

POLICY PAPER

Outsmart climate change: work with nature!

Enhancing the Mediterranean's climate resilience
through Nature-based Solutions

**OFF
YOUR
MAP**

Life
begins in
wetlands

While climate change is becoming more and more of a concrete reality, impacting people and places throughout the Mediterranean region, a broad range of Nature-based Solutions are available to enhance society's resilience in this new, dynamic and highly challenging context.

Nature-based Solutions to enhance climate resilience are pragmatic solutions building on the services and resources provided by ecosystems and biodiversity, which are more sustainable, robust and often more cost-efficient than conventional man-made solutions alone.

Using nature as a solution implies working with nature, instead of against it, and reaping the multiple benefits it offers over a long time.



MAIN FINDINGS

- 1. The Mediterranean region has been identified as a climate change 'hotspot'.** Average temperatures in the region have already risen to 1.6°C above pre-industrial levels, while a temperature rise of 2-3°C by 2050, and a rise of 3-5°C by 2100, have been forecast for the region (IPCC, 2013). This will lead to an increased frequency of extreme weather events, such as droughts, heat waves, storms and floods.
- 2. Conventional infrastructure alone will not be able to cope** with this new, highly dynamic and challenging context, which implies a significant level of uncertainty. Robust but flexible solutions are needed to help societies adapt.
- 3. Biodiversity and healthy ecosystems provide a broad range of services** - through Nature-based Solutions (NbS) - in terms of adaptation to and mitigation of climate change, and can increase society's overall resilience to stresses and shocks (FAO, 2019).
- 4. NbS are generally robust, flexible, cost-efficient, inclusive and long-term oriented solutions.** Stand alone or combined with man-made solutions, they also offer co-benefits related to food security, livelihoods, improved health and well-being, water regulation and disaster risk reduction, while contributing to nature conservation and restoration.
- 5. To facilitate the deployment and implementation of NbS and fully reap their benefits, shifts in mindsets, public policies (including legal and regulatory frameworks), and sound investment opportunities are needed.** This will help to overcome current barriers and allow NbS to reach their maximum potential.

KEY POLICY RECOMMENDATIONS

1. Within the framework of the Barcelona Convention, develop a strategy to **fully integrate NbS into national policies across all sectors** so as to significantly enhance countries' climate resilience by 2030.
2. In particular, **mainstream NbS into national plans for climate mitigation and adaptation**, such as the NDCs (Nationally Determined Contributions) and NAPs (National Adaptation Plans) required under the Paris Agreement, and DRR (Disaster Risk Reduction) plans under the Sendai Framework.
3. **Foster “Green City” schemes** throughout the region to improve citizens' resilience to heat waves, flood surges and coastal erosion, and possible water and food shortages.
4. **Promote sustainable and biodiversity-friendly practices and initiatives in the field of agriculture and aquaculture**, such as agroecology, local integrated nature-based production systems and sustainable fisheries to secure food security, rural and coastal livelihoods and employment opportunities.
5. **Manage coastal and marine ecosystems, including wetlands**, in a sustainable manner to enhance their capacity as carbon sinks and buffers, restore depleted fish stocks and protect marine biodiversity.
6. Overall, **implement adequate institutional structures, economic incentives and land tenure instruments** to facilitate the uptake and implementation of NbS and overcome existing obstacles to their implementation with a view to **moving towards a blue-green and circular economy** and ensure society's long-term resilience.



I. WHAT ARE NATURE-BASED SOLUTIONS?

Nature-based Solutions (NbS) are defined as “actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (IUCN, 2016).

They are intended to help society achieve its development goals and safeguard human well-being in ways that reflect cultural and societal values and enhance the resilience of ecosystems and their capacity for renewal and providing services. NbS address key societal challenges, such as food security, climate change, water security, human health, disaster risk, social and economic safety and development.

There are **several types of NbS**, which involve different levels of human intervention:

1) Conservation of existing ecosystems and landscapes

Where existing ecosystems (forests, wetlands, estuaries, grasslands and seagrass meadows), and coastal systems already offer significant services to mankind in terms of, for example, carbon sequestration and capture, disaster risk reduction, etc., NbS could involve preserving these ecosystems so that they can continue to deliver services. Establishing coastal setback zones for example improves safety along coastlines and acts as a disaster risk reduction measure.

2) Sustainable management and use of existing ecosystems and landscapes

Some ecosystems or landscapes can deliver significant services, or NbS, and continue to function properly as long as they are wisely managed or used. This can be the case with forests for timber, ocean fisheries, recreational sites, etc.

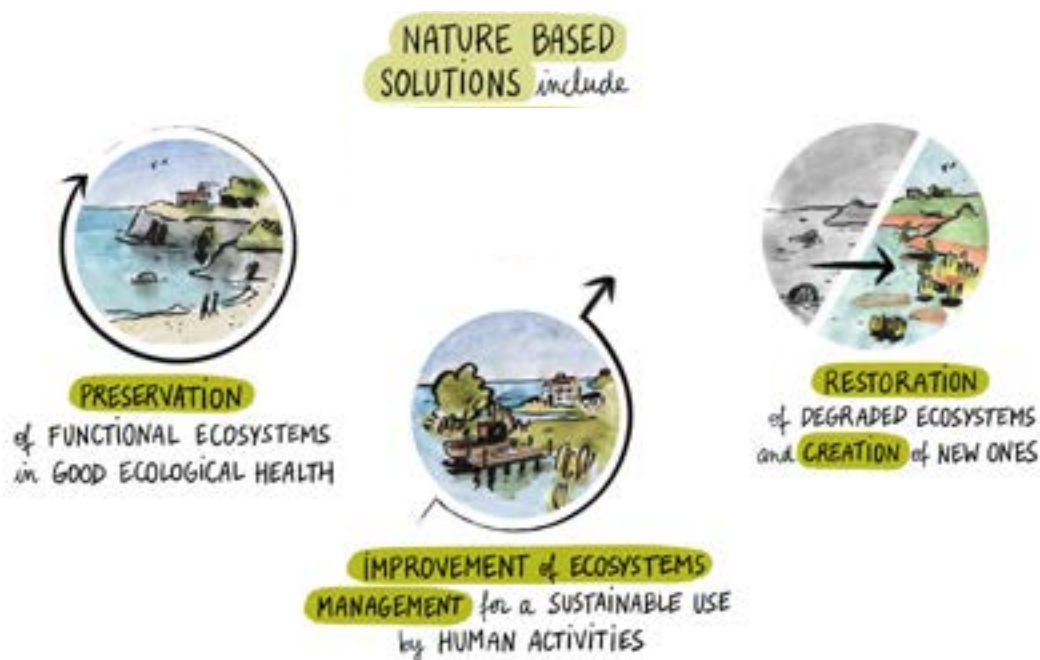
3) Restoration of valuable ecosystems and landscapes

Where valuable ecosystems have suffered degradation that prevents them from providing services, it may well be worth restoring them to recover their original functionalities for climate change or other purposes.

This can be the case with degraded floodplains and wetlands that play an important role as “climate buffers” against floods and droughts.

4) Creation of new ecosystem services and green infrastructure

In some areas, such as cities, NbS can be introduced so as to improve quality of life, climate resilience (especially to heat waves or flood surges) or food security for local residents. Such measures may include green roofs, parks and green corridors, and urban food gardens.



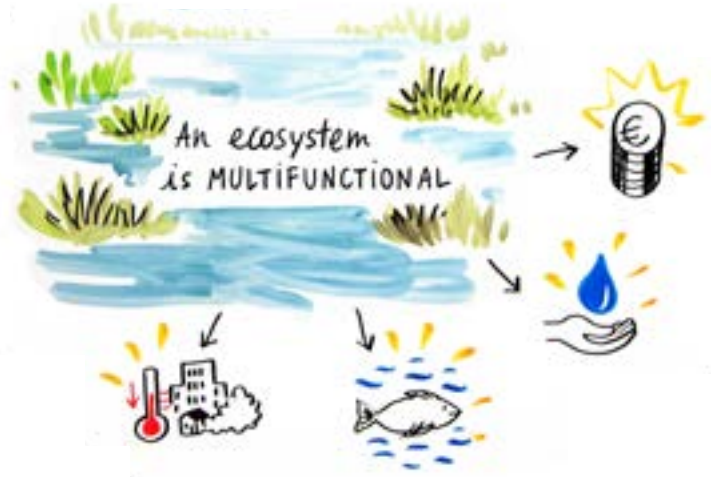
2. WHY DO NATURE-BASED SOLUTIONS MATTER FOR THE MEDITERRANEAN REGION?

There are three main elements that make NbS relevant for the Mediterranean region.

Firstly, in addition to the climate change impacts forecast specifically for this region, inherent water scarcity, concentration of economic activities in coastal areas and reliance on climate-sensitive agriculture all make the Mediterranean region one of the world's climate change 'hotspots'. Early implementation of adaptation and mitigation measures will therefore be key to enhancing its resilience in the near future.

Secondly, Mediterranean countries have committed, under various international agreements, to contribute to fighting climate change and achieving the UN's Sustainable Development Goals, in particular by implementing NbS.

Thirdly, NbS provide a range of measures – from reducing disaster risks to sequestering carbon – that can help Mediterranean countries do so in a robust and cost-efficient manner.



Box 1: Nature-based Solutions, an umbrella concept

Nature-based Solutions cover a whole range of ecosystem-related approaches, which can be grouped into five main categories, as shown in the following table.

Category of Approaches	Examples
Ecosystem restoration approaches	<ul style="list-style-type: none"> Ecological restoration Ecological engineering Forest landscape restoration
Issue-specific ecosystem-related approaches	<ul style="list-style-type: none"> Ecosystem-based adaptation Ecosystem-based mitigation Climate adaptation services Ecosystem-based disaster risk reduction
Infrastructure-related approaches	<ul style="list-style-type: none"> Natural infrastructure Green infrastructure
Ecosystem-based management approaches	<ul style="list-style-type: none"> Integrated coastal zone management Integrated water resources management
Ecosystem protection approaches	<ul style="list-style-type: none"> Area-based conservation approaches, including protected area management

Source: www.iucn.org

Box 2: Key Facts and Figures about the Mediterranean region

- The Mediterranean Sea covers almost 2.6 million km² and has a coastline of 46,000 km.
- Approx. 250 million people (or 55% of the total population in the Mediterranean) reside in coastal river basins.
- The Mediterranean region is the world's leading tourism destination with more than 300 million International Tourist Arrivals in Mediterranean countries and up to 500 million by 2030, with 50% in coastal areas.
- More than a third of the Mediterranean population (180 million people) can be classified as "water-poor" (i.e. below 1,000 m³ per resident per year) today, with an expected increase to over 250 million within 20 years.
- The Mediterranean region is recognized as one of the top 25 global biodiversity hotspots. It hosts approx. 10,000-12,000 marine species (4-18% of the world's known marine species, in an area less than 1% of the world's oceans).
- In 2015, forests covered approx. 10 % of the total area of Mediterranean countries. 4 countries (Spain, France, Turkey, Italy) host 64% of the region's overall forest area.
- Mediterranean wetlands reduced in area by 48% between 1970 and 2013.

Source: www.planbleu.org and *Mediterranean Wetland Outlook 2*

2.1. The Mediterranean, a climate change 'hotspot'

The Mediterranean has been identified as one of the world's most vulnerable regions to the impacts of global warming by the International Panel on Climate Change (IPCC). The IPCC has forecast a temperature rise of 2-3°C by 2050, and a rise of 3-5°C by 2100, for this region.

Phenomena such as heat waves, dry spells and extreme droughts will be more frequent and severe, while substantial drops in precipitation (reaching up to 20% under the 2°C scenario) will lead to reduced run off, increased soil dryness and diminished water availability, especially in summer. Global warming beyond 2°C would also result in a decrease of at least 12% of the Mediterranean biome area.

Meanwhile, average temperatures in the Mediterranean have already risen to 1.6°C above pre-industrial levels – compared to a global average of about 1°C – and precipitation has fallen by 2.5%. In recent years, most countries in the region have experienced numerous extreme weather events, ranging from summer droughts and heat waves, autumn floods to heavy winters and spring frost.

Box 3: Climate change impact trend in the Mediterranean Sea

The expected effects of climate change-driven stressors will affect marine & coastal biodiversity by producing shifts in the short, medium and long term:

- Short term (ongoing): spatio-temporal patterns of biodiversity; migratory paths; abundance of species; eco-physiological processes (reproduction); immunological response affecting individual performance and possible adaptive selection pressure on species traits;
- Medium term (decades): larval dispersal and recruitment; resource availability (food, habitat, etc.); primary and secondary production; complex (non-linear, non-independent) responses at the community / ecosystem level, likely leading to regime shifts and local extirpation of species and habitat losses; simultaneous effects of other human-driven stressors (e.g. over-fishing, pollution, habitat degradation, alien species), and land-sea links (e.g. soil erosion and desertification, agricultural runoff, river regulation, etc.);
- The long-term effects forecast by current scenarios might be mitigated by the reduction of GHG emissions and other appropriate measures, while the above short- and medium-term effects are already expected to occur anyway;
- These biodiversity changes are likely to have profound direct socio-economic effects, and impact public health. These kinds of effects are so far significantly underestimated in long-term planning for national economies.

Source: UNEP-MAP RAC/SPA, 2009a,b

Box 4: Significance and extent of risks to marine and coastal biodiversity in the Mediterranean Region associated with climate change

In 2009, national experts in the Mediterranean Region agreed (in line with the international scientific consensus) on the significance and extent of risks to marine and coastal biodiversity in their countries associated with climate change, as a result of (and simultaneous complex interactions between):

- **changes in precipitation** patterns and resulting freshwater scarcity, **increasing air and sea water temperature, enhancing UV radiation;**
- **sea level rise**, likely to accelerate coastal erosion, marine intrusion into coastal aquifers and wetlands, and other effects;
- **acidification** (decreasing pH);
- **change of hydrodynamic and hydrological parameters** (e.g. local and regional currents, upwelling, thermal stratification, frequency of storms and extreme events, salinity, turbidity, nutrient supply...).

Source: UNEP-MAP RAC/SPA, 2009a,b

Forest fires have also become more frequent, and storms and floods are becoming more destructive in the region.

These observed climate anomalies have already affected crop health and suitability in various areas, resulting in significant drops in the production levels of key regional crops, such as olives and grapevines. Such trends signal heightened risks of food shortage in the future.

About half of the Mediterranean population (250 million people) resides in coastal river basins, which are set to be hardest hit by extreme weather events, such as floods, storms and heat waves, as well as sea-level rise. Population growth and migratory influxes are set to aggravate the situation.

Furthermore, since the Mediterranean is a leading tourism destination, the projected negative effects of climate change on tourists' requirements (including comfort, mild temperature, preserved landscapes, beaches free of erosion and blooms (algae, jellyfish, etc.), fresh water, local resources, services) will also adversely affect this key economic sector in the region.

The coastal and marine environment – already suffering from intensive tourism, maritime transport, industrial development, urban sprawl, non-indigenous species and over-fishing – will now also be affected by the impacts of climate change on sea temperature, salinity, acidity and biodiversity.

2.2. International policy frameworks and processes relevant to NBS for climate resilience

All Mediterranean countries are Contracting Parties to the Barcelona Convention and have committed to the UN's 2030 Agenda for Sustainable Development as well as the Paris Agreement, two key international frameworks. Two other processes are also relevant in the region: the Sendai Framework for Disaster Risk Reduction and the UN Decade for Ecosystem Restoration. They require countries to take measures to enhance their climate resilience, contribute to mitigation efforts and sustainably manage key natural assets, such as marine, freshwater and terrestrial ecosystems and the services they provide.



• The UN's Barcelona Convention framework and its relevant processes and initiatives

In 2008-2009, the **RAC/SPA** undertook a broad overview to assess **vulnerability to climate change and its impact on Mediterranean marine and coastal biodiversity** in countries of the region. This overview, prepared by a large number of national experts and responsible officers in relevant national bodies, provided knowledge on key points, including: (I) the Mediterranean's wealth of biodiversity is highly sensitive to climate change impacts; (II) climate change is already occurring in the Mediterranean Region; (III) some impacts observed or occurring are probably irreversible; and (IV) the main concrete actions for limiting the consequences of human-induced climate change depend on other anthropogenic factors, reducing resilience and therefore increasing impacts on marine and coastal species and habitats. These facts called for urgent, harmonized and comprehensive actions.

Following this assessment, the "**Marrakesh Declaration**" adopted by Mediterranean Environment Ministers and Heads of Delegations on 4 November 2009, 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". Furthermore, with the UN Environment/MAP Mid-Term Strategy 2016-2021, climate change adaptation became a cross-cutting Strategy theme.

In 2008 the "**ICZM Protocol**" was signed, and by 2019 it had been ratified by 10 countries and the EU. Its flagship article n°8 invites countries to establish a setback zone where construction is not allowed. Taking into account areas directly affected by climate change and natural risks, this zone may not be less than 100 meters in width. The protocol leaves the option of this measure being adapted, but only under the responsibility of national governments.

Following the endorsement of a "**Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Zones**" by the Contracting Parties to the Barcelona Convention at their 19th Ordinary Meeting (COP 19, Athens, Greece, February 2016), the UN Environment/Mediterranean Action Plan system offers to policymakers and stakeholders in the Mediterranean region a structured outline for facilitating the identification of strategic objectives, strategic directions and priorities for adapting to climate change.

The main objective of the Framework is to define a regional strategic approach for increasing the resilience of Mediterranean marine and coastal natural and socioeconomic systems to the impacts of climate change and assisting policymakers and stakeholders at all levels across the Mediterranean in the development and implementation of coherent and effective policies and measures.

• The UN's 2030 Sustainable Development Agenda and the Mediterranean Strategy for Sustainable Development

Following the endorsement of the UN's 2030 Sustainable Development Agenda by the UN General Assembly in September 2015, the Contracting Parties to the Barcelona Convention adopted the Mediterranean Strategy for Sustainable Development (MSSD) 2016-2025 as a strategic guidance document for translating the UN 2030 Agenda to regional, sub-regional and national levels. The MSSD provides a holistic policy framework for a sustainable future in the Mediterranean region consistent with the Sustainable Development Goals (SDGs). It recognizes climate change as a priority issue for the region and calls for measures that work towards a green, low-carbon and climate-resilient Mediterranean.

Several of the MSSD's Objectives and Strategic Directions (SDs) promote the implementation of NbS to increase climate resilience and conserve ecosystem values and functions. This is the case, for instance, with SD 2.1 (on sustainable use, management and conservation of natural resources and ecosystems) and SD 2.2 (on conservation and use of indigenous or traditional plant varieties and domestic animal breeds), which promote environmentally-friendly agriculture and rural development practices.

With respect to NbS implementation in urban settings, the relevant Strategic Directions are SD 3.6 (on green buildings to contribute towards reducing the ecological footprint) and SD 3.7 (on urban resilience to reduce vulnerability to risks from hazards including climate change).

Climate change is addressed under Objective 4, with SD 4.1 (Increase scientific knowledge, raise awareness, and develop technical capacities to deal with climate change and ensure informed decision-making at all levels, recognizing and protecting the climate adaptation and mitigation services of natural ecosystems) and 4.2 (Accelerate the uptake of climate smart and climate resilient responses) being key for NbS promotion and implementation.



“Nature-based Solutions take into account the long term; they are often no-regret solutions that give ecosystems time to adapt. They offer a rich range of co-benefits. In both their Mid-Term Strategy and the MSSD, Mediterranean countries have identified Nature-based Solutions and their integration into national CC adaptation policies as a priority”,

Elen Lemaitre Curri, Director, Plan Bleu, UNEP/MAP.

Box 5: NbS-relevant SDGs and MSSD Objectives		
Theme	UN SDG #	MSSD Objective
Climate Change	SDG 13 (Climate Action)	Objective 4: Addressing climate change as a priority issue for the Mediterranean
Food Security	SDG 1 (No Poverty); SDG 2 (Zero Hunger)	Objective 2: Promoting resource management, food production and food security through sustainable forms of rural development
Water Security	SDG 6 (Clean Water and Sanitation)	Cross-cutting, mostly addressed under Objective 2 (see above)
Urban Areas	SDG 11 (Sustainable Cities and Communities)	Objective 3: Planning and managing sustainable Mediterranean cities
Ecosystems	SDG 14 (Life below Water); SDG 15 (Life on Land)	Objective 1: Ensuring sustainable development in marine and coastal areas; Objective 2 (SD 2.1, 2.3)
Health & Well-being	SDG 3 (Good Health and Well-being)	Cross-cutting, addressed under several Objectives

• The Paris Agreement, NDCs and NAPs

Adopted in December 2015, during COP21, the Paris Agreement reflects the willingness of the international community to mobilize all parties concerned in order to keep the increase in global average temperature below 2°C above pre-industrial levels, and to pursue the efforts to limit it to 1.5°C globally. In its Article 5.1, the Paris Agreement asks the Parties to “take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases”, including forests, hence recognizing the importance of ensuring the integrity of ecosystems as a means to mitigate climate change.

In addition, each Party is required to prepare and communicate the Nationally Determined Contributions (NDCs) that it intends to achieve, as well as National Adaptation Plans (NAPs) to reduce its vulnerability to the impacts of climate change, by building its adaptive capacity and resilience.

• The Sendai Framework for Disaster Risk Reduction

The Sendai Framework for Disaster Risk Reduction (2015-2030), adopted by the UN Member States in March 2015, emphasizes States’ “commitment to address disaster risk reduction and the building of resilience to disasters with a renewed sense of urgency within the context of sustainable development and poverty eradication, and to integrate, as appropriate, both disaster risk reduction and the building of resilience into policies, plans, programs and budgets at all levels and to consider both within relevant frameworks.”

The Sendai Framework clearly encourages measures that “strengthen the sustainable use and management of ecosystems and implement integrated environmental and natural resource management approaches that incorporate disaster risk reduction”, recognizing the usefulness of ecosystem-based solutions in reducing disaster-related risks or the so-called Eco-DRR approach.

• The UN Decade for Ecosystem Restoration

The “UN Decade for Ecosystem Restoration” was recently endorsed by the UN General Assembly. It will run from 2021 to 2030 under the leadership of UN Environment and the FAO, and aims to massively scale up the restoration of degraded ecosystems as a proven measure for fighting climate change while enhancing food security, water supply and biodiversity.

The initiative recognizes that ecosystems deliver numerous services essential to food and agriculture, including freshwater supply, protection from hazards and provision of habitats for biodiversity, and that urgent measures need to be taken to halt the rapid loss of species.

It also mirrors the findings by the FAO’s Commission on Genetic Resources, which were recently published in the report on “The State of the World’s Biodiversity for Food and Agriculture” and raised the alarm about the dreadful consequences of biodiversity loss on humanity’s ability to feed itself in the future.



2.3. The potential of Nature-based Solutions to address the Mediterranean's climate vulnerability

The Mediterranean region is extremely vulnerable to climate change, but as one of the world's biodiversity hotspots, it is endowed with a wealth of natural resources and ecosystems. These may, if used in a sustainable manner, provide a range of Nature-based Solutions (NbS) to enhance the region's resilience and offer opportunities for the transition towards a sustainable and inclusive green and blue economy.

Not only can NbS help societies in the Mediterranean region better adapt to ongoing climate change (e.g. through disaster risk reduction), they may also contribute to mitigating it, through carbon sequestration or emissions avoided (e.g. forests, peatlands and seagrass meadows).

Indeed, **NbS often have features that make them more adapted than conventional grey infrastructure for ensuring resilience to climate change in the long term.** They prove in general more adaptable, flexible and robust to shocks, and are therefore "climate-smarter". NbS often have low maintenance requirements, which saves time and money. They also provide multiple co-benefits and can complement existing infrastructure, representing a "no regret" solution.

In particular, NbS can contribute to enhancing the resilience of the following vulnerable sectors in the Mediterranean:


- **Water resources and water security:**

More than a third of the Mediterranean population (180 million people) can be classified as "water-poor" (i.e. below 1,000 m³ per resident per year) today, with an expected increase to over 250 million within 20 years.

Approaching a 1.6°C temperature increase above pre-industrial levels, the region has already experienced several summer droughts. Even if future global warming is limited to 2°C, summer rainfall is at risk of being reduced by 10 to 30% in some regions, thereby worsening existing water shortages. In addition, salinization of coastal groundwater due to sea level rise leading to saltwater intrusion also affects the fertility of low-lying crop lands.

Built infrastructure lacks nature's adaptability and robustness and, on its own, can barely cope with the projected near-to-permanent water scarcity, which will further worsen as global temperatures rise, leaving little room to cover future demand in the region. However, by drawing on NbS to harness the water-related services of ecosystems, such as forests, wetlands and floodplains, it is possible to reduce the increasing water stress. The conservation or restoration of wetlands and floodplains as flood and drought "buffers" and their reconnection to rivers is an excellent example of a NbS that at the same time helps the preservation of valuable ecosystems.

Paired with conventional water infrastructure, NbS can robustly increase water security and climate resilience in situations of extreme precipitation or drought events.

 *"In a changing climate, wetlands can play a significant role as buffer zones. They are real "sponges", stocking water during heavy rain, which is then available during periods of drought. They can thereby regulate the high variability in precipitation, which our dams and dikes cannot address anymore";*
Jean Jalbert, General Director, Tour du Valat, Camargue, France.



• Agriculture and food security:

With the aggravation of climate change leading to more frequent droughts, dry spells, heat waves, extreme weather events and corollary stresses (e.g. diseases and pest outbreaks), agricultural systems in the Mediterranean will be heavily impacted and agricultural output affected.

Yields for many crops are expected to decrease, especially in the Southern part of the Mediterranean. For instance, by 2050 there will be an estimated 40% reduction in legume production in Egypt, 12% for sunflowers and 14% for tuber crops in southern Europe. Rising temperatures will also affect olive production due to increasing water requirements, heat stress and more frequent occurrence of pests. In recent years, olive plantations across the Mediterranean have been hit by extreme events that mirror climate projections, such as erratic rainfalls, early spring frosts, strong winds and summer droughts, leading to dramatic plunges in harvests. Such trends are worrisome in terms of short-term food security.

Holistic approaches inspired by nature, such as agroecology, agroforestry or well-managed Marine Protected Areas (MPAs), can end up more robust than conventional solutions. Healthy ecosystems and biodiversity tend to increase the resilience of production systems and livelihoods to shocks and stresses, including climate change. They represent key resources in efforts to increase food production while limiting negative impacts on the environment, minimizing waste and making multiple contributions to the livelihoods of many people.

Encouraging diversification – e.g. by using multiple species, integrating the use of crop, livestock, forest and aquatic resources, and conserving habitat diversity at landscape or seascape scale, and protecting wild genetic resources – also strongly promotes resilience, improves livelihoods and supports food security and nutrition.

Box 6: Increasing climate resilience in forest areas - Alpilles Regional Nature Park, France

The Alpilles Regional Nature Park is home to a unique set of Mediterranean landscapes and biodiversity, and has been increasingly prone to wildfires since the 1950s, triggered by progressive agricultural decline and increasing dominance of softwoods, as well as environmental degradation (unsustainable land use, species decline, soil erosion, etc.). These fires have generated major safety issues for people and property. When conventional measures (e.g. fire protection tracks, tanks) no longer proved sufficient, managers turned to Nature-based Solutions.

This led to the EU LIFE+ project “LIFE Alpilles”, implementing traditional extensive grazing practices and management approaches which provide significant and multiple benefits, including prevention and improved management of fire hazards, contribution to local livelihoods and biodiversity conservation through the restoration of a rich and diverse wildlife.



“Biodiversity is critical for safeguarding global food security, underpinning healthy and nutritious diets, improving rural livelihoods, and enhancing the resilience of people and communities”,

José Graziano da Silva, Director-General of the FAO.

• **Urban areas, human health and well-being:**

Currently, almost 70% of the Mediterranean’s population lives in urban areas. With one of the fastest urbanization rates worldwide, the region’s urban population is expected to increase by an additional 130 million by 2050. In addition to the stresses triggered by fast urban expansion, Mediterranean cities are experiencing high vulnerability to the effects of climate change such as water scarcity, droughts, forest fires and heat waves.

NbS – in particular green infrastructure, such as green roofs, green corridors and parks – can be used by cities to meet specific needs such as filtering of storm water, absorption of rain water and storm surge/flood reduction, or mitigation of the heat island effect during extended heat waves.

Moreover, the natural environment and green areas are increasingly recognized as contributing positively to human health, well-being and social cohesion. Encounters with green space, including through urban gardening and farming, can foster citizens’ health and well-being as well as enhancing their food security.

NbS can often compete successfully with their grey infrastructure counterparts on the basis of lifecycle cost, resilience value, and public support. **Green infrastructure can also be combined with grey solutions to reduce overall cost and boost long-term performance.** Natural infrastructure can meet specific needs, while giving society and the economy valuable co-benefits that conventional solutions do not. Such additional benefits further enhance community resilience and well-being.

Finally, securing coastal setback zones increases the safety of life and property from marine flooding currently encountered during extreme weather events and set to increase with rising sea levels.

Box 7: Reducing heat stress in urban areas - rooftop farming in Greater Cairo, Egypt

Green infrastructure, such as green roofs and urban gardens, can improve the micro-climate, notably by reducing the heat stress in Mediterranean cities during summer, while enhancing food security and providing income-generating opportunities or other co-benefits.

One such example is the Rooftop Farming Pilot project in the Greater Cairo area, implemented between 2014 and 2018 by civil society organisations at local community level with the support of the German cooperation agency GIZ.

The project aimed to support urban agriculture activities in informal settlements as a means of fostering income generation and knowledge sharing, developing communities of practice and ownership, while improving the local micro-climate in a densely populated area prone to heat stress.



• Mitigation of climate change:

Approximately 60% of cumulative anthropogenic greenhouse gas (GHG) emissions since the pre-industrial era are stored either on land (in plants and soils) or in the ocean. Atmospheric carbon can also be sequestered by planting native vegetation and trees or establishing urban green spaces. Many measures which reduce GHG from land use or actively store carbon in soils and vegetation are considered to be nature-based.

The IPCC has estimated that, implemented across global forests, wetlands, grasslands and agricultural lands, NbS “**have the potential to provide 37% of the CO₂ mitigation needed by southern Europe and the Mediterranean by 2030**” in order to have a strong chance of holding warming to below 2°C (IPCC, 2018).

Mediterranean countries therefore have a clear interest in contributing to approaches that involve the conservation, restoration and sustainable management of forests, wetlands and oceans for their critical role in the functioning of the carbon cycle and the balanced regulation of the planet’s climate.

Moreover such measures lead to a reduction in GHG emissions and improve biodiversity protection and the health and recreation functions of land- and seascapes. For certain sectors such as tourism, agriculture and forestry, a nature-based approach can create new income opportunities.

Box 8: Sea flood risk management through coastal wetland ecosystems restoration - former saltworks in the Camargue, France

Coastal wetlands can function as protection to mitigate the effects of sea level rise and manage sea flood disaster risk. With 70% of its land surface below 1m elevation and increased coastal erosion, the Camargue delta is severely exposed to the effects of sea level rise.

Since 2011, 5,300 hectares of abandoned saltworks have been turned into natural coastal ecosystems. Dykes located along the coastline are no longer maintained, allowing coastline mobility and the restoration of sandy beaches where they had disappeared. Lagoons have been reconnected to the sea and surrounding wetlands and their capacity is used as a climate buffer for temporarily storing sea water during flooding events. The project on the former saltworks in the Camargue thereby contributes to adapting the delta to sea level rise while restoring resilient ecosystems.



Box 9: Carbon storage by coastal and marine ecosystems - LIFE Blue Natura project, Andalusia, Spain

Natural ecosystems can function as “carbon sinks” which fix or store large quantities of carbon dioxide (CO₂), which contribute to global warming. The region of Andalusia has a significant range of coastal marshes and seagrass meadows along the Atlantic and Mediterranean coasts.

The Blue Natura project assesses the carbon sequestration capacity of such ecosystems in order to establish their conservation value. Saltmarshes have a storage capacity of more than 1 million tonnes of CO₂ per year and seagrass meadows can store more than 1,500 tonnes of CO₂ per ha.

Restoring 1 ha of saltmarsh would help to sequester 1-2 tCO₂ annually. Restoring 1 ha of seagrass meadow, would add 0.15 - 1.5 tCO₂ annually to the Blue Carbon sink.

• Disaster management and risk reduction:

Ecosystems such as wetlands, forests and coastal systems can help society in the Mediterranean to better adapt and become more resilient to the adverse effects of climate change, including extreme weather events and climate-related disasters, through ecosystem-based adaptation (EbA) and ecosystem-based disaster risk reduction (Eco-DRR).

Ecosystems can reduce physical exposure to disasters by serving as protective barriers or buffers. Planting trees, shrubs and grasses as windbreaks and to protect coastal and other areas against various hazards has already proven helpful in several Mediterranean countries. Living shorelines, for instance, as well as the Posidonia banks along coastlines, often emerge as more beneficial than the commonly deployed, armoured shoreline protection. Establishing setback zones improves safety of life and property along the coastlines, but also secures the health of this specific eco-system. Cypress and carob trees, while being drought-resilient and adapted to the Mediterranean climate, provide fire-control services at low cost. Forest protection and reforestation at watershed level also helps reduce runoff and flood surges after intense rainfall.

Furthermore, NbS can protect man-made infrastructure and property in a cost-effective manner. Overall, NbS become more robust over time as they mature and are more likely to recover fully and faster after a shock than a conventional solution that may suffer costly damage or even fail. This long-term stability and resilience of NbS contrasts with grey infrastructure, whose performance drops over time as maintenance costs grow, and which must eventually be replaced entirely.

3. WHAT IS NEEDED TO IMPLEMENT NATURE-BASED SOLUTIONS?

3.1. Pre-requisites for the facilitation and implementation of NbS

- **Institutional setting and policy/legal frameworks:**



Appropriate policy and legal frameworks need to be in place to allow for the development of NbS. Most importantly, NbS need to be mainstreamed into sectoral policies at all levels and be given equal treatment with other conventional types of operations/infrastructure.

For those countries that are part of regional economic entities such as the EU, it is important that relevant frameworks exist at that level to have homogenous or standardized approaches (e.g. EU Green Infrastructure Strategy).

“One of the key advantages of Nature-based solutions is that you don’t have to look very far to find them. They are based on what already exists or should exist in Nature. There is no need to invent something new, just get inspired by Nature”,
Puri Canals, President, MedPan Network.

- **Economic incentives:**

Public authorities need to put in place financial/economic incentives such as subsidies, tax breaks or such like in order to foster the uptake of NbS and their full deployment throughout different sectors. This is crucial for the involvement of risk-averse private sector entities.

Legal and regulatory frameworks facilitating innovative financing mechanisms such as public-private partnerships, payment for ecosystem services schemes, investments in resource efficiency and savings also need to be adopted or strengthened. Public-private partnerships are especially critical for enabling funding for NbS in situations where the scale of the project is larger than any one entity can afford to fund.

Subsidies or tax breaks for investments in NbS are legitimate since NbS generally provide public goods (co-benefits that are not accounted for in market transactions) including delayed benefits in the long term. NbS are also increasingly selected because of their cost-effectiveness in addressing regulatory requirements, such as water discharge limits or remediation commitments, or the limited operating costs they are associated with (e.g. green roofs vs. concrete enhancement, or wetlands compared with engineered water treatment facilities).



• Project planning and implementation:

From the planning through the implementation phases, various considerations play a determining role in the successful implementation of NbS.

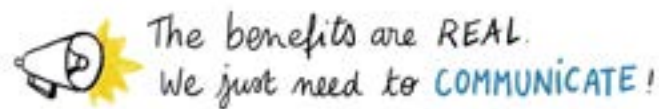
During the planning phase, it is crucial to:

- Verify the compliance of the projected NbS with legal/regulatory frameworks in place (e.g. permit requirements);
- Understand the sometimes complex bureaucratic processes that need to be followed with public administrations, in particular with regard to permits;
- Identify the key stakeholders and their interests;
- Secure political support and public/stakeholder buy-in in the area where the project is implemented, leaving enough time for stakeholder consultation if required;
- Determine the adequate geographical level (e.g. landscape, urban/rural, river basin) and time scale;
- Investigate the availability of land, appropriate land tenure instruments and secure long-term access;
- Analyse the cost-benefit ratio (including the cost both of inaction and alternative solutions);
- Demonstrate the project's eligibility and viability for potential funding requests.



During project design, it is important to:

- Communicate the project's expected benefits;
- Select project partners appropriately;
- Develop problem-solving and adaptive approaches with local stakeholders, including identification of potential trade-offs and win-win solutions;
- Secure a solid scientific knowledge basis and supporting data;
- Ensure sufficient and flexible funding.



During project implementation, it is necessary to:

- Engage an experienced project manager for project implementation;
- Engage partners through co-construction and management activities;
- Develop a monitoring and evaluation scheme to measure NbS benefits and assess project outcomes so as to potentially readjust implementation and share lessons learned;
- Cultivate a sense of ownership among relevant stakeholders and build an emotional connection to the project;
- Involve volunteers, youth, CSOs and other local groups to create awareness and build capacity in the community.

3.2. Key challenges to overcome in NbS implementation

NbS implementation is typically faces the barrier of “**the big unknowns**”, “**resistance to change**” or “**business-as-usual**” mindset that favours well-known technologies, such as purely grey infrastructure, over more unconventional green or green-grey approaches, which can be perceived to imply a **higher level of uncertainty and therefore risk**, particularly in terms of performance, costs, ownership and accountability for maintenance.

Another common challenge is the often **complex bureaucratic processes** that project implementers face when starting the formal procedures for obtaining a permit. In terms of permits for NbS-related projects, the **lack of technical guidance** for their implementation is a further commonly cited barrier, with reference to regulators and/or formal planning agencies, which often prioritize grey infrastructure because it is familiar to them. Furthermore, some countries require **Environmental Impact Assessments (EIAs)** before authorizing the development of new infrastructure projects, whether green or grey.

For new technologies there is often a **lack of regulatory/legal frameworks, technical requirements, measurement tools and demonstration cases**, which increase the perception of risk on the part of investors. This is because NbS need to be site-specific, tailor-made. There is rarely a “one size fits all” approach. Due to the novelty of NbS approaches, there is also **less data available showcasing their efficiency and benefits** versus other more mature technologies.



“Humankind needs a cultural shift, it needs to learn how to live with nature and not dominate it. Nature-based solutions are a suitable means of facilitating this alliance, on which our success in this century will depend”,
Bernard Cressens, President of the IUCN French Committee.



An additional barrier encountered is the fact that NbS can have **significant land requirements** (e.g. conservation of forests, wetlands, extensive farming, etc.). Moreover, compensation is often limited to projects implemented on public lands. In the case of a large number of landowners, appropriate instruments may not be available to acquire the land or compensate the landowners, establish long term contracts and obtain the necessary guarantees that the NbS will be preserved in the long term. Know-how, long-term commitment and periodic controls are also key to ensure proper maintenance of NbS.

There are also barriers to **securing funding for the implementation** of NbS from investors, if resources prove insufficient. One such barrier is the relatively **small financial investment of NbS projects**, which is not attractive for institutional investors who look for projects in the million-dollar range and beyond. Very few NbS projects manage to be of the desirable size for investors, despite the fact a significant amount of capital is available to invest.

Furthermore, project implementers will need to demonstrate the project’s **technical feasibility and cost-effectiveness**, notably due to the often diverse co-benefits they provide. For NbS this is even more relevant in securing financing, since most of them imply **techniques/approaches that have not been widely tested**, compared to grey alternatives and hence risks for the investor.

Making the business case for a NbS in the **absence of clear monetary/commercial value** can also hamper support from investors. To attract larger scale investments, **projects need to generate revenue**, which can be a challenge for NbS, which usually require a substantial amount of time before they start to generate revenue (assuming they succeed in generating a revenue stream) although they often provide a number of important co-benefits of non-monetary value.

4. CONCLUSIONS

Keeping ecosystems and biodiversity alive and healthy can be deemed a “no-regret” option, since it is useful, even if it has no immediate effects on climate change. Without seriously considering NbS, Mediterranean countries, however, would be missing out on cost-effective, highly resilient solutions to many of their challenges and an opportunity to move closer to a circular, zero waste and low emissions economy.

Proceeding with “business as usual” (including investments in conventional infrastructure) will become increasingly costly due to the new climatic conditions, resource depletion and the need to remediate environmental degradation. Combining more sustainable and climate-resilient solutions with conventional techniques and switching to blue-green and circular economy models will be smarter, and will likely become unavoidable at some point.

By becoming early adopters of Nature-based Solutions, Mediterranean countries would become more resilient with regard to changing climate conditions and ensure a more viable future for their economies and societies in a timely manner, securing employment and sustainable incomes, a pre-requisite for well-being and peace in the region.



5. KEY POLICY RECOMMENDATIONS

Recommendation #1 - Develop a Mediterranean Strategy for the Deployment of Nature-based Solutions to enhance Climate Resilience by 2030

It is recommended that governments of Mediterranean countries, in accordance with their international commitments, develop a common strategy for the massive implementation of NbS by 2030 to increase countries' resilience to climate change and contribute to the mitigation of its impacts.



This Strategy may include:

- **Resilience to droughts and water scarcity**, notably through sustainable water management, wetland and floodplain conservation and restoration, reforestation, drought-resilient trees and crops, as well as efficient irrigation systems;
- **Resilience to forest fires and diseases**, through sustainable land-use planning and sound forest management, conservation and restoration of forest biodiversity;
- **Resilience to heat waves in urban settings**, through the promotion of green and blue infrastructure solutions, such as green roofs and walls on buildings, green corridors in city centres and natural surface water bodies;
- **Resilience to floods, storm surges and sea level rise in coastal areas**, especially densely populated areas or tourism hotspots, through the conservation or restoration of dunes, floodplains and wetlands as buffer zones and natural infrastructure;
- **Resilience of terrestrial, freshwater and marine ecosystems to extreme weather events** through the conservation and/or restoration of their services and biodiversity for food security, disaster risk reduction, human health and well-being;
- **Conservation of seagrass meadows, wetlands, peatlands and forests** as solutions for carbon capture and sequestration;
- **Resilience of key economic sectors such as tourism, agriculture, fisheries and maritime transport** through a **blue-green economy** approach;
- **Governance-wise, shift in decision-making approaches to more bottom-up, inclusive and local collaborative schemes**, with strong community involvement in the design and implementation of the proposed NbS to foster ownership and early uptake;
- **Gradual transition to more climate-resilient economic models** with low carbon emission and consumption patterns and overall improved resource efficiency.

This Strategy would be developed with the active involvement of stakeholders from, amongst others, the scientific community, civil society, local authorities and communities, and possibly the private sector, to achieve their full buy-in and ownership. The Strategy would foresee and outline an Action Plan as well as a viable financing scheme for the implementation of NbS for climate resilience at national and sub-national level. International cooperation on the Mediterranean scale regarding knowledge exchange, transfer of know-how and capacity building to facilitate the rapid uptake and replication of the NbS should be given the appropriate attention and fostered accordingly.

Recommendation #2 - Mainstream Nature-based Solutions into NAPs, NDCs and DRR Plans

Since all Mediterranean countries are required to prepare their Intended Nationally Determined Contributions (INDCs), National Adaptation Plans (NAPs) and DRR plans, in accordance with their international commitments, it would make sense for them to seize this opportunity to mainstream NbS into these planning instruments.

The following key elements could be mainstreamed into these plans:

- **Conservation or restoration of flood plains and wetlands as “climate buffers”** to increase resilience to floods and droughts in support of existing grey infrastructure such as dams and dikes ;
- **Protection of coasts and shorelines from storm surges** through appropriate measures such as effective protection of seagrass meadows and autochthonous vegetation in support of infrastructure in place or as a substitute where the area is submerged or infrastructure cannot be adapted, as well as creation or restoration of coastal setback zones to leave room for the sea;
- **Sustainable, ecosystem-based forest management** to increase forest resilience to forest fires, pests and diseases;
- **Increase of the proportion of endemic drought-resistant crops** in the agricultural mix as well as planting of local fire-resistant tree varieties;
- **Promotion of and incentives for the greening of urban areas**, including through green corridors, green walls and roofs, etc. to reduce the “heat island” and “urban canyon” effects in the densely populated cities of the Mediterranean region, as well as deployment of the «sponge city» approach to improve the permeability of urban surfaces to help absorb storm waters and reduce the risk of dangerous flash floods;
- **Conservation and/or restoration of green or blue carbon sinks**, such as forests, wetlands, grasslands, peatlands and seagrass meadows.

NATURAL CLIMATE BUFFERS



Recommendation #3 - Develop “Green City” urban planning schemes and regional networks

It is recommended, in line with MSSD Objective 3, and particularly Strategic Directions 3.6 and 3.7, that city councils/local communities develop “Green City” schemes for medium to large cities, in collaboration with urban planners, architects and civil society groups as well as other relevant stakeholders.

Such “Green City” schemes could include measures such as:

- **Promotion of and incentives for blue and green spaces**, such as green corridors, green walls and roofs, urban lakes and wetlands, etc. to reduce the “heat island” and “urban canyon” effects that significantly affect the health and well-being of urban populations during the summer months in Mediterranean cities ;
- **Deployment of the “sponge city” approach** to improve the permeability of urban surfaces, help absorb storm waters and reduce the risk of dangerous flash floods in urban settings;
- **Promotion of urban agriculture schemes**, e.g. at community level, to enhance the food security of urban populations in the face of the potential decrease of agricultural yields due to the increasing occurrence of extreme droughts and subsequent water scarcity;
- **Rewilding and increasing plant biodiversity in urban parks** to increase the climate resilience of such areas and offer adequate habitats for local bird and insect species;
- **Promotion of installation of rainwater harvesting and recycling schemes** as well as **grey water reuse facilities** to ensure sufficient availability of water for the irrigation of green spaces during dry spells and heat waves in the summer months.

Ideally, “Green City” schemes should be adopted by a **formal statement from city leaders** (e.g. mayor’s office, municipal council, etc.) with the aim of **green infrastructure/services being considered alongside grey infrastructure** and being prioritized whenever possible. Green city schemes should also facilitate permits for relevant projects and help catalyse funding. Furthermore, cooperation with initiatives at Mediterranean level – e.g. MedCities and the Euro-Mediterranean Regional and Local Assembly (ARLEM) – should be encouraged so as to build on existing experience, networks for exchange of know-how and replication of projects. Additional insights could be sought from the “Strategy for Green Infrastructure in the EU” and the EU Horizon 2020 Expert Group on “Nature-Based Solutions and Re-Naturing Cities”.

Recommendation #4 - Promote sustainable agriculture and aquaculture practices

Bearing in mind that NbS and biodiversity-friendly practices enable agriculture systems to be more resilient to shocks and stresses, including the effects of climate change, it will be of key relevance for Mediterranean countries to adopt policy frameworks prioritizing such approaches in the near future. Such policy commitments would be in line with the MSSD, in particular Strategic Directions 2.1 and 2.2.

The Mediterranean community could also strongly advocate for such policies to be adopted at international level as well as at sub-regional level, in particular by the EU. The EU is currently developing its “Common Agricultural Policy (CAP) beyond 2020” strategy, which represents a significant opportunity to promote a thorough mainstreaming of NbS into European agricultural policies, with an impact beyond its borders. The latter may indeed also influence trade in agricultural produce with neighbouring countries and other trade partners.

Such policies would include:

- **Promotion of agricultural schemes based on agroecology principles**, including soil regeneration, conservation of pollinating insects, agricultural biodiversity, no-till methods, crop rotation, sustainable grazing techniques, crop associations, integrated farming systems, etc.;
- **Promotion of climate-robust, drought-resistant indigenous or traditional plant varieties and animal breeds** to reduce the water dependence of the agricultural sector and increase its resilience to droughts and increased water insecurity;
- **Financial support to farmers and rural communities** who decide to halt the use of chemical fertilizers and pesticides and adopt organic agriculture or agroecology-related approaches;
- **Strengthening of small farmers’ livelihoods** to increase overall food autonomy and security;
- **Taking into account traditional knowledge and practices** in rural management decisions, in particular on biodiversity;
- **Strengthening of synergies in biodiversity management** between relevant sectors for the purposes of more sustainable agriculture at national and international level;
- **Promotion of multidisciplinary research** on sustainable and biodiversity-friendly agriculture;
- **Enhanced multi-stakeholder, cross-sectoral and international cooperation**, particularly involving producers and their organizations, consumers, suppliers and marketers, policymakers, and national and international governmental and non-governmental organizations.



Recommendation #5 - Foster climate-smart management of coastal and marine ecosystems

In addition to MSSD Objective 1 “Ensuring sustainable development in marine and coastal areas”, and in particular its Strategic Direction 1.1., Mediterranean countries should seek to further increase the sustainable use of their coastal and marine ecosystems through the implementation of climate-smart NbS.

Such measures could include:

- **Conservation and/or restoration of “blue carbon” sinks**, such as areas with endemic *Posidonia oceanica* seagrass meadows, which represent important fish spawning and nursing habitats and coastal protection services, through the designation and adequate management of Marine Protected Areas (MPAs) and protection measures outside MPAs;
- **Actions aimed at strengthening ecosystems resilience**, such as (i) increasing connectivity of MPAs; (ii) adapting legal and regulatory measures, and land use planning on coastal land use to anticipate climate change impacts; (iii) reducing pollution and other anthropogenic pressures; and (iv) undertaking additional measures to enhance ecosystems health; all to be implemented as collateral measures to mitigate climate change impacts;
- **Implementation of sustainable fishing practices** to restore depleted fish stocks and protect marine biodiversity, thus strengthening the resilience of coastal and marine ecosystems, including wetlands, and coastal communities that depend on them, facing increasing climate stress;
- **Establishment of coastal setback zones**, including through the conservation and restoration of coastal wetlands, to increase safety of lives and property and secure the health of coastal ecosystems.



Recommendation #6 - Facilitate the uptake of NbS through adequate institutional settings and economic incentives at all levels



To facilitate the uptake of NBS:

- **National governments** should:
 - Introduce legislation and regulations to mainstream NbS into sectoral policies and adapt public procurement rules and sometimes land tenure/land use planning instruments to fully recognize co-benefits, long-term benefits and the added value of no-regret solutions;
 - Streamline and develop guidance for designing, tailoring and enabling processes for NbS, giving preference to soft solutions over hard solutions in order to help businesses save time and money when developing NbS projects versus grey infrastructure;
 - Raise awareness and build capacity within regulatory agencies on the performance of NbS implementation. These guidance documents should include awareness raising related to the natural variance of NbS performance and the fact that sometimes these approaches have not been used widely in the past and may require a monitoring and adaptation phase;
 - Engage with investors to identify how to overcome scaling up challenges for NbS financing and develop NbS projects of a size that would be attractive to mainstream investors and for securing additional revenue streams. Moreover, encouraging further coordination on funding of NbS could help leverage additional funds.

- **Local authorities** should:

- Initiate activities to get the local community involved by engaging local stakeholders and fostering multidisciplinary, inter-sectoral and local collaboration;
- Build on “Citizen Science”, drawing on citizens’ traditional knowledge of nature or encouraging them to observe, interact with and monitor what exists in the world around them, empowering and inspiring them to contribute to identifying and implementing NbS at local level;
- Foster local partnerships and identify within them who will be in charge of getting permits, project implementation, financial management, keeping the project alive, communication and the creation of local participatory processes.

- **National research institutes and think tanks** should:

- Develop methods to quantify the long-term business benefits of NbS, in particular for climate change adaptation and disaster risk reduction, in order to increase financing options;
- Develop methods and tools for calculating the economic value of the non-market benefits of NbS for the community;
- Develop robust methods for calculating NbS replacement costs (i.e. cost of replacing an ecosystem service using man-made infrastructure, if the services were no longer provided).

- **Financial institutions** should:

- Test and evaluate the effectiveness and benefits of new models for financing NbS, including Debt for Adaptation models, Payments for Ecosystem Services, etc., as ways to sustainably finance NbS and generate revenue/cost-savings ;
- Develop finance/insurance products that support NbS and attract more investment, in coordination with business and national authorities.



“We need to create a common space of discussion as to bring the southern and northern countries together to participate and get capacities for all to implement projects at landscape scale in the region. The joint efforts of several regional organizations working within the framework of the Barcelona Convention could be a good approach”.

Antonio Troya, Director, IUCN Centre for Mediterranean Cooperation

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List of abbreviations:

CBD - Convention on Biological Diversity

CO₂ - Carbon dioxide

COP - Conference of the Parties

DRR - Disaster Risk Reduction

EbA - Ecosystem-based Adaptation

Eco-DRR - Ecosystem-based disaster risk reduction

EIA - Environmental Impact Assessment

EU - European Union

FAO - UN Food and Agriculture Organisation

GHG - Greenhouse gas

ha - hectare

ICZM - Integrated Coastal Zone Management

IPBES - Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC - International Panel on Climate Change

LBS - Land-based sources of pollution

MAP - Mediterranean Action Plan

MPA - Marine Protected Area

MSSD - Mediterranean Strategy for Sustainable Development

NAP - National Adaptation Plan

NbS - Nature-based Solutions

NDC - Nationally Determined Contribution

O&M - Operation and Maintenance

SDGs - Sustainable Development Goals

SPA/RAC - Special Protected Areas - Regional Activity Centre

tCO₂ - tonne of carbon dioxide

UN - United Nations

UNFCCC - UN Framework Convention on Climate Change

WHO - World Health Organization





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