



LIFE MIXFORCHANGE

After-LIFE Communication Plan

2022

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Executive summary of the After-LIFE communication Plan

This report summarizes the results of the LIFE MixForChange project, with an emphasis on those that are most relevant from a transfer point of view. In addition, the plan presents the roadmap to continue with the generation and dissemination of results of the actions developed during the project, during the years following its completion. The aim is to multiply the impact of the project beyond the financed period.

The After-LIFE Communication Plan covers five years from the end of the project (**July 2022 - June 2027**).



The Life MixForChange project

2.1 Project beneficiaries

The consortium is composed of 4 Spanish beneficiaries. The coordinating partner is the Forest Science and Technology Centre of Catalonia (CTFC), which has developed the project together with the Forest Ownership Centre (CPF), the Forest Owners' Association "Montnegre - Corredor" (APMC) and the Forest Owners' Association "Serra de Bellmunt-Collsacabra" (APFSBE).



Generalitat de Catalunya
Departament d'Acció Climàtica,
Alimentació i Agenda Rural



Centre de la Propietat
Forestal



serra de bellmunt
associació de propietaris forestals

In addition, the Barcelona Province Council (DiBa) participates as a collaborating entity.



Diputació
Barcelona

2.2 Project objectives

The main objective of the project is to contribute to the adaptation and increase the resilience of sub-humid Mediterranean mixed forests in Europe in the face of climate change, favouring the conservation and maintenance of productive, environmental and social functions.

The specific project objectives are:

1. Develop, implement and demonstrate new innovative forest management techniques, with climate change adaptation and close-to-nature criteria.
2. Develop new tools to integrate climate change adaptation of the sub-humid Mediterranean forest into the policy and regulatory framework affecting management.
3. Develop new tools to strengthen the bioeconomy linked to the timber products of the sub-humid Mediterranean forest, to increase the forest management economic sustainability in the medium and long term, to prevent abandonment.
4. Transfer the techniques implemented and the tools developed to the main regional and European actors where the sub-humid Mediterranean forest occurs.



2.3 Duration and actions of the project

The project is developed through 27 actions, between **October 2016 and June 2022**.

Preparatory actions

Agreements with the owners of the selected demonstrative stands for the execution of the innovative silviculture, stand diagnosis, individualized design and issuing the permits of the interventions.

Implementation actions

- Implementation of innovative forest management models in stands dominated by holm oak (*Quercus ilex* subsp. *ilex*), chestnut (*Castanea sativa*), oak (*Quercus petraea*, *Q. pubescens*, *Q. canariensis*) and pine (*Pinus sylvestris*, *P. pinea*) in 164 ha.
- Develop new tools to improve the bioeconomy associated to the management of sub-humid Mediterranean forests. This includes: protocol for assessing standing timber quality, catalogue of high added-value timber products, pilot logistics and marketing system for forest products.
- Tools to integrate the adaptation to climate change of sub-humid Mediterranean forests in the policy and regulatory framework. This includes: vulnerability maps of the main climate change impacts in the area, preparing handbooks on adaptive and close-to-nature silviculture and on local policies to promote adaptive forest management.
- Replication activities: promotion of the replication in new areas of the silviculture principles developed in the project; conducting a real case of adaptation of local policies to promote adaptive forest management at municipal level.

Monitoring actions

- Evaluation of the ecological and dasometric effects of the silviculture applied, with special attention to climate change adaptation related indicators (water balance, soil moisture, vulnerability to fires, biodiversity, vitality) and economic sustainability and climate change mitigation (growth, carbon balance).
- Evaluation of the socioeconomic impact of the silviculture applied.
- Creation of an External Advisory Committee that accompanies project development, improving its technical quality.
- Life Cycle Assessment of the silviculture applied.

Communication and dissemination actions

Transfer and dissemination of the project context, the solutions developed and the conclusions reached. The target audience includes forest owners, practitioners, local administrations (technical and political staff) and society in general.

Networking activities are also carried out with other projects and initiatives, including technical exchange trips to other countries.

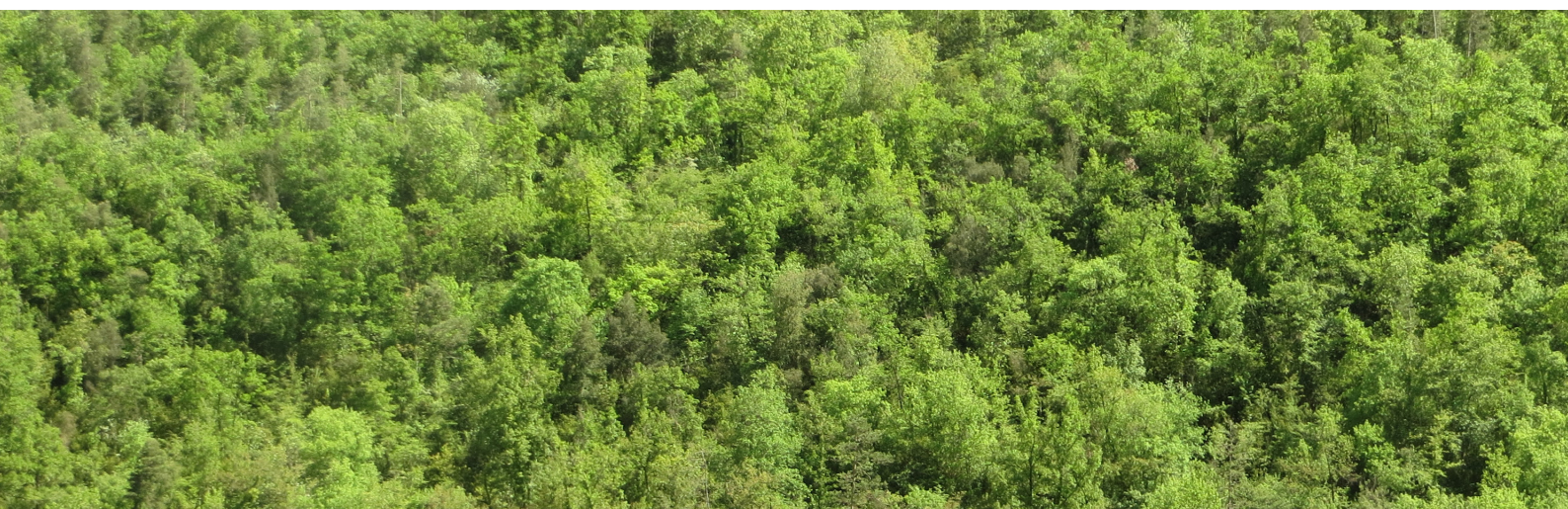
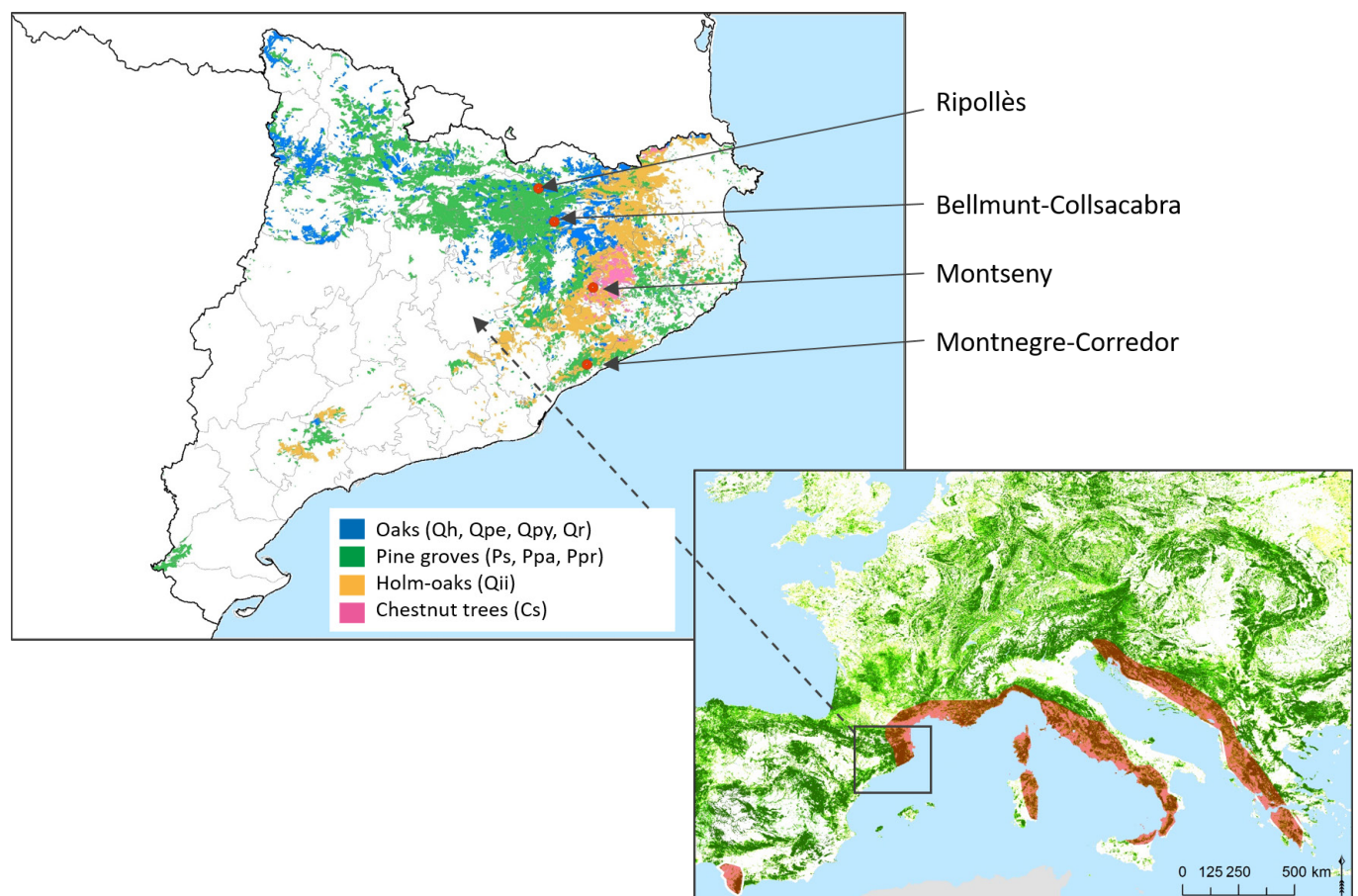
Management and coordination actions

Actions to guarantee the correct development of the project at a technical, administrative and financial level.

2.4 Work areas

The work areas cover 4 massifs in sub-humid Mediterranean conditions in Catalonia (NE Spain), as presented below:

- Montnegre-Corredor: low coastal mountain conditions (maximum altitude 760 m, distance to the sea <10 km), warm temperatures and high rainfall (Foehn), steep slopes, siliceous substrates.
- Montseny: high pre-coastal mountain conditions (maximum altitude 1,700 m, distance to the sea 20-40 km), low temperatures in winter and high rainfall (Foehn), siliceous substrates.
- Bellmunt-Collsabra: continental Mediterranean mountain conditions (maximum altitude 1,300 m, distance to the sea >50 km), low temperatures in winter and intermediate rainfall; siliceous and calcareous substrates.
- Ripollès: continental Mediterranean mountain conditions in transition to Euro-Siberian - Pyrenean (maximum altitude 1,500 m, distance to the sea >50 km), low temperatures in winter and intermediate rainfall; siliceous and calcareous substrates

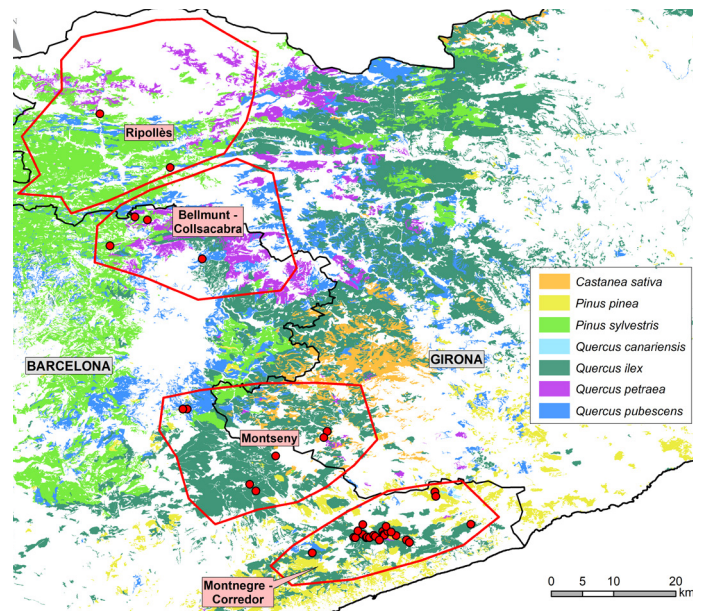


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Results of the silviculture applied

3.1. Description of the silviculture applied

The project has developed and applied an innovative silviculture that incorporates climate change adaptation and close-to-nature criteria. In total, 164 ha have been intervened (winters 2017/18 and 2018/19), besides 54 ha of replication. In total, we have intervened in 39 demonstration stands, distributed over 4 work areas: the Montnegre-Corredor, Montseny and Bellmunt-Collsabra massifs and the valleys of southern Ripollès. The demonstrative forests include 4 forest formations, according to their main species: holm oak, chestnut, oaks (*Q. pubescens*, *Q. canariensis*, *Q. petraea*) and pine forests (*Pinus sylvestris*, *P. pinea*).



The **main objectives** of the silviculture applied are:

- **Increase vitality** (individual and collective), to promote the resistance to climate change impacts.
- **Increase complexity** of structures and species, to increase biodiversity and resilience.
- **Promote the valorisation of quality timber**, to improve the economic sustainability in the medium term.
- **Reduce vulnerability to forest fires.**

These general objectives are specified for **each forest formation**:

Holm oak forests: promote capitalization, broadleaved species and seed trees.

Chestnut forests: accompany a change of main species if chestnut is not vital.

Oak forests: promote high quality oaks and other broadleaved species.

Pine forests: promote oak and other broadleaved species.

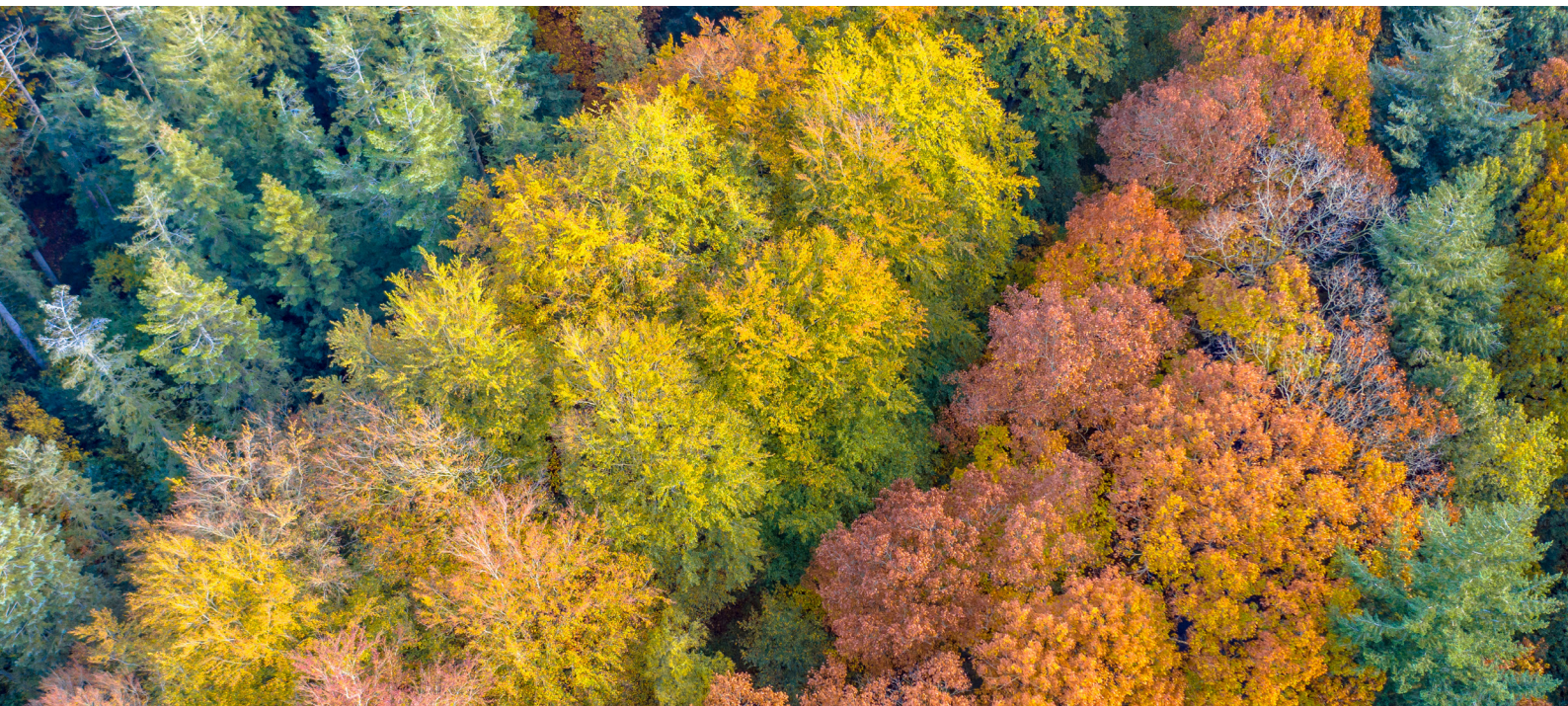
Intervention **planning** is done at the **stand scale**, based on a prior expert assessment. In general, interventions of intermediate intensity are proposed (extraction of 20-30% of the basal area), with a clear component of selectivity and overall stand improvement. On the undergrowth, a selective and partial clearing is proposed, seeking to break the vertical fuel continuity and at the same time maintain all the species present. A 20-30% undergrowth cover is respected, especially of the less abundant species, those of greatest interest to the fauna and the least fire-prone.

Finally, the interventions are applied **paying attention to the role of each tree** and other **micro-site** elements of the ecosystem. Thus, specific promotion interventions (competition release) of individual trees are applied, depending on their economic (well-formed trees of valuable timber producing species) and/or environmental interest: underrepresented species, trees with microhabitats of interest.



Scheme of application of a silviculture with single-tree criteria, in favour of a selected tree (marked in yellow). The arrows show the situation before and after an intervention, and the dashed lines the lapse between two consecutive interventions.

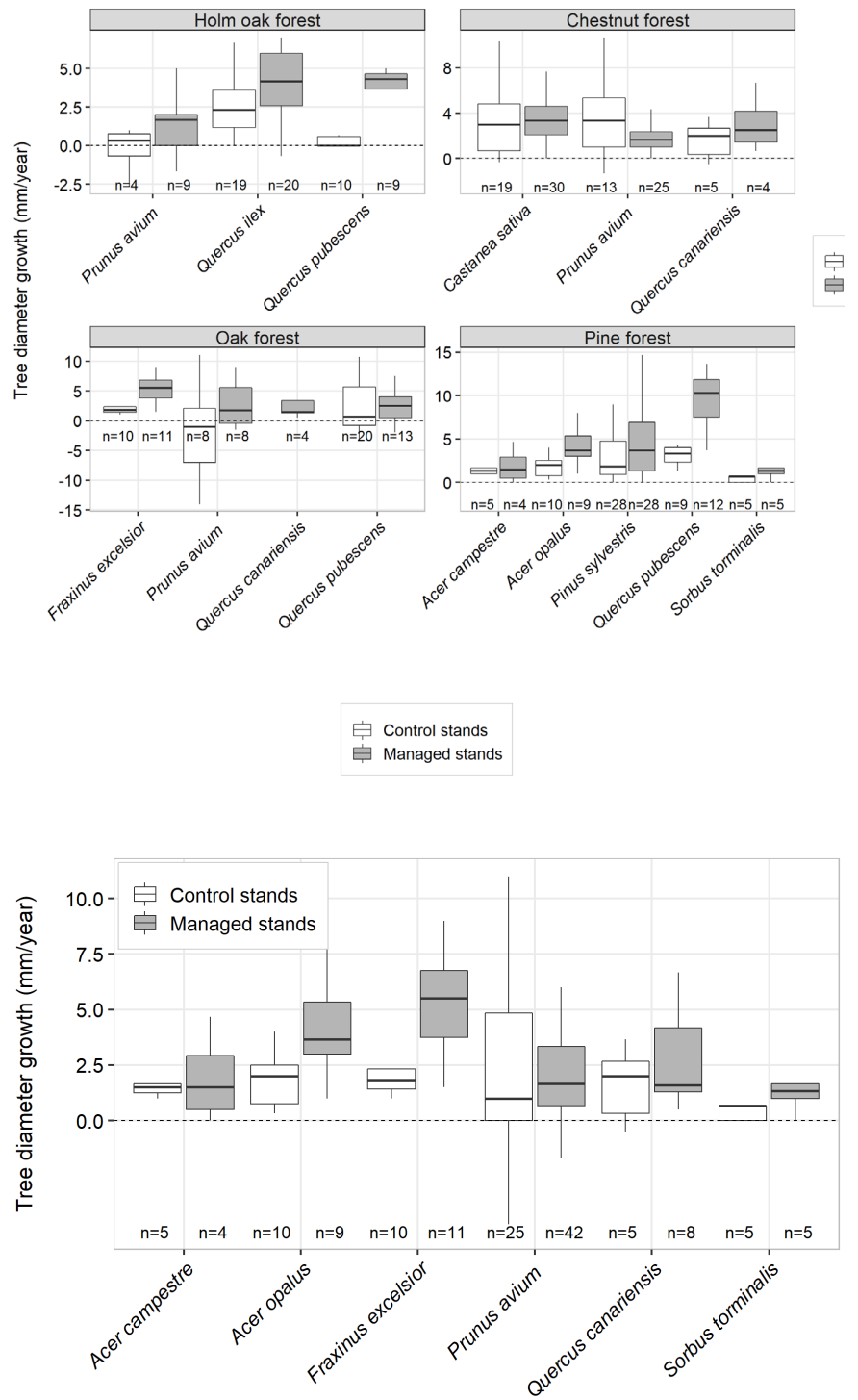
We evaluated the effects of MixForChange silviculture based on a network of 71 inventory plots located in the demonstrative stands. In addition, 14 of these plots have a “twin control” plot, in which no intervention was applied, to compare the evolution of both situations. The variables studied include the main indicators of climate change adaptation and also the economic balance.





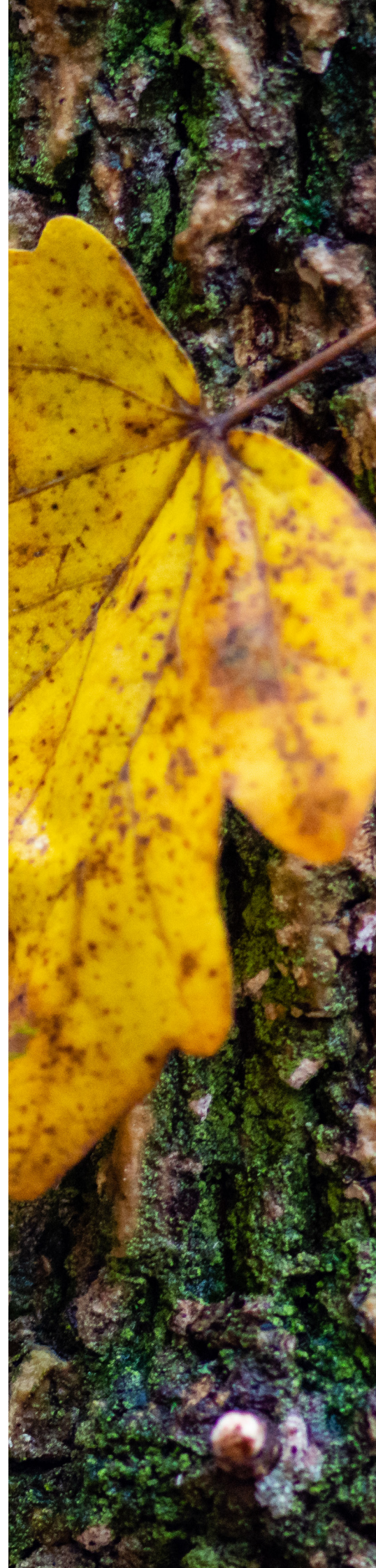
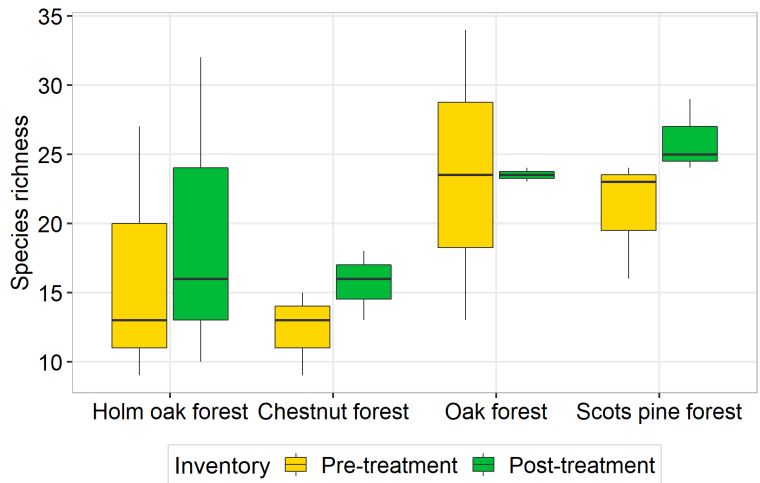
3.2. Effect on vitality and growth

The silviculture applied increased the growth rate of trees of the main and secondary species. Growth is an indicator of the vitality of trees.



3.3. Effect on biodiversity

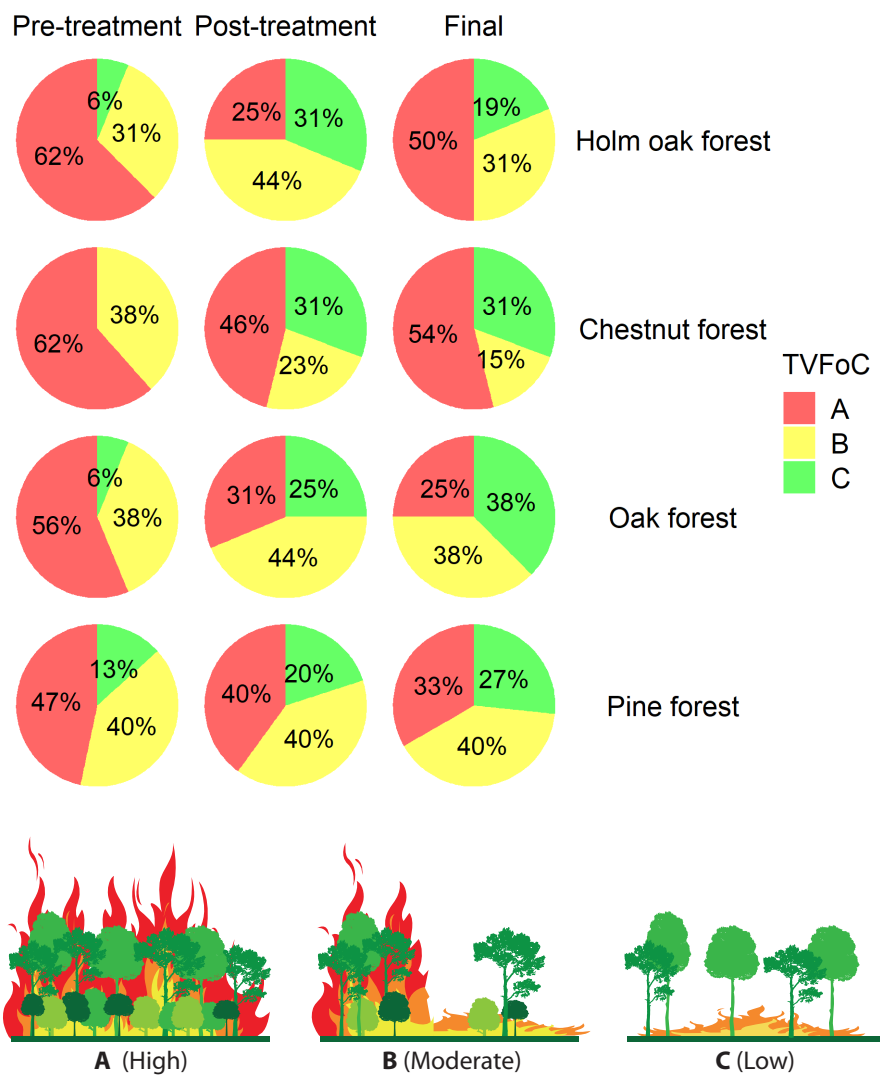
Biodiversity has been evaluated using two indicators: floristic richness (total number of plant species) and the ecosystem capacity to host biodiversity, expressed through the Potential Biodiversity Index. The silviculture applied has not significantly affected any of these indicators. In addition, it is expected that in the medium term the effect will be positive, thanks to the creation of discontinuities in the forest and the maintenance of all the species present.





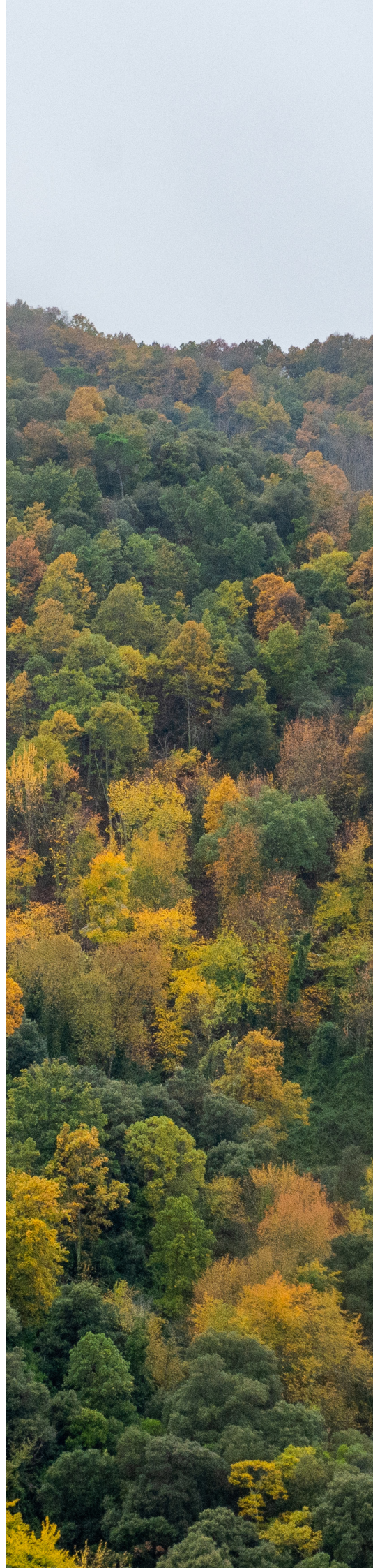
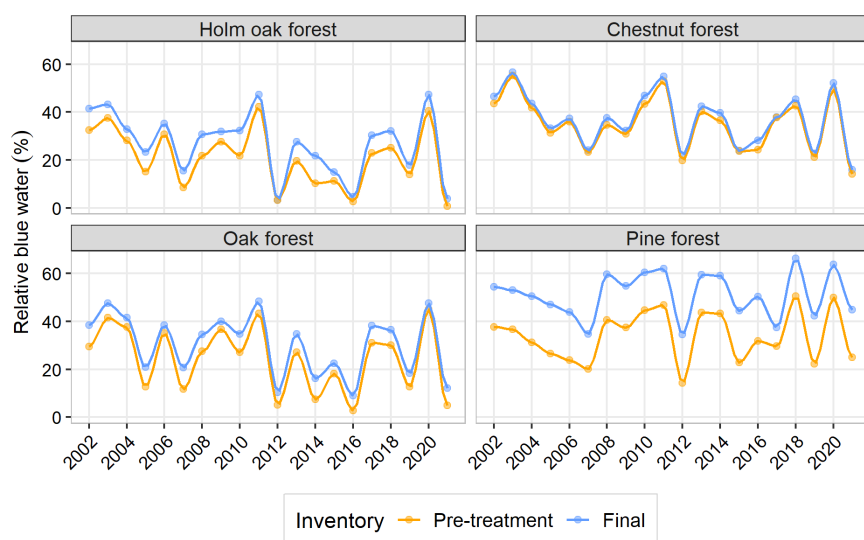
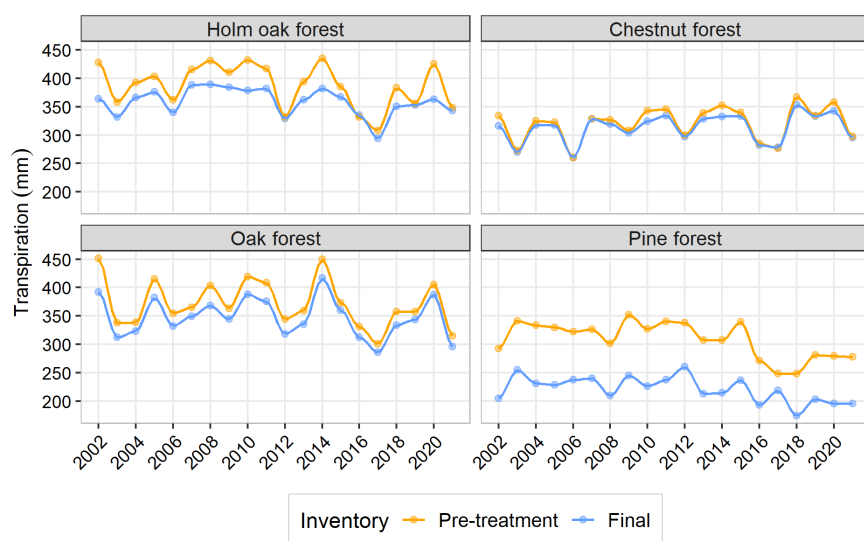
3.4. Effect on fire vulnerability

We studied the evolution of the structural vulnerability to crown fire, an indicator of the risk that a forest has that, in the event of a fire, it will spread with great intensity, reaching the forest canopy and becoming a Great Wildfire. The silviculture applied (Post-intervention) reduced the vulnerability to fires compared to the initial situation (Pre-intervention). After 2 or 3 growing periods (End) the vulnerability of holm oak and chestnut forests increases, due to the resprout of the main species. On the other hand, oak and pine forests continue to reduce their vulnerability to fires thanks to the settlement of felling debris.



3.5. Effect on water balance

Water is the most limiting factor for plant growth in the Mediterranean, and it is expected that this resource will become increasingly scarce. The effect of MixForChange silviculture on transpiration (the water used by the forest to grow) and on relative blue water (the percentage of precipitation that passes through the forest and reaches watercourses) has been studied in several demonstrative stands, with the *Medfate* model. In both cases, the silviculture induces an improvement thanks to the reduction in density of both tree and undergrowth layers, leading to reductions in transpiration of up to 29% and increases in the percentage of blue water of up to 17%.





3.6. Effect on the economic balance

The costs and return of MixForChange silviculture have been studied through surveys, and compared with those resulting from the theoretical application of conventional silviculture. We calculated the economic balance of both alternatives for each demonstrative project stand. Both alternatives have, on average, a negative economic balance, with values ranging between -600 and -1,800 €/ha. The economic results of both silvicultural options are similar when the forest has a large number of intermediate and large-sized trees. In contrast, in forests with predominantly small trees, the economic balance is more negative in the case of MixForChange silviculture.

MixForChange silviculture results in lower return (due to the extraction of less product) and higher technical staff costs (marking, forest workers training) and clearing (more selective) than conventional silviculture. However, the logging costs are lower in the case of MixForChange silviculture.

It should be said that these results correspond to a first application of this silviculture in stands that had been unmanaged for decades, or subject to conventional silviculture. The economic results of the innovative silviculture are expected to become more favourable as it is applied repeatedly, with increasingly better trained forest workers and resulting in an increasing rate of valuable timber.

3.7. Overall Assessment of MixForChange silviculture

In general terms, MixForChange innovative silviculture has achieved the stated objectives of improving direct and indirect indicators of climate change adaptation: the vitality and complexity of the stands have been increased, both the water balance and the vulnerability to forest fires have been improved, without causing a negative effect on biodiversity indicators. This silviculture does not aim to optimize any of these indicators, but to achieve a general improvement on all of them.

With regard to the economic and valuable timber production indicators, only with repeated application and long-term monitoring will it be possible to assess the impact of this silviculture.

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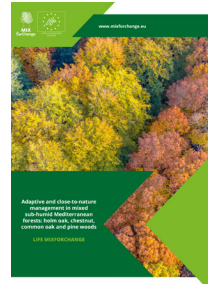
Communication and dissemination plan during the project

4.1. General dissemination

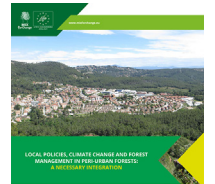
- Web page in Spanish, Catalan and English: www.mixforchange.eu.
- Eleven issues of the [semi-annual newsletter](#)
- More than 30 appearances in [TV, radio and press](#), and more than 10 in specialised media

4.2. Main technical publications

Handbook: [Adaptive and close-to-nature management in mixed sub-humid Mediterranean forests: holm oak, chestnut, common oak and pine woods](#). J. Coello (CTFC), M. Piqué (CTFC), M. Beltrán (CTFC), L. Coll (CTFC), N. Palero (CPF), L. Guitart (APMC). 2022



Handbook: [Local policies, climate change and forest management in peri-urban forests: a necessary integration](#). J. Coello (CTFC), L. Guitart (APMC), T. Cervera (CPF), J. Rovira (DiBa), M. Piqué (CTFC). 2021.



[Pilot system of logistics and marketing of timber products from mixed sub-humid Mediterranean forests](#). L. Guitart, M. Rosell (APMC). 2022



Handbook: [Protocol for standing timber quality assessment of valuable broadleaves](#). J. Coello (CTFC), Q. Garcia (CPF), T. Baiges (CPF). 2020



Catalogue: [Uses of valuable broadleaves timber in Catalonia](#). J. Coello, M. Piqué, M. Beltrán (CTFC). 2020





4.3. Other publications and transfer documents

Integration of adaptive forest management in policies and regulations:

- [Report-summary of the aspects modified in the ORGEST system to incorporate the innovative MixForChange management models \(2022\)](#)
- [Real case of integration of the adaptation to climate change of sub-humid Mediterranean mixed forests in local policies: City Council of Mataró \(2021\)](#)
- [Memorandum of regional regulatory aspects to be modified to facilitate the adaptation to climate change of sub-humid Mediterranean mixed forests \(2021\)](#)
- [Mapping climate change vulnerability of sub-humid Mediterranean mixed forests \(2019\)](#)

Main articles published:

- [Adaptive and close-to-nature management in subhumid Mediterranean mixed forests of Catalonia: treatments characterisation and silvicultural evaluation \(2022\)](#)
- [Adaptive silviculture with single-tree criteria: results of application. Protocol for standing timber quality assessment of valuable broadleaves \(2022\)](#)
- [Economic evaluation of climate change adaptive silviculture in Catalan sub-humid Mediterranean forests \(2022\)](#)
- [Development of a pilot logistics and marketing system for forest products from sub-humid Mediterranean mixed forests \(2022\)](#)
- [Results of the application in Catalan sub-humid Mediterranean forests of adaptive silviculture with single-tree and close-to-nature criteria \(2021\)](#)
- [Identification of value trees and their competitors \(2021\)](#)

MixForChange technical seminars and trips:

- [Presentations made in the Specialization Course: Close-to-nature silviculture and mixed forests management for climate change adaptation. Webinar. 6-7 October 2021](#)
- [Presentations made at the seminar on mixed forests silviculture in the sub-humid Mediterranean. Orvieto \(Italy\), September 23, 2019.](#)
- [Technical report of the second exchange trip \(Occitanie, France, 2021\)](#)
- [Technical report of the first exchange trip \(Tuscany and Umbria, Italy, 2019\)](#)

Description of the demonstrative silvicultural treatments applied, monitoring protocols and summary reports with the conclusions:

- [Report: MixForChange silviculture Ecological Monitoring – Action D2 \(2021\)](#)
- [Report: MixForChange silviculture dasometric results – Action D3 \(2021\)](#)
- [Report: Assessment of the effects of MixForChange silviculture on ecosystem services and socio-economic outcomes - Action D4 \(2022\)](#)
- [Methodology for the socioeconomic evaluation of the project \(2019\)](#)
- [Ecological evaluation protocol of MixForChange silviculture \(2019\)](#)
- [Dasometric evaluation protocol of MixForChange silviculture \(2018\)](#)
- [Description of the innovative silviculture: holm oak forests \(C1\) \(2019\)](#)
- [Description of the innovative silviculture: chestnut forests \(C2\) \(2019\)](#)
- [Description of the innovative silviculture: oak forests \(C3\) \(2019\)](#)
- [Description of the innovative silviculture: pine forests \(C4\) \(2019\)](#)

After-LIFE Communication and dissemination plan (2022-2027)

During the After-LIFE period (**July 2022 – June 2027**) the beneficiaries of the project will continue to carry out monitoring, communication and dissemination tasks, with the aim of prolonging the impact of the project at the level of transfer and capacity building. As described in the following sections, this plan includes specific actions at local, regional, national and European level, aimed at four target audiences:

- Society in general.
- Forest ownership: people and entities that own forests.
- Practitioners: professionals from companies, NGOs and administration related to forest management and research.
- Administration: public entities related to forestry and environmental administration.

5.1. Continuation of the monitoring of the demonstrative stands

The 85 forest inventory plots installed during the project (actions D2 and D3) are permanent, suited for a long-term monitoring. This future monitoring includes, at least, a new silvo-dasometric inventory, structural vulnerability to fires, Potential Biodiversity Index and water balance.

If necessary, we will prioritise the plots in which to continue monitoring, according to criteria of representativeness of the silviculture applied, accessibility and transfer interest.

Responsible (other participants)	CTFC (All)
Estimated resources	€40,000 - €80,000
Expected date	Autumn 2025 – spring 2026 (7 or 8 growing seasons after MixForChange silvicultural treatments)
Financing	Agreements with the Provincial Councils of Barcelona and Girona; Regional projects (PDR “Demonstration Plots” call), national (operational groups, AEI) or European (LIFE, Interreg Sudoe / Poctefa / MED), Demonstrative plots network of the Forest Ownership Centre
Target audience	Forest ownership, Practitioners, Administration
Impact indicator	Number of inventory plots measured

This activity will contribute to generating baseline information for the preparation of future articles, communications in conferences and other transfer and dissemination activities.



5.2. Website maintenance

The website is the main communication tool of LIFE MixForChange, and it will continue to fulfil this function beyond the end of the project, keeping the domain www.mixforchange.eu active for at least the after-LIFE period (5 years).

During this period, the website activity will be considerably reduced, for which reason it will be restructured so that the final format places special emphasis on the main project publications and transfer products, reducing the visibility of the sections showing project news.

Responsible (other participants)	CTFC (All)
Estimated resources	€3,000
Expected date	July 2022 – June 2027
Financing	Own resources
Target audience	Society, Forest ownership, Practitioners, Administration
Impact indicator	Number of unique web users in the after-LIFE period

5.3. Dissemination of project publications

The publications and materials generated during the project will continue to be disseminated, especially the two handbooks that synthesize the lessons learned during the project (“Adaptive and close-to-nature management in mixed sub-humid Mediterranean forests: holm oak, chestnut, common oak and pine woods”, 2022; and “Local policies, climate change and forest management in peri-urban forests: a necessary integration”; 2021) and the articles that have not been published before the end of the project (i.e. four communications in the Spanish Forest Congress 2022).

The main channels used are:

- Project website
- Websites and social networks of the different beneficiaries and of the individual participants
- Presentations in conferences, trainings and seminars
- Technical meetings and networking activities

Responsible (other participants)	CTFC (All)
Estimated resources	€3,000
Expected date	July 2022 – June 2027
Financing	Own resources
Target audience	Society, Forest ownership, Practitioners, Administration
Impact indicator	Number of downloads of each product in electronic format in the after-LIFE period

5.4. Publications and participation in technical-scientific seminars

The final project results, as well as new ones generated in the post-LIFE period (especially linked to a new measurement of the inventory plots), will be disseminated via publications in technical and scientific journals and participations in technical and scientific seminars. Specifically, the following publications and communications are planned:

- 2 scientific papers, one related to action D2 and the other one to actions D3 and D4, led by CTFC
- 3 technical articles on the project silviculture and the results of the project inventory plots measurement in the after-LIFE period, led by CTFC and CPF.
- 3 communications in national or international technical-scientific seminars or conferences. The main planned events include the IX Spanish Forest Congress (2026), regular meetings of the Spanish Society of Forest Science (SECF), Mediterranean Forest Week or events organized within the framework of other projects, especially from the LIFE call. These communications are expected to be led primarily by the CTFC.

Responsible (other participants)	CTFC (All)
Estimated resources	25.000 €
Expected date	Scientific papers: published in 2022 and 2023 Technical articles: 2024, 2026 and 2027 Communications in seminars: 2026-27
Financing	Own resources and sources of financing mentioned in 5.1
Target audience	Forest ownership, Practitioners, Administration
Impact indicator	Number of articles published Number of communications made in congresses

5.5. Training activities and capacity building

The transfer of MixForChange silviculture is particularly effective when carried out in the field. To this end, the following activities are planned:

- 1 annual training for students and/or practitioners in CPF's training forests ("marteloscoptes"): identification of valuable trees and MixForChange silviculture marking practices, with the support of the project's handbooks and technical publications.
- 2 field days in which the updated results of the silviculture applied will be presented after a new monitoring period.

Responsible (other participants)	CPF (All)
Estimated resources	€8,000
Expected date	Annual trainings: 2023-27 Field days: 2026-27
Financing	Own resources, participant registration fees and funding sources mentioned in 5.1
Target audience	Forest ownership, Practitioners, Administration
Impact indicator	Number of trainings and people trained Number of conferences organized





5.6. Re-application and replication of MixForChange silviculture

The silvicultural interventions applied in the MixForChange demonstrative stands are considered a first step to take them towards a structure that is increasingly resistant and resilient to climate change impacts, and with a growing potential for valuable timber production. To achieve these objectives, it is necessary to continue applying new silvicultural treatments following the same principles, with an estimated frequency of between 8 and 12 years. Therefore, based on the data collected in 5.1, a new silviculture intervention will be designed in the maximum possible area within the projects' demonstrative forests (target: 125+ of the 164 ha of MixForChange demonstrative forests + 40 ha of replication), to be executed as soon as possible after its design.

The design of this re-application and the promotion of its implementation (especially, in the form of technical advice to the owner: definition of objectives, marking support, training and accompaniment of logging companies) will be led by the forest owners' associations (APFSBE and APMC), CPF and CTFC. In this replication, the Barcelona Province Council, a collaborating entity of the project and executor of 33 ha of replication, will also have a key role.

In addition, technical support is planned for people and entities that want to apply this type of silviculture in new areas. This accompaniment consists of technical support for the stand diagnosis, the establishment of management objectives and the interventions marking. Thus, it is expected to increase the area in which this forestry is applied by additional 100 ha. This accompaniment will be led by the forest owners' associations (APFSBE and APMC), CPF and CTFC. Once again, the Barcelona Province Council will play an important role in this replication, in its own estates and those within the forest owners' associations within its area of work.

Responsible (other participants)	CPF (All)
Estimated resources	€10,000
Expected date	Re-application (design): 2026 Replication: July 2022 – June 2027
Financing	Funding sources mentioned in 5.1, Barcelona Province Council
Target audience	Forest ownership, Practitioners, Administration
Impact indicator	MixForChange demonstration area where forestry is re-applied Area on which MixForChange forestry is replicated

5.7. Appearances in the media

It is expected that at least three press releases will be produced in the After-LIFE period, related to MixForChange topics, which will lead to at least eight appearances in the local, regional and national media.

Responsible (other participants)	CTFC (All)
Estimated resources	€3,000
Expected date	July 2022 – June 2027
Financing	Own funds
Target audience	Society
Impact indicator	Number of press releases Number of media appearances

5.8. Follow-up of the adoption of the political-regulatory tools generated in the project

It is planned to monitor the adoption of the regulatory tools developed in the project, promoting the application of changes in regional environmental, forestry and climate policy and regulations. For example, the program to improve the Guidelines for Sustainable Forest Management in Catalonia (ORGEST), integrating and improving silvicultural itineraries incorporating the principles applied in the project.

Responsible (other participants)	CPF (CTFC)
Estimated resources	€12,000
Expected date	2022-2024
Financing	Own funds and European financing
Target audience	Forest ownership, Practitioners, Administration
Impact indicator	Number of meetings with experts Improved ORGEST models





LIFE15 CCA/ES/000060
2016-2022

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Generalitat de Catalunya
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ASSOCIACIÓ DE PROPIETARIS FORESTALS
DEL MONTNEGRE I EL CORREDOR

serra de bellmunt
associació de propietaris forestals

With the collaboration of:



**Diputació
Barcelona**

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