LEVERS FOR SUCCESS

TECHNICAL ASPECTS AND PROJECT DESIGN

- **Conduct an initial state study:** Plot assessment made it possible to identify the trees that need to be preserved and the most suitable tree species to be tested according to the characteristics of each site.
- **Adapt to the field:** Steep slopes on the selected forest plots means only spider excavators can be used, but they are not available everywhere. The work on the 5th site was finalised manually by loggers.
- **Protect plants:** Game has had the most harmful impact on the plantations that the project has faced. The plants were planted bare-rooted to prevent them from being uprooted by wild boar for the substrate in their fibre-pots. Protectors made of bamboo have been tested (compared to protectors made of fibreglass or plastic-coated wire netting, they are biodegradable, but the average cost is higher and concerns prevail about the risk of plants growing at an angle).

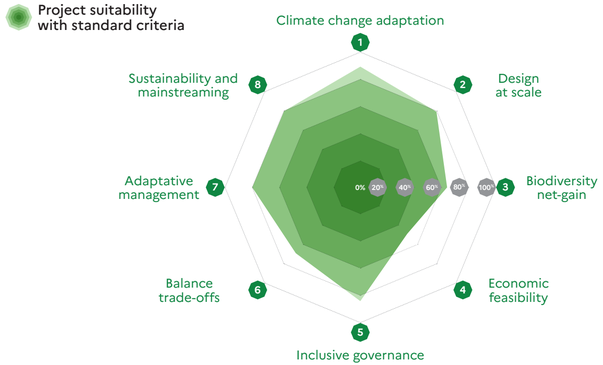
ECONOMIC VIABILITY

- The planting carried out is not compatible with an intensively productive forestry and do not generate a sustainable economic return. The low plantation density (900 stems/ha), the chosen operating method and the planting costs (€8000/ ha) make it difficult to consider building an economic model based on this technical model. The owners involved in the project will not be adversely impacted because **they did not need to pay for the planting.**

ACTION MONITORING AND REPLICABILITY

- **Adaptive aspect:** Systems for monitoring over time have been set up in order to establish a network of planting references illustrating the change of declining chestnut groves in a context of climate change. Field measurements provide numerical data (mortality, height, diameter, vigour, shape, etc.) and information on species, planting techniques and biodiversity trends.

ASSESMENT ACCORDING TO THE IUCN GLOBAL STANDARD FOR NATURE BASED SOLUTIONS



TAKING IT FURTHER

- **Identifying new sources of funding:** It was difficult to find forestry work operators given the fragile and unstructured sector and the low economic profitability of the work sites (low wood value and high operating costs). New funding sources would make it possible to increase the work volume, to offer prospects to stakeholders in the sector and thus to optimise costs.
- **Cross-matching experiments:** Enhance and interconnect this network of planting references with other territories, tree varieties and contexts.

FOR MORE INFORMATION

- Nature 2050 Programme webpage: https://www.cdc-biodiversite.fr/realisations/foret-cevenole/

PROJECT LEADER

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DATE

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RÉPUBLIQUE FRANÇAISE
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THE CEVENNES FOREST
2016 - 2050


Cévennes Forest
©J. Bourrely

CARTE D'IDENTITÉ

GEOGRAPHICAL LOCATION
Gard (30), Lozère (48)

ADAPTATION ISSUES ADDRESSED
Droughts, floods

AFFECTED HABITAT(S)
Forest ecosystems

TYPE(S) OF NBAS
Sustainable ecosystem management: adaptation of a mountain forest to climate change.

PROJECT LEADER(S) AND ASSOCIATED PARTNER(S)
- **National Forest Ownership Centre of Occitanie** and Institute for Forestry Development
- **Private Forest of the Lozere and the Gard Cooperative**
- Nature 2050 Programme **– CDC Biodiversity**

FUNDERS AND BUDGET
Nature 2050 Programme by CDC Biodiversity: **350 000 €**

To this is added the cost of maintaining and monitoring the project until 2050 covered by CDC Biodiversity, each private owner and the French National Forest Ownership Centre.

CDC BIODIVERSITÉ

Plantations made in 2019 - Cevennes Forest Restoration Project © CDC Biodiversité

PROJECT OBJECTIVES

- **For climate change adaptation**
  Improve carbon sequestration capacitiezs, restore the ecosystem services provided by the forest in particular, the water runoffs management and the mitigation of flooding down in the valleys. Tree varieties and technical operations were made compatible with the +2°C temperature increase scenario.
- **For biodiversity**
  Diversify forest tree species in wooded areas to improve their resilience
- **For the local community**
  Boost forestry activity, ensure landscape sustainability, gain knowledge to fuel reflection on the future of forestry and develop experimental methods that can be reproduced on a larger scale.

PROJECT REGULATORY CONTEXT

- Cévennes National Park
- Territorial Coherence Scheme of the Cévennes (updated in 2013)

CONTEXT AND ISSUES

A historic and emblematic forest in the heart of the Cevennes National Park, the Cevennes Forest covers over 30,000 hectares between the Gard and Lozère departments. In 2014, a study conducted by the French National Forest Ownership Centre (CNPF) made an alarming observation: more than half of the subjects studied were dead or in an advanced state of decline. This phenomenon is a consequence of the historical practice of chestnut tree monocultures, initially exploited in orchards but then abandoned following rural exodus. Today, this population is threatened by stump dieback, canker, the arrival of Cynips galls, the increase in hydric-stress periods and ageing. The aim is to increase the diversity of tree species within the range to improve the resilience of the area to climate change. The particularly rugged landform and the alternation between rainy Mediterranean weather events and long periods of drought call for restoration of the services provided by forests in promoting water retention in drainage basins and preventing soil erosion.

ACTIONS IMPLEMENTED

Within the framework of this experimental project, new adaptive management protocols were implemented on five pilot sites totalising an area of 23 ha. Five private forest owners agreed to implement innovative solutions to gradually replace the declining chestnut tree. Nine hundred planting per hectare were done using a spider excavator. The sites were chosen for their diversity, being at the interface of different climatic conditions (temperature, altitude, sun exposure) typical of the Cevennes region thereby allowing the most complete feedback possible. This innovative project was carried out according to the following strict implementation procedures: mosaic plantation with at least 50% deciduous trees per plot, no use of inputs, at least 3 to 4 different species per plot and a maximum of one hectare of the same tree varieties in order to assess their resilience over time, companion planting and conservation of older trees. A control plot of 0.5 ha is kept to compare the performance of plots planted with mixed tree species with single crop forestry Small-needled conifers were planted at the bottom of the land to prevent runoff and avoid evapotranspiration.

SCHEDULE

	PROJECT LIFESPAN
2016	Agreement between 5 private owners and CDC Biodiversity
2017	Partnership agreement with the CRPF Initial state study of the plots and design Co-development of indicators
2018	Start of works
2019	Start of monitoring
2020	End of planting (4 sites) Monitored until 2050
2021	CPlantations on the 5th site Site monitoring and coordination until 2050

GOVERNANCE ADOPTED

The «Let's build the future forests together» collective, made up of forest owners, has joined forces with several local actors - the Regional Forest Ownership Centre (CRPF) of Occitanie, the Institute for Forestry Development and the Private Forest of the Lozère and the Gard (FPLG) Cooperative - to co-construct this reforestation project by taking into account the local characteristics of the Cevennes forest. The FPLG cooperative is responsible for management and the CRPF for project monitoring. CDC Biodiversity is leading the project and supporting the defining and monitoring of indicators until 2050 via the Nature 2050 programme. The owners of the sites are represented by one of these stakeholders who takes the lead during the first five years (supervision of works, coordination of the owners).

PROJECT BENEFITS AND CONTRIBUTIONS

BENEFITS REGARDING TARGET ADAPTATION ISSUES

- Droughts: tree planting improves water infiltration and storage in the soil thereby improving the resilience of the Cevennes Forest during drought episodes.
- Floods and erosion: By improving the water retention during rainy episodes, the plantations and management techniques tested reduce runoff and thus limit soil erosion and the risk of flooding in the valleys.
- Creation of a reference tool and development of reproducible methods: Knowledge improvement about adaptation of the Cevennes Forest to climate change by creating a reference tool on the most compatible tree species for sustainable integration into the forestry sector and techniques for managing water resources.

BENEFITS FOR BIODIVERSITY

- Combating the overall decline of chestnut trees in the Cevennes Forest through the diversification of varieties.
- Reconstitution of the biodiversity potential of the Cevennes Forest (melliferous species, Valuable and nutritive hardwoods).

OTHER BENEFITS

- Preservation of the attractiveness and identity of the territory through the revival of local forestry.
- Enhancing carbon sequestration and maintaining forest ecosystem services.

Use of a spider digger to carry out the works in the Cévennes Forest © CRPF

MONITORING INDICATORS

Adapting to climate changes

- Ecosystem evolution/maturity: Measurements of organic carbon stock in soil and the natural abundance of Nitrogen-15 in leaves.

Biodiversity

- Potential Biodiversity Index (PBI): Inventory of forest biodiversity and monitoring of its evolution over time.

Other

- Dendrometric monitoring: Measurement of recovery rates and growth of different tree species.