Coastal risks and adaptation

a Mediterranean perspective

by MedECC

MedECC Mediterranean Experts on Climate and environmental Change

Understanding Coastal Risks

Marine and terrestrial Mediterranean coastal zones are vulnerable to a range of risks that can be aggravated by climate change and massive human activities

Coastline erosion

Especially around river mouths and harbors due to reduced sediment supply from rivers. The dangers of shoreline retreat are:

- *Critical infrastructure at risk (transport networks, ports, airports, cultural sites)*
- *Shrunken tourism areas*
- *Loss of vital coastal habitats*
- *Weakened coastal defenses*

Flooding

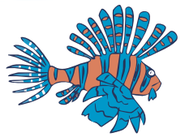
Rising sea levels significantly increase the threat of coastal flooding and permanent inundation.

Vulnerable areas
Densely populated and urbanised regions

Compound flooding threat
heavy rainfall events + rare tsunamis

Biodiversity loss

Mass mortality
Many coastal species are reaching their tolerance limits.



1,000 **invasive species** *are observed, disrupting ecosystems and biodiversity.*

→ *By 2050, the mean shoreline is projected to* ***retreat up to 23 m*** *compared to 2010*

→ *20 million people could be* ***permanently displaced*** *by 2100*

→ *Over 220 million people are* ***already suffering*** *from water scarcity*

→ ***Wetlands have shrunk by 50%*** *since 1970, reducing biodiversiy and natural protection against sea level rise.*

→ *Over 80% of fish* ***stocks are overfished****, with some being exploited up to six times beyond sustainable limits*

Present adaptation methods, mostly engineering-based, often ignore future sea-level rise, which limits their long-term effectiveness.

Reducing CO_2 emissions is crucial to avoid worsening risks in every sector.

Stronger governance, cross-border cooperation, and coordinated regulation are essential for managing resources and pollution.

Designating the region as an Emission Control Area by 2025 could cut sulfur emissions by 79% and fine particles by 24%.

Support needed for southern and eastern countries.

Adaptation Measures and Solutions

Tackling these coastal risks involves enhancing protection, managing pollution, and conserving ecosystems. Effective adaptation requires tailored risk assessments and improved governance.

Natural protection

from flooding and erosion. It faces conflicting local development goals:

Nature-based solutions *are promising but require compromises in spaces and usages.*

Relocating people or infrastructure *must be well-planned. Barriers are high costs and poor social acceptance.*

Ecosystem conservation

Protection & restoration efforts
Essential but insufficient, as some losses are irreversible.

Actions to counter non-indigenous species
eradication efforts, commercial exploitation, protected areas, etc.

Renewable energies

Offshore wind, wave and solar energy
The overall shifting to renewable remains slow.

Circular and sustainable development models
Great potential for southern and eastern countries

Water scarcity

It is influenced by:

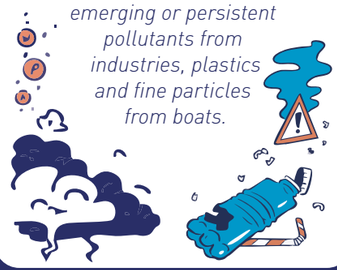
overall drying trends
from climate change

salinisation of coastal aquifers
due to seawater intrusion when the sea level rises

increasing demands
from tourism, irrigation, population growth

Accumulated pollution

Nutrients from agriculture, toxic metals, pharmaceuticals, emerging or persistent pollutants from industries, plastics and fine particles from boats.



Further impacts on people

The combination of degradations, climate change extreme events and pollution are threatening local economies, livelihoods and health of millions of citizens. Tourism, agriculture, and fisheries are particularly vulnerable.

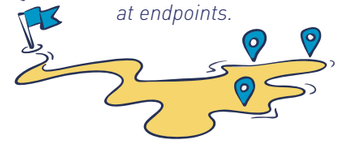
Durable tourism

Electrifying ports *via Short-Side Electricity (SSE) to reduce CO_2 emissions.*

Encouraging sustainable tourism *with green taxes, sustainable tourism indicators, and eco-labelling.*

Pollution management

Actions to reduce pollution are more **effective at the source** *than at endpoints.*



Implementing waste-to-energy projects, recycling, reusing, sustainable farming, and better water treatment are key steps.

Water availability

To ensure long-term water security, increasing water supply should be paired with:

Reducing demand: *improving irrigation and urban water management, shifting agricultural practices through financial incentives.*

Improving water quality *with wastewater treatment that provides co-benefits (like healthier ecosystems).*