Filling knowledge gaps to sustain future forestry

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Sustaining the growing demand for wood products and other forest services is becoming increasingly difficult due to the likes of climate change, pests and diseases affecting European forests. The TREES4FUTURE project brought together 28 research organisations from various disciplines to provide common datasets that will eventually result in more trimmed forestry for the future.

Despite its continued efforts to support sustainable forest management, the forestry sector still has much learning to do when it comes to tree genetics and physical environment, basic wood properties and their impact on end-product quality, as well as know-how to bring studies from individual to forest scale. Whilst the much needed data and expertise do exist, they are currently scattered across various disciplines with no effective means to cross-fertilise them.

Starting in 2011, the TREES4FUTURE (Designing Trees for the future) project aimed to bridge these gaps by providing a holistic approach to forestry that integrates abiotic and biotic environmental aspects through biological responses, biomass production and industrial technology. Five years on, the project has brought each of its 11 work packages to a successful closure.

Among the project outcomes are: a common search interface for genetic data; new standards and methodologies for the assessment of field traits and wood properties; and the creation of three thematic networks on phenotypic plasticity, phenology and societal perception of forestry.

On a purely research level, the close to EUR 7 million project also developed: a suite of statistical tools for genetic evaluation; a molecular marker platform for fingerprinting and traceability of biological material; a site matching tool to match the current or projected climate at a site to any other similar place in Europe; a clearinghouse with 'Geographic information system' (GIS) functionality for research data; improved compatibility of existing modelling tools; and medium to high-throughput phenotyping methods.

Gert-Jan Nabuurs, Professor of European Forest Resources at Wageningen University and vice-coordinator of TREES4FUTURE, agreed to discuss these outcomes ahead of the publication of the project 's final report.

Why do you think climate change requires a new approach from the wood products and services sector?

There are several reasons the wood products sector requires a new approach. First, the impacts of climate change will alter the state of the forests throughout Europe. In the South, forests will be affected by droughts and fire. In Central Europe, new species will become more dominant, and in Northern Europe the forests will start to grow faster, especially the ones populated by pine.

On the other hand, the wood products sector can help mitigate climate change. Wood products require less energy to produce than the likes of steel and concrete. We foresee a higher demand for the construction sector. Also new demands for new products will arise: these include novel packaging for food or textile, or biorefined products. This will all change the sector dramatically.

One of the main project outcomes is a platform for analytical, statistical, genetic and molecular analysis. What are the benefits of using it for stakeholders?

Tree breeding stands at the basis of all above-mentioned changes. In order to push breeding forward, the platform is very much needed. Thanks to TREES4FUTURE, access to data is also more secure.

What are the other tools that you created? What's their added value?

For example, we created a set of modelling tools that provides insights into how the sites will change under climate change, or which provenances are best to plant. Furthermore, we created a set of modelling tools to scale up genetic information (which is now scarce and local) to regional predictions of impacts.

Why was it important to bring all stakeholders together for this project?

Eventually, the tree breeders will have to use the information from TREES4FUTURE. The national partners in T4F have a task of further informing national breeders associations. And they will do that.

Can you provide a notable example of a knowledge gap that has been filled thanks to TREES4FUTURE?

Access to provenance trials has been improved. This may sound strange, but it remains a challenge to have good overviews of provenance trials from the past. Furthermore, high throughput phenotyping methods have been further developed and made available. This makes it possible to

carry out many measurements and relate these to genetic information. Also, the upscaling of genetic information in modelling tools is now possible. The latter shows that there is much resilience in tree populations, and that climate change impacts are dampened.

The project was completed in April. Do you intend to keep maintaining and promoting the tools you developed?

Yes, the transnational access tools will remain available through the website. Also, the developed tools are open source.

What could be, according to you, some examples of selection processes that would be facilitated by the project's outcomes?

We now know much more about Douglas fir provenances and how they grow here in Europe in comparison to their native sites in the USA. This knowledge may alter the selection of provenances in the future.

More information: Project website: www.trees4future.eu/

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