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MOTIVE –

Models for Adaptive Forest Management

**How to respond to climate and land use change in
European forests?**

**1st EIONET NRC Meeting on Forest,
8-9 September, 2011, EEA, Copenhagen**

Facing Climate Change Impacts

Increased growth rates in the North



Higher risk of storm and insect damages



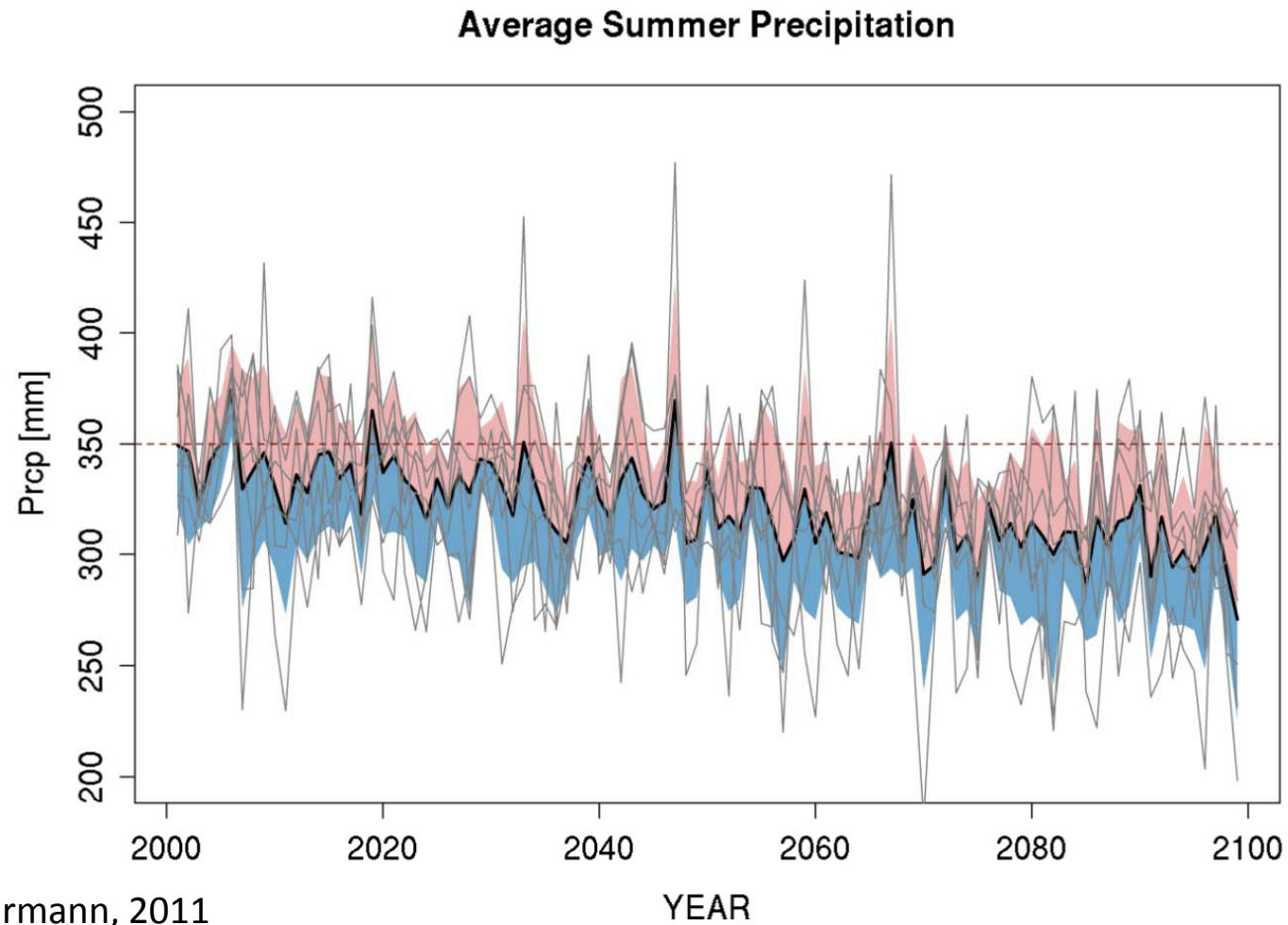
Shifting species suitability



More intense and frequent forest fires



Baseline trends and possible future climate for the EU



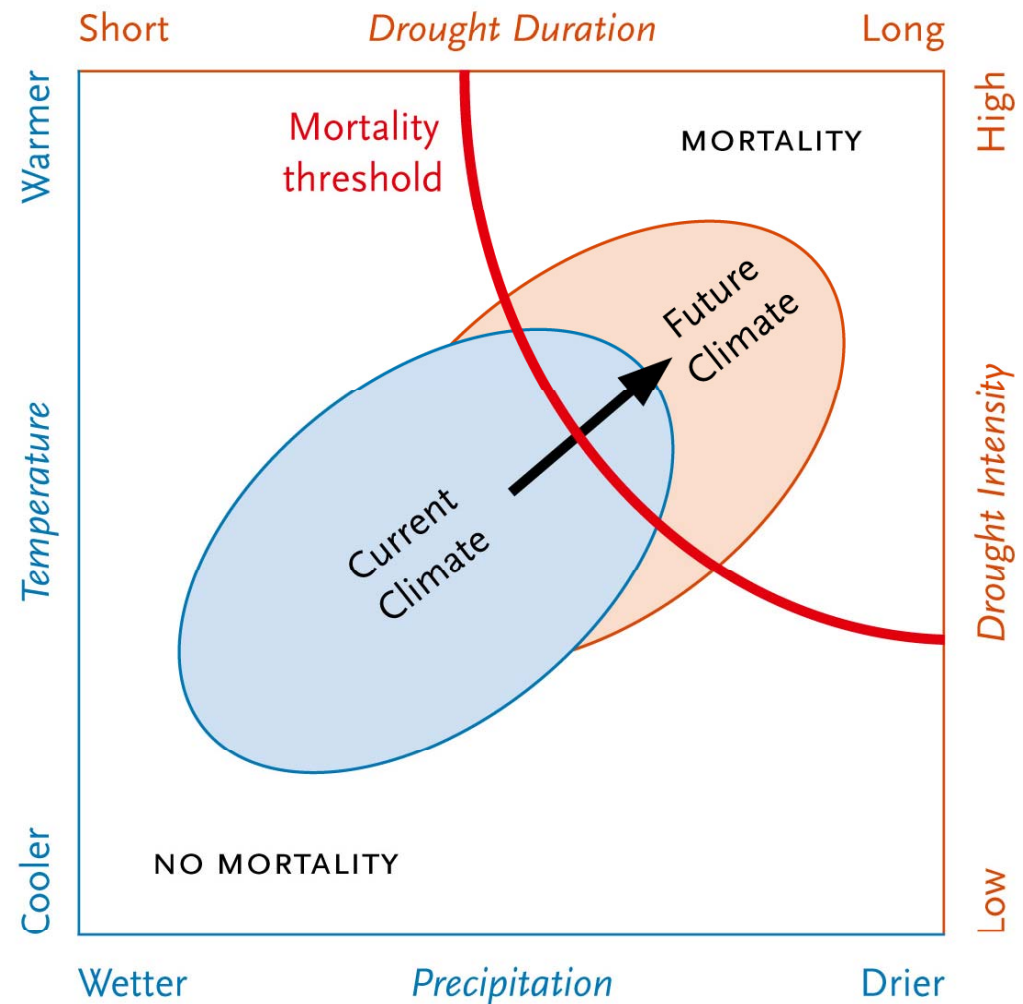


Impact of climate change on European forests

Temperature/ precipitation

Climate change is expected to increase the average temperature and precipitation is likely to decrease in southern and south-eastern parts of Europe thus increasing the likelihood and duration of drought periods in the regions.

(Allen et al. 2010. Forest Ecology and Management 259:666-684).





Impact of climate change on European forests

Storms

Since 1990, several storms have caused widespread damage in European forests, resulting in the yield reduction of recoverable timber and considerable carbon releases.

Frequency of high intensity storms is likely to increase.
(Gardiner et al. 2010)



Impact of climate change on European forests

Pests



The European spruce bark beetle has benefited from warm and dry summers as well as from storm events in recent decades in large parts of Europe. Pest outbreaks reach into higher altitudes than before.

EFI Policy Brief: Climate Change Impacts and Adaptation in European Forests

(Kolström, Vilén, Lindner)



The EFI Policy Brief 6 outlines the status of current knowledge on the climate change impacts and adaptation in European forests, and identifies the challenges that need to be addressed for successful responses in policy and management

The MOTIVE project



- Large scale integrated project
- In the 7th Framework programme of the EU
- MOTIVE investigates adaptive management strategies that address climate and land use change. It also examines the impacts of these changes with respect to a broad range of forest goods and services.
- Coordinated by Forest Research Institute of Baden-Württemberg
- Project Co-ordinator: Prof. Dr. Marc Hanewinkel

MOTIVE is addressing FP7-ENV-2008-1 call ENV.2.1.6.1 "Development of adaptive forest management models" (project number 226544).



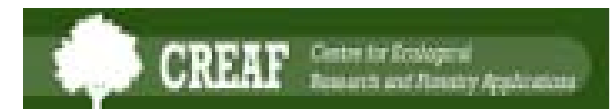
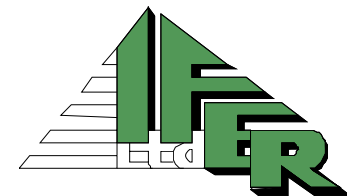
Objectives

To provide insights, data and tools to improve policymaking and adaptive forest resource management under climate change

- **Integrated assessment** of forest management strategies
- A comparative assessment across **a wide range of** climatic and socio-economic **conditions**
- Influence of **feedback loops** from socio-economy and policy making on resource management
- Translate scientific state of knowledge into **decision support** for policy makers and forest practitioners



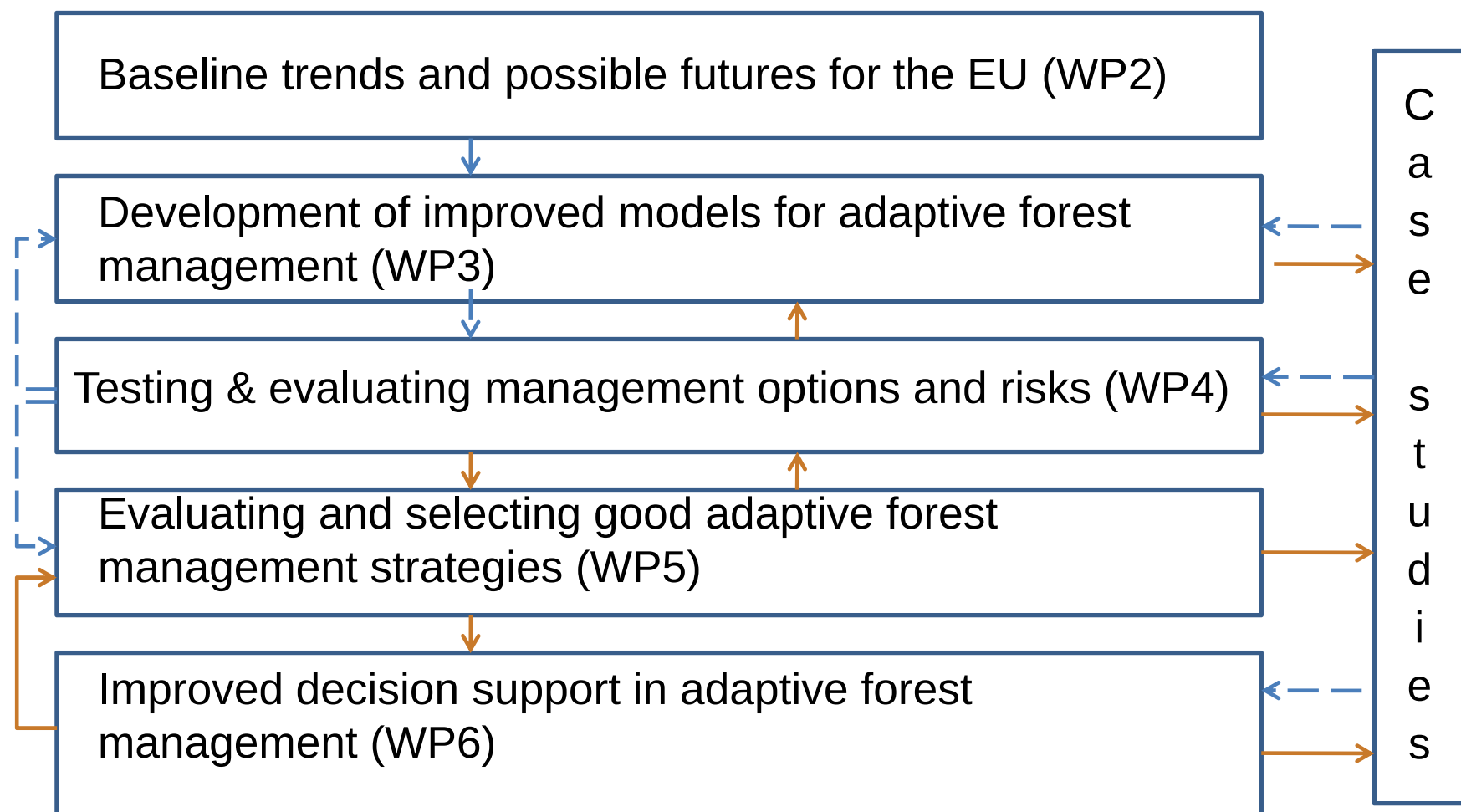
The Consortium





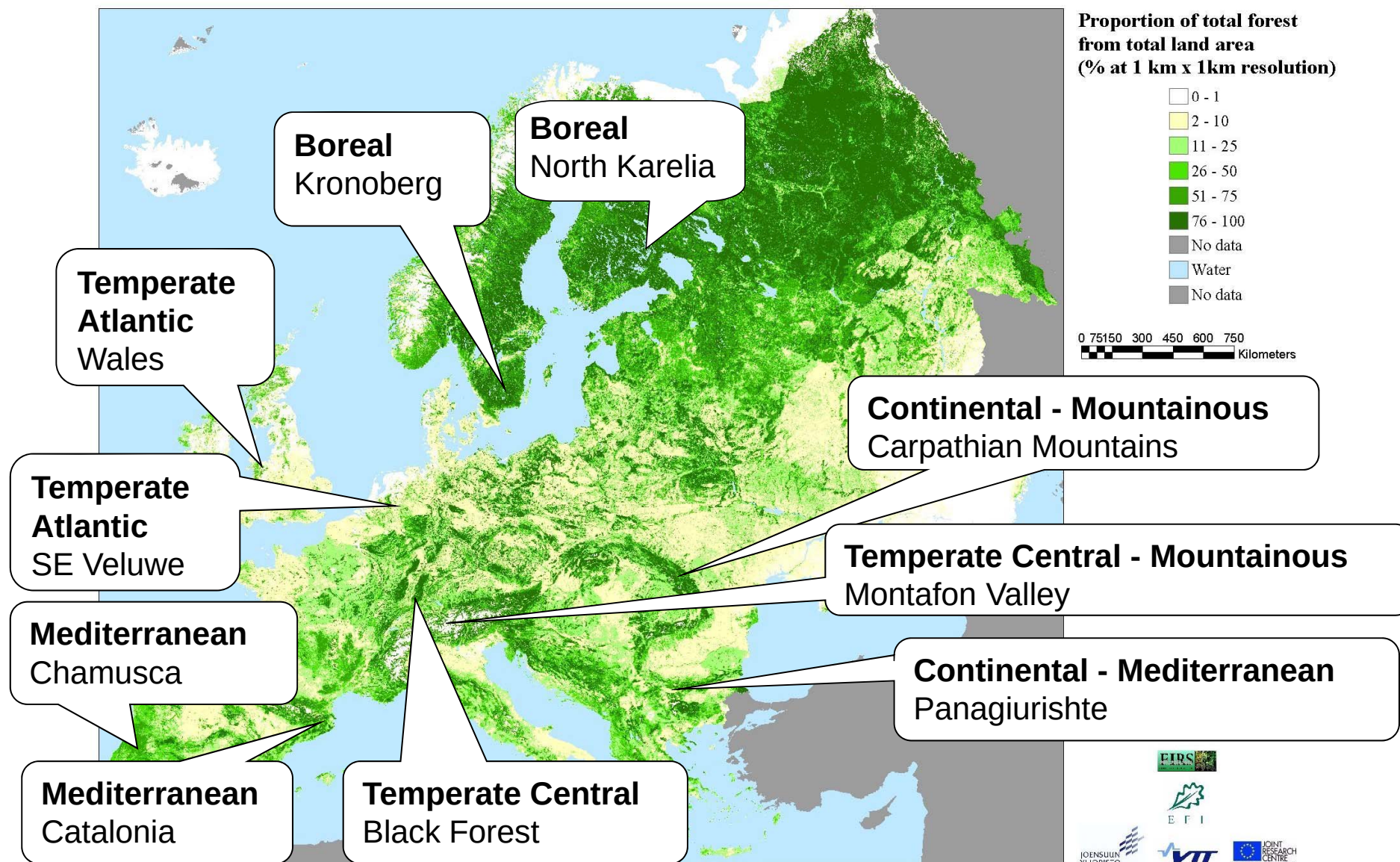
Scientific work packages

— — — — — data — — — — — methods





Regional case studies





Case study information 1/3

Region	The main risks	Goods and services	Adaptation options
North Boreal North Karelian, Finland	wind and snow	timber biomass for energy	- species preference - type and intensity of thinning - rotation length
South Boreal Kronoberg, Sweden	wind	timber nature conservation	- rotation length - use of deciduous tree species
Temperate Atlantic Wales, UK	wind pest outbreaks	timber recreation	- low-impact silvicultural systems - tree mixtures
Northern Plain Atlantic SE Veluwe, Netherlands	drought fire	timber nature conservation	- different tree species - dense forest



Case study information 2/3

Region	The main risks	Goods and services	Adaptation options
Central Temperate Black Forest, Germany	pest outbreaks wind drought	timber biomass for energy recreation	- shift of species - close to nature management
Central Alpine Montafon Valley, Austria	wind pest outbreaks	timber biomass for energy carbon nature conservation recreation	- shift of species - silvicultural regimes
Mediterranean Prades, Spain	drought fire	water protection nature conservation recreation, timber	- forest fire prevention - thinning alternatives
Mediterranean Atlantic Chamusca, Portugal	drought fire	water protection timber	- management alternatives

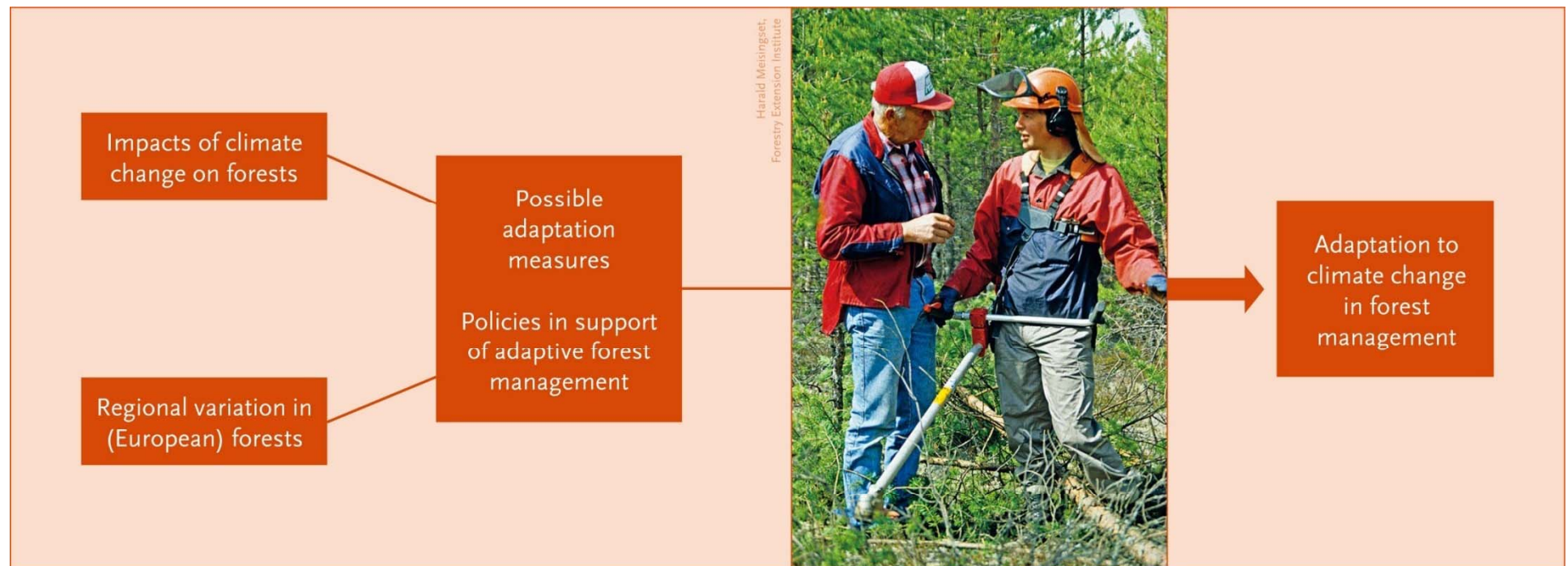


Case study information 3/3

Region	The main risks	Goods and services	Adaptation options
Continental Mediterranean Panagyurishte, Bulgaria	drought fire	timber biomass for energy water protection recreation	- transformation from coppice stands into high stands - species control
Continental mountainous Carpathians, Romania	drought pest outbreaks	timber biomass for energy carbon	- thinning intensity - rotation length
European	drought wind fire pest outbreaks	timber biomass for energy carbon nature conservation	- introducing new species - adapt the forest management aims



The awareness of forest owners and practitioners is critical for implementation of adaptation to climate change





Stakeholder engagement 1/3

Stakeholder analysis and engagement plan

Who are the stakeholders?

What roles they should play and at which stage:

- who to involve (e.g. in design and implementation)
- who to consult (e.g. about key elements such as scenarios or for data collection)
- to inform (e.g. about the project and its outputs)

Process should be inclusive by engaging with all relevant individuals and groups





Stakeholder engagement 2/3

Factors contributing to decision-making in case study areas



- Forest types
- Ownership and management structures
- Legislative frameworks e.g. Forestry Acts
- Land use and user groups e.g. timber, collecting NFTP, conservation, recreation, hunting
- Key stakeholders in the case study



Stakeholder engagement – examples

3/3

Wales – Meeting with public sector (Forestry Commission) staff to discuss managing potential changes in the face of climate change.

Also organised meetings with private sector. Working with policy team to develop management types and feed into policy for species diversity

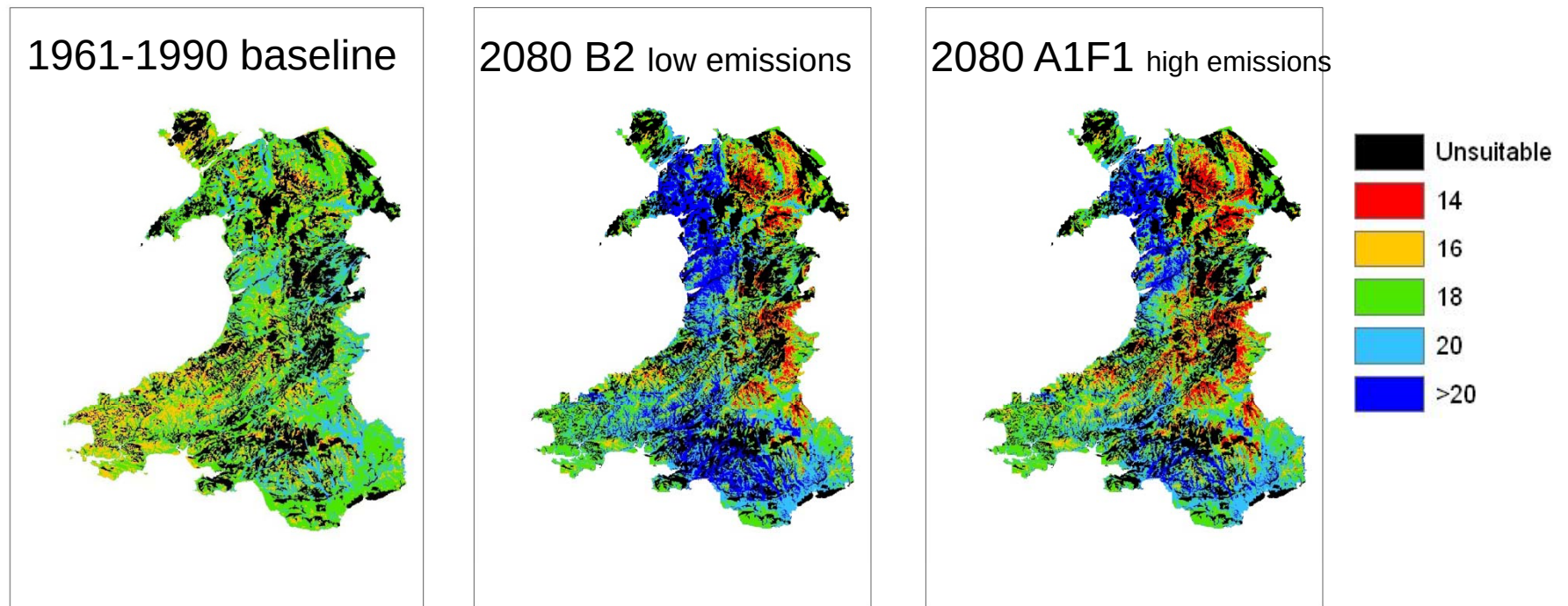
Germany – Field visit with stakeholders in Baden-Baden, Rastatt. Concerns of forest managers fed into scenario development e.g. storm risks relating to present planting/upcoming regeneration, species suitability (currently and in the future).



Catalonia – informal discussions with National Park staff concerning drought and fires risk of coppice forests. Also, how to engage local community who are resistant to changes in forest management. Discussions over tool development.



Future suitability and yields of the sites for Douglas fir in Wales



Ray, Nicoll, 2011

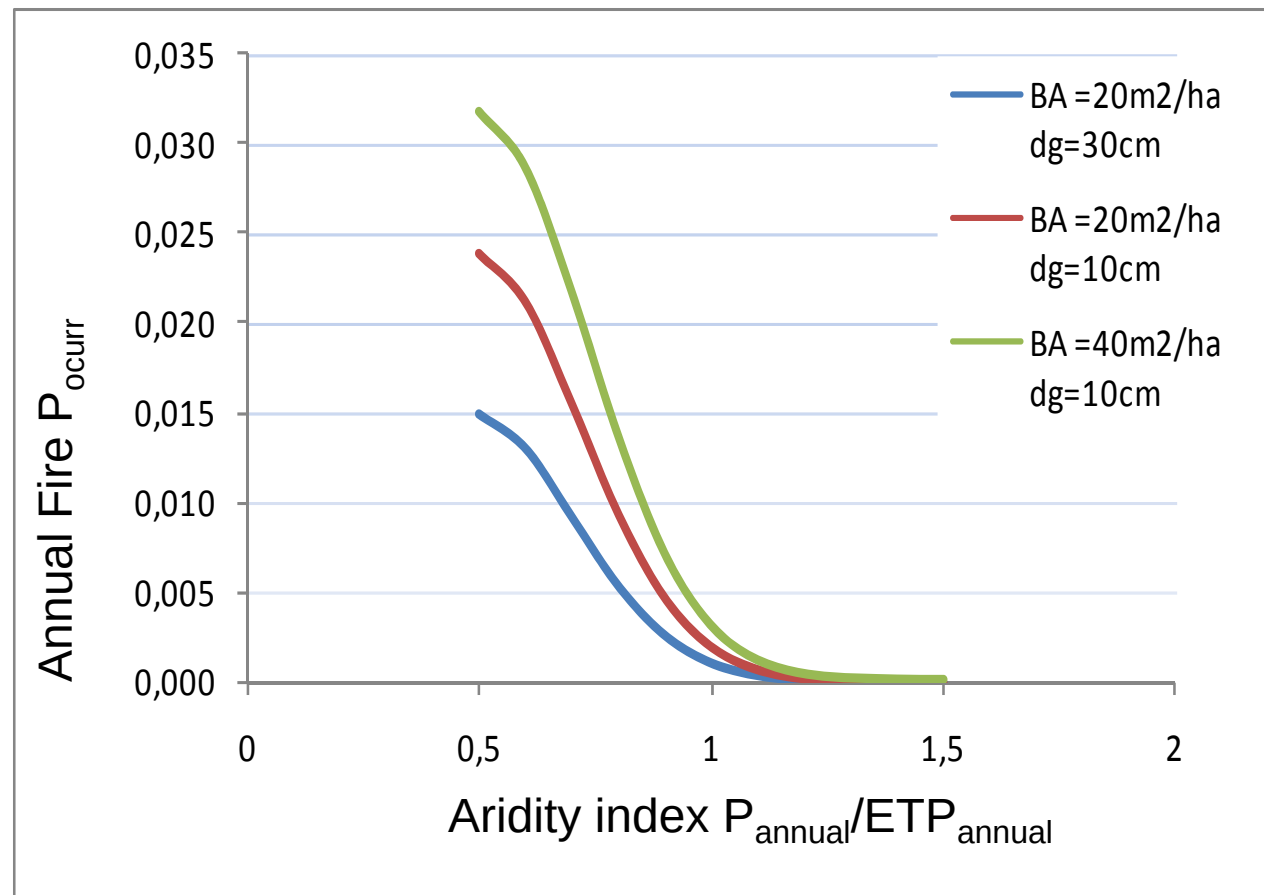


Management influences fire risk in Southern Europe

(Catalonian case study)

Decreasing fire occurrence probability with reduced basal area (BA) and larger average diameter (dg).

C. Gracia, 2011



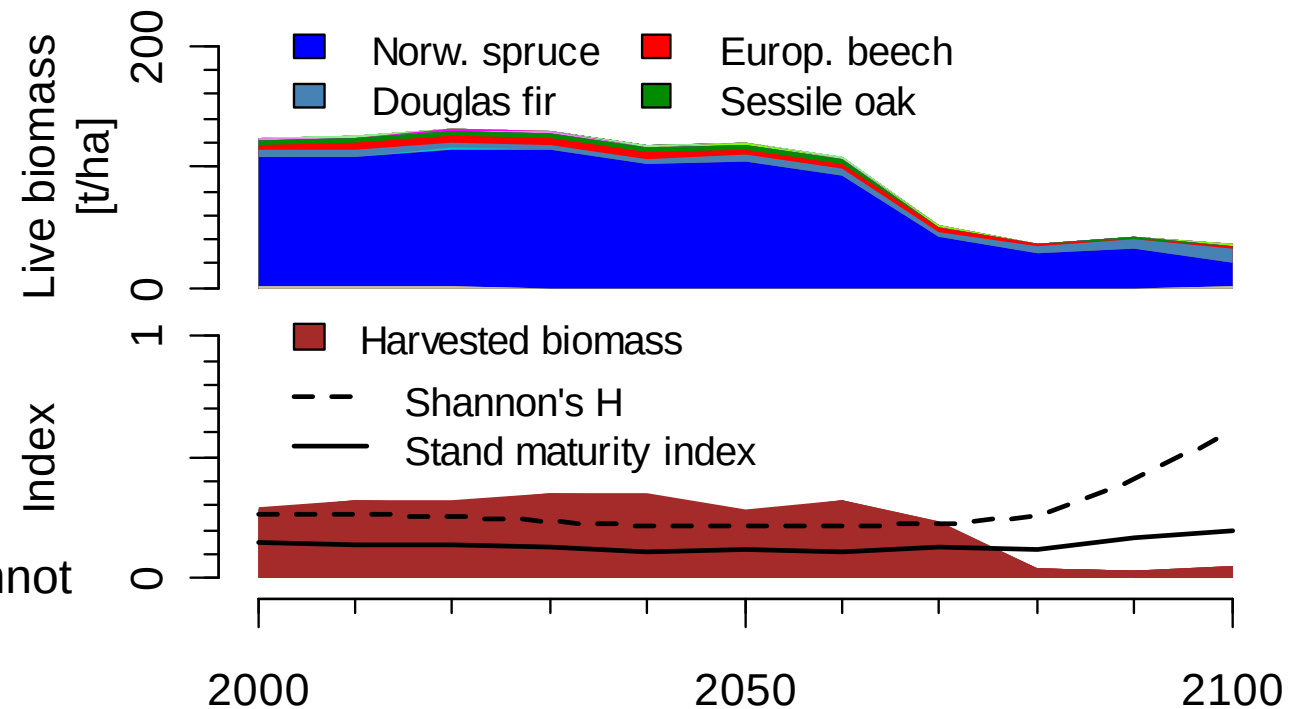


Testing and evaluating management options and risks

Black Forest, Germany

Declining
Norway spruce
biomass under
an intermediate
climate change
scenario & unchanged
even-aged Norway
spruce management

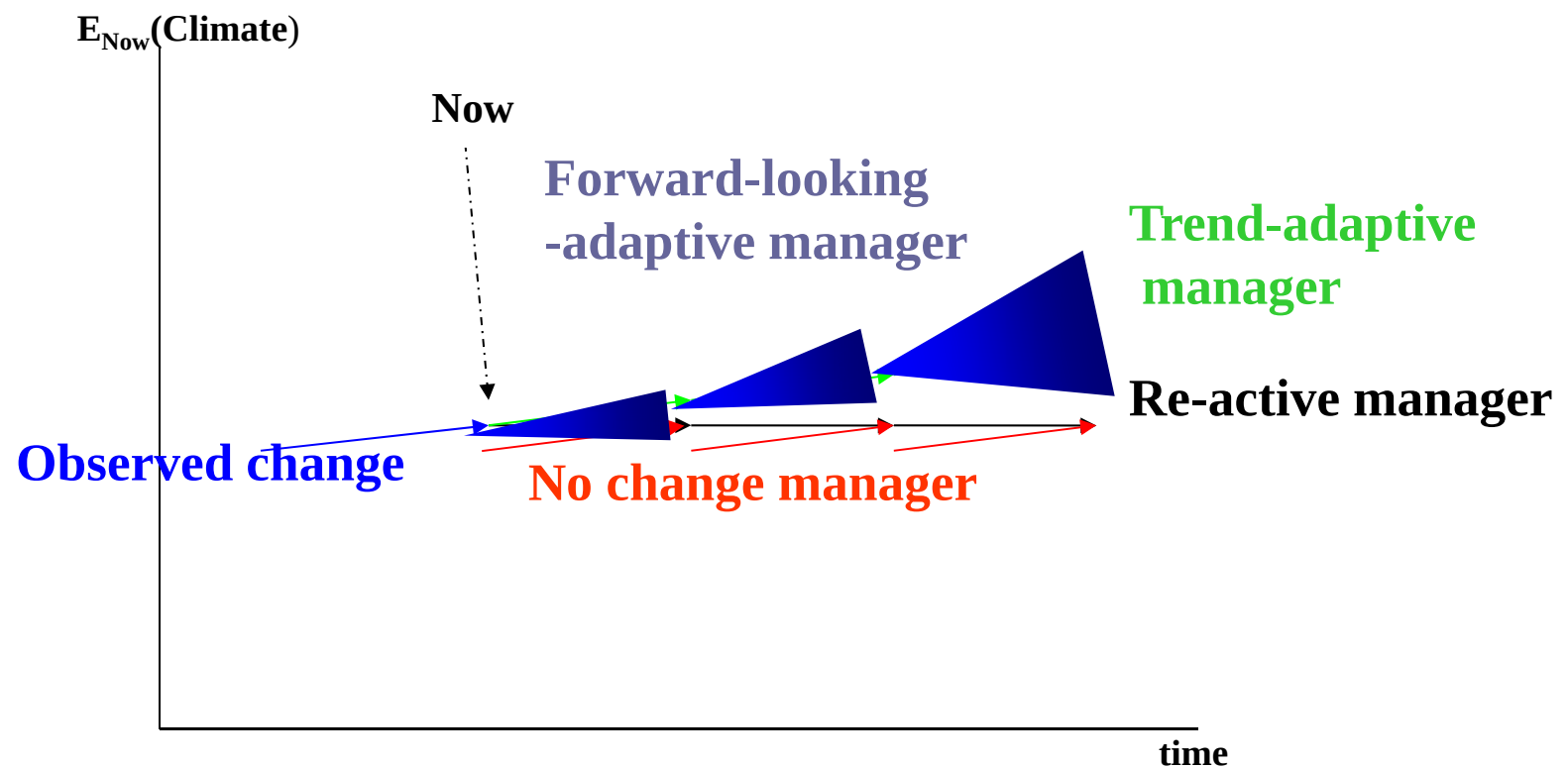
Provision of timber cannot
be maintained without
management changes



Temperli, Elkin, Bugmann, 2011.



Challenges facing forest managers and the approaches science may take to support decisions

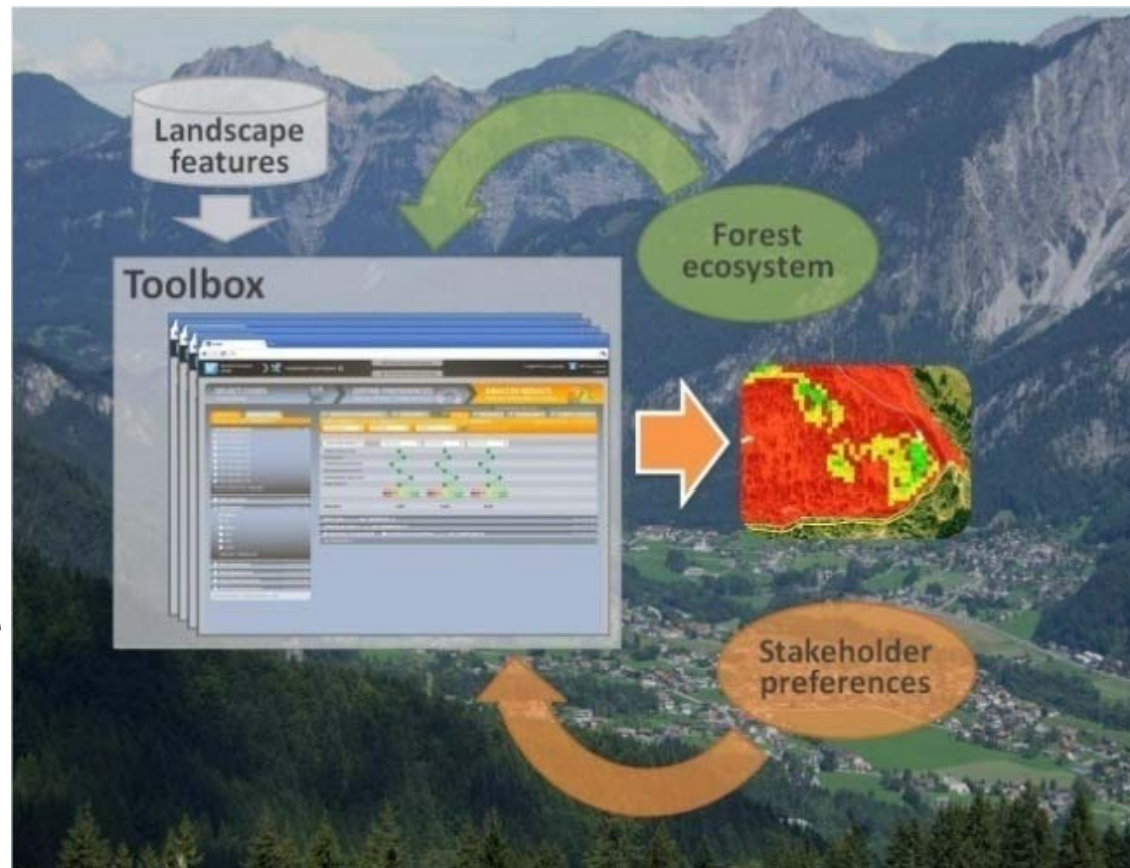


Bredahl-Jacobsen et al. 2010



Improved decision support in adaptive management – MOTIVE toolbox for adaptive forest management

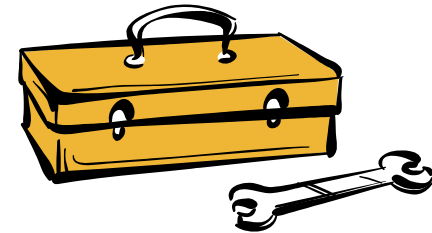
The Ecosystem Service Assessment tool within the MOTIVE toolbox for adaptive forest management. The appraisal is based on forest structure and composition, stakeholder preferences, and landscape features (e.g. a digital terrain model).



Maroschek, Rammer, Lexer, 2011.



What is coming up next in MOTIVE



- Scenario calculations will quantify impacts on ecosystem goods and services in case studies across Europe under alternative management strategies.
- Results of the calculations will show possibilities for advanced methods in adaptive forest management. These results and methods will be integrated in **a decision support tool box for adaptive forest management.**
- MOTIVE will provide **assessments of the efficiency of current and future adaptive forest management strategies** in terms of wood production trends under changing climate, reduced greenhouse gas emissions, carbon sinks, or forest conservation.



More about MOTIVE and topic

Website of the project: www.motive-project.net

Linked  Discussion forum:

Climate Change Impacts and Adaptation in European Forestry

www.linkedin.com/groups?about=&gid=2895718

Email contact: motive@efi.int

Thank you!