# C.A.F.E. | Carbon, Aqua, Fire & Eco-resilience Decision Support System



***C.A.F.E. determines the optimum silvicultural activities to manage multiple products, goods and services such as biomass production, C2 sequestration, fire risk, water provisioning , climatic resilience or biodiversity, for a selected solution.***

This tool determines the optimum silvicultural activities to manage multiple products, goods and services such as biomass production, CO2 sequestration, fire risk, water provisioning, climatic resilience or biodiversity, which are simultaneously quantified in time and space for a selected solution. Main advantages include:

- Changing the mono-objective approach in order to include a group of ecosystem goods and services.
- Improving the economic performance of low productive areas by quantifying and valorising other resources that could be remunerated attending to the environmental value.
- Holistic optimization of multiple goods and services out of forest management.
- Adequacy to the specific characteristics of each site.
- Multi-scalar results (plot, forest working unit, catchment, etc.).

C.A.F.E. is a tool that combines eco-hydrologic dynamic simulation with many-criteria optimization, where the user can carry out forest management according to more than one product at the same time, and choose the relevance of each objective/product. This software is capable of working under different climatic regions thanks to the previous calibration of the eco-hydrological simulation. Furthermore, it is possible to modify the spatial scale moving from plot to catchment, integrating a strong biophysical unit. In the same way, simulating different climatic scenarios is also possible. The result is a group of possible solutions among which forest manager can decide and apply.

## DETAILS

### ORIGIN OF WOOD

Forest

### TYPE OF WOOD

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### KIND OF WOOD CONCERNED

All wood produced in the forest system (trunk, branches, roots).

### IMPACT ON ENVIRONMENT & BIODIVERSITY

- Demonstration and replication of a successful, innovative forest management scheme at a watershed scale. At the beginning it will be applied at sub catchment level in Spain (415 hectares), then at catchment level in Germany, Portugal and Spain (7,824 hectares) and finally it will be further expanded up to 350,000 hectares within five years from the project completion.
- Reinforcement of mechanisms to develop climate change adaptation measures in rural areas and to ensure its socioeconomic sustainability;
- Increased water reserves of 45-200 l/m²/year and increased water availability downstream, leading to a reduction in energy extraction costs to 5 W/hm;
- Increased sustainable biomass production for bioenergy uses, between 10 and 15 t/ha year, including both forest and

### MOBILIZATION POTENTIAL

Very positive

### SUSTAINABILITY POTENTIAL - VALUE

Very Positive

### EASE OF IMPLEMENTATION

It is not easy to use, but we are developing user guides to make it easier.

### EASE OF IMPLEMENTATION - EVALUATION

Medium

agricultural residues traditionally burned and usually the cause of wildfires.

- Reduced fire hazards by 30%, protecting rural populations currently residing in risk areas
- Increased resilience of 25% of forest areas to withstand droughts, pests and disease outbreak.

### INCOME EFFECT

If the management objective is to maximise productivity, revenues will also be maximised.

### KEY PREREQUISITES

Input data for the chosen mechanistic model.

Decision variables.

Constraints to be applied.

### EXPLOITATION POTENTIAL

High, as it is based on mechanistic modelling it can be applied in any climatic region. Furthermore, by including a wide range of ecosystem services, it can meet the needs of different types of forest management.

### TYPE OF EVENT WHERE THIS BPI HAS BEEN FEATURED

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### HUB

South-West Hub

### JOB EFFECT

The management that is proposed always generates jobs to carry it out.

### ECONOMIC IMPACT

The tool is free, so the economic impact is positive as you provide a very powerful management tool at 0 cost.

### COSTS OF IMPLEMENTATION ( EURO - € )

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### SPECIFIC KNOWLEDGE NEEDED

Knowledge of Geographic Information Systems is necessary to be able to prepare the input data for the tool.

## MORE DETAILS

CHALLENGE ADDRESSED

1.- Improve forest resilience and adaption to climate change

DOMAIN

Forest management, ecosystem, resilience

Forest disturbances, risks

TYPE OF SOLUTION

Modelling, simulation, optimization

KEYWORDS

Resilience/Networking/Decision support system(DSS)/

DIGITAL SOLUTION

Yes

INNOVATION

Yes

COUNTRY OF ORIGIN

Belgium

SCALE OF APPLICATION

Continental

START AND END YEAR

2019 - 2023

## CONTACT DATA


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## REFERENCES AND RESOURCES

MAIN WEBSITE

http://www.resilientforest.eu/wp-content/uploads/2020/05/DSS-TOOL-.pdf

PROJECT WEBSITE

https://www.resilientforest.eu/

PROJECT REFERENCE

The project LIFE RESILIENT FORESTS – Coupling water, fire and climate resilience with biomass production from forestry to adapt watersheds to climate change is co-funded by the LIFE Programme of the European Union under

RESOURCES

## LOGO OF BEST PRACTICE

## LOGO OF MAIN ORGANIZATION

### PROJECT UNDER WHICH THIS FACTSHEET HAS BEEN CREATED

Rosewood 4.0

### POST DATE

8 Sep 2021

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### A TOOL FROM ROSEWOOD 4.0, DESIGNED AND DEVELOPED BY