

PRACTIC CASES OF CTFC NET4FOREST TOOL-KIT

For this practice case, we will present some of the approaches and results from the LIFE MixforChange Project as a valous reference tool to be applied in the forestry management sphere, specially in the Mediterranean context.

The Life MixforChange Project is a project which its main objective is the forest management for climate change adaptation and the promotion of the bioeconomy of the Catalan Mediterranean sub-humid forest.

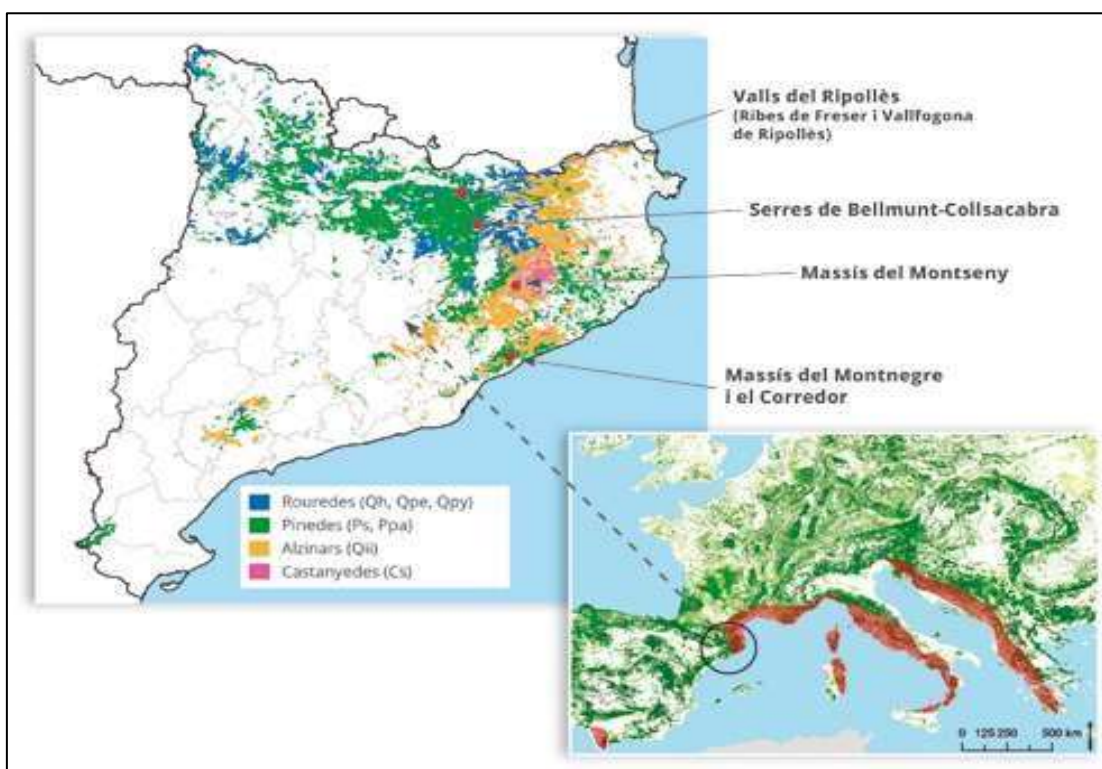


Figure 1. Typologies of forests and working area of MixforChange project and Subhumid Mediterranean forest in Europe.

This 5-year project (October 2016 - September 2021) involves the Centre de Ciència i Tecnologia Forestal de Catalunya (CTFC), coordinator of the project, the Centre de la Propietat Forestal (CPF) and the Associacions d'Propietaris Forestals del Montnegre-Corredor (APMC) and Serra de Bellmunt-Collscabra (APFSBE).

The sub-humid Mediterranean forest:

The sub-humid Mediterranean forest is an ecosystem of great uniqueness and importance on a European scale. The sub-humid Mediterranean is a relatively mild climate with high precipitation. These favourable conditions give rise to a great diversity of species, both in the domain and the continental one, intimately mixed and with a predominance of planifolia. In Catalonia, these conditions are mainly found, in the mountain ranges of the north-eastern quadrant: intermediate altitudes (predominantly between 300-800 m) of the eastern Prepirineu and the Montseny and Montnegre-Corredor massifs. Figure 1 shows the climate area in Europe and Catalonia. Main forest typologies in these conditions are mixed stands dominated by holm oak (*Quercus ilex* subs. *ilex*), other *Quercus ilex*, chestnut (*Castanea sativa*). Principal Forest typologies in these conditions are mixed stands dominated by holm oak (*Quercus ilex* subs. *ilex*), other *Quercus ilex*, chestnut and various pines (*Pinus sylvestris*, *P. pinea*, *P. pinaster*). Among the accompanying species, which can occasionally be dominant, the planifolious trees with the potential to produce high-quality wood stand out:

The project is carried out in 164 ha of holm oak, oak, chestnut and pine forests, in 4 areas: Montseny, Montnegre-Corredor, Bellmunt-Collsabra and Ripollès valleys.

Cherry, ash, maple, wild service tree, rowan tree, and pear among others.

Climate change and the Mediterranean sub-humid forest:

Over the coming decades, temperatures expected to continue to rise, which in the Mediterranean will be accompanied by a reduction in precipitation (especially summer precipitation) and an increase in the frequency and intensity of extreme events: heat waves, intense droughts and storms. Expected effects on the sub-humid Mediterranean forest may aggravate by its peculiarities:

- **Intrinsic vulnerability.** Forest species present are poorly adapted to intense droughts.
- **An abundance of abandoned forests** (unmanaged) with a simplified density of species and structures: This abandonment aggravates the low economic sustainability of current management, based on a short value chain with low added value (firewood and low-quality wood).
- **Forests located in the surroundings of highly populated areas**, with a high dependence on the externalities of these forests: regulation, hydrology, erosion control, landscaping and recreation.
- **Importance of natural values and biodiversity:** most of these areas included in the Xarxa Natura 2000 network and other protected areas.
- Lack of awareness of the relevance of integrating forest management and climate change adaptation into **local and regional policies.**

From winter 2017 to spring 2018, the effect of the silvicultural interventions will be evaluated in the course of the project.

The role of forest management in tackling this problem: the origin of MixForChange

Forest management can make a significant contribution to mitigating this problem, enhancing the adaptability of forest stands to climate change and promoting economic and environmental sustainability.

Forest management models for adapting stands to climate change aim to foster the complexity and vitality of stands.

Forest management for climate change adaptation of the Mediterranean forest mainly based on reducing competition (thinning), increasing complexity (diversity of species and structures) and reducing vulnerability to forest fires. Increasing economic and environmental sustainability is achieved through forest management models that take advantage of natural processes (lateral shading and advantageous microclimate thanks to the maintenance of companion species). Favourable to the quality-wood production in a limited number of trees selected for their vigour and conformation. This problem and this potential will be the trigger for a consortium of four entities (CTFC, CPF, APMC, APFSBE) to apply for funding under the LIFE call, within the climate change line, to implement a demonstration project in this field.

Objectives of LIFE MixForChange project:

The main objective of the project is to contribute to adaptation and increased resilience of mixed sub-humid Mediterranean forest to climate change, fostering conservation and maintenance of its productive, environmental and social functions. The specific objectives of the project are:

- a) To develop and implement new forest management models in 164 ha of demonstrative pilot stands, representative of the sub-humid Mediterranean forest in Catalonia. These models permit to enhance adaptation to climate change in these forests (reducing competition, increasing vitality, complexity, biodiversity and efficiency in the use of water) and to raise the quality and added value of forest products.
- b) Develop new tools to integrate adaptation to climate change of the sub-humid Mediterranean forest in the policy and regulatory framework that affect management, both at the municipal level and throughout Catalonia.
- c) Develop new tools to strengthen the economy linked to the products of the sub-humid Mediterranean forest, which allow increasing the economic sustainability of the management in the medium and long term. These tools include protocols for the characterization of standing wood, catalogues of high added value products that can generate in these forests and the implementation of a logistics and marketing system.
- d) Transfer the implemented techniques and tools to the main actors at the Catalan, state and European level through the project website, technical publications (articles and guides), training activities, workshops, conferences, periodic bulletin, etc.



Stand of the project in Ripollès. AGS-CTFC



Oak forest thinning. AGS-CTFC



Mixed pine and oak stand. AGS-CTFC



Mixed stand of oaks and pines. Teresa Baiges