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Draft Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas
(8 April 2015)

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Draft Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas

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About this document (to be deleted in the final draft)

This document is the second draft of the Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas ("the Framework"). It was prepared by UNEP/MAP in the context of the GEF-funded "*Integration of climatic variability and change into national strategies to implement the ICZM Protocol in the Mediterranean*" project ("ClimVar & ICZM" Project). This project is executed in 11 Mediterranean countries to promote the use of Integrated Coastal Zone Management (ICZM) as an effective tool to deal with the impacts of climate variability and change in coastal zones.

The mandate, the background and the process for the development of the Framework so far is presented in detail in the Annex to this document.

The present draft is the result of a 4-month consultation process mainly through an ad-hoc technical Advisory Panel consisting of key international experts on adaptation. Additionally, coordination and alignment with the climate related chapter of the revision of the MSSD was ensured from the beginning. Inputs were also sought from the Climate Experts Group of the Union for the Mediterranean.

Following this consultation phase, which focused mainly on the scientific and technical integrity and state-of-the-art of the document, the Framework is now being shared for inputs and comments with national Focal Points of MAP and RACs, MCSD members and the Focal Points of the MedPartnership and ClimVar & ICZM projects. On the basis of the feedback received, a final draft will be prepared and submitted to the MCSD for its review, in order for it to be finally submitted to the MAP Focal Points Meeting in October 2015 and then adopted by the 19th meeting of the Contracting Parties to the Barcelona Convention (COP 19) to be held in Athens in February 2016.

The final version of the draft Framework will be complemented by a detailed background report providing an overview of the issues, the challenges and the current status regarding the adaptation to climate change of the Mediterranean Marine and Coastal Areas.

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List of Abbreviations

CIRCE	"Climate Change and Impact Research: the Mediterranean Environment" project
EcAp	Ecosystem Approach
EEA	European Environment Agency
GCOS	Global Climate Observing System
GEF	Global Environment Facility
GLOSS	Global Sea-Level Observing System
ICZM	Integrated Coastal Zone Management
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
LAS	League of Arab States
MAP	Mediterranean Action Plan
MCSD	Mediterranean Commission on Sustainable Development
MedGOOS	Mediterranean Global Ocean Observing System
MOON	Mediterranean Operational Oceanography Network
MSSD	Mediterranean Strategy for Sustainable Development
PoW	Program of Work
SREX	IPCC's Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation
UfM	Union for the Mediterranean
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Glossary of Terms

Adaptation[1]:	The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.
Climate change	Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use.
Climate variability[1]:	Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).
Disaster risk management[1]:	Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, and sustainable development.
Ecosystem Approach	A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. An ecosystem approach is based on the application of appropriate scientific methods, focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems
Exposure[1]:	The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected.
Hazard[1]:	The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. In this report, the term hazard usually refers to climate-related physical events or trends or their physical impacts.
Integrated coastal zone management (ICZM)[2]:	A dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts.
Impacts[1]:	Effects on natural and human systems. In this report, the term impacts is used primarily to refer to the effects on natural and human systems of extreme weather and climate events and of climate change. Impacts

[1] *IPCC, 2014: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.*

[2] *Integrated Coastal Zone Management Protocol.*

	generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. Impacts are also referred to as consequences and outcomes. The impacts of climate change on geophysical systems, including floods, droughts, and sea level rise, are a subset of impacts called physical impacts.
Maladaptation[1]	Actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future.
Resilience[1]**:**	The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation.
Risk[1]**:**	The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure, and hazard, following the IPCC AR5 WGII (2014). In this report, the term risk is used primarily to refer to the risks of climate-change impacts.
Vulnerability[1]**:**	The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

1 INTRODUCTION

1.1 Purpose and scope of the Framework

1. The development of the Framework is guided by the following vision:

By 2025 the Marine and Coastal Areas of the Mediterranean countries and their communities have increased their resilience to the adverse impacts of climate variability in the context of Sustainable Development. This is achieved through common objectives, cooperation, solidarity, equity and participatory governance.

2. Currently, responses to climate-related pressures and hazards are often limited to short-term and reactive local emergency measures. These responses may in fact in some case increase the risk to compromise future opportunities for adaptation, leading to maladaptation. Building environmental and socioeconomic resilience against climate change is about pro-active, longer term and integrated planning that addresses the root causes of vulnerability and guides the economic development of the region in a more sustainable direction.

3. Climate risks extend well past territorial boundaries, and therefore so do the necessary measures to address them. A cross-border collaborative and coordinated approach to adaptation is in line with the UNFCCC's National Adaptation Plan process which among others urges countries to promote "coordination and synergy at the regional level and with other multilateral environmental agreements"[3] and additionally with the EU Strategy on Adaptation to Climate Change, which encourages EU countries to "establish contact with neighboring countries to inform about the adaptation process and areas of concern with regard to cross-border impacts and identify approaches for coordination over different political, legal and institutional settings"[4].

4. The overall aim of the Framework is to provide a regional approach in coordinating and assisting policy makers and stakeholders at all levels across the Mediterranean to:
   - promote the right enabling environment for mainstreaming adaptation in national and local planning;
   - promote and exchange best practices and low-regret measures;
   - promote leveraging of necessary funding; and
   - exchange and access best available data, knowledge, assessments and tools on adaptation, in order to increase the resilience of the Mediterranean marine and coastal natural and socioeconomic systems to the impacts of climate change.

5. Its focus, coherently with the legal framework set by the Protocols of the Barcelona Convention, is on the marine and coastal environments of the Mediterranean. The geographical scope of the Framework is that of the Barcelona Convention, that is the Mediterranean Sea and the coastal zones of the 21 countries that border it. The Framework recognizes that climatic changes will have impacts that do not respect the boundaries of a coastal zone as it is usually defined and that adaptation actions may be required further inland, in particular in inland watersheds.

6. The Framework is structured around four Strategic Objectives. Each Strategic Objective includes separate Operational Objectives and suggested priority fields of action for their realization.

7. UNEP/MAP plans to launch an analysis of the Protocols and the strategic documents under the MAP system, and of how the Framework's objectives could be mainstreamed into them. The Framework, together with the results of this analysis, is expected to provide the basis for considering the need and appropriateness of a Regional Action Plan on Adaptation, which could inter alia describe in more detail steps and requirements for stakeholders' involvement, a plan for

[3] UNFCCC Secretariat, Technical guidelines for the national adaptation plan process, December 2012.
[4] European Commission, Guidelines on developing adaptation strategies, April 2013.

implementation of activities and actions at the regional and national levels, as well as a monitoring and evaluation plan.

1.2 Background – The Mediterranean Changing Climate

8. Climate change poses significant challenges to the Mediterranean countries and is expected to worsen already acute situations present in the region. Essential resources like fresh water, agricultural production and fish provisions may become endangered while coastal communities, ecosystems and infrastructure will be challenged by increased physical risks. More importantly, human lives may become endangered and health risks increased in a warmer climate. The development of an adaptation strategy for the Mediterranean region should provide answers to the risks, reduce the exposure of the society and the ecosystems and increase the overall resilience of the Mediterranean states.

The Region's climate is already changing

9. Climate variability and change is becoming increasingly evident in the Mediterranean. According to observations and studies referenced in the recent IPCC Fifth Assessment Report (AR5)[5] and in IPCC's SREX Report[6], in recent decades, summer heat waves' intensity, number, and length have increased alongside extreme precipitation events and soil dryness. Major increases have been observed in warm temperature extremes including events such as hot days (Tmax >30°C) and tropical nights (Tmin>20°C). Trends of decreasing precipitation and discharge are consistent with increasing salinity in the Mediterranean Sea, indicating a trend toward increased freshwater deficits. The Mediterranean also exhibits variability regarding the observed sea level rise. According to the latest EEA indicators assessment[7], in the Mediterranean Sea there are areas with increases of more than 6 mm/year, and with decreases of more than -4 mm/year.

Projections for the future

10. The IPCC AR5 considers the Mediterranean Region as "highly vulnerable to climate change" and states that it "will suffer multiple stresses and systemic failures due to climate changes". Different sub-regions of the Mediterranean will witness different changes to their climate. On average however for the whole Region, estimates mentioned in the IPCC AR5 for the medium-low emissions scenario (RCP 4.5) and for the period 2081-2100 compared to 1986-2005 include an increase in surface mean air temperature of 2-4oC, 10-20% decreases in mean annual precipitation, increased risk of desertification, soil degradation, an increase in duration and intensity of droughts, changes in species composition, increase of alien species, habitat losses and agricultural and forests production losses.

11. Sea level rise in the Mediterranean Sea involves local as well as global contributions. Thus multi-decadal regional projections involve larger uncertainties than those for the global ocean. A rise of 0.4-0.5m is projected for most of the Mediterranean under IPCC AR5's medium-low emission scenario RCP 4.5. The effect of sea level rise due to global warming is more important in most of the Mediterranean Sea where, due to the small tidal range, coastal infrastructure and coastal communities are located closer to mean sea level. In addition vertical land movements caused by tectonic as well as other causes pose additional risks for such areas.

Overview of expected climate change impacts

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[5] Working Group I Contribution to the 5th IPCC Assessment Report, Climate Change 2013 - The Physical Science Basis, http://www.ipcc.ch/report/ar5/wg1/

[6] IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change

[7] European Environment Agency, Global and European sea-level rise (CLIM 012) - Assessment published Sep 2014http://www.eea.europa.eu/data-and-maps/indicators/sea-level-rise-2/assessment

12. Climate change is expected to apply additional stresses on several sectors and systems by modifying land degradation rates and the recurrence of droughts, floods and other extreme climate events, as well as through changes in temperatures, in the precipitation regime and in the sea level.

13. The Mediterranean countries need to turn the challenges they face under a changing climate into opportunities to increase their resilience by addressing the reasons that have so far led many environmental parameters into almost critical status.

14. *Environmental systems*: The Mediterranean region is among the richest in biodiversity of global importance. However, many of its ecosystems have already been weakened by pollution, overexploitation, fragmentation of habitats, and biological invasions. Such stresses are expected to be amplified under climate change. The composition of most of the present marine and coastal ecosystems will probably change and there will be a greater risk of the extinction of species especially those that are already vulnerable and in particular those species with a restricted climatic distribution, those that need highly specific habitats and/or those small populations which are naturally more vulnerable to modifications in their habitats. Climate change is also expected to amplify biological invasions and proliferation of pathogens and diseases, fostered by the rise in temperature of the marine waters[8]. At the same time, sea acidification is currently occurring at an unprecedented rate, subjecting some marine organisms to an additional, and worsening, environmental stress[9]. Warming and reduced rainfall is expected to lead to a decrease in trees and plant growth while annual burned area due to forest and wild land fires is projected to significantly increase in many areas bordering the Mediterranean Sea. The region's coastal systems and low-lying areas would be subject to submergence and erosion due to increased sea-level rise and sea flood surges. Coastal aquifers, already overall overexploited, would become increasingly threatened by salt water intrusion due to rising sea levels and/or over-extraction.

15. *Socioeconomic systems*: The region's water resources are already subject to various interacting pressures such as rapid population growth, urbanization, tourism alongside environmental degradation. These stresses would be multiplied under climate change because of projected declines in precipitation and runoff, and depletion of groundwater resources. Agriculture in the coastal zones will be affected with significant decreases in some crop yields which could reach alarming levels under high emissions scenarios, threatening food security especially for poor communities. Changes in the geographical distribution of wild fish stocks can lead to possible decreased catch potential for some species. Climate change can also influence where aquaculture is possible, which species are raised, and the efficiency of the production. The coastal zones, which face high risks due to sea-level rise, host most of one third of the word tourism that visit Mediterranean countries. The crucial tourism industry could face negative consequences during the summer months because of heat waves, drought and the associated risk of fires, although occupancy rates may increase during spring and autumn and therefore impacts on the sector will not be uniform across the region. Sea level rise could lead to loss of beaches and other natural attractions. Urban communities will be affected in terms of heat stress, water security and quality, sea-level rise and storm surges, extreme weather events and inland flooding. Wastewater systems and transport infrastructure will also be affected by sea level rise. Energy transmission infrastructure could be at risk; changes in water availability will affect hydropower generation and may lead to increased deployment of desalination options. Higher temperatures will increase the overall and peak demand for cooling in the summer months but at the same time reduce heating demand during the winter..

16. *Public health*: The overall health effects of a changing climate in the Mediterranean are likely to be negative. Extreme high air temperatures contribute directly (through heat stress) and indirectly

[8] UNEP-MAP-RAC/SPA, 2010. Impact of climate change on marine and coastal biodiversity in the Mediterranean Sea: Current state of knowledge
[9] Mediterranean Sea Acidification in a changing climate (MedSeA) Project

(through raised levels of ozone and other secondary pollutants) to deaths from cardiovascular and respiratory disease, particularly among elderly people. Extreme heat also raises pollen and other aeroallergen levels which trigger asthma. Rising sea levels and increasingly extreme weather events may destroy homes, medical facilities and other essential services therefore increasing risks to public health. Lack of safe water can compromise hygiene and increase the risk of diarrheal disease while floods can contaminate freshwater supplies, heighten the risk of water-borne diseases, and create breeding grounds for disease-carrying insects, threatening especially those with already limited access to water and sanitation. Decrease in the production of staple foods will increase the prevalence of malnutrition and undernutrition, especially among those on low incomes. Finally, changes in the climate are likely to lengthen the transmission seasons of important vector-borne diseases and to alter their geographic range.

1.3 The Barcelona Convention and Climate Change

17. In 1975, 16 Mediterranean countries and the European Community adopted the Mediterranean Action Plan (MAP), the first-ever Regional Seas Programme under UNEP's umbrella. In 1976 these Parties adopted the Barcelona Convention (Convention for the Protection of the Mediterranean Sea Against Pollution, renamed in 1995 to Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean). MAP's legal framework includes the following seven Protocols that address specific aspects of Mediterranean environmental conservation:

- Dumping Protocol
- Prevention and Emergency Protocol
- Land-based Sources and Activities Protocol
- Specially Protected Areas and Biological Diversity Protocol
- Offshore Protocol
- Hazardous Wastes Protocol
- Protocol on Integrated Coastal Zone Management (ICZM)

The implementation of most of these initiatives is expected to be affected by risks resulting from climate change.

18. UNEP/MAP has been supporting actions to assess climate change impacts in the Mediterranean marine and coastal zone, dating back to the publication in 1992 of "Climate change and the Mediterranean: environmental and societal impacts of climatic change and sea level rise in the Mediterranean region"[10]. A comparative analysis of the main findings, conclusions and recommendations of the site-specific case studies were presented in 1996 in the 2nd Volume[11] of the aforementioned edition. One of the major observations of these studies was the critical role that coastal zone planning has to play in climate adaptation policies. Several of the Regional Activity Centers of UNEP/MAP have undertaken studies[12], such as a series on the impacts of climate

[10] Climatic Change and the Mediterranean: Environmental and Societal Impacts of Climatic Change and Sea-Level Rise in the Mediterranean Region, Vol. 1 (Eds.: L. Jeftic, J.D. Milliman and G. Sestini), Arnold Publ., 1992, 673pp.

[11] Climatic Change and the Mediterranean: Environmental and Societal Impacts of Climatic Change and Sea-Level Rise in the Mediterranean Region, Vol. 2 (Eds.: L. Jeftic, S. Keckes and J. Pernetta), Arnold Publ., 1996, 564pp.

[12] Selected reports:

- SPA/RAC, 2008, Impact of climate change on biodiversity in the Mediterranean Sea
- PB/RAC, 2008, Climate Change and Energy in the Mediterranean
- SPA/RAC, 2009, Synthesis of National Overviews on Vulnerability and Impacts of Climate Change on Marine and Coastal Biological Diversity in the Mediterranean Region
- SPA/RAC, 2010, Impact of climate change on marine and coastal biodiversity in the Mediterranean Sea – Current state of knowledge

change on Mediterranean biodiversity, identifying climate change impacts in coastal zones, and others.

19. The Mediterranean Strategy for Sustainable Development (MSSD), adopted in 2005, included the mitigation of climate change and adaptation to its effects as one of its 7 Priority Fields of Action. The Assessment on the Implementation of the MSSD report (2011) suggested that the revised MSSD should put more emphasis on emerging priorities such as adaptation to climate change. The process for the revision of the MSSD (2016-2025) started in late 2014 and the new draft Strategy has climate change as one of its 6 Focus Areas. The development of the Framework has been closely linked with that of the revised MSSD and in particular its Climate Chapter, to ensure full coherence between the two strategic documents.

20. The Contracting Parties to the Barcelona Convention endorsed at their 15th meeting (Almeria, Spain, January 2008) the Ecosystem Approach (EcAp) as an overarching principle of the UNEP/MAP system at the strategic level, to be integrated in all its policies and activities, with the ultimate objective of achieving a Good Environmental Status[13] of the Mediterranean Sea. EcAp is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. UNEP/MAP has undertaken a project aiming at providing support to the Barcelona Convention for the implementation of the Ecosystem Approach. One of EcAp's Operational Objectives is to minimize the impacts induced to the marine and coastal ecosystems by climate variability and change. Close synergies are envisaged in the implementation of the objectives of both EcAp and the Framework.

21. At the 16th meeting of the Contracting Parties to the Barcelona Convention (Marrakesh, Morocco, November 2009), the "Marrakesh Declaration" adopted by Ministers of Environment and Heads of Delegation agreed to "*Implement effective coordination to ensure the integration of climate change issues into development policies with the aim of achieving the Millennium Development Goals and the objectives of the MSSD, and ensure the strengthening of cooperation for the sharing of experience in the field of surveillance (early-warning systems) and the development and implementation of adaptation and risk-management strategies*".

22. In 2010, UNEP/MAP began work on a Regional Climate Change Adaptation Framework in the Mediterranean. The draft Framework was reviewed and discussed at the 14th Meeting of the Mediterranean Commission on Sustainable Development (MCSD) in Montenegro, June 2011.

23. UNEP MAP's Program of Work for 2014-15 which was adopted at the 18th meeting of the Contracting Parties to the Barcelona Convention (Istanbul, Turkey, December 2013) had climate change as one of its seven Themes and contained several mitigation and adaptation actions, including the preparation of the Framework and its review by the MCSD in order for it to be submitted for consideration by 19th meeting of the Contracting Parties to the Barcelona Convention (Athens, Greece, February 2016).

- PAP/RAC, 2010, Climate Change in Coastal Zones of the Mediterranean - Background Paper & Position Paper
- PB/RAC, 2011, Adapting to climate change in the water sector in the Mediterranean: situation and prospects

[13] "the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations" as defined in EU's Marine Strategy Framework Directive

1.4 Other Relevant Policy and Institutional Frameworks and Initiatives

24. Alongside the activities ongoing under the auspices of UNEP/MAP-Barcelona Convention in relation to the creation of an adaptation framework for the Mediterranean coast and marine environment, there are various other regional initiatives, with which cooperation will be a necessity. For the purpose of this document, we mention the following ones.

25. The European Commission adopted in April 2013 the EU Strategy on Adaptation to Climate Change which identifies three priority areas: 1. Promoting action by Member States, through encouraging the adoption of comprehensive adaptation strategies and providing funding to help them build up their adaptation capacities. 2. 'Climate-proofing' action by further promoting adaptation in key vulnerable sectors and ensuring that Europe's infrastructure is made more resilient, and 3. Better informed decision-making by addressing gaps in knowledge about adaptation. The Commission states that priority will be given to adaptation flagship projects that address key cross-sectoral, trans-regional and/or cross-border issues. In order to support the development and implementation of climate change adaptation strategies and actions in Europe, the European Climate Adaptation Platform Climate-ADAPT[14] has been launched since 2013.

26. The Union for the Mediterranean is a multilateral partnership created in July 2008, consisting of the 28 member states of the EU and 15 other Mediterranean partner countries. Its climate-related policy framework provides for the development of regional policy and action frameworks and projects in response to climate change challenges. The decisions of the UfM Ministerial Conference on Environment and Climate Change (13 May 2014, Athens) aim at enhancing coherence of and promoting joint action within a Mediterranean climate change agenda. In that context, the UfM Climate Change Expert Group and the UfM Working Group for Environment and Climate Change were established.

27. The Arab Framework Action Plan on Climate Change, 2010-2020 which was elaborated in the League of Arab States (LAS) framework, aims at enhancing the Arab countries' capacity to take appropriate measures for addressing climate change issues while achieving sustainable development targets and MDGs in the Arab Region. Its adaptation focus is on:

- Vulnerability assessments of climate change impacts on economic and social development;
- Adaptation strategies in a range of sectors;
- Preparation and implementation of strategies for disaster risk reduction.

Linkages have been secured with other relevant LAS strategies such as the Arab Strategy for Disaster Risk Reduction 2020 and the Arab Water Security Strategy 2010-2030.

[14] http://climate-adapt.eea.europa.eu

2 STRATEGIC FRAMEWORK OBJECTIVES

28. The Framework has been structured around four strategic objectives, each of them identifying several operational objectives with relevant priority fields where action should be taken:
    i. Promote appropriate institutional and policy frameworks, increase awareness and stakeholder engagement and enhance capacity building and cooperation;
    ii. Identify, assess and implement best practices (including low regret measures) for effective and sustainable adaptation to climate change impacts.
    iii. Leverage existing and emerging finance mechanisms relevant to climate change, including international and domestic instruments
    iv. Better informed decision-making through research and scientific cooperation and improved availability and use of reliable data, information and tools.

Strategic Objective 1: Promote appropriate institutional and policy frameworks, increase awareness and stakeholder engagement and enhance capacity building and cooperation

29. Complex challenges for the coastal areas are becoming even more difficult due to the financial and political situation in the region. Climate change and its impacts are placing Mediterranean stakeholders in the position that requires maximum coordination, harmonization and integration of different sectoral policies. In order to reach results, institutional capacities, relationships, policies and practices to assess and manage climate change risks and opportunities and national development goals must be strengthened. Coordination within and between national institutions on climate change adaptation in the coastal and marine areas is a necessary prerequisite to create an enabling environment for the formulation and implementation of efficient solutions to such a complex and cross-cutting problem. Coordination within and between national institutions on climate change issues is often limited while capacities and human resources necessary for integrating adaptation approaches across policies and sectors are inadequate.

Operational Objective 1.12: To enhance awareness and engagement of key stakeholders on climate adaptation

30. Public support and engagement is essential for the acceptance and implementation of adaptation activities. This will require an appreciation of the importance of the issues involved and the potential costs of inaction. Improving awareness on climate change, its impacts and adaptation options is something that must also permeate education, the business sector and local authorities. Building awareness on the adaptation needs is a slow and complex process, therefore it can't wait.

31. In this context, priority fields where action should be taken include:

    i. Integrated awareness campaigns addressed to the general public, public bodies and the private sector, communicating a consistent and effective message about climate change risks and adaptation options for adapting.
    ii. Targeted awareness campaigns tailored for specific audiences, sectors or circumstances.
    iii. E-learning and massive open online course (MOOC) programmes on climate change impacts in the Mediterranean.
    iv. Networks and organizations of stakeholders (including farmers, fishermen and tourism managers) to promote awareness raising, provide salient information and enhance their ability to respond to hazard events.

Operational Objective 1.21: To enhance adequate institutional and policy frameworks

32. Planning for adaptation to climate change and increased resilience to its impacts should not be considered as a separate policy field, disconnected from other aspects of sustainable development, but should rather be integrated across development and economic strategies and plans. Support is

required to develop the countries' capacities to use the available knowledge base in the decision making processes and access the right tools.

33. In this context, priority fields where action should be taken include:

i. Regional policy instruments to promote adaptation to the impacts of climate change. Assessment on how the Barcelona Convention can be a tool to assist countries build coastal resilience, and on the future implementation of its protocols and action plans in the light of climate change.
ii. Identification and addressing of all institutional, legal and cultural barriers to adaptation policies.
iii. Support to countries to develop and adopt comprehensive national adaptation strategies and share them with neighboring countries.
iv. Support and guidance on best practices and integrated approaches to mainstream climate change considerations in developmental and environmental plans and strategies. Coordination between sectoral plans in order to derive synergies and co-benefits and avoid maladaptation.
v. Integrated approach for the reduction of non-climate related threats that have a strong influence on risk and undermine the capacities of communities and ecosystems to adapt to climate change (water pollution, overfishing, sand mining, damming)
vi. Strategic Environmental Assessment, including the assessment of climatic factors and adaptation implications, for all major plans and strategies.
vii. Risk and Impacts assessment in relation to climate change prior to major infrastructure investments in coastal and marine areas.

Operational Objective 1.3: To promote a regional approach on Disaster Risk Management

34. As climate change and socioeconomic trends boost the number of people exposed to hazards such as floods and heatwaves, improved early warning systems and greater coordination of disaster management activities will be needed to manage risks and protect lives and property.

35. In this context, priority fields where action should be taken include:

i. Integration of regional climate related data into disaster risk management
ii. Regional and transboundary cooperation and assistance to cope with climate-related extreme events and emergency situations.
iii. Exchange of best practices on disaster risk management in the region.
iv. Innovative climate services and products to inform Risk Management, tailored to the needs of key public and private stakeholders.

Operational Objective 1.4: To improve the implementation and effectiveness of adaptation policies through monitoring and reviewing progress

36. Appropriate measurement and reporting of the progress towards achieving the objectives of Adaptation policies and plans, at both the national and regional level, is essential for effectiveness, transparency and accountability. It is therefore necessary that adaptation policies are designed as a continuous and flexible process, including feedback through monitoring and evaluation, both in terms of the validity of the underlying scientific assumptions and of the appropriateness and effectiveness of projects and policies.

37. In this context, priority fields where action should be taken include:

i. New and transparent reporting requirements for the Contracting Parties to the Barcelona Convention on the implementation of climate adaptation policies.

ii. Identification of responsible institutions for monitoring progress. Adequate monitoring and review mechanisms in place at sectoral and local levels. Availability of good quality relevant data.
iii. Development of a monitoring and evaluation framework including objectives, benchmarks and timescales for reviews to take place.
iv. Dynamic updating and refining of adaptation plans as experience increases and more data on impacts becomes available.

Strategic Objective 2: Identify, assess and implement best practices (including low regret measures) for effective and sustainable adaptation to climate change impacts.

38. Improved knowledge and understanding is essential for more reliable forecasts of future conditions that would guide policy makers. However, uncertainty will remain inherent to adaptation decision making. But there exist low-regret measures with proven effectiveness and practically no negative side effects the implementation of which should not be delayed while waiting for more certain information and knowledge to be available. Many of these low-regret measures produce co-benefits, help address other development goals, and help minimize the scope for maladaptation.

Operational Objective 2.1: To identify adaptation needs and best practices.

39. Priority fields where action should be taken include:

i. Identification by countries of their adaptation needs for the coastal and marine environment and of relevant technology needs and inclusion in their National Adaptation Plans.
ii. Identification and sharing of best practices, including low regret measures, for adaptation in the coastal and marine environment.
iii. Identification and addressing of challenges and constraints for the transfer and adoption of best practices (including low-regret measures) and technologies across the Mediterranean basin.

Operational Objective 2.2: To mainstream and adopt best practices.

40. Priority fields where action should be taken include:

i. Mainstreaming and implementation of best practices into national adaptation planning processes.
ii. Maximisation of synergies with relevant mitigation efforts.
iii. Local authorities and communities to implement adaptation actions tailored effectively to localized impacts of climate change including innovative, grass root responses.
iv. Ecosystem based Adaptation approaches and the ICZM Protocol as priority tools for encouraging adaptation efforts.

Strategic Objective 3: Leverage existing and emerging finance mechanisms relevant to climate change, including international and domestic instruments

41. In the face of a changing climate and related risks, the cost of inaction can be huge. The measures to increase the resilience of our natural and socioeconomic systems should therefore not be considered as economic costs but rather as investments that are even economically profitable as they reduce risks and expected damages and losses, while at the same time exploiting opportunities towards sustainable development. Even if global emissions are cut to the level required to keep global warming below 2°C thus avoiding the most catastrophic consequences of climate change, the total costs of adaptation could exceed $250 billion per year by 2050, according to UNEP's Adaptation Gap Report. Such financial resources should not be expected to come from only one or

a few sources. For developing countries, international assistance could be the primary source but mobilizing public and private funds domestically is essential.

Operational Objective 3.1: To overview and prioritize public spending relative to climate adaptation and mobilize national sources of climate finance.

42. Country-led approaches are essential for a strategic allocation of funds to key areas, especially taking into account that national sources are expected to cover most of the costs of adaptation measures. Beyond public resources, the involvement of the private sector which could be essential for the sharing of investments costs, risks, rewards and responsibilities, needs to be fully tapped. Existing and emerging economic instruments can foster adaptation by providing funds as well as incentives for anticipating and reducing impacts.

43. In this context, fields where action should be taken include:

i. Review of the national portfolio of response options in order to efficiently and effectively allocate, e.g. through a Climate Public Expenditure and Institutional Review.
ii. Economic valuations of the costs of climate change as foundation for governments to allocate national funding on adaptation.
iii. Avoidance of maladaptive actions and non-efficient "hard" infrastructures to low-regret measures that improve climate resilience.
iv. Appropriate share of public spending to climate adaptation measures as part of an integrated sustainable development agenda.
v. Socially sensitive and transparent public-private partnerships for adaptation action encouraging the involvement of the private sector in related schemes.

Operational Objective 3.2: To support access to international financing

44. The Contracting Parties to the UNFCCC have set up a number of funding mechanisms for channeling the international assistance envisaged in the Convention, such as the Adaptation Fund and the Green Climate Fund. Funds have also been set up through multilateral agencies such as the World Bank.

45. More specifically in the Mediterranean context, international financing for adaptation measures can be available through international banking institutions such as the European Investment Bank / Facility for Euro-Mediterranean Investment and Partnership, the European Bank for Regional Development, the Global Environment Facility, the African Development Bank and the Islamic Development Bank. However, many countries in the region are not yet fully prepared to take advantage of opportunities offered by existing and emerging financing instruments related to adaptation.

46. In this context, fields where action should be taken include:

i. Supporting countries' capacities to prepare schemes and proposals in order to effectively access and manage international and regional funding for climate change adaptation.
ii. Maximization of multilateral funding for areas of common interest and concern.
iii. Coordination mechanisms between donors and key actors in the Region and beyond in order to agree on an integrated funding strategy and priorities, for avoiding overlapping or duplication of efforts and activities.
iv. Feasibility and potential of a regional approach to risk transfer mechanisms.
v. Innovative financing mechanisms such as the issuance of Green Bonds.

Operational Objective 3.3: To promote and build alliances with banking and insurance sector.

47. Integrating risk management into business practices could be best achieved through pricing it. Communicating risks associated with climate change through pricing may impact on awareness better than any other communication tool. Therefore, alliances between government, banks and the insurance sector could result with smarter risk management and reduced future climate related costs for the society.

48. In this context, fields where action should be taken include:

i. Integration of climate risk management into business and management practices.
ii. Cooperation with the insurance (including re-insurance) and banking sectors in the Mediterranean countries.
iii. Standardized international metrics related to climate risk and exposure.
iv. Assessment of reinsurance and insurance practices in the Mediterranean countries, exchange of best practices and provision of targeted information for different coastal stakeholders.

Strategic Objective 4: Better informed decision-making through research and scientific cooperation and improved availability and use of reliable data, information and tools.

49. Decisions on adaptation policies should be informed by scientific research into the changes in the climate system, the impacts of climate change, the vulnerabilities of natural and socio-economic systems to those impacts and the effectiveness of adaptation options.

Operational Objective 4.1: To enhance the understanding of the vulnerability of natural and socioeconomic systems and sectors and of possible impacts

50. In order to formulate informed, effective and sustainable adaptation strategies and plans, it is vital that knowledge is developed and uncertainties are reduced, especially regarding the understanding of ecosystem-scale interactions and of socioeconomic consequences. Thematic and sectorial assessments have been carried out in the past years by various institutions and a significant body of knowledge exists that can be built upon. However, more coordination is needed, knowledge gaps still need to be addressed and socioeconomic trends need to be assessed.

51. In this context, priority fields where action should be taken include:

i. Sensitivity and adaptive capacity of marine species and ecosystem responses to changes in oceanic conditions, including the introduction of alien species.
ii. Mapping of coastal and marine ecosystems and assessment of the role of services they provide to climate resilience.
iii. Sea level rise and salt water intrusion affecting groundwater resources and wetlands.
iv. Current and wave patterns, and sediment movement affecting shoreline dynamics.
v. Subsidence of certain coasts.
vi. Water resources and the water cycle
vii. Vulnerability and interactions of socioeconomic systems and sectors such as:
Agriculture and forestry
Water resources management
Health
Tourism
Urbanization
Fisheries
Energy
Transport and trade

Key infrastructure

viii. Combined effects and interactions of climate change and socioeconomic dimensions and trends such as:
Migration
Demographics
Conflict and social stability
Gender
Vulnerable groups (eg children, older people, indigenous populations)

ix. Assessment of potential positive consequences and opportunities to different sectors from a changing climate.

Operational Objective 4.2: To build capacities for and promote use of vulnerability and risk assessment at regional to local levels

52. In order to support policy makers at the regional, national and local levels, capacities and tools need to be developed for a better understanding of climate change risks, of options for adaptation, and of how climate change adaptation links to national development goals. The risks, which compose of hazard, vulnerability and exposure, need to be assessed in all dimensions: environmental (biodiversity losses of marine and coastal ecosystems), social (health, mortality) and economic (potential losses in all sectors). Direct and indirect effects of climate forcing on natural hazards must be explored and disentangled. Special attention should be given to the vulnerability component of risk where the level of uncertainties is much higher.

53. Despite the fact that the Mediterranean is a global climate hotspot, the region has been rather under-investigated in terms of comprehensive analyses and assessments. Numerous sub-regional projects and initiatives exist whose results need to be brought together in a consistent way in order to move towards the development of a complete and integrated Risks and Vulnerability Assessment for the whole Mediterranean region.

54. In this context, priority fields where action should be taken include:

i. Understanding of the drivers, interactions, impacts and responses within the socioeconomic and environmental nexus.
ii. Integrated risk and vulnerability models introducing socioeconomic feedbacks.
iii. Economic valuations of the costs of climate change impacts on vulnerable sectors and hotspots.
iv. Development of easy-to-use risk assessment methods such as index-based methods to be applied at regional, national and local levels.
v. Technical assistance and capacity building activities to competent national institutions for the monitoring of climate change impacts and assessing the cost of adaptation options.
vi. Georeferencing of the Mediterranean Sea and coasts and their resources and threats.
vii. Auditing of strategically important coastal assets and assessment of their vulnerability.
viii. University Departments, curricula and modules on climate change issues and exchange programmes for adaptation scientists.

Operational Objective 4.3: To strengthen science-policy interface by channeling and making accessible adaptation related knowledge

55. The strengthening of adaptive capacities requires an increasing systematization and communication of scientific and local knowledge, as well as their integration into public policies and programs. However, institutional and cultural barriers between researchers, policy-makers and the public that hinder the transformation of knowledge into plans and actions still remain a challenge in the Mediterranean. There is a need to pay more systematic attention to strengthening the science/policy interface, and to recognize the three way relationship between scientists, policymakers and the public.

56. In this context, priority fields where action should be taken include:

i. Strategy for communicating scientific and other types of knowledge to different stakeholders as well as the general public.
ii. Process for science-policy-business-community dialogues at and between all governance levels, both regionally and nationally.
iii. Development of a Mediterranean Regional Network under the UNEP-facilitated Global Adaptation Network in order to share lessons, knowledge and information and highlight research and guidance needs and priorities.
iv. Regional Clearinghouse / repository of best practices and relevant reports and publications.

Operational Objective 4.4: To strengthen regional climate information at a resolution suitable for adaptation planning

57. In order for scientists and stakeholders to be able to assess the impacts of climate change and develop adaptation plans it is essential that they have access to the best possible information from observation systems that monitor the climate system and detect and attribute climate change.

58. All Mediterranean countries participate to a different extent in the Global Climate Observing System (GCOS) international monitoring programme as well as the following regional initiatives:
- Monitoring Network System for Systematic Sea Level Measurements in the Mediterranean and Black Sea (MedGLOSS);
- Mediterranean Operational Network for the Global Ocean Observing System (MONGOOS)
- Mediterranean Hydrological Cycle Observing System (MED-HYCOS).

59. In the European Union, Copernicus is the flagship programme on monitoring the Earth's environment using satellite and in-situ observations. Copernicus' Climate Change Service aims to combine observations of the climate system with the latest science to develop information about the past, current and future states of the climate in Europe and worldwide.

60. The countries of the Mediterranean have national observation and monitoring systems of varying data quality and availability, with northern countries enjoying more long-term and high-quality climate data than southern ones. Infrastructure, spatial coverage and data issues at the national level are challenges that need to be addressed. Crucial coordination issues, however, are also essential to be addressed at the regional level.

61. In this context, priority fields where action should be taken include:

i. Availability of environmental and socioeconomic data required for adaptation, including the maintenance and modernization of monitoring programmes and networks in the region
ii. Sharing and standardization of collection, quality and storage, of all data relevant to adaptation planning, following WMO Resolution 40[15].
iii. Regional information platform that will contain information on climate change monitoring and research, interconnecting or harvesting information from relevant databases and platforms
iv. Development of regional climate models integrating socioeconomic trends and threats.
v. A strategic approach to climate adaptation research in the region involving academic, industry and government bodies and their partnerships.

[15] https://www.wmo.int/pages/about/Resolution40_en.html

3 ANNEX - Briefing note on the process of the development of the Regional Climate Change Adaptation Framework (2009-20015)

Background

At the 16th meeting of the Contracting Parties to the Barcelona Convention in 2009, the "*Marrakesh Declaration*" adopted by Ministers of Environment and Heads of Delegations agreed to "*Implement effective coordination to ensure the integration of climate change issues into development policies with the aim of achieving the Millennium Development Goals and the objectives of the MSSD, and ensure the strengthening of cooperation for the sharing of experience in the field of surveillance (early-warning systems) and the development and implementation of adaptation and risk-management strategies*". The Five-Year Programme of Work 2010-2014 that was adopted in the same meeting was built on six Themes, one of which was climate change. Output II under this Theme was "*Reduced socio-economic vulnerability*" and one of the Indicative Activities was to "*Support development of the Marine and coastal dimensions of regional/national strategies on adaptation*".

UNEP/MAP started preparing a "*Regional Framework for Climate Change Adaptation in the Mediterranean*" which was presented as a "work in progress" in the 14th Meeting of the MCSD in Budva, Montenegro in 2011 where the Commission acknowledged the need for such a Framework. Unfortunately, the document wasn't further developed due to lack of funding.

In 2012 the GEF Secretariat endorsed the *"Integration of climate variability and change into national strategies for the implementation of the ICZM Protocol in the Mediterranean"* (ClimVar & ICZM) project. UNEP/MAP was identified as executing agency of the project as sister project to the regional GEF funded *"Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem"* (MedPartnership) project. It was agreed that one of the activities of the project would support the finalization of the draft Adaptation Framework.

The 18th meeting of the Contracting Parties to the Barcelona Convention in 2013 in Istanbul adopted the UNEP/MAP Programme of Work 2014–2015. Output 1.2 of the Programme titled "*Implementation gap filled: Contracting Parties supported in meeting the objectives of BC, protocols and adopted strategies*" has among its Targets for 2014-15 "*Climate Change Adaptation Framework prepared, reviewed by MCSD and submitted for consideration by COP19*".

Finally, in the Declaration of the Union for the Mediterranean Ministerial Meeting on Environment and Climate Change that took place in 13 May 2014 in Athens, the Ministers "*support the regional climate change adaptation framework under development by UNEP-MAP*".

The development of the Framework

A climate expert, consultant to UNEP/MAP for the ClimVar & ICZM project, started working on the Framework in mid-2014. The original draft from 2011 formed the basis of the work. Additionally, a review was made of all relevant adaptation strategies, including the European Commission's EU Strategy on adaptation to climate change, the Baltic Sea Region Climate Change Adaptation Strategy, the Black Sea Economic Cooperation Climate Change Adaptation Strategy. Additionally, the Mediterranean countries' Communications to the UNFCCC were reviewed as well as major publications from international institutions and initiatives such as the IPCC, UNEP, the European Environment Agency, the World Bank, the EC's Joint Research Centre, the Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources on Socio-Economic Vulnerability in the Arab Region (RICCAR) and others.

Consultations were held within the MAP system for the Framework's purpose and aims and the document's Table of Contents. Coordination and alignment with the climate related chapter of the revision of the MSSD was ensured from the beginning and especially during the Consultation

Workshop in Sophia Antipolis in November 2014. Inputs to the Framework were also sought from the Climate Experts Group of the Union for the Mediterranean during its meeting in October 2014.

The objectives and the priority fields of action of the Framework were crucial inputs for the development of the climate change strategic theme in the strategic framework of the UNEP/MAP's Mid-Term Strategy.

An essential aspect of the Framework is that it has been developed in a step-by-step consultation and review process involving an ad hoc technical Advisory Panel involving key regional experts on climate adaptation, which was established in autumn 2014. The members of the Panel, which were initially suggested by partners in the MAP system, include representatives from UNEP - Adaptation Unit, UNCTAD - Policy and Legislation Section, the Stockholm Environment Institute, the Islands & Small States Institute, the Economic and Social Commission for Western Asia, the League of Arab States, the Euro-Mediterranean Center on Climate Change, the Deutsche Gesellschaft für Internationale Zusammenarbeit, the African Development Bank, the EU Joint Research Center as well as Professors from the Universities of Mohammed V-Agdal, Castilla-La Mancha, Southampton, Kiel and the Aegean.

The zero-draft of the Framework was shared with the Panel members and discussed in detail in its first meeting on 18 December 2014 in Athens. Based on the proceedings of the meeting and more detailed comments that were received electronically, a new draft was prepared, shared with the Panel members and discussed in detail in its second meeting on 11-12 March 2015 in Athens.

Following this consultation phase, which focused mainly on the scientific and technical integrity and state-of-the-art of the document, the Framework is now being shared for inputs and comments with national Focal Points of MAP and RACs, MCSD members and Focal Points of the MedPartnership project. On the basis of the feedback received, a final draft will be prepared and submitted to the MCSD for its review, in order for it to be finally submitted to the MAP Focal Points Meeting in October 2015 and then adopted by the 19th meeting of the Contracting Parties to the Barcelona Convention (COP 19) to be held in Athens in February 2016.