Towards competitive sustainability and well-being of people from European forests

Forest Research Institutes provide science-based solutions for green transition

A sustainable and resilient forest-based bioeconomy is essential for driving the green transition. It provides biobased products and energy, addressing the dual challenges of biodiversity preservation and climate change mitigation. The European forest-based bioeconomy has opportunities to excel its global competitors by enhancing its competitive sustainability*. This can be achieved through strategic investments in research and innovation, fostering a shift towards more sustainable society and economic development. **It is imperative that the upcoming EU Bioeconomy Strategy delineates specific research objectives tailored for the forest-based sector to guide this transformation.**

Recommendations:

1. To establish a leading, competitive European bioeconomy, it is crucial to develop robust and innovative industrial systems that can rely on efficient and sustainable procurement of resources from European forests.
2. The well-being of humanity and the delivery of ecosystem services depends on maintaining healthy and resilient forests.
3. Implementing proactive, varied and multi-functional forest management strategies significantly increases our ability to achieve environmental, economic and social objectives.

This Policy Brief has been produced in collaboration with Natural Resources Institute Finland (Luke), Austrian Research Centre for Forests, Forestry Research Institute of Sweden, Norwegian Institute of Bioeconomy Research and Slovenian Forestry Institute.

* University of Cambridge 2020

© Natural Resources Institute Finland

Recommendation 1

To establish a leading, competitive European bioeconomy, it is crucial to develop robust and innovative industrial systems that can rely on efficient and sustainable procurement of resources from European forests.

Europe has the potential to develop its sustainable competitiveness through forest-based value-chains. For the long-term development of forest-based bioeconomy it is essential that companies and foresters can rely on sourcing from sustainably managed European forest resources. Additionally, the entire forest value chain, including both value-added products and services must be supported by research and innovations to facilitate a green transition.

Europe must anticipate increased demand for forest-based materials when substituting fossil-based materials. Concurrently, there is a need to develop value chains for higher value-added products from forest biomass. Aiming for resource-efficient wood processing, the goal is to fully utilise wood biomass through circular economy practices, yielding a range of high-value products and energy as secondary outputs.

The efficient development of the European forest bioeconomy is influenced by multiple EU-level forest-related policies, both recently implemented or forthcoming (Figure 1). The combined and holistic impacts of these policies on forests and forest-based bioeconomy have, however, not been well assessed. Furthermore, the relocation of industrial production and raw material supply outside Europe can shift the impacts to other, potentially more vulnerable areas with less regulation. Such behavior is highly questionable and potentially compromises the EU's security of supply during crisis situations, including renewable energy provision.

In terms of energy, a rapid transition to renewable energy from solar and windmills will result in land use changes affecting the forest area available for wood harvesting and other purposes. This consideration may become vital for future forest management.

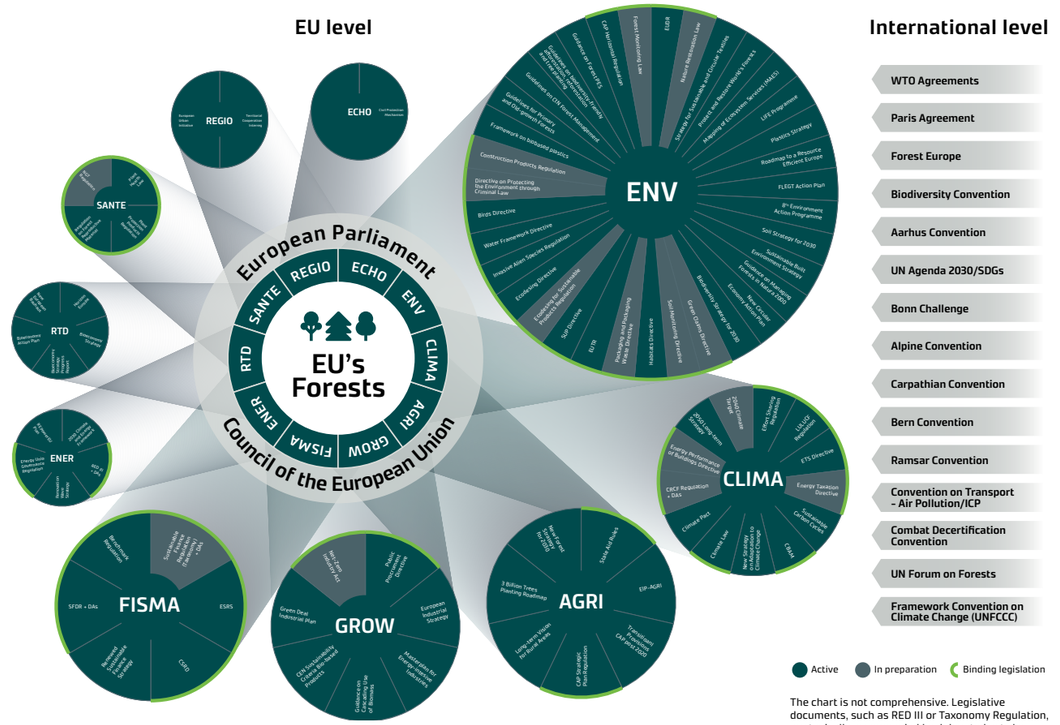


Figure 1 | European policy landscape — policies that impact forests and forest-based sector.

Evidence supporting the need for action:

- Based on globally agreed commitments, the use of fossil materials will and needs to decline (e.g. COP decisions). Consequently, there is a pressing need to develop new products based on renewable raw-materials as alternatives.
- Scientific studies show that if wood harvesting in Europe is decreased, a large proportion of harvesting and industrial production will move to other countries and continents (Kallio et al. 2018, Schier et al. 2022). This can lead to decreased self-sufficiency in Europe but also potentially cause negative effects on biodiversity and the environment in those other regions.
- Multifunctional forest management will result in more heterogeneous supply of raw materials from forests. This diversity necessitates the creation of new industrial systems and value-chains.

Research needs for a sustainable future:

- There is a need for new and improved forest-based products, services and value chains. Additionally, finding solutions for a more cost-effective and sustainable wood supply in Europe is essential.
- We need methodologies to evaluate the collective impact of new and forthcoming policies and regulations on forestry development. Identifying potential trade-offs and target conflicts is crucial, ideally before the policies are enacted.
- It is important to explore forest management regimes and technologies that not only meet the targets of increased multifunctionality but simultaneously ensure a cost-efficient and secure supply of forest-based raw materials.

"Europe has the potential to develop its sustainable competitiveness through forest-based value-chains."

"It is important to ensure a cost-efficient and secure supply of forest-based raw materials."

Luke

© Natural Resources Institute Finland

Recommendation 2

The well-being of humanity and the delivery of ecosystem services depends on maintaining healthy and resilient forests.

Forests are invaluable, providing both market and non-market benefits that affect our well-being. Societal demands towards forests are diversifying and we must ensure a balanced future provision of diverse ecosystem services. This requires healthy, robust and thriving forests.

"Forests are invaluable, providing both market and non-market benefits that affect our well-being."

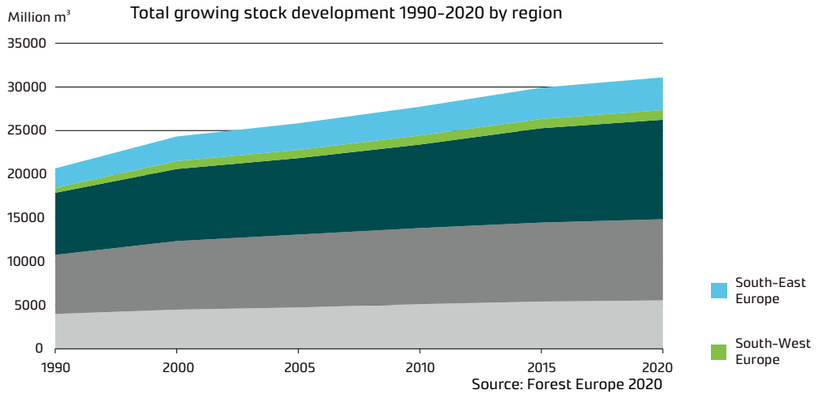
One of the key factors affecting availability of forest ecosystem services is climate change. Climate change sets both short and long-term challenges. To address this, we must enhance the resilience of forests. In addition to climate resilience, this includes their biological diversity. In the future, forests must be adaptable to climate change, maintain vigorous growth, and support biodiversity. They should provide spaces for recreation and other intangible services people need. Achieving this requires future oriented sustainable forest management, that reconciles the diverging needs of owners and user groups. At the same time, identifying and navigating target conflicts and necessary trade-offs related to implementation of various policies is also crucial.

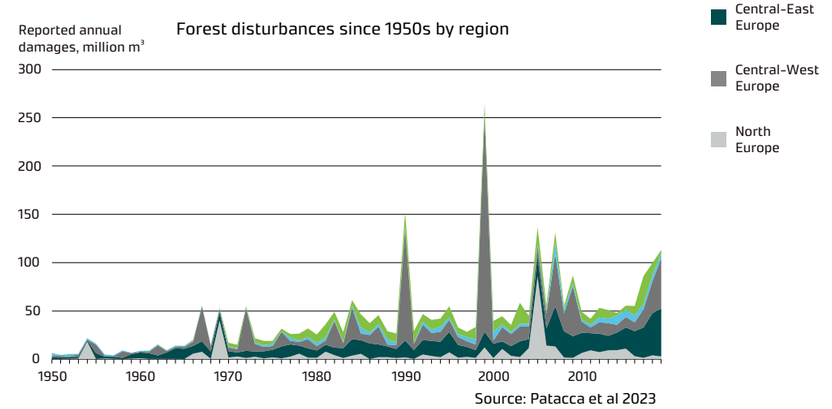
Evidence supporting the need for action:

- The societal demands on forests are constantly evolving (e.g. Högbom et al 2021, Stratton et al 2024). Recognizing and balancing these demands in forest management is essential for achieving our forest related goals.
- Climate change is having a profound effect on Europe's forests. Adapting forest management to future conditions is vital to ensure healthy and diverse future forests that can grow optimally and sequester carbon effectively.
- Since 1950, there has been a significant increase in natural disturbances affecting European forests (Patacca et al. 2023, Figure 2). To ensure the stability of forest ecosystems for the future, the understanding of the genetic component of forests becomes even more important. Innovative breeding technologies that enhance tree resistance to disturbance are key to improving forest resilience and supporting sustainable management.

Research needs for a sustainable future:

- We need a deeper scientific understanding on how climate change is causing forest growth to decline in Europe. Developing models to predict future trends and identifying management strategies that could reverse the current decline is imperative.
- New business models should be developed to create products and services that leverage a broader array of forest ecosystem services. Additionally, further demonstrations and piloting projects of new solutions are needed.
- Foresight, co-design and participatory approaches are necessary to meet the varied expectations and evolving needs of forest owners, citizens and their stakeholder groups with differing views on forests and forest use and the forest industry.
- We must develop methods for monitoring, measuring and valuing all forest benefits as well as forest health and forest damage. This will enable data-driven decision making that supports sustainable forest management.





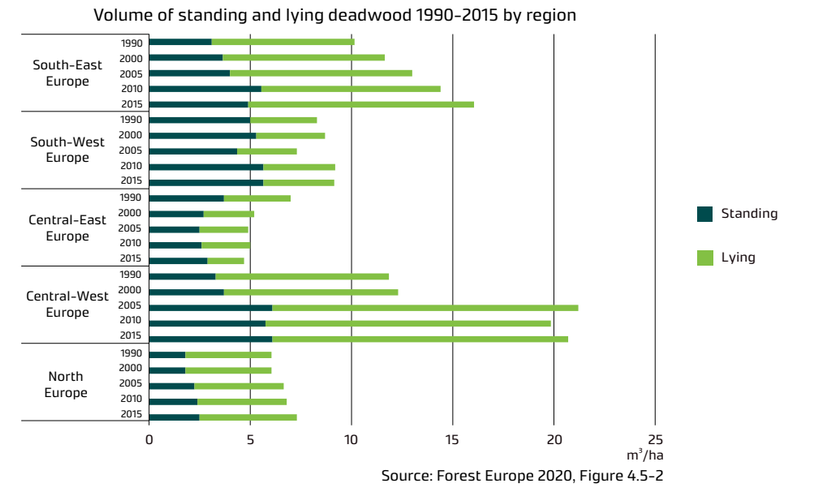


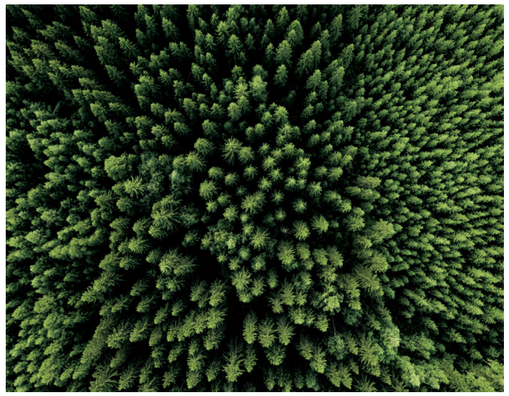
Figure 2 | Development of growing stock from 1990 to 2020, forest damages from 1950 to 2019 and development of deadwood volumes from 1990 to 2015 in European regions. In recent years, the growth of forests has started to slow down throughout Europe, e.g. due to effects of changes in environmental conditions predominatly due to climate change, the age-structures of forests and human impacts. At the same time, the climate-induced forest damages have been considerably increasing (Patacca et. al. 2023). In some countries, the damages already exceed the annual growth, and the volume of growing stock has started to decrease. Nevertheless, the development of deadwood volumes, as important indicator for biodiversity, show positive trend in most European regions.

© Natural Resources Institute Finland

Recommendation 3

Implementing proactive, varied and multi-functional forest management strategies significantly increases our ability to achieve environmental, economic and social objectives.

There is an urgent need to develop and implement a variety of multifunctional forest management approaches. These approaches must be tailored to different regions, and effectively respond to current and anticipated future demands of wood and ecosystem services. To prepare our forests for future climatic conditions, active and foresight-based sustainable forest management practices are essential. However, universal solutions are rarely practical due to the variety of forest ecosystems in Europe.



"There is an urgent need to develop and implement a variety of multifunctional forest management approaches. "

The ongoing digital transformation presents numerous opportunities for precision forest management. It is also crucial to keep in mind regional forest ownership structures and traditions and to continue refining region-specific ways to utilise forest resources.

Changes in forest structures and related delivery of key ecosystem services can often take decades to become apparent. A broader array of management strategies is necessary to address these long-term objectives, which can only be achieved through viable conversion strategies that are yet to be developed.

Evidence supporting the need for action:

- In many European regions, small-scale multifunctional forest management and closer to nature forestry (CtN) are widely practiced. Expanding these practices requires modern strategies, skilled professionals and up-to-date knowledge base among all actors, including small-scale forest owners.
- Forest related EU policies significantly influence various facets of sustainable forest management (e.g. Ahtikoski et al. 2024). It is important to resolve any conflicting goals to facilitate informed management decisions.
- Leveraging existing knowledge on diverse forest management strategies across the different forest types in Europe is essential to ensure a cost-competitive wood supply and provision of services vital to the European bioeconomy.

Research needs for a sustainable future:

- Development of conversion strategies to more varied, region-specific management concepts.
- Creation of syntheses and scenario analyses to determine feasible combinations of forest management for raw material production, protection, restoration, and climate change adaptation and mitigation.
- Promotion of collaborative joint research actions and knowledge transfer of best practices in forest management between forest managers in Europe.
- Exploration of digital solutions and new technologies that enable autonomous machinery, artificial intelligence for monitoring forests and biodiversity, and innovative new modes of work in multifunctional forest management operations.

References

Ahtikoski A., Väätäinen K., Anttila P., Laitila J., Mutanen A., Lindblad J., Sikanen L., Routa J. (2024). The effects of the EU's forest-related policies on harvesting costs in Finland. Silva Fennica vol. 58 no. 3 article id 23018. https://doi.org/10.14214/sf.23018.

Duncker, P. S., S. M. Barreiro, G. M. Hengeveld, T. Lind, W. L. Mason, S. Ambrozy, and H. Spiecker. 2012. Classification of forest management approaches: a new conceptual framework and its applicability to European forestry. Ecology and Society 17(4): 51. http://dx.doi.org/10.5751/ES-05262-170451.

Forest Europe, 2020: State of Europe's Forests 2020.

Högbom L, Abbas D, Armolaitis K,Baders E, Futter M, Jõgiste K, Lazdins A, Lukmine D, Mustonen M, Øistad K, Poska A, Rautio P, Varnagiryte-Kabasinskiene I, Vodde F, Weslien, J-O, Wilhelmsson L, Zute D. 2021. Trilemma of Nordic-Baltic Forestry — how to imply UN sustainable development goals. Sustainability 2021, 13, 5643. https://doi.org/10.3390/su13105643.

Kallio, A. Maarit I, Solberg, B., Käär L., Päivinen, R. (2018). Economic impacts of setting reference levels for the forest carbon sinks in the EU on the European forest sector. Forest Policy and Economics vol 92, pp. 193-201. https://doi.org/10.1016/j.forpol.2018.04.010.

Patacca, M., Lindner, M., Lucas-Borja, M. E., Cordonnier, T., Fidej, G., Gardiner, B., Hauf, Y., Jasinevičius, G., Labonne, S., Linkevičius, E., Mahnken, M., Milanovic, S., Nabuurs, G.-J., Nagel, T. A., Nikinmaa, L., Panyatov, M., Bercak, R., Seidl, R., Ostrogović Sever, M. Z. … Schelhaas, M.-J. (2023). Significant increase in natural disturbance impacts on European forests since 1950. Global Change Biology, 29, 1359-1376. https://doi.org/10.1111/gcb.16531.

Schier F, Iost S, Seintsch B, Weimar H, Dieter M. Assessment of Possible Production Leakage from Implementing the EU Biodiversity Strategy on Forest Product Markets. Forests. 2022; 13(8):1225. https://doi.org/10.3390/f13081225.

Stratton, A. D. H., Jacobsen, J. B., Strange, N., Weckroth, M., Weiss, G., Zivojinovic, I., Raši, R., Krajter Ostoić, S. (2024). Societal expectations towards and perceptions of Europe's forests (D2.1). HE project EUFORE no. 101081788. European Commission, 83 pages.

University of Cambridge Institute for Sustainability Leadership (CISL). (2020). Developing the EU's 'competitive sustainability' for a resilient recovery and dynamic growth. Cambridge, UK.

Venäläinen A, Lehtonen I, Laapas M, et al. Climate change induces multiple risks to boreal forests and forestry in Finland: A literature review. Glob Change Biol. (2020); 26: 4178-4196. https://doi.org/10.1111/gcb.15183.

Luke

© Natural Resources Institute Finland

More info

The aim of this policy brief is to provide joint science-based policy support from Europe's leading forest research institutes. The participating research institutes represent the forest-rich countries of Europe and are: Natural Resources Institute Finland (Luke), Austrian Research Centre for Forests (BFW), Forestry Research Institute of Sweden (Skogforsk), Norwegian Institute of Bioeconomy Research (NIBIO) and Slovenian Forestry Institute.

These institutes have extensive regional expertise and knowledge, and they are united in their commitment to developing science-based solutions to enhance the sustainability of the forest sector. Concurrently, they aim to highlight the research needs in the sector and advocate for their inclusion in future EU research agendas.

The proposed solutions are designed to facilitate evidence-based decision making thereby advancing the sustainability and competitiveness of the European forest sector.

Writers:

Mikko Kurttila (Programme Director), Antti Asikainen (EVP, research), Matleena Kniivilä (Research Manager), Mika Mustonen (Senior Specialist), Johanna Buchert (CEO), Natural Resources Institute Finland (Luke)

Peter Mayer (Managing Director), Austrian Research Centre for Forests

Charlotte Bengtsson (CEO), Magnus Thor (Director Research and Innovation), Forestry Research Institute of Sweden

Rasmus Astrup (Head of Research), Norwegian Institute of Bioeconomy Research

Nike Krajnc (Director), Slovenian Forestry Institute

Recommeded citation: Kurttila, M., Asikainen, A., Kniivilä M., Mustonen, M., Mayer, P., Bengtsson, C., Thor, M., Astrup, R., Krajnc, N., Buchert, J. 2024. Towards competitive sustainability and well-being of people from European forests. Luke Policy Brief 7/2024. Natural Resources Institute Finland, 8 p.

Co-operation:

Luke

GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

skogforsk

BFW AUSTRIAN RESEARCH CENTRE FOR FORESTS

NIBIO
NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

We build sustainable future and well-being from renewable natural resources.

Luke Policy Brief 7/2024
ISSN 2343-4252
ISBN 978-952-380-930-7 (print)
ISBN 978-952-380-928-4 (web)
http://urn.fi/URN:ISBN:978-952-380-928-4