

Climate change – Biodiversity –

Raw materials:

Challenges for the procurement of forest reproductive material in Germany

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Photo: St. Reim



Photo: SBS



Photo: H. Wolf

Contents

- Challenges for the forests of the future
- Requirements to forest reproductive material (FRM)
- Tree species and potentials for the procurement of FRM
- Need of action and outlook

Challenges

Climate change

Change of temperature,
precipitation, courses, extremes

- Significant impact on
 - ▶ site conditions, species and competition
 - ▶ physiology, phenology and fructification of trees
 - ▶ stability and productivity
- CO₂-avoidance und -storage



Photo: SBS

Challenges

Biodiversity



Diversity of living spaces and species as well as genetic variety within species – Base of life and human existence

- Change of living spaces and competition
- Extinction, displacement or spreading of native species
- Spreading of species descending from other floral and faunal regions

Challenges

Raw materials



Photo: H. Wolf

Economical livelihood – Base for regional added values

- Sustainable timber production with far-reaching CO₂-neutrality
- Substitution of fossil and CO₂-burdend raw materials
- Use of changing living spaces under different competition conditions
- Forest and plant protection

Challenges

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Climate change

Challenges

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Climate change

Biodiversity

Challenges

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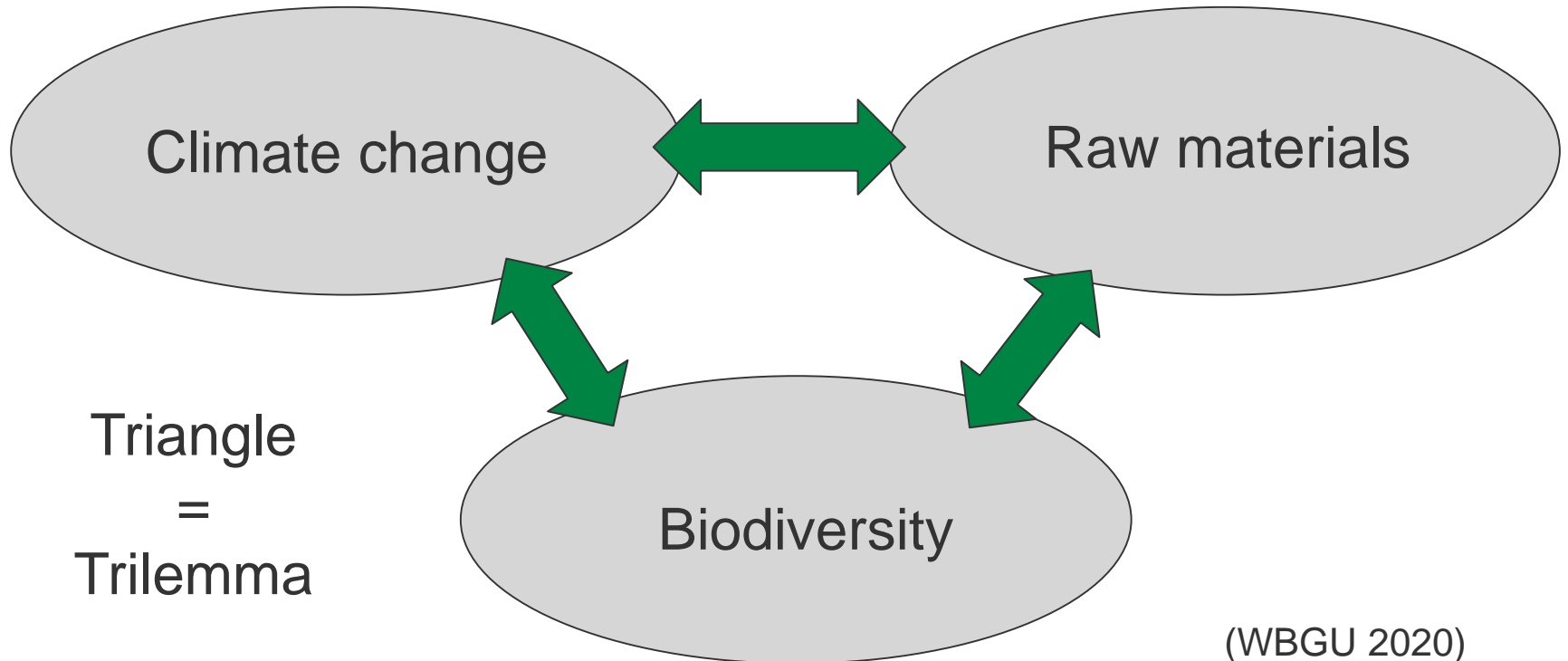
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Climate change

Raw materials

Biodiversity

Challenges



Requirements to FRM



■ Adaptability

- Genetic structure
- Ability to regenerate and to pass on genetic information

■ Ability to resist

- Abiotic factors a. o. drought, frost
- Biotic factors a. o. fungi

■ Efficiency

- Growth esp. height, diameter, volume
- Quality a. o. stemform, branchiness, wood characters

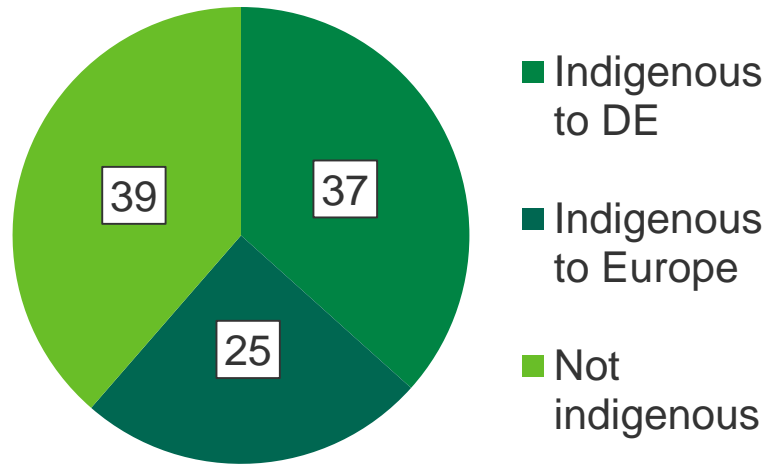
Requirements to FRM

- Seeds, plants and parts of plants should be in the position to cope with the present and future conditions:
 - ▶ adapted (present)
 - ▶ adaptable (future)
 - ▶ high value and identity secured
- ▶ Precondition for stability and efficiency of future forests

Initial position

➤ Central Europe: 50 to 200 tree species

Source: Rekacewicz et al. 2009



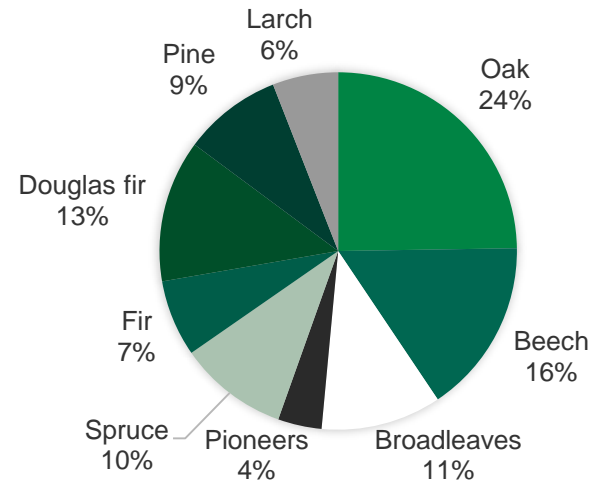
Source: Liesebach et al. 2021

- 101 tree species in Germany of relevance, but
- Species endangered
 - Loss or shift of areal (5)
 - Pests and diseases (4)
 - Hybridization (3)
 - Others (2)
- Species rare and scattered

The big five

- Forest area in Germany dominated by oaks, beech, spruce and pine (74 %)
- Approved basic material (59 %)

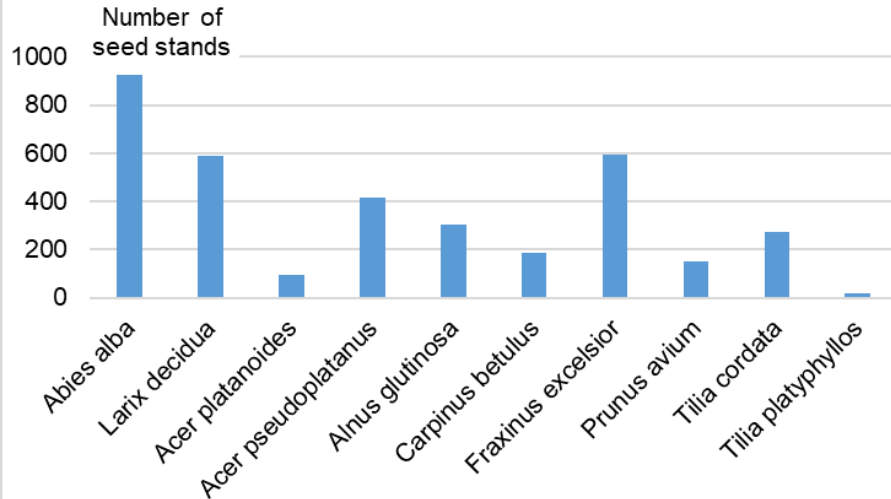
Percentage of approved seed stands by numbers
(N about 15.650) (state: 01.07.2019, BLE)



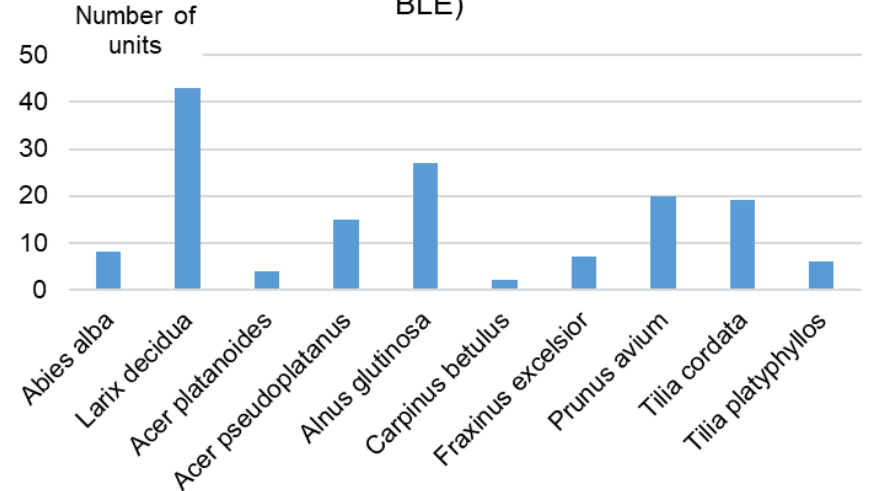
The many little ones

- About 26 % of the forest area in Germany
- Approved basic material according to FRM-Act

Category "Selected" (state: 01.07.2019, BLE)



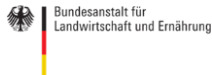
Category "Qualified and tested" (state: 01.07.2019, BLE)



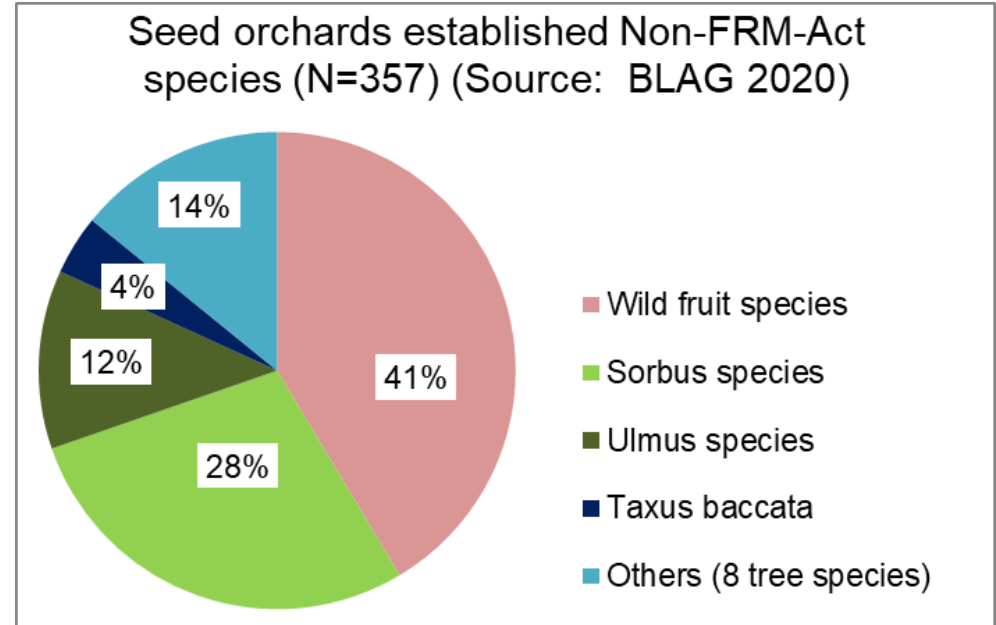
The many rare ones

- Rare to very rare, several species endangered regionally
- Mainly Non-FRM-Act species
- Identification and documentation of Black Poplar and Elm species as well as rare tree species occurrences in DE

Gefördert durch:

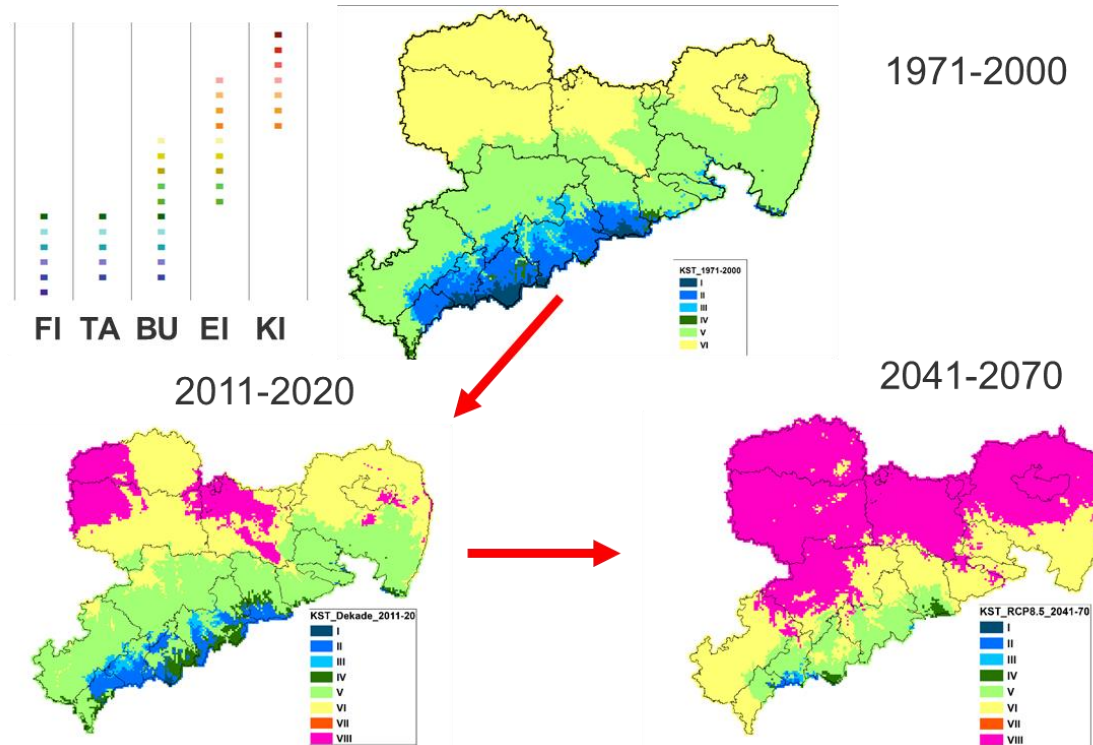


aufgrund eines Beschlusses
des Deutschen Bundestages



Climate-prognosis 2022

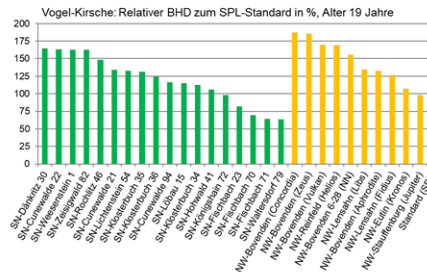
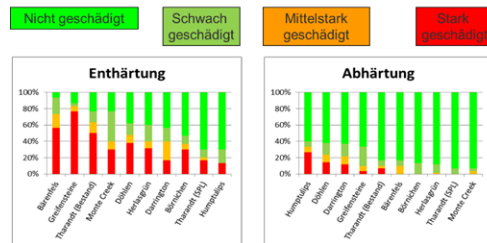
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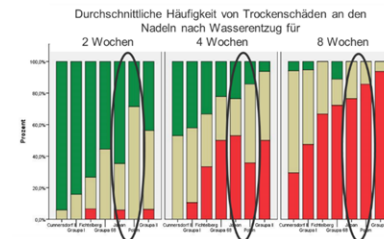
Identification of species to cope with the future

- Tree species already well known and useable immediately as alternative in reforestation or for establishment of shelter wood
 - Alternatives: *Prunus avium*, *Quercus rubra*, *Robinia pseudacacia*, *Abies grandis*, *Pseudotsuga menziesii*, *Larix decidua*, *L. kaempferi*, *L. x leptolepis*
 - Shelter wood: *Betula pendula*, *Alnus glutinosa*, *Populus tremula*, Hybrid Poplars, *Prunus avium*, *L. x leptolepis*

Douglasie: Herkunftsspezifische Unterschiede (Frostschäden bei -18°C (HKG 823 06))



Hybridlärche: Unterschiede zwischen Nachkommenschaften nach 2, 4 und 8 Wochen Trockenheit



Identification of species to cope with the future

Recommendations of Federal-State-Working Group FGR

- Indigenous to DE
 - *Carpinus betulus*, *Acer platanoides*, *Tilia cordata*, *Sorbus torminalis*, *Quercus pubescens*
- Indigenous to Europe
 - *Abies nordmanniana*, *Fagus orientalis*, *Corylus colurna*
- Not indigenous to Europe
 - *Cedrus atlantica*
- Consideration of regional differences
- Consideration of *Abies*-, *Pinus*- and *Quercus*-species as work packages

Need for action

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Preliminary remark

Only required, if
„Laissez faire“ or “Let it be”
will not be made into a dogma

Need for action I

- Consequent expansion of the catalogue of species (asap)
- Implementation of genetic knowledge on regeneration (immediately)
- Up date of provenance recommendations according to latest knowledge (continually)
- Improvement of information exchange among scientific institutions, forest companies and tree nurseries (continually)

Need for action II

- Procurement of FRM as part of existential requirements (immediately up to long term)
 - Intensification of approval of basic material for multifunctional forestry as well as for gene conservation purposes
 - Conservation and management of seed stands
 - Establishment of seed orchards
 - Seed harvest over immediate need and storage where ever possible
 - Revitalization and development of vegetative propagation methods

Need for action III

- Intensification of research on species and provenance choice (immediately, mid to long term)
- Obligation to specify the provenance also of non-FRM-act species (asap)
- Enabling rooms for manoeuvre through establishment of facts of exception (asap)
- Evaluation of minimum standards required (asap), e. g.
 - age of approval or condition of the material in question
 - number of trees to be harvested (too small?)

- Use of species and genetic diversity (succession, natural regeneration, seed harvest)
- Priority for the procurement of FRM (seed stands, seed orchards, vegetative propagation)
- ▶ Improvement of resilience
 - Toughness (species diversity, choice of provenance, breeding)
 - Adaptability (species diversity, genetic variability)
 - Flexibility (silvicultural methods, structures, living spaces, breeding)



Thank you very much for your attention