

Mediterranean Region

Potential impacts of climate change on forest goods and services

Climate characteristics

The region is characterized by hot and dry summers (two months of summer droughts) and winters which are mild to cool and rainy. There is a variety of climatic regions owing to the complex configuration of seas and mountainous peninsulas in the zone. Annual rainfall typically amounts to 500–600 mm, much less than in the northern bioclimatic zones.

Key climate change trends

Yearly rainfall is expected to drop by up to 20% but increase in winter. Temperature increases of 3–4°C. Changes in frequency, intensity and duration of extreme events with more hot days, heavy rainfall and fewer cold days are expected.



The holm oak is an essential, almost defining, element of the Spanish Mediterranean landscape. Photo: J. Castro, Fotolia

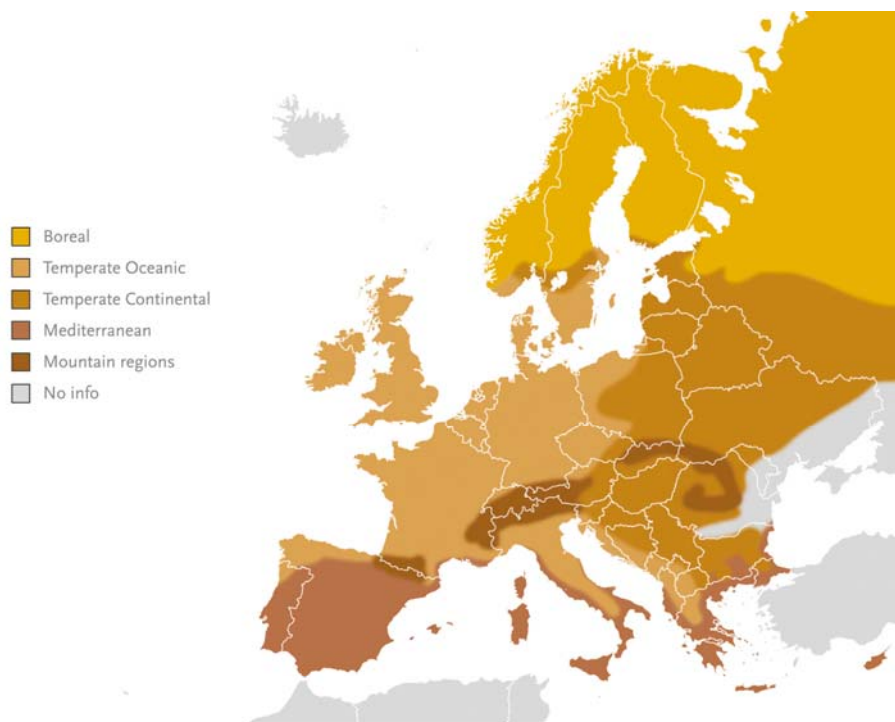
Sensitivity to climate change

Higher air temperature without increase in precipitation or with decreasing rainfall will lead to increased occurrence of drought, which is the most important impact factor in this region.

Precipitation (rainfall) is expected to decrease; this, in combination with increased temperature will lead

to more droughts which will reduce plant growth and primary productivity.

Drought has a great impact on beech at the lower elevations. Drought-tolerant tree species and shrubby plants could be favoured at the expense of the ones demanding more water (e.g. Holm Oak), with consequent changes in dominance and species distribution.



Projected climate change impacts vary in different bioclimatic regions.

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Sensitivity to climate change

Abiotic risks (non-living factors which affect ecosystems, like wind patterns, precipitation, temperature). The most important risk is the fire risk, which is expected to increase due to climate change.

Biotic disturbances (changes in living organisms). Temperature increase will lead to distributional shifts of insect populations. In addition, highly thermophilic (heat-loving) pathogen species are likely to become a more serious problem in southern Europe. Changing patterns of precipitation have led to an increasing incidence of oak decline in the Iberian Peninsula. This highly pathogenic fungus is especially active in a warm climate and requires wet soil conditions to infect roots.

Potential impacts on forest goods and services

Wood production may decline significantly under the projected climate change scenarios. Prolonged droughts will increase mortality, and increased forest fire risk will cause further losses in wood production.

Biodiversity. The number of typical tree species is likely to decrease. The projected increase in fire disturbances will also affect species diversity, favouring disturbance-tolerant species and negatively affecting species which are less adapted to fire disturbance regimes.



Pine forest in Spain. Photo: Fotolia

Protective functions. The impact of fire on soils has important secondary effects on carbon cycling and water relations. In addition, fire is likely to lead to increased erosion risk due to reduced plant regeneration after frequent fires, potentially contributing to an acceleration of desertification.

Adaptation options

- Select well-adapted tree species or new plants that are genetically similar to those that might have grown in the area previously, and favour them at the tending and thinning stages.
- Fuel management and the modification of stand structure (distribution of trees by species and size within a stand) to reduce fire risk.



The most important risk in the Mediterranean forest is fire risk. Photo: Fotolia

The project **MOdels for AdapTIVE forest management (MOTIVE)** is a large-scale integrated project (project number 226544) in the 7th Framework Programme of the EU that develops tools to support decision-making in forestry in response to climate and land use change. It encompasses 20 partners from 14 European countries. It has an overall budget of almost 9 million euros, from which 7 million will be paid as EU contribution. The project is coordinated by the Forest Research Institute of Baden-Württemberg with duration of 4 years.