**Key concepts**

**Local adaptation**
The genetic differentiation between populations results from spatial variation in the pattern of natural selection. Local adaptation might be expressed by variations in growth, survival, phenology and other fitness related tree characteristics.

**Forest reproductive material (FRM)**
Reproductive material of forest tree species including (i) seed unit (cones, infructescences, fruits and seeds), (ii) parts of plants (stem, leaf and root cuttings, explants or embryos) and any parts of a plant intended for the production of planting stock, (iii) planting stock (plants raised from seed units, parts of plants or from plants from natural regeneration).

**Provenance**
A group of individual trees growing at a particular place of origin.

**Provenance test**
A common garden experiment, established at one or more locations, where the genetic variation of different provenances is evaluated in terms of tree growth, mortality, phenology, stem form, etc.

**Regions of Provenance**
An integral part of European and National FRM legislation and defined as an area with sufficiently uniform ecological conditions in which forest stands or seed sources show similar phenotypic or genetic characters. In reality, the delineation of the Regions of Provenance differs from country to country and might be based on a number of criteria, including ecological units, vegetation zones or even administrative boundaries.

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**“Local is best”**
Traditionally, localized forest seeds have been advocated for reforestation on the assumption that such materials are best adapted to the local environmental conditions. A large number of scientific studies however found that local seedlings are often outperformed by non-local provenances and global climate change creates new environmental characteristics to which local seed sources will be maladapted.

**Forest trees exhibit manifold local adaptations to the habitat that guarantee their optimal growth and survival under various environmental conditions.**

Available at: http://t1p.de/0r7s

**Eur-Lex access to European Union Law**
Available at: http://t1p.de/a31t

**Summary report of the Commission Expert Group on Legislation on seeds and plant propagating material.**
Section Forest Reproductive Material, _Anchon_ (BE), 26-27 April 2017.
Available at: http://t1p.de/hw

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**References**

**SUSTREE Project**

**SUSTREE: „Conservation and sustainable utilization of forest tree diversity in climate change”**

SUSTREE is a transnational project promoting climate change adaptation and genetic diversity of forest ecosystems in Central Europe. Funded by Interreg, SUSTREE comprises of eight partner institutions from six countries (Austria, Germany, Czech Republic, Hungary, Poland, Slovakia) of Central Europe sharing their expertise, to enable management of the forest genetic resources. Within this cooperation project:

- We develop transnational decision models or decision support tools for forest seed transfer and genetic conservation based on species distribution models and available intra-specific climate–response function.
- These models are being connected to national registers of forest reproductive material in order support nursery and forest managers for selecting the appropriate seedling material for future plantations.
- Most applications in state forest enterprises will document the usability of the introduced tools for forest and natural resource managers as well as for policy makers and public bodies responsible for restoration and forest reforestation schemes.

**SUSTREE Policy Brief „Conservation and sustainable utilization of forest tree diversity in climate change”**

**KEY MESSAGES**

1. Forest trees exhibit manifold local adaptations to the habitat that guarantee their optimal growth and survival under various environmental conditions.

2. Climate change disrupts the link between climate and tree growth thereby challenging the “local is best” paradigm.

3. Regions of Provenance, national and European forest reproductive material legislations, differ among countries and do not reflect climate conditions and thus contribute to the management of genetic resources under climate change.

4. Forest trees exhibit manifold local adaptations to the habitat that guarantee their optimal growth and survival under various environmental conditions.

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Background

Genetic variation within tree species can be utilised to enhance resilience of forests to climate change and to save the multifunctional role of forest ecosystems.

Annually, approximately 900 million seedlings of the major tree species are planted in Central Europe. This offers an opportunity to implement adaptive management by matching adapted forest trees and seedlings with suitable planting locations under expected future climate conditions.

European and national legislations define Regions of Provenance to guide the provision of forest seeds and seedlings. These Regions of Provenance are not comparable among countries and certain legislations restrict the transfer of forest seeds and seedlings across borders.

Considering expected changes of climate in the future, demarcating the respective Regions of Provenance was statistically assigned to climatically similar groups for current and future climate (Fig. 5).

Regions across borders were found to have similar climate demonstrating that (i) climatic zones generally were not crossed while delineating such Regions of Provenance and (ii) individual countries used different approaches for delineating the respective Regions. Moreover, the climate within groups of Regions of Provenances will be strongly impacted by climate change.

Regions of Provenance explain only between 38 and 31% of the variation of climate in Central European forests, while country borders and altitude explain up to 52% for single climate variables (Fig. 4).

We tested for similarities and differences in the climate regions of the current Regions of Provenance across Central Europe. Existing Regions of Provenance were statistically assigned to climatically similar groups for current and future climate (Fig. 5).

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