Europe’s Vulnerability to Environmental Change

A new study suggests that in Europe, Mediterranean and mountain regions are the most vulnerable to environmental change. In the coming decades, changes in climate and land use in these regions are likely to result in large changes in ecosystem services supply causing problems to water regimes, energy, biodiversity, agriculture, forestry and tourism.

Scenarios of global environmental change raise concern about alterations in ecosystem services such as food production and water supply, but the potential ranges and magnitudes of such changes, especially at regional scales, are poorly understood. In a recent study funded by the EU, an international team of researchers used a range of models that simulated the effects of change in climate, land use and socio-economic factors. Subsequently, European scenarios of trends in environmental change were developed with particular attention to alterations in ecosystem services supply until the end of this century.

Overall, the scientists found that contrarily to global scenarios, the trends of change in Europe differ from global trends since characterised by moderate or none population increase, relatively small extent of urbanisation, increase in forest area, and decrease in demand for agricultural land.

In this context, the major problems in the future will likely be related to climate change. The scientists expect that increasing temperature and reduced precipitations will lead to an increase in frequency and severity of droughts and fire-related risks, especially in Mediterranean regions. It is suggested that by 2080 an additional 14 to 38% of the Mediterranean population will be experiencing scarcity due to climate change that will likely be aggravated by rising water demand for tourism and irrigation.

Mountain regions also seemed vulnerable because of a rise in the elevation of snow cover and altered river runoff regimes that are likely to increase the risk of winter floods and reduce navigability and hydropower potential in the summer.

On the other hand, European trends in land use change (e.g., increases in forest area and productivity) offer some opportunities for sustainable management (e.g., “surplus land” for agricultural intensification and bioenergy production). The study also confirms that Europe’s ecosystems currently absorb carbon dioxide (CO2) from fossil fuel emissions. Expected increases in forest area will have positive effects on this sink, but by the end of this century warming will also accelerate carbon release from soils. Consequently, the European forests and grasslands will then contribute to, rather than absorb CO2 emissions.

The authors argue that the development of adaptation strategies, such as reduced water use, long-term soil preservation and flexible management of nature reserves, could be built on this study but require further understanding of the complex interplay between stakeholders and their environment, in the context of local, national and EU-wide constraints and regulations.

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