

CAFE TOOL FOR ADAPTIVE FOREST MANAGEMENT

KEY POINTS

- Integrates local data, models ecohydrological and local priorities, connecting technical management with the territory.
- Simultaneously optimizes ecosystem services related to water, fire, carbon, biomass, biodiversity and eco-resilience.
- Allows comparison of multiple management alternatives.
- Provides operational recommendations: when, how much, where and how to intervene.
- Its design allows it to be applied in different- three ecosystems.
- It allows anticipating the effects of climate change and adapting management to future conditions

Summary

Mediterranean forest ecosystems face an increasing combination of prolonged droughts, more frequent fires, soil degradation, and loss of biodiversity.

These impacts, amplified by climate change and insufficient management, jeopardize the capacity of forests to provide essential ecosystem services such as water regulation, fire prevention, carbon sequestration, and socio-economic opportunities.

In this context, the SALAM-MED project was born with the objective of identifying and validating Nature-based Solutions (NbS) that increase resilience and ga-

They guarantee the provision of essential services in the arid and semi-arid regions of the Mediterranean. One of the solutions is Adaptive Forest Management (AFM), designed collaboratively between research and local actors to adjust interventions according to territorial priorities and future scenarios.

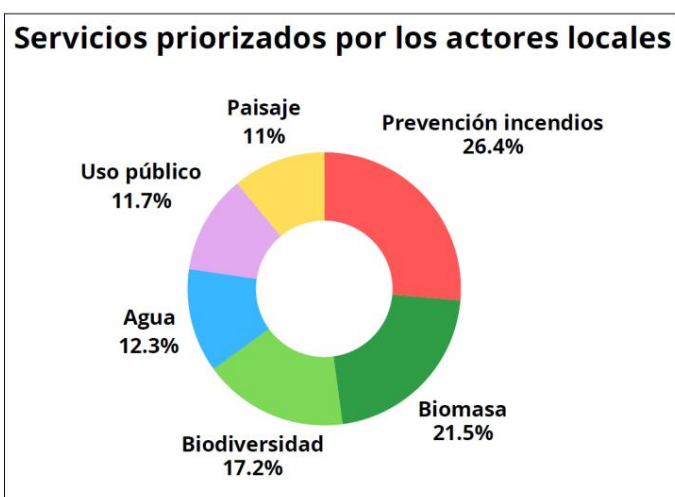
To facilitate this process, the CAFE tool is used, a decision support system that allows for the evaluation of how different management alternatives simultaneously influence water resources, carbon, fire risk, biodiversity and resilience in a transparent and participatory manner.

Thanks to this co-creation of science, technology and local actors, GFA and CAFE provide a solid basis for guiding forest policies capable of addressing the challenges of the Mediterranean, supported by scientific evidence and social validation.



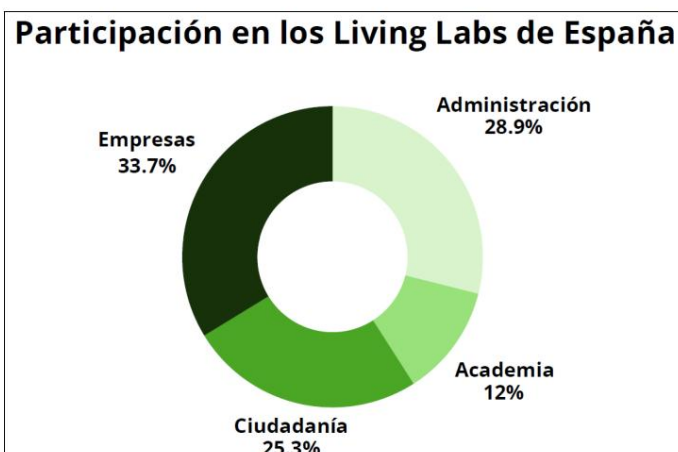
The investigation

The research conducted at SALAM-MED confirms that Adaptive Forest Management (AFM) is strengthened when silvicultural actions aimed at reducing biomass are combined with a quantitative assessment of their effects using indicators. In this process, the CAFE tool has made it possible to integrate field data, local knowledge, and eco-hydrological modeling to evaluate how different management strategies affect prioritized ecosystem services.



The participatory process developed in the Living Labs of Spain provided the necessary social base to guide the technical analysis.

The balanced participation of administrations, companies, civil society and the scientific community provided a pluralistic view on the challenges and opportunities of forest management in Mediterranean contexts.



Based on the identified priorities, CAFE allowed for the evaluation and comparison of different management recommendations. The results indicate that increasing the structural diversity of the forest, reducing competition for water, and strengthening resilience to droughts and fires are key elements for sustaining essential ecosystem services. Furthermore, CAFE's interactive dashboard facilitated the visualization of trade-offs between services, guiding decisions toward more balanced options that are consistent with local priorities.

The workshops highlighted the need to interpret management from a multi-stakeholder perspective: conserving/improving ecosystem services (reducing fuel consumption, improving water regimes, carbon sequestration, etc.) while simultaneously ensuring their compatibility with the socio-economic uses of the territory. They also allowed for the identification of persistent challenges, such as the limited availability of high-resolution data, the complexity of eco-hydrological processes, budget constraints, and the need for technical training to use digital decision-support tools.

Overall, the results show that moving towards effective Adaptive Forest Management requires integrating technological innovation, local participation and robust tools, capable of translating scientific knowledge into practical and strategic decisions to strengthen the resilience of Mediterranean forests.

Recommendations

- Strengthen technical capacities and knowledge transfer. Promote specific training in ecohydrological modeling, the use of decision support platforms and adaptive management, along with stable advisory networks for administrations and forest managers.



Promote management strategies that increase the territory's capacity to anticipate, absorb, and recover from disturbances, using CAFE to compare alternatives, evaluate trade-offs between objectives, and select the options most consistent with local conditions and priorities.

- Ensure robust data for evidence-based planning. Establish ecohydrological monitoring programs and calibration protocols that ensure the reliability of the models used and their effective integration into GFA planning.
 - Consolidate participatory frameworks for legitimate decision-making. Institutionalize co-design processes that involve administrations, technicians, and local actors in prioritizing ecosystem services, validating scenarios, and interpreting results.
 - Use CAFE as a tool for transparency and communication. Leverage the interactive panel to improve the traceability of decisions, facilitate inter-institutional coordination and strengthen communication with local communities.
 - Integrate multi-criteria approaches into the evaluation of alternatives. Apply the Pareto front and other interactive visualizations to explore trade-offs between services, promoting balanced and well-founded decisions.
 - Focus interventions on climate prevention and adaptation.
- Incorporate operational constraints and territorial criteria. Integrate factors such as slope, accessibility, and intervention capacity to ensure that the recommendations derived from CAFE are technically and logistically feasible.
 - To promote the replicability and territorial expansion of the approach. To promote the application of CAFE in new Mediterranean areas and strengthen regional cooperation networks that promote Adaptive Forest Management on a larger scale.





GENERALITAT VALENCIANA

parc natural de la serra calderona



More information



bit.ly/SalamMedCAFE



www.salam-med.org



Contact Point
Nucleo Ricerca Desertificazione NRD
Università degli Studi di Sassari
 V.le Italia 39a - 07100 Sassari - Italia
 Tel.: +39 079 213102/3 / Fax: +39 079 219394
 E-mail: salam_med@uniss.it / nrd@uniss.it
SALAM-MED Website www.salam-med.org
