

Project aims for efficiency and sustainability



A European research project is pioneering new applications to improve forest operations

How could the European bio-based industry intensify its practices and take advantage of its growth potential in an environmentally and economically sustainable manner? Research project EFFORTE is looking for answers from forest management and wood harvesting practices.

In a joint effort, European forest research institutions and industry are set to find cost-effective and environmentally friendly solutions for forest operations. One of the aims of the EFFORTE project is to develop real-time applications for forecasting the most efficient and environmentally sustainable interval for wood procurement and will develop and pilot new methods and applications utilising big data.

“The questions of terrain trafficability and environmental sustainability are very relevant to the forest sector all over Europe. In all parts of the continent, there are seasons of difficulty with the wood procurement process, especially concerning the condition of forest soil”, says EF-

FORTE project’s coordinator Jori Uusitalo from the Natural Resources Institute Finland (Luke).

Efficiency also through mechanisation and big data

EFFORTE will also pursue higher productivity and efficiency in forest operations such as tree planting and young stand cleaning operations through mechanisation.

Big data, on the other hand, provides a huge opportunity to increase efficiency of forest operations. EFFORTE researchers will develop and pilot precision forestry applications together with the industry sector.

“Big data connects knowledge of weather and soil conditions and efficient silviculture and harvesting actions with the demand and expectations from forest industries and the society. This makes it possible to adopt precision forestry management practices”, Jori Uusitalo says.

Public-private finance

EFFORTE brings together European research organisations and the forest industry. The project is financed by a new type of public-private partnership: the Bio-Based Industries Joint Undertaking (BBI). While the BBI program’s total funding is €3.7bn, EFFORTE project has a budget of €4.2m, half of which is financed by BBI and the other half funded by the consortium partners themselves.



How the UK is contributing

by Shaun Mochan

Woodilee Consultancy and James Jones will undertake a UK-based field experiment in relation to trafficability on harvesting sites. The aim is to develop models of mechanical properties of forest soils based on soil texture, soil moisture status and forest stand levels. We will also look at ground pressure metrics and stress distribution at the machine tyre and track soil surface interface level to try and prevent major rutting on sensitive forest sites. The project also looks at soil deformation due to mechanized harvesting and forwarding operations and resilience of soil to compaction. The long-term effects of forest trafficability on soil function, ie is it detrimental to soil nutrient value, water exposure and replanting tree root development.

These field trials will be jointly coordinated by Woodilee and James Jones in the Aberdeenshire area on sandy, loam, clay soils. The outcomes will be simulated models and numerous reports relating to harvesting and soil water or ground water habitats in relation to nutrient value and growth sustainability and the silviculture effects of rutting, water, soil and harvesting methods; ie what machine type is best suited to different soil types and what is the long-term effect on second rotation crops.

The overall project aims to understand the different aspects of harvesting and silviculture systems relating to second rotation crops after harvesting, rutting and soil disturbance. We will also be using multiple data streams (‘big data’) analytics to derive model outcomes. We will be feeding in as much data as possible, such as stem file data from harvesters, machine outputs (eg fuel, hour operated, outputs, maintenance, tyre pressure, chain or tracks) and also forest data such as soil type, water, and the use of satellite and Lidar data to give accurate mapping and long-term planning.

Shaun Mochan is managing director, Woodilee Consultancy Ltd

FACT FILE

EFFORTE is a three-year research project, continuing until 31 August 2019.

The project is coordinated by Natural Resources Institute Finland (Luke).

Project partners

- Oy Arbonaut Ltd, Finland
- Metsäliitto Osuuskunta (Metsä Group), Finland
- Metsäteho Oy, Finland
- UPM-Kymmene OYJ, Finland
- Stora Enso OYJ, Finland
- Stora Enso Skog AB, Sweden
- Stiftelsen Skogsbrukets Forskningsinstitut – Skogforsk, Sweden
- Sveriges Lantbruksuniversitet (SLU), Sweden
- SCA Skog AB, Sweden

- Holmen Aktiebolag, Sweden
- Sveaskog Förvaltnings AB, Sweden
- Södra Skogsagarna Ekonomisk Förening (Södra), Sweden
- Creative Optimization Sweden AB (Creative), Sweden
- Institut Technologique Foret Cellulose Bois-Construction Ameublement (FCBA), France
- Forets et Bois de L’est Société Cooperative Agricole (FBE), France
- Office National des Forets (ONF), France
- Société d’Exploitation Forestiere de l’Est (SEFE), France
- Comptoir des Bois de Brive (CBB), France
- Union Française Industries Cartons, Papiers et Celluloses (COPACEL), France
- Woodilee Consultancy Ltd, United Kingdom
- James Jones and Sons Ltd, United Kingdom
- Eidgenössisches Departement für Wirtschaft, Bildung und Forschung (WBF), Switzerland

EFFORTE – Efficient forestry for sustainable and cost-competitive bio-based industry
www.luke.fi/efforte

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Encouraging European collaboration on research and innovation

Forest-based Sector Technology Platform



This summer saw the fruition of Forest Research's work to create a UK National Support Group to strengthen interactions with the European Forest-based Technology Platform (FTP).

Established in 2005, the FTP is an industry-driven initiative of the European forestry, woodworking, pulp, paper and processing industries. Its purpose is to drive innovation and European competitiveness by encouraging industry participation in research and ensuring forestry sector interests are properly reflected in EU research programmes. Its National Support Groups (NSGs) provide links to national research and innovation activities, and encourage the participation of national stakeholders in research.

With the addition of the UK, the FTP network now has NSGs in 24 European countries. Formalising the UK's full participation, FTP Managing Director Johan Elvnert emphasised the similarities between the UK and other European countries in terms of innovation interests: "Analysis carried out by the FTP in May 2016 confirmed that 80% of the innovation concerns of the UK forest-based sector are shared by other European partners."

“The FTP ... has brought businesses and researchers from different sectors together to understand new opportunities

Alison Melvin, Business Development Manager at Forest Research, who has led development of the UK NSG, explains that the focus is now to help UK stakeholders to foster and maintain longer-term research collaboration with their European counterparts.

"UK researchers have strong collaborations with European partners through participation in research programmes such as Horizon 2020, which we hope will continue, but participation in the FTP means we can also link directly with countries sharing similar innovation interests. For example, English regions with a predominance of hardwoods can benefit from connecting with French and German research and innovation initiatives in this field; and Scotland's softwood collaborations with the Nordic countries also provide good springboards for further development."

Stakeholder support

The UK National Support Group has been warmly welcomed by industry stakeholders.

Andrew Heald, Confor's technical director believes the FTP will be a good catalyst to develop collaboration between businesses and researchers: "The FTP is acknowledged as one of the most successful of the EU's 26 Technology Platforms, not just because it has helped to double the funding for forest-based topics in Horizon 2020 work programmes, but also because it has brought businesses and researchers from different sectors together to understand new opportunities."

David Hopkins, Director of the Timber Trade Federation (TTF), added: "The UK is already greatly expanding its use of wood in construction, so there are great opportunities to develop European links in this part of the sector as well."
www.forestry.gov.uk/fr/ftp
www.forestplatform.org/en/about-ftp

Australians upgrade pulpwood into high-value hardwood substitute

Researchers from the Flinders Centre for NanoScale Science & Technology (CNST) in South Australia have collaborated with Australian company 3RT Holdings Pty Ltd to develop a method for converting cheap pulpwood into a highly sustainable tropical hardwood substitute.

3Wood contains the same properties as tropical hardwood but maintains a stronger dimensional stability and eliminates wastage.

"Almost 40 per cent of all logs in the world are being cut into chips for the pulp and paper industry", said 3RT managing director Peter Torreele. "This 3Wood makes the harvesting of native forests, unnecessary. We are aiming to replace all applications where today hardwood would be used if it were available – furniture, floors, frames and there are other possibilities – it is endless."

3Wood is made from a complete log – including wastewood – and does not bleed out or stain nearby floors or walls.

It is developed using ordinary pulpwood and then a water-based adhesive that reacts with the fibres in the wood to make it stronger.

Compression

This process is known as lignocellulose manufacturing technology, which works to compress softwood to create a new product that is denser, harder and more durable than the original.

The wood is then exposed to a combination of temperature and pressure to form it into a rectangular shaped block with dimensions of 120cm x 13cm x 5cm.

CNST Director and co-developer David Lewis said 3Wood helped eliminate wastage and was a more environmentally friendly alternative to other products.

"We can manufacture blocks of wood out of pulpwood with the same strength as a 100-year-old tree but without the problems," he said.

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