, by MedECC's First Mediterranean Assessment Report (MAR1)[4].

For instance, the European Union has recently strengthened its 2030 GHG emissions reduction target, from -40% to -55% compared to 1990. The European Union is also aiming to achieve carbon neutrality by 2050. Those two targets show significant commitments to climate action and could inspire countries all over the world to enhance their ambition as well. For instance, it is stated in the report *The Heat is On* that "*more than 40 least developed countries and small island developing states are among those at the forefront of action to reduce GHG emissions by indicating they will submit more ambitious NDCs. These nations, each accounting for less than 0.1 percent GHG emissions, are facing disruption to water and food supplies and rising sea levels, among others. Their objective is to lead by example and demonstrate that ambition can come even from the poor and most vulnerable*". While those countries are already facing the impacts and consequences of climate change and hence would be willing to use most of their available resources to adaptation measures, they chose to play their part in the shared effort to mitigate global GHG emissions.

Long term strategies are a part of the commitment that countries can formulate. 12 nations have submitted Long-Term Strategies to UNFCCC, 53 nations are developing Long-Term Strategies, 44 nations indicate they plan to develop Long Term Strategies and 31 nations have till no plans to develop Long-Term Strategies. For instance, Jordan will start in 2021 to define the roadmap for 2050, and Morocco is seeking carbon neutrality by 2050. Tunisia has developed a low emission climate resilient strategy for 2050.

The objectives for updating the NDC are very diverse, as shown by the figure below:

[30] *UNEP, Emissions Gap report 2020, December 2020*

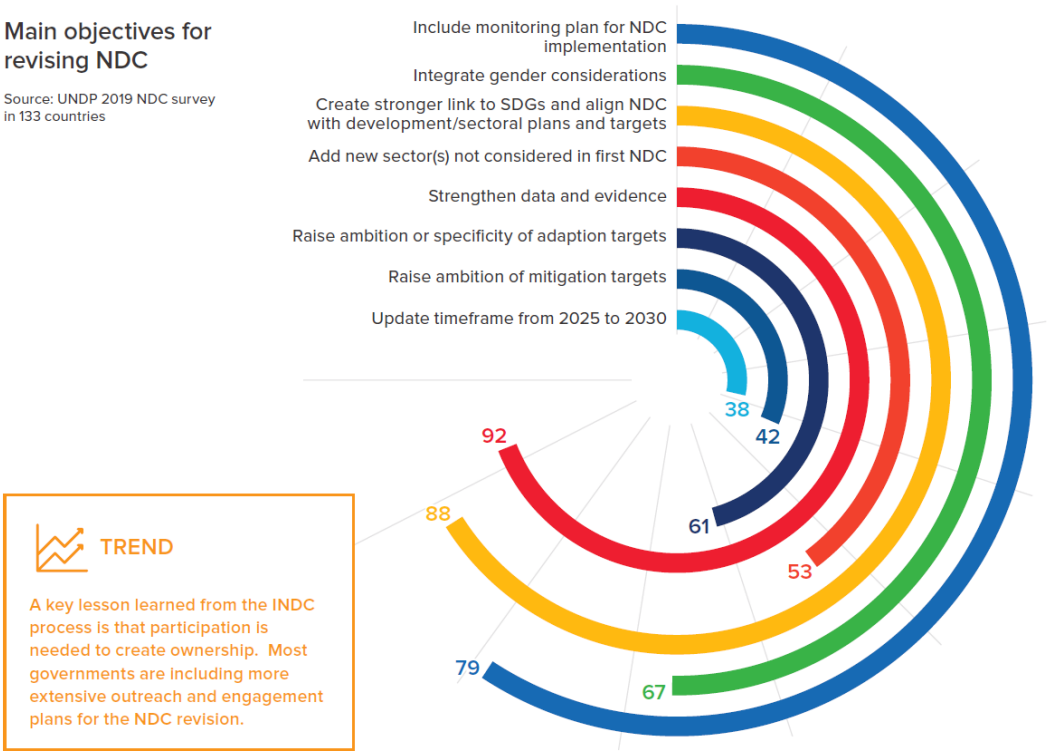


Figure 7 – NDC updating objectives. Source: UNDP and UNFCCC, *The Heat is On*, 2019[29]

The two main drivers for updating the NDC are:

- Strengthen data and evidence: more transparency is required, as to allow comparison over the years and get the clearest vision as possible in order to properly define means and objectives.
- Create stronger link to SDGs and align NDC with development/sectoral plans and targets: this driver shows that NDC and SDGs need to be integrated, to come up with more systemic solutions.

The figure below shows that the rates of ongoing NDC implementation strategies are still heterogenous and need to be enhanced so countries can have a clear view of the path towards the future regarding climate actions.

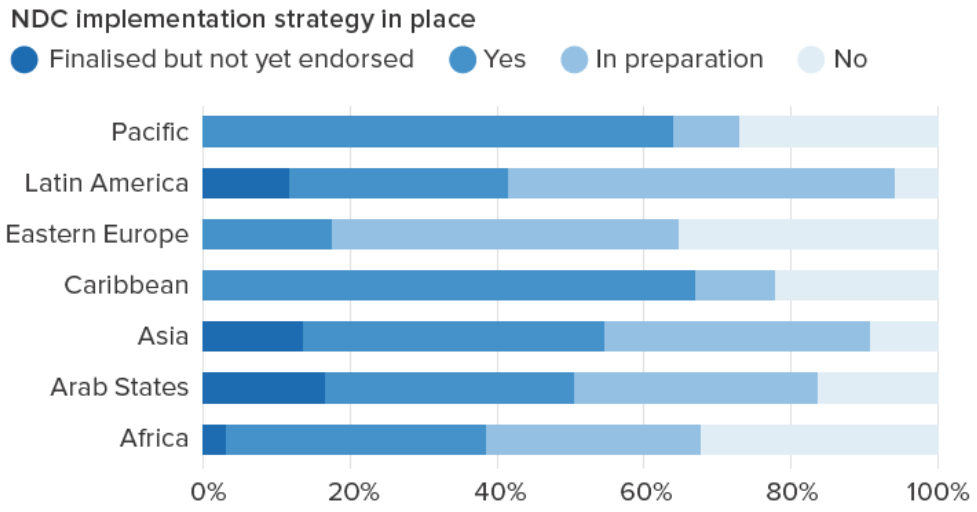


Figure 8 – NDC update state of progress. Source: UNDP and UNFCCC, *The Heat is On*, 2019[29]

The figure below displays the share of countries that included mitigation actions or adaptation actions in their NDC. We can see that mitigation is a greater concern than adaptation as 90% of countries included mitigation actions in their NDC, while only 78% included adaptation actions. This can be surprising, as climate change impacts are already threatening most countries over the world.

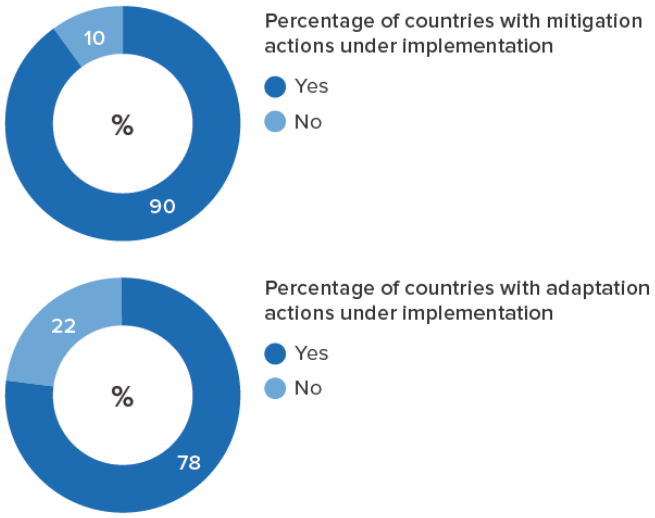


Figure 9 – NDCs mitigation and adaptation components. Source: UNDP and UNFCCC, *The Heat is On*, 2019[29]

Focus on the SEMed region

The SEMed Region covers the following 13 countries: Albania, Algeria, Bosnia-Herzegovina, Egypt, Israel, Jordan, Lebanon, Mauritania, Montenegro, Morocco, Palestine, Tunisia, and Turkey. The status regarding the NDC update for the 13 SEMed countries is summarized below (survey results):

	INDC	NDC 1	NDC2
Albania	24/09/2015	21/09/2016	Intends to update NDC*
Algeria	01/10/2015	20/10/2016	Intends to update NDC
Bosnia-Herzegovina	08/10/2015	16/03/2017	Intends to update NDC
Egypt	16/11/2015	29/06/2017	NA
Israel	30/09/2015	22/11/2016	Intends to update NDC*
Jordan	30/09/2015	04/11/2016	NA
Lebanon	30/09/2015	-	16/03/2021
Mauritania	30/09/2015	27/02/2017	Intends to update NDC
Morocco	05/06/2015	19/09/2016	Intends to update NDC*
Montenegro	23/09/2015	21/12/2017	Intends to update NDC
Palestine	-	21/08/2017	Intends to update NDC*
Tunisia	16/09/2015	10/02/2017	Intends to update NDC*
Turkey	30/09/2015	-	Intends to update NDC*

Table 4 - NDC status

Source: WRI NDC tracker (December 2020)
NA: no information available
Intends to update NDC: intends to enhance ambition or action in NDC submitted before COP-26.
**: Confirmed by the survey*

The NDC Partnership provides information about the updating process for 77 countries. Among those 77 countries, we can find information about Albania, Jordan, Lebanon, Morocco, Palestine and Tunisia. The main information is the following:

- Albania: supported by the UNDP and GIZ in the review and update of its NDC. The next steps are the preparation of a workplan for NDC implementation and roadmap development, requesting the possible financial support of the in-country facilitator and the Rapid Situational Assessment (RSA) to be reviewed by a gender consultant.
- Jordan: is engaged through certain support mechanisms is developing Partnership Plans and is implementing Partnership Plans. Next steps include coordination with partners (GIZ, UNDP) over the next months to develop a clear strategy for the future. UNDP provided support to Jordan to NDC revision including through the Climate Promise in addition to support to help integrate NDC into green recovery from COVID-19.
- Lebanon: developed Partnership plans with sectoral experts and requested economic advisory support for Covid-19 green recovery. UNDP supported Lebanon's 2021 NDC update. Under the UNDP's Climate Promise, Lebanon has developed a document which climate-proofs the national various investment agendas (Climate Investment Programme, Lebanon Economic Vision and the Financial Recovery Plan) – to ensure their compatibility with Lebanon's NDC targets. In addition, under the CAEP support of the NDC Partnership, Lebanon is establishing a financing facility dedicated for the NDC implementation (Lebanon Green Investment Facility). Next steps include the ministerial validation of partnership plans.

- Morocco: has finalized its Rapid Situational Assessment of the situation and is engaged through CAEP and Country Engagement mechanisms. UNDP provided support to Morocco to NDC revision including through the Climate Promise.
- Palestine: is developing its NDC implementation plan, along with its new NDC. Palestine is coordinating with CAEP experts regarding process next steps, which include the finalization of the NDC implementation plan to develop Palestine's Partnership Plan. The Government wishes to continue the collaboration with CAEP.
- Tunisia: first draft of the Partnership Plan was received. UNDP provided support to Tunisia to NDC revision including through the Climate Promise.

III. SEMed NDCs: overview of priorities

1.1. Priorities regarding GHG emissions

MedECC stressed in their September 2020 MAR 1 report[4] that: "*All Mediterranean countries have significant potential to mitigate climate change through an accelerated energy transition, implying phasing down fossil fuel and accelerated development of renewable energies. This ambitious energy transition, reaching beyond the plans and targets announced by governments and policy makers in line with contributions made for the UNFCCC Paris Agreement, requires a significant transformation of the energy policies and economic models in the Mediterranean countries. While northern rim countries advance towards this transition by gradually diversifying their energy mix, improving energy efficiency and enlarging the fraction of renewables, despite investments, some eastern and southern rim countries need support, finance, technology transfer and capacity building in the framework of the UNFCCC Paris Agreement*."

The table below presents the weight of SEMed countries in global CO2 emissions, over the 1750-2017 period, and in 2017. Data come from the organization *Our World in Data*[31], which compiled data from the *Global Carbon Project*.

	Share of global CO2 emissions in % (1750-2017)	Share of global CO2 emissions in % (2017)
Albania	0,018	0,018
Algeria	0,261	0,416
Bosnia and Herzegovina	0,053	0,074
Egypt	0,353	0,605
Israel	0,141	0,184
Jordan	0,039	0,059
Lebanon	0,040	0,054
Mauritania	0,004	0,008

[31] *https://ourworldindata.org/contributed-most-global-co2*

Montenegro	0,007	0,007
Morocco	0,101	0,174
Palestine	0,003	0,006
Tunisia	0,051	0,078
Turkey	0,610	1,239

Table 5 – SEMed countries contribution to global GHG emissions over the 1750-2017 period, and in 2017. Source: authors' computation from *Our World in Data*

GHG emissions derive mainly from two major sources: energy production and consumption coming out from fossil fuels (in every activities) on the one hand, and agricultural and land use and forest (AFOLU), on the other[32]. Considering their predominant role, they have been carefully examined in this report.

The rapid development of the South and East Mediterranean countries is leading to a significant increase in energy demand and is changing the economic and energy landscape of the region (OME[33]). *The North countries are undergoing different changes, with a diversification of energy sources through the increased introduction of renewable sources and implementing stronger and effective energy efficiency measures, also thanks to the growing investment in digital technology[34]*.

The next NDCs will likely refer to a proactive scenario based upon the implementation of strong energy efficiency programs, an increased diversification in the energy mix in addition to renewable energy stations on different scales (small-medium-large). Regardless of the scenario, energy demand in the SEMed countries will exceed that of the North (OME[33]).

Nevertheless, mitigation efforts concern a number of sectors as presented in the table below (survey results).

Country	***Referential for the unconditional mitigation target***	***Target year***	***Sectors involved***
Albania	BAU scenario	2030	- Energy (including transport) - Industrial processes - Agriculture - LULUCF - Waste
Israel	Not stated	Not stated	Not stated
Lebanon	BAU scenario	2030	- Energy - Industrial processes - Transport - Agriculture - LULUCF - Waste
Morocco	2010 baseline year	2030	- Industrial processes

[32] Christian de Perthuis, Le tictac de l'horloge climatique, November 2019
[33] Observatoire Méditerranéen de l'Energie (OME): Mediterranan energy perspectives 2018.
[34] Mettling, Bruno, Booming Africa, Le Temps de l'Afrique Digitale, Débats Publics Ed., 2019.

			- Waste
Palestine	BAU scenario	2040	- Energy - Agriculture
Tunisia	BAU scenario	2030	- Industrial processes - Transport
Turkey	BAU scenario	Not stated	- Energy - Transport - Agriculture - LULUCF - Waste

Table 6 – Climate ambition to be included in the next NDC. Source: authors' survey to SEMed countries.

Results from the survey show that most of the countries will use a business-as-usual scenario to set their unconditional mitigation target in their next NDC and consider 2030 as the target year 2030. Regarding the sectors involved in the reduction ambition, we see that while it might be economy-wide (Lebanon), some countries choose to focus their efforts on specific sectors.

Regarding the design of long-term country strategy, main commitments are presented in the table below (survey results):

Country	***Long-term strategy***
Albania	Net zero emission, target year to be defined
Israel	Under discussion
Lebanon	Deep decarbonization towards 2050
Morocco	Net zero emission towards 2050
Palestine	Not decided yet
Tunisia	Net zero emission, target year to be defined
Turkey	Net zero emission towards 2050

Table 7 – Long term strategies. Source: authors' survey to SEMed countries.

1.2. Priorities regarding adaptation

It has already been stressed in the previous UfM report that adaptation actions were not sufficiently described within the first editions of NDCS nor on initial publications of NAP. It is quite necessary that parties of the SEMed regions describe those actions in a way that enable further evaluation by public decision-makers, multi-lateral banks. Indeed, part of NDC objectives are conditional to international funds, whereas at the same time, adaptation stakes have been proven to be critical in the Mediterranean region.

In Chapter 3 of MedECC First Mediterranean Assessment Report (MAR1)[35] regarding water, it notably stated that: "*With global warming level of 4°C above pre-industrial conditions, high-resolution projections project precipitation to be reduced by a median of 10.4% relative to 1981-2010 (-6.0% to +21.1% between ensemble members). "The severe drying is particularly apparent over the southern Mediterranean, southern and western Iberian Peninsula and France, Italy and south Greece and the Levant, with relative changes in mean annual runoff up to -50%. With these precipitation changes and combined with rising temperatures and thus higher evaporation demand, runoff is expected to be 7.4% less (-4.4% to -21.1% between ensemble members) (Table 3.6). There are large local uncertainties in hydrological impacts, but in most locations, hydrological response indicates drier conditions at 4°C, with an increasing level of agreement between ensemble models*".

Adaptation priorities highlighted through the survey

Adaptation is a major concern for the SEMed countries, as they are and will heavily impacted by global warming consequences. We can also see that countries bear in mind that adaptation actions should not endanger their mitigation efforts and maybe find synergies. The table below summarizes country answers on adaptation actions to be included in their revised NDC.

Country	***Adaptation actions***	***Climate change issues to adapt to***	***Bodies in charge of the NDC update and frameworks to be used***
Albania	Not stated	- Air temperature - Rain - Sea level rise - Droughts	N/A
Israel	- Implementation of Green Building Standards - Urban tree planting - Installation of solar panels on buildings and infrastructure (rather than open spaces) - Development of Urban Nature parks - Protecting more natural habitats (i.e., Nature Parks, National Parks - Preservation of open and natural landscapes and maintaining their connectivity - Conservation of Aquatic habitats (rivers , streams, winter ponds etc.) - Protecting additional Marine Nature Reserves	- Air temperature - Rain - Sea level rise - Urban heat - Urban flooding	- National Guidelines for Climate change to Adaptation at local level - Pilot projects are being carried out in 13 cities and regional councils to develop local/regional adaptation action plans - In 2019, 20 local authorities participated in the EU funded "CLIMAMED" program for the purpose of capacity building.
Lebanon	- Climate-smart agriculture - Enhance carbon sinks	- Air temperature - Rain - Sea level rise	The Ministry of Interior and Municipalities, the Ministry of Environment as well as the

[35] *MedECC, 2020, First Mediterranean Assessment Report (MAR1), Chapter 3 Resources, Subchapter 3.1 Water*

Country	*Adaptation actions*	*Climate change issues to adapt to*	*Bodies in charge of the NDC update and frameworks to be used*
	- Develop sustainable water services - Sustainable management of terrestrial and marine biodiversity	- Sea water acidification - Sea water temperature - Droughts - Forest fires - Extreme storms - Desertification - Health hazards	Disaster Risk Management Unit at the Prime's Minister's Office could be the direct interface with local actors when it comes to developing local adaptation plans
Morocco	- Program of reforestation 2010-2030 - Olive oil program 2020-2030 - Cactus planting project 2020-2030	- Air temperature - Rain - Sea water temperature - Droughts	Yes (no detail provided)
Palestine	Mitigation co-benefits for planned adaption actions of highly vulnerable sectors, agriculture, Waste, Food, Energy, Water Health, Industry, terrestrial ecosystem, tourism, and urban infrastructure.	- Air temperature - Rain - Sea level rise - Droughts - Floods - Frost - Heat waves	- Environment Quality Authority - National designated authority for green climate fund in full coordination with local government units and joint services councils for solid waste as well as joint services councils for water and wastewater
Tunisia	- Infrastructure - Land management	- Rain - Sea level rise - Droughts	N/A
Turkey	- Integral and sustainable forest management - Reducing emissions from deforestation and forest degradation - Role of conservation, sustainable management of forests and enhancement of forest carbon stock	- Air temperature - Rain - Sea level rise - Sea water acidification - Sea water temperature - Droughts	Local authorities can prepare their local adaptation plans and submit it to the Ministry directly.

Table 8 – SEMed countries adaptation actions to be included in next NDC. Source: authors' survey to SEMed countries

Potential synergy between adaptation and mitigation is scarcely commented. The table below presents the specific analysis led by Lebanon.

Adaptation Priority	Mitigation co-benefits
Strengthen the agricultural sector's resilience to enhance Lebanon's agricultural output in a climate-smart manner	Climate-smart agriculture includes GHG reducing measures such as managing quantities and types of fertilizers
Promote the sustainable use of natural resources, restore degraded landscapes, and increase Lebanon's forest cover	Reforestation, afforestation and land restoration activities enhance carbon sinks

while meeting the ecological, social and economic needs of sustainable forest management	
Structure and develop sustainable water services, including irrigation, in order to improve people's living conditions	Irrigation using clean energy sources reduces GHG emissions
Value and sustainably manage Lebanon's terrestrial and marine biodiversity for the preservation and conservation of its ecosystems and habitats and the species they harbor in order to adequately respond to anthropogenic and natural pressures and to ensure Lebanese citizens equal access to ecosystem goods and services	Biodiversity management contributes to carbon sinks and the blue economy

Table 9 – Lebanon's adaptation actions creating mitigation co-benefits. Source: authors' survey to SEMed countries

In addition to these actions that would trigger mitigation co-benefits, Lebanon has included in its NDC several other adaptation actions (with no identified mitigation co-benefits). These include :

- Reducing the vulnerability of climate change impacts on coastal zones, especially in cities;
- Ensure overall public health and safety through climate-resilient health systems;
- Reduce disaster risk and minimize damages by mitigating and adapting to climate-related natural hazards and extreme weather.

To enhance climate change assessment, Israel is setting-up Desertech, a centre for adaptation to climate change in arid and semi-arid areas, to be located in a new Innovation District in Beer Sheva which is located at the edge of the Negev Desert. This centre will build on Israel's existing technological expertise in water, agriculture, energy and construction on desert climates and develop new technologies, but is intended in the future to also provide capacity building and other services. This initiative shows the great concern that is put on climate change consequence, and the political will to seek innovative solutions.

Assessment through the adaptation fitness metrics

To help analyse the relevance of adaptation actions highlighted in NDCs, Citepa's fitness indicator of adaptive actions (see description in Annex) helps judge whether, for a certain level of vulnerability to a climate hazard (drought, flood, heat wave, sea level rise, storm, temperature increase), the expected action is relevant or the most relevant of different options. This is an ex-ante evaluation, aiming to assess the relevance of decisions, based on the choices made by all Parties in the NDCs. It is not there to replace project monitoring and evaluation methods, which would assess, on-going as well as ex-post, the performance of the undertaken actions. Monitoring and evaluations are essential to improve the knowledge and allow to better identify what actions should be undertaken.

The fitness methodology

The adaptation fitness metrics aims at providing an objective assessment of the adaptation actions indicated by the countries in their NDC and NAP. From actions listed in first NDCs, we constructed a taxonomy of adaptation actions allowing for comparison. The fitness calculation is based on a statistical analysis that takes into account the type of action as well as the physical climate change induced hazard and level of hazard, in order to evaluate if, given the hazard faced, the choice is relevant with the actions – compared to what other countries stated in their NDC or NAP. The hazard level is defined at the national level. A brief description is provided below (see more detailed description in Annex).

Overview

- Method: link climate change induced hazards (locks) with a taxonomy of adaptation actions (keys)
- Databases: World Bank's Adaptation content of NDCs, NAPAs
- Hypothesis: choices stated in the first NDCs are the best representation of knowledge about adaptation
- Statistics: correspondence analysis and use of geometric distance in a defined 6-dimensions space. From 0 (lowest fitness) to 1 (highest fitness); We propose here the application of the Factorial Correspondence Analysis (FCA) method to compare adaptive solutions listed by class of solution according to hazard intensity. The FCA allows to consider all the information that is contained in contingency tables. We base our analysis on the environmental keys we constructed, and on risk intensity matching to define contingency tables (as displayed below).
- Objective: assess the relevance of countries' adaptation action choices, as communicated in their NDCs.

The taxonomy for the hazards

- From DARA's Climate Vulnerability Monitor[36]: intensity defined at national level for 7 climate change induced hazards: temperature increase, rainfall increase (volume and frequency), sea level rise, storms, floods, droughts and heat waves. Four levels of intensity are possible: low and moderate, high, severe and acute.

The taxonomy for the keys

- From World Bank and Climate Watch databases on adaptation: 1562 adaptation projects among the 140 Nationally Determined Contributions, to define adaptation solutions based on text analysis.

Contingency tables

- For each hazard, displaying of occurrences for each key. Below is the contingency table for the "Drought" hazard:

[36] https://daraint.org/

Drought	LowModerate	High	Severe	Acute	Total
Resistant variety	4	24	2	3	33
Forest management	1	14	2	2	19
Wetland management	4	12	1	0	17
Forest fire	1	14	0	1	16
Warn system	2	8	1	2	13
Irrigation system	3	6	0	3	12
Agricultural production	1	8	0	1	10
Water storage	0	8	0	2	10
Livestock production	4	6	0	0	10
Rangeland management	3	4	1	0	8
Public awarness	0	7	0	0	7
Fish production	0	6	1	0	7
Rainwater harvest	3	4	0	0	7
Epidemic disease	0	6	0	0	6
Water drink	0	5	0	1	6
Groundwater	1	3	0	1	5
Insurance program	0	4	0	0	4
Develop infrastructure	0	2	0	0	2
Capacity build	1	1	0	0	2
Surface water	0	1	0	1	2

- **Table 10 - Contingency table for the hazard "Drought" for all NDCs**

- For each hazard, with the Correspondence Analysis, we compute the fitness coefficient for each key. The Correspondence Analysis (CA) steps are detailed in annex. In this section, only the results of the analysis are provided. Fitness coefficients range from 0 (least relevant solution) to 1 (most relevant solution) within all hazard intensities. Below is the table displaying fitness coefficients for the “Drought” hazard:

Fitness	LowModerate	High	Severe	Acute
Agricultural production	0,509	0,958	0,312	0,441
Capacity build	0,906	0,389	0,095	0,039
Develop infrastructure	0,287	0,676	0,639	0,199
Epidemic disease	0,651	0,843	0,284	0,244
Fish production	0,932	0,550	0,185	0,132
Food security	0,554	0,933	0,496	0,434
Forest fire	0,325	0,826	0,248	0,228
Forest management	0,325	0,826	0,248	0,228
Groundwater	0,569	0,794	0,531	0,533
Insurance program	0,325	0,826	0,248	0,228
Irrigation system	0,448	0,959	0,298	0,365
Land management	0,416	0,811	0,616	0,432
Livestock production	0,591	0,597	0,235	0,623
Public awarness	0,499	1,000	0,429	0,347
Rainwater harvest	0,755	0,492	0,485	0,118
Rangeland management	0,720	0,788	0,441	0,240
Resistant variety	0,325	0,826	0,248	0,228
Surface water	0,600	0,728	0,283	0,592
Warn system	0,006	0,240	0,000	0,876
Water drink	0,236	0,480	0,283	0,943
Water management	0,946	0,504	0,161	0,108
Water storage	0,333	0,817	0,277	0,539
Water supply	0,318	0,770	0,268	0,600
Wetland management	0,517	0,950	0,313	0,451

Table 11 - Fitness coefficient for the hazard "Drought" for all NDCs

For instance, we can see that the solution “Public awareness” gets the highest fitness value, showing that this solution is more likely to be chosen by countries when facing drought hazards, especially for a high intensity, even though it is not the solution with the highest number of occurrences in the contingency table. This table serves as an illustration of the results that are obtained with the adaptation fitness metric.

In their 2015 NDC, we noted that SEMed countries’ adaptation choices differed a lot from one country to another (see Annex for detailed fitness coefficient tables, for 2015 NDCs) while facing similar hazards and intensities. It shows that higher level of cooperation between countries might be desirable to benefit from other countries’ expertise, technologies or experiences. The expected improvement of the definition of adaptation in the next NDC update should allow to define better the taxonomy and compute updated values more precisely for the fitness coefficients. Also, more accurate adaptation action definitions will help the understanding of these actions, and may allow easier replication in similar context.

IV. Conclusion

This report aims to define the state of progress for the next NDC update, taking place in 2021, for 13 SEMed countries[37]; it builds on results received from 7 countries as well as on desktop research. The development process of the NDC update is still on-going; due to the Covid-19 pandemic, it has been difficult for countries to fully prepared for the update, and to already define a common path towards the 3rd update which will take place in 2025.

As identified at the macro level by Plan Bleu (*State of the Environment and Development in the Mediterranean*, 2020) or MedECC (*1st Mediterranean Assessment Report*, 2020), the Mediterranean region is facing great challenges due to global warming and will be impacted more than average. The greatest challenges identified in the regional reports are:

- Demographic growth: increasing demand for energy, water and food, and pressuring land use (especially coastal zones).
- Freshwater availability: mainly for agricultural purposes.
- Land artificialization: reducing agricultural potential and endangering coastal zones with touristic activities.
- Air and water pollution.

Therefore action (regarding both greenhouse gas emission mitigation and adaptation to climate change) is needed in order increase the region's resilience. From the answers to the survey, we have seen that there is great concern and that financial and human resources are mobilized in order to enhance climate ambition that will be displayed in the next NDC update. Two sectors of the economies are particularly concerned by climate action:

- Energy: energy consumption is the main source of GHG emissions in SEMed countries (see table 1) and increasing demand is expected considering demographic growth and economy's development. Greenhouse gas emission mitigation can be achieved with a switch from coal and oil towards natural gas (as initiated in Israel, Jordan or Tunisia) and renewable energy sources. Enhanced energy efficiency in buildings and processes is also a way to achieve GHG emission mitigation. Ambitious targets have been stated in the survey's answers and will be included in the 2021 NDCs.
- Agriculture: the stake is to ensure food security to a growing population while preserving water availability and lower dependence to international imports and price volatility. Given the weight of agriculture in the SEMed countries GDP, adaptation to climate change consequences (drought, salinization, need for increased irrigation, loss of arable land) is crucial. Possible actions could lie

[37] We did not receive an answer for each country included in the study, which makes it difficult to define a clear picture of the state of progress among the 13 SEMed countries, and their willingness to collaborate, as to increase synergy in actions and resources.

in crop diversification or the use of new varieties. Regarding mitigation actions in the agricultural sector could include better fertilization management via N_2O, improved water treatment/management, or carbon sinks.

The fitness coefficients reflect the relevance of choices made in the 2015 version of the NDC but do not aim to identify the best solution given the hazard and intensity. Rather, it could be used as a way to short-list projects that seem to be commonly identified as an appropriate answer to address a climate change induced hazard and allow countries to pick from these actions. Or the other way around, countries' choices could be validated by the fitness associated. Development institutions like the UNDP, the World Bank or the Islamic Bank of Development could integrate the fitness metric to the indicators used to define if a given adaptation project should be funded and implemented.

As SEMed countries share similarities (fossil fuel usage for instance) and issues (environmental issues, such as water availability for instance), they could benefit from working hand in hand to implement a limited, well targeted number of actions to optimize the allocation of resources towards great challenges, hence the need for enhanced cooperation as previously highlighted in the 2019 report. In the survey's answers, countries have shown will to collaborate.

If we can define country clusters within the SEMed group, based on common issues for instance, we would assess whether the adaptation actions proposed by the countries in the different national communications are relevant or not - checking if countries all over the world chose the same kind of solution when facing a similar issue. Several initiatives are already in motion in order to provide countries with a platform to seek for international support. The possibility to form country clusters would then allow to benefit from synergies regarding capacities, technologies or by addressing the same issues. These clusters could be defined based on the issues faced regarding adaptation to climate change, or the socio-economic profiles of the countries for instance. Political will is required to allow cooperation regarding the environmental urgency.

Thematic hubs can also be a way to address these issues in synergy and in solidarity. The Plan Bleu report names several (full definition from the report is provided in annex):

- The INFOMAP system.
- The Integrated Monitoring and Assessment Programme (IMAP).
- A shared environmental information system with EU countries.
- The European Marine Observation and Data Network (EMODnet)

After the NDC update occurring in 2021, we recommend a continuation of action in the SEMed and in the entire Mediterranean, aligned with the crucial agenda of the Paris Agreement (2022-2024), in support to the development of new more transparent and ambitious NDCs before the end of 2024 as well as stand-alone NAPs as well as BTRs. This could be achieved by:

- Creating synergies: by theme (hubs like those of Plan Bleu) and by creating a Mediterranean Climate Change Hub / Cluster depending on major threats (under the coordination of UfM and with UNDP, NDC Partnership, CLIMA MED, OME collaborations).

- Linking the threats described above: regional climate modelling coupled with modelling of the availability of water resources (freshwater for food and agriculture, taking into account the risks of drought, temperatures, extreme episodes, sea level rise, demography); agronomic research (development of new or enhanced varieties) and smart agriculture (N_2O, irrigation techniques, etc.). Upstream, Citepa's adaptation fitness coefficient might help to define a short-list of well-suited solutions for each level of hazard.
- Modelling the regional energy demand in order to support countries to allow to define mitigation targets as a percentage reduction compared BAU scenario for instance. It would allow for more transparency and would facilitate the comparison and additionality of objectives.
- Assessing potential synergy between mitigation and adaptation measures.
- Establishing a transparent system for reporting and projecting emissions GHG emissions, especially regarding carbon sinks, as many actions are related to reforestation and carbon sequestration.
- Targeting development banks aid according to the priorities of hubs and regional clusters.

Annex

Citepa adaptation fitness metrics

To help analyse the relevance of adaptation actions highlighted in NDCs, CITEPA's fitness indicator of adaptive actions helps judge whether, for a certain level of vulnerability to a danger caused by climate change (drought, flood, heat wave, sea level rise, storm, temperature increase), the expected action is relevant or the most relevant of different options. This is an ex-ante evaluation, aiming to assess the relevance of decisions, based on the choices made by all Parties in the NDCs. It is not there to replace project monitoring and evaluation methods, which would assess, on-going as well as ex-post, the performance of the undertaken actions. Monitoring and evaluations are essential to improve the knowledge and allow to better identify what actions should be undertaken.

The relevance of the choice of the adaptation action is evaluated according to the actions decided by the countries for the same level of vulnerability to a certain danger caused by climate change. If the countries have chosen the same answer to a danger posed (for the same intensity), the chosen action will have a high fitness coefficient. Conversely, if an action does not return often among the choices of the countries, this one will have a low fitness coefficient. The fitness coefficient assumes that the countries, in their NDC, NAP, NAPA, have made the best choices with regard to their adaptation actions.

The fitness coefficients of the different adaptive actions chosen by SEMed countries will be presented in the report. We have built taxonomies associated with various risks posed by climate change through a statistical study of adaptive projects contained in the NDCs and the National Adaptation Programs of Action (NAPA).

We then compared the categories of these taxonomies using a Factorial Correspondence Analysis (FCA). The Euclidean distance of adaptive actions in relation to the intensities of vulnerabilities posed by climate change, represents the attraction of an action vis-à-vis a degree of vulnerability. This distance was then transformed into a coefficient between 0 and 1, in order to be easily readable. The closer the coefficient is to 1, the more the adaptive action would be statistically attracted by a level of vulnerability, suggesting a high correspondence between the two features.

We have identified two categories of climate risks, the first grouping the problems of resilience, the others of disaster.

Resilience problems are those that we can adapt with, others are disaster or catastrophic magnitude events, it is impossible to really adapt, they are too extreme events, we have to deal with them "To cope with", reduce vulnerability to these events.

SOLUTIONS/ ACTIONS	TO ADAPT WITH	TO COPE WITH
Climate event	Temperature rise	Drought
		Heat wave
	Higher frequency and volume of precipitations	Flood
	Sea level rise	Storm and cyclone
	Multi risk	Multi Risk
	Unknown hazard	Unknown hazard

Table 12 - Climate change induced hazards

In order to allow a quantitative comparison of adaptive projects, we have associated with each climatic phenomenon, a level of intensity of this phenomenon, as estimated by the Climate Vulnerability Monitor developed by DARA and the Climate Vulnerable Forum.

The method consists in calculating the distance between all the keys and all the locks (vectoral distance), then to build a score by using the minimum and maximum distance to normalize the coefficient between 0 and 1.

That approach has been presented during a side-event in COP-25 Madrid, jointly organized by UfM and UNDP. A new statistical run will be made before COP-26, once new NDCs and up-dated and more explicit versions of NAPs, will be issued. Those explicit projects will be crossed with regional climate forecasts (especially on water and temperature hazards). With such a new statistical exercise, we should be able to confirm to each SEMed country, whether the contemplated adaptation actions/projects are suitable to the climate tasks ahead.

Methodology

Taxonomy of the adaptation keys

From the World Bank and Climate Watch databases on adaptation, we have 1562 adaptation projects among the 140 Nationally Determined Contributions. From those 1562 actions, we created adaptation keys for each physical hazard, to allow comparison between context-specific adaptation actions based on text analysis.

Taxonomy of climate change induced hazards

From DARA's Climate Vulnerability Monitor, we have the intensity defined at national level for 7 climate change induced hazards. The hazards are divided into two categories[38]

- **Climate parameters**:
  - *Temperature*
  - *Rainfall (volume and frequency)*
  - *Sea level*
- **Physical risks**:
  - *Storms*
  - *Floods*

[38] *"Locks" are defined in consistency with the IPCC AR5 report and are consistent with the 2020 European taxonomy*

- *Droughts*
- *Heat waves.*

Contingency tables

For each hazard, we have the number of occurrences for each adaptation key. Below is the contingency table for the "Drought" hazard:

Drought	LowModerate	High	Severe	Acute	Total
Resistant variety	4	24	2	3	33
Forest management	1	14	2	2	19
Wetland management	4	12	1	0	17
Forest fire	1	14	0	1	16
Warn system	2	8	1	2	13
Irrigation system	3	6	0	3	12
Agricultural production	1	8	0	1	10
Water storage	0	8	0	2	10
Livestock production	4	6	0	0	10
Rangeland management	3	4	1	0	8
Public awarness	0	7	0	0	7
Fish production	0	6	1	0	7
Rainwater harvest	3	4	0	0	7
Epidemic disease	0	6	0	0	6
Water drink	0	5	0	1	6
Groundwater	1	3	0	1	5
Insurance program	0	4	0	0	4
Develop infrastructure	0	2	0	0	2
Capacity build	1	1	0	0	2
Surface water	0	1	0	1	2

- **Table 13 - Contingency table for the hazard "Drought" for all NDCs**

Factorial Correspondence Analysis

As we need to consider all the information that is included in the contingency tables, we propose to assess the relevance of adaptation action choices made by countries all over the world by performing a Factorial Correspondence Analysis (FCA). The correspondence analysis allows to define a number of dimensions lower or equal to the number of variables, and extract most of the information that is contained in the different contingency tables. This analysis would provide different features, allowing us to define a fitness coefficient of each adaptation key for a certain context (hazard and intensity considered) to assess the relevancy of this key. The FCA can be deconstructed with the following steps:

From the contingency tables, we define 4 dimensions (the number of hazard intensity, as the two characteristics of each hazard have been merged). Each key contributes with a certain degree to the construction of each dimension. The vectoral space is reduced to three dimensions, which explain 100% of the contingency table variance.

Each hazard intensity and each key has coordinates in this three-dimension space. Given those coordinates, we can calculate a distance between each key and each hazard intensity. Vectoral distance between environmental key i and hazard intensity j is calculated as follows:

$$D_{ij} = \sqrt{(I_1 - J_1)^2 + (I_2 - J_2)^2 + (I_3 - J_3)^2}$$

With I_1 being the coordinate of environmental key i for the first dimension, and with J_1 being the coordinate of hazard intensity j for the first dimension.

At this point, we have vectoral distances that are expressed numerically. The lower the distance, the greater the attraction between key and hazard intensity.

To have an easy-to-read coefficient, we normalize the values between zero and one, with the following transformation:

$$X'_{ij} = \frac{X_{ij} - X_{Min}}{X_{Max} - X_{Min}}$$

With X_{ij} being the vectoral distance between environmental key i and hazard intensity j. The maximum (X_{Max}) and minimum (X_{Min}) vectoral distances are taken for one hazard, with the four intensity features characterizing it.

Hence, we can define the fitness coefficient, expressed between zero and one, with the following:

$$Fitness_{ij} = 1 - X'_{ij}$$

The fitness coefficient aims to allow comparison between adaptation projects for one single climate change-induced hazard. The key and the intensity with the smallest distance value get a coefficient value of 1. On the contrary, the pair with the largest distance, will get a coefficient value of 0.

The fitness coefficient does not assess the efficiency of the adaptation action. Indeed, *ex-post* evaluation would be necessary to assess the ability of the solution to solve the issue it has been designed for. As the fitness coefficient is based on the number of occurrences of the different adaptation action for a certain hazard, and on a transformation of the contingency tables to take into account multiple variables, it rather assesses the relevancy of the choice made by the country, based on the hypothesis that countries made the best choices they could. This analysis goes deeper than only enumerate the choices by hazard intensity. It also considers the distribution of the environmental key. That is, a project that has been chosen for only one intensity will get a higher fitness coefficient value than a project that has been chosen to solve different intensities, even if the latter have a larger number of occurrences for the intensity than the former. This allows for environmental keys that have been chosen fewer times to still be considered as good choices.

On the contingency table above, we see that the key “Public awareness” gets 7 occurrences, all of them for the “high” intensity in the “Drought” hazard. On the other hand, the key “Warn system” (for warning

systems) gets a total of 13 occurrences. Those occurrences are distributed across the four different intensities: “Low and Moderate”: 2; “High”: 8; “Severe”: 1; “Acute”: 2.

On the table below, which reports fitness coefficients for the drought hazard, “Public awareness” gets the highest fitness value, showing that if the project has been clearly identified by countries worldwide to face a certain hazard intensity, the fitness is higher.

Fitness	LowModerate	High	Severe	Acute
Agricultural production	0,509	0,958	0,312	0,441
Capacity build	0,906	0,389	0,095	0,039
Develop infrastructure	0,287	0,676	0,639	0,199
Epidemic disease	0,651	0,843	0,284	0,244
Fish production	0,932	0,550	0,185	0,132
Food security	0,554	0,933	0,496	0,434
Forest fire	0,325	0,826	0,248	0,228
Forest management	0,325	0,826	0,248	0,228
Groundwater	0,569	0,794	0,531	0,533
Insurance program	0,325	0,826	0,248	0,228
Irrigation system	0,448	0,959	0,298	0,365
Land management	0,416	0,811	0,616	0,432
Livestock production	0,591	0,597	0,235	0,623
Public awarness	0,499	1,000	0,429	0,347
Rainwater harvest	0,755	0,492	0,485	0,118
Rangeland management	0,720	0,788	0,441	0,240
Resistant variety	0,325	0,826	0,248	0,228
Surface water	0,600	0,728	0,283	0,592
Warn system	0,006	0,240	0,000	0,876
Water drink	0,236	0,480	0,283	0,943
Water management	0,946	0,504	0,161	0,108
Water storage	0,333	0,817	0,277	0,539
Water supply	0,318	0,770	0,268	0,600
Wetland management	0,517	0,950	0,313	0,451

Table 14 - Fitness coefficient for the hazard "Drought" for all NDCs

Results for the SEMed countries

The metric has been applied to 7 SEMed countries who sufficiently informed their NDC on adaptation actions, fitness coefficient of their adaptation actions. The different tables concerning the different hazards faced by the SEMed countries, with the fitness coefficient for the chosen action, are presented below. First, we have the “to cope with” hazards (flood, drought, heat waves and storm) and afterwards the “to adapt to” issues (temperature increase and sea-level rise). The results are presented for the SEMed countries that sufficiently informed adaptation actions in their 2015 NDC. When two actions are the same for one country, it means that we have identified two projects that can range in the same type.

The colour code is the following for the fitness coefficient:

Between 0,8 and 1	
Between 0,6 and 0,8	
Between 0,4 and 0,6	
Below 0,4	

- **Flood:**

Country	Key	Intensity	Fitness
Algeria	Health service	LowModerate	1,000
Algeria	Restore ecosystem	LowModerate	0,446
Egypt	infrastructure construction	LowModerate	0,853
Jordan	Disease prevention	LowModerate	0,924
Mauritania	Coastal protection	LowModerate	0,794
Mauritania	Coastal protection	LowModerate	0,794
Mauritania	Disease prevention	LowModerate	0,924
Mauritania	Infrastructure construction	LowModerate	0,853
Morocco	Protection barrier	LowModerate	0,856
Morocco	Restore ecosystem	LowModerate	0,446
Tunisia	Mangrove	LowModerate	0,839
Tunisia	Vector born disease	LowModerate	0,872

Table 15 - Intensities and fitness coefficients for SEMed countries adaptation for the hazard "Flood"

Countries chose different type of adaptation actions to address the flood hazard. All countries face it at a low and moderate intensity. Most choices seem to be rather relevant (fitness greater than 0.8), while the choice to restore ecosystems does not seem to be an action that countries chose to often include in their NDC when facing flood hazard at low and moderate intensity. It is worth noting that the actions with higher fitness regards health ("health service", "disease prevention", "vector born disease" which designates the actions to fight the spread of respiratory pathologies, for instance the monitoring of epidemics, or adapting the health system to climate change through protection against water-borne diseases), rather than physical protection.

- **Drought:**

Country	Key	Intensity	Fitness
Algeria	Water management	High	0,504
Egypt	Food security	LowModerate	0,554
Egypt	Water management	LowModerate	0,946
Jordan	Develop infrastructure	LowModerate	0,287
Lebanon	Forest management	High	0,826
Mauritania	Food security	LowModerate	0,554
Mauritania	Irrigation system	LowModerate	0,448
Mauritania	Livestock production	LowModerate	0,591
Mauritania	Resistant variety	LowModerate	0,325
Morocco	Surface water	Acute	0,592
Morocco	Water management	Acute	0,108
Tunisia	Forest fire	High	0,826
Tunisia	Forest managment	High	0,826
Tunisia	Land management	High	0,811

Table 16 - Intensities and fitness coefficients for SEMed countries adaptation for the hazard "Drought"

Actions to address the drought hazard range from water management to land management. Considering the intensity, we can see that the fitness differs for a same type of action (i.e., water management: 0.504 for high intensity, 0.946 for low and moderate intensity). For an acute intensity (highest on the scale), it seems that water management (which is more a long-term type of action) is not the best answer.

- **Heat waves:**

Country	Key	Intensity	Fitness
Algeria	Public health	High	0,886
Jordan	Public health	LowModerate	0,414
Mauritania	Public health	Severe	0,890

Table 17 - Intensities and fitness coefficients for SEMed countries adaptation for the hazard "Heat waves"

All actions addressing heat waves regard public health, with a higher fitness when the intensity grows, as we would indeed expect that the impact of heat waves on public health is a bigger concern as it grows.

- **Storm:**

Country	Key	Intensity	Fitness
Egypt	Infrastructure capacity building	LowModerate	0,956
Mauritania	Coastal protection	LowModerate	0,836
Tunisia	Human settlement	LowModerate	0,978
Tunisia	Infrastructure capacity building	LowModerate	0,956

Table 18 - Intensities and fitness coefficients for SEMed countries adaptation for the hazard "Storm"

Facing a risk of storms, countries chose to reinforce their infrastructure or to protect the coastal zones. The fitness is rather high for all the choices.

- **Temperature increase:**

Country	Key	Intensity	Fitness
Algeria	Ensure food security	LowModerate	0,797
Algeria	Health service	LowModerate	0,907
Egypt	Ensure food security	LowModerate	0,797
Egypt	Fishery sector	LowModerate	0,810
Egypt	Water management	LowModerate	0,483
Jordan	Disease control	LowModerate	0,905
Jordan	Vector born disease	LowModerate	0,973
Mauritania	Ensure food security	Acute	0,525
Mauritania	Fishery sector	Acute	0,459
Mauritania	Fishery sector	Acute	0,459
Mauritania	Livestock management	Acute	0,237
Mauritania	Livestock management	Acute	0,237
Mauritania	Resilient crop variety	Acute	0,420
Morocco	Land management	LowModerate	0,964
Morocco	Reforestation	LowModerate	0,761
Morocco	Watershed management	LowModerate	0,717
Tunisia	Capacity build	LowModerate	0,472
Tunisia	Disease control	LowModerate	0,905
Tunisia	Health service	LowModerate	0,907
Tunisia	Resilient crop variety	LowModerate	0,977
Tunisia	Vector born disease	LowModerate	0,973
Tunisia	Warning system	LowModerate	0,694

Table 19 - Intensities and fitness coefficients for SEMed countries adaptation for the hazard "Temperature increase"

Except for Mauritania, which faces an acute risk of temperature increase, all the countries face a low and moderate risk of temperature increase. Solutions regarding health (“health service”, “disease control”, “vector-borne disease”) seems to address well the issue, while solutions regarding food security (“ensure food security”, “fishery sector”, “livestock management”) have not been praised by the Parties to address an acute risk of temperature increase.

- **Sea-level rise:**

Country	Key	Intensity	Fitness
Egypt	Information system	LowModerate	0,852
Mauritania	Coastal protection	Severe	0,705
Mauritania	Infrastructure management	Severe	0,896
Mauritania	Infrastructure management	Severe	0,896
Mauritania	Marine resources	Severe	0,687
Mauritania	Sea induced flood	Severe	0,471
Tunisia	Coastal protection	LowModerate	0,744
Tunisia	Erosion defense	LowModerate	0,855
Tunisia	Human settlement	LowModerate	0,882
Tunisia	Infrastructure management	LowModerate	0,757
Tunisia	Potable water	LowModerate	0,468

Table 20 - Intensities and fitness coefficients for SEMed countries adaptation for the hazard "Sea-level rise"

The infrastructure-based solutions present a higher fitness than coastal protection actions. We can see that in Egypt the choice to build information around the issue has a high fitness considering a low and moderate intensity.

Questionnaire

To perform a proper analysis, information at field level needs to be gathered. This is the reason why Citepa addressed a survey to national focal points, with questions including matters such as the ambition (regarding greenhouse gas (GHG) emission mitigation as well as adaptation to climate change) to be targeted by the countries with the next NDC submission, capacity building needs, or monitoring, reporting and verification (MRV) frame. Finally, the path to the 3rd NDC update taking place in 2025 is investigated with this survey. The survey has been developed in collaboration with United Nations Development Program (UNDP) and UfM. An *ad-hoc* meeting has been held online with national focal points in order to ensure that the questions are well received, and relevant answers given. As of March 23rd, 2021 answers were received from Albania, Israel, Lebanon, Morocco, Palestine, Tunisia and Turkey.

Answers are displayed across the report, in the relevant sections.

The survey is the following:

Questionnaire to SEMed countries

Preliminary questions

Name of your country:

Who is answering this questionnaire:

- Name:
- Organization:
- Position:
- Email address:

1. Taking stock of progress to date

a. Is your country planning on submitting a new or updated NDC in 2020 or 2021, by COP-26?

☐ Yes. Please specify when the updated shall be ready to be submitted:

- Please specify the motivation(s) to update your NDC (multiple answers are authorized):
  - ☐ Raising ambition
  - ☐ Inclusion of new mitigation targets
  - ☐ Inclusion of new adaptation targets
  - ☐ Inclusion of new sectors
  - ☐ In order to update the baselines
  - ☐ Alignment with Covid-19 green recovery plan
  - ☐ Other. *Please specify:*

☐ No. *Please specify*:

☐ Unknown

b. Will your next NDC review be based upon your experience and feedbacks from your previous NDC?

c. Will you be applying the further guidance, adopted by CMA in Katowice in December 2018, for information to facilitate clarity, transparency and understanding (ICTU) of NDCs?

☐ Yes
☐ No

2. Mitigation component of the NDC

a. What is the contribution (in percent and absolute values) of each of the following sector to your country's greenhouse gas (GHG) emissions?

- Energy:
- Industry:
- Transport:
- Agriculture:
- Waste:
- LULUCF:

b. Do you plan to formulate your NDC mitigation targets based on a common referential with other SEMed countries?

☐ Yes. *Please specify*:
  ☐ BAU scenario
  ☐ Absolute baseline year
  ☐ Other. *Please specify*:
☐ No

c. Do you intend to enhance unconditional mitigation targets?

☐ Yes
☐ No

d. If you answered YES to previous question, please specify the activity sector which is targeted:

☐ Energy
☐ Industry
☐ Transport
☐ Agriculture
☐ Waste
☐ LULUCF

e. To design local mitigation plans, are there specific public bodies and schemes interfacing local actors with national entities?

☐ Region
☐ City
☐ District

☐ Other. *Please specify:*
☐ No

f. Which kind of indicators will you use for mitigation purposes apart from CO_2 equivalent?

g. What financial and capacity resources are needed to implement actions to meet unconditional mitigation targets?

h. Regarding the design of a new NDC, have you identified support or financial mechanisms to benefit from?

3. Adaptation component of the NDC

a. What would be your key adaptation actions that would mitigate GHG emissions at the same time? (synergies between adaptation and mitigation)

b. To design local adaptation plans, are there specific public bodies and schemes interfacing local actors with national entities?

c. Which main climate change issues do those local adaptation plans address?
☐ Air temperature
☐ Rain
☐ Sea level rise
☐ Sea water acidification
☐ Sea water temperature
☐ Droughts
☐ Other. *Please specify:*

4. Institutional arrangements and stakeholders' engagement (please specify)

a. What is the national institutional organization put in place to update your NDC?

b. How do you intend to align your NDC with Sustainable Development Goals (SDGs)?

5. Monitoring, Reporting, Verification (MRV) and Evaluation system

a. Have you implemented an operational, sustainable, scalable MRV tool?

If yes, *please specify*: GHG emission inventory, mitigation actions, adaptation actions, support mechanisms (financial, capacity-building, technology transfer), etc.

b. Did you or do you intend to follow MPGs and hence the Enhanced Transparency Framework rules in order to update your next NDC?

6. Identified options to enhance the NDC (barriers and needs)

a. Which recent shifts in real economy (in-country or worldwide) would you intend to reflect in the next version of your NDC?

b. As for adaptation purposes, would you require additional and updated information on trends, impacts and vulnerabilities? If so, which main ones?

c. Would you require international support for your next NDC, in order to raise capacity?
- ☐ Yes. *Please specify*:
- ☐ No

d. In compliance with ETF, and as for communicating the NDC, which kind of information would you deliver to enhance clarity, transparency & understanding?

7. Towards the 3rd NDC update

a. Have you already defined a schedule towards the 3rd update, taking place in 2025?
- ☐ Yes
- ☐ No

b. If you answered Yes to the previous question, do you plan to align this schedule with other SEMed countries?
- ☐ Yes
- ☐ No

c. Do you intend to include adaptation communication withing your next NDC or as a stand-alone report?

d. Do you intend to develop a Tier-2 approach of emission factors?

If yes, please specify the key source and for which GHG:

e. Did you already collaborate (or did you in the recent past) with another SEMed country or even with any Mediterranean country on NAP and/or NDC?

8. Long-term strategy

a. Do you plan on implementing a net zero emission scenario for the future?
- ☐ Yes
- ☐ No

b. If you answered Yes to the previous question, what is the target year?

Questionnaire results providing field data

As of March 23rd, 2021, Albania, Israel, Lebanon, Morocco, Palestine, Tunisia and Turkey have returned this questionnaire.

We are going to summarize those results and compare SEMed countries, using the table below:

NDC progress and stakes	Albania
Updating	Yes
Design of NDC	Raising ambition New mitigation targets New sectors Update baselines Alignment with Covid-19 green recovery plan National objective for reducing greenhouse gas emissions by 2030
NAP	Identification of adaptation actions to be included in the NDC
Enhancing ambition	
Mitigation / Net zero ambition	Mitigation target towards 2030 Net zero ambition with a target year to be defined
Adaptation	Will be included in the next NDC
Gaining from experience	Next NDC will be based upon experience and feedbacks from previous NDC
Preparedness to implement action	- Establishment of the Inter-Ministerial Working Group on Climate Change(IMWGCC), chaired by the Deputy Minister of Environment, in charge of drafting climate related policies and strategies - Ministry of Tourism and Environment is the focal point to the Convention and the institution responsible for the overall coordination and management of the MRV system, including the preparation of National Communications and Biennial Update Reports. - Establishment an inter-ministerial working group to evaluate each year, the progress of national strategies and plans related to climate change. Once a year, the relevant ministries will report on the progress in meeting the objectives
Main adaptation challenge	Climate scenarios and the impact of climate indicators on vulnerable sectors at coastal zones of Albania
Specific link/coordination adaptation vs mitigation	Not stated
Climate targets versus SDGs	The working team will consider and ensure alignments with Albania's global commitments, in particular regarding SDGs of the 2030 Agenda for Sustainable Development. Contribution of Albania's revised NDC to SDGs and the Sendai Framework for Disaster Risk Reduction 2015–2030 will be part of the revised NDC.
Targeted sector contributing to the emissions	Energy (including transport) Industrial processes (including, if possible, solvents use) Agriculture LULUCF

	Waste
Intention to collaborate with other countries	Not stated
New partnerships	NDC partnership since 2019
Capacity needs	Albania has detailed cost estimates, funding gaps, potential financiers, a methodology to prioritize external sources; and a situation analysis in view of specific high potential financing sources, including GCF, the Adaptation Fund, Regional Development Fund, and EU instrument accession
Progress towards MRV and ETF	- No MRV tool - Use of guidance adopted by CMA in Katowice in December 2018 - Use of ETF to be defined but Albania will present in its next NDC: - quantifiable information on the reference point - time frames and/or periods for implementation - scope and coverage of the NDC - Planning processes for mitigation actions and NDC actions follow-up. - Assumptions and methodological approaches, including for estimating and accounting for anthropogenic GHG emissions and, as appropriate, removals - How it considers the use of market mechanisms and national budget funds - How the NDC scenario include international funds to finance mitigation actions - - How the NDC contributes towards achieving the objective stated in UNFCCC Article 2.
Progress towards specific emission factors and vulnerabilities	The use of tier-2 emission factor is to be defined

Table 21

NDC progress and stakes	Israel
Updating	Yes
Design of NDC	Raising ambition New mitigation targets Update baselines
NAP	Identification of adaptation actions to be included in the NDC
Enhancing ambition	
Mitigation / Net zero ambition	- No clear mitigation target stated - Long-term strategy under discussion
Adaptation	Will be included in the next NDC
Gaining from experience	Israel's proposed NDC update is more do with changes in Israel's energy mix and in particular the introduction of gas and phase out of coal which enables to increase the reduction of Greenhouse gases. Green building standards and increased numbers of tenders are also increasing the penetration of solar energy which with lead to a higher goal for renewables.
Preparedness to implement action	An inter-ministerial, multi-stakeholder Steering Committed for both Adaptation and Mitigation chaired by the Ministry of Environmental Protection at which each implementing body (ministries and others) will undertake activities within their authority to achieve the NDC goals. Regarding mitigation an MRV system is in place and findings are reported annually to parliament.
Main adaptation challenge	- Developing a powerful weather and climate supercomputer for more accurate data and modeling - More accurate data on Sea Level rise in the Israeli coast - Trends and changes in the Mediterranean region
Specific link/coordination adaptation vs mitigation	Several actions tend to create synergies between adaptation and mitigation
Climate targets versus SDGs	The focus of the NDC is not SDG implementation but coherence of Climate policies with other governmental policies. A clause to this effect is included in our Draft Climate Law on which we are currently working. Such a clause will reflect SDG implementation as well.
Targeted sector contributing to the emissions	Not stated
Intention to collaborate with other countries	Not stated
New partnerships	Not stated
Capacity needs	Need for increased technical expertise
Progress towards MRV and ETF	- Use of guidance adopted by CMA in Katowice in December 2018 - MRV: GHG emission inventory - ETF: will be used to update NDC
Progress towards specific emission factors and vulnerabilities	Development of tier-2 emission factors for fugitive CH4 emissions from natural gas

Table 22

NDC progress and stakes	Lebanon
Updating	Yes
Design of NDC	Raising ambition New mitigation targets New adaptation targets New sectors Update baselines
NAP	
Enhancing ambition	
Mitigation / Net zero ambition	- Renewable energy use target - Energy efficiency target - Net zero emission ambition towards 2050
Adaptation	Will be included in the next NDC
Gaining from experience	Lebanon's 2020 NDC update takes into consideration how the 2015 NDC was constructed and has identified best practices and lessons learned to have a more robust and more transparent 2020 NDC.
Preparedness to implement action	Lebanon included in its 2020 NDC update Climate Action Enablers such as Improved Governance and Institutional Capacities, Incentivized Action and Fiscal Reform, Strengthened Partnerships, Innovative Research and Development, Comprehensive Integration and Enhanced Monitoring and Transparency. The implementation of the targets is contingent upon the achievement of the Climate Action Enablers to enhance the readiness of institutions and non-state actors to participate in the NDC.
Main adaptation challenge	For its adaptation priorities, Lebanon has referred to the latest sectoral policies which included climate trends. Moreover, the latest RICCAR (Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region) assessments to inform its adaptation chapter.
Specific link/coordination adaptation vs mitigation	See table 15
Climate targets versus SDGs	Lebanon's NDC is fully aligned with the SDGs, as the NDC implementation is a roadmap to sustainable development and a green economy. Lebanon's priority for the next decade is to spur sustainable growth through the creation of decent jobs and improve the well-being of its population through welfare programs and protection of natural resources. Consequently, the implementation of this NDC consists of inherent components in Lebanon's economic recovery path, while reaffirming Lebanon's commitment to the climate fight. Moreover, all the policies that make up Lebanon's NDC have been assessed in terms of synchronization with the 169 SDG sub-targets to identify synergies in implementation and reporting.
Targeted sector contributing to the emissions	Economy wide
Intention to collaborate with other countries	Not stated
New partnerships	- Lebanon's 2020 NDC Update was supported by the Nationally Determined Contribution Support Program (NDCSP), funded by the UNDP

	CCDRR/Climate Change Funding Window Allocation, EU, Germany and Spain. - Global Environment Facility's (GEF) Capacity-Building Initiative for Transparency (CBIT)
Capacity needs	Financial resources
Progress towards MRV and ETF	- Use of guidance adopted by CMA in Katowice in December 2018 - MRV: improvement with each submitted Biennial Update Report and National Communication in terms of its capacity in transparency and MRV - ETF: Lebanon intends to implement the MPGs in order to submit a Biennial Transparency Report before 2024. The CBIT project will help design the tracking system for the NDC. The MPGs chapter on tracking progress and achievement of the NDC has helped shaped some of the information in Lebanon's 2020 update.
Progress towards specific emission factors and vulnerabilities	Use of tier-2 for emission factors is planned to be developed for some sectors under the CBIT project. Preliminary findings show that energy (transport) and waste sectors will have more accurate emission factors under the project.

Table 23

NDC progress and stakes	Morocco
Updating	Yes
Design of NDC	Raising ambition New mitigation targets New adaptation targets Update baselines New sectors
NAP	
Enhancing ambition	
Mitigation / Net zero ambition	- Unconditional mitigation target - Reach 52% of the installed electric power from renewable sources by 2030 ; - Reduce energy consumption by 15% by 2030; - Significantly reduce public subsidies for fossil fuels, following on from reductions already undertaken in recent years; - Substantially increase the use of natural gas through infrastructure projects allowing the import of liquefied natural gas. - Net zero emission ambition towards 2050
Adaptation	Will be included in the next NDC
Gaining from experience	Yes (no detail provide)
Preparedness to implement action	- Morocco has identified several indicators to define its mitigation target - Direction of Climate Change the Biodiversity and Green Economy (DCCDBEV/ Department of Environment) is in charge of the NDC update
Main adaptation challenge	Estimating the cost of adaptation
Specific link/coordination adaptation vs mitigation	See table 14
Climate targets versus SDGs	Morocco's NDC is an integral part of the National Strategy for Sustainable Development (SNDD). This SNDD resulted in the creation of the National Commission for Sustainable Development, which monitors the implementation of the objectives of our SNDD as well as alignment with the Sustainable Development Goals.
Targeted sector contributing to the emissions	Industry Waste
Intention to collaborate with other countries	Not stated
New partnerships	Not stated
Capacity needs	Financial resources: USD 19.2 Bn Support from Green Climate Fund
Progress towards MRV and ETF	- Use of guidance adopted by CMA in Katowice in December 2018 - MRV: The process is undergoing and we expect to have our MRV platform in the middle on the next year (2021). - ETF: will be used to update next NDC
Progress towards specific emission factors and vulnerabilities	Use of tier-2 for emission factors Energy and Transport sectors and for the main GHG that are specific for each sector.

Table 24

NDC progress and stakes	Palestine
Updating	Yes
Design of NDC	- Enhance engagement of stakeholders - Take into account update with regard to implemented actions - Consider action for climate empowerment (ACE) - Consider Loss and Damage in NDC
NAP	
Enhancing ambition	
Mitigation / Net zero ambition	- Mitigation targets with two scenarios compare to BAU in 2040: -24,4% (in case of independence) or -12.8% (status quo) - Unconditional ambition: for projects currently under implementation with funding from different resources other than climate finance, no new mitigation targets will be adopted, the focus will be on enhancement, implementation
Adaptation	Will be included in the next NDC
Gaining from experience	Yes, it will be based on previous NDC experience and feedback, achievements, and challenges.
Preparedness to implement action	- At the national level, local government units are potential partners - Environment Quality Authority is the lead institution in climate change. - The national designated authority for green climate fund in full coordination with local government units and joint services councils for solid waste as well as joint services councils for water and wastewater.
Main adaptation challenge	The current available information is considered appropriate so far
Specific link/coordination adaptation vs mitigation	See table 14
Climate targets versus SDGs	This is already identified when the NDC was developed. These actions will also support the implementation of sustainable development goals (SDGs). The State of Palestine's ability to mitigate and adapt to climate impacts will be crucial to the ability to achieve, by 2030, not only SDG 13 on combating climate change, but a number of other SDGs such as SDG 1 on ending poverty in all its forms, SDG 3 on good health and well-being, SDG 5 on gender equality, SDG 6 on clean water and sanitation, and SDG 7 on affordable and clean energy among others. Hence, implementing NDCs can support the achievement of the sustainable development goals across all sectors and levels of government.
Targeted sector contributing to the emissions	Energy Agriculture
Intention to collaborate with other countries	Palestine would very much welcome such coordination if there are other interested countries in the region are willing to do so.
New partnerships	Not stated
Capacity needs	- Fundraising, long term planning, low emission planning, technological capacities, - Mapping of potential donors was prepared, some potential donors include: GCF, GEF, GIZ, UNDP, FAO, AFD, IFAD, ISDB,WB, KFW, JICA, ENAMEL
Progress towards MRV and ETF	- Use of guidance adopted by CMA in Katowice in December 2018

	- MRV: no tool yet implement - ETF: will be used to update next NDC
Progress towards specific emission factors and vulnerabilities	Until now tier 1, may be tier 2 will be considered for transport sector depending on data availability.

Table 25

NDC progress and stakes	Tunisia
Updating	Yes
Design of NDC	- Raising ambition - New mitigation targets - New adaptation targets - Update baseline
NAP	
Enhancing ambition	
Mitigation / Net zero ambition	- Mitigation target towards 2030 - Long-term strategy to be identified, after the development of the Climate Resilient Low Emissions Development Strategy by 2050 which is underway.
Adaptation	Will be included in the next NDC
Gaining from experience	Yes, based on a review
Preparedness to implement action	Ministry of Environment is in charge of the NDC update
Main adaptation challenge	To assess the vulnerability of sectors, ecosystems and natural resources.
Specific link/coordination adaptation vs mitigation	See table 14
Climate targets versus SDGs	Integrate into each orientation the ability to meet the Sustainable Development Goals (SDGs)
Targeted sector contributing to the emissions	Industry Transport
Intention to collaborate with other countries	Not stated
New partnerships	Not stated
Capacity needs	- The mitigation objective would require the mobilization of a total investment amount over the 2015-2030 period of around US $ 17.5 billion, the total cost to cover capacity building needs is estimated at approximately US $ 523 million over the period 2015-2030, The total financing needs for adaptation to climate change are estimated to be around US $ 1.9 billion over the period 2015-2030. The NDC has identified that 20% of the resources will be national - Technical assistance in terms of policy and transparency - Technical assistance, institutional strengthening, capacity building.
Progress towards MRV and ETF	- Use of guidance adopted by CMA in Katowice in December 2018 - MRV: GHG emission inventory - ETF: will be used to update next NDC
Progress towards specific emission factors and vulnerabilities	Use of tier-2 emission factors for CO2 emissions from the energy sector.

Table 26

NDC progress and stakes	Turkey
Updating	Yes
Design of NDC	Not stated
NAP	
Enhancing ambition	
Mitigation / Net zero ambition	- It is intended to modify and enhance the BAU scenario and absolute baseline year with the TIMES model. - Net zero ambition towards 2050
Adaptation	Will be included in the next NDC
Gaining from experience	Yes (no detail provided)
Preparedness to implement action	Tukey has intended to update and enhance NDC with the support of related stakeholders such as private sector associations, public institutions, NGO's, academia. It will submit to the Climate Change Coordination Board.
Main adaptation challenge	Adaptation action plan and climate change action plan will be revised according to the mitigation and adaptation objectives. To achieve these objectives Turkey needs international finance support and also technology support.
Specific link/coordination adaptation vs mitigation	See table 14
Climate targets versus SDGs	Not stated
Targeted sector contributing to the emissions	Industry Transport
Intention to collaborate with other countries	Not stated
New partnerships	Not stated
Capacity needs	Needed (no detail provided)
Progress towards MRV and ETF	- MRV: GHG emission inventory - ETF: not stated
Progress towards specific emission factors and vulnerabilities	Not stated

Thematic hubs (*Plan Bleu, State of the Environment and Development in the Mediterranean*, 2020)

- The INFOMAP system. INFOMAP is being designed as the UN Mediterranean knowledge platform to provide and share data, information services and knowledge for the benefit of the UNEP/MAP components and Contracting Parties. Its purpose is to: (i) Provide access to the reporting system; (ii) Harmonize data structure and models; (iii) Create a common catalogue of resources; (iv) Integrate data with interoperability layer; (v) Create a common platform to view, query and analyse data; (vi) Produce tools to support data and information dissemination.

- The Integrated Monitoring and Assessment Programme (IMAP). IMAP is being developed with support from the MAP system, as part of the implementation of the Ecosystem Approach (EcAp) to assess progress towards achieving Good Environmental Status of the Mediterranean Sea and coast. IMAP is based on eleven Ecological Objectives (EO), corresponding to 28 operational objectives and their related 27 agreed common indicators covering three clusters (i) pollution and marine litter, (ii) biodiversity and non-indigenous species and (iii) coast and hydrography. The initial implementation phase of the IMAP (2016-2019) resulted in the development of the first 2017 Mediterranean Quality Status Report (MED QSR).

- A shared environmental information system with EU countries. Mediterranean countries collaborate to improve data availability and access to environmental information. The EU-supported Shared Environmental Information System (SEIS) for the reduction of marine pollution fosters the regular production and sharing of quality-assessed environmental data, indicators and information in Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, and Tunisia. This complements information available in EU countries.

- The European Marine Observation and Data Network (EMODnet) is a network of organizations supported by the EU's integrated maritime policy. These organizations work together to observe the sea, process data according to international standards and make that information freely available as interoperable data layers and data products. EMODnet covers issues linked to geology, bathymetry, seabed habitats, chemistry, biology, physics and human activities. Originally focused on European countries only, EMODnet also increasingly includes data related to neighbouring countries, including SEMCs.

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