Introduction and framing

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Chapter 1
Introduction and framing

Executive summary

Human migration[16] has today assumed spatial and temporal scales of exceptional magnitude *(Section 1.1)*. It involves conflict– and disaster-induced displacement of individuals and communities. The term 'disaster-induced displacement' does not only refer to displacement due to natural events, such as natural hazards, extreme weather events, or climate-related impacts, but may also include socio-economic hardships, human disturbances and political pressures *(Section 1.1).*

While shaped by a number of generic key aspects that are valid in other contexts worldwide, the Mediterranean region deserves special attention when considering the environmental change[17]-conflict-migration nexus because of its climatic, economic and societal setting (*medium confidence; Section 1.2*).

Abandoning their original settlements because of the severe consequences of environmental change may be seen as a frequently applied adaptation strategy for affected communities *(medium confidence; Section 1.3).* It is critically important to consider that voluntary or involuntary migration is usually the result of a variety of drivers *(Section 1.3).* Contrary to commonly quoted convictions, environmental change represents just one factor among others in the decision to migrate. Other drivers, particularly conflicts and their devastating consequences, various general socio-economic factors, as well as governance issues in a given country, frequently constitute more important drivers of migration than environmental change and its impacts. The number of conflict-induced displacements in 2021 was the highest ever recorded with 14.4 million migrants worldwide *(high confidence; Section 1.3).*

The southern and eastern Mediterranean countries and the Arab region are particularly relevant cases for conflict-induced displacement because they are affected by complex and violent armed struggles (*medium confidence; Section 1.2.3*). The impacts of environmental change may lead to enhanced competition over scarce resources and exacerbate conflicts and migration (*medium confidence; Section 1.2.3*). Environmental change may also aggravate structural inequalities between southern and eastern Mediterranean countries, on the one hand, and northern Mediterranean countries and Europe, on the other (*medium confidence; Section 1.2.3*).

This Analysis comprises seven chapters and is structured as shown in *Figure 1.2 (Section 1.2.1).* An important aspect of the science-policy context of this Analysis is a well-organised Science-Policy Interface (SPI) for the Mediterranean, which is briefly introduced *(Section 1.2.2)* and described more in detail in *Box 1.1.*

The drafting of this Analysis follows the practices and processes established by the Mediterranean Experts on Climate and environmental Change (MedECC) network in the context of the First Mediterranean Assessment Report (MAR1) (MedECC 2020a). Preparation of the report involved contributions from thirty-nine authors representing twenty-one countries. *(Section 1.4, Annex 1).*

[16] In this Analysis, 'migration' or 'migrants' is adopted to collectively refer to individuals and groups who voluntarily or involuntarily leave their homes to find new homes in either their country of origin (internal migrants), or in a country across the borders (cross-border or external migrants), encompassing asylum seekers and refugees, terms that are not mutually exclusive and may overlap strongly.

[17] In this Analysis, the term 'environmental change', if not explicitly mentioned, includes changes in terrestrial and marine ecosystems as well as changes in climate conditions at local, regional, or global scales.

1.1 Motivation to write the Expert Analysis

Human migration, whether voluntary or involuntary, is caused by events and circumstances that frequently leave individuals or groups of individuals no other choice than to move. Migration has been part of human history for millennia and may involve relocations on a moderate scale, within a given region or country, or movements that lead to much more distant relocations to other countries or even other continents. The number of forcibly displaced individuals in the world amounted to around 82 million by the end of 2020 (UNHCR 2021) and is expected to reach over 130 million displaced people in 2024 (UNHCR 2024). Considered to be one of the 'most congested human migration routes' *(Figure 1.1)*, the Mediterranean Basin recorded approximately 160,000 arrivals in 2022 (UNHCR 2022).

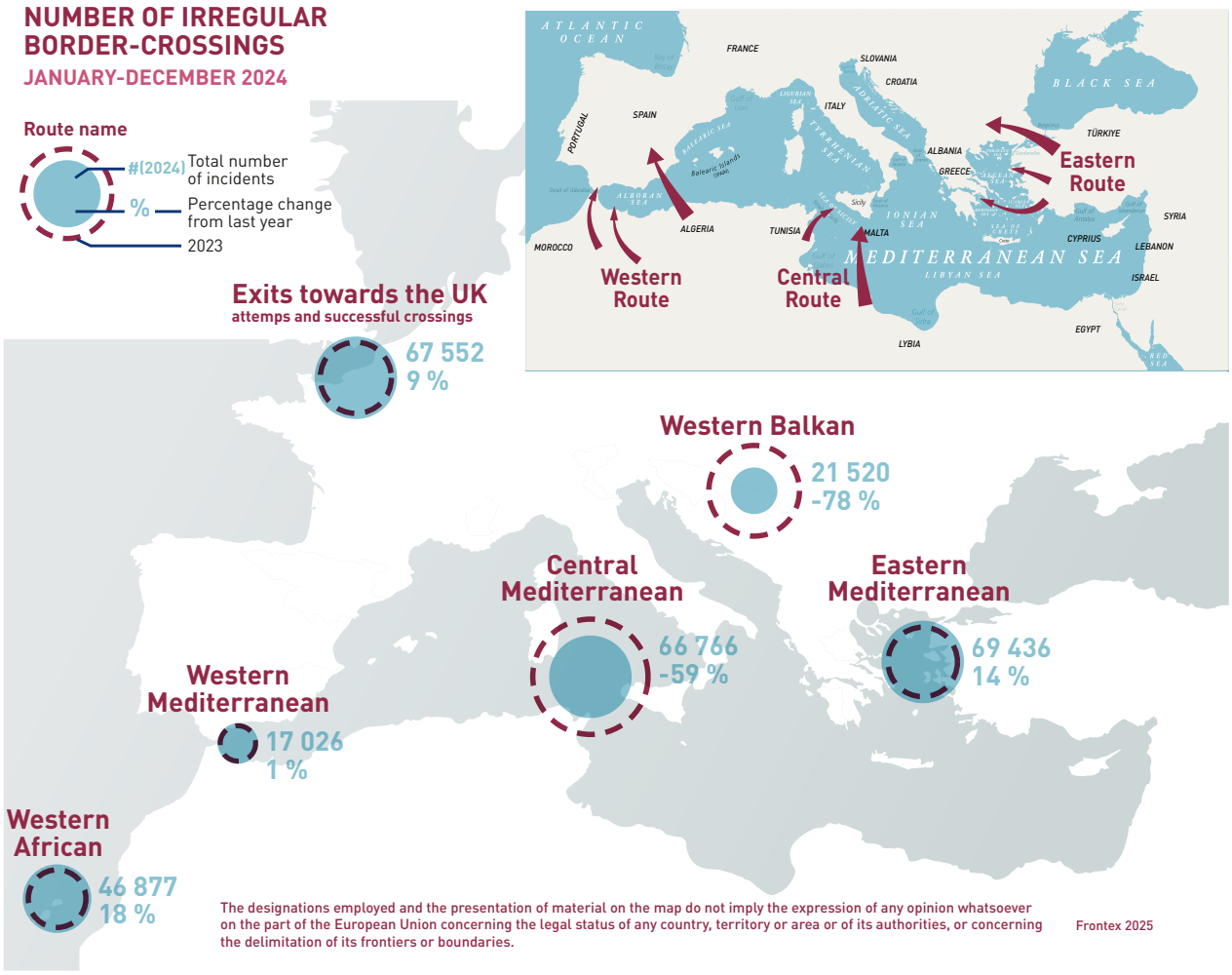

Figure 1.1 | Number of irregular border crossings by migrants in 2024 via the Western, Central, and Eastern Mediterranean Route, as well as other European migration movements. Source: FRONTEX[18]; the insert (upper right) represents schematically the major Mediterranean migration routes; source: Migration Policy Institute[19].

[18] https://www.frontex.europa.eu/what-we-do/monitoring-and-risk-analysis/migratory-routes/migratory-routes/

[19] https://www.migrationpolicy.org/article/asylum-seeker-and-migrant-flows-mediterranean-adapt-rapidly-changing-conditions

A distinction is usually made between conflict-induced and disaster-induced displacement or migration[20]. The former term refers to displacement caused by wars and acts of aggression, including violent human activities and politically motivated oppression. The latter denotes displacement to avoid the adverse consequences of climate change-induced natural hazards, such as extreme weather events like floods and landslides, and repeated periods of drought. It also includes fleeing the devastation caused by natural disasters such as earthquakes and volcanic eruptions. A closer look, however, reveals that the distinctions between conflict-induced and disaster-induced displacement/migration may often be blurred in practice. Conflicts may escalate due to disputes over natural resources that are strained because of environmental changes, while human activities may amplify the impact of natural disasters, which can lead to migration.

The studies referenced in MAR1 (Koubi et al. 2020) and more recently by Lange et al. (2022) have addressed the relationships between climate and environmental change, migration, and conflicts in the Mediterranean in general terms.

1.1.1 Why consider the relationships between environmental change, migration, and conflict?

The interdependency and numerous mutual linkages and feedback mechanisms between environmental change, conflict and human migration present significant challenges for a comprehensive understanding and the definition of policy guidelines. These challenges are central to this report, which is guided by the following key questions:

1. What are the major structural inequalities, uneven development and socio-economic challenges, and their relations to environmental change that are pervasive in the Mediterranean?

2. How can threats to human life and livelihoods posed by environmental change be described and possibly quantified, given the fact that the Mediterranean Basin is considered a climate change 'hotspot'? (see Giorgi 2006; Cramer et al. 2018).

3. What are the major impacts of environmental change on food and water security, economic activities, and human and environmental health in urban and rural settings?

4. Environmental change may increase conflict risks in relation to poverty, weak institutions, and limited capacities, specifically but not exclusively in the eastern and southern Mediterranean countries. Can causal relationships between changes in environmental conditions and conflicts be directly identified and described?

5. How can diverse patterns of human mobility, that is either sudden onset events and their direct consequences, or gradual slow onset events leading to more permanent types of mobility, be recognised and described?

6. To what extent does environmental change exacerbate the intersectional inequalities and challenges that already exist in governance structures in Mediterranean countries, and how are they related to human mobility and conflict?

7. What steps are needed to overcome the lack of empirical studies, methodological shortcomings, and difficulties in accessing data needed to understand the complexity of the environmental change-conflict-migration nexus in the Mediterranean Basin?

8. What collective and collaborative efforts are specifically required in the Mediterranean region to address the issues mentioned above?

While these key questions may be considered generic and valid for many regions in the world, the Mediterranean Basin deserves special attention regarding the environmental change-conflict-migration nexus. Individual chapters of this Analysis provide evidence for this (see *Section 1.2.1* and below).

[20] It is very important to distinguish between displacement and migration. Individuals who are displaced may later become migrants, but this is not inevitable if they return to their place of origin. Whether someone is classified as a 'displaced person' or a 'migrant' depends on the specific circumstances of the event.

This report adopts a forward-looking perspective to explore suitable options and anticipatory actions for mitigation and adaptation. It aims to improve the common understanding of the determinants, trends, patterns, and impacts of human migration and displacement. This may assist in the development of policy measures designed to minimise suffering, allocate resources where they are most urgently needed, and collectively support human well-being.

1.1.2 Why focus on the Mediterranean region?

The Mediterranean Basin, the largest semi-enclosed sea in the world, is surrounded by countries across three continents sharing a coastline of about 46,000 km (EEA 2015). The population of these countries is around 512 million (UNEP/MAP and Plan Bleu 2020), with 70% of them living in urban settings and one third of those in coastal zones. Intensive development and tourism have increased the fragmentation of landscapes and disrupted their ecological integrity. Population growth, urbanisation, and rising living standards have led to unsustainable patterns of consumption and production, with a heavy environmental footprint, putting food and water security at risk.

The Mediterranean region is facing increasing cumulative environmental and climate risks, including strong warming (up to 6°C by 2100) and drying, accelerating sea level rise (currently 4 mm yr^{-1}), and increasing air and water pollution (Cramer et al. 2018; Cherif et al. 2020; Ali et al. 2022). The resulting drier and hotter conditions, in combination with enhanced coastal flooding, will affect local communities directly because of increased exposure. This represents hazards and high risks for human societies as well as terrestrial and marine ecosystems in the foreseeable future.

Climate change also leads to an increase in the frequency and intensity of extreme events. These events, such as long-lasting hot spells, extreme precipitation events, extended periods of drought, wildfires, and sandstorms, have caused severe impacts that have adversely affected the livelihoods of local communities (Vafeidis et al. 2020).

The Mediterranean region is a biodiversity hotspot with the highest rate of endemic species in the world. Pressures on ecosystems from anthropogenic activities, pollution, and climate change will lead to irreversible environmental damage and loss of biodiversity (Valavanidis and Vlachogianni 2013; IUCN 2022). Ecosystems face various threats, especially in the south and east of the Mediterranean Basin. This includes land degradation, as well as the loss of half of the wetlands over the course of the 21st century, overfishing (20% of fish species at risk of extinction by 2050), unsustainable agriculture, wildfires (burnt area may double by 2100) and the invasion of non-indigenous species.

Because of their high vulnerability, the adaptive capacity of ecosystems and human systems in the Mediterranean is likely to reach or exceed their limits. This may cause serious and lasting consequences for human health and livelihoods and may lead to involuntary migration of local communities to places where water, food, and other resources are perceived to be more readily available and accessible. This was described in detail in MAR1 (MedECC 2020a). Additional information is provided in the State of the Environment and Development (SoED) in the Mediterranean report published by Plan Bleu, a Regional Activity Centre of the United Nations Environment Programme's Mediterranean Action Plan (UNEP/MAP and Plan Bleu 2020). Both reports shed light on the hefty toll that the triple global crisis of climate change, biodiversity loss, and pollution is taking on Mediterranean ecosystems.

The Sustainable Development Goals (SDGs) were universally agreed by the United Nations (UN) in 2015 under the framework of the 2030 Agenda for Sustainable Development. Efforts undertaken in Mediterranean countries since 2015 have resulted in positive developments. However, these have fallen short of achieving the SDGs by 2030 and are not enough to reduce the most significant pressures on the environment, and to safeguard the Mediterranean Basin for present and future generations while meeting human development needs (UNEP/MAP and Plan Bleu 2020).

According to the latest Sustainable Development Report, the Mediterranean is also a region of divisions (Sachs et al. 2023). Most countries of the Middle East and North Africa (MENA) belonging to the wider Mediterranean fail to achieve up to nine of the SDGs in the absence of transformative policies, awareness-raising campaigns, and specific education programmes. Due to more relevant policies and more adequate funding, the Mediterranean EU member states have demonstrated greater progress in achieving the SDGs, such as France, Italy and Cyprus, with only two, three, and four of the goals not achieved, respectively.

1.1.3 The environmental change-conflict-migration nexus

A well-defined and quantifiable causal link between individual high-impact environmental changes and subsequent (involuntary) migration is highly complex. While environmental changes may frequently be the primary factor leading individuals, families or entire communities to move (IOM 2014), it is critically important to keep in mind that, in most situations, people choose or are forced to migrate as a result of more than one driver. Disasters in general triggered more than 60% of the new internal displacements recorded in 2021, accounting globally for 23.7 million migrants. Of those, 94% were driven by climate-change related extreme events, such as storms, extended droughts, or flooding. Moving away from one's original homeland in response to such disasters is not the only reason for migration. Migration is often also understood as an adaptation measure for communities affected by increasingly extreme weather and climate conditions.

Globally, the number of conflict-induced internal displacements in 2021 was the highest ever recorded, at 14.4 million. The overwhelming majority of displacements were caused by armed conflicts. However, communities fled repeatedly as conflict frontlines shifted. Camps hosting internally displaced people (IDPs)[21] were frequently attacked in some countries, forcing people to move again (IDMC 2022).

Achieving a more comprehensive understanding of the nexus between environmental change, conflict, and migration, both now and in the near future, is the core focus of this report. The linkages and feedback mechanisms between each of these two drivers and migration are complex. This applies similarly to the relationships between environmental change and conflict. Unravelling and determining verifiable and concrete relationships between all elements of the nexus remains a major challenge from both a conceptual and applied perspective.

1.1.4 The environmental change-migration-conflict nexus in the policy context of the Mediterranean region

The Southern and Eastern Mediterranean countries and the MENA region are at the epicentre of both a global climate change hotspot and the world's involuntary (and forced) migration crisis. The MENA region is home to 5.8% of the world's population. However, 38% of its population, or 173 million people, live in conflict-affected areas (see UNDP 2022).

The MENA region is home to just 5.8% of the world's population, yet it bears a disproportionate burden of conflict and displacement. As of 2022, 38% of the region's population — approximately 173 million people — live in conflict-affected areas (UNDP 2022). In the Eastern Mediterranean, 77 million people across four countries — Lebanon, Libya, Palestine, and Syria — are in need of humanitarian assistance. These countries are among the seven conflict-affected countries in the broader Arab region, which also includes Iraq, Iran, and Israel. In 2023, the MENA region was the origin of 14.8 million refugees, representing around 40.5% of the global refugee population. At the same time, it hosted 9.4 million refugees under UNHCR and UNRWA mandates — 25.4% of the global total. Notably, over 6.5 million refugees have originated from Syria alone. Around 19 million internally displaced persons (IDPs), more than a third of all conflict-induced IDPs globally (UN ESCWA 2024), are found in the Eastern Mediterranean and Middle Eastern region.

Conflicts have devastating impacts and long-term security, humanitarian, and development implications, and give rise to involuntary displacement (Abu-Ismail et al. 2021). They have accelerated the pace of migration from and into the MENA, including trans-border movement of refugees, especially in Jordan and Lebanon, but also in Cyprus, Greece, and Türkiye. This has resulted in significant pressures on the host countries' economic and social infrastructure.

Conflicts and migration can be exacerbated by the impacts of environmental change, which increase competition over scarce resources and reinforce potential struggles. Extreme weather and climate events, as well as gradual environmental changes (e.g. coastal erosion or sea level rise) aggravate socio-economic, health, and safety challenges. In addition, increasing temperatures, water scarcity, soil salinisation, and land degradation, driven largely by environmental changes and affecting agricultural productivity and food security, may

[21] According to the Guiding Principles on Internal Displacement (UN 1998), internally displaced persons (IDPs) are 'persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized border.' See also: https://www.ohchr.org/en/special-procedures/sr-internally-displaced-persons/about-internally-displaced-persons

lead an increasing number of people to migrate. Conversely, environmental-change driven migration can be reinforced by violence and conflict.

Structural inequalities in the Mediterranean region, such as national and sub-regional demographic dynamics exacerbate, the already existing North-South divide. While fertility rates equal to or greater than two children per woman are observed in the southern and sastern Mediterranean countries, fertility rates fall below the critical threshold of two children per woman in the western and northern countries. Population numbers in the latter region are expected to stagnate or decrease. However, the currently observed considerable flow of migrants from the conflict areas of countries in parts of the MENA region to Europe may alter the population dynamics of the western and northern Mediterranean countries (Le Tellier and de Miras 2017).

This report gathers and analyses existing evidence on environmental change-induced migration to address remaining policy and knowledge gaps. The environmental change-conflict-migration nexus in the Mediterranean represents an interesting, yet challenging, topic from the perspective of a science-policy interface (SPI) because (1) there are knowledge gaps, as well as (2) a lack of consensus among scientists, regarding the underlying relationships and interdependencies between the elements of this nexus. This report will therefore consider and address the following policy dimensions, gaps, and challenges:

- Apart from any natural drivers, the extent to which environmental change will continue to influence migration will depend on whether emissions of greenhouse gases (GHG) can be reduced, as well as on the adaptation capacities of the impacted sub-regions and countries.

- Since the population affected needs assistance to adapt to the impacts of environmental change, there is a need for adaptation measures, climate risk management, and disaster risk reduction, including early warning systems.

- There is a need for development assistance to promote adaptation to climate change or the reduction of poverty and livelihood disruptions caused by desertification, drought, and crop failure.

- There is a need to address political crises in some Mediterranean countries. This primarily concerns the southern and eastern countries that are part of the MENA region, where an increasingly young and often well-educated population is faced with bleak economic prospects and unemployment.

- Additional research on migration dynamics and the impacts of climate and environmental change on the well-being and integrity of communities is also needed. Comprehensive information, including data on labour migration caused by climate change and urban issues, particularly with regard to rural inhabitants moving into cities, slums, and informal settlements, should be collected and analysed.

- There is an urgent requirement for a gender-responsive approach because environmental change and migration affect women and men differently.

1.2 Main issues addressed and structure of the report

A brief description of the report's structure *(Figure 1.2)* and the main issues covered therein are provided below.

1.2.1 Scope and content of the report

The overall scope of the report and the environmental setting in the Mediterranean Basin are briefly described in the current chapter and in more detail in *Chapter 2* (*Geographical and temporal scope and current setting). Chapter 2* also addresses socio-economic and demographic trends, and major developments in environmental and climate conditions, and provides a brief overview of the past, current and future state of migration and conflict in the Mediterranean region.

Chapter 3 (Threats to human life and livelihoods from environmental change) offers insights into pressures and challenges to human life and livelihoods caused by environmental changes such as decreasing precipitation, heat waves and sea level rise, which may in turn lead to conflict and/or migration. In addition, the chapter considers the impacts of non-climatic drivers, such as overfishing, environmental pollution, and land use changes, and addresses threats to human life and livelihoods by examining the following sectors: water and food security, human health, coastal processes and conditions, degradation of terrestrial and marine ecosystems, and the energy sector.

Chapter 4 (Key challenges for security: conflict and cooperation in the Mediterranean) considers the current status of conflicts in the region and their geopolitical root causes. Subsequent sections of the chapter address interactions between environmental change and conflict, on the one hand, and the relationships between conflict and migration, on the other.

Chapter 5 (Understanding the environment-migration nexus in the Mediterranean) aims to explain various basic concepts of human mobility in the context of the environmental change-conflict-

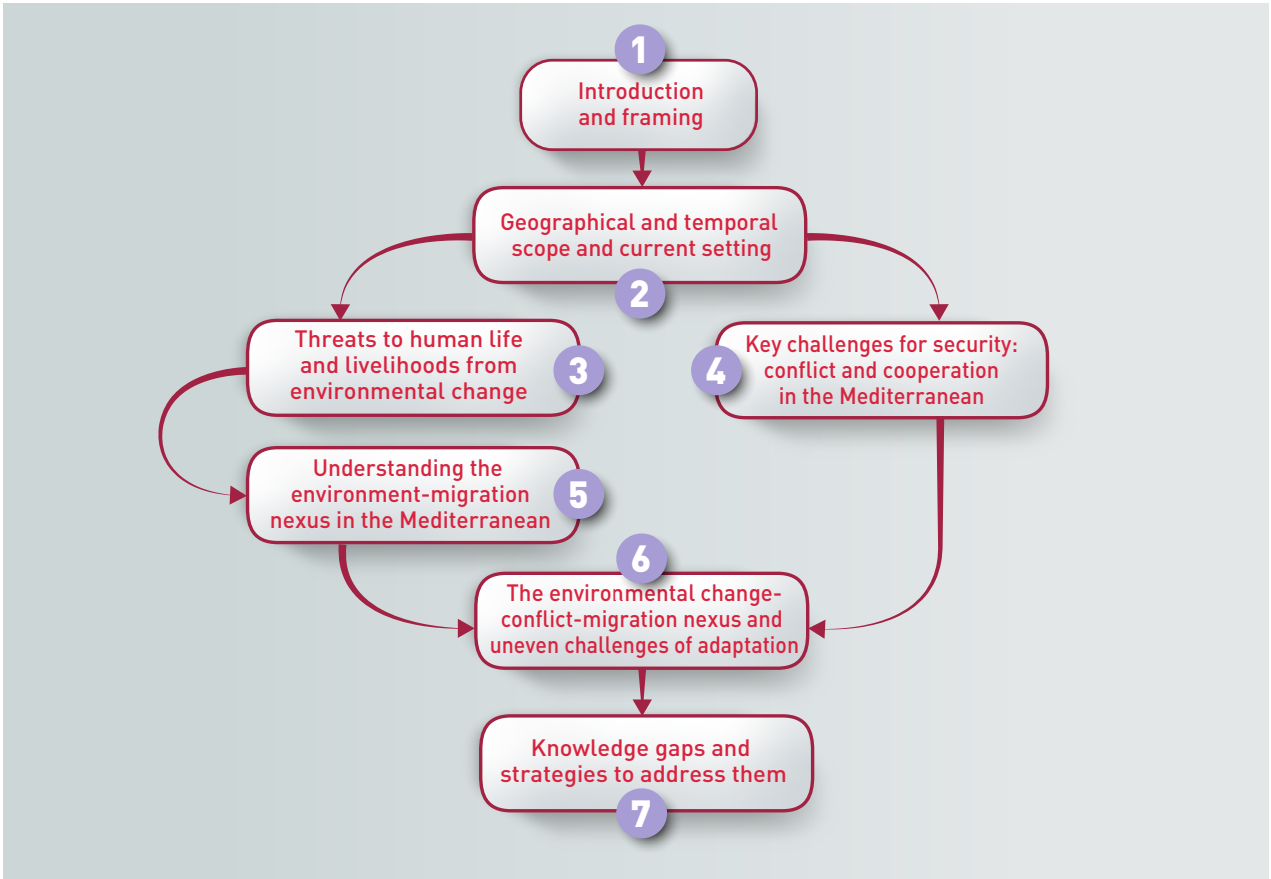

Figure 1.2 | A brief description of the report's structure and the main issues covered. Numbers in the figure denote chapter numbers.

migration nexus. These concerns relate to different forms of human mobility. The chapter provides definitions and explanations regarding human mobility, various factors that trigger movement at different scales away from home communities and the spatial extent of such movements across regional and national borders. It considers the societal challenges that arise once mobile populations arrive at their new destinations. It also deals with the diversity of the spatial and temporal patterns of migration, including the fate of population groups that remain immobile at their locales, despite environmental changes. Finally, the chapter addresses the consequences of environmental migration, specifically regarding adaptation and maladaptation of the migrants to the local conditions of the new place of settlement.

Chapter 6 (The environmental change-conflict-migration nexus and uneven challenges of adaptation) provides a synthesis of the issues addressed in the previous chapters. After looking into the complexity of interactions between environmental change, migration, and conflict, the chapter addresses governance issues, including legal frameworks and regimes related to the environmental change, conflict, and migration nexus in the Mediterranean region. The chapter also covers the challenges associated with migration and place-based vulnerabilities of communities, as well as those related to the environmental and intersectional aspects of migration.

Finally, *Chapter 7 (Knowledge gaps and strategies to address them)* focuses on knowledge gaps associated with the facts and ideas proposed and discussed in the previous chapters and offers approaches to address them. This includes strategies to enable a better understanding of the mechanisms affecting the links between environmental change, migration, and conflict.

The science-policy approach for this report can be found in *Box 1.1.*

1.3 Key issues and conclusions to be drawn

Migratory movements of people in the Mediterranean Basin are growing to a level that far surpasses human movements to and within the Mediterranean in the recent past. The great suffering and loss of life among migrants deserve special attention from scholars and policymakers alike.

An individual's or community's decision to move is based on numerous circumstances. Changes in environmental conditions, as well as conflicts and their devastating consequences for the livelihood of affected communities, enhance their vulnerability and represent powerful drivers of migration.

In order to shed light on the environmental change-conflict-migration nexus, the relationships between environmental change and migration, and those between conflict and migration, are analysed separately. The combined consequences of climatic and non-climatic drivers on migration are considered in the context of vulnerability and adaptation of affected communities. These interactions have been captured by the concept of a 'vicious circle', which locks affected societies into a structure of violence, vulnerability, and environmental and climate change impacts (see *Chapter 4*).

While changing environmental conditions may be a relevant driver of migration, leaving one's home may be considered an adaptation strategy for affected communities. However, environmental changes and resulting migration may also increase conflict risks. The influx of large numbers of migrants into host countries may reduce their adaptive capacity because of, for example, increasing resource scarcity, socio-political unrest, and cultural differences in already stressed societies. The fate of migrants in the Mediterranean region is therefore significantly influenced by the absorptive capacity of host countries, and this needs to be taken into consideration. Moreover, pre-existing concerns associated with migration can lead to or amplify unfair criticism and stigmatisation of migrants. This is particularly important, since this challenge is often treated as a security issue and not a human rights question.

Contrary to commonly quoted convictions that environmental changes are directly causing migrant flows (the terms 'environmental or climate migrants' are used to depict people so affected), the report comes to a different important conclusion. We find that other drivers, and in particular conflicts and their devastating consequences, various general socio-economic factors, and governance issues in a given country, frequently constitute more important drivers of migration than environmental changes and their impacts. This applies particularly to cross-border migration.

Achieving a more comprehensive understanding of the nexus between environmental change, conflict, and migration, both now and in the near future, represents the core focus of this report. However, direct and quantifiable causal links between environmental change, conflict, and migration are complex and hard to unravel. This represents a significant gap in our understanding that needs to be bridged urgently. Unravelling the methodological complexity in specifying realistic and effective policy measures through interdisciplinary and cross-sectoral studies will be indispensable. The knowledge gap underscores the need for additional research to comprehensively understand the root causes of migration. Embracing a multifaceted approach is essential to finding solutions to these challenges. Active involvement from the development, natural sciences and humanitarian research communities, bringing together environmental scientists, economists, sociologists, and local practitioners, will be essential to develop an evidence-based regional vision on how the environment-migration nexus is contextualised in different sub-regions of the Basin. This kind of interdisciplinary approach can enhance our understanding of the developmental aspects of environmental change impacts within the broader framework of the 2030 Sustainable Development Goals (SDGs).

The existing literature suggests that conflicts are a cause of involuntary and voluntary migration. However, the uncertainty and complexity of linkages between developing and ongoing conflicts on the one hand, and migratory movements on the other, significantly complicate matters. Devising appropriate and efficient response mechanisms therefore remains a challenge, especially when conflicts and vulnerabilities emerge due to the absence of effective governance structures, limited cross-border cooperation, or unsustainable policies. Given this challenge, developing and implementing effective adaptation measures and initiatives, for both migrant and host communities, represents an essential strategy for reducing the risk of exacerbating existing conflicts.

Despite numerous advances in our understanding of the environmental change-conflict-migration nexus, questions remain open. However, some additional lessons from the report could inform decision-makers in devising policies and programmes that

address the root causes of the problems associated with the nexus, rather than their symptoms. This also includes proposals for future research that address climate science, social and economic behaviour, and geopolitics through a multidisciplinary lens, as mentioned above.

The narrative of environment-induced migration and displacement as a linear cause-effect relationship needs to be revisited. The push factors and motivations to move are numerous and differ from one region to another, and from one group of people and community to another. Both research and policy domains therefore need to understand that migration from rural to urban areas and across borders differ considerably. They are shaped by different socio-economic conditions and geopolitical forces at play in countries of origin as well as in host countries. The drive to leave one's home and livelihood, history and culture is also shaped by the risk involved in the journey (or at least a perception of it), its legality, and the routes migrants are prepared to take.

The narrative around the environmental change-conflict-migration nexus needs to be shifted urgently from a security-focused frame of reference to one that emphasises opportunities for development and cooperation. A development-focused approach based on engagement of all stakeholders can enhance social cohesion and reduce tensions that may arise from competition over scarce resources.

Because the Mediterranean has been identified as a 'climate change hotspot', climate actions, should prioritise adaptation strategies and programmes, particularly in southern and eastern countries. This will help building the resilience of vulnerable communities and develop climate-resilient solutions that enhance livelihoods, promote social equity, and mitigate vulnerability to climate impacts.

In order to build resilience to environmental change, more in-depth qualitative research is needed to explore how community-driven environmental initiatives and collaboration on joint management of scarce natural resources as common public goods can foster peaceful coexistence and shared prosperity. There are a growing number of success stories documenting how such environmental projects can engage stakeholders to efficiently address local needs and build local capacities. This in turn will enhance livelihoods, promote social equity, and mitigate vulnerability to environmental change in a given community.

Finally, the importance of regional collaboration among Mediterranean countries, inter-governmental bodies, and Basin-level initiatives across the Mediterranean cannot be over emphasised. These represent important avenues for building a coherent approach to managing the environmental, socio-economic, political and developmental challenges around the Basin. This may be achieved through existing multi-stakeholder platforms, joint initiatives and projects that promote dialogue and collaboration on climate, environment, and migration.

1.4 Background, methodology, and drafting process

This Expert Analysis draws on the expertise of the MedECC network and builds on the First Mediterranean Assessment Report (MAR1, MedECC 2020a). It responds to the motivation to provide deeper analysis of several critical issues identified in MAR1 each focusing on (1) the climate and environmental coastal risks (MedECC 2024a); (2) the interlinkages between climate and water–energy–food–ecosystems (WEFE) nexus (MedECC 2024b); and (3) the interdependencies, linkages, and feedbacks between environmental change, conflict, and human migration (this Analysis).

1.4.1 Nature of the analysis as a synthesis of available literature and data

This Analysis represents a collective and iterative review, synthesis, and assessment of available openly published literature. MedECC has carried out no new or additional research, and all findings of the assessment are supported by scientific references. It is primarily based on peer-reviewed literature (in English or other languages), selected non-peer reviewed literature has also been considered, such as institutional or government reports, national statistics, etc. It builds on the MAR1 (MedECC 2020a), previous reports by the Intergovernmental Panel on Climate Change (IPCC), and other relevant local, regional, and national assessments, and draws on evidence from over 1000 scientific publications. The preparation of this Expert Analysis follows an iterative drafting and review process, based on the approach used for the MAR1, ensuring scientific rigor, author independence, and balanced expertise.

1.4.2. Selection of authors based on their expertise, with a consideration of gender and geographical balance

The MedECC Scientific Steering Committee (SC) appointed the Coordinating Lead Authors (CLAs) and Lead Authors (LAs) taking into account a range of scientific, technical, and socio-economic views and backgrounds, as well as geographical and gender balance. A total of 39 CLAs, LAs, and Contributing Authors (CAs) contributed to this Expert Analysis *(Annex I)*. The selection process included efforts to ensure a balance in gender and geography between authors from the northern and western shores of the Mediterranean, and those from southern and eastern countries. The gender balance in this assessment is 38% men and 62% women. 28% of the authors are affiliated in institutions located in Northern Mediterranean Countries, 26% in Southern and Eastern Mediterranean Countries and 46% in other countries (see *Annex I*). This imbalance is due to a number of issues, including the fact that research on the environmental change-conflict-migration nexus or on selected features of the nexus (except the issue of climate change) is less prominently covered by Mediterranean scientists. It should also be noted that linkages between migration and conflict are highly sensitive politically in some Mediterranean countries, which creates significant obstacles to conducting and publishing research on these topics.

1.4.3 Neutrality and independence of the authors

The nature of this Analysis demands the highest possible neutrality and independence of CLAs, LAs, and CAs. Care was therefore taken to select only those scientific experts who fulfilled the criteria — that is primarily scientists from private or public universities and research institutions that carry out work on non-sensitive topics not directly associated with government or defence-related topics. Authors of the report carry out their work on a voluntary basis.

1.4.4 Process of writing, editing, and reviewing the report

Each chapter was drafted under the guidance and supervision of the CLAs, who coordinated content and supervised LAs and CAs. CLAs and LAs are responsible for the content of each chapter and draft specific sections based on their area of expertise. The CLAs oversee the process and are responsible for the coordination of the chapters. The Report Coordinators drive and oversee the entire process of completing the first and subsequent versions of the report, as well as the drafting of the Executive Summary.

This Analysis has gone through a two-stage review process. The Zero Order Draft (ZOD) of the report underwent an internal review by members of the MedECC Scientific Committee and MedECC authors. Following reviewers' comments, a First Order Draft (FOD), including the draft Executive Summary, was produced and underwent an external review process *(Annex II)*. Comments from both stages were incorporated into the final draft. The Executive Summary ensures clarity for decision-makers and facilitates a science-policy dialogue.

Box 1.1

The role of science-policy interfaces for inclusive environmental governance

A science-policy interface (SPI) is based on coordinated dialogue between scientists and policymakers in a problem-solving process and offers a structure or process that enhances the effectiveness of governance in improving the identification, formulation, and evaluation of policies (UNEP 2009). SPIs improve communication and information sharing and help to bridge the gap between scientists and policymakers through two-way and well-balanced communication channels.

Communication obstacles between scientists and policymakers can hinder stakeholder dialogue. The two spheres do not always 'speak the same language', and are not always addressing the same timeframes, among other barriers.

Timeframes — policy decisions must be taken in the short term (i.e. the term of political mandates), while scientists need much more time to establish sound and reliable knowledge.

Language — communication to policymakers should be based on short key messages and recommendations – a decision-maker makes his/her decision on a specific subject if, and only if, there is consensus among scientists (and it is even better if that consensus can be summarised in half a page). In a context of uncertainty, with complex environmental policy affairs, adaptive (or no-regret) policies should have the potential to be adjusted according to socio-economic contexts and the availability of new knowledge (or new scientific consensus).

SPIs go beyond a linear communication approach, where scientists work to pass on knowledge to policymakers, leaving them to decide subsequently what should be done and what actions should be implemented. 'Instead of just communicating information, scientists and policymakers interact and exchange ideas to understand problems together. In this arrangement, policymakers can inform scientists of their research needs and expectations, their analysis of issues and current policymaking processes, while scientists can clarify the scope of their research and the way it can be translated into recommendations and concrete measures' (Lemaitre-Curri et al. 2018, p.5).

Three criteria are fundamental to a robust SPI: credibility, relevance and legitimacy (Cash et al. 2003):

Credibility — the perceived validity of the information, methods and procedures used within an SPI.

Relevance — how closely the procedures and objectives of the SPI relate to the needs of the policymaking process.

Legitimacy — the fairness, accuracy and political balance perceived by the parties involved in the SPI.

SPIs facilitate evidence-based decision-making. They aim to jointly develop and use knowledge on specific issues for the definition, implementation, and follow-up of measures to this end (Young et al. 2013). The collective and structured work must enable the production of shared knowledge syntheses on various issues, expressed in an accessible and balanced language, and adapted if necessary to the diplomatic constraints inherent in multilateral processes (IDDRI and AFD 2017). SPIs can take various forms, from informal discussions between scientists and policymakers to intergovernmental bodies or research projects, involving deliberate interactions between science and policy to serve governance purposes.

Several SPIs have been established or are drawn on by multilateral environmental agreements and international and regional fora addressing environmental issues, allowing scientific experts, policymakers and other stakeholders to network and influence decision-making processes. As an exemplary case, the United Nations Environment Programme (UNEP) and the World

Meteorological Organization (WMO)[22] established the Intergovernmental Panel on Climate Change (IPCC)[23] in 1988. Based on current knowledge on climate change, IPCC synthesis reports specifically address policymakers and provide them with a reliable scientific basis for formulating climate policy. IPCC experts are appointed by their member states, who approve the synthesis reports line-by-line through negotiation and consensus. Formally established in 2012, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)[24] is the independent intergovernmental body for biodiversity and ecosystem services. It includes innovative aspects regarding platform members and stakeholders engaged in the consultation process, where not only scientists and policymakers, but also special interest groups such as members of civil society, among others, are represented.

Multi-stakeholder dialogue and environmental governance in the Mediterranean region

Keeping track of the Mediterranean through rigorous monitoring has been one of the core functions of the UN Environment Programme / Mediterranean Action Plan – Barcelona Convention system (UNEP/MAP) since its creation five decades ago. This normative framework set up under the auspices of UNEP in the 1970s as a regional multilateral environmental agreement and UN treaty unites 21 Mediterranean countries and the European Union (EU) within a unique legally binding framework for policy and implementation.[25] A framework with three dimensions: institutional, regulatory, implementation – in a nutshell, governance and action, to support the definition and implementation of regional and national environment policies, from the identification of needs expressed by policymakers to partnerships, including with academia.

Scientists, policymakers, and other stakeholders in the Mediterranean region have long been interacting. The scientific community has played a key role in building the Mediterranean environmental governance framework. 'In his article on epistemic communities, Professor Peter Haas (1990) argues that the Mediterranean Action Plan (...) was partly born out of the action of a community of scientists who shared common convictions (Haas 1990). To a certain extent, the MAP has benefited from the contribution of scientific communities involved in a global context that highlighted the need to strengthen scientific knowledge, long before the current concept of SPI had been identified' (Lemaitre-Curri et al. 2018).

With its ecological complexity, socio-economic disparities, numerous international agreements, and particularly strong pressures on the environment, the Mediterranean is both a showcase and a testing ground for global environmental governance. An array of international agreements requiring Mediterranean states to preserve the region's natural resources has been in place for several decades. These include among others the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, the General Fisheries Commission for the Mediterranean (GFCM)[26] under the auspices of the UN Food and Agriculture Organization (FAO)[27], and the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS)[28].

The Contracting Parties to the Barcelona Convention adopted decisions calling for a stronger science-policy interface, including through the Mediterranean Strategy for Sustainable Development (MSSD)[29], the Regional Climate Change Adaptation Framework programme, and the Integrated Monitoring and Assessment Programme

[22] https://wmo.int/

[23] https://www.ipcc.ch/

[24] https://www.ipbes.net/

[25] https://www.unep.org/unepmap/who-we-are

[26] https://www.fao.org/gfcm/en/

[27] https://www.fao.org/home/en

[28] https://accobams.org/

[29] https://www.unep.org/unepmap/what-we-do/mediterranean-strategy-sustainable-development-mssd

(IMAP)[30] of the Mediterranean Sea and Coast. This requirement to strengthen the science-policy interface also features in the biannual UNEP/MAP programme of work.

Within the UNEP/MAP – Barcelona Convention system, a network of National Focal Points, scientific experts and other stakeholders co-operate through steering and advisory committees that support policymaking processes. This is done through MED POL[31], the regional scientific programme of pollution monitoring and assessment, and the Regional Activity Centres (RACs), which represent the UNEP/MAP components that mobilise scientific expertise on specific environmental themes.

The UN 2030 Agenda for sustainable development acknowledges the importance of the regional and sub-regional dimensions, regional economic integration and interconnectivity in sustainable development (UN General Assembly 2015). Regional and sub-regional frameworks are recognised as facilitating the effective translation of global sustainable development policies into concrete action at national level. The 2030 Agenda welcomes the cooperation of regional and sub-regional commissions and organisations for follow-up and review, and it encourages states to identify the most suitable regional fora in which to engage. The UNEP/MAP Mediterranean Commission on Sustainable Development (MCSD) is a case in point. It was created in 1995 in the aftermath of the Rio Conference (1992) as the multi-stakeholder advisory body of the Parties to the Barcelona Convention.[32] The Commission has been instrumental as a forum for experience sharing and peer learning by gathering not only government representatives, but also stakeholders from various categories on an equal footing. This includes representatives of local authority networks, civil society/non-governmental organisations (NGOs), socio-economic actors, inter-governmental organisations (IGOs), the scientific community, and parliamentarians. MedECC is a member of the MCSD under the group of scientists.[33]

The MCSD was instrumental in integrating the principles of the 2030 Agenda into the MSSD, which was adopted by all Mediterranean countries at the 19th Meeting of the Parties to the Barcelona Convention (COP 19) (Athens, Greece, 9-12 February 2016)[34], as a strategic guiding document for all stakeholders and partners to translate the SDGs at the regional, sub-regional and national levels. The MSSD identifies, under its Objective 4 'Addressing Climate Change as a Priority Issue for the Mediterranean', and as a regional Flagship Initiative, the establishment of 'a regional science-policy interface mechanism (...) with a view to preparing consolidated regional scientific assessments and guidance on climate change trends, impacts and adaptation and mitigation options'. MedECC corresponds to this MSSD Flagship Initiative, and the UNEP/MAP Medium-Term Strategy 2022-2027 confirms 'support to MedECC as a voluntary science policy interface platform of Mediterranean climate scientists'.

The case study of MedECC's First Mediterranean Assessment Report (MAR1)

MedECC is an open and independent international scientific network of experts founded in 2015 responding to these needs for a regional-level SPI in the Mediterranean, in the context of the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris, France, in 2015. The network aims at gathering, updating, and consolidating the best available scientific knowledge on climate and environmental change and associated risks in the Mediterranean basin to render it accessible to policymakers, stakeholders, and citizens. Since

[30] https://www.unep.org/unepmap/what-we-do/monitoring-and-assessments

[31] https://www.unep.org/unepmap/fr/who-we-are/institutional-set/med-pol

[32] https://www.unep.org/unepmap/who-we-are/governing-and-subsidiary-bodies

[33] https://www.unep.org/unepmap/who-we-are/governing-and-subsidiary-bodies/mcsd-members

[34] Decision IG.22/2: https://wedocs.unep.org/bitstream/handle/20.500.11822/6084/16ig22_28_22_02_eng.pdf

2018, the Plan Bleu/RAC[35] of UNEP/MAP has hosted the MedECC Scientific Secretariat. MedECC is also supported by the Union for the Mediterranean (UfM), a regional, institutional intergovernmental platform gathering all EU member states and Southern and Eastern Mediterranean countries. MedECC published MAR1 in 2020 responding to the need for a comprehensive synthesis and assessment of recent trends climate and environmental change in the Mediterranean region including the likely future development of the region and the consequences of environmental change for natural systems, the economy, and human well-being.

The development of MedECC reports follows an iterative drafting and review process, similar to the approaches used by the IPCC and the IPBES. The UNEP/MAP and UfM Secretariats organised a consultation between their policymakers and the MedECC coordinators and CLAs. These consultations included an online review of the draft SPM (April – June 2020)[36] followed by a one-day plenary session held remotely on 22 September 2020. The consultation was attended by members of the MCSD Steering Committee, Plan Bleu Focal Points, members of the UfM Climate Change Expert Group (CCEG) and of the UfM Environment Task Force, the MedECC Secretariat, Steering Committee, and Coordinating Lead Authors, as well as UNEP/MAP, Plan Bleu and UfM Secretariat representatives. The aim of these consultations was to ascertain that MAR1 findings, as presented in the draft SPM, were fully comprehensible, unambiguous, and that the assessment of literature was transparent, objective, and complete. Attended by approximatively 100 participants, this plenary stakeholder consultation constituted an important step in reinforcing the science-policy dialogue.

The MedECC MAR1 SPM (MedECC 2020b) was formally endorsed by the Contracting Parties of the COP 22 of the Barcelona Convention and reflected in the Antalya Ministerial Declaration (Türkiye, December 2021) (UNEP/MAP 2021a, 2021b). It was also recognised as an important contribution of the scientific community to future climate and environmental actions in the Mediterranean region in the Ministerial Declaration of the Second UfM Ministerial Conference on Environment and Climate Action (Cairo, Egypt, October 2021) (UfM 2021).

In addition, MedECC contributed to the IPCC Sixth Assessment Report (AR6), with a cross-chapter paper dedicated to the Mediterranean for the first time (Ali et al. 2022). This chapter was prepared under the co-leadership of one of the MedECC coordinators, and several MedECC MAR1 authors contributed to it, ensuring a strong synergy across the two assessment reports.

It is worth mentioning that the 2020 North-South Prize of the Council of Europe was awarded to MedECC for its efforts to address climate change and biodiversity conservation in the Mediterranean, in particular by elaborating the first-ever scientific assessment on climate and environmental change impacts in the Mediterranean Basin[37]. The jury stated that MedECC constitutes a concrete example of the vision of the Mediterranean Sea as a shared space for peace, development, and human rights. The ceremony took place on 9 December 2021 in Lisbon, Portugal.

[35] https://planbleu.org/en

[36] The MedECC Secretariat received 453 comments on the draft SPM from 21 governments, decision-makers and partner organisations. In addition, 196 comments were received on the MAR1 draft full report.

[37] https://rm.coe.int/decision-jury-nsp2020/1680a0b27f

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