Assess4EST Seeing trees and forests for the future - assessment of trade-offs and potentials to breed and manage forests to meet sustainability goals

Luke Katri Kärkkäinen (coord), SLU (SE), NIBIO (NO), Silava (LV)

Sustainable management of forests is challenging but of utmost importance not only for bioeconomy but also for mitigation of climate change effects. In sustainability studies, the impacts of tree breeding, genetic diversity and regeneration methods on growth and resilience of forests have not been fully acknowledged. Tree breeding and utilization of genetically enhanced forest regeneration material has already impact on present forest productivity, and other traits such as wood quality and resilience can be improved when the genetic basis of traits are known. Effects of climate change can be mitigated by good combinations of tree breeding, adaptation-based deployment and silviculture if crucial changes in climate can be predicted and the genetic basis of adaptation to climate is understood. However, trade-offs at biological level (genetic correlations between traits) and at SDG level need to be addressed when assessing different regeneration methods.

In Assess4EST, we use novel genomic breeding tools and introduce new features to national growth and yield simulators to assess possibilities to combine sustainability goals in forest management by studying the impacts of genetic variation in the regeneration methods: even-aged planting with advanced generation improved material vs. natural regeneration in even and uneven aged stands. We will concentrate on assessing traits important for sustainability goals: growth, increasing resilience and adaptability of forests to rapid climate change, as well as wood quality suitable for products that store carbon and substitute more emission-intensive and non-renewable products.

We will produce scenarios for forest management concentrating not only on yield, carbon sequestration and biodiversity, but also resilience of forest in a changing climate and quality of the biomass produced. Furthermore, this project will create a novel platform for discussions between researchers, tree breeders and stakeholders on the future use of forests and wood, building joint insight on how trees and forests should be bred and managed to meet sustainability requirements.

More information:

- Consortium Leader, Research Professor Katri Kärkkäinen, Natural Resources Institute Finland, katri.karkkainen@luke.fi
- Project website: under construction