



2019  
**2025**

**STRATEGY**

**STAGE 1**

**CTFC** 



## CONTEXT

CTFC (Forest Science and Technology Centre of Catalonia) is a research institute that aims to develop innovative, cutting edge and societally relevant research on the sustainable development of forests. The vision of the CTFC is to be recognized as a centre of reference at local, national and international levels in the fields of forest, rural development, and the sustainable management of the environment.

In the context of recent international research assessments supervised by the CERCA Institute (the technical service of the Government of Catalonia), the CTFC international panel has asked the management of CTFC to update the general research strategy and guiding framework for the next years in order to identify the general research priorities more clearly. More specifically, the international panel has recommended CTFC to align its research strategy with other consolidated international research agendas, citing as an example the research initiatives lead by the European Forest Institute (EFI). The update of the research strategy incorporates a general guiding framework allowing for flexibility in future development of research agendas. Furthermore, this strategy may also favour a better linkage of research and knowledge and technology transfer initiatives, and a better articulation of CTFC initiatives with other research institutions in the context of a globalized and interlinked research landscape.



# GENERAL RESEARCH FRAMEWORK

Given the recommendations and analyses of available research agendas at the European level, as well as the current and previous cooperation between CTFC and EFI, CTFC has adopted as a guiding principle the general research strategy developed by EFI in their vision and strategy for 2025.

For the last 200 years we have relied on a fossil-based economy, which has delivered unprecedented economic and population growth, technological development and social prosperity. However, this has also resulted in great environmental and social challenges which threaten the well-being of current and future generations. A sustainable future requires a systemic change in our economy to ensure we can continue to prosper within the sustainable limits of our planet. We need to move from a linear, fossil-based economy towards a circular, bio-based economy.

Governing our forests in a time of transformational changes makes the role of research, foresight and innovation more important than ever. The synthesis and contextualization of scientific knowledge are key to support science-informed policies and decisions addressing current and future challenges and opportunities. In this context, the CTFC general strategy is based on three interdisciplinary and interconnected themes: **bioeconomy, resilience** and **governance**. Under these three themes, CTFC focuses on following the EFI strategic goals. These goals fall well within the vision and strengths of CTFC.



An ambitious  
**European forest  
research and  
innovation area**



**Science-informed  
policies** to address  
societal challenges  
and opportunities



**Awareness**  
in society of the  
importance of  
forests

CTFC adopts these themes and the strategic goals as general guiding principles of its activity and connects its vision with that of EFI “A world where forests significantly contribute to sustainable well-being.” CTFC will strive to achieve these goals by focusing on developing innovative and cutting-edge research, foresight, knowledge and technology transfer, and networking.



Source:  
EFI strategy 2017-2025.

# KEY CONCEPTS OF THE CTFC RESEARCH STRATEGY

CTFC adopts the general research strategy proposed by EFI and uses its general framework to develop its specificity, mainly in the context of Mediterranean forests with a special focus on Catalonia and Southern Europe.

## STRATEGIC GOALS:

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- Ambitious European forest research and innovation area

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CTFC contributes to European and international initiatives

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  - Science-informed policies to address societal challenges and opportunities

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CTFC contributes to the body of knowledge supporting policies in the forest and sustainability research agenda

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  - Awareness in society of the importance of forests

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CTFC promotes and favours actions and initiatives that facilitate the involvement of society in decisions affecting the future of forest systems

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# CONNECTING KNOWLEDGE TO ACTION

The CTFC research strategy integrates the Bioeconomy (sustainability futures) and Governance themes (policy options and implementation) under a single research programme: **Bioeconomy and Governance (BIOGOV)**. Furthermore, and due to the long history of CTFC activities in the frame of Resilience assessments (forest processes and disturbances), CTFC will develop work on this theme under two broad programmes: **Landscape Dynamics and Biodiversity (LANBIO)**; and **Multifunctional Forest Management (FORMAN)**.

Together with the development of thematic research agendas, CTFC will promote the transfer of knowledge and its conversion to actions in the real world by a series of instruments that are not the objective of this research strategy but that will explicitly link research and impact. These initiatives include FBS (Forest Bioengineering Solutions), a spin-off company focusing on the market and development of high value products and services in the domains covered by CTFC activities, and the promotion of CTFC as a TECNIO centre.\*

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\* TECNIO certification is given by the Government of Catalonia and identifies differential applied technology providers and facilitators.

## HOW EACH PROGRAMME CONTRIBUTES TO THE GENERAL RESEARCH THEMES

### BIOECONOMY THEME

Forests, forestry and the forest-based sector are the cornerstone of the European bioeconomy and a major contributor to climate change mitigation. The speed and scale of European forest bioeconomy development depends on a number of critical factors, including: technological and market developments within and outside the forest-based sector; the dynamics of global biomass demand and supply; the European and international policy framework; and the ability to use forests in a sustainable way. The forest bioeconomy is also affected by globalization, the digital economy, and synergies with other sectors (construction, chemicals, textiles, energy, etc.). Therefore, foresight, interdisciplinary and cross-sectoral research at the interface of markets, products, policies and forest resources is needed. Knowledge about the broad sustainability implications of developing a European forest bioeconomy, as well as the effects of regulations and policy incentives, is also important.

### GOVERNANCE THEME

In the future, the dynamics of supply and demand for water, food, energy, raw materials and land will be drastically altered, as the result of global change and the need to transition towards a circular, bio-based economy. Resources will become increasingly scarce, and resource-related conflicts may result in global political instability and increasing migration pressure. Innovative, transdisciplinary research is needed to support forest governance and help reconcile diverging interests and perspectives (e.g. urban versus rural), integrate expectations from different stakeholders

and sectors, and seek synergies between the variety of forest land uses and forest management goals.

Knowledge is needed from local to global and from rural to urban levels, to form the basis for new, science-informed European governance schemes and policies that can reconcile, among others, resilience and bioeconomy-related goals.

## **DEVELOPMENT OF BIOECONOMY AND GOVERNANCE RESEARCH THEMES AT CTFC**

CTFC will conduct research and innovative initiatives in Bioeconomy and Governance themes by developing the **BIOGOV** programme. This programme aims to address the following five major sub-topics in Mediterranean forests.

### **SPECIFIC CHALLENGES:**

#### **Bioeconomy and Governance (BIOGOV) programme**

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- 1 /** Value chain: Markets for wood and non-wood products, biomass for energy and bioproducts
  - 2 /** Promotion of the range of forest ecosystem services, and development of instruments to quantify the value of those services and implement sustainable management
  - 3 /** Social aspects, social capital and social innovation
  - 4 /** Design and assessment of sustainability policies
  - 5 /** Development of technological innovation in bioproducts
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## **RESILIENCE THEME**

The increasing impacts and complexity of global change call for a new strategic role for forests in fostering Europe's socio-ecological resilience. In a highly urbanized Europe where cities account for 80% of the population and energy use, urban forestry and forest-based solutions like wood construction are key to developing climate-smart cities. The role of forests and trees in maintaining and enhancing essential resources like water, soil and biodiversity needs to be better understood in the context of sustainable rural areas and agricultural systems. Increased knowledge about forest resilience, including a better understanding of the impacts of climate change, disturbances and the role of forest management in biodiversity conservation is also needed. This requires new interdisciplinary research connecting forest science to other land-use disciplines and urban studies to create the basis for effective, integrated policies and forest and land-use management strategies.

## **DEVELOPMENT OF THE RESILIENCE RESEARCH THEMES AT CTFC**

CTFC will conduct research and innovative initiatives regarding Mediterranean forests in the Resilience theme by developing two different programmes: **FORMAN** and **LANBIO**. The general structure under the Resilience theme is translated into shared approaches and methodologies for these two programmes which will also identify specific challenges addressed for each of them in a general context of future large-scale global changes.

### **MAIN SHARED TOPICS FOR BOTH PROGRAMMES:**

#### **Topics:**

- Forests, water and forest management
- Forest dynamics and biodiversity
- Abiotic disturbances: wildfires and windstorms
- Biotic disturbances: pathogens

## Methods and concepts:

- Tools to facilitate and guide decision-making
- Forest and landscape modelling
- Ecosystem service assessment

## SPECIFIC CHALLENGES:

### Multifunctional Forest Management (FORMAN) programme

The programme will develop topics included in the Resilience theme and focus on forest management at stand level and the impacts of management on the different components of forest systems.

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**1 /** Stand forest dynamics

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**2 /** Soil and plant water balance

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**3 /** Forest soil assessment and carbon sequestration

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**4 /** Silviculture for adaptation and multifunctional forest management models

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**5 /** Fire prevention and forest restoration

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**6 /** Agroforestry and silvopastoral systems

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### Landscape Dynamics and Biodiversity (LANBIO) programme

The programme will develop topics included in the Resilience theme and focus on the integration of issues relevant at the landscape planning level.

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**1 /** Biogeochemical cycles and functional ecology

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**2 /** Biodiversity in agroforestry systems

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**3 /** Landscape level dynamics

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**4 /** Landscape and regional management planning

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**5 /** Regional conservation planning

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**6 /** Risk analysis and global change impacts

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**7 /** Adaptive landscape/regional forest management

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**8 /** Ecosystem service assessment and trade-off analysis

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## **CONCLUSION AND WAY FORWARD**

With this document, CTFC adopts a general strategy aligned with the EFI vision and general strategy, but tailoring it to the Mediterranean context with a special focus on Catalonia and Southern Europe.

The main topics and operational actions to develop the CTFC strategy need to be defined in a second stage in which each of the CTFC programmes will identify and expand on the rationale for priority identification within each of the programme sub-topics.

We have included examples of the kind of information that the CTFC strategy can generate during STAGE 2 development. Two independent plans of implementation (Research; and Knowledge and technology transfer action plans) will also be developed.

# **STAGE 2**

## RESEARCH STRATEGY DISCUSSION DOCUMENT

### ***Example of development at the topic level***

*Priority lines of research within the resilience theme and to be developed by the FORMAN and LANBIO programmes.*

- A** Identify the role of different components of global change (climate change, biological invasion, land-use change, pests) on forest ecosystem services, and the interactions between the different components of global change.
- B** Define early indicators of the impacts of the different components of global change by monitoring of key species and the detection of changes in the ecophysiology and soil of forests. These indicators must allow anticipation of possible changes through appropriate management of forest and non-forest resources.
- C** Develop new modelling and monitoring techniques, including the application of remote sensors (with a particular focus on drones) to the study of the distribution and dynamics of populations of key species and indicators. The study of the factors driving environmental change derived from human activity (i.e. global change) and forest management determining species distribution patterns at different spatial scales will allow the development and improvement of multifunctional forest management models.
- D** Quantify the importance of the range of ecosystem services (recreation and cultural services, fire prevention, biodiversity, water and soil conservation, carbon sequestration) and forest products (wood, energy, mushrooms) in Mediterranean forests. The accurate

quantification of the value of these services and products will allow assessment of the contribution of forests to human well-being, which in turn will allow a better distribution of available resources and appropriate prioritization of future investments in the sector.

- E** Formulation of new models and tools for the management and multifunctional planning of forest landscapes of the Mediterranean region, including externalities and other ecological and socio-economic factors. This will include development of decision support tools to evaluate the impact of other forest management and planning scenarios from economic, ecological and social perspectives. Based on the modelling, these tools can be used to optimize management with regard to, for example, productivity, biodiversity, leisure, landscape, fire risk.
- F** Define new integrated planning tools that link forest management with territorial and urban planning.
- G** Contribute to the development of new policies and governance models that ensure the sustainable provision of multiple forest goods and services.





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