

Climate Credits

Beyond carbon

Life Climark





Life Climark

Promotion of **forest management** for **climate change mitigation** through the design of a **local climate credit market**

LIFE CLIMARK (LIFE16 CCM/ES/000065) is a LIFE Climate Change Mitigation project, co-financed by the European Union's LIFE Programme.

Coordinator:

The Forest Ownership Centre

Partners:

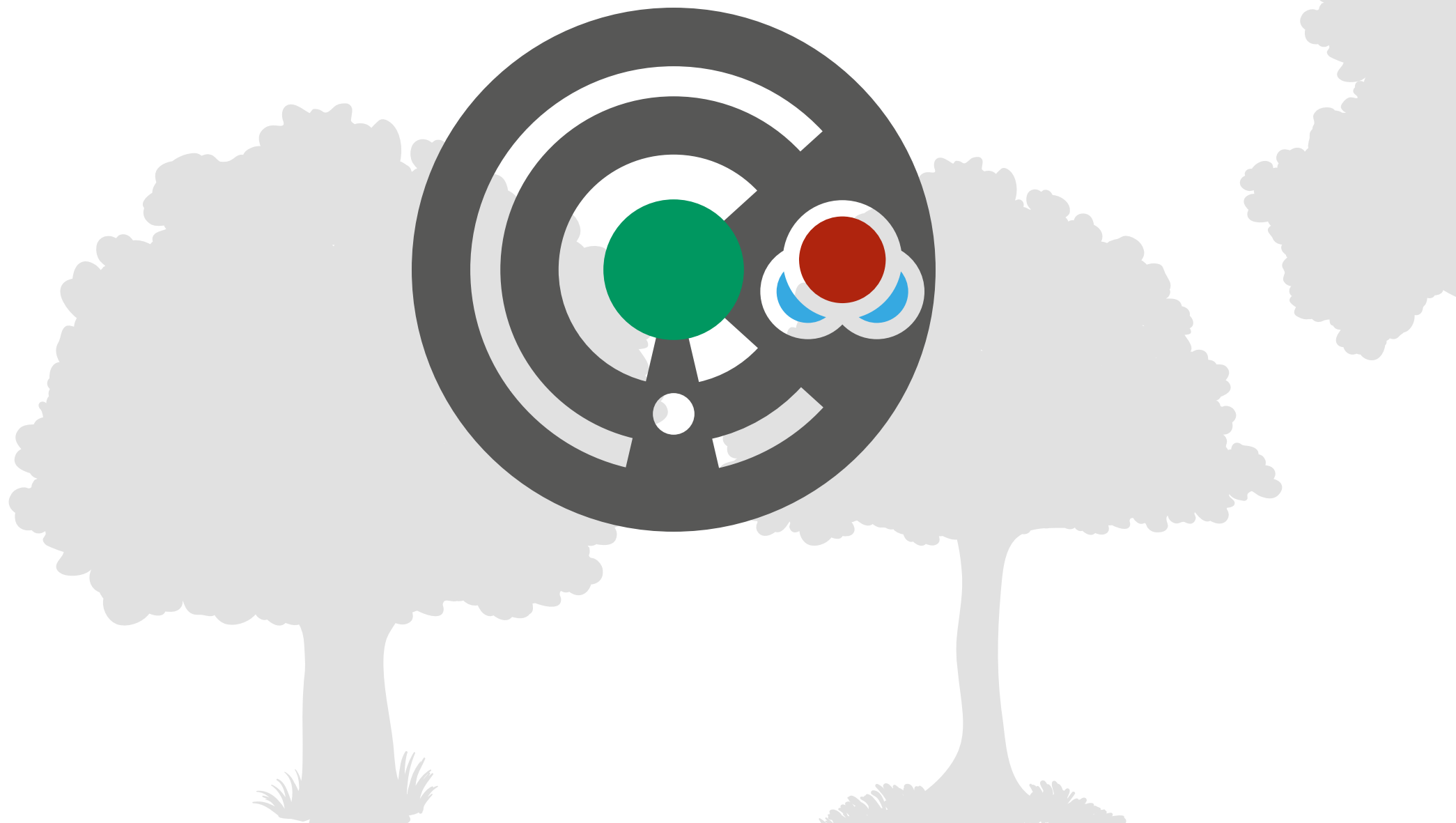
Consiglio Nazionale delle Ricerche-Istituto per i Sistemi Agricoli
e Forestali del Mediterraneo

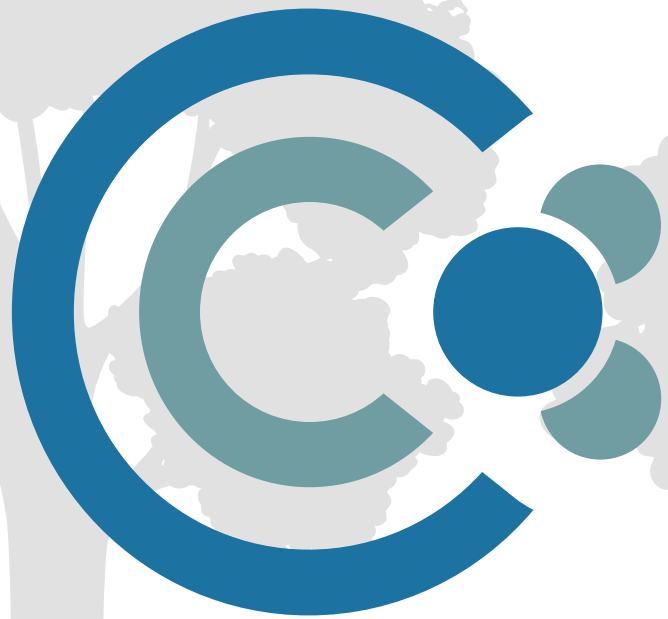
Forest Science and Technology Centre of Catalonia

Catalan Office for Climate Change

University of Lleida







Climate
Credits

About us

The LIFE CLIMARK project



LIFE CLIMARK is an initiative led by two Catalan public institutions and three research centres:

- The **Forest Ownership Centre** (CPF) and the **Catalan Office for Climate Change** (OCCC), responsible for the management of private forests and the management of climate change, respectively.
- Three leading research centres on multifunctional forest management, forest soils and forest fire analysis: the **Istituto per i Sistema Agricoli e Forestali del Mediterraneo** (CNR-ISAFoM Italy), the **Forestry Science and Technology Centre of Catalonia** (CTFC) and the **University of Lleida** (UdL).



Specific objectives of the project

The main objective of the **CLIMARK** project is to contribute to climate change mitigation and adaptation by creating a climate credit market that promotes the multifunctional management of Mediterranean forests to increase their carbon sink capacity, prevent fires, contribute to water supply and conserve biodiversity.



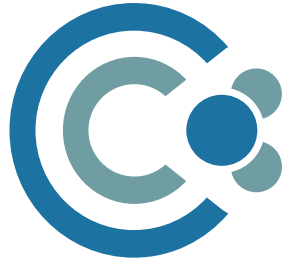
Maintain and improve the mitigating capacity of forest in Mediterranean Europe.



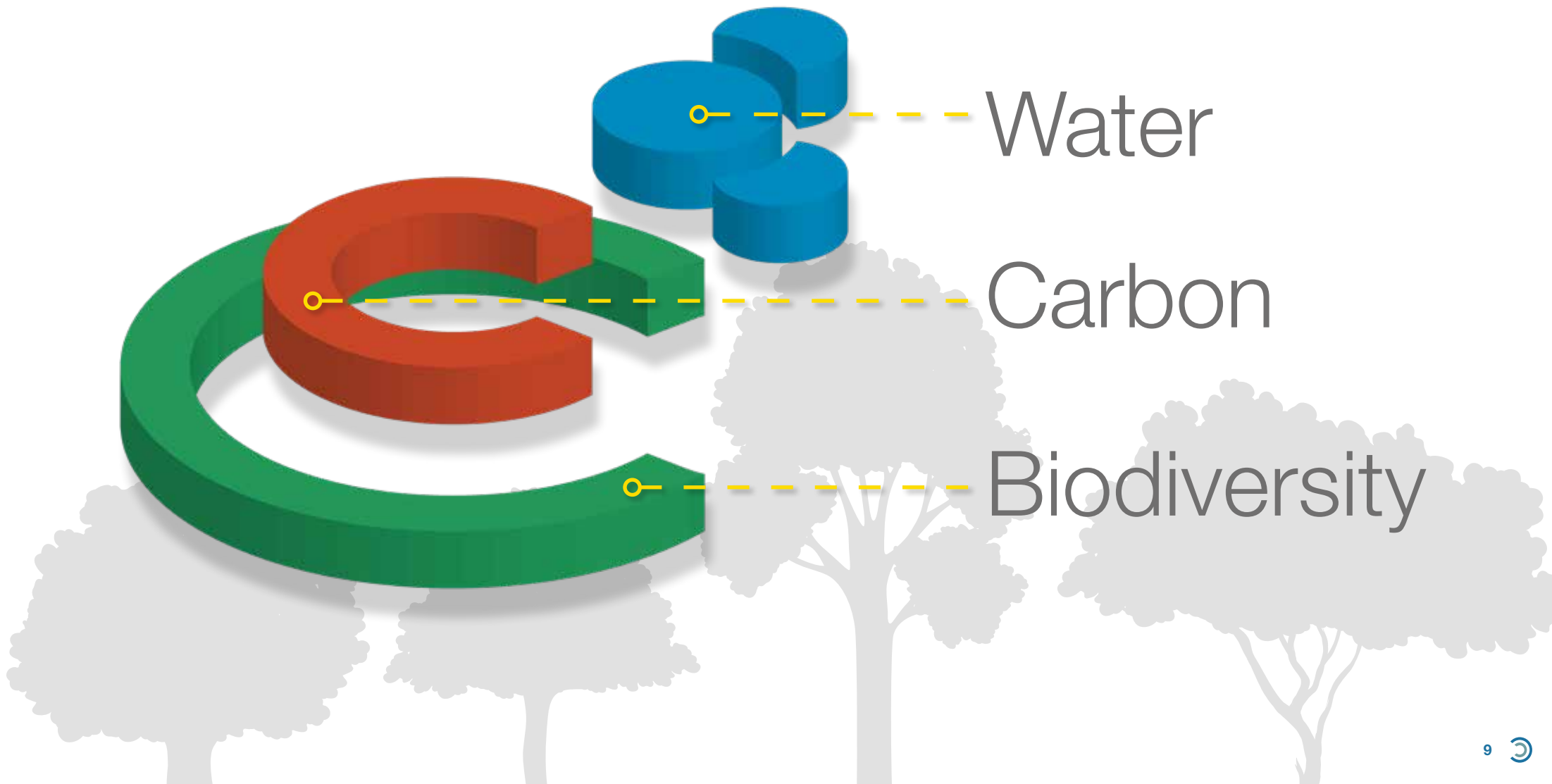
Design a local climate credit market as a tool to incentivise multifunctional forest management.



Raise awareness, provide training and equip all those interested in compensating their emissions through climate credits with the required tools.



**Crédito
Climático**



2

Forests and climate change

Forests contribute to climate change mitigation...

but this role is at risk.





The great forest expansion that took place in Catalonia during the second half of the last century has contributed to the sequestration of atmospheric carbon dioxide, which has been stored in the form of carbon in trees and forest soils.

Today, however, the role of Catalan forests in climate change mitigation is at risk: the rate of carbon dioxide sequestration has decreased by 17% over the last 25 years and the increase in disturbances threatens stocks that have built up over decades.

In 25 years, forest biomass in Catalonia has increased by 73% and forests are 24% denser


now than in 1990. These changes in forest structure, combined with climate change, have damaged the health of forests, increased the risk of fires and affected the provision of basic services such as water, with a 30% reduction in the flow of rivers in the same period. (FORESTIME Report, 2020).

Biodiversity has also been affected by forest expansion, especially biodiversity linked to scrub and open spaces. In the last 20 years, the populations of birds and butterflies associated with these habitats have been reduced by 14% and 57% respectively (State of Nature in Catalonia Report, 2020).

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The tool: multifunctional forest management

“We defend the role of forest management in achieving landscapes that are more resilient to climate change”



Multifunctional forest management helps to ensure the role of forests in climate change mitigation and is key to adapting our landscapes to the new climate.

Beyond obtaining wood and cork products, in many cases a forest must be managed to prevent catastrophic fires or to increase the resistance of forest stands to longer periods of drought and more frequent disturbances, or so that they can recover more quickly.

When such management integrates several objectives, the different benefits that forests provide to each territory – known as *Forest Ecosystem Services* – can be enhanced, amongst them aspects as important as forest biodiversity or the supply of quality water.

Truly multifunctional and “climate-smart” management enables us to:

- Produce renewable goods from local resources whenever possible;
- Capitalise on climate change mitigation-adaptation synergies;
- Incorporate criteria for conservation and greater biodiversity; and
- Take into account the local characteristics of the land, to identify the most consistent management options in each case.

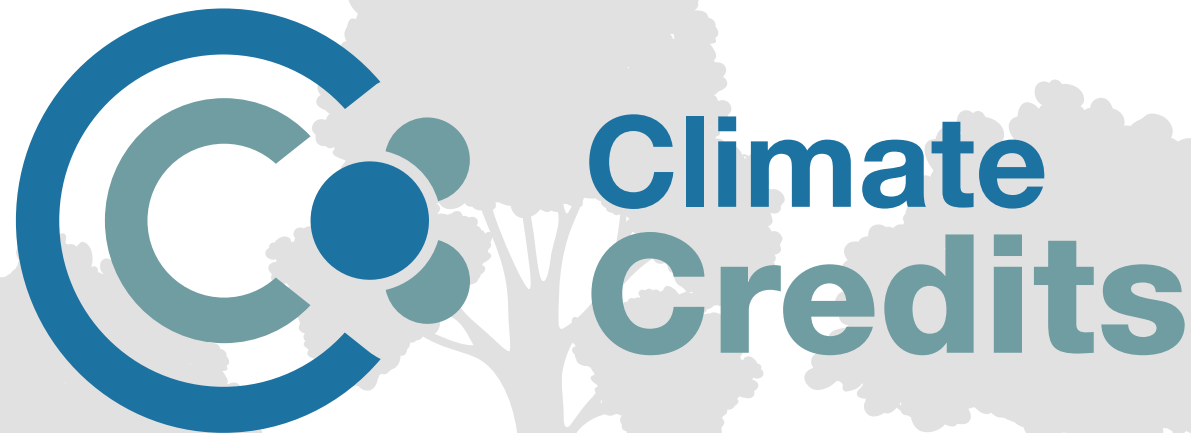
Multifunctional and climate-smart forest management



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The LIFE CLIMARK proposal:

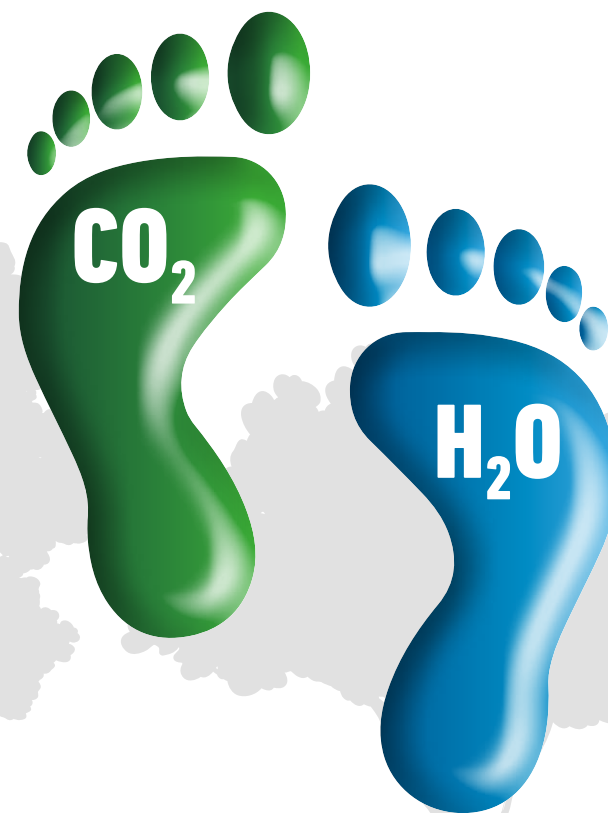
*A new market of Climate
credits*



LIFE CLIMARK proposes that multifunctional management projects enter the environmental financing circuits through a new climate credit market.

Climate credits are a new exchange unit designed to facilitate investment in nature-based solutions in Catalonia within the framework of voluntary offsetting and corporate social responsibility initiatives.

Climate credits provide companies with an opportunity to offset their carbon and water footprints voluntarily by investing in forest management in Catalonia.



How climate credit works

Basically, the system enables one **company or entity to buy** x climate credits with which to cover part or all of a forestry project.

For those **managing woodlands**, it is a way to diversify income sources for their work, based on the benefits that their activities generate for society.

For companies and organisations, the **Climate Credit mark** constitutes a secure, controlled way of managing their contributions, ensuring visibility and transparency.



Multifuncional forest management

SELLER



Carbon fixation in forest masses and soil



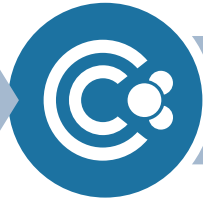
Reducing water consumption in woodlands



Biodiversity conservation



Reducing the risk of fire



Acquisition of climate credits

BUYER

Corporate social responsibility



Reputation and recognition



Finalcial contribution to improving the local environment



Climate credits



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What do climate credits include?

Climate credits, beyond carbon

CARBON

Forestry fixation in forest stands and soil

WATER

Reducing water consumption in woodlands

Climate credits are based on a comprehensive concept of forest management: for a forestry action to generate climate credits, it must have a positive impact on climate change mitigation and adaptation, and it must do so in a manner consistent with the local context in which it is applied.

Climate credits are calculated by assessing the impact certain forestry practices have on three key factors in mitigating the effects of climate change and adapting to it in the Mediterranean area: **climate, water and biodiversity**, bearing in mind in all cases the contribution of such management to forest fire prevention.

Forestry measures generating climate credits must comply with as many as possible of the following objectives:

BIODIVERSITY

Biodiversity conservation

FIRE

Reduction of fire risk probability, and its impact on carbon emissions



CARBON

Fixation and conservation of carbon stocks in forests, soil and products

Sustainable forest management could increase the climate change mitigation capacity of forests by up to 20%.

One of the goals we have set ourselves is to reverse the current slowdown in European forests' capacity to fix carbon. This involves applying smart and personalised forest management to each forest stand. The measures we finance are aimed at promoting the management of existing woodland and, where possible, the planting of new trees. With good planning, forest management can help to:

1. **Conserve existing carbon stocks**, for example with measures to prevent fire, encouraging the production of long-life woodlands and taking care not to damage woodland soil.
2. **Maintain the forest's capacity for carbon sequestration**, increasing its vitality in regulating competition for resources and, locally, by planting new trees where this is logical in ecological, technical and economic terms.

The **production of locally sourced renewable raw materials** like timber or cork contributes to the replacement of fossil fuels and materials, thus contributing to the targets for decarbonising the economy envisaged in policies on climate change and promoting the bioeconomy.



WATER

Reducing water consumption in woodlands

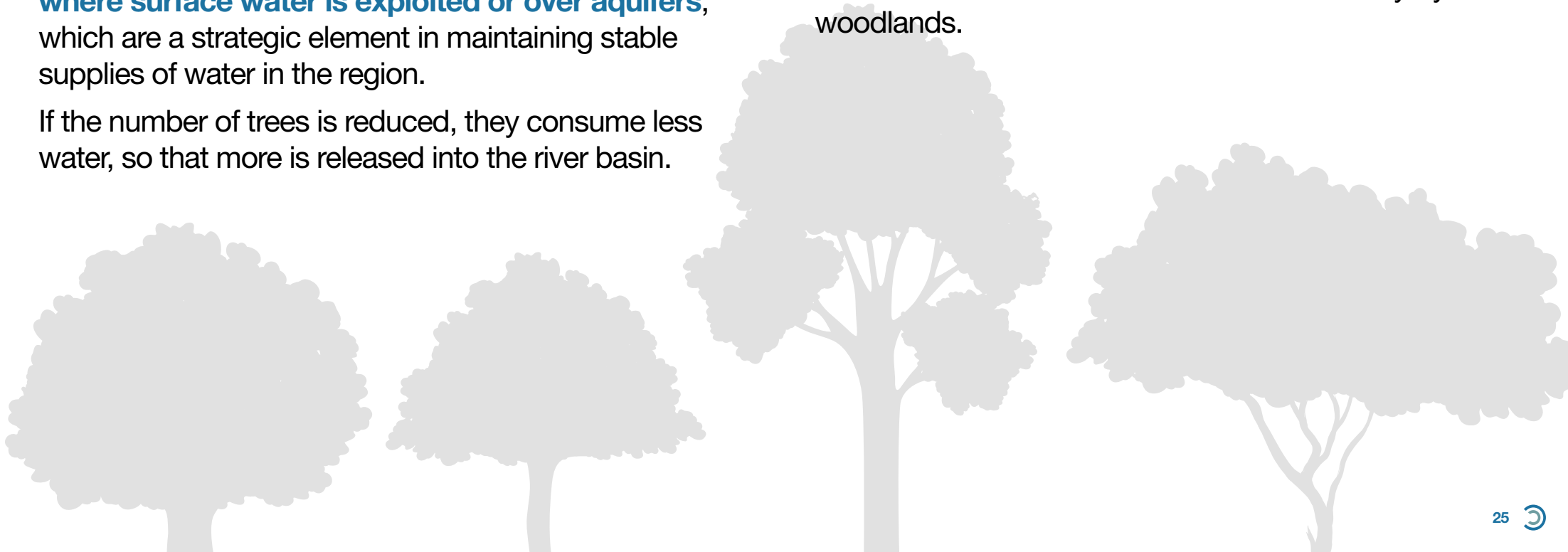
One of the main consequences of climate change in Catalonia is a reduction in water resources. Having woodlands that can consume less water is thus a key factor in being able to adapt to reduced precipitation and more frequent drought.

Measures are being taken with a view to **regulating the number of trees in woodland located in river basins where surface water is exploited or over aquifers**, which are a strategic element in maintaining stable supplies of water in the region.

If the number of trees is reduced, they consume less water, so that more is released into the river basin.

We need to achieve a balance in tree cover that enables us to:

- Maintain healthy tree cover to control flooding and guarantee water quality.
- Increase the amount of water filtering back into aquifers and rivers, wherever possible.
- Ensure that water is consumed more efficiently by woodlands.





BIODIVERSITY

Biodiversity conservation and improvement

At LIFE CLIMARK, in addition to supporting the conservation of biodiversity, we want to make a decisive contribution to enriching the biodiversity of the forest areas managed.

We aim to foster an approach to management that protects and increases woodland biodiversity. This can be done, for example, by keeping large diameter trees when felling or generating dead wood, thus providing

a habitat for a wide range of organisms. Biodiversity can also be enhanced by planting new native species suitable for local conditions.

According to the stage of development of each woodland, and based on a prior diagnosis using the **Potential Biodiversity Index (IBP)**, we can determine the most effective measures for each stand.





FIRE

Reduced risk of large fires

Large forest fires have serious effects on landscape, biodiversity and the social and cultural services related to them, and they endanger human life. Moreover, a forest that is more vulnerable to fire endangers the work it has done over decades to fix carbon.

The measures we encourage with climate credits include increasing the ability of woodland to resist forest fires, which will be more frequent and more serious because of climate change. We hope to [optimise the structure of the most vulnerable woodland](#) to increase its resistance

to fire, prevent major forest fires and improve prospects for the regeneration of tree cover following a fire.

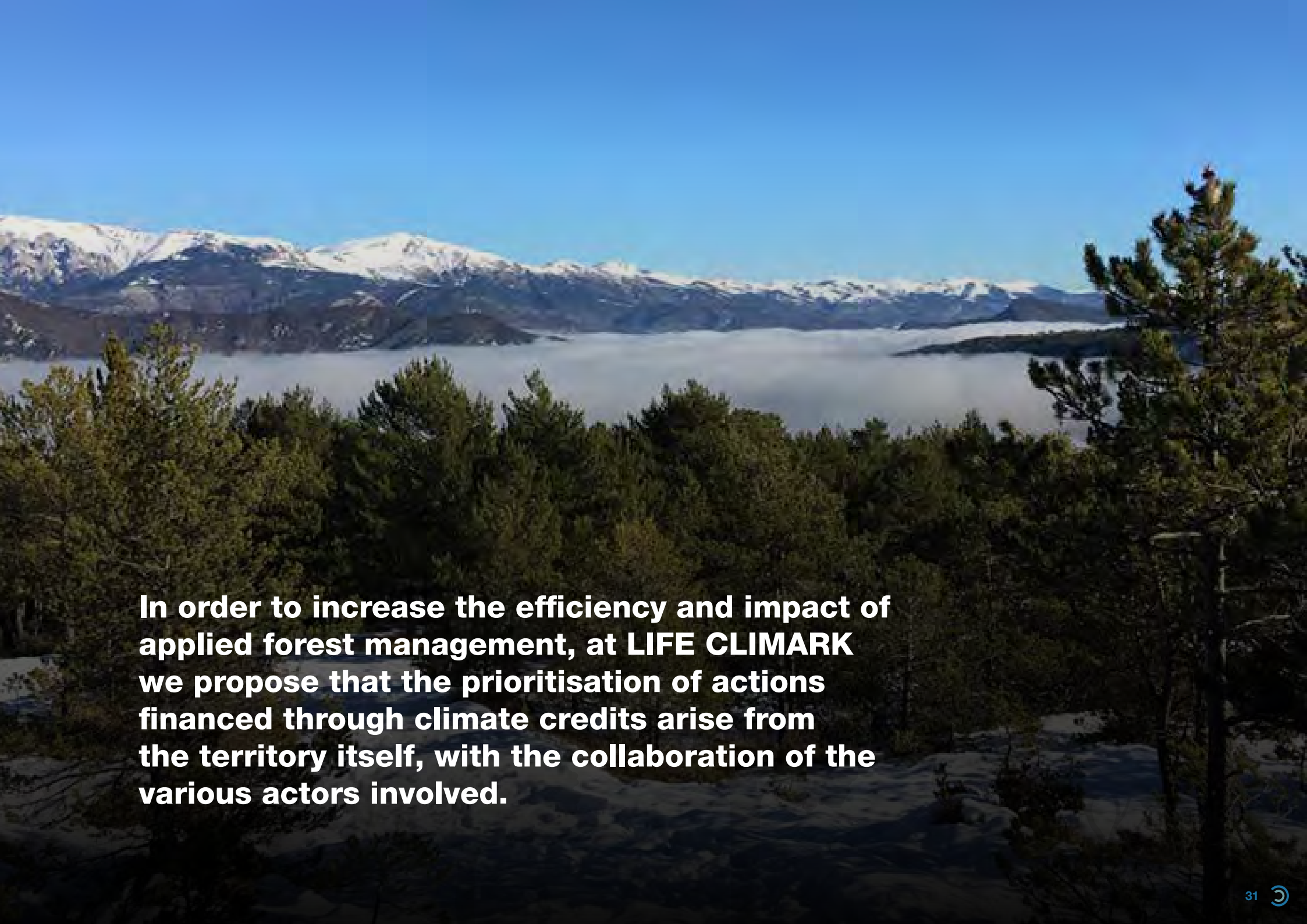
In areas with a high risk of fire, appropriate measures may include a reduction in total biomass and in vertical fuel continuity to prevent crown fires and reduce the intensity of any outbreak. If these measures are implemented in strategic management zones identified by the fire service, they will also help to reduce the risk of a megafire that could not be contained.



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**We promote
grouped, efficient
and viable forest
management**

***“We believe in land
management based on
participation and co-
governance”***

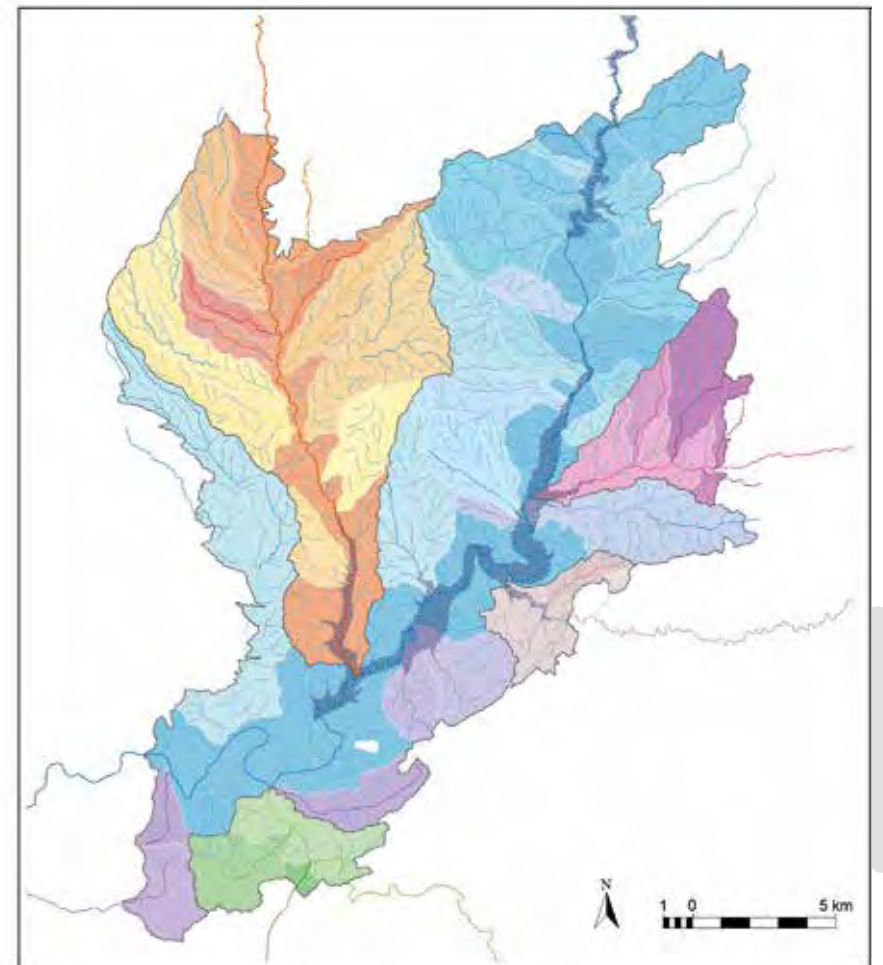


In order to increase the efficiency and impact of applied forest management, at LIFE CLIMARK we propose that the prioritisation of actions financed through climate credits arise from the territory itself, with the collaboration of the various actors involved.

Forest projects for climate change mitigation and adaptation (PROMACC)

This collaborative diagnosis process takes the form of a *climate change mitigation and adaptation forest project* (PROMACC). PROMACCs include the programming of forestry actions to be carried out in a given territory for a maximum period of three years and the calculation of the climate credits generated, which will be made available to companies and purchasing entities.

- These are [operational voluntary projects](#), which contribute to the enhancement of the forest ecosystem services offered by a given place.
- They are based on [landscape-scale planning](#), which establishes priority measures in line with climate change mitigation/adaptation criteria according to the development goals of that particular area.
- They are based on [grouped forest management](#).



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Forest actions that can be financed through climate credits



One of the new features that climate credits incorporate is that they consider not only **forest plantations**, but also the **management of existing forests** (clearing and tree felling) to be mitigation/adaptation measures, incorporating in all of them biodiversity conservation measures.

In forest management, the aim of clearings is to regulate the distribution and growth space of trees in order to maximise profits throughout the entire rotation, before nature takes its course over a much longer period. **If well-planned, clearings offer potential benefits in relation to climate change mitigation and adaptation**, both in terms of the effects on forest and on water available for human consumption.

At LIFE CLIMARK we have defined **priority locations and a list of actions, which maximise the impact of forest management on carbon sequestration, water production or biodiversity conservation based on the *Guidelines for Sustainable Forest Management in Catalonia (ORGEST)***.

In all cases, however, the calculation of the climate credits generated is carried out taking into account the overall impact of the actions on these three indicators.

1. Actions that increase carbon sequestration

Management of forests with stagnant growth

Young forests from post-fire natural regeneration with high accumulation of biomass, unmanaged, and dense adult forests with lower-than-expected growth.

Thinning is carried out, which reduces the number of trees in the stand. The reduction in competition stimulates the growth of the remaining trees and, in the medium term, can mean a **net increase in sequestered carbon per hectare**. If this clearing is done in young forests, the cut trees remain on the ground and **some of the carbon is incorporated into the soil**. If it is carried out in adult forests, the products obtained become **renewable raw materials** which can replace other fossil materials, preventing unnecessary carbon emissions into the atmosphere.



Planting trees

The most ecologically and economically viable opportunities for planting forest trees are considered, depending on each territorial context.

Planting includes **reforestation** of deforested woodlands areas, **enrichment planting** if the stand already has a minimum tree cover, of even **afforestation** of agricultural stands. This latter concerns **dense forest plantations**, in which the land changes from agricultural to forestry use, and **agroforestry plantations**, where an annual agricultural crop is obtained, interspersed by trees.



2. Management to protect current carbon stocks

Forest management in strategic locations for fire prevention

These are areas defined by the fire brigade as being of interest for the extinguishment strategy and areas of high fire occurrence and probable high emissions.

Forestry works to obtain a better forest structure are undertaken which includes **clearing trees, selecting regrowth and clearing undergrowth**, to reduce the volume of biomass and break its vertical continuity. If these tasks are carried out in strategic areas, fires can be prevented from becoming catastrophic.



— Action at a strategic point

— Protected area

3. Actions that generate products that store the carbon fixed by the trees for longer

Change of management in high quality locations and species

They allow the production of **longer-life wood products** (beams, furniture, etc.).

It is a question of ensuring, where possible, that management is carried out that guarantees the cascading use of the wood, that is to say, that enables the highest possible quality product to be obtained for a given species and conditions.

Techniques include **transformation of forest structure from coppice to high-forest woodland** or **tree-oriented silviculture** in oak groves, beech woods or quality mixed forests, or the application of **long rotation forestry**, in pine forests.



4. Management to increase water supply

Forest management in strategic areas for quality water supply

This includes basins where water is used, forests on top of aquifers, forests around springs, catchments or watercourses of interest.

Any action aimed at **reducing the number of trees or undergrowth of a stand generates, in the short term, a decrease in water consumption** by vegetation. However, if the aim is to maximise the impact on blue water, one can opt for specific management when possible: intense **thinning or recovery of old pastures** with tree reserves.



5. Management to conserve biodiversity

Forest management in forests with the priority objective of conservation and adaptation to climate change

In some cases, the management goal may be exclusively to conserve the forest and the biodiversity it hosts, increasing its resistance and resilience to the impacts of climate change.

In this case, cutting is aimed at reducing competition to increase the vitality of the stand, and at generating more complex and biodiverse forest structures, capable of withstanding possible future disturbances. Thus, it contemplates, among others, the **search for mixed forests and the application of silvicultural techniques focused on maintaining fewer, but larger trees and favouring sporadic species.**



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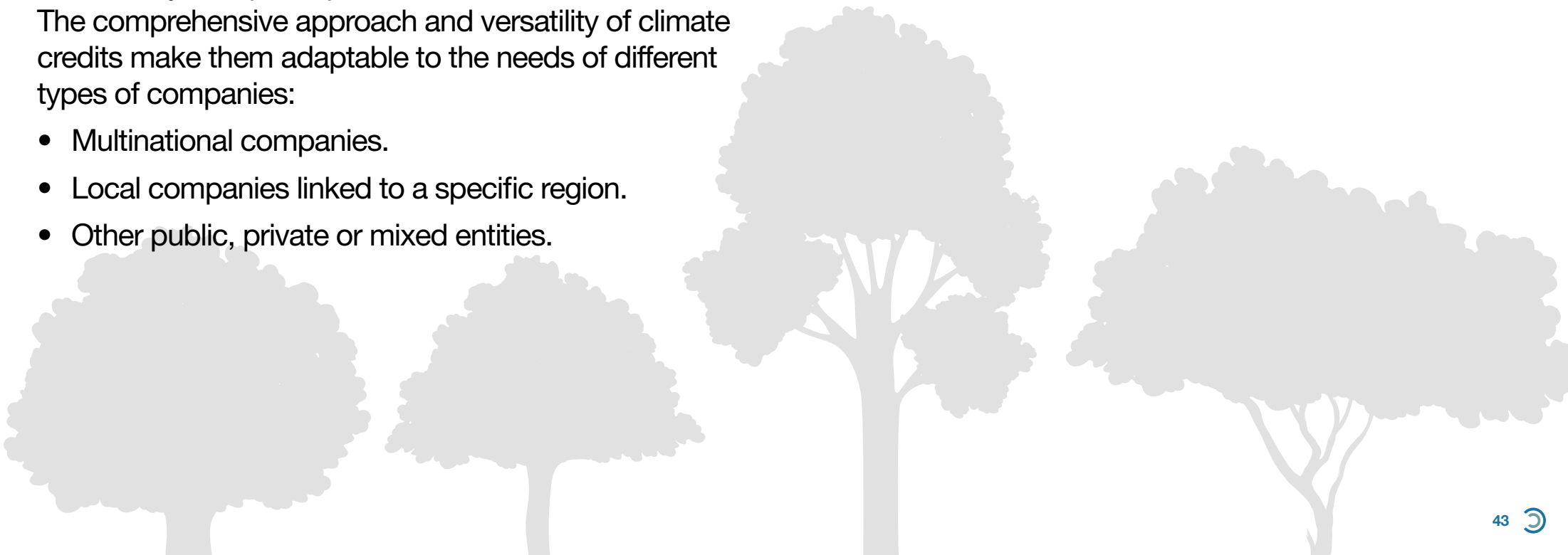
Benefits of participating in the market

The climate credit market wants to facilitate CSR and compensation initiatives related to the climate emergency.

BENEFITS FOR CREDIT BUYING COMPANIES AND ENTITIES

Any company or entity wanting to do their bit in the fight against climate change and its effects, while contributing to the improvement of the landscape and the territory, can participate in the climate credit market. The comprehensive approach and versatility of climate credits make them adaptable to the needs of different types of companies:

- Multinational companies.
- Local companies linked to a specific region.
- Other public, private or mixed entities.





Buying climate credits offers

SECURITY AND VISIBILITY

Invest in **reputable CSR, characterised by transparency and visibility**, through the Climate Credit mark.

Methodologies validated by experts, generation and purchase of credits certified by an independent party...

CUSTOMISATION

Manage the impact of your activity **comprehensively**, considering not only CO₂ emissions but also water consumption and/or your impact on biodiversity.

Option to independently offset your **carbon or water footprint**.

COMPANY IMAGE

Improve your company's image by associating the brand with **climate change mitigation and adaptation**, including **forest fire prevention**, the **conservation of woodland and its biodiversity** and, in short, keeping a landscape and a **region alive**.

ENVIRONMENTAL AND SOCIAL IMPACT

Exercise your joint responsibility towards sustainable development and the natural environment **in the region where you operate**, and generate quality employment.

Climate credits enhance the value of forestry companies that are committed to the training and qualification of their workers and to the dignification of forestry work.



BENEFITS FOR CREDIT SELLERS

The climate credit market makes no sense without a forest or land on which to operate. In Catalonia, 78% of forests are privately owned, so we need the cooperation of forest owners.

Climate credits contribute to the efficiency and viability of multifunctional and climate-smart forest management:

1. They offer forest management a **way into environmental financing circuits**, which is key for this management to take place.
2. They make available to foresters and their associations the **tools needed to:**
 - **Identify the forestry measures** – and locations – that will have most impact on the objectives of climate change mitigation/adaptation.
 - **Calculate the impact of management** on the carbon balance, water supply and biodiversity, and the climate credits that are generated.

BENEFITS FOR SOCIETY

In addition to working to fight the climate emergency, **multifunctional forest management** can bring multiple benefits to society. When well understood and planned, forest management can contribute to the conservation of forests and the biodiversity they host, to generate landscapes that are more resistant and

resilient to forest fires and drought and even to mitigate the impact of climate change on a resource as vital to the Mediterranean as water.

In addition, management produces a series of renewable raw materials, essential in a more sustainable and green economy, and generates employment and development in the rural environment.

Promoting multifunctional forest management contributes to five United Nations Sustainable Development Goals:

- Climate action.
- Life on land.
- Clean water and sanitation.
- Affordable and clean energy.
- Decent work and economic growth.





What is behind climate credits?

The climate credit market is the result of collaborative work carried out over five years (2018-2021), by various entities coordinated by the Catalan

Forest Ownership Centre

under the umbrella of the

LIFE CLIMARK project

co-financed by the European Union.

We have tested several multifunctional management treatments, applying them in the field in more than 100 hectares, on 28 forest estates distributed throughout Catalonia.



The LIFE CLIMARK multifunctional management proposal has been applied to six landscape units (LU) that mainly represent the landscape and territorial diversity of Catalonia, and have been adapted for the Veneto region, in Italy.

Catalonia

1-Montmell LU

2-Vall de Rialb LU

3-Els Aspres LU

4-Replans de Berguedà LU

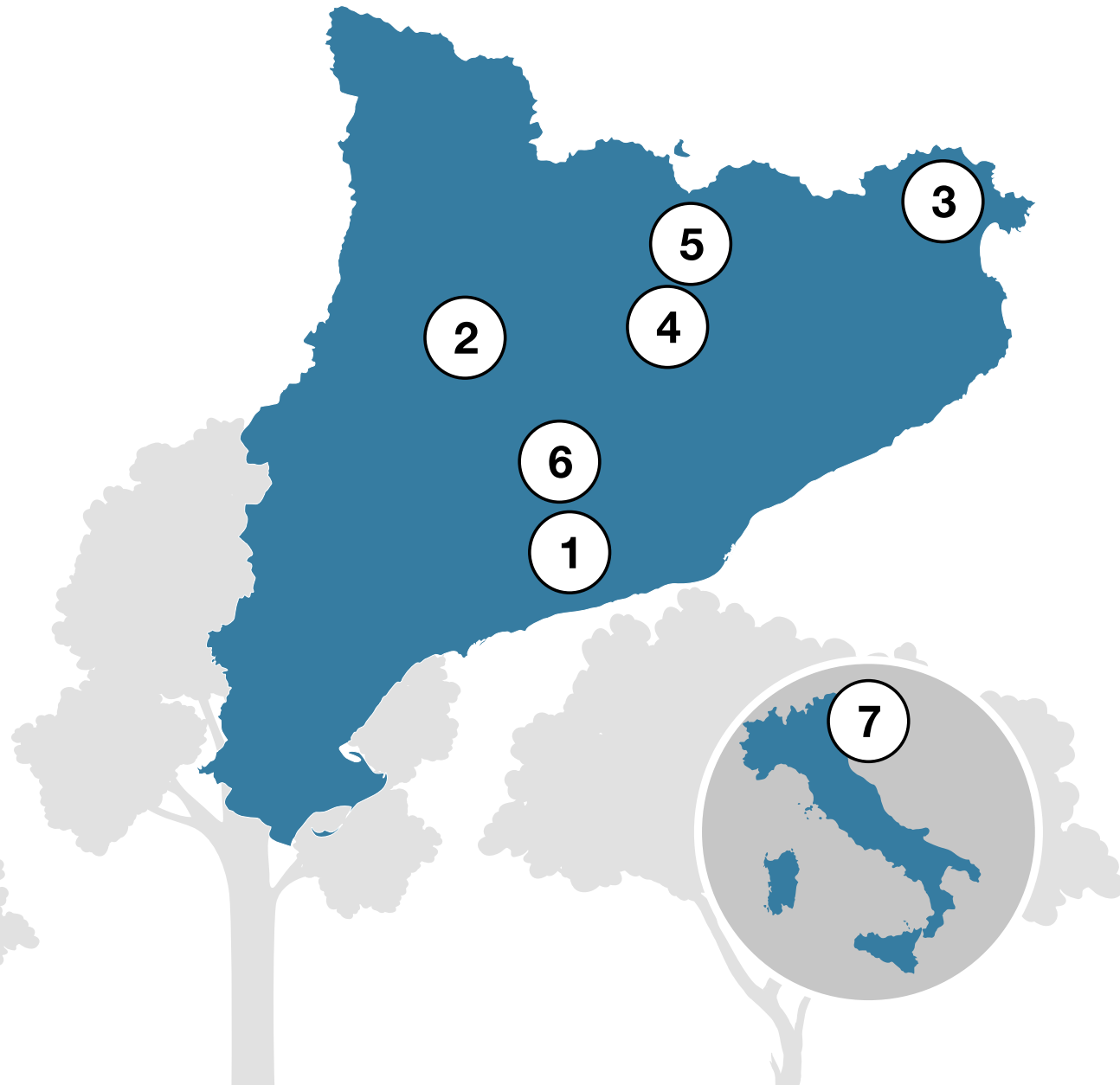
5-Capçaleres del Llobregat LU

6-Serres d'Ancosa LU

Veneto

7.1-Cansiglio

7.2-Lorenzago di Cadore





Aleppo pine woods
(*P. halepensis*)
at the Montmell and Serres
d'Ancosa LUs.



Scots pine woods
(*P. sylvestris*)
at the Capçaleres del
Llobregat LU.



Scots pine and pine forests
(*P. nigra*) at the Vall de Rialb
LU.



Cork oak woods at the Els
Aspres LU.

Forestry treatments have been carried out in **young and adult forests with different tree species and in different locations**, to cover the maximum diversity of forests and climates in Catalonia.

Based on a previous diagnosis, the actions were agreed with **regional actors**, trees were marked for felling and training was provided in the forestry work companies.

Monitoring plots were established in all the stands to be able to follow up on the ex post evolution of the impact of management and to be able to compare it with ex ante estimates, on which the calculation of climate credits is based. In order to advance the knowledge obtained, the monitoring has been extended to 25 stands managed five or more years ago.



Cereal agroforestry planting with walnut and ash for quality wood, at the Replans del Berguedà LU.



Planting of stone pines to produce pine nuts in the Els Aspres LU.



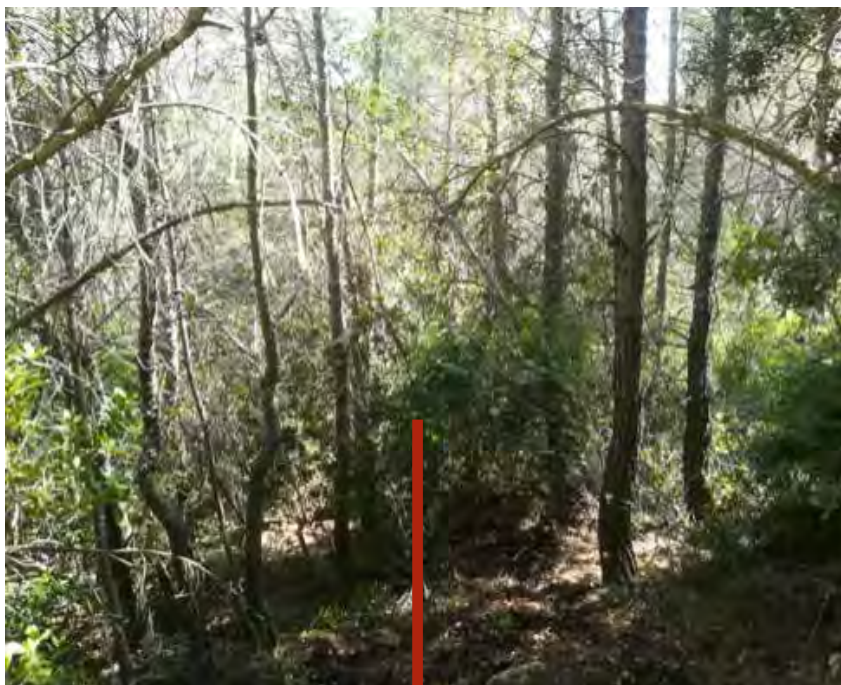
Enrichment plantation with several hardwoods at the Serres d'Ancosa LU.



Cork oak plantation for cork production in Vidreres (la Selva).

Although in Catalonia the forest area is already very large and the priority is to manage existing forests, it is possible to find **new tree planting opportunities** in each area, always linked to their ecological and economic viability, in order to guarantee the permanence of the planted trees as long as possible.

Within the framework of the project, 25 hectares have been planted, on both agricultural and forestry land, and the evolution of seven more plantations, carried out previously, has been monitored.



In addition to the experimental nature of the actions implemented, the stands where action has been taken become part of the Forest Ownership Centre **Network of Demonstration Plots**, and serve as a basis for the organisation of seminars for disseminating the proposed multifunctional forest management, for owners of forest estates in Catalonia and other land managers.



An example of the result achieved by implementation work in the “Pins Verds” state, in a post-fire Aleppo pine stand, before and after silvicultural actions; seedling thinning.

We have identified the most robust criteria, indicators and calculation methods possible, in line with existing knowledge

Quantifying the impacts of forest management on carbon, water and biodiversity has not been easy. It is a task that involves years of research and monitoring and the collaboration of several experts in each of these areas. At LIFE CLIMARK, we have piggybacked on the **work carried out in previous projects** and furthered it by means of **networking actions** with other ongoing projects and entities in and outside Catalonia.

In the choice of calculation methods, we have sought **international recognition** as far as possible and/or maximum consensus, according to the knowledge and accuracy available today. That is why we have also created various **committees of experts** to help ensure the soundness of the proposal and its replicability.



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climate change

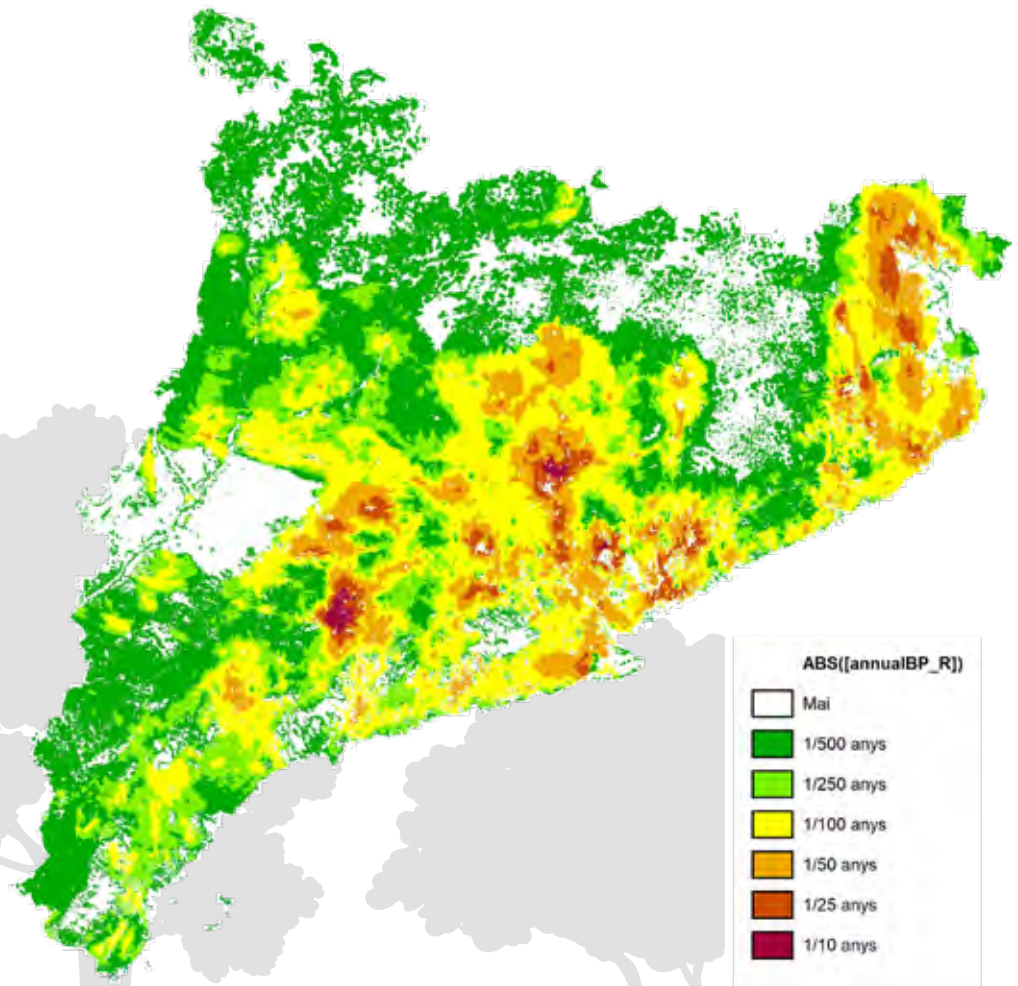


We are pioneers in including the effect of fires and preventive management in carbon balances

Large forest fires, in addition to seriously affecting the landscape and biodiversity and threatening human lives, release a significant amount of CO₂ into the atmosphere. However, these emissions are not usually taken into account in carbon accounting, as they are non-fossil carbon emissions and are considered unavoidable.

At LIFE CLIMARK, however, we believe that **planned forest management can contribute enormously to reducing the probability and intensify of major forest fires** and that, despite producing biogenic carbon dioxide, the magnitude thereof and the current climate emergency make it necessary to take this into account.

Therefore, the **University of Lleida**, a partner in the project, has taken on the challenge of calculating, for the first time in Europe, the probable CO₂ emissions derived from large forest fires and the reduction achieved by applying forest management for the prevention of fires.



We have set up field monitoring to verify and specify the most innovative aspects of the credit, such as the impact on water or soil carbon

Another innovative aspect of the climate credits was to quantitatively estimate the amount of blue water generated in a river basin as a result of reducing the number of trees or the area of woodland.

For this purpose, we turned to the expertise of the **Forest Science and Technology Centre of Catalonia (CTFC)**, a project partner and the creator of the simulator used to calculate the climate credits.

However, it was necessary to carry out field monitoring that could, in the medium term, corroborate the estimates made by the theoretical models.

En aquesta tasca, que encara continua, ha estat imprescindible la col·laboració en aquesta tasca, which is still ongoing, the collaboration of two key entities has been essential: the **Catalan Water Agency (ACA)** and the **Institute of Environmental Assessment and Water Research (IDAEA-CSIC)**, which have monitored the forests of la Llacuna and the Vallcebre basin, respectively.

The CTFC has also initiated a line of work to gauge the impact of certain forest management practices on the carbon accumulated in forest soils in the medium and long term.



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The last step: market creation and pilot testing

Credit market design

The **Catalan Office for Climate Change (OCCC)** is currently working on developing the climate credit trading unit and its market – the accounting rules, the trading system and the verification criteria that should govern the new market – to ensure the necessary transparency.

Possibilities are also being explored to integrate the market into the OCCC Voluntary Greenhouse Gas Emission Offsetting Programme in Catalonia and the CARBOMARK carbon market in the Veneto region of Italy.

Pilot testing

In order to set up the new climate credit market, at least three pilot tests will be carried out in two European regions, **two in Catalonia and one in Veneto**, where local promoters and buyers committed to climate change mitigation will be put in contact with each other.

The pilots are designed to test all phases of the process, from the planning and calculation of credits to the final transaction and its dissemination.

Thus, the drafting of forest projects for climate change mitigation and adaptation (PROMACC) will be tested in different contexts, property types and eligible actions, and the mechanisms for approaching different types of financing entities (private, public and mixed) will be piloted.

Contact us if you are interested in taking part!

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