“Water, Wetlands and Nature-based Solutions in a Nexus Context in the Mediterranean”
Wetlands are among the world’s most productive environments. At the crossroads of key economic sectors, wetlands are wellsprings of biological diversity and provide vital natural resources as well as valuable services to mankind, representing a significant opportunity for “nature-based solutions”. Yet, the Mediterranean region has already lost up to 50 percent of its wetlands since 1900.

Introduction

Wetlands are at the interface of land and water (including seas) and they allow for important exchanges between terrestrial, freshwater and marine ecosystems. The geographic location and use of wetlands – e.g., river estuaries, coastal zones – positions them at the crossroads of various economic activities, such as farming, fisheries, energy production and tourism. For all of these activities, water is required.

Taking a Water-Energy-Food-Ecosystems (WEFE) Nexus perspective increases the understanding of the interdependencies between wetlands and the water, energy and food sectors. It shows that these sectors are inextricably linked and that actions in any one of them usually have impacts in one or both of the others as well as on ecosystems.

The Nexus approach helps to overcome ‘silo’ mindsets and explicitly addresses trade-offs resulting from choosing particular development paths and investments. It seeks interdisciplinary solutions increasing opportunities for mutually beneficial responses and synergies between sectors and eventually resource efficiency, in a world where pressure on precious resources and ecosystems, including wetlands, is steadily increasing.

What are wetlands?

The term “wetlands” refers to a broad variety of water-based ecosystems, and more than 50 definitions of wetlands are used worldwide.

The Ramsar Convention defines wetlands as: “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres”.

In addition, its List of Internationally Important Wetlands “may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands”.

Five major natural wetland types are generally recognized:

- estuarine (incl. deltas, tidal marshes and mudflats, mangrove swamps)
- lacustrine (wetlands associated with lakes)
- riverine (wetlands along rivers and streams)
- palustrine (marshes, swamps and peat bogs)
- marine (coastal wetlands including coastal lagoons, rocky shores, seagrass beds and coral reefs)

In addition, there are human-made wetlands such as fish and shrimp ponds, farm ponds, irrigated agricultural land including rice paddies, salt pans, reservoirs, gravel pits and wastewater treatment ponds.

In the Mediterranean, 397 sites have been designated as Wetlands of International Importance covering more than 6.7 million hectares. Yet, not all are adequately managed.

Source: Tour du Valat / Mediterranean Wetlands Observatory, 2013

#OffYourMap  #LifeBeginsinWetlands
Main ecosystem services provided by wetlands

“Global progress on water and sanitation cannot be achieved without healthy ecosystems such as wetlands. They are key for water supply, quantity and quality,” said Martha Rojas Urrego, Secretary General of the Ramsar Convention, during her intervention on the SDG 6 on Water at the High-level Political Forum on Sustainable Development held in New York, from 9 July to 18 July 2018.

Source: Plan Bleu, adapted from an illustration by the Rhone-Mediterranean and Corsica Water Agency

Why are wetlands important? What services do they provide?

Wetlands are among the world’s most productive environments. Wetlands provide food (e.g., fish, rice), water regulation and other services (e.g., water purification, protection from floods and storm surges, recreation) that are crucial for human kind. They also are wellsprings of biological diversity, providing the water and primary productivity upon which countless species of plants and animals depend for survival.

What key threats are Mediterranean wetlands facing?

While agriculture is the sector that has the greatest impact on wetlands and water, there is also growing pressure due to urbanisation, infrastructure development, and tourism as well. These human impacts reduce wetland functions and services, making them less able to contribute to sustainable human development.

Direct causes of wetland degradation in the Mediterranean include:

- diffuse and point-source pollution and littering
- over-use of water resources
- poor wastewater treatment
- hydropower infrastructure
- urban sprawl and tourism development
- drying and conversion to farm land

While agriculture is the sector that has the greatest impact on wetlands and water, there is also growing pressure due to urbanisation, infrastructure development, and tourism as well. These human impacts reduce wetland functions and services, making them less able to contribute to sustainable human development.

The Wetlands of Oristano, Sardinia – A complex ‘Nexus’ case

The Oristano area in Sardinia (Italy) is rich in wetlands, including the 6 Ramsar areas of the MARISTANIS project (www.maristanis.org). Wetlands have strongly modelled the area’s culture and economy, but linkages between Nexus sectors are negatively affected by a complex and poorly coordinated management system. Water and Food sectors are strongly linked, with traditional fisheries/productive aquaculture based on wetlands. Meanwhile, agriculture and livestock farming are a source of water pollution. Conflicts affect relations between ecosystem conservation and food sector, since birds feed on fish and crop seeds, including rice.

However, Nature-Based Solutions, such as growing reeds, could improve water quality and enhance food production, reducing release of nutrients from agriculture and mining pollutants into wetlands. Reeds could be used as a component in biogas production with agricultural waste. The MARISTANIS project aims at reinforcing the positive linkages between the WEFE Nexus sectors by supporting administrations in adopting relevant international, national and EU policies and eco-friendly practices in relevant economic sectors.
How do wetlands relate to the Nexus?

The table below provides a brief, non-exhaustive analysis of wetlands' interlinkages with the three main sectors of the Nexus and a few suggestions for their improved management in a Nexus context.

<table>
<thead>
<tr>
<th>Wetlands-Nexus Interlinkages</th>
<th>Water</th>
<th>Energy</th>
<th>Food</th>
<th>Ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive contribution or adverse impacts of wetlands → Nexus sector</td>
<td>- Water reservoirs (supply/recharge)</td>
<td>- Carbon sequestration (carbon 'sinks')</td>
<td>- Fisheries</td>
<td>- Biodiversity hotspots (fish, birds, turtles, etc.)</td>
</tr>
<tr>
<td></td>
<td>- Water purification</td>
<td>- Fuel wood</td>
<td>- Aquaculture (incl. fish, molluscs, shrimps, etc.)</td>
<td>- High landscape value</td>
</tr>
<tr>
<td></td>
<td>- Flood buffer zones</td>
<td>- ‘Obstacle’ to infrastructure development</td>
<td>- Farming (e.g., rice, cattle breeding)</td>
<td>- Recreation</td>
</tr>
<tr>
<td></td>
<td>- Disaster risk reduction (e.g., protection from storm surges)</td>
<td>- Water-borne diseases (e.g., malaria)</td>
<td>- Salt production</td>
<td>- Spiritual/cultural values</td>
</tr>
<tr>
<td></td>
<td>- Water-borne diseases (e.g., malaria)</td>
<td>- Water-borne diseases (e.g., malaria)</td>
<td>- ‘Under-developed’ valuable arable land or fisheries area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Water-borne diseases (e.g., malaria)</td>
<td>- Water-borne diseases (e.g., malaria)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Positive contribution or adverse impacts of Nexus sectors → wetlands</td>
<td>- Water provision</td>
<td>- RES reduce the need for fuel wood and other combustibles</td>
<td>- Source of income/livelihoods for local communities</td>
<td>- Cultural/spiritual value</td>
</tr>
<tr>
<td></td>
<td>- Drought and/or flood management</td>
<td>- Flood management</td>
<td>- Habitat destruction, incl. drying out for agriculture</td>
<td>- Public awareness</td>
</tr>
<tr>
<td></td>
<td>- Water over-abstraction or diversion</td>
<td>- Hydropower (change in water and sediment flows, fragmentation of rivers)</td>
<td>- Irrigation infrastructure and practices (e.g., irrigation canals)</td>
<td>- Education</td>
</tr>
<tr>
<td></td>
<td>- Water pollution from point or diffuse sources, incl. solid waste disposal</td>
<td>- Solar PV (sand extraction from river beds and coastal areas)</td>
<td>- Poaching/hunting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Water infrastructure development (dams, canals, etc.)</td>
<td>- Wind turbines (impacts on birds)</td>
<td>- Pollution from agro-chemicals and waste</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Sediment extraction for construction</td>
<td>- Soil/coastal erosion</td>
<td>- Eutrophication from fertilizers</td>
<td></td>
</tr>
<tr>
<td>Possible Nexus-related approaches/solutions for wetlands</td>
<td>- IWRM/IRBM</td>
<td>- Sustainable hydropower</td>
<td>- Sustainable fisheries management</td>
<td>- Ecosystem-based approach</td>
</tr>
<tr>
<td></td>
<td>- ICZM/Marine Spatial Planning</td>
<td>- Climate change mitigation policies</td>
<td>- Organic agriculture</td>
<td>- Conservation through setting up terrestrial and marine PAs</td>
</tr>
<tr>
<td></td>
<td>- Environmental flows</td>
<td>- Sustainable energy policies (e.g., SE4All, incl. RES, energy efficiency and reduction of energy use)</td>
<td>- Sound land use planning</td>
<td>- Ecosystem services valuation</td>
</tr>
<tr>
<td></td>
<td>- Sustainable water infrastructure development</td>
<td>- SEAs and EIAs for infrastructure development (e.g., hydropower dams)</td>
<td>- SEAs/EIAs for aquaculture and other major developments</td>
<td>- Nature-based solutions</td>
</tr>
<tr>
<td></td>
<td>- Water saving and efficiency measures</td>
<td>- Improved management of land-based sources of pollution</td>
<td>- Sustainable tourism practices</td>
<td>- Sustainable fisheries management</td>
</tr>
<tr>
<td></td>
<td>- Improved management of land-based sources of pollution</td>
<td>- Sustainable energy policies (e.g., SE4All, incl. RES, energy efficiency and reduction of energy use)</td>
<td>- SEAs and EIAs for infrastructure development (e.g., hydropower dams)</td>
<td>- Public awareness raising, education</td>
</tr>
</tbody>
</table>
What is the governance framework relevant to Mediterranean wetlands and the Nexus?

Mediterranean wetlands are covered by a plethora of international and regional policies and legal frameworks, which however are not integrated. Moreover, the term “wetlands” is not used in all documents. Sometimes, as in the EU Water Framework Directive, they are referred to either as “transitional” and “coastal” waters or in specific terms (marsh, lagoon, lake, estuary, etc.).

Since 2015, with the adoption of the UN 2030 Agenda, there are now 17 Sustainable Development Goals (SDGs) countries have to seek to achieve by 2030, such as Goal 6 on Water, Goal 7 on Energy, Goal 15 on Terrestrial Ecosystems, etc. In addition, there are EU policies and legal frameworks addressing energy, water management and agriculture, which are also very relevant for wetlands in the Nexus context.

Who are the key Nexus stakeholders relevant for wetlands?

Stakeholders and decision-makers attribute values to wetlands and their benefits to people in diverse ways. Policy-makers within and across all ‘sectors’ must recognize and take into account these multiple wetlands values and their interdependencies if wetlands’ wise use and sustainable development are to be achieved. The key players officially involved in the management of wetlands usually are:

- River basin management bodies
- Protected areas management bodies
- Ramsar site managers/local points

In the context of a Nexus approach and in light of the objective of achieving the universally agreed upon Sustainable Development Goals (SDGs) by 2030, it is important also to involve stakeholders from other sectors in the decision-making and management of wetlands, as well as to be inclusive in terms of representation of the civil society, women, local communities, the private sector, elected representatives and other potential interest groups that have a stake in a specific wetland and/or issue, so as to obtain optimal results in terms of trade-offs, sustainability, good governance and equity.

Hence, the need is crucial to conduct dialogues at local, national and regional level and to promote participatory approaches and the involvement of stakeholders from different sectors – e.g., water agencies, energy utilities, farmers’ associations, Non Governmental Organisations (NGOs), women’s groups, local communities, Members of Parliament (MPs), and businesses.

Key international policies relevant to Mediterranean wetlands

At international level:
- UN Sustainable Development 2030 Agenda (SDGs), in particular Goals No. 2, 6, 7, 13, 14, 15
- Ramsar Convention on Wetlands
- Convention on Biological Diversity (CBD)
- UN Water Conventions (Helsinki, 1992; New York, 1997)

At regional level:
- Barcelona Convention and its most relevant protocols:
  - ICZM Protocol
  - SPA and Biodiversity Protocol
  - LBS Protocol
- Medit. Strategy for Sustainable Development (MSSD)

At sub-regional (EU) level:
- EU ‘Nature’ Directives (Birds and Habitats)
- EU Water Framework Directive
- EU Marine Strategy Framework Directive
- EU Maritime Spatial Planning Directive
- EU Renewable Energy Directive
- EU Common Agriculture Policy (CAP)

References:

What are our "take home" messages?

- Wetlands are where life begins. Either natural or artificial, they provide a variety of crucial services to people - e.g., food, water supply, flood protection - beyond being biodiversity hotspots and sensational landscapes.

- Don’t wipe wetlands off your map! They need a lot more recognition and support from you since they are being degraded and getting lost at alarming rates and their unique natural features will soon be gone, forever, too.

- Wetlands have an economic value and can compete as "nature-based solutions" with more conventional services and "grey" infrastructure (e.g., waste water treatment plants).

- Wetlands need you. They don’t have a voice, you have. You can turn the tide!