MedECC: An expert network on climate and environmental changes in the Mediterranean Basin

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MedECC goals and evolution

The MedECC ambition is to develop

• a scientifically robust assessment of the risks associated with climate and environmental change in the Mediterranean Basin, based on published research (mainly in peer-reviewed journals)

• a regional science-policy interface on climate and environmental change in the Mediterranean, approved by policymakers

Policy-relevant, but not policy-prescriptive
The “MedECC Foundation paper”

Climate change and interconnected risks to sustainable development in the Mediterranean

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- Published Dec 2018 at UNFCCC COP24 in Katowice, Poland
- updated for IVth UfM Regional Forum
- available in English, French and Arabic
1st Mediterranean Assessment Report (MAR1)

86 Coordinating Lead Authors (CLAs) and Lead Authors (LAs), 21 countries:
- 31% based in southern and eastern Mediterranean countries
- 36% of women

In total 187 authors from 25 countries contributed to the report (CLAs, LAs and Contributing Authors- CAs).
1st Mediterranean Assessment Report (MAR1)

Summary for Policymakers (SPM-

Full report with 6 chapters (~500 p):
1. Introduction
2. Drivers
3. Resources
4. Ecosystems
5. Society
6. Managing Risks

- Collective scoping and writing
- Voluntary contributions
- Academic criteria
- Transparent review by scientific experts and stakeholders / policymakers
Mediterranean expected warming

- Due to anthropogenic emissions of greenhouse gases, climate is changing in the Mediterranean Basin, historically and projected by climate models, exceeding global trends.
- Annual mean temperatures on land and sea in the Mediterranean Basin are 1.5°C higher than in pre-industrial times.
- They are projected to rise until 2100 by additional 3.8-6.5°C for a high greenhouse gas emissions scenario (RCP8.5) and 0.5-2.0°C for a scenario (RCP2.6) compatible with the UNFCCC Paris Agreement.
- On land and in the sea, heat waves will intensify in duration and peak temperatures.
- Despite strong regional variation, summer rainfall will likely be reduced by 10-30% in some regions, enhancing existing water shortages.
Global mean sea level rise

- Mean sea level has risen by 6 cm during the last 20 years.
- This trend is likely to accelerate (with regional differences) by the global rate of 43-84 cm until 2100,
- but possibly more than 1 m in the highly likely case of further ice-sheet destabilization in Antarctica.
Non climate drivers: pollution, land-use, non-indigenous species

- Most impacts of climate change are exacerbated by other environmental challenges such as changing land use, increasing urbanization, tourism, agricultural intensification, land degradation, and pollution.

- Tropospheric ozone concentration increases and high-level episodes will be more frequent. $SO_2$ and $NO_x$ have sharply increased recently, mainly because of shipping activity, and this trend will likely increase in the future.

- Pollution includes plastic, emerging contaminants, fecal bacteria and viruses, all with expected increase in the future.

- The Mediterranean Sea is invaded by many non-indigenous species through the Suez Canal, but also transported by boats. On land, non-indigenous species are particularly invasive in regions with high infrastructure and commerce development, including accidentally introduced phytophagous pests which cause damages to crops and forests.

- These trends are expected to continue in the future.
Risks for water resources: strongly related to agriculture

- Agriculture is the largest user of water in the Mediterranean region.
- Climate change impacts water resources in combination with demographic and socio-economic drivers, reducing runoff and groundwater recharge, water quality, increasing conflicts among users, and risk of ecosystem degradation.
- The demand for irrigation is expected to increase by 4-18% by 2100.
- Demographic change, including the growth of the large urban centers, could enhance this demand by 22-74%.
- There is adaptive potential in the improvement of water use efficiency and reuse.
Mediterranean region 60% of the world’s growing area for durum wheat. Through bread, pasta or couscous, this is the base of the food pyramid and are daily included as part of the main meals in Mediterranean diet.

Crop yield reductions are projected for the next decades in most current areas of production and for most crops. This will potentially be worsened by emerging pests and pathogens.

There is large adaptation potential in changing farming practices and management to agroecological methods, providing also important potential for climate change mitigation by increased carbon storage in soils.
Risks for the human health

- Human health is already impacted by high temperatures and by air and water pollution.
- The combined impacts of expected environmental change (notably air pollution and climate) increase risks for human health, from heat waves, food shortages, vector-based, respiratory and cardio-vascular diseases.
- These health risks particularly impact disfavored populations, including the elderly, children and people with low income.

Attributable fraction of heat-related deaths during summer with different climate scenarios by country in Europe. a) RCP 4.5 in 2050; b) RCP 8.5 in 2050, c) RCP 4.5 in 2085 and d) RCP 8.5 in 2085 (Kendrovski et al., 2017).
All Mediterranean countries have significant potential to mitigate climate change through an accelerated energy transition, implying the phasing out fossil fuels and accelerated development of renewable energies.

This energy transition, in line with Paris Agreement, requires a significant transformation of the energy and economic model in the Mediterranean region.

Northern rim countries advance towards this transition by gradually diversifying their energy mix, improving energy efficiency and enlarging the fraction of renewables.

Eastern and southern rim countries still lag behind in these developments.

Around 2040, the share of renewables could triple to reach 13-27% under current transition scenarios.

Enhanced regional energy market integration and cooperation are crucial to unleashing cost-effective climate change mitigation.
RISKS AND IMPACTS OF ENVIRONMENTAL CHANGE IN THE MEDITERRANEAN BASIN

ECOSYSTEMS

By 2040, mean temperature will be 2.2°C above pre-industrial levels. Per 1°C warming, rainfall will decrease 4%. Sea level could rise by more than 90 cm by 2100.

CLIMATE-RELATED DRIVERS

NON CLIMATE-RELATED DRIVERS

- Air and water pollution increase overall.
- Urbanization & land degradation reduce agricultural land.
- Overfishing & invasive species threaten marine biodiversity.

Warming is just one of the MANY drivers of environmental risks!

WATER

In the South and East, over 160 million people suffer from water scarcity today. By 2100, water demand may increase further.

By 2050, crop yields may decline by up to 17%.

20% of exploited marine species may be lost.

FOOD

COASTS

Sea level rise impacts coastal infrastructures incl. cultural heritage, and causes loss of agricultural land due to water and soil salinization.

Health

Impacted by heat waves, pollution, extreme events, food shortages, vector-borne diseases. Effects of pollution, amplified by temperature elevation.

Find out more on https://www.medec.org
The MedECC ambition is to support policies for sustainable development

• More effective policy responses to climate and environmental changes will imply:
  • strengthened mitigation of the drivers of environmental change such as greenhouse gas emissions,
  • but also enhanced adaptation to impacts.

• Poverty, inequalities and gender imbalances hamper the achievement of sustainable development and climate resilience in Mediterranean countries.

• Culture is a key factor to the success of adaptation policies in the highly diverse multicultural setting of the Mediterranean Basin.

• Policies for climate adaptation and environmental resilience potentially infringe on human rights - they need to account for concerns such as justice, equity, poverty alleviation, social inclusion, and redistribution.
Supporting institutions

Web site: medecc.org