

## PROJECT INFORMATION

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**Project title:** Drivers of seed production of tree species in Germany

**Project ID:** 250

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## PROJECT DESCRIPTION

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### Objectives

In this study we want to link long-term flowering time series with seed production and test potential drivers of changes such as weather and resource dynamic hypothesis.

giving evidence of the specific purposes for which the data shall be used e.g. hypotheses to be tested, statistical methods to be applied, further data involved in the evaluations etc.

### Background and Hypotheses

As climate change worldwide intensifies, droughts and rising temperatures are affecting the reproductive stages of perennials (particularly in forests). Reproductive stages can be divided into two main components: increasing flowering intensities and more seed masting events. Seed masting has been intensively studied, flowering, however, as a prerequisite for seed masting events is also worth linking to masting events. Consequently, the link between the masting phenomenon and the flowering phenomenon, and how resources flow between the reproductive and vegetative growth stages, is very interesting to us. However, officially published numbers of seed harvest in Germany are biased by varying demand for forestry plants from nurseries. Therefore, the data from ICP Forests Level II, especially on litter fall and seed production, are valuable additional information for our study.

### Statistical method

The inter-annual Ring Width Index (RWI), Basal Area Index (BAI), and leaf part of litter fall are used to represent the vegetative growth part of the forest, the inter-annual flowering intensity and seed yield as well as the pollen part to link the reproductive growth part of the forest during the reproductive stage.

By using different models (Beta regression model, liner mixed effects model, GAMLSS model), try to find the most vital climate factors influencing masting, as well as to identify the synchrony of the masting phenomenon with flowering, pollen and climate and spatio-temporal (time, provenance, temperature, precipitation, drought) patterns, then try to reflect the flow of resources in the forest during the same period, it is possible to explain the masting phenomenon and the pattern of resource variation in the two different phases.

### Further data involved

The research will also be integrated with useful potential databases, such as those on pollen data set (Pollen data set: Pollen Monitoring Programme), climate German Weather Database, i.e. DWD.