

# *ForRISK - Forest density reduction to minimize the vulnerability of Norway spruce and silver fir to extreme drought – a risk assessment*

## CONTEXT

Climate change may profoundly impact the structure and functioning of forest ecosystems. Reducing stand basal area is a suggested forest management strategy that may provide climate adaptation in the short-term, before active adaptation approaches more suited to future climates will be considered. However, when developing adaptation strategies, the economic implications and efficiency of the proposed strategies have to be assessed and taken into account to support decision making under uncertainty within forest management. Therefore, within sustainable management, a proper risk management is crucial, especially when climatic framework conditions are changing.

## MAIN OBJECTIVES

ForRISK aims at examining the interacting effects of drought and forest management on tree growth and ecophysiological mechanisms. The results will be integrated into an economic risk assessment, providing a powerful framework for adapting central European forest ecosystems to increased drought intensity. Specifically, ForRISK will:

- focus on Norway spruce and silver fir, two of the most economically and ecologically important tree species in Europe. ForRISK will capitalize on forest stands in Germany, France, and Switzerland
- analyze growth trends, ecophysiological mechanisms, and drought vulnerability of forests in relation to specific values of stand basal area
- assess how to better adapt forests to drought risks, based on risk assessment and economic evaluation of management approaches
- elaborate management options, and discuss adaptation of guidelines with the local stakeholders.

## MAIN ACTIVITIES

To reach its goals, ForRISK will:

- analyze tree- and stand-level growth responses in relation to drought and management via tree-ring analyses and historical inventory measurements
- investigate intra-annual ecophysiological processes and mechanisms during and after drought via isotope analyses
- provide a mechanistic ecosystem model for Norway spruce and silver fir, including detailed descriptions of the drought reactions of the two species
- quantify the effect of different management treatments to reduce drought vulnerability using a classical risk management approach, focusing on economic risk assessment and risk evaluation
- provide optimized drought adaptation strategies, considering climate change uncertainties
- engage the well-established stakeholder networks of the project partners to reach forest practitioners in Switzerland, France, and Germany to disseminate project results.



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## PARTNERS

**Swiss Federal Research Institute WSL, Switzerland (Coordinator)**  
French National Institute for Agricultural Research INRA, France  
Albert-Ludwigs-University ALUFR, Germany  
Forest Research Institute of Baden-Württemberg FVA, Germany  
Swiss Federal Institute of Technology ETH, Switzerland

## DURATION

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€ 660 000

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