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Guardians of the glades: protecting Europe's forests against climate change

EU-funded researchers are combining cutting-edge research with sustainable forestry practices to protect our forests and preserve the many environmental benefits they provide.

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The Făgăraș Mountains in southern Romania are home to one of Europe's few remaining primary old-growth forests.

These forests are still untouched by human activity and boast a rich variety of trees, from the heat-tolerant oaks of the lowlands to the coniferous forests in the high mountains.

Forest benefits

In this still pristine protected area, EU-funded researchers are working with local communities and the World Wildlife Fund to support effective forest management.

"Forests provide us with a lot of benefits, and we are in danger of losing these benefits," said Dr Sorin Cheval, senior researcher at Romania's National Meteorological Administration. Cheval is leading a four-year EU-funded initiative called OptFor-EU, which started in 2023 and runs until 2027.

The initiative brings together experts from Austria, Germany, Italy, Lithuania, the Netherlands, Norway, Spain, Romania and the United Kingdom. The research team aims to make sure that forest management decisions across Europe take account of the key role that forests play in protecting our environment and offsetting some of the effects of climate change.

Natural carbon capture

Forests make up 43% of EU territory and are among Europe's most valuable natural assets, playing a crucial role in capturing carbon, regulating ecosystems and protecting biodiversity. Beyond their beauty, they act as powerful carbon sinks, absorbing CO_2 from the atmosphere and helping to combat climate change.

According to Cheval, this is why the OptFor-EU team is focusing not only on how climate change impacts forests, but also on how forests can be best used to reduce the negative impact of climate change.

"Forests can survive without humans, but we cannot survive without forests," said Dr Francesca Giannetti. She is a researcher specialising in forestry and remote sensing, affiliated with the University of Florence and working with Cheval in the OptFor-EU project.

Giannetti's research focuses on the application of 3D remote sensing technologies in precision forestry. Remote sensing is used for mapping forest growth and assessing how urban forests are contributing to the reduction of air pollution.

Integrating innovative technologies into forest management will help to better inform decision-making when it comes to protecting these precious natural landscapes.

Forests under pressure

According to Gianetti, there are many challenges that forest managers have to keep in mind every day. They need to make sure that enough wood is produced, while also worrying about erosion, natural disasters and lack of water. At the same time, they need to account for the impacts of climate change.

These challenges are compounded by the fact that forests grow and change in a span of decades.

"In forest management, we don't work with years or months like in agriculture. We have to think 80 to 100 years into the future," said Giannetti. That is why we need a system to support forest management now so that we can make better decisions for the future, she added.

Together with forest managers and other stakeholders, the OptFor-EU researchers are developing a decision support system that will be made freely available to those involved in forest management. The aim is to help them make the best-informed decisions possible.

Supporting forest managers

Proper management is essential in this regard, said Dr Alessio Collalti, a senior researcher at the National Research Council of Italy, specialising in forest ecology, carbon and nitrogen cycles, and vegetation modelling.

"In recent years, we have discovered that management has a far bigger impact on forest ecosystems than climate change itself," Collalti said.

"We need good and adapted management schemes to improve forest resilience," he said, referring to forests' ability to cope with challenges and return to health after a serious disturbance like a drought or a storm.

The OptFor-EU support system will include ready-to-use products, services and guidance aligned with the goals of the Paris Agreement on climate change, the European Green Deal and the new EU Forest Strategy for 2030.

Building resilience for a green future

Data used to build the system will be drawn from eight case studies being carried out in a wide variety of forested areas across Europe. These range from the ancient semi-natural woodland of Wytham Woods in the UK to the hardy resin-producing Extremadura pine forests of Spain.

Also included are recognised nature reserves in the Florentine mountains in Italy, the Čepkeliai – Dzūkija National Park in Lithuania and protected forests in Austria, Germany and Norway.

“We are conducting the eight case studies to cover all forest types. This is the first time there is such an EU-wide overview,” said Deborah Hemming, an OptFor-EU scientist based at the Met Office – the UK’s national meteorological service.

In Romania, Dr Nicu Constantin Tudose, a forest engineer and station director at the Marin Drăcea National Institute for Research and Development in Forestry, is a key contributor to OptFor-EU’s Romanian case study.

“Old-growth forests, defined as ecosystems that have evolved over extended periods without significant anthropogenic or natural disturbances, are exceedingly rare in Europe,” he said.

Sadly, according to Tudose, even these ancient areas are suffering nowadays as a result of the increasing frequency and intensity of extreme climatic events, particularly prolonged droughts. This is a worry for forest managers across Europe.

“In our study, 95% of the forest managers interviewed by the OptFor-EU team identified this issue as their main concern,” said Tudose.

This demonstrates the urgent need for targeted interventions to support forest resilience.

“We need to provide forest managers with a clear long-term understanding of the interactions between climate and forest ecosystems,” he said.

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- OptFor-EU
- OptFor-EU project website
- New EU forest strategy for 2030
- EU biodiversity strategy for 2030
- Commission launches EUDR Information System