

# Procurement of highly productive and site-adapted forest reproductive material for future forests under climate change - FitForClim



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## I. Background

Timber is an important raw material, which has the benefit of sequestering carbon (CO<sub>2</sub>). However, in the face of changing climatic conditions it becomes challenging to sustain the supply with high quality timber. It is therefore important to foster the genetic adaptability of forests to those changes.

Thus, a Germany wide joint forest tree breeding project (FitForClim) has started recently. It aims at setting the foundation for a sustainable supply of markets with high-quality forest reproductive material. Said material needs to show a sufficient genetic diversity, in order to be productive in **stable and adaptable stands**, even under novel conditions due to a changing climate and under diverse site conditions. Apart from **increased productivity (carbon sequestration)** the project also aims to **enhance wood-quality**. This is a precondition for a multi utilization of timber, which means that the material is used once or several times before it is used for energy generation.

## II. Objectives

In order to achieve this goal the project implements inter-institutional analyses of data from long-term tree breeding trials of the species: **Norway spruce, Scots pine, European/ Japanese larch, Douglas fir, sessile/ pedunculate oak and sycamore maple**. Valuable information for the revision of provenance recommendations and for the establishment of breeding zones are expected from such analyses. Furthermore the selection of trees with outstanding properties (so called plus-trees) and their subsequent propagation for the establishment of seed orchards can be based on such information. Forest owners, forestry enterprises, decision-makers and multipliers will be informed via a new web portal. Synergies and the remaining capacities in the field of forest tree breeding will be used efficiently due to the intensive networking of the partners in the joint project.

The intensity of breeding efforts will vary among the focus tree species. Possible trials could range from stand progeny trials (e.g. with oak) to controlled cross-breeding (e.g. with larch). After 15 years of breeding effort, the average gain in wood volume is expected to be around 10 to 30 %.

### Planned project runtime

	Planned project runtime											
	3 years				3 years				3 years			
	2014				2015				2016			
Milestones – 1. Project phase	I	II	III	IV	I	II	III	IV	I	II	III	IV
Construction of a joined project database	X	X	X	X								
Construction/ maintainance of a project website	X	X	X	X	X	X	X	X	X	X	X	X
Evaluation of field trials and allocation of existing datasets	X	X	X	X	X	X						
Analysis of experimental data of the focus tree species			X	X	X	X	X	X	X	X	X	
Selection of plus-trees			X	X	X	X	X	X	X	X	X	X
Start vegetative propagation of plus-trees				X	X		X	X				X
Genetic analysis							X	X	X	X	X	
Seed production concept for oak trees			X	X			X					X

## III. Selection of plus-trees

The **first project phase**, puts an emphasis on the selection of plus-trees in order to establish the breeding populations. Approximately 2/3 of the trees will be selected from trials after analysis of existing long-term data or from seed orchards and clone archives. Another 1/3 will be selected from forest stands. Plus-trees will be selected in Germany (German Federal States) mainly according to the following factors:

1. Representative distribution related to the federal state forest area and abundance of the respective tree species (figure 1)
2. Water availability as indicated by the climatic water balance (figure 2)
3. Topographic distribution by altitude (figure 3)
4. Ecological units (areas of similar climate, soil substrate, topography, vegetation, landscape history and administration; figure 4)
5. Provenance, mean annual temperature, continentality

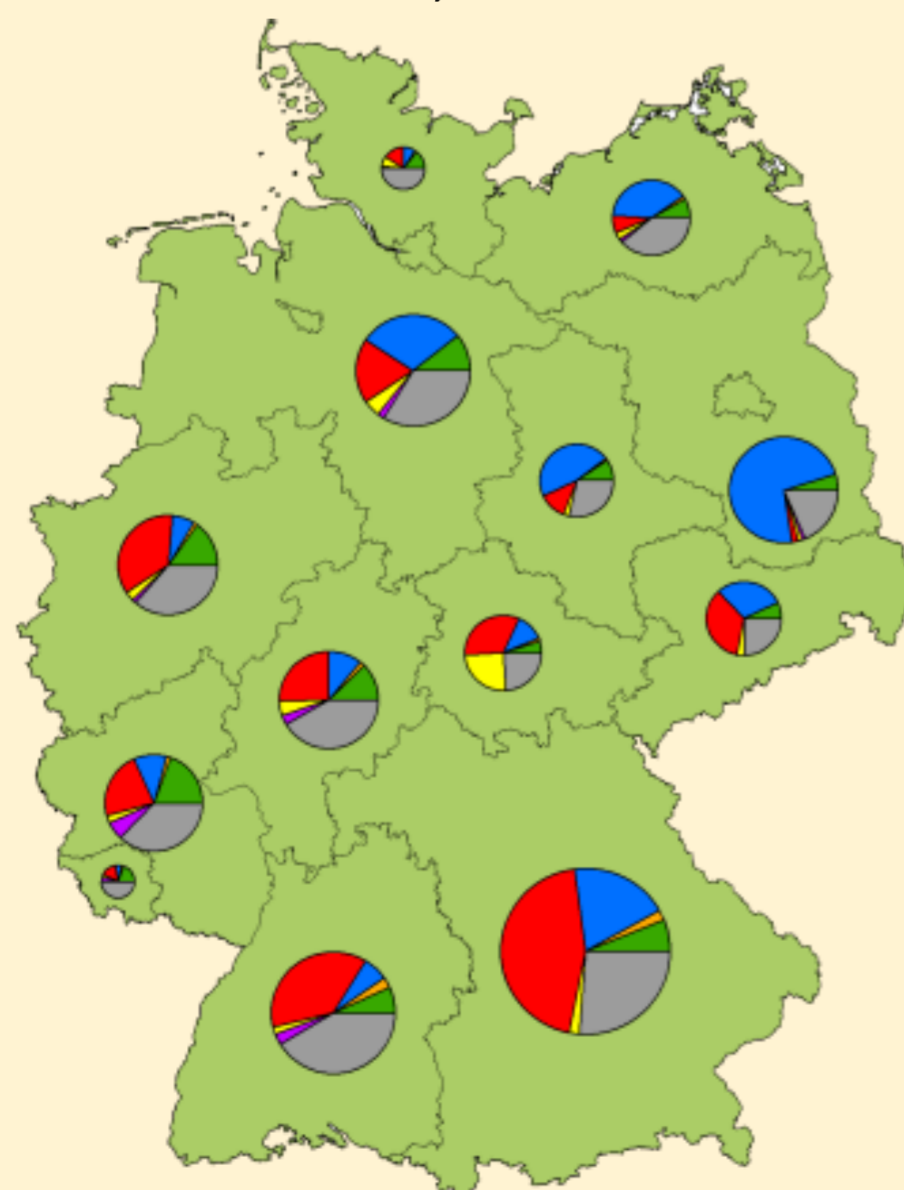


Figure 1: Share of forest area in German Federal States. Circle size represents overall sum of forest land (ha); pie charts illustrate the respective species' share.

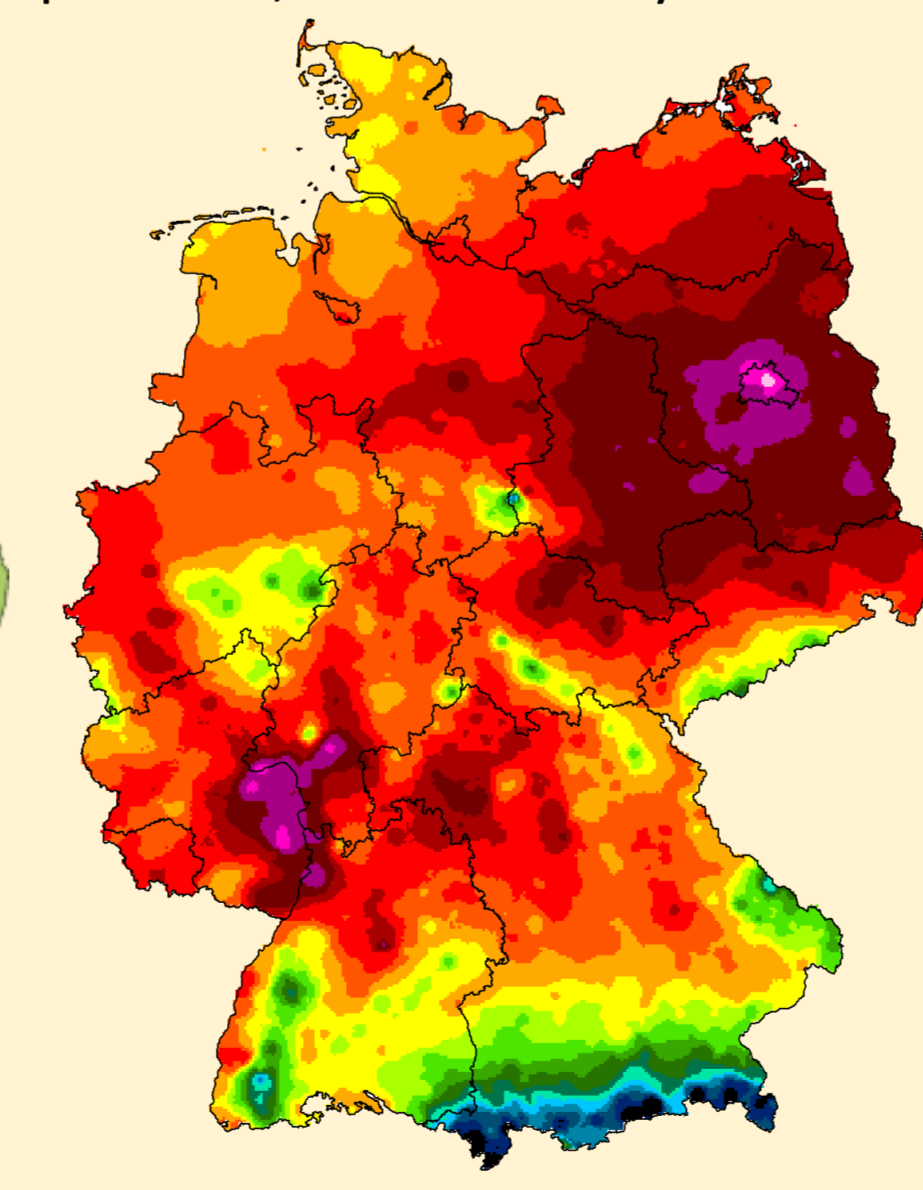


Figure 2: Climatic water balance for Germany during the vegetation period. Average values for the period from 1981 – 2010.



Figure 3: Elevation model for Germany



Figure 4: Ecological units (N = 46), comprise a total of 610 districts with comparable growing conditions. Their classification is based on geographics and administration.

Project partner:



In cooperation with:

Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg, Landesbetrieb Forst Brandenburg, Landesbetrieb Wald & Holz Nordrhein-Westfalen, Landesforst Mecklenburg-Vorpommern, Landesforsten Rheinland-Pfalz, Thüringen Forst – Anstalt öffentlichen Rechts

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