

A new climate of resilience for Spanish forests

- ★ Many forests in Southern Europe are comprised primarily of one species of tree in an even canopy, often of similar ages, factors which heighten their vulnerability to the effects of climate change.
- ★ The team behind the LIFE RedBosques_Clima project are developing a new management model, aiming to enhance the ability of forests to adapt to climate change, as **Dr José Atauri** explains.

The forests of southern Europe are highly vulnerable to the effects of climate change, with increasingly frequent heatwaves, higher temperatures and lower rainfall having a significant impact on our trees. Huge expanses of trees across southern Spain died last Summer due to lack of water for example, while in general trees are weaker and less robust than in the past. "Many European forests are relatively young and too dense, with too many trees per hectare. Where there are large numbers of trees in a relatively small area they compete for water and light, and they don't grow in a healthy way," explains Dr José Atauri, Head of Conservation at FUNGOBE/EUROPARC-Spain, one of the partners in the LIFE RedBosques_Clima project.

LIFE RedBosques_Clima project

As technical coordinator of the project, Dr Atauri is part of a team working to help forests adapt to the impact of climate change so that they can continue capturing and storing carbon, as well as providing other vital ecosystem services. This work is focused on several forests in Spain, which act as pilot sites. "One forest is in the region of Catalonia, three are in the Valencia region, and another is in Castilla-La Mancha," outlines Dr Atauri. "They are highly representative of typical forests in Spain. They are young, with a very continuous, even tree canopy and dense coverage. We have a lot of very young forests in Spain, less than 80 years old. We are developing measures, recommendations and management tools, aiming to diversify the structure of these forests."

This work builds on the earlier LIFE RedBosques project which focused on



Illustration of poor forest adaptation.

identifying and analysing the features of old-growth forests, forest stands which have developed over extended periods of time with no timber extraction. These stands are more diverse than younger forests, with a wider variety of tree species and ages, while Dr Atauri says they also have other features which make them more resilient in the face of climate change. "These old-growth

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forests are not continuously wooded, they are interspersed with gaps, which enhances their resilience," he explains. Over the four years of the LIFE RedBosques project, Dr Atauri and his colleagues gained some deep insights into old-growth forests. "We learnt a lot about the properties of old-growth forests," he continues.

The team behind the LIFE RedBosques_Clima project are now looking to use these insights to inform forest management, aiming to improve adaptive capacity and secure their long-term future against the backdrop of a changing climate. Many forests in Spain are relatively young, following the widespread abandonment of rural areas over the last 60-70 years. "We have more forests than ever in

Spain, as agricultural land is being abandoned and colonised by forests," says Dr Atauri. "Previously people who lived around forests would take away some of the wood for their livelihoods. But now much of this land has been abandoned and forests can regenerate and grow, which is why they are now very much denser than they were."



Illustration of good forest adaptation.

A key priority in the project now is to enhance the resilience of these younger forests, taking into account their specific features and characteristics. A vulnerability index has been developed as part of the project, which will be applied at the pilot sites to gain a fuller picture. "The index allows us to evaluate how vulnerable a particular forest is to drought. This involves measuring some properties of the forest structure, such as how many species with different functional traits there are and their regeneration abilities, the age profile of the trees and the overall density of the forest," outlines Dr Atauri. "These can all be measured and reflected in the vulnerability index. So we can identify the specific characteristics of a forest that leave it more vulnerable."

This can then guide conservation and adaptation measures to enhance resilience. Managing the forest in such a way that they incorporate some of the key features of old-growth forests helps reduce vulnerability, says Dr Atauri. "We recommend allowing some trees to get older, to establish some gaps in forests, and to grow a wider range of species with more diverse climate requirements," he says. While the project at this stage is focused primarily on the pilot sites, climate change is already affecting wooded areas across Spain and southern Europe, so Dr Atauri is keen to implement these ideas more widely in future, helping to protect and conserve forests. "This is essentially a demonstrator project, and we hope to work in more locations," he continues.

Management tools

The more immediate priority however is to finalise the project actions, including applying the management tools at the pilot sites, with LIFE RedBosques_Clima set to conclude in November. The pilot actions are largely complete, and the project team are now looking to share and communicate their findings. "We are working to convey the message that allowing forests to be more diverse and complex is one of the main strategies to adapt to new climate conditions," outlines Dr Atauri. There is also interest in establishing a successor project, which would again focus on climate change. "It would primarily be about how to manage forests in a way that makes them less vulnerable to the effects of climate change," says Dr Atauri.

A variety of different approaches have been proposed to help achieve this, including the promotion of herbivory and cattle grazing, as well as potentially using prescribed burns to restore the local ecology and promote biodiversity. Another possibility is using wild herbivores to boost the resilience of forests. "Those are some of the initial ideas that have been proposed, but they haven't yet taken full form," acknowledges Dr Atauri. The ultimate goal is to protect and conserve forests, which Dr Atauri says play a wide variety of environmentally important roles. "They control the water cycle and the micro-climate for example. They also give us places for recreation and research, and important products like wood," he points out. "That wide range of services must be protected for the future, by protecting and managing our forests in an effective way."

LIFE RedBosques_Clima

Nature-based solutions to improve adaptation of forests to climate change

Project Objectives

The LIFE RedBosques_Clima project aims to improve the resilience of forests to climate change by enhancing heterogeneity and biodiversity. It provides tools to assess vulnerability and guide adaptation strategies, applying them in pilot cases. The project also facilitates knowledge transfer to forest managers, policymakers, and stakeholders to promote large-scale replicability.

Project Funding

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Project Team

<https://redbosquesclima.eu/en/team/>

Project Partners

<https://redbosquesclima.eu/en/project-partners/>

Contact Details

Project Coordinator,
José Antonio Atauri Mezquida
Fundación Fernando González Bernáldez
Oficina Técnica EUROPARC-España
ICEI Edificio A, Campus de Somosaguas, UCM
28224 Pozuelo de Alarcón (Madrid)
T: +91 394 2522

E: fungobe@fungobe.org
W: <https://redbosquesclima.eu/>
W: www.fungobe.org
X: @fungobe
W: www.redeuroparc.org
X: @redeuroparc

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José Antonio Atauri Mezquida



José Antonio Atauri Mezquida holds a degree in Biology and a Ph.D. on Ecology. His research work has been primarily focused on landscape and forest ecology. He currently works for FUNGOBE/EUROPARC-Spain, as coordinator of conservation projects, where coordinated the LIFE RedBosques project and currently LIFE RedBosques_Clima.



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