

REPUBLIC OF TÜRKİYE
ANKARA UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES DEPARTMENT OF
MARITIME TRANSPORTATION LAW AND POLITICS

THE LEGAL IMPACT OF CLIMATE CHANGE IN THE MEDITERRANEAN
SEA: EVALUATION OF ADAPTATION AND MITIGATION MEASURES

LLM Program
(conducted in English) in
the Sea & Maritime Law

Derya ULUTÜRK

Ankara, 2024

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I state that all the information in my master's thesis titled “The Legal Impact Of Climate Change In The Mediterranean Sea: Evaluation Of Adaptation And Mitigation Measures” (2024, Ankara), which I prepared under the supervision of Prof. Dr. İsmail DEMİR, was collected and presented in accordance with academic rules and ethical behaviour principles, I fully indicated the information I received from other sources in the text and in the bibliography, I declare that I have acted in accordance with the ethical rules, and I will accept any legal consequences in case the contrary arises.

Date: 05/08/2024

Derya ULUTÜRK

TABLE OF CONTENTS

TABLE OF CONTENTS	I
ABBREVIATIONS	III
LIST OF FIGURES	VI
INTRODUCTION	1
A) SUBJECT MATTER, AIM AND QUESTIONS.....	1
B) SCOPE AND STRUCTURE	3
C) RESEARCH METHODS	4
I. CLIMATE CHANGE AND ITS IMPACTS ON THE MEDITERRANEAN SEA	5
A) EVOLUTION OF CLIMATE CHANGE.....	9
B) FUNDAMENTAL IMPACTS OF CLIMATE CHANGE IN THE MEDITERRANEAN SEA	10
1- Socio-Economic Impacts of Climate Change	13
a) <i>Agricultural Industry</i>	14
b) <i>Fisheries Industry</i>	14
c) <i>Forestry Industry</i>	15
d) <i>Tourism Industry</i>	15
2- Ecological Impacts of Climate Change	16
a) <i>Hydrological Shifts</i>	16
b) <i>Agricultural Systems</i>	16
c) <i>Terrestrial Ecosystems</i>	17
d) <i>Coastal Ecosystems</i>	17
e) <i>Marine Ecosystems</i>	18
II. LEGAL AND INSTITUTIONAL FRAMEWORK ON CLIMATE CHANGE	20
A) GENERAL OVERVIEW	22
1- Legal Framework on Climate Change	22
a) <i>United Nations Convention on the Law of the Sea</i>	22
b) <i>United Nations Convention on Biological Diversity</i>	27
c) <i>United Nations Framework Convention on Climate Change</i>	29
d) <i>The Kyoto Protocol to The United Nations Framework Convention on Climate Change</i>	33
e) <i>The Paris Agreement</i>	36
f) <i>Sendai Framework for Disaster Risk Reduction</i>	41
2- Institutional Framework on Climate Change	41
a) <i>United Nations Environmental Programme</i>	41
b) <i>International Panel on Climate Change</i>	43
c) <i>United Nations Sustainable Development Goals</i>	46
B) SPECIFIC APPROACH ON THE MEDITERRANEAN	49
1- Legal Framework on Climate Change	50
a) <i>The Convention for The Protection of The Marine Environment and The Coastal Region of The Mediterranean (Barcelona Convention)</i>	50

<i>b) Related National Laws and Regulations</i>	56
2- Institutional Framework on Climate Change	60
<i>a) Mediterranean Action Plan</i>	60
<i>b) Union for the Mediterranean</i>	64
<i>c) The Mediterranean Experts on Climate and Environmental Change</i>	66
III. ADAPTATION AND MITIGATION STRATEGIES AND THEIR INTEGRATION	68
A) WAYS TO ADDRESS THE IMPACTS OF CLIMATE CHANGE	68
1- Mitigation Efforts in the Mediterranean Sea	69
2- Adaptation Measures in the Mediterranean Sea	75
B) INTERACTION BETWEEN ADAPTATION AND MITIGATION APPROACHES	79
IV. EVALUATION OF ADAPTATION AND MITIGATION MEASURES IMPLEMENTED ON THE MEDITERRANEAN SEA TO ADDRESS CLIMATE CHANGE IMPACTS FROM A LEGAL PERSPECTIVE	86
A) THE EFFECTIVENESS OF LEGAL INSTRUMENTS IN CLIMATE ACTION	86
1- Maladaptation	87
2- Insufficient Climate Finance	88
3- The Lack of Technological Development	90
4- Implementation Gap	91
5- Acting in Silos	93
B) ACCELERATION OF CLIMATE ACTION THROUGH LEGAL FRAMEWORKS	94
CONCLUSION	98
ACADEMIC SOURCES	101
A) PRIMARY SOURCES	101
1- Convention Based Regimes	101
<i>a) Global Regimes</i>	101
<i>b) Regional Regimes</i>	103
2- National Regimes	103
B) SECONDARY SOURCES	105
1- Doctrine	105
<i>a) Books</i>	105
<i>b) Articles</i>	106
2- Court Decisions	120
3- Reports	120
4- Resolutions	129
5- Others	130
ABSTRACT	136
ÖZET	137

ABBREVIATIONS

Barcelona Convention	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean
BBNJ Agreement	Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction
CBD	United Nations Convention on Biological Diversity
CC/RAC	Regional Activity Centre on Climate Change
COP	Conference of the Parties
Dumping Protocol	Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft
EbA	Ecosystem-based adaptation
GEF	Global Environment Facility
GHG	Greenhouse Gases
Hazardous Waste Protocol	Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal
ICZM Protocol	Protocol on Integrated Coastal Zone Management in the Mediterranean
IMO	International Maritime Organization
INFO/RAC	Information and Communication Regional Activity Centre
IPCC	Intergovernmental Panel on Climate Change

ITLOS	International Tribunal for the Law of the Sea
Kyoto Protocol	Kyoto Protocol to the United Nations Framework Convention on Climate Change
LBS Protocol	Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources
MAP	Mediterranean Action Plan
MedECC	Mediterranean Experts on Climate and Environmental Change
MedWaves	Sustainable Consumption and Production Regional Activity Centre
MPA	Marine Protected Areas
NDCs	Nationally Determined Contributions
Offshore Protocol	Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from the Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil
PAP/RAC	Priority Actions Programme Regional Activity Centre
PB/RAC	Plan Bleu Regional Activity Centre
Prevention and Emergency Protocol	Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea
RACs	Regional Activity Centres
Rio+20	United Nations Conference on Sustainable Development
REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea

SDGs	Sustainable Development Goals
SPA/BD Protocol	Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean
SPA/RAC	Specially Protected Areas Regional Activity Centre
Stockholm Conference	1972 United Nations Conference on the Human Environment
UfM	Union for Mediterranean
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNEP/MAP	United Nations Environmental Programme Mediterranean Action Plan
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
WMO	World Meteorological Organization

LIST OF FIGURES

Figure 1: The Mediterranean Basin	11
Figure 2: The need for climate change adaptation and mitigation	85

INTRODUCTION

Climate change emerges as a central pillar within the triple planetary crisis, its pervasive and far-reaching impacts delineated by the latest reports from the Intergovernmental Panel on Climate Change (hereinafter the ‘IPCC’). The urgency of securing a liveable and sustainable future for all inhabitants of our planet is underscored by the narrowing window of opportunity outlined in these reports. Therefore, there exists an urgent and compelling need to pivot collective focus towards adaptation and mitigation endeavours to engender climate resilience on a global scale.

The Mediterranean region, and especially the Mediterranean Sea, stands as the frontline in the battle against climate change, bearing the brunt of ecological and socioeconomic impacts. Thus, the urgency of addressing climate change in the Mediterranean cannot be overstated. Coordinated action at local, regional, and global scales is imperative to achieve a climate-resilient Mediterranean, integrating adaptation and mitigation strategies tailored to confront escalating risks and vulnerabilities.

In this regard, this study focuses on a critical examination of climate change impacts on the Mediterranean Sea, focusing specifically on the efficacy and legal feasibility of existing adaptation and mitigation strategies within the region. By analysing the ecological and socio-economic consequences of climate change on this vulnerable marine environment, the study aims to provide a comprehensive assessment of current responses while identifying potential pathways for enhancing climate resilience within a robust legal framework.

A) SUBJECT MATTER, AIM AND QUESTIONS

This thesis undertakes a comprehensive analysis and comparative assessment of legal frameworks addressing climate change impacts within the Mediterranean Sea. The research focuses specifically on evaluating adaptation and mitigation strategies as articulated within international environment law and the law of the sea.

The purpose of this thesis is to comprehensively examine the legal consequences of climate change in the Mediterranean Sea. It seeks to understand how climate change has

generated a complex web of legal challenges and opportunities in this region. The primary objective is to analyse evolving international, regional, and national legal frameworks addressing climate-related issues in the Mediterranean Sea. The study also evaluates the effectiveness of adaptation and mitigation measures implemented to address these legal changes, uncovering both their accomplishments and areas for improvement. This study highlights the significance of the critical need to approach climate change as a multifaceted challenge demanding a coordinated legal response.

To achieve this purpose, the thesis addresses several key questions:

- How has climate change emerged as one of the most complex and pressing challenges in Earth's history, and what are the key drivers behind its evolution?
- What are the primary impacts of climate change on the Mediterranean region, particularly on the Mediterranean Sea, and what specific vulnerabilities and challenges are posed to the region's biodiversity, coastal areas, and marine ecosystems?
- What institutional and legal frameworks currently address the impacts of climate change, with a comparative assessment of global and Mediterranean region-specific approaches, and how effectively do these frameworks safeguard the region's vulnerability to climate change?
- What specific adaptation measures have been implemented to address the effects of climate change on the Mediterranean Sea, and what are their legal and practical implications for the protection of the region?
- What mitigation strategies have been employed to counteract the impacts of climate change in the Mediterranean Sea, and how do these strategies contribute to the overall protection and sustainability of the region?
- How can adaptation and mitigation measures be integrated to enhance the resilience and protection of the Mediterranean region, and what legal, policy, and practical challenges are associated with implementing these integrated approaches?

- What lessons can be learned from successful adaptation and mitigation initiatives in the Mediterranean region, and how can these lessons inform future policy decisions, legal frameworks, and practical implementations?

B) SCOPE AND STRUCTURE

Climate change stands as one of the most pressing global challenges of the contemporary era, its far-reaching impacts transcending national borders and profoundly affecting ecosystems, economies, and societies worldwide. The urgent imperative to address climate change has catalysed the proliferation of international agreements, legal frameworks, and policy mechanisms designed to mitigate its effects and foster adaptive capacity. This thesis undertakes a comprehensive exploration of the legal implications arising from climate change within the Mediterranean Sea region. To fully comprehend the multifaceted nature of these implications, the research delves into the historical context, provides an analysis of existing legal frameworks, and critically examines the practical measures implemented to address climate change within this geographically significant area.

The origins of international cooperation to address environmental challenges, including climate change, can be traced back to the mid-20th century, marked by the establishment of key institutions such as the United Nations Environment Programme (hereinafter the 'UNEP') and the pivotal 1972 Stockholm Conference. These early endeavours laid the foundation for fostering the recognition of environmental issues as subjects of international concern. However, it was in the 21st century that the urgency of climate change became undeniable, culminating in landmark agreements like the United Nations Framework Convention on Climate Change (hereinafter the 'UNFCCC').

The thesis recognizes the Mediterranean region as a pivotal area for examining the legal dimensions of climate change. Therefore, it is crucial to comprehend the existing international, regional, and national legal frameworks that govern climate-related issues in this region. This analysis encompasses an examination of the Mediterranean-specific agreements, such as the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (hereinafter the 'Barcelona Convention'), situating

them within the broader framework of international environment law. Furthermore, the research will analyse the role of customary international law in shaping legal responses to climate change in the Mediterranean Sea context.

The core objective of this research is to evaluate the effectiveness of adaptation and mitigation measures implemented in response to climate change in the Mediterranean Sea. This entails a meticulous examination of the adaptation strategies adopted by Mediterranean countries, as well as their efforts to mitigate the effects. It is essential to assess the outcomes of these measures, their successes, limitations, and the potential for improvement. Furthermore, understanding the legal mechanisms through which these measures are implemented and enforced is vital for a comprehensive analysis.

At the outset, this thesis embarks on an extensive exploration of the legal ramifications of climate change in the Mediterranean Sea. By delving into the historical context, elucidating the existing legal frameworks, and scrutinizing the effectiveness of adaptation and mitigation measures, this research aims to provide valuable insights into the complex interplay between climate change and the legal implication to address this complexity in this vital geographical area. This analysis will not only enhance the understanding of the legal challenges posed by climate change but also contribute to the formulation of informed policies and legal strategies to address these challenges effectively.

Climate change and its legal implications in the Mediterranean Sea represent a multifaceted and dynamic area of inquiry that intersects international environment law, law of the sea, and regional governance. This study is driven by the recognition that climate change transcends traditional legal boundaries and necessitates an integrated approach to address the complex challenges it poses. The scope of this thesis is designed to provide a holistic understanding of the legal impact of climate change in the Mediterranean region, focusing on adaptation and mitigation measures.

C) RESEARCH METHODS

This study's primary focus is on the theoretical analysis of legal frameworks, making it a comprehensive review of international agreements and conventions regarding climate change and its impact on the Mediterranean Sea. This encompasses international treaties

such as the UNFCCC, Paris Agreement, and Kyoto Protocol as well as regional conventions like the Barcelona Convention and national legislations within the Mediterranean countries.

This thesis will delve into a range of international, regional, and national legal instruments and frameworks relevant to climate change in the Mediterranean Sea. Primary emphasis will be placed on the examination of international agreements, conventions, and protocols concerning climate change, environmental protection, and maritime governance.

I. CLIMATE CHANGE AND ITS IMPACTS ON THE MEDITERRANEAN SEA

Climate can be defined as “the overall weather conditions and, more specifically, a statistical summary of factors like temperature, humidity, wind, and pressure over a period ranging from months to millions of years”¹. The recommended timeframe for calculating averages is 30 years known as Climatological Standard Normals, according to the World Meteorological Organization (hereinafter the ‘WMO’)². The climate is affected by both the natural variability driven by internal factors like ocean currents and Earth's rotation, and long-lasting changes resulting from external influences outside the climate system³. These external influences can originate from natural phenomena such as solar fluctuations and volcanic activities, as well as human activities. Human activities, particularly the burning of fossil fuels, deforestation, and industrial operations, have augmented the atmospheric concentrations of greenhouse gases (hereinafter the ‘GHG’), mainly carbon dioxide, methane, nitrous oxide and ozone⁴. This has strengthened the natural greenhouse effect and led to modifications within the Earth's climatic system. Due to the activities mentioned above, climate change has become an everyday phenomenon.

¹ World Meteorological Organization, ‘Climate’ (*World Meteorological Organization*, 2024) <<https://wmo.int/topics/climate>> accessed 1 April 2024.

² Omar Baddour and Hama Kontongomde, *The Role of Climatological Normals in a Changing Climate* (World Meteorology Organization, 2007, WMO/TD No. 1377) 1-27 7.

³ Sonia I. Seneviratne and others, ‘Changes in Climate Extremes and their Impacts on the Natural Physical Environment’ in *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, A Special Report of Working Groups I and III of the IPCC (2012) 109-230 125.

⁴ British Geological Survey, ‘The Greenhouse Effect’ <<https://www.bgs.ac.uk/discovering-geology/climate-change/how-does-the-greenhouse-effect-work/>> accessed 1 March 2024.

The United Nations Framework Convention on Climate Change is an international environmental treaty aimed at stabilizing greenhouse gas concentrations in the atmosphere to prevent dangerous anthropogenic interference with the climate system⁵.

The UNFCCC Article 1 defines climate change as:

“... a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

In line with the UNFCCC, climate change is understood to encompass alterations in the global atmospheric composition attributable either directly or indirectly to human endeavours, which amplify the inherent natural variability of the climate across comparable time periods.

Over the years, the global surface temperature has surged, surpassing 1.1°C above pre-industrial levels between 1850 and 1900 by the period of 2011–2020⁶. This warming trend is largely attributed to the relentless increase in global GHGs, which have been unequivocally recognized as the primary drivers of global warming and provide a significant external source of climate change⁷. These emissions stem from various human activities such as unsustainable energy practices, soil use changes, and consumption patterns, perpetuating an alarming trajectory of climate change⁸.

The repercussions of this human-induced climate shift are apparent in various constituents of the Earth's systems, including alterations to the atmosphere, oceanic changes, melting polar ice caps, and widespread disturbances in ecosystems⁹. The resultant shift in weather patterns, alongside the oceanic and ecological alterations, has given rise to an upsurge in extreme weather events and the disruption of longstanding

⁵ The United Nations Framework Convention on Climate Change, 1771 UNTS 107, adopted on 09/05/1992, entered into force on 21/03/1994, <https://treaties.un.org/doc/Treaties/1994/03/19940321%2004-56%20AM/Ch_XXVII_07p.pdf> accessed 10 March 2024. Türkiye has ratified the Convention on 24/05/2024.

⁶ Intergovernmental Panel on Climate Change (IPCC), ‘Climate Change 2023: Synthesis Report: Contribution of Working Groups I, II and III to the Sixth Assessment Report’ (2023)

⁷ Ibid, 2.

⁸ Ibid, 4.

⁹ Ibid, 5.

climatic norms¹⁰. These changes have culminated in a range of adverse outcomes for the natural world and human societies alike. As this global phenomenon unfolds, certain regions are feeling the repercussions more acutely than others.

The Mediterranean Sea and its environs exemplify a region that has been significantly affected by these widespread climatic disruptions¹¹. Past assessments have consistently underscored the region's susceptibility to the impacts of climate change, revealing a persistent trend of warming in both atmospheric and oceanic temperatures, alongside projected shifts in precipitation patterns¹². This collective trajectory of climatic changes, coupled with the region's inherent vulnerability and exposure, has designated it as a striking 'climate change hotspot'¹³. The Mediterranean Basin, with its diverse natural systems and socioeconomic sectors, stands at the forefront of climate-related challenges, facing imminent threats to its ecological integrity and societal resilience¹⁴.

In recent years, climate change has significantly impacted the Mediterranean Basin and, in particular, the Mediterranean Sea¹⁵. The intensified effects of rising temperatures are evident in several challenges to its ecological stability and the welfare of human communities. One particularly worrying consequence is the increase in sea levels, which results from the thermal expansion of seawater as well as the melting of polar ice caps and glaciers¹⁶. Such changes not only heighten coastal erosion and the risk of flooding

¹⁰ Muhammed Adnan and others, 'Weather and Climate Extreme Events in Changing Climate' in *Climate Change 2021: The Physical Science Basis* Working Group I to the Sixth Assessment Report of the IPCC 1513-1766 1522.

¹¹ MedECC, *Mediterranean Experts on Climate and Environmental Change*, 'Climate and Environmental Change in the Mediterranean Basin Current situation and risks for the future' (First Mediterranean Assessment Report, 2022).

¹² Thomas Stocker and others, 'Technical Summary' (2013) *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; Semia Cherif and others, 'Drivers of Change' (2020) *Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report* 59-180.

¹³ Filippo Giorgi, 'Climate Change Hot-Spots' (2006) 33 *Geophysical Research Letters*.

¹⁴ Christopher B. Field and others, 'Technical Summary' in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* 35-94.

¹⁵ Katarzyna Marini, 'Climate and Environmental Change in the Mediterranean- Main Facts' (2020) MedECC <<https://www.medecc.org/climate-and-environmental-change-in-the-mediterranean-main-facts/>> accessed 01/04/2024.

¹⁶ Rebecca Lindsay, 'Climate Change: Global Sea Level' Climate.gov <[https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-](https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level)

this region illustrate the urgency of addressing a phenomenon that, while long in the making, has reached critical junctures in recent history.

A) EVOLUTION OF CLIMATE CHANGE

Climate change represents one of the most urgent global challenges confronting humanity, with origins deeply entrenched in the historical evolution of the Earth. While climate change has occurred as a natural process over millennia, marked by fluctuations in atmospheric composition and environmental conditions, the contemporary phase of climate change is unparalleled in its rapid rates of warming and widespread ecological disruption. This contemporary span can be attributed to the onset of the Industrial Revolution during the late 18th century, a period signifying the commencement of a profound transformation in human civilization²².

The Industrial Revolution ushered in an era of rapid industrialization and urbanization, along with the extensive combustion of fossil fuels²³. Such progress led to a substantial increase in GHG emissions, primarily due to fossil fuel burning, deforestation, and intensified agricultural practices²⁴. This anthropogenic input to GHG concentrations in the atmosphere began to alter the climate, propelling an accelerated evolution of climate change²⁵.

As the 20th century progressed, the rate of climate change hastened, propelled by expanding industrial activities and growing populations²⁶. The resultant shifts in global temperatures, glacial retreat, and extreme weather prevalence heralded the dawn of the Anthropocene as a new geological epoch dominated by human influence on Earth's natural systems²⁷. Cutting-edge scientific research and technological breakthroughs have

²² S. Vijavavenkataraman, S. Inivan and Ranko Goic, 'A Review of Climate Change, Mitigation and Adaptation', (2012), 16 Renewable and Sustainable Energy Reviews 878-897 879.

²³ William F. Ruddiman, 'The Anthropogenic Greenhouse Era Began Thousands of Years Ago' (2003) 61 Climatic Change, 261-293 264.

²⁴ Kara Anderson, 'What was the Industrial Revolution's Environmental Impact?' (*Greenly*, 2024) <<https://greenly.earth/en-us/blog/ecology-news/what-was-the-industrial-revolutions-environmental-impact>> accessed 10 April 2024.

²⁵ Ruddiman, 267.

²⁶ Vijavavenkataraman, Inivan and Goic, 879.

²⁷ Josh Fox, 'Climate Change: Impacts of the Industrial Revolution' (*Landmark Academy*, 4 May 2020) <<https://www.landmarkacademyhub.co.uk/climate-change-impacts-of-the-industrial-revolution/>> accessed 10 April 2024.

since confirmed the significant human impact on climate change, emphasizing the pressing need for coordinated global efforts to mitigate its effects²⁸.

Now, in the 21st century, the trajectory of climate change continues unchecked, with widespread ramifications felt in all corners of the globe. The consensus among scientists, as reported by entities like the IPCC, leaves no room for doubt: human activities are the overriding causes of modern climate change²⁹. The Paris Agreement articulates an objective to limit the escalation of global temperatures to significantly below 2°C in excess of pre-industrial levels, a target that underscores the urgency for immediate and consequential action³⁰. The evidence of climate change is now indisputable and manifests through an array of phenomena³¹.

Looking ahead, the course of climate change will be determined by the collective efforts of the global community. As the implications of climate change escalate, the call for a concerted and unwavering commitment to environmental stewardship becomes louder and more pressing. The steadfast pursuit of cooperation and action across geographical and political boundaries is pivotal in mitigating the impacts of a warming world. Indeed, the observation of climate change dynamics within distinct regions such as the Mediterranean, in conjunction with widespread climatic alterations observed globally, underscores the imperative for a coordinated and comprehensive international response.

B) FUNDAMENTAL IMPACTS OF CLIMATE CHANGE IN THE MEDITERRANEAN SEA

The Mediterranean Sea, a relatively small and semi-enclosed maritime region, features limited circulation with the global ocean, primarily through the Strait of Gibraltar. Links with the Black Sea occur through the Turkish Straits, as well as with the Red Sea through

²⁸ Vijavavenkataraman, Inivan and Goic, 879.

²⁹ Mark Lynas, Benjamin Z Houlton and Simon Perry, 'Greater than 99% consensus on human-caused climate change in the peer-reviewed scientific literature' (2021) 16 Environmental Research Letters

³⁰ United Nations Climate Change, 'The Paris Agreement' <<https://unfccc.int/process-and-meetings/the-paris-agreement>> accessed 10 April 2024.

³¹ Vijavavenkataraman, Inivan and Goic, 879.

the Suez Canal³² (Fig. 1). Covering an area of over 2.5 million square kilometres (km²)³³, the Mediterranean Sea functions as a ‘miniature ocean’³⁴.



Figure 1: The Mediterranean Basin³⁵

Widely regarded as a microcosm of the global ocean, the Mediterranean Sea encapsulates the broader impacts of climate change, making it a critical proxy for understanding similar phenomena on a global scale³⁶. The region is already considered one of the most affected by climate change due to the synergistic interactions with various disturbances³⁷. The delicate balance of this ecosystem is being tested by the rapid and recent climate change, which has increased environmental risks, with even greater impacts foreseen in future scenarios. The Mediterranean's large human population, together with persistent human

³² Manfred A. Lange and others, ‘Introduction’ (2020) *Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report* 41-58 48.

³³ Francisco Pastor, Jose Antonio Valiente and Samiro Khodayar, ‘A Warming Mediterranean: 38 Years of Increasing Sea Surface Temperature’ (2020) 12 *Remote Sensing* 1-16 1.

³⁴ Jean Pierre Bethoux and others, ‘The Mediterranean Sea: A Miniature Ocean for Climatic and Environmental Studies and a Key for the Climatic Functioning of the North Atlantic’ (1999) 44 *Progress in Oceanography* 131–146 133.

³⁵ GRID Arendal, < <https://www.grida.no/resources/5931> > accessed 30 March 2024.

³⁶ Ferdinando Boero, ‘The Future of the Mediterranean Sea Ecosystem: Towards a Different Tomorrow’ (2015) 26 *Sustainable Management of the Mediterranean* 3-12 3.

³⁷ Christophe Lejeune and others, ‘Climate Change Effects on a Miniature Ocean: The Highly Diverse, Highly Impacted Mediterranean Sea’ (2009) 25 4 *Trends in Ecology & Evolution* 250-260 250.

activity, has made it particularly sensitive to changes, resulting in a pronounced impact on the regional scale³⁸. These anthropogenic influences have impacted the Mediterranean environment, including sea surface temperature, leading to a feedback loop as weather and climate changes affect human activities³⁹.

Projections for the 21st century suggest climate change will continue to exarate in the Mediterranean, with significant increases in atmospheric and oceanic temperatures and a surge in extreme weather events, particularly heatwaves⁴⁰. One of the most pressing concerns is the rise in sea levels, anticipated to reach 0.15–0.33 meters by 2050, with higher rates possible under scenarios of heftier emissions⁴¹.

The myriad domains affected by climate change in the Mediterranean underscore the interconnected nature of the climate risks marked by the confluence of multiple climatic stressors and high vulnerability. The cumulative effects of rising temperatures, altered precipitation patterns, and sea-level rise challenge the region's ecological integrity, socio-economic stability, and human well-being. These climate-related threats penetrate diverse sectors, demanding adaptive governance and collaborative actions to effectively mitigate climate change's impacts on this pivotal region.

In the middle of the geographical regions affected by climate change, the Mediterranean Sea stands as one of the most significantly impacted, with repercussions on marine biodiversity, oceanic dynamics, and coastal environments. Temperature increases lead to transformative shifts in the sea, with far-reaching effects on its marine biodiversity and the dynamics of coastal ecosystems. As the waters warm, established patterns of marine

³⁸ Elham Ali and others, 'Cross Chapter Paper 4: Mediterranean Region' (2022) *Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 2233-2272 2235.*

³⁹ Pastor, Valiente and Khodayar, 4.

⁴⁰ Elham Ali and others, 'Cross Chapter Paper 4: Mediterranean Region' (2022) *Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 2233-2272 2235.*

⁴¹ Gaia Galassi and Giorgio Spada, 'Future Sea-Level Rise in the Mediterranean Sea' (2014) 16 *Geophysical Research Abstracts.*

species distribution and migratory habits undergo alterations, resulting in substantial changes to the composition and dynamics of marine ecosystems.

These climatic alterations are not merely ecological concerns; they have significant socio-economic repercussions as well. There are communities whose livelihoods depend on fisheries. As marine habitats transition, the health of the ecosystems that support tourism and local economies transition as well, negatively impacting the marine communities. Rising temperatures and sea levels, compounded by increasing occurrences of extreme weather, will continue to have profound effects on the built infrastructure, agriculture, and overall human welfare across the Mediterranean region.

The intricate interplay of these climate processes within the Mediterranean provides essential insights into the broader consequences of global climate change. As a hotspot for climate change, this region serves as a critical indicator of the transformations taking place on a larger scale. The synthesized literature points toward the need for comprehensive, integrated, and adaptive management approaches that incorporate ecological, socio-economic, and governance perspectives. To highlight the importance, this section will examine the paramount impacts of climate change in the Mediterranean Sea, addressing both ecological and socio-economic ramifications.

1- Socio-Economic Impacts of Climate Change

Climate change elicits profound socio-economic impacts within the Mediterranean, laying siege to key sectors foundational to the region's well-being. Agricultural, fisheries, forestry, and tourism industries, each deeply interwoven with the area's natural resources, face increased susceptibility to climatic shifts. These sectors, pivotal to the region's socio-economic fabric, rely on the stability of ecosystems and the continued provision of services by the Mediterranean environment. The anticipated disruptions due to climatic volatility threaten socio-economic frameworks, challenging the region's resilience and adaptive capacity.

In addition to water scarcity and agricultural stresses, the region faces augmented pressures from burgeoning human populations concentrated along the coastlines. Rapid urbanization and development alter land use and elevate the demand for dwindling natural

resources, thereby intensifying competition among water, food, and energy sectors. The situation is compounded by socio-economic disparities within and between countries in the region, with varying capacities for adaptation and resilience.

The scope of socio-economic analyses should be expanded to include valuation studies of ecosystem services, ensuring that the full economic costs of biodiversity loss and ecosystem degradation are recognized and appropriately addressed in climate change adaptation and mitigation policies.

a) Agricultural Industry

Shifts in climatic parameters, including temperature, precipitation, and water availability, constitute formidable challenges within the agricultural domain⁴². Even though the effect of weather and climate change on the agricultural industry is not a brand-new consequence of being evaluated⁴³, for the last ten years, the effects of climate change on the agricultural industry have been accepted as one of the most important concerns by the states. As the sector contends with potential yield declines, soil fertility reduction, and perturbed agricultural productivity, the implications for food security and rural economies become increasingly palpable⁴⁴. Altered cropping cycles, along with the evolution of pest and disease prevalence, exacerbate existing socio-economic stresses, necessitating increased reliance upon technological interventions and external agricultural inputs⁴⁵.

b) Fisheries Industry

The fisheries sector grapples with the ramifications of altered marine biodiversity and changing oceanic conditions⁴⁶. Temperature increases and ocean acidification precipitate uncertain outcomes for fish populations, with potential declines in productivity and shifts

⁴² Ashok Mishra, Ellen Bruno and David Zilberman, 'Compound Natural and Human Disasters: Managing Drought and COVID-19 to Sustain Global Agriculture and Food Sectors' (2021) 754 *Science of the Total Environment* 1-6 2.

⁴³ See: 'Dust Bowl' <https://tr.wikipedia.org/wiki/Dust_Bowl> accessed 30 May 2024.

⁴⁴ Ibid, 4.

⁴⁵ Ibid, 5.

⁴⁶ Erin Spencer, 'How Does Climate Change Affect Fisheries?' (*Ocean Conservancy*, 27 October 2023)

in species distribution⁴⁷. The introduction of invasive marine species and the occurrence of harmful algal blooms impose added burdens on fisheries, with repercussions for market dynamics, livelihoods, and community dependence on marine-derived nourishment⁴⁸.

c) Forestry Industry

Forestry, integral to the environmental and socio-economic landscape of the Mediterranean, is another sector under duress⁴⁹. Projections indicate a rise in the frequency and severity of wildfires, with the possibility of forest areas afflicted by fire potentially doubling should global warming reach a 3°C scenario, emphasizing the severity of this peril⁵⁰. Such devastation not only incurs economic and environmental costs but also disrupts the social fabric, highlighting the sector's role in carbon dynamics, watershed management, and biodiversity support⁵¹. Thus, the preservation and sustainable exploitation of forest resources emerge as vital imperatives for bolstering climate resilience and ensuring sustainable development in the region.

d) Tourism Industry

Tourism, a flourishing sector buoying the Mediterranean economies, is predicated on the allure and integrity of natural and cultural attractions⁵². As climate pressures intensify, tourism infrastructure and destinations may suffer from degradation of coastal zones, shifts in climate amenable to tourism activities, and the resultant spatial and temporal realignments in tourist flows⁵³. This sector's vulnerability to climate vagaries demands

⁴⁷ Edward H. Allison and others, 'Vulnerability of National Economies to the Impacts of Climate Change on Fisheries' (2009) 10 *Fish and Fisheries* 173-196 176.

⁴⁸ T. Daw and others, 'Climate Change and Capture Fisheries: Potential Impacts, Adaptation and Mitigation' in Kevern Cochrane and others (eds.) 'Climate Change Implications for Fisheries and Aquaculture' (*Food and Agriculture Organization of the United Nations*, 2009).

⁴⁹ Dieter H.F. Schoene and Pierre Y. Bernier, 'Adapting Forestry and Forests to Climate Change: A Challenge to Change the Paradigm' (2012) 24 *Forest Policy and Economics* 12-19 12.

⁵⁰ Shiv Bolan and others, 'Impacts of Climate Change on the Fate of Contaminants Through Extreme Weather Event' (2024) 909 *Science of the Total Environment* 1-22 6.

⁵¹ UNDP, 'Forests Can Help Us Limit Climate Change- Here is How' (UNDP Climate Promise, 25 October 2023) <<https://climatepromise.undp.org/news-and-stories/forests-can-help-us-limit-climate-change-here-how>> accessed 10 March 2024.

⁵² Daniel Scott, Stefan Gössling and C. Micheal Hall, 'International Tourism and Climate Change' (2012) *Wiley Interdisciplinary Reviews: Climate Change* 1-21 6.

⁵³ UNWTO, 'Climate Action in the Tourism Sector: An Overview of Methodologies and tools to Measure Greenhouse Gas Emissions' (2023) <<https://www.e-unwto.org/doi/10.18111/9789284423927>> accessed 10 March 2024.

adaptive strategies to ensure continuity of the economic benefits while safeguarding environmental assets⁵⁴.

2- Ecological Impacts of Climate Change

Climate-induced alterations within the Mediterranean Basin reveal a critical vulnerability of the region's ecological systems. Pervasive alterations in temperature and precipitation patterns, coupled with the increasing frequency and magnitude of extreme weather events, contribute to the multifaceted ecological impacts of climate change across terrestrial and marine environments.

a) Hydrological Shifts

Hydrological shifts manifest through heightened variability in rainfall and evapotranspiration, leading to considerable fluctuations in river flow regimes with reductions reported between 5% and 70%⁵⁵. This pronounced variability is likely to result in alternating periods of drought and flooding, with significant implications for ecosystem services, water supply for human consumption, agriculture, and electricity generation reliant on hydropower⁵⁶. The duality of scarcity and excess poses severe challenges to existing water infrastructure and necessitates an urgent reassessment of water management and conservation strategies⁵⁷.

b) Agricultural Systems

Agricultural systems in the Mediterranean are particularly at risk, with climate models predicting acute declines in yield for rain-fed crops due to shifts in climate variables. Projected yield losses may reach up to 64% in specific localities, intensifying food

⁵⁴UN Tourism, 'Transforming Tourism for Climate Action' <<https://www.unwto.org/sustainable-development/climate-action>> accessed 10 March 2024.

⁵⁵ Hui Zhang and others, 'Recent Climate Change Has Driven Divergent Hydrological Shifts in High-Latitude Peatlands' (2022) 13 Nature Communications 1-7 2.

⁵⁶ Xander Wang and Lirong Liu, 'The Impacts of Climate Change on the Hydrological Cycle and Water Resource Management' (2023) 15 Water 1-4 2.

⁵⁷Martina Angela Caretta and others, 'Water' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 551-712 700.

security concerns, and potentially leading to increased reliance on imported foodstuffs⁵⁸. These agricultural impacts resonate throughout the food production chain, affecting not only the availability and pricing of food but also the socio-economic stability of communities engaged in farming⁵⁹.

c) Terrestrial Ecosystems

The influence of climate change on terrestrial ecosystems presents yet another dimension of concern, with a likely increase in the prevalence of forest fires, shifts in species range, and the introduction of new pests and diseases that can thrive under altered climatic conditions⁶⁰. These disturbances can lead to a loss of forest cover, with subsequent effects on carbon storage and habitat availability, further exacerbating the vulnerability of terrestrial ecosystems⁶¹.

d) Coastal Ecosystems

The repercussions of sea-level rise amplify the challenges faced along Mediterranean coasts⁶². Coastal erosion, salinization of freshwater aquifers, and habitat destruction are prevalent concerns. Wetland areas, critical for biodiversity and natural flood defenses, are particularly susceptible, facing reductions in area and degradation of ecological functions⁶³. Saltwater intrusion exerts adverse impacts on soil quality and agricultural productivity in coastal plains, like estuaries, deltas, and coastal lagoons⁶⁴, while erosion and habitat loss infringe upon the biodiversity of coastal and marine ecosystems, like

⁵⁸ Rachel Bezner Kerr and others, 'Food, Fibre and Other Ecosystem Products' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 713-906 725.

⁵⁹ Ibid, 801.

⁶⁰ Camille Parmesan and others, 'Terrestrial and Freshwater Ecosystems and Their Services' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 197-377 216.

⁶¹ Ibid, 243.

⁶² Sarah L. Cooley and others, 'Oceans and Coastal Ecosystems and Their Services' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 379-550 393.

⁶³ Ibid, 393-394.

⁶⁴ Ibid, 420-421.

warm-water coral reefs, rocky shores, kelp ecosystems⁶⁵, with cascading effects on local economies and tourism.

e) Marine Ecosystems

The Mediterranean Sea's unique biodiversity, characterized by a high degree of endemism, stands at the forefront of climate-induced ecological stresses⁶⁶. The marine ecosystems of the Mediterranean are under increasing pressure due to the multifarious effects of climate change, such as ocean acidifications, ocean warming and sea level rise and changes in the marine biodiversity, which are evident across various ecological and environmental parameters. The ramifications of these changes are profound, touching upon every aspect of marine life and extending to the socio-economic fabric of communities dependent on these waters.

Ocean warming is a direct consequence of climate change, with sea-water temperatures in the Mediterranean climbing at an alarming rate⁶⁷. Rising sea levels are an iconic indicator of climate change. Sea-level rise engenders multiple hazards for the low-elevation zones within the Mediterranean Basin. This phenomenon threatens to submerge coastal habitats, such as marshes, lagoons, and estuaries, that serve as essential breeding and feeding grounds for a diverse array of species⁶⁸. The Mediterranean Sea's unique geography means that it is particularly sensitive to alterations in precipitation and evaporation patterns, which, in turn, impact salinity levels and water circulation⁶⁹. Coastal erosion, saltwater intrusion into freshwater systems, and the loss of critical buffer zones caused by the sea-level rise exacerbate the vulnerability of both biological communities and human settlements⁷⁰.

⁶⁵ Ibid, 410-419.

⁶⁶ Mohammed Merhed and others, 'Hydrological Response Characteristics of Mediterranean Catchments at Different Time Scales: A Meta-Analysis' (2016) 61 14 *Hydrological Science Journal* 2520-2539 2522.

⁶⁷ Thomas Lacoue-Labarthe and others, 'Impacts of Ocean Acidification in a Warming Mediterranean Sea: An Overview' (2016) *Regional Studies in Marine Sciences* 1-39 5.

⁶⁸ Elham Ali and others, 'Cross Chapter Paper 4: Mediterranean Region' (2022) *Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 2233-2272 2245.*

⁶⁹ Mohammed Merhed and others, 12.

⁷⁰ Ibid, 2246.

The elevation in temperature and sea-level rise disrupts the balance of marine ecosystems, leading to species migration, changes in reproductive timings, and a decrease in species diversity⁷¹.

Such changes are anticipated to have broad implications for primary productivity, species distribution, and the functioning of the entire marine ecosystem. Inundation and habitat displacement can lead to changes in species' spatial distribution, sometimes introducing new competitive dynamics or reducing the resilience of certain populations to other environmental stressors⁷². For instance, modified circulation patterns can cause shifts in the location of spawning grounds and the availability of food for economically important fish species, potentially leading to changes in fisheries productivity and the potential collapse of certain fish stocks⁷³. Furthermore, the coral reefs, pivotal in supporting marine biodiversity, undergo severe stress leading to bleaching, a process that can result in extensive die-off and loss of habitat for numerous marine organisms⁷⁴. Finally, endemic marine species within the Mediterranean Sea are confronted with an escalated risk of extinction owing to constrained opportunities for northward migration as a countermeasure to the warming of marine waters⁷⁵.

Ocean acidification is a less visible however has equally insidious effect of climate change in the Mediterranean Sea⁷⁶. The oceans' absorption of excess atmospheric carbon dioxide disrupts the water's chemical equilibrium, reducing the pH levels and resulting in a more acidic environment⁷⁷. The critical life processes of calcareous organisms, such as shellfish and coral reefs, are hindered as the availability of carbonate

⁷¹ Ewan Tregarot and others, 'Effects of Climate Change on Marine Coastal Ecosystems- A Review to Guide Research and Management' (2024) 289 *Biological Conservation* 1-22 13-15.

⁷² Marcel Holyoak and Sacha K. Heath, 'The Integration of Climate Change, Spatial Dynamics, and Habitat Fragmentation: A conceptual Overview' (2016) 11 1 *Integrative Zoology* 40-59 42.

⁷³ Food and Agriculture Organization of the United Nations, 'Impacts of Climate Change on Fisheries and Aquaculture' (2018) <<https://openknowledge.fao.org/server/api/core/bitstreams/9aeb8ade-a623-4954-8adf-204daae3b5de/content>> accessed 15 March 2024.

⁷⁴ Morgan S. Pratchett and others, 'Effects of Coral Bleaching and Coral Loss on the Structure and Function of Reef Fish Assemblages' in Madaleine J. H. Van Oppen and Janice M. Lough (eds.) *Coral Bleaching: Patterns, Processes, Causes and Consequences* (Springer, 2018).

⁷⁵ Frida Ben Rais Lasram and others, 'The Mediterranean Sea as a 'cul-de-sac' for Endemic Fishes Facing Climate Change' (2011) 16 12 *Global Change Biology* 3233-3245 3236.

⁷⁶ Abed El Rahman Hassoun and others, 'Ocean Acidification Research in the Mediterranean Sea: Trends and Next Steps' (2022) 9 *Frontiers in Marine Sciences* 1-28 2.

⁷⁷ *Ibid*, 7-8.

ions required to form their skeletons and shells diminishes⁷⁸. This chemical shift not only threatens individual species but can lead to a broader ecological imbalance with potential ripple effects throughout the food web⁷⁹.

II. LEGAL AND INSTITUTIONAL FRAMEWORK ON CLIMATE CHANGE

In the aftermath of a series of environmental calamities, global attention consolidated around concerns about the natural environment. Some governments advocated for an enlargement of the United Nations' (hereinafter the 'UN') endeavours in the environmental field⁸⁰. Such deliberations culminated in the 1972 United Nations Conference on the Human Environment (hereinafter the 'Stockholm Conference'). The Stockholm Conference illustrated the feasibility of environmental and sustainable development cooperation where there is leadership and when the voices of all interested parties are considered⁸¹. The Stockholm Conference yielded three principal decision sets that highlighted the imperative of integrating developmental aims with environmental considerations⁸². Subsequent to the Stockholm Conference, the UN General Assembly agreed on the establishment of the United Nations Environmental Programme, engendering a novel span of multilateral environmental collaboration and treaty formulation⁸³. In this regard, the Stockholm Conference holds a pivotal role in the legal and institutional framework of climate change. One of the most important legacies of the

⁷⁸ Ibid, 12.

⁷⁹ Lacoue-Labarthe and others, 9-14.

⁸⁰ Pamela Chasek, 'Stockholm and the Birth of Environmental Diplomacy' (2020) International Institute for Sustainable Development Earth Negotiations Bulletin 2, <https://www.iisd.org/system/files/2020-09/still-one-earth-stockholm-diplomacy_0.pdf?q=sites/default/files/2020-09/still-one-earth-stockholm-diplomacy_0.pdf> accessed 10 March 2024.

⁸¹ Chasek, (2020) 5.

⁸² United Nations General Assembly Resolution 2995 (XXVII), <<https://documents.un.org/doc/resolution/gen/nr0/270/25/pdf/nr027025.pdf?token=3MNrgEmmjpZudTw7k9&fe=true>> accessed 10 March 2024.

⁸³ United Nations General Assembly Resolution 2997 (XXVII), <<https://documents.un.org/doc/resolution/gen/nr0/270/27/pdf/nr027027.pdf?token=IXEbiHJgm5zuvNgUva&fe=true>> accessed 10 March 2024.

Stockholm Conference is the 1992 Earth Summit in Rio de Janeiro, which resulted to the formation of the UNFCCC⁸⁴.

Climate change, with its universal reach and multifaceted impacts on the environment, has prompted the establishment of numerous multilateral agreements, serving as the cornerstone for collaborative international climate action⁸⁵. These agreements are methodically designed to tackle both the imperatives of adapting to the ramifications of climate change and of mitigating its foundational causes. Moreover, these agreements also influence over the Mediterranean region, reflecting the diverse concerns and interests of its member states.

The primary multilateral framework governing global climate efforts is the United Nations Framework Convention on Climate Change, which aims to stabilize greenhouse gas concentrations and prevent dangerous human-induced perturbations within the climatic system. Under the auspices of the UNFCCC, a series of consequential agreements, such as the Kyoto Protocol and the Paris Agreement, have set binding targets for GHG emissions reductions and outlined mechanisms for international cooperation.

The Mediterranean region is also a party to region-specific initiatives, like the United Nations Environmental Programme Mediterranean Action Plan (hereinafter the 'UNEP/MAP') and the Convention on the Protection of the Marine Environment and the Coastal Region of the Mediterranean, which focus on combatting pollution and promoting sustainability in the marine environment. These frameworks underscore the unique regional concerns, encapsulating commitments to preserve the delicate balance of the Mediterranean's ecosystems while facilitating climate adaptation and mitigation.

An in-depth analysis of each agreement and its bearing on the Mediterranean region reveals the need for a nuanced method to align international directives with regional imperatives, a critical balancing endeavour for the attainment of effective climate

⁸⁴ Pamela Chasek, 'The Legacies of the Stockholm Conference' (2022) International Institute for Sustainable Development Earth Negotiations Bulletin 40 <<https://www.iisd.org/system/files/2022-05/still-one-earth-conference-legacy.pdf>> accessed 10 March 2024.

⁸⁵ Eloise Scotford, Stephen Minas and Andrew Macintosh, (2017) 'Climate Change and National Laws across Commonwealth Countries' 43 (3-4) Commonwealth Law Bulletin 318-361 357.

governance. Consequently, this section of the thesis will scrutinize the legal and institutional framework on climate change from a broad viewpoint as well as from the vantage point specific to the Mediterranean.

A) GENERAL OVERVIEW

The intricate mosaic of climate change governance is established through a consortium of international treaties and agreements, which collectively construct a comprehensive approach to climate change adaptation and mitigation at global and regional levels. International frameworks delineate national strategies towards climate change.

In this context, the United Nations Framework Convention on Climate Change and its subsidiary agreements, alongside the resolutions of the Convention's Conference of the Parties, are ultimate elements of this international governance structure⁸⁶. Additionally, other global accords, such as the Sendai Framework for Disaster Risk Reduction and the UN Agenda 2030 for Sustainable Development Goals, exert substantial influence on the processes of national policy-making in relation to adaptation and risk management.

1- Legal Framework on Climate Change

a) *United Nations Convention on the Law of the Sea*

The United Nations Convention on the Law of the Sea (hereinafter the 'UNCLOS')⁸⁷, which came into force on November 16, 1994, operates as a "constitution for the oceans", offering a wide-reaching legal framework that governs the use of the world's seas and oceans, delineates maritime zones, and facilitates international cooperation for the conservation and sustainable utilization of the marine environment⁸⁸.

⁸⁶ Eloise Scotford, Stephen Minas and Andrew Macintosh, (2017) 'Climate Change and National Laws across Commonwealth Countries' 43 (3-4) Commonwealth Law Bulletin 318-361 322.

⁸⁷ United Nations Convention on the Law of the Sea, opened for signature on 10 December 1982, entered into force on 16 November 1994, 1833 UNTS, <https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf> accessed 22 April 2024. Türkiye is not a party to UNCLOS.

⁸⁸ Tullio Treves, 'United Nations Convention on the Law of the Sea' (2008) United Nations Audiovisual Library of International Law 1-6 1.<https://legal.un.org/avl/pdf/ha/uncls/uncls_e.pdf> accessed 1 June 2024.

UNCLOS's overarching objectives are multifaceted. They include establishing a legal order to promote peaceful uses of the seas, equitable and efficient utilization of their resources, the conservation of living resources, and the protection of the marine environment⁸⁹. To these ends, UNCLOS codifies the basic principles necessary to guide states in the responsible stewardship of marine ecosystems.

Climate change, a result of human activities primarily driven by GHG emissions, has a profound impact on the oceans. This impact is evident in the form of rising sea levels, warming of ocean waters, and ocean acidification, all of which pose a threat to marine biodiversity and the integrity of marine habitats. UNCLOS's environmental framework is of paramount importance in addressing these climate-related changes⁹⁰. It contains crucial provisions that outline the obligations of states to preserve and protect the marine environment, thereby providing pathways to mitigate adverse effects and adapt to climate change impacts⁹¹.

Notably, Part XII of UNCLOS specifically addresses environmental concerns, mandating states to adopt laws and measures to prevent, reduce, and control pollution of the marine environment⁹². Given the exacerbation of these issues by the implications of climate change, UNCLOS represents an important legal instrument for fostering marine protection and sustainability⁹³. The increasing frequency and severity of climate disasters, as defined by the IPCC, also challenge UNCLOS signatories to reevaluate their commitments to marine environmental protection⁹⁴.

In this light, The International Tribunal for the Law of the Sea (hereinafter the 'ITLOS'), constituted under the UNCLOS, occupies a pivotal position within the evolving climate

⁸⁹ Ibid, 3.

⁹⁰ Bastiaan Ewoud Klerk, 'Climate Change Obligations under the Law of the Sea: Interpreting UNCLOS in light of the Paris Agreement' (2021) University of Oslo Faculty of Law 1-54 21.

⁹¹ Ibid, 28.

⁹² Ibid, 26.

⁹³ Bleueen Guilloux and Romain Schumm, 'Which International Law for Ocean and Climate?' (2017) Ocean & Climate Platform Scientific Note 79-88 81 <<https://ocean-climate.org/wp-content/uploads/2020/01/13.-The-International-laws-for-Ocean-and-Climate-scientific-fact-sheets-2019.pdf>> accessed 1 June 2024.

⁹⁴ Nilüfer Oral, 'UNCLOS and Sea Level Rise' (2023) 149 Marine Policy 1-7 1.

change discourse⁹⁵. As the principal judicial body for interpreting and applying UNCLOS, ITLOS possesses the potential to significantly shape international legal norms and obligations concerning climate change and its impact on marine environments while offering critical insights and directions for enhancing UNCLOS's capacity to respond effectively to climate-related challenges⁹⁶.

Underscoring this potential, on 21 May 2024, ITLOS delivered a highly anticipated advisory opinion on climate change and international law⁹⁷. This landmark opinion concluded that UNCLOS State parties bear specific obligations to mitigate climate change's adverse effects on the marine environment, encompassing the prevention, reduction, and control of GHG emissions⁹⁸. Notably, this marks the first instance of an international judicial body explicitly addressing State obligations to combat climate change within the framework of UNCLOS⁹⁹.

The advisory opinion provides a critical analysis of several key issues, including the interplay between UNCLOS and the global climate change regime and the specific obligations of States in mitigating climate-damaging GHG emissions¹⁰⁰. Significantly, ITLOS determined that "States Parties to the Convention have specific obligations under Article 194 of UNCLOS to take all necessary measures to prevent, reduce, and control marine pollution from anthropogenic GHG emissions and to endeavour to harmonize their policies in this connection."¹⁰¹ Furthermore, the Tribunal emphasized the "stringent"

⁹⁵ Armando Rocha, 'A Small but Important Step: A Bird's-Eye View of the ITLOS' Advisory Opinion on Climate Change and International Law' (*Climate Law A Sabin Center Blog*, 2024) <<https://blogs.law.columbia.edu/climatechange/2024/05/27/a-small-but-important-step-a-birds-eye-view-of-the-itlos-advisory-opinion-on-climate-change-and-international-law/>> accessed 1 June 2024.

⁹⁶ Klerk, 46.

⁹⁷ ITLOS Advisory Opinion, 'Request For an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law' (21 May 2024) Case No:31 <https://www.itlos.org/fileadmin/itlos/documents/cases/31/Advisory_Opinion/C31_Adv_Op_21.05.2024_orig.pdf> accessed 1 June 2024.

⁹⁸ Jacqueline Peel, 'Unlocking UNCLOS: How the ITLOS Advisory Opinion Delivers a Holistic Vision of Climate-relevant International Law', (*VerfBlog*, 2024) 1-5 1 <<https://verfassungsblog.de/unlocking-unclos/>> accessed 1 June 2024.

⁹⁹ Korey Silverman-Roati and Maxim Bönnemann, 'The ITLOS Advisory Opinion on Climate Change: An Introduction into the Joint Blog Symposium' (*VerfBlog*, 2024) 1-5 1 <<https://verfassungsblog.de/the-itlos-advisory-opinion-on-climate-change/>> accessed 1 June 2024.

¹⁰⁰ *Ibid*, 3.

¹⁰¹ Paragraph 258 of ITLOS Advisory Opinion.

due diligence standard imposed upon States under Article 194, paragraph 1, of UNCLOS¹⁰².

While the ITLOS advisory opinion is not legally binding, nor does it assign liability to any specific State, it provides crucial clarification regarding the scope of obligations incumbent upon UNCLOS State parties in addressing climate change¹⁰³. States are obligated to undertake all necessary measures to mitigate marine pollution attributable to climate change, including the implementation of environmental impact assessments to monitor both public and private activities. Failure to fulfil these obligations exposes States to potential future proceedings under UNCLOS¹⁰⁴.

The interplay between UNCLOS and climate change issues underscores the dynamic nature of international law. It ought to evolve to confront emerging global challenges. Through the continued development and interpretation of its provisions, UNCLOS will remain a cornerstone in shaping the legal responses necessary to ensure the resilience and sustainability of our global ocean ecosystems in an era of unprecedented environmental change. As states and international bodies grapple with the legal and practical implications of climate-induced changes to the marine environment, UNCLOS provides a foundational framework to guide these efforts, inviting all stakeholders to be part of this process.

UNCLOS's prospective role in climate change is not only evident in the mitigation of marine environment degradation but also in bolstering adaptation strategies. For instance, the predicted rise in sea levels will have profound implications for maritime boundaries and zones established under the Convention¹⁰⁵. Countries will need to navigate these changes in accordance with the legal principles set out by UNCLOS, potentially leading to the redefinition of baselines, exclusive economic zones, and continental shelves in a

¹⁰² Paragraph 256 of ITLOS Advisory Opinion.

¹⁰³ Peel, 4.

¹⁰⁴ Ibid, 5.

¹⁰⁵ Oral, (2023), 4.

manner that is consistent with both the legal framework of UNCLOS and the realities imposed by climate change¹⁰⁶.

Despite the current provisions, the application of UNCLOS to climate change-related phenomena is an area ripe for development¹⁰⁷. Questions about its scope and enforcement mechanisms persist, particularly concerning transboundary harm, the obligation to conduct environmental impact assessments, and the precautionary principle. Likewise, climate change's impact on the sustainability of Small Island Developing States and coastal nations creates additional imperatives for the international community under UNCLOS to provide support and protection¹⁰⁸.

The burgeoning interconnectedness of climate change and maritime law underscores the need for a comprehensive legal framework capable of addressing the emerging challenges facing our oceans. In this context, the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (hereinafter the 'BBNJ Agreement')¹⁰⁹, represents a significant step towards strengthening the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. While the BBNJ Agreement primarily focuses on biodiversity conservation, its provisions on area-based management tools, environmental impact assessments, and marine genetic resources have clear and important linkages to climate change mitigation and adaptation¹¹⁰.

For instance, the establishment of marine protected areas, facilitated by the BBNJ Agreement, can contribute to climate change mitigation by safeguarding carbon sinks and

¹⁰⁶ Ibid, 4.

¹⁰⁷ Oral, (2023), 2.

¹⁰⁸ Donald R. Rothwell, 'Climate Change, Small Island States, and the Law of the Sea: The ITLOS Advisory Opinion Request' (2023) 27 *5 Insights* 1-6 1.

¹⁰⁹ The Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction, opened for signature on 20 July 2023, <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-10&chapter=21&clang=_en> accessed 1 June 2024.

¹¹⁰ Kirsty McQuaid and others, 'Addressing the Ocean-Climate Nexus in the BBNJ Agreement: Strategic Environmental Assessments, Human Rights and Equity in Ocean Science' (2023) 38 *The International Journal of Marine and Coastal Law* 447-479 449.

enhancing ecosystem resilience¹¹¹. Similarly, robust environmental impact assessments, as mandated by the Agreement, can help minimize the environmental footprint of activities in areas beyond national jurisdiction, contributing to broader climate change mitigation efforts¹¹².

The BBNJ Agreement, therefore, complements and strengthens the existing framework provided by UNCLOS, particularly in light of the ITLOS advisory opinion. As climate change continues to push the boundaries of traditional international maritime law, the symbiotic relationship between UNCLOS and climate action warrants dedicated attention and, potentially, future amendments or protocols to better equip it to address the far-reaching implications of the climate crisis on our oceans.

In summary, the relationship between UNCLOS and climate change highlights the necessity of robust legal frameworks to adapt and guide global and regional efforts in preserving the marine environment while grappling with the multifaceted challenges posed by a warming planet. It underscores the need for an integrated approach, where ocean governance and climate change mitigation and adaptation strategies work in tandem to ensure a sustainable future for our shared oceans.

b) United Nations Convention on Biological Diversity

The United Nations Convention on Biological Diversity¹¹³ (hereinafter the ‘CBD’) can be stated as an indispensable multilateral framework that recognizes the profound interconnection between biodiversity and climate change¹¹⁴. Adopted at the Earth Summit in Rio de Janeiro in 1992 and entering into force on December 29, 1993, the CBD is a pivotal agreement with the primary objectives of conserving biological diversity,

¹¹¹ Saiful Karim and William W. L. Cheung, ‘The New UN High Seas Biodiversity Agreement May Also Facilitate Climate Action: A Cautiously Optimistic View’ (2024) 3 NPJ Climate Action 1-3 1.

¹¹² McQuaid and others, 453.

¹¹³ The United Nations Convention on Biological Diversity, 1760 UNTS 79, adopted on 05/06/1992, entered into force on 29/12/1993, <https://treaties.un.org/doc/treaties/1992/06/19920605%2008-44%20pm/ch_xxvii_08p.pdf> accessed 10 March 2024. Türkiye has been a party to the Convention since 15/05/1997.

¹¹⁴ Secretariat of the Convention on Biological Diversity (2009). Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Montreal, Technical Series No. 41.

promoting the sustainable use of its components, and fostering the equitable sharing of benefits arising from the utilization of genetic resources.

The preservation of biodiversity is intrinsically linked to climate change mitigation and adaptation strategies. Ecosystems play a key role in regulating the climate—healthy forests, oceans, and other ecosystems act as carbon sinks, absorbing and storing carbon dioxide, thereby mitigating greenhouse gas concentrations in the atmosphere¹¹⁵. Conversely, the loss of biodiversity can exacerbate climate change, as diminished ecosystems have a reduced capacity to act as carbon sinks and can even become carbon sources when they are degraded or destroyed.

Moreover, the CBD advances adaptation to climate change by emphasizing the conservation and sustainable management of ecosystems to enhance their resilience. Protecting and restoring biodiversity helps ecosystems adapt to climate-induced changes, ensuring they can continue to provide essential services to human societies, such as food security, protection from natural disasters, and clean water. The CBD also addresses the need for integrating biodiversity considerations into climate change-related activities and policies. This includes promoting climate-smart planning and cross-sectoral approaches that take into account the effects of climate change on biodiversity, and vice versa. The intimate connection between the two agendas highlights the necessity of a cohesive approach where climate change and biodiversity initiatives mutually reinforce each other, creating synergies that maximize benefits and efficiencies.

The CBD established a critical framework for biodiversity preservation with the Aichi Biodiversity Targets, which are instrumental in combating climate change. The Aichi Biodiversity Targets were adopted in 2010 at the 10th Conference of the Parties in Nagoya, Aichi Prefecture, Japan¹¹⁶. These 20 targets aimed to significantly reduce

¹¹⁵ Climate Adapt, “Connecting biodiversity and climate change mitigation and adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change” <<https://climate-adapt.eea.europa.eu/en/metadata/publications/connecting-biodiversity-and-climate-change-mitigation-and-adaptation-report-of-the-second-ad-hoc-technical-expert-group-on-biodiversity-and-climate-change>> accessed 20 April 2024.

¹¹⁶ UNEP/CBD/COP10/9, 18 July 2010, ‘Revised and Updated Strategic Plan: Technical Rationale and Suggested Milestones and Indicators’ <<https://www.cbd.int/doc/meetings/cop/cop-10/official/cop-10-09-en.pdf>> accessed 20 April 2024.

biodiversity loss by 2020, recognizing the vital role of healthy ecosystems in carbon storage and regulating the Earth's climate, thus underscoring the deep interconnection between biodiversity and climate change.

As the timeline for the Aichi Targets expired with mixed progress, the Parties to the CBD gathered in 2021 and again in 2022 for the 15th Conference of the Parties, held in two parts in Kunming, China, and Montreal, Canada, to chart the future course of global biodiversity action giving rise to the Kunming-Montreal Global Biodiversity Framework¹¹⁷. This framework is the successor to the Aichi Targets, setting a new series of goals and targets for the protection, restoration, and sustainable management of biodiversity.

c) United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change¹¹⁸ stands as a cornerstone of intergovernmental climate policy and an underlying element in the advancement of climate-related laws and regulations. Established in response to mounting scientific evidence of climate change caused by humankind and its potentially disastrous implications, the convention marked a global consensus on the urgent need for a coordinated approach to tackle the emerging climate crisis.

The UNFCCC was adopted on May 9, 1992, and was made available for signing at the Rio Earth Summit on June 4, 1992¹¹⁹. It entered into force on March 21, 1994, and as of that juncture, it has near-universal membership with 197 countries and 1 regional economic integration organization¹²⁰ having ratified the treaty, symbolizing a worldwide pledge to confront the climate challenge.

¹¹⁷ CBD/COP/DEC/15/4, 19 December 2022, '15/4. Kunming- Montreal Global Biodiversity Framework' <<https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf>> accessed 20 April 2024.

¹¹⁸ The United Nations Framework Convention on Climate Change, 1771 UNTS 107, adopted on 09/05/1992, entered into force on 21/03/1994, <https://treaties.un.org/doc/Treaties/1994/03/19940321%2004-56%20AM/Ch_XXVII_07p.pdf> accessed 10 March 2024.

¹¹⁹ UNFCCC, 'Status of Ratification of the Convention', <<https://unfccc.int/process-and-meetings/the-convention/status-of-ratification-of-the-convention>> accessed 20 April 2024.

¹²⁰ UNFCCC, 'Status of Ratification of the Convention', <<https://unfccc.int/process-and-meetings/the-convention/status-of-ratification-of-the-convention>> accessed 20 April 2024.

The convention's key objective, as articulated in Article 2, is to “...stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”¹²¹. It defines a framework for the international endeavours by governments to accomplish this objective within a timeframe that permits ecosystems to adjust naturally, safeguards food production from jeopardy, and facilitates sustainable economic development.

The UNFCCC not only acknowledges the scientific basis and environmental risks of climate change but also gives due consideration to the potentially uneven economic impacts across different nations, particularly the specific vulnerabilities of developing countries. Articles 4¹²² and 12¹²³ of the convention highlight the differentiated responsibilities of countries, placing the onus on developed countries to spearhead the efforts in altering long-term climate change trends and disclosing their policies and exemplary approaches.

The convention further established key principles like "common but differentiated responsibilities"¹²⁴ and "precautionary measures"¹²⁵ ensuring that disparities in countries' contributions to global emissions and capacities to address these issues are considered in global climate change efforts¹²⁶. Additionally, the convention underscores the importance of developing and transferring environmentally sound technologies and the necessity of assisting particularly vulnerable nations in their climate change adaptation and mitigation endeavours in its Article 4.5¹²⁷.

Through its innovative and adaptive treaty mechanisms and provisions, the UNFCCC has catalysed global legislative and policy initiatives, aiming to transition the world toward a lower carbon future and foster climate resilience. Its indispensable role in shaping the guiding principles and policies of international climate change efforts underscores the

¹²¹ Article 2 of the UNFCCC.

¹²² Article 4 of the UNFCCC.

¹²³ Article 12 of the UNFCCC.

¹²⁴ Article 3/1 of the UNFCCC.

¹²⁵ Article 3/3 of the UNFCCC.

¹²⁶ Article 3 of the UNFCCC.

¹²⁷ Article 4/5 of the UNFCCC.

necessity of continued commitment and cooperation among nations to mitigate environmental risks while advancing sustainable development.

The annual Conference of the Parties (hereinafter ‘COP’) under the UNFCCC serves as the primary international forum for negotiating and assessing progress on climate change¹²⁸. As part of the convention's operational structure, the Subsidiary Body for Scientific and Technological Advice¹²⁹ and the Subsidiary Body for Implementation¹³⁰ were established, which are instrumental in providing technical expertise and enhancing the efficacy of the convention’s implementation.

The convention also set the stage for funding mechanisms, such as the Global Environment Facility (hereinafter ‘GEF’)¹³¹ and Green Climate Fund¹³², which are crucial for channelling resources to developing countries, aiding them tackle climate change effects and transitioning to low-carbon economies. Articles 4.8 and 4.9 of the convention, in conjunction with Article 3.1, underscore the imperative of supplying novel and supplementary financial resources while fostering the advancement and dissemination of suitable technologies. This acknowledgment is rooted in the recognition of the disparate effects of climate change across nations, with particular emphasis on the vulnerabilities faced by the least developed countries and those most susceptible to risks, such as small island developing states.¹³³

The reporting and review system of the UNFCCC, as laid out in Articles 4 and 12, is a vital aspect of the convention, ensuring transparency and accountability by mandating regular national communications and inventories of greenhouse gases from the Parties¹³⁴.

¹²⁸ Article 7 of the UNFCCC.

¹²⁹ Article 9 of the UNFCCC.

¹³⁰ Article 10 of the UNFCCC.

¹³¹ M.N.I Sorkar, ‘Institutions Building Capacity in the Contemporary World: The Case of Funding Mechanism and Policies in UNFCCC Negotiations’ (2019) 5 Chinese Political Science Review 177-199 183.

¹³² M.N.I Sorkar, ‘Institutions Building Capacity in the Contemporary World: The Case of Funding Mechanism and Policies in UNFCCC Negotiations’ (2019) 5 Chinese Political Science Review 177-199 189.

¹³³ Sirazoom Munira, Raisa Bashar, Tahmid Huq Easter and Miran R. Khan ‘Climate Finance in the UNFCCC Negotiations: Bridging Gaps with Lessons Learnt’ in Md. Jakariya and Md. Nazrul Islam (eds) *Climate Change in Bangladesh A Cross-Disciplinary Framework* (Springer Climate 2021) 1-24 8.

¹³⁴ Tinus Pulles and Lisa Hanle, ‘A Fit for Purpose Approach for Reporting and Review under UNFCCC’s Enhanced Transparency Framework’ (2023) 14 1 Carbon Management 1.

This system provides an evidence-based approach for assessment and international scrutiny of the efforts taken towards the objectives of the convention, encompassing both mitigation actions and the adaptation measures employed by signatory countries¹³⁵.

With each subsequent COP, the UNFCCC has adapted and evolved, addressing the emerging challenges and complexities of global climate change. An outcome of paramount importance arising from these conferences was the inception of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (hereinafter the 'Kyoto Protocol') in 1997, which instituted mandatory emission reduction objectives for developed nations¹³⁶. This pivotal protocol advanced the principles of the UNFCCC by creating a framework for operationalizing commitments and incorporating market-based mechanisms to incentivize emissions reductions.

In 2015, the baton was passed to the Paris Agreement, a landmark agreement that furthered the UNFCCC by delineating a comprehensive strategy for curtailing global temperature rise to a level significantly below 2 degrees Celsius. The Paris Agreement is characterized by its bottom-up approach, allowing countries to set their own nationally determined contributions towards the collective climate effort, which will be progressively updated and enhanced over time. It also emphasizes the importance of transparency, mutual assistance, and global stocktakes to review collective progress.

The UNFCCC serves not only as a platform for negotiation but also as a repository for the compilation and dissemination of pertinent data and exemplary methodologies concerning the phenomenon of climate change¹³⁷. The convention's clear articulation of roles and responsibilities among nations lays the groundwork for collective action and underscores the importance of mutual support and cooperation on the global achievement on climate change.

¹³⁵ Ibid, 3.

¹³⁶ UNFCCC, 'What is the Kyoto Protocol?' <https://unfccc.int/kyoto_protocol> accessed on 1 May 2024.

¹³⁷ Anthony Patt and others, 'International Cooperation' (2022) in *IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*.

Through its persistent endeavours, the UNFCCC persistently facilitates discourse, provides educational initiatives, and conducts outreach efforts, thereby advocating for the incorporation of climate change imperatives into overarching global, regional, and national frameworks. Serving as the cornerstone of the global climate governance structure, the UNFCCC retains its pivotal role in engendering political commitment and directing the requisite measures toward addressing and adapting to the intricate array of challenges posed by climate change. In doing so, it upholds principles of environmental sustainability and equitable intergenerational stewardship.

d) The Kyoto Protocol to The United Nations Framework Convention on Climate Change

The Kyoto Protocol represents a historic milestone in international environmental law, specifically targeting the issue of global warming through the reduction of greenhouse gas emissions¹³⁸. The necessity for a protocol of this kind emerged from a growing awareness in the late 20th century about the rapid increase in greenhouse gases attributed to human activities and their direct link to climate change¹³⁹. This led to the consensus that a legally binding agreement was crucial to compel industrially developed nations to initiate concrete steps towards mitigating climate impacts.

The Kyoto Protocol was ratified on December 11, 1997, during the third Conference of the Parties to the UNFCCC, and subsequently entered into force on February 16, 2005¹⁴⁰, represented the first binding agreement on climate change. The key feature of the Kyoto Protocol includes binding emission reduction targets for developed countries, which are listed in Annex B¹⁴¹. The overarching objective delineated by the Protocol entailed

¹³⁸ Sebastian Oberthür and Hermann E. Ott, *The Kyoto Protocol International Climate Policy for the 21st Century* (Springer-Verlag Berlin Heidelberg 1999).

¹³⁹ *Ibid*, 78.

¹⁴⁰ The Kyoto Protocol to the United Nations Framework Convention on Climate Change, 2303 UNTS 162, adopted on 11/12/1997, entered into force on 16/02/2005, <<https://unfccc.int/resource/docs/convkp/kpeng.pdf>> accessed 10 March 2024. Türkiye has ratified the Kyoto Protocol on 28/05/2009.

¹⁴¹ Clare Breidenich, Daniel Magraw, Anne Rowley and James W. Rubin, 'The Kyoto Protocol to the United Nations Framework on Climate Change' (1998) 92 *The American Journal of International Law* 315- 331 315.

achieving a reduction in emissions, averaging 5% below the levels recorded in 1990, throughout the commitment period spanning from 2008 to 2012¹⁴².

The Kyoto Protocol introduced the first international top-down mechanisms, offering mitigation incentives to both Annex I and non-Annex I parties¹⁴³. By establishing a flexible and comprehensive international framework, the Protocol provided a foundational model for the development of efficient future climate policies¹⁴⁴. Nations that ratified the Kyoto Protocol are anticipated to exhibit greater environmental productivity compared to those that have not ratified the agreement¹⁴⁵.

The Kyoto Protocol introduced several market-based mechanisms to achieve these reductions such as Joint Implementation¹⁴⁶, the Clean Development Mechanism¹⁴⁷, and the International Emissions Trading¹⁴⁸. Market-based approaches provide flexibility and economic incentives for reducing emissions by allowing countries to meet their targets through investing in emission-reducing projects in other countries¹⁴⁹. These mechanisms aim to assist Annex I Parties in achieving their emission reduction targets in a cost-effective and efficient manner, introducing flexibility and facilitating compliance with their respective commitments¹⁵⁰.

The Protocol's Articles specify numerous provisions including, but not limited to, the establishment of a pro-active Compliance Committee¹⁵¹ to oversee the implementation of commitments, detailed requirements for reporting and verifying emissions, and

¹⁴² Article 3/1 of the Kyoto Protocol.

¹⁴³ Akihisa Kuriyama and Naoya Abe, 'Ex-post Assessment of the Kyoto Protocol- Quantification of CO2 Mitigation Impact in both Annex B and non-Annex B Countries' 2018 220 *Applied Energy*, 286-295 287.

¹⁴⁴ Christoph Böhringer, 'The Kyoto Protocol: A Review and Perspectives' 2003 19 3 *Oxford Review of Economic Policy* 451-466 453.

¹⁴⁵ Ehsan H. Feroz, Raymond L. Raab, Gerald T. Ulleberg and Kamal Alsharif, 'Global Warming and Environmental Production Efficiency Ranking of the Kyoto Protocol Nations' 2009 90 *Journal of Environmental Management* 1178-1183 1182.

¹⁴⁶ Article 6 of the Kyoto Protocol.

¹⁴⁷ Article 12 of the Kyoto Protocol.

¹⁴⁸ Article 17 of the Kyoto Protocol.

¹⁴⁹ Empire Hachtime Nyekwere, 'Commercializing International Environmental Protection: A Review of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and Its Market-Based Mechanisms' (2020) 86 *International Affairs and Global Strategy* 21-37 24.

¹⁵⁰ Laurance Boisson de Chazournes, 'Kyoto Protocol to the United Nations Framework Convention on Climate Change' (2008) *United Nations Audiovisual Library of International Law* 3.

¹⁵¹ Article 18 of the Kyoto Protocol.

guidelines for accounting for greenhouse gas absorption¹⁵². The Protocol's compliance mechanism comprises an independent Compliance Committee, which is divided into a facilitative branch and an enforcement branch. This committee's objective is to facilitate, promote, and enforce adherence to the commitments outlined in the Protocol¹⁵³. Additionally, the compliance mechanism incorporates measures to generate performance information, facilitate compliance, and deter non-compliance through the imposition of penalties¹⁵⁴.

The Kyoto Protocol played a crucial role by providing a structured basis upon which subsequent negotiations and agreements that could develop more robust and universal strategies to address the pressing issue of climate change¹⁵⁵. Its introduction of quantitative limits on emissions and the establishment of international mechanisms for cooperation set a precedent for binding international climate action¹⁵⁶.

Although the Kyoto Protocol was a landmark in international climate policy, its effectiveness has been a subject of debate¹⁵⁷. While some Annex I parties met their targets, global emissions continued to rise, partly due to the exclusion of significant emitters like the United States of America from binding targets and the economic growth of developing countries¹⁵⁸. This highlighted inherent complexities and limitations within the Protocol's mechanism, casting doubt on the sufficiency of the framework to drive global emissions to desired levels¹⁵⁹.

¹⁵² Boisson de Chazournes, 4.

¹⁵³ Trade and Climate Change: A Report by the United Nations Environment Programme and the World Trade Organization (*World Trade Organization*) 75, < <https://digitallibrary.un.org/record/659981>> accessed 15 May 2024.

¹⁵⁴ Nyekwere, 29.

¹⁵⁵ Böhringer, 457.

¹⁵⁶ Nada Maamoun, 'The Kyoto Protocol: Empirical Evidence of a Hidden Success' 2019 95 *Journal of Environmental Economics and Management* 227-256 244.

¹⁵⁷ J. W. Anderson, 'The Kyoto Protocol on Climate Change Background, Unresolved Issues and Next Steps' (1998) *Resources for the Future*, 18.; Nicole Grunewald and Inmaculada Martinez-Zarzoso, 'Did the Kyoto Protocol Fail? An Evaluation of the Effect of the Kyoto Protocol on CO2 Emissions' (2015) 21 *Environment and Development Economics* 1-22 14.; Surender Mor and others, 'Kyoto Protocol and Paris Agreement: Transition from Bindings to Pledges-A Review' (2023) *Millennial Asia* 1-22 2.

¹⁵⁸ Daniel Bodansky, 'U.S. Climate Policy after Kyoto: Elements for Success, Policy Brief' (2002) *Carnegie Endowment for International Peace*.

¹⁵⁹ Nyekwere, 31.

While the Kyoto Protocol's first commitment period ended in 2012, Parties to the Kyoto Protocol adopted the Doha Amendment, extending the protocol until 2020 with new targets for participating countries¹⁶⁰. The Doha Amendment, however, did not receive enough ratifications to enter into force until the very end of its intended period, highlighting the difficulties in maintaining international momentum for legally binding commitments post-2012¹⁶¹.

Despite its challenges, the Kyoto Protocol's implementation spurred numerous national policies and strategies aimed at reducing emissions, promoted investment in renewable energy and energy efficiency, and fostered an international carbon market¹⁶². Importantly, it also provided valuable lessons on the complexities of international climate diplomacy, the importance of participation and compliance mechanisms, and the need for dynamic and scalable climate solutions that can bring all countries on board¹⁶³.

The legacy of the Kyoto Protocol lives on through the continued operation of its market mechanisms and its influence on the technical and political approaches to climate-induced mitigation that are integral to today's international climate regime, including the Paris Agreement. It continues to serve as a symbol of the international community's acknowledgment of the necessity for collective action against the global threat of climate change, establishing a framework of accountability and collaboration that informs both current and future efforts to protect the planet.

e) The Paris Agreement

The Paris Agreement stands as a landmark within the landscape of multilateral climate change accords, representing a collective aspiration to bolster the international community's resilience against the looming spectre of climate change. Its inception was

¹⁶⁰ The Doha Amendment to the Kyoto Protocol adopted on 08/12/2012, entered into force on 31/12/2020, <<https://treaties.un.org/doc/Treaties/2012/12/20121217%2011-40%20AM/CN.718.2012.pdf>> accessed 10 May 2024.

¹⁶¹ Benoit Mayer, 'The Curious Fate of the Doha Amendment' (*Blog of the European Journal of International Law*, 4 May 2020) < <https://www.ejiltalk.org/the-curious-fate-of-the-doha-amendment/>> accessed 10 May 2024.

¹⁶² Amanda M. Rosen, 'The Wrong Solution at the Right Time: The Failure of the Kyoto Protocol on Climate Change' (2015) *Politics & Policy* 43 1 30-58 39.

¹⁶³ *Ibid*, 40.

driven by the clear scientific consensus and societal recognition that an immediate and unified global action plan was essential to avert catastrophic climate impacts¹⁶⁴. Aiming to surpass the achievements and address the limitations of the Kyoto Protocol, this agreement sought to engage all nations in a cooperative effort to limit global temperature rise and foster climate resilience¹⁶⁵. The concerted objective of the signatory parties under this agreement is to expedite the global apex of greenhouse gas emissions as soon as possible to achieve a climate-neutral world by mid-century¹⁶⁶.

The Paris Agreement, adopted at COP 21 in Paris on December 12, 2015, and entered into force on November 4, 2016¹⁶⁷, achieved rapid ratification. It signifies a global commitment to ambitious efforts to address climate change and adapt to its effects. As it stands, 195 parties¹⁶⁸ have ratified the Agreement, illustrating its widespread acceptance and endorsement.

A distinctive feature of the Paris Agreement is that it structured around Nationally Determined Contributions (hereinafter the ‘NDCs’), which are at the core of the Agreement and encapsulate each signatory nation's commitments to curtail domestic emissions and adapt to the vicissitudes of climate change¹⁶⁹. The NDCs represent an evolution towards a more bottom-up approach in international climate diplomacy, characterized by voluntary pledges rather than the previous top-down model that delineated Annex I and Non-Annex I parties predominantly, the developed and developing countries with mandatory targets as stipulated under the Kyoto Protocol¹⁷⁰. This paradigm shift, introduced by the Paris Agreement, marks the inaugural inclusion of discretionary commitments from all principal global emitters, encompassing both

¹⁶⁴ S. Niggol Seo, ‘Beyond the Paris Agreement: Climate change policy negotiations and future directions’ (2017) 9 2 *Regional Science Policy & Practice* 121-140 124.

¹⁶⁵ Seo, 129.

¹⁶⁶ Mor and others, 4.

¹⁶⁷ The Paris Agreement, C.N.63.2016.TREATIES-XXVII.7.d, adopted on 12/12/2015, entered into force on 04/11/2016, Türkiye ratified the Paris Agreement on 11/10/2021 <https://unfccc.int/sites/default/files/english_paris_agreement.pdf> accessed 13 May 2024.

¹⁶⁸ United Nations Treaty Collection, ‘Chapter XXVII: Environment 7.d Paris Agreement’ <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en&_gl=1*10998wa*_ga*MTE2MDUyNTg1Mi4xNjc0NDE3ODY0*_ga_TK9BQL5X7Z*MTcxNjI4Njc5My4zNS4xLjE3MTYyODczMjguMC4wLjA.>> accessed 13 May 2024.

¹⁶⁹ Matthew Winning and others, ‘Nationally Determined Contributions under the Paris Agreement and the Costs of Delayed Action’ (2019) 19 8 *Climate Policy* 947-958 948.

¹⁷⁰ Winning and others, 949.

developed and developing nations. The longevity and efficacy of this process are contingent upon the progressive intensification of NDC ambitions, complemented by an efficacious verification mechanism that ensures stringent and thorough scrutiny¹⁷¹. The NDCs are seen as instrumental in implementing the Agreement over the coming decades¹⁷².

The Agreement necessitates all Parties to articulate and pursue national climate plans, enabling a bottom-up approach to emissions reduction while also fostering a spirit of global unity through shared objectives. It aims to facilitate coordinated action rather than to prescribe the necessities¹⁷³.

Articles within the Paris Agreement offer explicit directives and set critical international climate goals, such as:

- Article 2 of the Paris Agreement emphasizes the commitment to restrict the rise in global temperatures to significantly below 2°C above pre-industrial levels, while concurrently undertaking endeavours to constrain the temperature increase to 1.5°C.
- Article 3 of the Agreement acknowledges the necessity of providing support to the developing country parties to facilitate the efficacious implementation of the Agreement's stipulations.
- Article 4 mandates that Parties periodically submit and update their Nationally Determined Contributions, reflective of their highest possible ambition. Recognizing that reaching peak emissions will be more protracted for developing country Parties, the Article permits voluntary contributions from these countries, thus promoting a framework that is inclusive and sensitive to varying national contexts.

¹⁷¹ Ibid, 949.

¹⁷² W. P. Pauw and others, 'Conditional Nationally Determined Contributions in the Paris Agreement: Foothold for Equity or Achilles Heel?' (2020) 20 4 Climate Policy 468-484 469.

¹⁷³ Annalisa Savaresi, 'The Paris Agreement: An Early Assessment' (2016) 46.1 Environmental Policy and Law 14-18 15.

- Articles 9 through 11 impose an obligation on developed countries to provide financial sources¹⁷⁴, establish a technology mechanism to transfer technological developments¹⁷⁵, and enhance capacity building¹⁷⁶ to aid developing countries. This obligation is rooted in the principle of common but differentiated responsibilities and respective capabilities, with due consideration for disparate national circumstances.
- Article 13 institutes a robust transparency framework to augment mutual trust and confidence, with the intention of fostering the effective implementation of the Agreement through comprehensive action and support.

The Paris Agreement aims to achieve its objective by introducing a system of a ‘pledge and review’, in which countries are required to regularly submit NDCs outlining their planned climate actions for a specific time period¹⁷⁷. These pledges are intended as non-legally binding commitments. The agreement also includes mechanisms to continuously assess and strengthen these pledges, encouraging nations to both fulfil their commitments and enhance their level of ambition over time, a process known as ratcheting up¹⁷⁸. This assessment mechanism comprises a transparency framework¹⁷⁹ that evaluates the consistency of biennial reports submitted by member states with reporting rules and monitors progress in NDC implementation, a global stocktake¹⁸⁰ that evaluates collective progress toward the goals outlined in the Paris Agreement, and a compliance committee¹⁸¹ responsible for reviewing state adherence to the provisions of the agreement. The non-binding nature of the NDCs represents a significant departure from the Kyoto Protocol's approach of establishing mandatory national emissions targets reviewed through periodic national reports¹⁸². The non-binding nature of the Paris Agreement, coupled with the absence of an envisaged sanction mechanism, has

¹⁷⁴ Article 9 of the Paris Agreement.

¹⁷⁵ Article 10 of the Paris Agreement.

¹⁷⁶ Article 11 of the Paris Agreement.

¹⁷⁷ Kilian Raiser, Başak Çalı and Christian Flachsland, ‘Understanding Pledge and Review: Learning From Analogies to the Paris Agreement Review Mechanism’ (2022) 22 6 Climate Policy 711-727 712.

¹⁷⁸ *Ibid*, 715.

¹⁷⁹ Article 13 of the Paris Agreement.

¹⁸⁰ Article 14 of the Paris Agreement.

¹⁸¹ Article 15 of the Paris Agreement.

¹⁸² Robert Falkner, ‘The Paris Agreement and the New Logic of International Climate Politics’ (2016) International Affairs 92 5 1107-1125 1111.

complicated its implementation¹⁸³. This is due to the fact that countries operate in an anarchic international system lacking an overarching enforcement authority¹⁸⁴.

The Agreement has been influential in rallying international efforts, prompting countries to enhance their climate action plans and policies systematically¹⁸⁵. Since its adoption, there has been an unprecedented surge in the commitments of cities, states, businesses, and investors to lower emissions and strive for sustainable growth¹⁸⁶.

The Paris Agreement is dedicated to augmenting nations' competencies in managing the repercussions of climate phenomena, also with a pronounced emphasis on advancing adaptive undertakings and bolstering capacities for climatic robustness¹⁸⁷. Article 7 emphasizes these commitments, setting forth an international objective on adaptation that aims to amplify adaptive capacities, fortify resilience, and diminish susceptibility to climatic alterations¹⁸⁸.

Since entering into force, the Agreement has also spurred the creation and strengthening of numerous initiatives and coalitions¹⁸⁹ aimed at accelerating the transition to renewable energy, increasing energy efficiency, and fostering innovations in climate finance and carbon pricing¹⁹⁰. Moreover, non-state actors have become increasingly involved, cementing the Agreement's role as a catalyst for an all-of-society approach to tackling climate change¹⁹¹.

¹⁸³ Theodore Okonkwo, 'How International Law Can Deal with Lack of Sanctions and Binding Targets in the Paris Agreement' (2017) *Journal of Sustainable Development* 10 5 225-233 225.

¹⁸⁴ *Ibid.*, 226.

¹⁸⁵ David A. Wirth, 'The Paris Agreement as a New Component of the UN Climate Regime' (2017) *International Organizations Research Journal* 12 4 185-214 208.

¹⁸⁶ Molly Bergen and Helen Mountford, '6 Signs of Progress Since the Adoption of the Paris Agreement' (*World Resources Institute*, 8 December 2020) <<https://www.wri.org/insights/6-signs-progress-adoption-paris-agreement>> accessed on 15 May 2024.

¹⁸⁷ Alexandra Lesnikowski and others, 'What does the Paris Agreement Mean for Adaptation?' (2016) *Climate Policy* 17 825-831 826.

¹⁸⁸ Article 7 of the Paris Agreement.

¹⁸⁹ Joanna Depledge, Miguel Saldivia and Cristina Penasco, 'Glass Half Full or Glass Half Empty?: The 2021 Glasgow Climate Conference' (2022) 22 2 *Climate Policy* 147-157 147.

¹⁹⁰ Rafael Leal-Arcas and others, 'The Paris Agreement: Critical Assessment and Proposals for Key Clean Energy Initiatives' (2023) 17 3 *The IUP Journal of International Relations* 43-80 47.

¹⁹¹ Lesnikowski and others, 828.

The Paris Agreement marks a significant change in international climate policy, transitioning from the rigid emission targets of the Kyoto Protocol to a more adaptable and scalable approach that can address the diverse economic and environmental conditions of its member countries¹⁹². It heralds an era of international climate diplomacy characterized by collaboration, transparency, and an unyielding pursuit of a sustainable future, supported by a legal framework that requires nations to continually enhance their efforts to address climate change challenges.

f) Sendai Framework for Disaster Risk Reduction

The Sendai Framework for Disaster Risk Reduction¹⁹³, adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on 18 March 2015, does not exclusively tackle climate change but plays a vital role in addressing climate-related disasters¹⁹⁴. It underlines the urgent need to manage both disaster risk and the impacts of climate change, encouraging countries to invest in resilient infrastructure and early warning systems, critical aspects for which the Mediterranean states are also frequently affected by extreme weather events exacerbated by climate change¹⁹⁵.

2- Institutional Framework on Climate Change

a) United Nations Environmental Programme

The United Nations Environment Programme was established by UN General Assembly Resolution 2997 (XXVI)¹⁹⁶ of 15 December 1972 following the UN Conference on the Human Environment (Stockholm Conference). It recognized the need for a dedicated global authority to serve as an advocate, educator, catalyst, and facilitator for

¹⁹² Mor and others, 10.

¹⁹³ United Nations Office for Disaster Risk Reduction, *The Sendai Framework for Disaster Risk Reduction 2015-2030* < <https://www.undrr.org/media/16176/download?startDownload=20240521> > accessed on 17 May 2024.

¹⁹⁴ Ilan Kelman, 'Climate Change and the Sendai Framework for Disaster Risk Reduction' (2015) 6 *International Journal of Disaster Risk Science* 117-127 118.

¹⁹⁵ *Ibid*, 124.

¹⁹⁶ United Nations General Assembly Resolution 2997 (XXVI), 'Institutional and financial arrangements for international environmental cooperation' <<https://documents.un.org/doc/resolution/gen/nr0/270/27/pdf/nr027027.pdf?token=9HkB7pLYkgmXRK7cKX&fe=true>> accessed 18 May 2024.

environmental conservation and enhancement¹⁹⁷. The inception of UNEP stemmed from the growing awareness of global environmental issues and the need for a coordinated international response to tackle challenges ranging from pollution to the loss of biodiversity¹⁹⁸. UNEP has evolved to adapt to the changing environmental landscape, expanding its programs to address a broad spectrum of issues.

The UNEP functions as a worldwide environmental governing body, establishing the global environmental agenda, advocating for the consistent execution of sustainable development's environmental aspect, and acting as an influential proponent for global environmental preservation¹⁹⁹.

The United Nations Environment Programme administers a suite of principal programs targeting an array of environmental issues. These include a Climate Action Programme, which dedicates its efforts to aid nations in both climate change mitigation and adaptation processes, climate transparency, and climate finance²⁰⁰. Complementing this is the Disasters and Conflicts Programme, which scrutinizes the environmental determinants and ramifications of disasters and conflicts²⁰¹. Further, the Environmental Rights and Governance Programme is in place to bolster environmental governance across varying tiers of authority²⁰². Additionally, the Chemicals and Waste Programme contends with the environmental and health impacts brought forth by chemicals and waste. Lastly, the Resource Efficiency Programme is oriented towards propagating patterns of consumption and production that are sustainable, thereby contributing to the overarching goal of environmental conservation and sustainability.

¹⁹⁷ Iwona Rummel-Bulska, 'United Nations Environment Programme' (1995) 4 *Polish Quarterly of International Affairs* 129-148 130.

¹⁹⁸ Steinar Andresen and Kristin Rosendal, 'The role of the United Nations Environment Programme in the Coordination of Multilateral Environmental Agreements' in Frank Bierman, Bernd Seibenhüner and Anna Schreyögg eds., *International Organizations in Global Environmental Governance* (Routledge, 2009) 133-151 136.

¹⁹⁹ Rummel-Bulska, 131.

²⁰⁰ UN Environment Programme, 'Climate Action', < <https://www.unep.org/topics/climate-action>> accessed on 18 May 2024.

²⁰¹ UN Environment Programme, 'Disasters & Conflicts' < <https://www.unep.org/topics/disasters-and-conflicts>> accessed 18 May 2024.

²⁰² UN Environment Programme, 'Environmental Rights and Governance' < <https://www.unep.org/explore-topics/environmental-rights-and-governance>> accessed 18 May 2024.

Another notable endeavour by the UNEP is the inception of the Regional Seas Programme²⁰³. Established in 1974, this initiative facilitates collaborative transnational efforts for safeguarding contiguous marine ecosystems. As of the present, the programme has extended its reach to encompass 18 distinct regions²⁰⁴, uniting sovereign entities in a concerted effort to counteract marine and coastal deterioration by advocating for the sustainable management and exploitation of maritime environments²⁰⁵.

UNEP's engagement with climate change is multifaceted. Recognizing the urgent need to address global warming, UNEP supports nations in implementing their Nationally Determined Contributions under the Paris Agreement²⁰⁶. Through its Emissions Gap Report, UNEP provides an annual scientific assessment on the discrepancy between anticipated emission levels and those consistent with limiting global warming²⁰⁷.

The United Nations Environment Programme, through its myriad programs and initiatives, plays an essential role in the international institutional framework on climate change. It addresses the dire need for environmental stewardship through concerted global action. UNEP's commitment to tackling climate change is evident through its involvement in shaping policy, guiding scientific research, implementing ground-level actions, and fostering international cooperation. Its work in both mitigation and adaptation to climate change underscores the indispensable nature of its mission for the preservation and improvement of the global environment.

b) International Panel on Climate Change

Global efforts to grapple with the challenges of climate change and global warming commenced in earnest with the establishment of the Intergovernmental Panel on Climate

²⁰³ P. Akiwumi and T. Melvasalo, 'UNEP's Regional Seas Programme: Approach, Experience and Future Plans' (1998) 22 3 Marine Policy 229-234 230.

²⁰⁴ UN Environment Programme, UNEP Regional Seas Programme < <https://www.unep.org/topics/ocean-seas-and-coasts/regional-seas-programme>> accessed 18 May 2024.

²⁰⁵ Nilüfer Oral, 'Forty Years of the UNEP Regional Seas Programme: From Past to Future' in Rosemary Rayfuse eds. *Research Handbook on International Marine Environmental Law* (Elgar, 2015).

²⁰⁶ UNDP, UNEP, UNEP DTU&WRI (2020) *Implementing Nationally Determined Contributions (NDCs)* (UNEP DTU Partnership Copenhagen, Denmark).

²⁰⁷ UNEP, *Emission Gap Report* < <https://www.unep.org/resources/emissions-gap-report>> accessed 18 May 2024.

Change in 1988 following an endorsement by the UN General Assembly²⁰⁸. The necessity for a definitive scholarly authority on climate matters precipitated the establishment of the IPCC by the World Meteorological Organization and the United Nations Environment Programme²⁰⁹. The IPCC was conceptualized as an intergovernmental platform committed to the evaluation of scientific research pertaining to climate change, encompassing its consequences, potential future hazards, as well as strategies for both adaptation and mitigation²¹⁰.

The IPCC, while not engaging in primary research, conducts comprehensive syntheses and assessments of the latest scientific, technical, and socioeconomic data that is globally available, directly relevant to advancing the understanding of climate change²¹¹. It is arguably best known for its regular assessment reports, which are comprehensive reviews in assessment cycles of the current state of knowledge on climate change²¹². These reports are indispensable to decision-makers at all governance levels, supplying the scientific foundation that steers international climate policy frameworks, most prominently the United Nations Framework Convention on Climate Change and the subsequent Paris Agreement²¹³.

The IPCC operates through the contributions of thousands of scientists from around the world who voluntarily contribute to its assessments²¹⁴. This extensive scientific collaboration ensures that IPCC reports encompass a diverse range of disciplines and perspectives, and that findings are based on the consensus of the international scientific

²⁰⁸UN General Assembly Resolution 43/53 of 6 December 1988 <<https://www.ipcc.ch/site/assets/uploads/2019/02/UNGA43-53.pdf>> accessed 18 May 2024.

²⁰⁹ Seo, 122.

²¹⁰IPCC, 'History of IPCC' <[https://www.ipcc.ch/about/history/#:~:text=The%20Intergovernmental%20Panel%20on%20Climate%20Change%20\(IPCC\)%20was%20established%20by,UN%20General%20Assembly%20in%201988.>](https://www.ipcc.ch/about/history/#:~:text=The%20Intergovernmental%20Panel%20on%20Climate%20Change%20(IPCC)%20was%20established%20by,UN%20General%20Assembly%20in%201988.>)> accessed 18 May 2024.

²¹¹ Tommaso Venturini, Kari De Pryck and Robert Ackland, 'Bridging in Network Organizations: The Case of the Intergovernmental Panel on Climate Change (IPCC)' (2023) 75 *Social Networks* 137-147 137.

²¹² Ibid, 138.

²¹³ Mukul Sanwag and others, 'A New Role for IPCC: Balancing Science and Society' (2017) 8 4 *Global Policy* 569-573 569.

²¹⁴ Venturini, De Pryck and Ackland, 138.

community. The process of compiling an IPCC report involves multiple rounds of drafting and review, ensuring the rigor and reliability of its assessments²¹⁵.

A distinguishing feature of the IPCC methodology is its integrative process of stakeholder engagement, encompassing the participation of entities from both governmental and non-governmental sectors. Through a transparent review process, stakeholders have the opportunity to comment on draft reports, making the IPCC's assessments a product of collaboration between scientists and policymakers²¹⁶.

Since its inception, the IPCC has disseminated a sequence of assessment reports that have systematically integrated and condensed the expanding realm of scientific knowledge related to climate change²¹⁷. The structure of these reports is delineated across three specialized working groups: Working Group I expound upon the physical scientific underpinnings of climate change; Working Group II concentrates on the consequences of climate change, potential measures for adaptation, and associated vulnerabilities; and Working Group III appraises strategies to curtail greenhouse gas emissions and explores climate change mitigation tactics²¹⁸. Collectively, these reports encapsulate the interdisciplinary nature of climate change, covering everything from scientific aspects to socioeconomic factors. The IPCC's work culminates in the Synthesis Report, which brings together the key findings from the three working group reports and special reports. Additionally, to facilitate accessibility, the IPCC provides Summaries for Policymakers, which distil the key messages of each report into concise, actionable insights. Beyond its assessment reports, the IPCC also produces special reports, methodologies, and technical papers that provide scientific information on climate change topics of immediate policy relevance.

²¹⁵ IPCC, 'Principles Governing IPCC Work' <chrome-extension://efaidnbmninnibpcjpcglclefindmkaj/https://archive.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf> accessed 18 May 2024.

²¹⁶ Ibid.

²¹⁷ IPCC, 'History of IPCC' <https://www.ipcc.ch/about/history/#:~:text=The%20Intergovernmental%20Panel%20on%20Climate%20Change%20(IPCC)%20was%20established%20by,UN%20General%20Assembly%20in%201988.> accessed 18 May 2024.

²¹⁸ Venturini, De Pryck and Ackland, 138.

The assessments provided by the IPCC have served to guide international negotiations, playing a critical role in shaping the global response to climate change. The IPCC's Fifth Assessment Report was a critical input to the negotiations that led to the Paris Agreement in 2015²¹⁹. The reports also help nations develop their domestic climate policies and contribute to the wider understanding and communication of climate science.

The IPCC occupies a pivotal position within international climate policy, supplying dependable scientific groundwork upon which to formulate responses to climatic changes. Its contributions are substantial in enhancing the collective comprehension of climate dynamics and are instrumental in shaping policy measures oriented towards mitigating prospective hazards and identifying avenues for adaptation.

c) United Nations Sustainable Development Goals

Four decades after the seminal convening in Stockholm and twenty years following the Rio Earth Summit, the international community reconvened in Rio de Janeiro for the UN Conference on Sustainable Development (Rio+20)²²⁰. This pivotal conference catalysed the formulation of the 2030 Agenda for Sustainable Development and its associated 17 Sustainable Development Goals (hereinafter the 'SDG's'), which were formally endorsed on 27 September 2015 and came into force on 1 January 2016²²¹. The SDGs advanced the sustainable development paradigm that emerged from the Stockholm Conference, delineating an unprecedentedly tangible and motivating framework to date. Complementarily, the SDGs represent a global mandate seeking to eradicate poverty, safeguard the planet, and ascertain that by 2030, all individuals experience peace and plenitude. These goals surfaced as integral components of the 2030 Agenda for Sustainable Development, adopted unanimously by all United Nations member states in

²¹⁹ The University of Edinburgh School of Geosciences Research, 'IPCC (AR5) Report: The Foundation for the Paris Agreement' < <https://www.ed.ac.uk/geosciences/research/impact/ipcc/ar5-report> > accessed 18 May 2024.

²²⁰ United Nations Sustainable Development Goals, 'Summit Charts New Era of Sustainable Development' (*Sustainable Development Agenda, 24 September 2015*) < <https://www.un.org/sustainabledevelopment/blog/2015/09/summit-charts-new-era-of-sustainable-development-world-leaders-to-gavel-universal-agenda-to-transform-our-world-for-people-and-planet/> > accessed 18 May 2024.

²²¹ United Nations Sustainable Development, 'The Sustainable Development Agenda' < <https://www.un.org/sustainabledevelopment/development-agenda-retired/> > accessed 18 May 2024.

2015 as a continuation of the Millennium Development Goals²²². The 2030 Agenda proffers a more holistic and aspiring blueprint, unequivocally acknowledging that combatting climate change is essential for the realization of sustainable development.

The Sustainable Development Goals are comprised of 17 interrelated objectives that harmonize the economic, social, and ecological facets of sustainable development. Goals that pertain explicitly to climate change include SDG 7, SDG 13, SDG 14, and SDG 15²²³. These goals underscore the essential relationship between addressing climate change and its effects, and the overarching strategy for promoting sustainable well-being for humanity²²⁴.

SDG 13 necessitates expeditious measures to counter climate change and its ramifications, which is aligned with the aims of key climate frameworks such as the UNFCCC, the Kyoto Protocol, and the Paris Agreement²²⁵. This goal encapsulates targets that necessitate mitigation actions to curtail greenhouse gas emissions, alongside adaptation mechanisms intended to reduce vulnerability to climatic perils²²⁶.

Since their adoption, the SDGs have significantly influenced global and national policy frameworks, prompting countries to integrate these goals into their development planning and reporting processes²²⁷. Countries have embarked on efforts to align their environmental, social, and economic policies with the SDGs, often resulting in more holistic and integrated approaches to development²²⁸.

²²² Ibid.

²²³ United Nations A/RES/70/1, Transforming Our World: The 2030 Agenda for Sustainable Development, <<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>> accessed 18 May 2024.

²²⁴ Ibid, 14.

²²⁵ Ibid, 25.

²²⁶ United Nations Sustainable Development Department of Economic and Social Affairs, 'Progress and Info' (*Department of Economic and Social Affairs, 2023*) <https://sdgs.un.org/goals/goal13#progress_and_info> accessed 18 May 2024.

²²⁷ R. Bali Swain and F. Yang-Wallentin, 'Achieving Sustainable Development Goals: Predicaments and Strategies' (2020) 27 2 International Journal of Sustainable Development & World Ecology 96-106 97.

²²⁸ Ibid, 104.

Under the SDGs, countries are committed to regularly assessing and reporting on their progress toward achieving each goal²²⁹. This commitment fosters accountability and ensures that efforts towards sustainable development remain transparent and data-driven. The SDGs also emphasize the importance of partnerships and collaboration between governing authorities, the private sector, and civil society to mobilize the resources and knowledge needed to actualize the goals²³⁰.

The impact of the SDGs has been witnessed in areas such as increased investment in renewable energy, the promotion of sustainable agriculture, and enhanced conservation efforts²³¹. Moreover, they have provided a framework for mobilizing finance and fostering innovation in pursuit of sustainability²³².

The SDGs have no binding force; however, their widespread endorsement by Member States has granted them profound normative power to shape national priorities and international cooperation²³³. Ongoing initiatives in response to the SDGs have also heightened awareness of the interconnectedness of climate action and sustainable development. Nations are increasingly acknowledging that efforts directed at emission reduction, adaptation to climate change, and conservation of ecosystems contribute significantly to broader socio-economic objectives, such as reducing inequality, promoting good health, and building sustainable cities and communities.

The SDGs have become a defining feature of national and international policy landscapes. They offer a vision of a sustainable future while presenting countries with a diverse set of targets to stimulate action toward comprehensive and universally beneficial outcomes.

²²⁹ United Nations, ‘Transforming Our World: The 2030 Agenda for Sustainable Development’ (2015) <<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>> 1-41 12 accessed 30 May 2024.

²³⁰ Ibid, 12.

²³¹ Ranjula Bali Swain, ‘A Critical Analysis of the Sustainable Development Goals’ in Walter Leal Filho (eds.) ‘*Handbook of Sustainability Science and Research*’ (Springer, 2017) 341-355 345.

²³² Ibid, 347.

²³³ United Nations Sustainable Development, ‘The Sustainable Development Agenda’ <<https://www.un.org/sustainabledevelopment/development-agenda-retired/>> accessed 18 May 2024.

B) SPECIFIC APPROACH ON THE MEDITERRANEAN

The legal and regulatory canvas of the Mediterranean region is a dynamic quilt, continuously evolving to reflect the escalating urgency of climate change. National and regional legislations are increasingly being scrutinized and updated to accommodate climate adaptation and mitigation requirements, thereby fostering legal frameworks capable of responding to the complexities of climate-related challenges.

Countries within the Mediterranean basin have embarked upon the development of comprehensive climate policies, enacting laws that integrate climate change considerations into diverse aspects of governance including energy, land use, and coastal management. These initiatives underscore the recognition of climate change as an overarching priority that must be woven into the fabric of national development strategies and regulatory frameworks.

The evolution of legislation in the region is influenced by a confluence of factors, such as existing socio-economic conditions, environmental vulnerabilities, and international commitments. The interplay between national imperatives and international climate treaties reinforces the progression towards a more resilient and sustainable Mediterranean region.

As the legal landscape continues to adapt, a close examination of various national strategies and legislative enactments will reveal a common thread of enhancements in environmental standards, incentives for renewable energy deployment, and the alignment of local legal frameworks with broader international goals. Each Mediterranean country faces its own distinct challenges and possesses unique environmental and socio-economic contexts, which inform the development of tailored climate laws and regulations. Therefore, comprehensive legislation often incorporates a mix of mandatory targets and voluntary initiatives designed to facilitate a shift towards economies with reduced carbon output and societies equipped for climate resilience.

The growing interconnectedness of climate policy and economic regulation is evident in the proliferation of green finance laws, which aim to channel investments towards sustainable projects and technologies. Similarly, zoning and land-use planning laws are

progressively integrating considerations for the preservation of vulnerable ecosystems and sustainable management of natural endowments.

On a regional scale, collaborative legal mechanisms and programs aim to foster synergy and cooperation among member states in addressing climate change. These initiatives pave the way for harmonization of policies, the exchange of best practices, and joint efforts in transboundary challenges such as marine pollution and disaster risk reduction.

In recognition of the important role that non-state entities in climate action, regulatory frameworks are increasingly emphasizing the importance of public participation, transparency, and accountability. By involving a diverse array of stakeholders, including NGOs, the business sector, and civil societies, Mediterranean nations are reinforcing the societal foundation necessary for sustained environmental stewardship.

The legal and regulatory responses to climate change in the Mediterranean region are being developed within a rapidly evolving and complex framework that includes both national and regional initiatives. These initiatives are crucial for setting standards, guiding policy development, and ensuring coordinated action among the diverse countries in the region. Therefore, in this section the legal framework and the institutional framework related to climate change will be evaluated from the vantage point of the Mediterranean.

1- Legal Framework on Climate Change

a) The Convention for The Protection of The Marine Environment and The Coastal Region of The Mediterranean (Barcelona Convention)

The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, along with its protocols, focuses on reducing pollution, protecting biodiversity, and the endorsement of sustainable management for the Mediterranean Sea and adjacent coastal areas. Ratified on 16 February 1976 and effectuated on 12 February 1978, the Barcelona Convention²³⁴ represents a pivotal multilateral environmental treaty

²³⁴ The Convention for the Protection of the Mediterranean Sea Against Pollution, adopted on 16 February 1976, entered into force on 12 February 1978, 1102 UNTS 27, <<https://treaties.un.org/doc/Publication/UNTS/Volume%201102/volume-1102-I-16908-English.pdf>> accessed 19 May 2024. Türkiye ratified the Convention on 06/04/1981, entered into force on 06/05/1981.

within the framework of the United Nations Environment Programme's Regional Seas Programme. Subject to amendments in 10 June 1995, which subsequently took effect in 2004²³⁵, the Convention constitutes a core legal mechanism for the reduction of marine pollution and the protection of marine and coastal ecosystems in the Mediterranean region through enhanced regional collaboration. Integral to its mission, the Barcelona Convention orchestrates systematic efforts to facilitate the sustainable use of the Mediterranean's maritime resources, reconcile development with environmental stewardship, and foster ecological resilience in response to anthropogenic pressures.

The Barcelona Convention was originally developed to recognize the unique environmental pressures faced by the Mediterranean region. With growing concerns about pollution, habitat degradation, and marine resource depletion, the countries bordering the Mediterranean Sea came together to establish an integrated management framework to address these pressing issues²³⁶. There are currently 22 Contracting Parties to the Barcelona Convention, which are; Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syrian Arab Republic, Tunisia, Türkiye and the European Union²³⁷.

Within the framework of the Barcelona Convention, the Contracting Parties commit to the adoption of effective measures aimed at the prevention, reduction, and, where feasible, the elimination of pollution in the Mediterranean Sea Area²³⁸. Furthermore, the Parties endeavour to preserve and rehabilitate the marine environment, thereby facilitating sustainable development in the region. Parties to the Convention are obligated

²³⁵ The Amendments to the Convention for the Protection of the Mediterranean Sea Against Pollution, adopted on 10 June 1995, took effect in 2004 <https://wedocs.unep.org/bitstream/handle/20.500.11822/3002/95ig6_7_bcamendments_eng.pdf> accessed 19 May 2024.

²³⁶ Nesrin Algan, 'Akdeniz Eylem Planı, Sürdürülebilir Kalkınma ve Türkiye' (2011) 17 1-2 Milletlerarası Hukuk ve Mülletlerarası Özel Hukuk Bülteni 37-54 38.

²³⁷ UNEP/MAP Barcelona Convention, 'Contracting Parties' <<https://www.unep.org/unepmap/who-we-are/contracting-parties>> accessed 20 May 2024; Signatures and Ratifications of the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and Its Protocols as of 29 October 2020 <https://wedocs.unep.org/bitstream/handle/20.500.11822/7096/StatusOfSignaturesAndRatifications_20201029.pdf> accessed 20 May 2024.

²³⁸ Preamble of the Barcelona Convention.

to actualize its stipulations and dutifully report on actions undertaken²³⁹. Biannual meetings of the Contracting Parties serve as a forum to evaluate progress, refine strategies, and foster cooperative initiatives. The efficacy of adherence to the Convention and its Protocols is monitored through compliance mechanisms, which encompass reporting and surveillance procedures²⁴⁰. Deliberations on the policies, strategies, financial plans, and work schedules of the Mediterranean Action Plan take place in the Conference of Parties, convened by the Contracting Parties' respective competent Ministries every two years²⁴¹.

Over the years, the Barcelona Convention has facilitated numerous initiatives aimed at environmental protection. It has adopted legally binding measures, known as Protocols, that tackle specific aspects of marine and coastal protection, such as addressing biodiversity loss, preventing pollution from ships and in cases of emergency, managing coastal zones sustainably, and protecting specially designated areas. The Protocols of the Barcelona Convention²⁴² are:

- The Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft (hereinafter the 'Dumping Protocol'), which was adopted in 1976 and came into force in 1978, mandates that Contracting Parties undertake all appropriate measures to prevent, abate, and eliminate to the fullest extent possible the pollution of the Mediterranean Sea through the dumping of wastes or other materials²⁴³.
- The Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Case of Emergency, adopted in 1976 and came into force in 1978, was subsequently superseded by the

²³⁹ Ibid.

²⁴⁰ Article 27 of the Barcelona Convention.

²⁴¹ Rules of Procedure for Meetings and Conferences of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its related Protocols,

²⁴² As of 1 August 2024, Türkiye is not a party to "The Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from the Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil" and "The Protocol on Integrated Coastal Zone Management in the Mediterranean".

²⁴³ Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, adopted on 16 February 1976, <https://wedocs.unep.org/bitstream/handle/20.500.11822/35506/76conf1_final_act_ann2pd_eng.pdf> accessed 20 May 2024.

Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea (hereinafter the ‘Prevention and Emergency Protocol’)²⁴⁴. The latter was adopted in 2002 and came into force in 2004. This Prevention and Emergency Protocol establishes a regional framework for international cooperation and mutual assistance in preparing for and responding to incidents involving oil and hazardous noxious substances pollution.

- The Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources (hereinafter the ‘LBS Protocol’) was adopted in 1980 and came into force in 1983. In 1996, the LBS Protocol was amended and renamed the Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities²⁴⁵. These amendments entered into force in 2008. The primary objective of the LBS Protocol is to implement all appropriate measures to prevent, abate, and fully eliminate pollution of the Mediterranean Sea from land-based sources and activities. This is to be achieved through the reduction and phase-out of substances that are toxic, persistent, and prone to bioaccumulate, as listed in the Protocol.
- The Protocol Concerning Mediterranean Specially Protected Areas was adopted in 1982 and came into force in 1986. It was subsequently replaced by the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (hereinafter the ‘SPA/BD Protocol’), adopted in 1995 and entering into force in 1999²⁴⁶. The SPA/BD Protocol establishes a regional framework for the conservation and sustainable use of biological diversity in the Mediterranean. Under this Protocol, Parties are obligated to protect areas of significant natural or

²⁴⁴ Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea, adopted on 16 February 1976, <https://wedocs.unep.org/bitstream/handle/20.500.11822/35784/76conf1_final_act_ann3pe_eng.pdf> accessed 20 May 2024.

²⁴⁵ Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities, adopted on 7 March 1996, <https://wedocs.unep.org/bitstream/handle/20.500.11822/3016/96ig7_4_lbsprotocol_eng.pdf> accessed 20 May 2024.

²⁴⁶ Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean, adopted on 10 June 1995, <https://wedocs.unep.org/bitstream/handle/20.500.11822/3005/95ig6_7_spa_protocol_eng.pdf> accessed 20 May 2024.

cultural value by establishing Specially Protected Areas or Specially Protected Areas of Mediterranean Importance. Additionally, the Protocol mandates the protection of threatened or endangered species of flora and fauna, as listed in its Annexes.

- The Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from the Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil (hereinafter the ‘Offshore Protocol’) was adopted in 1994 and entered into force in 2011. This Protocol comprehensively addresses all aspects of offshore oil and gas activities in the Mediterranean. It includes measures aimed at reducing pollution during all phases of offshore activities, responding to offshore pollution incidents, and addressing issues of liability and compensation.
- The Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (hereinafter the ‘Hazardous Waste Protocol’) was adopted in 1996 and has been in effect since 2008²⁴⁷. The Hazardous Waste Protocol seeks to safeguard both human health and the marine environment from the deleterious impacts of hazardous wastes. Its provisions are directed at several core objectives: the diminution, and where practicable, the eradication of hazardous waste production; the contraction of hazardous waste volumes involved in transboundary movements; and the establishment of a regulatory framework governing permissible transboundary movements of such wastes.
- The Protocol on Integrated Coastal Zone Management in the Mediterranean, (hereinafter the ‘ICZM Protocol’) ratified in 2008 and enacted in 2011, establishes a legal apparatus for the holistic management of the Mediterranean's coastal territories. It enjoins the participating Parties to adopt requisite measures that bolster regional collaboration, thereby fulfilling the goals of integrated coastal zone management.

²⁴⁷ The Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal, adopted on 1 October 1996, <https://wedocs.unep.org/bitstream/handle/20.500.11822/3047/96ig9_4_protocol_eng.pdf> accessed 20 May 2024.

These Protocols have led to significant regional cooperation and policy development and inspired national legislations and policies that align with their goals.

While the Barcelona Convention was not originally concentrated on climate change, its pertinence has escalated with the increasing impacts of global warming on the Mediterranean region. Climate change is now a cross-cutting theme in the Convention's work, as it exacerbates existing pressures on marine ecosystems and coastal communities.

The Convention plays a pivotal role in promoting the incorporation of climatic considerations into marine and coastal planning as well as policy frameworks. It advocates for the adoption of adaptive measures, exemplified by the establishment of the 2016 Regional Adaptation Framework for Mediterranean Marine and Coastal Areas²⁴⁸. This framework's chief goal is to articulate a regional tactical approach that augments the resilience of natural and socio-economic systems in the Mediterranean's marine and coastal domains against climatic impacts²⁴⁹. It supports policymakers and stakeholders at diverse levels throughout the Mediterranean in formulating and actualizing coherent and efficacious policies and measures.

Future initiatives under the Barcelona Convention will likely be characterized by deeper integration with global climate change objectives, especially those outlined in the Paris Agreement and the SDGs²⁵⁰. Efforts may focus on reducing greenhouse gas emissions from maritime and coastal activities, enhancing carbon sinks through ecosystem restoration, and promoting renewable energy.

The Barcelona Convention constitutes an essential legal and institutional scaffold that has markedly contributed to climate change adaptation and mitigation efforts within the Mediterranean context. As environmental challenges progress, the Convention is anticipated to increasingly concentrate on executing holistic approaches designed to

²⁴⁸ UNEP/MAP, Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas (UN Environment/MAP Athens, Greece 2017).

²⁴⁹ Climate-ADAPT, 'Guidance Document on Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas' (*Climate-ADAPT*, 12 December 2023) accessed 20 May 2024.

²⁵⁰ 23rd Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols, 'Portoroz Ministerial Declaration' <https://cop23-slovenia.com/wp-content/uploads/2023/12/23ig26_L3_eng_portoroz-ministerial-declaration.pdf> accessed 20 May 2024.

preserve the marine ecosystem and the economic well-being of coastal communities reliant upon it.

b) Related National Laws and Regulations

Individual Mediterranean countries are also actively updating their national laws and frameworks to incorporate climate change objectives, often in line with regional initiatives and international commitments²⁵¹.

The European Union has set some targets for its Member States on climate change regulations²⁵². Thus, the EU Member States in the Mediterranean region, such as Spain, France, Italy, etc., ought to publish some plans to achieve the EU's goals.

For instance:

- Spain has the National Climate Change Adaptation Plan 2021-2030²⁵³, which supersedes a previous iteration from 2006 covering the period 2006-2020. The National Climate Change Adaptation Plan serves as the coordinating framework for Spanish Public Administrations, orchestrating the evaluation of assessment and adaptation to climatic variations within Spain²⁵⁴. The plan covers diverse sectors like biodiversity, agriculture, coastal areas, and transportation. Its goal is to aid administrations and organizations in evaluating climate change impacts and promoting participatory processes for defining adaptation strategies.
- In 2015, France adopted the Energy Transition for Green Growth Act²⁵⁵, legislation purposefully designed to curtail greenhouse gas emissions, catalyse the

²⁵¹ KF Kuh, 'The Law of Climate Change Mitigation: An Overview' (2018) 2 Encyclopedia of the Anthropocene 505-510 507.

²⁵² Directore-General for Climate Action, 'European Climate Law' < [²⁵³ National Climate Change Adaptation Plan 2021-2030 <\[https://www.miteco.gob.es/content/dam/miteco/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/pnacc-2021-2030-en_tcm30-530300.pdf\]\(https://www.miteco.gob.es/content/dam/miteco/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/pnacc-2021-2030-en_tcm30-530300.pdf\)> accessed 30 March 2024.](https://climate.ec.europa.eu/eu-action/european-climate-law_en#:~:text=The%20European%20Climate%20Law%20writes,2030%2C%20compared%20to%201990%20levels.> accessed 30 March 2024.</p></div><div data-bbox=)

²⁵⁴ Ibid.

²⁵⁵ LOI no 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte < https://climate-laws.org/documents/law-no-2015-992-on-energy-transition-for-green-growth-energy-transition-law_c0f1?q=france+energy+transition&id=law-no-2015-992-on-energy-transition-for-green-growth-energy-transition-law_aea3> accessed 17 April 2024.

diversification of its energy model, and increase the utilization of renewable energy sources, with particular emphasis on application within the Mediterranean region²⁵⁶.

- In 2015, the Italian Ministry of the Environment and Energy Security instituted the National Strategy for Adaptation to Climate Change²⁵⁷. This strategy identifies risks and actions needed for sectors such as agriculture, forestry, tourism, and coastal zones, all of which are key components of the Mediterranean environment. Italy has also been progressing on the National Adaptation Plan for Climate Change Adaptation to ensure the objectives set forth in the National Strategy for Adaptation to Climate Change²⁵⁸.
- Greece has established the National Climate Change Adaptation Strategy²⁵⁹ in 2016 in line with EU strategies, which prioritizes actions in key sectors like agriculture, tourism, and public health with a view of promoting sustainable development²⁶⁰.

On the other hand, non-EU countries that are in the Mediterranean region have also updated their national legislation to meet global goals. For example,

- Egypt, bordering the south-eastern corner of the Mediterranean, has put in place various climate change strategies and action plans focusing on both mitigation and adaptation, particularly in the Nile Delta region which is susceptible to sea-level

²⁵⁶ Climate Change Laws of the World, 'Law no. 2015-992 on Energy Transition for Green Growth (Energy Transition Law)' < https://climate-laws.org/document/law-no-2015-992-on-energy-transition-for-green-growth-energy-transition-law_aea3?q=france+energy+transition> accessed 17 April 2024.

²⁵⁷ Ministero dell'Ambiente e della Sicurezza Energetica, 'Strategia Nazionale di Adattamento ai Cambiamenti Climatici', (2015) < [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.mase.gov.it/sites/default/files/archivio/allegati/clima/documento_SNAC.pdf](https://www.mase.gov.it/sites/default/files/archivio/allegati/clima/documento_SNAC.pdf)> accessed 17 April 2024.

²⁵⁸ Ministero dell'Ambiente e della Sicurezza Energetica, Piano Nazionale di Adattamento ai Cambiamenti Climatici, 11/05/2023, <<https://www.mase.gov.it/pagina/piano-nazionale-di-adattamento-ai-cambiamenti-climatici>> accessed 17 April 2024.

²⁵⁹ Ministry of Environment&Energy General Directorate of Environmental Policy Directorate of Climate Change and Atmospheric Quality, 'National Climate Change Adaptation Strategy', April 2016 < [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.bankofgreece.gr/RelatedDocuments/National_Adaptation_Strategy_Excerpts.pdf](https://www.bankofgreece.gr/RelatedDocuments/National_Adaptation_Strategy_Excerpts.pdf)> accessed 17 April 2024.

²⁶⁰ Climate Change Laws of the World, 'The National Strategy for Climate Change Adaptation' < https://climate-laws.org/document/the-national-strategy-for-climate-change-adaptation_5c92?q=National+Strategy+for+Adaptation+to+Climate+Change+Italy&o=50> accessed 17 April 2024.

rise and coastal erosion²⁶¹. Egypt's National Strategy for Adaptation to Climate Change and Disaster Risk Reduction includes a set of policies aimed at safeguarding the agricultural sector, freshwater resources, and coastal zones against the adverse effects of climate alteration, with special attention to sea-level ascension²⁶².

- Algeria's National Climate Plan, prepared in collaboration with national and international partners such as the Ministry of Environment of Algeria, Food and Agriculture Organization, GEF, and the UNDP, aims to drive sustainable socioeconomic advancement, promote social inclusivity, and reduce the dependency of vulnerable economic sectors on climate-sensitive practices²⁶³. The plan includes sustainable development initiatives and renewable energy policies as key elements of its climate adaptation and mitigation strategy²⁶⁴.
- Morocco's National Climate Plan 2030 is oriented towards the enhancement of adaptive capabilities and resilience to climate change²⁶⁵. It promotes the formulation of medium to long-term strategic responses to the ramifications of climate change²⁶⁶.
- In 2024, Türkiye released the Climate Change Mitigation Strategy and Action Plan for 2024-2030²⁶⁷, along with the Climate Change Adaptation Strategy and

²⁶¹ 'Egypt's National Strategy for Adaptation to Climate Change and Disaster Risk Reduction' (*Food and Agriculture Organization of the United Nations FAOLEX Database*, 12/01/2023) < <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC141200/>> accessed 17 April 2024.

²⁶² The Egyptian Cabinet Information&Decision Support Center, 'Egypt's National Strategy for Adaptation to Climate Change and Disaster Risk Reduction' December 2011 <chrome-extension://efaidnbmnribpcajpcglclefindmkaj/https://faolex.fao.org/docs/pdf/egy141200.pdf> accessed 17 April 2024.

²⁶³ Executive Board of the United Nations Development Programme, the United Nations Population Fund and the United Nations Office for Project Services, 'Country Programme Document for Algeria (2023-2027)' DP/DCP/DZA/4 07/12/2022 <chrome-extension://efaidnbmnribpcajpcglclefindmkaj/https://www.undp.org/sites/g/files/zskgke326/files/2023-03/CPD%20Algeria%202023-2027.pdf> accessed 17 April 2024.

²⁶⁴ Ibid, 5.

²⁶⁵ Climate Change Competence Center of Morocco, 'National Policy' < <https://www.4c.ma/documents?lang=en>> accessed 17 April 2024.

²⁶⁶ Sue Fleming and Riadh Ammari, 'Climate Action Will Boost Tunisia's Economy says World Bank Report.' (01/12/2023) ReliefWeb < <https://reliefweb.int/report/tunisia/tunisia-country-climate-and-development-report-november-2023-enar>> accessed 17 April 2024.

²⁶⁷ T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı İklim Değişikliği Başkanlığı, 'İklim Değişikliği Azaltım Stratejisi ve Eylem Planı (2024-2030)' < chrome-extension://efaidnbmnribpcajpcglclefindmkaj/https://iklim.gov.tr/db/turkce/icerikler/files/%C4%B0klım%20De%20ve%20Fi%20C5%9Fikli%20Azalt%20ve%20Eylem%20Plan%20(2024-2030).pdf> accessed 17 April 2024.

Action Plan for 2024-2030²⁶⁸. Within this framework, the primary objective of these documents is to achieve the net zero emissions target by 2053. The Climate Change Mitigation Strategy and Action Plan encompasses the energy, industry, urban planning, transportation, waste management, agriculture and forestry sectors as well as carbon pricing mechanisms, and transition issues²⁶⁹. Additionally, the Climate Change Adaptation Strategy and Action Plan are built upon climate change impact, vulnerability, and risk analyses to identify and implement adaptation actions at national, regional, and local scales²⁷⁰. Furthermore, Türkiye continues its efforts towards the enactment of the Climate Law²⁷¹.

These examples illustrate how Mediterranean countries, despite their different economic, environmental, and social contexts, are all actively engaged in developing national strategies and legislations to mitigate greenhouse gas emissions and to adapt to climate change ramifications. The given legislations are often in response to specific national vulnerabilities and strengths, and they aim to contribute to international climate goals while also aligning with regional initiatives such as the Barcelona Convention and the EU. Typically, each country's route encompasses a comprehensive policy suite targeting various sectors such as energy, agriculture, and transportation, and ensures the active participation of an extensive range of stakeholders from public and private sectors, in

²⁶⁸ T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı İklim Değişikliği Başkanlığı, 'İklim Değişikliğine Uyum Stratejisi ve Eylem Planı (2024-2030)' < chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://iklim.gov.tr/db/turkce/icerikler/files/%C4%B0klim%20De%C4%9Fi%C5%9Fikli%C4%9Fi%20Uyum%20Stratejisi%20ve%20Eylem%20Plan_%202024-2030.pdf> accessed 17 April 2024.

²⁶⁹ T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı İklim Değişikliği Başkanlığı, 'İklim Değişikliği Azaltım Stratejisi ve Eylem Planı (2024-2030)' < chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://iklim.gov.tr/db/turkce/icerikler/files/%C4%B0klim%20De%C4%9Fi%C5%9Fikli%C4%9Fi%20Azalt%C4%B1m%20Stratejisi%20ve%20Eylem%20Plan%C4%B1%20(2024-2030).pdf> accessed 17 April 2024.

²⁷⁰ T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı İklim Değişikliği Başkanlığı, 'İklim Değişikliğine Uyum Stratejisi ve Eylem Planı (2024-2030)' < chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://iklim.gov.tr/db/turkce/icerikler/files/%C4%B0klim%20De%C4%9Fi%C5%9Fikli%C4%9Fi%20Uyum%20Stratejisi%20ve%20Eylem%20Plan_%202024-2030.pdf> accessed 17 April 2024.

²⁷¹ 'İklim Değişikliği Bakanı Prof. Dr. Halil Hasar: İklim Kanunu Lokomotif Gücümüz Olacak' 28/09/2023, *T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı* <https://csb.gov.tr/iklim-degisikligi-baskani-prof.-dr.-halil-hasar-iklim-kanunu-lokomotif-gucumuz-olacak-bakanlik-faaliyetleri-38819> accessed 17 April 2024.

addition to civil society organizations. The evolution of climate change legislation and regulations within the Mediterranean showcases an ongoing shift toward resilient and sustainable societies equipped to navigate and react to the complex challenges presented by climate change.

2- Institutional Framework on Climate Change

a) Mediterranean Action Plan

The Mediterranean Action Plan (hereinafter the ‘MAP’), established in 1975, is a regional strategy under the umbrella of the United Nations Environment Programme's Regional Seas Programme. It is designed to promote sustainable development and environmental stewardship in the Mediterranean region. MAP was one of the first Regional Seas programmes and serves as a cooperative effort among Mediterranean countries to address critical environmental challenges in an integrated manner.

The primary objective of MAP is to provide a strategic policy framework that enables the countries of the Mediterranean basin to protect the marine environment and support sustainable development. MAP's approach encompasses socio-economic and environmental aspects, recognising the intrinsic connection between protecting the regional environment, conserving biodiversity, and promoting human well-being.

MAP operates through several components, which include:

- The Barcelona Convention and its Protocols that is the legal foundation for its activities.
- The Regional Activity Centres are specialized entities that provide technical support, capacity building, and sharing of best practices.
- The MAP Coordinating Unit facilitates the implementation of environmental strategies and action plans.

The activities, programs, and projects implemented by the MAP Components, including the MAP Coordinating Unit and the six Regional Activity Centres (RAC) hosted by Mediterranean countries, aim to respond to the ever-changing environmental challenges,

including climate change's impact on marine and coastal ecosystems, and to coordinate Contracting Parties for development and environmental sustainability in the Mediterranean Region.

An important component of this institutional structure is the RACs, which have specific mandates to provide and develop the expertise necessary to implement the Convention for the common good of the Mediterranean. The six RACs hosted by the six Contracting Parties to the Convention are listed below;

- The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (hereinafter the 'REMPEC'), situated in Valletta and hosted by Malta, was established in 1976 with a decision by the Meeting of Contracting Parties with an initial focus on combating oil pollution²⁷². The Centre has been operating as REMPEC since 1989. REMPEC is administered by the International Maritime Organization (hereinafter the 'IMO') in collaboration with UNEP/MAP. Its primary objective is to avert, diminish, and aid in addressing pollution during emergency situations that arise from maritime vessels²⁷³
- The Plan Bleu Regional Activity Centre (hereinafter the 'PB/RAC'), located in Marseille, operates under the host country of France²⁷⁴. The PB/RAC was established in 1977. Its operational agenda is defined biennially during the Meetings of the Contracting Parties. The fundamental aim of the PB/RAC is to increase awareness among stakeholders and decision-makers in the Mediterranean about environmental concerns and sustainable development, including the generation of alternative developmental scenarios²⁷⁵.
- Croatia hosts the Priority Actions Programme Regional Activity Centre (hereinafter the 'PAP/RAC') in Split²⁷⁶. Established in 1977 as part of

²⁷² REMPEC, 'Mandate' (published on 12 June 2019) < <https://www.rempec.org/en/about-us/mandate/mandate>> accessed 20 May 2024.

²⁷³ UNEP (DEPI)/MED.IG.19/8, Decision IG.19/5 "Mandates of the Components of MAP" <https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf> accessed 20 May 2024.

²⁷⁴ Plan Bleu, 'Who Are We?' < <https://planbleu.org/en/who-we-are/>> accessed 20 May 2024.

²⁷⁵ UNEP (DEPI)/MED.IG.19/8, Decision IG.19/5 "Mandates of the Components of MAP" <https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf> accessed 20 May 2024.

²⁷⁶ PAP/RAC, 'Who Are We?' < <https://paprac.org/who-are-we>> accessed 20 May 2024.

UNEP/MAP, PAP/RAC collaborates with National Focal Points and operates through an interdisciplinary framework. It sustains an extensive network comprising experts from numerous institutions and organizations throughout the Mediterranean region. Its central tenet is to steer the endeavours of Mediterranean nations toward sustainable coastal development²⁷⁷.

- The Specially Protected Areas Regional Activity Centre (hereinafter the ‘SPA/RAC’) is established in Tunisia. Formally established pursuant to a resolution at the 1985 Conference of the Parties Meeting, SPA/RAC's undertakings are dedicated to facilitating the enactment of the Barcelona Convention's Protocol concerning Specially Protected Areas and Biological Diversity²⁷⁸. It prioritizes the expansion of special protection zones, the curtailment of marine and coastal biodiversity decline, and the provision of support and technical knowledge to the Contracting Parties²⁷⁹.
- The Sustainable Consumption and Production Regional Activity Centre (hereinafter the ‘MedWaves’) is hosted by Spain in Barcelona. Inaugurated in 1996 via a collaborative accord between the Spanish Ministry of the Environment and the Catalan Government, MedWaves functions within the legal structure of UNEP to advance the objectives of both the Barcelona Convention and the Stockholm Convention on Persistent Organic Pollutants²⁸⁰. Its purview encompasses the circular economy, marine debris, plastic contamination, toxic substances, and the blue economy²⁸¹. MedWaves engages in capacity enhancement, provision of technical assistance, consultative services, and training endeavours to bolster the capabilities of the Contracting Parties in these specified domains.

²⁷⁷ UNEP (DEPI)/MED.IG.19/8, Decision IG.19/5 “Mandates of the Components of MAP” <https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf> accessed 20 May 2024.

²⁷⁸ SPA/RAC, ‘Missions’ < <https://www.rac-spa.org/missions>> accessed 20 May 2024.

²⁷⁹ UNEP (DEPI)/MED.IG.19/8, Decision IG.19/5 “Mandates of the Components of MAP” <https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf> accessed 20 May 2024.

²⁸⁰ MedWaves, ‘The Barcelona Convention’ < <https://www.medwaves-centre.org/convention/the-barcelona-convention/>> accessed 20 May 2024.

²⁸¹ UNEP (DEPI)/MED.IG.19/8, Decision IG.19/5 “Mandates of the Components of MAP” <https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf> accessed 20 May 2024.

- The Information and Communication Regional Activity Centre (hereinafter the ‘INFO/RAC’) is hosted by Italy in Rome. Constituted in line with the decision from the Conference of the Parties in 2005, INFO/RAC's mission is to develop an information management infrastructure that underpins the activities of communication and information within the Mediterranean Action Plan²⁸². Key goals entail elevating public consciousness and fostering engagement, in addition to the accumulation and dissemination of information that assists the decision-making processes across regional, national, and local levels²⁸³.

The Regional Activity Centres play a crucial role in executing action plans across various scales, encompassing regional, international, subregional, and national levels. The operationalization of these action plans and programs necessitates the proactive engagement of Mediterranean countries and associated stakeholders to efficaciously implement these strategies²⁸⁴.

Climate change is a significant area of concern for MAP, given the multiple stress factors it imposes on the Mediterranean region. MAP addresses climate change through various strategies that encompass mitigation and adaptation measures. The Programme promotes knowledge exchange on climate science, supports the development of regional climate change models and vulnerability assessments, and enables the integration of climate change considerations into national policies and plans. In this regard, a new Regional Activity Centre on Climate Change (hereinafter the ‘CC/RAC’) hosted by Türkiye has been established at the 23rd Conference of Parties to the Barcelona Convention²⁸⁵. The newly established centre aims to conduct regional initiatives that aim to minimize the impacts of climate change, chiefly through the identification and implementation of novel

²⁸² INFO/RAC, ‘Mission’ < <http://www.info-rac.org/en/about-us>> accessed 20 May 2024.

²⁸³ UNEP (DEPI)/MED.IG.19/8, Decision IG.19/5 “Mandates of the Components of MAP” <https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf> accessed 20 May 2024.

²⁸⁴ Beyza Özturanlı Şanda and Özlem Örne, ‘Legal Status of the Regional Activity Centers (RACs) under the Institutional Structure of Mediterranean Action Plan (MAP)’ (2023) 61 DEHUKAM Journal of the Sea and Maritime Law, 87-116 94.

²⁸⁵ UNEP/MED IG.26/22, ‘Decision IG.26/12 Establishment of Regional Activity Center on Climate Change’ <https://wedocs.unep.org/bitstream/handle/20.500.11822/44725/23ig26_22_2612_eng.pdf> accessed 20 May 2024.

solutions for adaptation and mitigation²⁸⁶. Additionally, the centre endeavours to secure financial resources to support these objectives and to elevate awareness pertaining to these critical concerns²⁸⁷.

The purview of the Mediterranean Action Plan is broadening to foster heightened involvement from both public and private entities in climate-related initiatives. Through the establishment of strategic partnerships, MAP amplifies its ability to execute expansive projects that concurrently cater to environmental preservation and enhance climate resilience²⁸⁸. MAP recognises the criticality of integrating a diverse spectrum of stakeholders in climate-related endeavours, encompassing local populations, non-governmental organisations, academic institutions, and business sectors. The programme advocates for inclusive participation, ensuring equitable representation and the assimilation of indigenous knowledge within the framework of climate strategy development²⁸⁹.

The Mediterranean Action Plan continues to play a critical role in uniting the Mediterranean countries around shared environmental challenges exacerbated by climate change. The MAP promotes collaborative endeavours, establishes a strong policy infrastructure, and enables inventive approaches. It is instrumental in navigating the Mediterranean region toward a trajectory characterized by sustainability and increased resilience to climatic perturbations.

b) Union for the Mediterranean

The Union for Mediterranean (hereinafter the ‘UfM’), through its policy frameworks and projects, enhances cooperation and partnerships among member states to tackle social,

²⁸⁶ Merve Berker, ‘Climate Change Centre for Mediterranean to be established in İstanbul’ (*Anadolu Agency*, 19 December 2023) <<https://www.aa.com.tr/en/environment/climate-change-center-for-mediterranean-to-be-established-in-istanbul/3086541#:~:text=The%20Climate%20Change%20Regional%20Activity,ensuring%20regional%20adaptation%20to%20climate>> accessed 12 March 2024.

²⁸⁷ Ibid.

²⁸⁸ Marinos Yeroulanos, ‘The Mediterranean Action Plan: A Success Story in International Cooperation’ (1982) 49 293 *Ekistics* 175-179 177.

²⁸⁹ Plan Bleu, ‘The Mediterranean Action Plan: The Challenges of a Regional Process Towards Sustainable Development’ (2013) <https://planbleu.org/wp-content/uploads/2010/10/rio20_pb_governance_en.pdf> accessed 20 May 2024.

economic, and environmental challenges, with climate action being a pivotal point of focus²⁹⁰. The UfM supports and promotes national strategies on climate change, encouraging member states to take holistic and robust action towards adaptation and mitigation.

The UfM constitutes a multilateral collaborative framework that includes 43 nations spanning Europe and the Mediterranean Basin²⁹¹. It was established to foster cooperation and enhance stability in the region, with climate action recognized as a pivotal point of focus due to its cross-border nature and significant impact on regional development and security²⁹². The UfM provides a unique framework that leverages the power of collective action to address climate change²⁹³. It has become a platform for member states to coordinate their efforts, share best practices, and develop regional policies tailored to confront the distinctive challenges posed by climate change within the Mediterranean region.

One of the UfM's key roles is supporting the development and implementation of national strategies on climate change. This includes encouraging member states to take comprehensive action to mitigate greenhouse gas emissions and adapt to climate change impacts. The UfM underscores the necessity of incorporating climate-related considerations into the entirety of national planning frameworks and development agendas²⁹⁴.

The UfM facilitates and promotes a wide range of climate-related projects to access climate finance. These initiatives often focus on specific areas such as renewable energy sources, energy efficiency, sustainable transportation as well as water and resource management, and urban development. Through projects that leverage regional

²⁹⁰ Union for the Mediterranean, 'What We Do?' < <https://ufmsecretariat.org/what-we-do/>> accessed 20 May 2024.

²⁹¹ Union for the Mediterranean, 'Member States' <<https://ufmsecretariat.org/who-we-are/member-states/>> accessed 20 May 2024.

²⁹² Ibid.

²⁹³ Union for the Mediterranean, 'What We Do?' < <https://ufmsecretariat.org/what-we-do/>> accessed 20 May 2024.

²⁹⁴ The UfM Ministers of Foreign Affairs, 'The Union for the Mediterranean: an action-driven organisation with common ambition' adopted on 23 January 2017 <<https://ufmsecretariat.org/wp-content/uploads/2017/10/UfM-Roadmap-for-action-2017.pdf>> accessed 20 May 2024.

cooperation, the UfM aims to implement practical solutions to reduce the carbon footprint of member states and increase their adaptive capacity²⁹⁵.

Recognizing that climate change affects various sectors differently, the UfM advocates for and supports sector-specific strategies. This encompasses a concentration on issues pertinent to water scarcity and agricultural practices which hold significant concern in the Mediterranean region due to the associated effects of climate change on water supplies and food stability²⁹⁶.

By aligning initiatives with international climate goals and ensuring consistency with other regional efforts like the MAP and the Barcelona Convention, the UfM strives to harmonize regional efforts and amplify their impact.

c) The Mediterranean Experts on Climate and Environmental Change

The MedECC (the Mediterranean Experts on Climate and Environmental Change) is an autonomous and inclusive collective of over 700 scientists and specialists from 35 countries, established in 2015²⁹⁷. The network's experts are tasked with evaluating the ramifications of climatic and environmental alterations in the Mediterranean. Commencing in 2018, the PB/RAC has accommodated the Scientific Secretariat under a collaborative arrangement with the Union for the Mediterranean²⁹⁸.

The MedECC network fosters regional collaboration to address environmental and climate change issues. By enhancing the knowledge base and scientific assessments, MedECC supports better-informed decision making and law-making for climate change adaptation and mitigation in the Mediterranean.

A pivotal aspect of MedECC's work involves producing comprehensive scientific assessments regarding environmental conditions and the consequential effects of climatic

²⁹⁵ Ibid.

²⁹⁶ Elistania Elistaina, Farandy Nurmeiga and Agung Permadi, 'Strategy to Strengthen Cooperation Between the European Union and the Mediterranean Countries Through the Union for Mediterranean (UfM)' (2019) 21 2 Global:Jurnal Politik Internasional 242-261 254.

²⁹⁷ MedECC, 'Who Are We?' <<https://www.medecc.org/organisation/>> accessed 20 May 2024.

²⁹⁸ Plan Bleu, 'MedECC-Mediterranean Experts on Climate and Environmental Change' <<https://planbleu.org/en/projects/medecc-mediterranean-experts-on-climate-and-environmental-change/>> accessed 20 May 2024.

shifts. The principal aim of MedECC is to furnish cutting-edge risk analyses that synthesize the existing scientific knowledge. This includes examining the potential influences of climatic variations on various sectors such as water resources, agriculture, biodiversity, and human health in the Mediterranean²⁹⁹.

MedECC produces reports, such as the Mediterranean Assessment Report, which detail the various risks and challenges the region faces from climate and environmental changes³⁰⁰. These reports are critical in providing a consistent and transparent knowledge base from which strategies for adaptation and mitigation can be formulated. MedECC's assessments are instrumental in identifying key vulnerabilities within the Mediterranean region³⁰¹. By laying out the impacts of climate change, these assessments supply on building resilience and developing targeted adaptation strategies that can protect ecosystems, economies, and communities.

The network interacts with other regional initiatives and frameworks, such as the UfM and the MAP, to ensure coherence and the efficient use of resources. These collaborations aim to create a unified front in addressing the multifaceted aspects of climate change in the region.

Initiatives like the Barcelona Convention, the UfM, and the Mediterranean Action Plan promote regional cooperation, which is complemented by national strategies. This supports a robust framework that considers the shared and unique needs of this diverse region.

²⁹⁹ MedECC, *Mediterranean Experts on Climate and Environmental Change*, 'Climate and Environmental Change in the Mediterranean Basin Current situation and risks for the future (First Mediterranean Assessment Report, 2020) 49.

³⁰⁰ MedECC, 'Reports' <<https://medecc.org/reports/>> accessed 20 May 2024.

³⁰¹ Ibid.

III. ADAPTATION AND MITIGATION STRATEGIES AND THEIR INTEGRATION

A) WAYS TO ADDRESS THE IMPACTS OF CLIMATE CHANGE

As it can be seen in the previous chapters, climate change stands as a central pillar in the triple planetary crisis due to its pervasive and far-reaching impacts. Global climate change is inevitably a fact, and nations worldwide need to find ways to address its impacts. Various agreements, such as the UNFCCC, the Paris Agreement, the 2030 Agenda for Sustainable Development Goals, and various institutional structures like the UNEP and the IPCC, have taken many initiatives to address the impacts of climate change³⁰². The main consensus of the globe is that the effects of climate change can be reduced by mitigation and adaptation³⁰³.

Mitigation and adaptation strategies are both vital components in addressing the risks posed by climate change. Mitigation efforts focus on GHG emissions and implementing carbon capture methods to prevent widespread changes on a global scale³⁰⁴. On the other hand, adaptation measures encompass a diverse array of measures tailored to various levels of scale, aimed at preparing for and mitigating the adverse impacts of climate change³⁰⁵.

The IPCC states that profound, swift, and enduring mitigation efforts, coupled with the expedited advancement of adaptation initiatives within this decade, are projected to curtail ensuing losses and damages to human and ecological systems³⁰⁶. Such proactive measures are anticipated to confer additional advantages, notably with respect to air quality and public health. Conversely, procrastination in both mitigation and adaptation endeavours is likely to cement commitments to high-emission infrastructure, elevate the

³⁰² For further information: Chapter II: Legal and Institutional Framework on Climate Change.

³⁰³ Kashif Abbass and others, 'A review of the global climate change impacts, adaptation and sustainable mitigation measures' (2022) 29 *Environmental Science and Pollution Research* (2022) 42539–42559 42551.

³⁰⁴ Paul Watkiss, Magnus Benzie, and Richard J.T. Klein, 'The complementarity and comparability of climate change adaptation and mitigation' (2015) 6 *WIREs Climate Change* 541-557 541.

³⁰⁵ *Ibid*, 541.

³⁰⁶ Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2023: Synthesis Report: Contribution of Working Groups I, II and III to the Sixth Assessment Report' (2023).

likelihood of assets becoming stranded, provoke cost inflation, diminish feasibility, and amplify losses and damages. Consequently, the objective is to pre-emptively address these environmental stressors and threats to mitigate their impacts and obtain the emergence of novel risks.

The Mediterranean Sea represents a critical arena in the ongoing struggle to combat climate change, enduring the forefront of its ecological and socio-economic repercussions. Addressing these challenges and achieving a climate-resilient Mediterranean Sea requires coordinated action at local, regional, and global scales, integrating climate adaptation and mitigation strategies. Given its status as one of the globe's regions most susceptible to climatic perturbations, the Mediterranean mandates customised and pioneering strategies to address the mounting risks and susceptibilities engendered by the climatic transition. Therefore, in this chapter, an in-depth examination of the initiatives undertaken to combat climate change in the Mediterranean Sea will be conducted.

1- Mitigation Efforts in the Mediterranean Sea

The global and persistent nature of GHGs is a cornerstone of the scientific understanding of climate change. Due to their long atmospheric lifespans and homogeneous distribution within the atmosphere, the specific geographic origin of GHG emissions or removals does not significantly influence the magnitude or spatial patterns of global warming. Rather, it is the net balance of global GHG emissions that ultimately determines the trajectory of climate change.

The IPCC articulates climate change mitigation as a series of actions directed towards reducing the release of GHG into the atmosphere, enhancing the sinks that remove these gases, and engendering systemic transformations to arrest the accumulation of such gases³⁰⁷. The objective of these measures is to stabilize greenhouse gas concentrations at

³⁰⁷ Renee van Diemen and others, 'Annex I: Glossary' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022 Mitigation of Climate Change: Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022).

a level that would prevent dangerous anthropogenic interference with the climate system, fostering a sustainable and temperature-constrained future³⁰⁸.

The Mediterranean Sea, being a unique and complex ecological domain, predisposes its climatic needs toward comprehensive mitigation³⁰⁹. The region is experiencing perturbations in climate patterns, manifesting in escalated temperatures, altered precipitation rhythms, and heightened sea level rise, which necessitates a robust mitigation infrastructure³¹⁰. An urgent reduction in GHG emissions is vital, along with fortification of natural sinks, to alleviate the exacerbated climatic impacts in the region³¹¹.

A spectrum of strategies to mitigate greenhouse gas emissions has been enacted in the Mediterranean struggle against climate change³¹². One notable global actor, the International Maritime Organization, has established strategies that include enhancing the energy efficiency of shipping fleets, integrating innovative low-carbon technologies, and investing in the development of sustainable fuels. The IMO's ambition aligns with the broader objective of achieving a net zero emission target, charting a course toward the full decarbonization of maritime transport by the latter half of the twenty-first century³¹³.

IMO's strategies stem from its initial GHG reduction strategy adopted in 2018³¹⁴. This strategy aims to decrease the total annual GHG emissions from international shipping by

³⁰⁸ Scotford, Minas and Macintosh, 331.

³⁰⁹ Monica Salvia and others, 'Climate mitigation in the Mediterranean Europe: An assessment of Regional and City-Level Plans' (2021) 295 *Journal of Environmental Management* 1-11 2.

³¹⁰ 'Summary for Policymakers' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2023: Synthesis Report: Contribution of Working Groups I, II and III to the Sixth Assessment Report' (2023) 1-34 28.

³¹¹ Jim Skea and others, 'Summary for Policymakers' in Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2022 Mitigation of Climate Change: Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change' (2022) 1-48 40.

³¹² Dania Abdul Malak and others, 'MED Maritime Integrated Projects Med-IAMER: Final Report' (2016) 1-571 14-17
<https://www.researchgate.net/publication/315701229_Integrated_Actions_to_Mitigate_Environmental_Risks_in_the_Mediterranean_Sea_Med-IAMER_project_-_Final_report> accessed 26 May 2024.

³¹³ IMO, '2023 IMO Strategy on Reduction of GHG Emissions from Ships' <<https://www.imo.org/en/OurWork/Environment/Pages/2023-IMO-Strategy-on-Reduction-of-GHG-Emissions-from-Ships.aspx>> accessed 26 May 2024.

³¹⁴ IMO MEPC Resolution MEPC.304 (72), Initial IMO Strategy on Reduction of GHG Emissions from Ships', adopted on 13 April 2016, <[https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.304\(72\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.304(72).pdf)> accessed 26 May 2024.

at least 50% by 2050 compared to 2008 levels, with a long-term vision of phasing them out as soon as possible within this century³¹⁵. Subsequent to this initiative, the IMO has remained responsive to technological and regulatory progress, exemplified by its adoption of the “2023 IMO Strategy on Reduction of GHG Emissions from Ships”³¹⁶. The significance of IMO’s strategies lies in their potential to drive comprehensive change in an industry that is inherently international. Key components of the strategy include improving energy efficiency, transitioning to low-carbon and sustainable alternative fuels, and developing market-based measures³¹⁷.

IMO aims to improve energy efficiency by decreasing the Carbon Intensity of new ships with the Energy Efficiency Design Index and articulating the Ship Energy Efficiency Management Plan for all ships, which are measures designed to improve energy efficiency and reduce fuel consumption, thereby lowering GHG emissions³¹⁸. The transition to low-carbon and sustainable alternative fuels such as biofuels, methanol, or ammonia is critical for decarbonization³¹⁹. Additionally, investment in research and development of renewable energy sources, like wind and solar, and in technologies such as electric propulsion systems, are central to the IMO's decarbonization efforts³²⁰. The International Maritime Organization contemplates the formulation of market-based mechanisms as economically viable mid-term measures to incentivize the reduction of emissions within the maritime sector³²¹. These mechanisms encompass strategies such as

³¹⁵ Meinhard Doelle and Aldo Chircop, ‘Decarbonizing International Shipping: An Appraisal of the IMO’s Initial Strategy’ (2019) 28 3 *Review of European, Comparative & International Environmental Law* 268-277 272.

³¹⁶ IMO MEPC Resolution MEPC.377 (80), ‘2023 IMO Strategy on Reduction of GHG Emissions from Ships’ adopted 7 July 2023, <<https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/annex/MEPC%2080/Annex%2015.pdf>> accessed 26 May 2024.

³¹⁷ Aldo Chircop, ‘The IMO Initial Strategy for the Reduction of GHGs from International Shipping: A Commentary’ (2019) 34 *The International Journal of Marine and Coastal Law* 482-512 491.

³¹⁸ Tae-Hwan Joung and others, ‘The IMO Initial Strategy for Reducing Greenhouse Gas (GHG) Emissions, and Its Follow-Up Actions Towards 2050’ (2020) 4 1 *Journal of International Maritime Safety, Environmental Affairs, and Shipping* 1-7 2.

³¹⁹ Levent Bilgili, ‘Comparative Assessment of Alternative Marine Fuels in Life Cycle Perspective’ (2021) 144 *Renewable and Sustainable Energy Reviews* 1-17 3.

³²⁰ Jeffrey Dankwa Ampah and others, ‘Reviewing Two Decades of Cleaner Alternative Marine Fuels: Towards IMO’s Decarbonization of the Maritime Transport Sector’ (2021) 320 *Journal of Cleaner Production* 1-25 4-6.

³²¹ David Metzger, ‘Market-Based Measures and Their Impact on Green Shipping Technologies’ (2022) 21 3 *WMU Journal of Maritime Affairs* 3-23 4.

the implementation of carbon pricing frameworks or the establishment of a cap-and-trade system specific to shipping, which are deemed proficient in fostering financial motivation for diminishing greenhouse gas outputs³²².

Furthermore, The IMO's enactment of the International Convention for the Prevention of Pollution from Ships³²³ stands as a testament to its commitment to marine environmental protection. Notably, Annex VI of the convention plays a crucial role in dictating standards for the emission of sulphur oxides and nitrogen oxides from ships³²⁴. Within this specific regulatory framework, as of 1 May 2025, the Mediterranean Sea has been designated as an "Emission Control Area for Sulphur Oxides and Particulate Matter", underscoring the region's enhanced environmental safeguards³²⁵. This classification positions the Mediterranean Sea at the forefront of areas where heightened emission reduction measures are operational, reflecting a global shift toward mitigating the environmental impact of maritime activities.

The IMO's strategies sets a rigorous course towards decarbonization, but the actual reduction in emissions and the effectiveness of these measures will ultimately depend on the collective and sustained effort of the international community, including shipping companies, policymakers, technology providers, and the financial sector³²⁶. Successfully reaching the net zero emission target involves not only the adoption of IMO's measures but also aligning them with the national policies of member states and ensuring the incentivization of low-carbon shipping practices globally³²⁷. Considering the long

³²² Ibid, 17.

³²³ The International Convention for the Prevention of Pollution from Ships, 1340 UNTS 293, adopted on 2 November 1973, amended on 17 February 1978, entered into force on 2 October 1983, <<https://treaties.un.org/doc/Publication/UNTS/Volume%201340/volume-1340-A-22484-English.pdf>> accessed 26 May 2024.

³²⁴ Bilgili, 2.

³²⁵ IMO MEPC Resolution MEPC.361(79), 'Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto Mediterranean Sea Emission Control Area for Sulphur Oxides and Particulate Matter' adopted on 16 December 2022, <[https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/annex/resolution%20MEPC%20361\(79\).pdf](https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/annex/resolution%20MEPC%20361(79).pdf)> accessed 26 May 2024.

³²⁶ Hanna Bach and Teis Hansen, 'IMO Off Course for Decarbonisation of Shipping? Three Challenges for Stricter Policy' (2023) 147 Marine Policy 1-7 5.

³²⁷ In this regard, according to Article 3 of the Official Gazette published on 09/07/2024, the Turkish Parliament has approved plans to tax ships entering or leaving its ports in the country's upcoming carbon market. <<https://www.resmigazete.gov.tr/eskiler/2024/07/20240709-1.htm>> accessed 1 August 2024.

lifespan of shipping vessels and the time required for turnover of the fleet, timely action is critical. The maritime industry's journey to net zero is complex and challenging, but the IMO's strategic direction provides a foundation upon which this crucial transition can be built.

Complementary to technological advances and regulatory strategies, climate change mitigation in the Mediterranean involves a multifaceted approach to protect and restore coastal blue carbon ecosystems, such as wetlands, seagrasses, mangroves, and marine biodiversity³²⁸. These ecosystems are potent carbon sinks, significantly contributing to carbon sequestration and playing an instrumental role in mitigating the impacts of anthropogenic carbon emissions³²⁹. Such nature-based solutions are integral to a holistic mitigation strategy, bridging the gap between biodiversity preservation and climatic stabilization.

There are several measures that have been taken to mitigate the effects of climate change for the protection and restoration of the Mediterranean Sea and its coasts. Central to these measures is the establishment and expansion of marine protected areas (hereinafter the 'MPA')³³⁰. These areas have become cornerstones of conservation, playing a pivotal role in safeguarding vital habitats, preserving biodiversity and allowing ecosystems to recover from human impacts. The MPAs not only protect against overfishing and habitat destruction but also contribute to reducing GHG emissions by preventing practices that could lead to increased carbon release³³¹.

In addition to MPAs, efforts to restore mangrove forests and coastal wetlands are underway. Recognized for their role as robust carbon sinks and natural defenses against storm surges and erosion, these habitats are restored through reforestation with native

³²⁸ Marine Lecerf and others, 'Coastal and Marine Ecosystems as Nature-Based Solution in New or Updated Nationally Determined Contributions', (2023) Ocean&Climate Platform, Conservation International, IUCN, Rare, The Nature Conservancy, Wetlands International and WWF, 1-75 39.

³²⁹ Ibid, 19.

³³⁰ Emmanouil Tyllianakis, "'Please let me visit": Management Options for Marine Ecosystems in a Mediterranean Marine Protected Area' (2022) 67 Journal for Nature Conservation 1-11 1-2.

³³¹ Maria Maestro and others, 'Marine Protected Areas in the 21st Century: Current Situation and Trends' (2019) 171 Ocean& Coastal Management 28-36 30.

species and the control of invasive species³³². This leads not only to increased carbon dioxide absorption but also provides essential habitats for biodiversity and erosion control³³³. Managing pollution, particularly from land-based sources, is also part of the strategy to ensure the vitality of coastal ecosystems³³⁴ like coral reefs and seagrass beds, which are integral to carbon sequestration. Furthermore, ecosystem-based management practices are being integrated into the stewardship of marine resources. This ensures that marine ecosystems maintain their functionality and continue to offer services vital to climate change mitigation, such as carbon sequestration³³⁵.

Each of these measures contributes to the overall mitigation strategy by either directly reducing GHG emissions or by enhancing the natural processes that remove carbon dioxide from the atmosphere. Protecting and restoring coastal ecosystems ensure their continuity as natural barriers against climate impacts and as critical habitats for a diverse range of species, sustaining the Mediterranean's biodiversity.

Meticulous attention to, and investment in, the various mitigation measures is indispensable for the Mediterranean region's response to climate change. The synergy of international regulations, such as those stipulated by the IMO, with local conservation initiatives offers a comprehensive approach to mitigate the adverse effects of climate change. Collaboration across countries can lead to the sharing of best practices, harmonization of policy approaches, and enabling joint projects with broader regional impacts. Collectively, these efforts strive to maintain the Mediterranean's ecological equilibrium, safeguard its marine biodiversity, and ensure the endurance of its natural

³³² Martin Zimmer and Veronique Helfer, 'Mangrove Forests- A Nature-based Solution for Climate Change Mitigation and Adaptation' (2022) 1 *The International Journal for Rural Development* 23-25 23 < https://www.rural21.com/fileadmin/downloads/2022/en-01/rural2022_01-S23-25.pdf> accessed 26 May 2024.

³³³ IUCN, 'Mangrove Restoration: Offering Two-for-one Solutions to Climate Change' (*IUCN*, 20 January 2017) <<https://www.iucn.org/news/forests/201701/mangrove-restoration-offering-two-one-solutions-climate-change#:~:text=All%2029%20nations%20have%20identified,to%20replanting%20entire%20mangrove%20forests.>> accessed 26 May 2024.

³³⁴ Ramesh Ramachandran and others, 'Improving Science and Policy in Managing Land-Based Sources of Pollution' (2014) 11 *Environmental Development* 4-18 5.

³³⁵ C. Epple and others, 'Managing Ecosystems in the Context of Climate Change Mitigation: A Review of Current Knowledge and Recommendations to Support Ecosystem-Based Mitigation Actions that Look Beyond Terrestrial Forests' (2016) *Technical Series No.86 Secretariat of the Convention on Biological Diversity* 1-55 21.

heritage for future generations. Achieving this balance is not merely a regional concern but a global imperative with significant implications for the health of our planet's oceans and the stability of its climate.

2- Adaptation Measures in the Mediterranean Sea

Climate change adaptation plays a vital part in addressing climate change impacts, along with mitigation and sustainable development³³⁶. The Paris Agreement states the urgent need on "...increasing the ability to adapt to adverse impacts of climate change and foster climate resilience..."³³⁷ and the importance of having a "... global goal on adaptation"³³⁸.

While widely recognized as a necessity, and potentially even an opportunity, the concept of climate change adaptation suffers from a lack of definitional clarity. The diverse interpretations of adaptation, and the subsequent framing of adaptive responses, significantly influence the nature and effectiveness of strategies employed to address the effects of climate change³³⁹. The IPCC Sixth Assessment Report has framed adaptation as;

"... the process of adjustment to actual or expected climate and its effects in order to moderate harm or exploit beneficial opportunities³⁴⁰".

Thus, adaptation in the context of climate change refers to an array of actions tailored to address and navigate the evolving environmental conditions resulting from climate variability and change. Adaptation can be seen as a collection of responsive actions aimed at adjusting to new environments. It involves both technical solutions and social learning processes that shape decision-making during adaptation³⁴¹.

³³⁶ Rawshan Ara Begum and others, 'Points of Departure and Key Concepts' (2022) *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* 121-196 127.

³³⁷ The Paris Agreement Article 2.

³³⁸ The Paris Agreement Article 2.

³³⁹ RM Wise and others, 'Reconceptualising adaptation to climate change as part of pathways of change and response' (2014) 28 *Global Environmental Change*, 325–336.

³⁴⁰ Vincent Möller and others, 'Annex II: Glossary' (2022) *Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, 2897-2930 2898.

³⁴¹ Kevin Collins, Ray Ollison, 'Jumping off Arnstein's ladder: social learning as a new policy paradigm for climate change adaptation' (2009) *Environmental Policy and Governance* 358-373 360.

The Mediterranean Sea's adaptation needs are varied, mirroring the complexity of the region's environmental and socio-economic landscapes. Rising sea levels, increasing sea surface temperatures, and changing precipitation patterns necessitate resilient and responsive adaptation measures³⁴². Integrated coastal zone management strategies, sustainable water resources management, and the fortification of critical infrastructure are instrumental in safeguarding the region's ecological integrity and human livelihoods.

Adaptation measures to address the impact of climate change encompass a broad spectrum of strategies, each designed to bolster resilience and reduce vulnerability. Structural and physical solutions form one such category, including both robust engineering practices like the construction of dikes, sea defences and levees³⁴³, more natural approaches such as beach nourishment³⁴⁴ to protect coastal areas. In parallel, social measures like education and awareness campaigns play a critical role in informing stakeholders about the risks of climate change and potential adaptation methods³⁴⁵. Community engagement in adaptive management³⁴⁶ is also vital, fostering a collaborative approach to resilience.

Institutional measures are another key facet of adaptation, involving the development of robust policy frameworks and zoning regulations³⁴⁷. These policies and plans incorporate comprehensive climate risk assessments and initiatives that climate-proof infrastructures and communities. On the technological front, cutting-edge forecasting systems are being put in place alongside improved agricultural practices such as more efficient irrigation

³⁴² Seyed M. H. S. Rezvani, Nuno Marquez de Almeida and Maria Joao Falcao, 'Climate Adaptation Measures for Enhancing Urban Resilience' (2023) 13 9 Buildings 1-29 3.

³⁴³ Alexandra Toimil and others, 'Addressing the Challenges of Climate Change Risks and Adaptation in Coastal Areas: A Review' (2020) 156 Coastal Engineering 1-13 2.

³⁴⁴ Alexandra Toimil and others, 'Estimating the Risk of Loss of Beach Recreation Value under Climate Change' (2018) 68 Tourism Management 387-400 387-388.

³⁴⁵ Farzaneh Shaikh Khatibi and others, 'Can Public Awareness, Knowledge and Engagement Improve Climate Change Adaptation Policies?' 2 Discover Sustainability 1-24 17.

³⁴⁶ Ibid, 16.

³⁴⁷ James J. Patterson, 'More than Planning: Diversity and Drivers of Institutional Adaptation under Climate Change in 96 Major Cities' (2021) 68 Global Environmental Change 1-15 2-4.

methods and water-saving technologies, which help communities better anticipate and respond to climate-related challenges³⁴⁸.

Economic resilience is similarly bolstered through financial instruments such as insurance schemes and investments in diversified livelihoods, which provide a buffer against the financial shocks induced by climate change³⁴⁹. Ecosystem-based approaches emphasize the restoration and preservation of natural habitats, recognizing their intrinsic value as protective barriers, key components of sustainable natural resource management practices, and pivotal ways to adapt to climate change³⁵⁰.

Behavioural adaptation is another critical component, where inducing changes in both individual and collective actions can significantly reduce exposure to risk and augment the capacity to adapt³⁵¹. Such changes could range from everyday lifestyle adjustments to community-wide shifts in resource utilization and environmental stewardship. Collectively, these diverse yet interconnected measures constitute a comprehensive strategy to adapt to the rapidly changing climate, ensuring that societies are equipped to face these challenges and thrive in the face of adversity.

In the Mediterranean, integrating these types of adaptation measures is essential to cope with and accommodate the region's unique set of climatic threats. For instance, given the region's historical and contemporary significance, cultural heritage sites are increasingly being equipped with early warning systems and meticulous conservation plans that consider climate risk³⁵². Agriculture, which plays a substantial role in Mediterranean societies, is progressively incorporating water-efficient practices and exploring drought-resistant crop varieties to adapt to changing precipitation patterns³⁵³.

³⁴⁸ Bayram Ali Yerlikaya, Seher Ömezli and Nazlıcan Aydoğan, 'Climate Change Forecasting and Modeling for the Year of 2050' in Shah Fahad and others (eds) *Environment, Climate, Plant and Vegetation Growth* (Springer, 2020).

³⁴⁹ Matt Gouett, 'Innovative Financial Instruments and Their Potential to Finance Climate Change Adaptation in Developing Countries' (2023) International Institute for Sustainable Development 1-48 30.

³⁵⁰ Johanna Nalau and Susanne Becken, 'Ecosystem-based Adaptation to Climate Change: Review of Concepts' (2018) Griffith Institute for Tourism Research Report No 15 1-34 17.

³⁵¹ Patterson, 7.

³⁵² Elena Sesana and others, 'Adapting Cultural Heritage to Climate Change Risks: Perspectives of Cultural Heritage Experts in Europe' (2018) 8 *Geosciences* 1-23 12.

³⁵³ Yerlikaya, Ömezli and Aydoğan, 114.

Marine ecosystems, facing acidification and warming waters, are also areas where adaptive management is critical. Fisheries, among the most affected by climate change, are increasingly subject to seasonal and area closures, gear restrictions, and quota systems that consider stock variability due to climate change³⁵⁴. These practices are intended to adopt adaptive management not only to protect the marine environment but also to sustain local economies that rely on these resources.

To address sea level rise, structural measures such as sea walls and breakwater constructions have been erected in vulnerable areas³⁵⁵. Ecosystem-based solutions are also prominent, including the restoration of wetlands and the conservation of mangrove forests to act as natural barriers that lessen the impact of storm surges and coastal flooding³⁵⁶.

Ecosystem-based adaptation (hereinafter ‘EbA’) is a strategy for community development and environmental management that seeks to utilize biodiversity and ecosystem services to help people adapt to the adverse effects of climate change³⁵⁷. EbA approaches, such as the preservation of coastal habitats, reforestation to hold back desertification and the sustainable management of water resources, provide natural buffers against climate impacts and support biodiversity conservation while delivering additional benefits, including water purification, climate regulation, and the provision of recreational opportunities³⁵⁸. Integrated coastal zone management strategies in the Mediterranean are also in place, balancing development needs with environmental protection through effective spatial planning, habitat protection, and infrastructure development that prioritizes long-term ecosystem health and services³⁵⁹.

³⁵⁴ Andrea Bryndum-Buchholz, Derek P. Tittensor and Heike K. Lotze, ‘The Status of Climate Change Adaptation in Fisheries Management: Policy, Legislation and Implementation’ (2021) 22 *Fish and Fisheries* 1248-1273 1256.

³⁵⁵ Toimil and others, (2020) 2-3.; Example of seawalls: < <https://www.ctc-n.org/technologies/sea-walls>> accessed 1 August 2024.

³⁵⁶ C. Epple and others, 24.

³⁵⁷ Un Environmental Programme, ‘Ecosystem-based Adaptation’ < <https://www.unep.org/topics/climate-action/adaptation/ecosystem-based-adaptation>> accessed 27 May 2024.

³⁵⁸ Ibid.

³⁵⁹ Gonzalo C. Malvarez and others, ‘Spatial Data and Its Importance for the Implementation of UNEP MAP ICZM Protocol for the Mediterranean’ (2015) 19 *Journal of Coastal Conservation* 633-641 639.

Effective adaptation in the Mediterranean likewise requires transboundary collaboration due to the shared nature of its marine resources and socioeconomic interdependence. Regional cooperation is vital for harmonizing policies, sharing data and research, and coordinating adaptation efforts, particularly in the context of sea level rise and its implications for multiple nations³⁶⁰.

It is also crucial to establish robust systems for monitoring and evaluating the outcomes of adaptation measures, enabling iterative learning and the continuous improvement of strategies. Investment in data collection and sharing across the region supports these efforts, allowing for the assessment of ecosystem responses and the effectiveness of implemented actions. In this regard, INFO/RAC under the UNEP/MAP system is poised to play a critical role³⁶¹.

As climate change impacts continue to unfold, adaptation measures in the Mediterranean Sea encompass a broad spectrum of actions, from concrete infrastructure to social and institutional reforms, all aimed at reducing vulnerability to climate-induced changes. Through collaborative, integrated, and ecosystem-based approaches, the region can enhance its resilience, conserve its valued marine biodiversity, and support its human populations in the face of the growing climate challenge.

B) INTERACTION BETWEEN ADAPTATION AND MITIGATION APPROACHES

The contemporary climate change narrative is increasingly characterized by the recognition of the intrinsic interconnectedness between adaptation, mitigation and sustainable development. Adaptation refers to actions taken to adjust to actual or expected climate change and its effects, which moderates harm or exploits beneficial opportunities, while mitigation involves efforts to reduce the sources or enhance the sinks of GHG. Although traditionally conceptualized and implemented separately, there is a growing acknowledgement of the synergistic potential when adaptation and mitigation are aligned

³⁶⁰ Driss El Yazami, 'From Paris to Marrakesh Rediscovering Universalism' in Stephanie Thiebault and Jean-Paul Moatti (eds) *The Mediterranean Region under Climate Change, A Scientific Update* (IRD Editions, 2016).

³⁶¹ INFO/RAC, 'Mission' <<http://www.info-rac.org/en/about-us>> accessed 27 May 2024.

cohesively³⁶². Consequently, a deficiency in global mitigation measures necessitates a commensurate increase in adaptation efforts to counteract escalating climate ramifications³⁶³. Conversely, strategies that concentrate solely on either mitigation or adaptation, without regard for their interdependence, acting in siloes, have the potential to generate detrimental trade-offs, thereby impeding the collective advancement of climate-related initiatives³⁶⁴. Their interplay creates a dynamic field in which synergies can be harnessed and trade-offs managed³⁶⁵. This integrated approach is essential to better confronting the climate challenge and producing co-benefits.

Trade-offs and synergies between climate change mitigation and adaptation are two sides of the interaction between these strategies³⁶⁶. Empirical evidence affirms that intertwining adaptation and mitigation measures can result in positive synergies. Synergies exist when actions taken for one strategy have beneficial impacts on the other, effectively enhancing or complementing both adaptation and mitigation efforts³⁶⁷. Synergistic interactions can improve overall efficiency, cost-effectiveness, and outcomes in addressing climate change. For instance, restoring and protecting mangrove forests can buffer coastal areas from storms and flooding as an adaptation measure while also sequestering significant amounts of carbon as a mitigation effort³⁶⁸.

Conversely, trade-offs may occur when actions beneficial to one strategy may have adverse implications for the other. They represent a conflict between adaptation and mitigation goals, where the pursuit of one may impede or compromise the outcomes of

³⁶² Rawshan Ara Begum and others, 'Points of Departure and Key Concepts' (2022) *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* 121-196 127.

³⁶³ Jeffrey Qi and Anita Terton, 'Addressing Climate Change Through Integrated Responses: Linking Adaptation and Mitigation' (2022) *International Institute for Sustainable Development* 1-11 2.

³⁶⁴ *Ibid.*, 2.

³⁶⁵ Thomas F. Thornton and Claudia Combetti, 'Synergies and Trade-offs between Adaptation, Mitigation and Development' (2017) 140 *Climatic Change* 5-18 6.

³⁶⁶ International Climate Initiative, 'Synergies of Adaptation, Mitigation and Sustainable Development' (2022) <<https://www.international-climate-initiative.com/en/iki-media/news/synergies-of-adaptation-mitigation-and-sustainable-development/>> accessed 30 May 2024.

³⁶⁷ Mia Landauer, Sirku Juhola and Maria Söderholm, 'Inter-relationships between Adaptation and Mitigation: A Systematic Literature Review' (2015) 131 *Climatic Change* 505-517 508.

³⁶⁸ Marco Frey and Federica Gasbarro, 'Adaptation and Mitigation Synergies and Trade-Offs' in Walter Leal Filho (eds), *Climate Action, Encyclopedia of the UN Sustainable Development Goals* (Springer Nature Switzerland AG, 2020) 1-9 7.

the other³⁶⁹. Examples of trade-offs include large-scale afforestation on agricultural land, which could reduce the land available for food production, forcing changes in agricultural practices or increasing food prices, and building climate-resilient infrastructure that could involve energy-intensive materials, increasing GHG emissions and contradicting mitigation efforts³⁷⁰.

Recognizing and managing these interactions is crucial for optimizing outcomes. In designing climate change strategies, identifying synergies and minimizing trade-offs are critical for balanced and effective action³⁷¹. Ultimately, the goal is to create holistic solutions that concurrently advance both adaptation and mitigation objectives with minimal conflict and maximum cooperative benefit.

It is imperative to adopt an integrative planning approach to adeptly address the potential trade-offs between mitigation and adaptation and better enhance synergies within climate policy frameworks³⁷². Such frameworks need to merge adaptation and mitigation from the inception, underpinned by an informed discernment of their mutual implications³⁷³. This foundational integration assures that climate policies are proactive rather than reactive, equipping them with the foresight needed to navigate complex environmental challenges.

The evaluation of proposed climate actions should be comprehensive, encompassing assessments of their economic, environmental, and social dimensions to ascertain co-benefits and potential trade-offs. This thorough appraisal is essential to grasping the full scope of climate interventions and their ripple effects. A multi-sectoral approach in the planning process is crucial. Collaboration among diverse sectors, including energy, agriculture, water, and urban development, is invaluable in sharing insights and

³⁶⁹ Landauer, Juhola and Söderholm, 510.

³⁷⁰ Frey and Gasbarro, 6.

³⁷¹ Qi and Terton, 3.

³⁷² Qi and Terton, 1.

³⁷³ Asim Zia, 'Synergies and Trade-Offs between Climate Change Adaptation and Mitigation across Multiple Scales of Governance' in Bernd Siebenhüner and Riyanti Djalante (eds) *Adaptiveness: Changing Earth System Governance* (Cambridge University Press, 2021) 102- 126 108.

cultivating cross-sectoral solutions³⁷⁴. Involving these varied stakeholders fosters a well-rounded perspective, crucial for the orchestration of comprehensive climate policies.

In the realm of policy tools, flexibility is paramount. Instruments such as low-carbon options complemented by carbon pricing ought to be agile and capable of modulation to reflect their impact on both adaptation and mitigation strategies³⁷⁵. These tools can serve as economic incentives for embracing low-emission technologies, which concurrently bolster climate resiliency³⁷⁶. Policies should also exhibit a nested configuration, embodying diverse scales that span from the hyperlocal to the international platform³⁷⁷. Each tier of governance should maintain its respective adaptation and mitigation imperatives, while also harmonizing with overarching policy objectives.

Regarding financing, it is important to pilot mechanisms that not only underwrite but also prioritize initiatives promoting synergies between adaptation and mitigation efforts, while sidelining those marked by acute trade-offs³⁷⁸. These financing strategies should aim to fortify sustainable development in its broadest interpretation.

Flexibility and adaptability should permeate policy design, translating into policies that can pivot promptly in response to emergent knowledge, evolving scenarios, and the interplay between adaptation and mitigation experiences. Such adaptability ensures policies remain effective and pertinent over time.

Furthermore, the imperative of equity and inclusivity should underpin the formulation of climate policy³⁷⁹. Such an approach guarantees the equitable distribution of climate action's burdens and benefits, with consideration for the needs of the most vulnerable groups, who are disproportionately susceptible to the impacts of climate change and may

³⁷⁴ Adaptation Committee under the United Nations Framework Convention on Climate Change, 'Information Paper on Linkages Between Mitigation and Adaptation', AC/2020/9, Seventeenth Meeting of the Adaptation Committee 24-27 March 2020, 1-20 1-5 <https://unfccc.int/sites/default/files/resource/ac17_8b_ada_miti.pdf> accessed 30 May 2024.

³⁷⁵ J. van den Bergh and others, 'Designing an Effective Climate-Policy Mix: Accounting for Instrument Synergy' (2021) 21 6 *Climate Policy* 745-764 750.

³⁷⁶ *Ibid.*, 751.

³⁷⁷ Asim Zia, 122.

³⁷⁸ J. van den Bergh and others, 755.

³⁷⁹ Sonja Klinsky and Harald Winkler, 'Equity, Sustainable Development and Climate Policy' (2014) 14 1 *Climate Policy* 1-7 2.

confront intensified trade-offs between mitigation and adaptation measures³⁸⁰. Policymakers are thus enjoined to remain circumspect to avoid the deepening of existing inequalities and to diligently craft policies that afford protection and equitable opportunities for all members of society.

The evolution of climate policy frameworks has been invariably shaped by the recognition that a single-dimensional approach is insufficient to tackle the complex nature of climate change³⁸¹. Historically, the development of such frameworks, particularly within the auspices of the UNFCCC, has been characterized by a compartmentalized consideration of mitigation and adaptation strategies³⁸². Initially, there was a distinct divergence in focus, with developed nations emphasizing mitigation due to their substantial emissions, whereas developing nations homed in on adaptation and confronted more immediately with the detrimental effects of climate-induced alterations³⁸³.

However, as the development of robust climate policy frameworks necessitates a multifaceted strategy encompassing thoughtful design, continual reassessment, and inclusive participation from all segments of society, this initial segregation has progressively given way to a more synergistic viewpoint. Policymakers have come to recognize the interdependencies between mitigation and adaptation, leading to a climate agenda that skilfully navigates the dynamic interplay between these efforts. This paradigm shift not only minimizes potential conflicts but also leverages mutual advantages, ensuring cohesiveness and bolstering the effectiveness of the global response to the multifaceted challenges presented by climate change.

Consecutive IPCC Assessment Reports have also progressively illuminated the interdependence of adaptation and mitigation. With each iteration, from the Fourth to the Sixth Assessment Reports, there has been an increased emphasis on the necessity of

³⁸⁰ Ibid, 3.

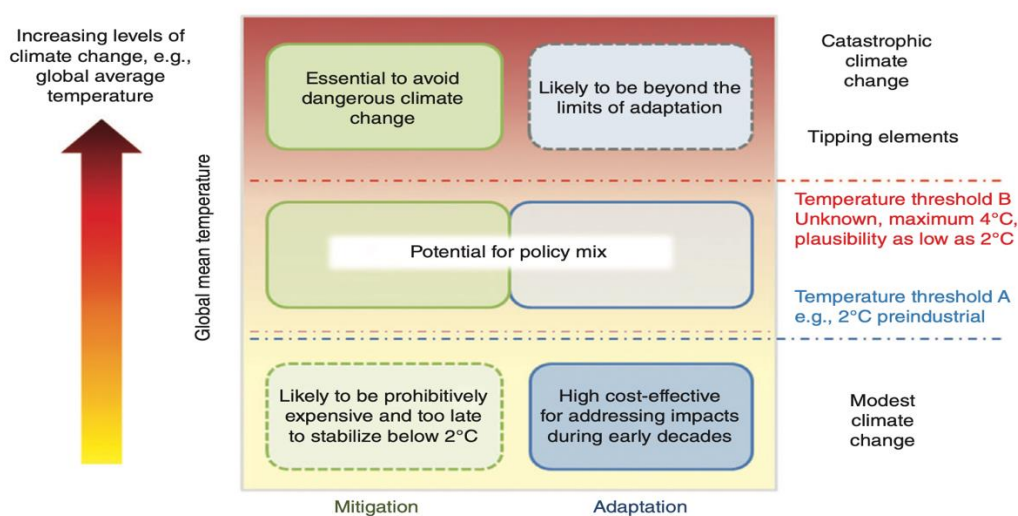
³⁸¹ Paul Watkiss, Magnus Benzie, and Richard J.T. Klein, 'The Complementarity and Comparability of Climate Change Adaptation and Mitigation' (2015) 6 WIREs Climate Change 541-557 541.

³⁸² Organization for Economic Cooperation and Development, 'Strengthening Adaptation-Mitigation Linkages for a Low-Carbon, Climate Resilient Future' (2021) <https://www.iucn.org/sites/default/files/2022-07/towards_nature-based_solutions_in_the_mediterranean.pdf> accessed 30 May 2024.

³⁸³ Watkiss, Benzie, and Klein, 542.

integrating these strategies to efficiently combat climate change and facilitate sustainable development. The evolution in viewpoint is underscored by the Fourth Assessment Report's exploration of the symbiotic relationship between the two approaches³⁸⁴ and the Fifth Assessment Report's examination of potential resilient pathways incorporating adaptation and mitigation within the broader context of sustainable development³⁸⁵. The Sixth Assessment Report synthesizes these perspectives, underscoring the simultaneous imperative to mitigate and adapt to climate change effects to curtail the trajectory of anthropogenic global warming³⁸⁶.

This integration is depicted through the illustrative figure given, which underscores the complementary nature of mitigation and adaptation policies. However, it also hints at challenges in transitioning from theoretical frameworks to practical policy implementation.



³⁸⁴ Klein RJT and others, 'Inter-relationships between Adaptation and Mitigation' in Perry ML and others (eds) *Intergovernmental Panel on Climate Change (IPCC) 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.'* (IPCC, 2007) 745–777 752.

³⁸⁵ Wilbanks FTJ and others, 'Climate-resilient Pathways: Adaptation, Mitigation, and Sustainable Development' in Field CB and others (eds) *Intergovernmental Panel on Climate Change (IPCC) 'Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part A— Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change'* (IPCC, 2014) 1101–1131 1111.

³⁸⁶ Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2023: Synthesis Report: Contribution of Working Groups I, II and III to the Sixth Assessment Report' (2023).

Figure 2: The need for climate change adaptation and mitigation³⁸⁷

Moreover, the diversity of regional vulnerabilities implies that optimal combinations of adaptation and mitigation measures are context-specific, influenced by regional, national, and temporal factors³⁸⁸. Thus, the unique circumstances and outcomes should be attentively examined within regions such as the Mediterranean to effectively address both present and future climatic challenges.

Reiterating the urgency presented in the Sixth Assessment Report, climate-resilient development not only necessitates immediate action but demands a coordinated approach that combines adaptation efforts with GHG mitigation. This integrative approach transcends the scope of isolated strategies, merging them into a cohesive framework that advances resilience across multiple dimensions.

Illustrating the synergistic relationship in the Mediterranean, initiatives such as renewable energy and nature-based solutions exemplify the overlap between adaptation and mitigation. Renewable energy projects contribute to mitigation by reducing dependence on fossil fuels, while simultaneously enhancing resilience against energy infrastructure disruptions associated with climate change-related events³⁸⁹. Similarly, nature-based solutions emphasize ecosystem conservation and restoration, which can bolster natural resilience to climate impacts while sequestering carbon, thereby contributing to both adaptation and mitigation efforts³⁹⁰.

Such practices highlight the potential for co-benefits that transcend traditional environmental outcomes. Investments in renewable energy and ecosystem restoration not only address climate change but also hold the potential to create job opportunities, protect biodiversity, and improve public health by providing cleaner air and water³⁹¹. It is these

³⁸⁷ Watkins, Benzie and Klein, 545.

³⁸⁸ Toth FL and others, 'Decision-making Frameworks' (2001) in Robert T. Watson and others (eds) *'Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change'* (IPCC, 2001) 601 – 688 605.

³⁸⁹ Aiman Albatayneh, 'Water Energy Food Nexus to Tackle Climate Change in the Eastern Mediterranean' (2023) 16 *Air, Soil and Water Research* 1-12 2.

³⁹⁰ IUCN, 'Towards Nature-Based Solutions in the Mediterranean' (2020) <https://www.iucn.org/sites/default/files/2022-07/towards_nature-based_solutions_in_the_mediterranean.pdf> accessed 30 May 2024.

³⁹¹ Wolfgang Cramer and others, 'Climate Change and Interconnected Risks to Sustainable Development in the Mediterranean' (2018) 8 *Nature Climate Change* 972-980 977.

interlocking benefits that underline the imperative for an integrated approach to climate policy which harmonizes adaptation and mitigation strategies to achieve a sustainable and resilient future.

Thus, the Mediterranean region, with its unique socio-economic and ecological landscape, presents an archetypal case for harmonized adaptation and mitigation approaches. The region's strategies must be continually assessed, optimized, and reimaged to ensure they are responsive to the evolving nexus of climate change challenges, balancing the immediacy of adaptation needs with the long-term vision of mitigation goals.

IV. EVALUATION OF ADAPTATION AND MITIGATION MEASURES IMPLEMENTED ON THE MEDITERRANEAN SEA TO ADDRESS CLIMATE CHANGE IMPACTS FROM A LEGAL PERSPECTIVE

As mentioned in the previous chapters, the Mediterranean Sea encompasses a region where the intricate interplay of socio-economic development, environmental concerns, and legal frameworks presents a unique challenge for climate change policy. Evaluating the adaptation and mitigation measures implemented to address climate change impacts from a legal perspective necessitates a comprehensive consideration of several pivotal factors. In this chapter, this evaluation will focus on the effectiveness of the related instruments and ways to accelerate climate action.

A) THE EFFECTIVENESS OF LEGAL INSTRUMENTS IN CLIMATE ACTION

Legal instruments aimed at climate action in the Mediterranean should be assessed for their effectiveness, which encompasses not only the mitigation of GHG emissions but also the enhancement of adaptive capacities. The Mediterranean faces several key challenges that need to be navigated to achieve effective climate mitigation and adaptation outcomes. In this section, these subjects and the necessary actions to be taken will be evaluated.

1- Maladaptation

Maladaptation in the Mediterranean Sea context refers to adaptation actions that may lead to negative outcomes, either by exacerbating existing climate vulnerabilities or by creating new risks³⁹². The Mediterranean region, with its diverse ecological systems, cultural landscapes, and socio-economic structures, is particularly susceptible to such unintended consequences.

For instance, efforts to adapt to increasing water scarcity brought on by climate change could involve the construction of desalination plants to supplement freshwater supplies³⁹³. While this may seem like a viable solution, without careful consideration, it can lead to a range of maladaptive outcomes. The energy-intensive nature of desalination can increase greenhouse gas emissions, contributing to global warming unless renewable energy sources are used³⁹⁴. Additionally, the brine discharge from desalination can harm marine ecosystems, affecting the delicate balance of the Mediterranean Sea's biodiversity.

Furthermore, coastal defenses such as sea walls and groynes may be erected to protect infrastructure from sea-level rise and storm surges³⁹⁵. While these structures can offer immediate protection, they might also result in coastal erosion downstream and interfere with natural coastal processes³⁹⁶. This approach could ultimately undermine long-term sustainability and exacerbate the vulnerability of coastal communities, especially if the structures are not well-maintained or prove inadequate in the face of more severe climate impacts.

To avoid maladaptation, it is crucial for policymakers and stakeholders in the Mediterranean region to adopt a holistic approach to climate adaptation planning. This

³⁹² Alexandre Magnan and Gaëlle Mainguy, 'Avoiding Maladaptation to Climate Change: Towards Guiding Principles' (2014) 71 *Sapiens* 1-12 2.

³⁹³ Alessio Satta and others, 'Strengthening the Knowledge Base on Regional Climate Variability and Change: Application of a Multi-Scale Coastal Risk Index at Regional and Local Scale in the Mediterranean' (2015), *Plan Bleu Report* 1-188 30 <https://www.researchgate.net/publication/305769686_Application_of_a_Multi-Scale_Coastal_Risk_Index_at_Regional_and_Local_Scale_in_the_Mediterranean> accessed 30 May 2024.

³⁹⁴ *Ibid*, 95.

³⁹⁵ *Ibid*, 25.

³⁹⁶ *Ibid*, 89.

involves using long-term projections, integrating socio-economic and environmental considerations, employing adaptive management strategies that allow for flexibility and course corrections, and prioritizing initiatives that offer co-benefits for mitigation, adaptation, and sustainable development³⁹⁷. Only through such integrated and careful planning can the region navigate the complex climate challenges ahead without inadvertently compounding the problems.

2- Insufficient Climate Finance

The legal assessment must also examine the adequacy and mobilization of climate finance. Insufficient climate finance has often hampered the implementation of both mitigation and adaptation measures, and legal structures must ensure equitable and accessible funding mechanisms to bridge this financial gap.

To achieve this, supplementary international monetary flows are essential. This necessitates amending extant international legal conventions to obligate developed nations to pledge more substantial financial support for climatic endeavours³⁹⁸ in the Mediterranean in accordance with the tenets of equity and varied national capacities. Furthermore, the mobilization of private investments is critical. Crafting legal frameworks that provide pecuniary inducements to the private sector, including but not limited to tax deductions, state assistance, or the formation of public-private ventures, could significantly enhance capital flow into climate change abatement efforts³⁹⁹.

Additionally, fostering the creation and circulation of green bonds and other pioneering fiscal instruments is vital⁴⁰⁰. This can be achieved through the institution of legal frameworks which furnish both clarity and security for investors, thus becoming a dependable avenue for accruing funds for climate-related projects⁴⁰¹. Enacting legal

³⁹⁷ Magnan and Mainguy, 9-10.

³⁹⁸ Jeremie Fosse and others, 'Green Finance in the Mediterranean' (2017) 3 IEMed European Institute of the Mediterranean Policy Study 1-132 20-21 <https://www.iemed.org/wp-content/uploads/2017/12/IEMed_Policy_Study3_Green-finance-in-the-Mediterranean.pdf> accessed 30 May 2024.

³⁹⁹ Ibid, 23.

⁴⁰⁰ Ibid, 27.

⁴⁰¹ Ujala Qadir and others, 'Green Bonds for Climate Resilience: State of Play and Roadmap to Scale' (2021) Global Center on Adaptation 1-59 9 <https://gca.org/wp-content/uploads/2021/10/Green-Bonds-for-Climate-Resilience_State-of-Play-and-Roadmap-to-Scale.pdf> accessed 30 May 2024.

instruments to implement carbon pricing is also imperative⁴⁰². Such mechanisms, which could take the form of carbon taxes or emissions trading schemes, would generate revenues explicitly earmarked for climate change initiatives⁴⁰³.

In addition to the above, legal provisions should be made for the development of risk guarantee and insurance mechanisms to assuage investor apprehension and thereby entice investments in climate resilience and emissions reduction technologies⁴⁰⁴. In the domain of bolstering capability and providing support, it is vital to introduce legal stipulations for capacity building and technical aid, with the aim of arming Mediterranean countries with the tools necessary to secure climate finances and create viable projects⁴⁰⁵.

By implementing and rigidly enforcing these strategic legal initiatives, the nations within the Mediterranean region can drastically enhance their proficiency in garnering and applying climate finance for both adaptation and mitigation measures. This comprehensive legal overhaul could streamline the deployment of financial resources into areas where they are most needed, ensuring that the Mediterranean's response to climate change is both robust and efficacious.

In practice, these reforms would necessitate a collaborative effort among Mediterranean countries, as well as the engagement of global partners, to integrate climate finance into their legal and regulatory systems. This would entail the establishment of uniform guidelines and harmonization of policies to facilitate cross-border cooperation and investment, thereby creating a unified Mediterranean front in the battle against climate change.

⁴⁰² OECD, 'Effective Carbon Rates 2023' (2023) 1-12 3 < <https://www.oecd.org/tax/tax-policy/effective-carbon-rates-2023-brochure.pdf>> accessed 30 May 2024.

⁴⁰³ Ibid, 10.

⁴⁰⁴ Fosse and others, 54.

⁴⁰⁵ Martin Stadelmann and Angela Falconer, 'The Role of Technical Assistance in Mobilizing Climate Finance- Insights from GIZ Programs' (2015) Climate Policy Initiative 1- 11 10 < <https://climatepolicyinitiative.org/wp-content/uploads/2015/10/The-Role-of-Technical-Assistance-in-Mobilizing-Climate-Finance-%E2%80%93-Insights-From-GIZ-Programs.pdf>> accessed 30 May 2024.

3- The Lack of Technological Development

The role of technology development in climate action cannot be overstated. Legal measures may need to incorporate policies that drive innovation, technology transfer, and the dissemination of knowledge, enabling the Mediterranean region to respond proactively to climate change.

The lack of technology development and transfer in the Mediterranean Sea poses significant challenges to effectively addressing climate change impacts. Technologies for climate adaptation and mitigation, such as renewable energy systems and water conservation methods, are integral for transitioning to a low-carbon and resilient society⁴⁰⁶. However, the development and dissemination of these technologies within the Mediterranean are hindered by several factors.

Disparities in economic development, research capacities, and technological innovation across Mediterranean countries result in uneven access to climate-friendly technologies⁴⁰⁷. While some nations have advanced industries and research institutions capable of innovating new solutions, others may lack the funding, infrastructure, and skilled workforce required to develop or adopt these technologies locally. This gap limits the ability of less developed countries to benefit from advancements that could significantly enhance their climate resilience and reduce GHG emissions⁴⁰⁸.

Moreover, international technology transfer, which is crucial for spreading existing solutions throughout the region, is often stymied by legal, economic, and political barriers. Intellectual property rights can restrict access to essential climate technologies, making them expensive or unavailable to countries in need⁴⁰⁹. Financial constraints further compound the issue, with less developed Mediterranean countries facing

⁴⁰⁶ Şiir Kılış and others, 'Effective Mitigation of Climate Change with Sustainable Development of Energy, Water and Environment Systems' (2022) 269 *Energy Conversion and Management* 1-22 14.

⁴⁰⁷ United Nations Department of Economic and Social Affairs, 'World Social Report 2020: Inequality in a Rapidly Changing World' (2020) 1-171 59 <<https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/02/World-Social-Report2020-FullReport.pdf>> accessed 30 May 2024.

⁴⁰⁸ *Ibid*, 79.

⁴⁰⁹ *Ibid*, 122.

difficulties in investing in new technologies without external support or favourable financing mechanisms.

To overcome these obstacles, concerted effort is needed from regional bodies, national governments, and international organizations to foster environments conducive to technology development and transfer. This would involve investing in research and development, creating legal frameworks that facilitate technology sharing with regard for intellectual property rights, and establishing funding mechanisms to support technology adoption. The Mediterranean region's response to climate change could be significantly bolstered by enhancing collaboration, removing barriers to technology exchange, and leveraging the strengths of each nation to foster a collective push towards a sustainable future.

4- Implementation Gap

The implementation gap in climate change measures is a significant obstacle for the Mediterranean region. Despite the formulation of policies and international agreements aimed at mitigating and adapting to climate change, translating these plans into concrete actions presents several challenges. While nations around the Mediterranean Sea often commit to climate goals, actual progress can be slower than intended, leading to a gap between policy and practice⁴¹⁰.

One reason for this gap is the lack of resources and infrastructure required for the implementation of climate policies⁴¹¹. Many Mediterranean countries, especially those with lower economic development, may find it difficult to allocate sufficient funds and technical expertise to execute complex climate strategies. These countries may have ambitious climate targets, but without adequate investment in both human capacity and material resources, these targets are unlikely to be met.

Additionally, governance structures within the region can sometimes impede effective policy implementation. Fragmented institutional frameworks and limited inter-sectoral

⁴¹⁰ Taryn Fransen and others, 'Taking Stock of the Implementation Gap in Climate Policy' (2023) 13 *Nature Climate Change* 752-755 752.

⁴¹¹ *Ibid*, 754.

coordination can result in disjointed efforts that fail to address the interconnected nature of climate issues⁴¹². There may be a comprehensive national climate plan in place, but without effective coordination at regional and local levels, the plan could falter in execution.

Another factor contributing to the implementation gap is regulatory and bureaucratic inertia⁴¹³. Changing established systems and practices to accommodate new climate measures often requires significant legal and administrative reforms, which can be slow and resistant to change⁴¹⁴. The urgency of climate action is sometimes at odds with the time-consuming processes of passing new legislation, adjusting institutional mandates, and fostering inter-agency collaboration.

Public acceptance and support also play a critical role in closing the implementation gap⁴¹⁵. Misalignment between climate policies and public perception can lead to resistance or lack of engagement from the communities that are asked to adapt to new measures⁴¹⁶. Without the buy-in of local stakeholders, even well-designed policies may face challenges in implementation.

In order to narrow the implementation gap in the Mediterranean region, a multi-layered approach is needed. This includes strengthening governance mechanisms to improve policy execution, increasing investment in human and material resources, streamlining legal processes to enable swift action, and engaging communities to ensure policies have broad support. Furthermore, fostering regional cooperation can facilitate knowledge sharing and joint action, which can help in bridging the distance between environmental commitments and realized climate action.

⁴¹² Ibid, 754.

⁴¹³ Grischka Perino and others, 'Closing the Implementation Gap: Obstacles in Reaching Net-Zero Pledges in the EU and Germany' (2022) 10 3 Politics and Governance 213-225 216.

⁴¹⁴ Ibid, 218.

⁴¹⁵ Ibid, 219.

⁴¹⁶ Ibid, 219.

5- Acting in Silos

Acting in silos refers to the tendency of organizations, sectors, or countries to work independently from one another without sufficient interaction or coordination⁴¹⁷. In the context of climate change adaptation and mitigation in the Mediterranean Sea region, this tendency can lead to suboptimal outcomes and reduce the overall effectiveness of climate action.

In this diverse region, countries vary widely in their economic, social, and political landscapes. Individual states may pursue their own climate strategies based on national priorities and capacities, potentially overlooking broader regional needs and opportunities⁴¹⁸. This can result in a patchwork of efforts that, while well-intentioned, fail to leverage the potential benefits of collaborative action. For example, one country's measures to protect its coastline from sea-level rise might have negative implications for neighbouring countries if not designed and executed with a regional perspective.

Furthermore, within any given country, government departments and ministries may develop climate policies focused on their particular remits, like water resources or urban development, without considering how these policies interact with one another⁴¹⁹. This can lead to conflicting objectives, with one department's adaptation measures inadvertently undermining another's mitigation efforts or vice versa⁴²⁰.

The danger of siloed action is particularly pronounced when it comes to sharing best practices and innovations⁴²¹. With countries focused on their internal agendas, opportunities to learn from the experiences of neighbours are missed. This lack of

⁴¹⁷ Mina Di Marino and others, 'Interlinking the Silos: How to Stimulate a new Debate on more Greenery Cities' (2023) 87 *Urban Forestry & Urban Greening* 1-4 2.

⁴¹⁸ Adaptation Committee under the United Nations Framework Convention on Climate Change, 'Information Paper on Linkages Between Mitigation and Adaptation', AC/2020/9, Seventeenth Meeting of the Adaptation Committee 24-27 March 2020, 1-20 6 <https://unfccc.int/sites/default/files/resource/ac17_8b_ada_miti.pdf> accessed 30 May 2024.

⁴¹⁹ Grisca Perino and others, 222.

⁴²⁰ Ibid, 223.

⁴²¹ Roy Bouwer, Lorena Pasquini and Marie-Ange Baudoin, 'Breaking Down the Silos: Building Resilience Through Cohesive and Collaborative Social Networks' (2021) 39 *Environmental Development* 1-21 3.

communication can prevent the dissemination of successful technologies or approaches that could be effective if applied regionally.

To break down these silos, a more integrative approach is needed across the Mediterranean. Regional forums and dialogues that bring together different countries and sectors can help establish common goals and collaborative projects⁴²². There also needs to be an emphasis on systemic thinking in policy development, recognizing the interconnected nature of climate impacts and the need for harmonized responses that cross political and sectoral boundaries⁴²³.

Ultimately, to achieve the levels of cooperation necessary for effective climate action in the Mediterranean Sea region, there must be a concerted effort to foster communication, share knowledge and resources, and align policies. Working together, countries in the region can far more effectively face the common challenges posed by climate change than they can through fragmented and isolated efforts.

B) ACCELERATION OF CLIMATE ACTION THROUGH LEGAL FRAMEWORKS

The urgency of the climate crisis necessitates a multi-pronged approach, with legal frameworks emerging as a cornerstone of effective climate action. These frameworks provide the architecture for structured and enforceable mechanisms capable of driving significant progress in both climate change mitigation and adaptation. Critically, the success of such legal frameworks hinges on the integration of climate justice, just transition, and equity, ensuring that the burdens and benefits of climate policies are distributed fairly and inclusively.

Climate justice, as a core ethical and moral principle, underscores the imperative to address the disproportionate impacts of climate change on vulnerable populations, particularly those residing in developing nations and marginalized communities. It

⁴²² Haseeb Bakhtary and others, 'Breaking Silos: Enhancing Synergies across NDCs and NBSAPs' (2023) WWF International 1-26 2 <<https://wwfint.awsassets.panda.org/downloads/breaking-silos-enhancing-synergies-between-ndcs-and-nbsaps.pdf>> accessed 31 May 2024.

⁴²³ Qi and Terton, 3.

underscores the urgent need to address the profoundly disproportionate impacts of climate change, recognizing that marginalized and disadvantaged populations, both in the present and extending to future generations, bear a disproportionate burden of the adverse effects⁴²⁴. These effects, including but not limited to extreme weather events, rising sea levels, and resource scarcity, are not uniformly distributed⁴²⁵. Climate justice advocates for the implementation of equitable solutions that prioritize the needs of those most acutely affected by climate change while concurrently striving to mitigate GHG emissions⁴²⁶. Crucially, it emphasizes the importance of distributive fairness in climate action, ensuring that both the burdens and benefits are allocated with careful consideration of historical and systemic inequalities⁴²⁷. Ultimately, climate justice calls for a paradigm shift towards a more inclusive and sustainable approach in addressing the multifaceted challenges posed by climate change⁴²⁸. Legal frameworks that embrace climate justice principles function to safeguard these groups, empowering them through active participation in decision-making processes⁴²⁹. This entails the development of laws and policies that acknowledge historical injustices and provide avenues for redress and compensation⁴³⁰. For example, the incorporation of legal provisions for loss and damage within international conventions can provide a mechanism for nations most acutely affected by climate change to seek reparations and support⁴³¹.

⁴²⁴ United Nations Department of Economic and Social Affairs, 'Climate Justice Global Alliance' <<https://sdgs.un.org/partnerships/climate-justice-global-alliance#:~:text=Climate%20justice%20advocates%20for%20equitable,account%20historical%20and%20systemic%20inequalities.>> accessed 31 May 2024.

⁴²⁵ University of California Center for Climate Justice, 'What is Climate Justice?' <<https://centerclimatejustice.universityofcalifornia.edu/what-is-climate-justice/#:~:text=Climate%20justice%20connects%20the%20climate,least%20responsible%20for%20the%20problem.>> accessed 31 May 2024.

⁴²⁶ United Nations Department of Economic and Social Affairs, 'Climate Justice Global Alliance' <<https://sdgs.un.org/partnerships/climate-justice-global-alliance#:~:text=Climate%20justice%20advocates%20for%20equitable,account%20historical%20and%20systemic%20inequalities.>> accessed 31 May 2024.

⁴²⁷ Farhana Sultana, 'Critical Climate Justice' (2022) 188 *The Geographical Journal* 118-124 120.

⁴²⁸ *Ibid.*, 122.

⁴²⁹ UNDP Climate Promise, 'Climate Change is a Matter of Justice- Here's Why' (*UNDP*, 2023) <<https://climatepromise.undp.org/news-and-stories/climate-change-matter-justice-heres-why>> accessed 31 May 2024.

⁴³⁰ *Ibid.*

⁴³¹ *Ibid.*

Furthermore, the concept of a just transition is inextricably linked to the acceleration of climate action. A just transition encompasses the shift towards a low-carbon economy in a manner that safeguards workers and communities whose livelihoods are presently reliant on fossil fuel industries⁴³². The pursuit of a just transition represents a critical endeavour to mitigate the inherent inequalities exacerbated by climate change and the transition to a net-zero carbon emissions global economy⁴³³. This concept emphasizes the imperative to ensure that the benefits of climate action are maximized while simultaneously minimizing the potential for adverse impacts on workers and their communities⁴³⁴. By proactively addressing the social and economic ramifications of decarbonization, a just transition framework seeks to create a more equitable and sustainable pathway for all stakeholders⁴³⁵. Legal frameworks can play a crucial role in facilitating this transition by mandating comprehensive plans that encompass retraining programs, robust social safety nets, and strategies for economic diversification⁴³⁶. These measures are essential to mitigate the potential for social and economic disruption that may arise from the phasing out of carbon-intensive industries⁴³⁷. By embedding just transition principles within national legislation, governments can foster resilient and sustainable economies that prioritize both human well-being and environmental objectives⁴³⁸.

In addition, in the context of accelerating climate action, legal frameworks in the Mediterranean must address the common pitfall of siloed approaches⁴³⁹. Laws and regulations often tackle mitigation and adaptation separately, resulting in fragmented and

⁴³² Setenay Hizliok and Antonina Scheer, 'What is the Just Transition and What Does It Mean for Climate Action' (*The London School of Economics and Political Science Graham Research Institute on Climate Change and the Environment*, 2024) <[⁴³³ Ibid.](https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-just-transition-and-what-does-it-mean-for-climate-action/#:~:text=The%20just%20transition%20is%20a,in%20achieving%20net%20zero%20globally.> accessed 31 May 2024.</p></div><div data-bbox=)

⁴³⁴ Darren McCauley and Raphael Heffron, 'Just Transition: Integrating Climate, Energy and Environmental Justice' (2018) 119 *Energy Policy* 1-7 2.

⁴³⁵ Ibid, 5.

⁴³⁶ Daria Shapovalova and Eddy Wifa, 'The Role of Law in Enabling a Just Transition' (*IUCN Technical Brief*, 2023) 1-3 1 <<https://www.iucn.org/sites/default/files/2023-11/iucn-cop-28-technical-brief-wcel-the-role-of-law-in-enabling-a-just-transition.pdf>> accessed 31 May 2024.

⁴³⁷ Ibid, 1.

⁴³⁸ Ibid, 2.

⁴³⁹ Bakhtary and others, 4.

sometimes conflicting outcomes. An integrated legal approach can provide a more cohesive structure for climate policy, enabling comprehensive and effective responses to climate challenges⁴⁴⁰. The adaptation deficit, the gap between the level of adaptation required and the measures implemented, should also be considered⁴⁴¹. Legal frameworks, by setting clear adaptation targets and establishing accountability mechanisms, have the potential to catalyse actions that reduce this deficit⁴⁴².

Lastly, given the transboundary nature of the Mediterranean Sea and the diversity of jurisdictions along its shores, legal frameworks must foster regional collaboration and harmonization of climate policies⁴⁴³. This will underline the necessity of concerted efforts and shared responsibility among Mediterranean countries in both mitigating climate impacts and adapting to their inevitable consequences⁴⁴⁴.

The acceleration of climate action through robust legal frameworks is not merely desirable but rather a fundamental pillar in the global effort to combat climate change comprehensively and equitably. By grounding these frameworks in the principles of climate justice, just transition, and equity, policymakers are empowered to craft legislation that is both robust and inclusive, effectively reducing GHG emissions while simultaneously fostering social and economic resilience. This holistic approach is essential to ensure that the benefits of climate action are equitably distributed, safeguarding and empowering vulnerable populations throughout the transition to a more sustainable future. Ultimately, the success of climate measures in the Mediterranean will be determined by the extent to which legal frameworks can adapt to and pre-empt the complex, long-term nature of climate challenges. By assessing the feasibility, appropriateness, and enforceability of mitigation and adaptation measures and by ensuring these measures are fully integrated and sufficiently funded and executed, legal

⁴⁴⁰ Ibid, 21.

⁴⁴¹ Samuel Fankhauser and Thomas K. J. McDermott, 'Understanding the Adaptation Deficit: Why are Poor Countries More Vulnerable to Climate Events than Rich Countries?' (2014) 27 *Global Environmental Change* 9-18 12.

⁴⁴² Ibid, 17.

⁴⁴³ Ilias Mavroeidis and others, 'Chapter 8: Governance' in Elen Lemaitre-Curri and Lina Tode (eds.) *SoED 2020: State of the Environment and Development in the Mediterranean* (Plan Bleu, 2020) 1-341 292.

⁴⁴⁴ Ibid, 293.

scholars and policymakers can forge a path towards a sustainable and resilient Mediterranean ecosystem.

CONCLUSION

Climate change, a pressing global issue, poses far-reaching implications for our planet. Within this context, a comprehensive analysis of the specific impacts of climate change on the Mediterranean Sea, a region renowned for its unique ecological diversity and socio-economic significance, has been provided. Furthermore, new pathways to address these impacts and foster a climate-resilient Mediterranean have been sought.

A foundational understanding of climate change and its implications for the Mediterranean Sea has been established. Particular attention was paid to the profound impacts on marine ecosystems, with a thorough examination of ocean acidification, sea level rise, and the cascading effects on marine biodiversity. This chapter has revealed the fact that the Mediterranean region, especially the Mediterranean Sea, needs concrete action in order to combat the effects of climate change.

Building upon this foundation, the legal and institutional frameworks governing climate action has been analysed. This analysis employed a two-pronged approach. Initially, the international endeavours within legal and institutional frameworks, highlighting the global response to this shared challenge has been examined. Then, the focus narrowed to the Mediterranean region, in their fight against climate change. The existing measures implemented and underscored the necessity for specialized legal and institutional frameworks tailored for both region-wide and country-specific mitigation and adaptation efforts has been elucidated.

The multifaceted approaches required to address climate change's impacts and safeguard the Mediterranean Sea has been delved into. A thorough examination of both climate change mitigation and adaptation efforts that recognize the distinct, yet interconnected nature of these strategies has been provided. The potential synergies between mitigation and adaptation, highlighting best practices for integrating these approaches to maximize benefits for the Mediterranean has been explored. It was demonstrated that Mediterranean

countries face significant challenges in achieving the desired outcomes and in effectively controlling and minimizing the impacts of climate change.

An evaluation of existing adaptation and mitigation measures implemented within the Mediterranean Sea, focusing specifically on their legal dimensions, was culminated. This critical analysis assessed the effectiveness of current legal frameworks in driving climate action within the region and explored potential avenues for strengthening these frameworks, identifying key considerations for accelerating climate action and fostering a more resilient future for the Mediterranean Sea.

A number of crucial findings has been revealed regarding the fight against climate change in the Mediterranean. While international agreements and regional frameworks provide a foundation for action, the analysis of adaptation and mitigation measures reveals a pressing need for strengthened commitments and accelerated implementation. The interconnected nature of the Mediterranean Sea necessitates a united front against climate change, with all bordering nations working in concert to elevate existing measures and develop innovative solutions.

Central to this endeavour is the need for robust stakeholder engagement. Local authorities, policymakers, scientists, industry leaders, and civil society groups must be actively engaged in developing and implementing climate action plans that break the silos and elevate synergy. Fostering a sense of shared responsibility and ownership is crucial for the success of any climate action strategy in the Mediterranean.

The urgency of the climate crisis has been underscored. While there is growing global awareness of the challenges posed by climate change, this awareness must translate into accelerated action. The Mediterranean Sea, with its rich biodiversity and socio-economic importance, is particularly vulnerable to climate impacts. Therefore, strengthening legal frameworks, fostering regional cooperation, and promoting stakeholder engagement are not merely aspirational goals, but rather essential steps towards a climate-resilient future for the Mediterranean. However, a critical gap remains in effectively addressing the legal ramifications of climate change in the Mediterranean. Further study is urgently needed to explore emerging legal avenues, particularly in the realm of climate litigation, and to

address the inadequacies of existing sanction mechanisms within international climate agreements like the UNFCCC and the Paris Agreement.

The escalating impacts of climate change necessitate a paradigm shift towards stricter legal frameworks and enforcement mechanisms. Without a strong legal foundation, current efforts to combat climate change in the Mediterranean, while well-intentioned, risk being insufficient. Humankind responds to clearly defined rules and consequences; robust legal frameworks are therefore not just complementary, but fundamental to ensuring a sustainable future for the Mediterranean Sea.

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ABSTRACT

The Mediterranean Sea, a cradle of civilization and a region of exceptional biodiversity faces an unprecedented challenge: climate change. Rising sea levels, ocean acidification, and increasingly frequent extreme weather events threaten this invaluable ecosystem and the livelihoods of millions who depend on it. This crisis demands a critical examination of the legal frameworks governing climate action and a clear-eyed evaluation of existing adaptation and mitigation measures.

This thesis delves into the complex legal landscape of climate change in the Mediterranean, analysing the efficacy and feasibility of current responses. International agreements, regional frameworks, and national policies are scrutinized to assess their adequacy in addressing the multifaceted impacts of climate change on the Mediterranean Sea. This includes analysing the feasibility of strengthening existing legal mechanisms, exploring emerging legal avenues, and addressing the inadequacies of sanction mechanisms within international climate agreements. Beyond evaluation, this work explores pathways for enhancing climate resilience within a strengthened legal framework.

By critically examining the legal dimensions of climate action in the Mediterranean Sea, this thesis aims to contribute to a deeper understanding of the challenges and opportunities facing the region. It underscores the urgent need for strengthened legal frameworks, enhanced regional cooperation, and innovative legal solutions to mitigate the impacts of climate change and foster a more sustainable future for the Mediterranean.

Keywords: Climate Change, Adaptation, Mitigation, Law of the Sea, United Nation Framework Convention on Climate Change (UNFCCC)

ÖZET

Medeniyetlerin beşiği ve olağanüstü biyolojik çeşitliliğe sahip olan Akdeniz, eşi benzeri görülmemiş bir zorluk olan iklim değişikliği ile karşı karşıyadır. Yükselen deniz seviyeleri, okyanus asitlenmesi ve giderek daha sık yaşanan aşırı hava olayları, bu değerli ekosistemi ve ona bağlı milyonlarca insanın geçim kaynaklarını tehdit etmektedir. Bu kriz, iklim eylemlerini yöneten yasal çerçevelerin incelenmesini ve mevcut uyum ve azaltım önlemlerinin net bir değerlendirmesini gerektirmektedir.

Bu tez, Akdeniz'deki iklim değişikliği ile alakalı karmaşık yasal mevzuatı derinlemesine inceleyerek mevcut çalışmaların etkinliğini ve uygulanabilirliğini analiz etmektedir. Uluslararası anlaşmalar, bölgesel sözleşmeler ve kıyıdaş ülkelerin ulusal politikaları; iklim değişikliğinin Akdeniz üzerindeki çok yönlü etkilerini ele alma noktasındaki yeterliliklerini değerlendirmek amacıyla incelenmektedir. Bu inceleme, mevcut yasal mekanizmaların uygulanabilirliğinin analiz edilmesini, yeni yasal yolların araştırılmasını ve uluslararası iklim anlaşmalarındaki yaptırım mekanizmalarının etkilerinin ele alınmasını içermektedir. Bu çalışma, güçlendirilmiş bir yasal çerçeve içinde iklim direncinin artırılması için uyum ve azaltım yollarının etkinliğini araştırmaktadır.

Akdeniz'deki iklim değişikliğine yönelik uluslararası, bölgesel ve ulusal mevzuatların yasal boyutlarını inceleyerek bölgenin karşılaştığı zorluklar ve fırsatlar hakkında daha derin bir anlayışa katkıda bulunmayı amaçlamaktadır. İklim değişikliğinin etkilerini hafifletmek ve Akdeniz için daha sürdürülebilir bir gelecek sağlamak amacıyla güçlendirilmiş yasal çerçevelere, artırılmış bölgesel iş birliğine ve yenilikçi yasal çözümlere duyulan acil ihtiyacın altını çizmektedir.

Anahtar Kelimeler: İklim Değişikliği, Adaptasyon, Azaltım, Uluslararası Deniz Hukuku, Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi (UNFCCC)