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and Forestry of Finland

National Forest Strategy 2025 - updated version

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National Forest Strategy 2025 - updated version

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Abstract

In its resolution on 21 February 2019, the Government adopted the updated version of the National Forest Strategy 2025, which was approved by the Forest Council in December 2018. The vision and objectives of the Strategy, originally approved in 2015, remained primarily unchanged, but the project portfolio was updated to correspond to changes in the operating environment.

The Forest Strategy aims to achieve the 2030 Agenda goals related to forests and now takes into account climate sustainability and the safeguarding of forest biodiversity more clearly than before.

The strategy describes the priority areas and measures concerning forest sector development that the public sector will focus on as part of joint development work. Some of the projects detailed in the original strategy have already been completed, and new, more topical projects have cropped up in their place.

The entirely new projects added to the strategy deal with climate-sustainable forestry, international forest policy, influencing at the EU level and developing products made from wood. Overarching themes of the projects in the strategy include digitalisation and increased communication and interaction. In addition to these, more of the projects in the strategy now take into account the diversification of forest management methods and of business and industry, along with the safeguarding of biodiversity and protection of water resources.

The various measures have been compiled into a strategic project portfolio, the implementation of which will promote an increase in welfare produced through the forest sector and help to safeguard different aspects of sustainability. The updated project portfolio consists of ten projects.

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Tiivistelmä

Valtioneuvosto vahvisti 21.2.2018 periaatepäätöksellään metsäneuvoston joulukuussa 2018 hyväksymän Kansallinen metsästrategia 2025:n päivitetyn version. Vuonna 2015 alun perin hyväksytyn strategian visio ja tavoitteet pysyivät pääosin ennallaan, mutta hankeosiota uudistettiin vastaamaan muuttunutta toimintaympäristöä.

Metsästrategia toteuttaa metsiin liittyviä Agenda 2030 -tavoitteita ja siinä huomioidaan nyt aiempaa selkeämmin muun muassa ilmastokestävyys ja metsäluonnon monimuotoisuuden turvaaminen.

Strategiassa kuvataan metsäalan kehittämisen painopisteet ja toimenpiteet, joihin julkinen valta lähivuosina keskittyy osana metsäalan yhteistä kehittämistä. Osa alkuperäisen strategian hankkeista on jo viety loppuun ja niiden tilalle on valmisteltu uusia, ajankohtaisia kokonaisuuksia.

Strategiaan lisätyt kokonaan uudet hankkeet koskevat ilmastokestävää metsätaloutta, kansainvälistä metsäpolitiikkaa ja EU-vaikuttamista sekä puusta valmistettavia tuotteita. Läpileikkaavina hankkeina strategiassa korostuvat digitalisaatio ja vuorovaikutuksen lisääminen. Metsänhoitomenetelmien monipuolistaminen, monimuotoisuuden turvaaminen, vesiensuojelu ja monipuolistuva elinkeinotoiminta ovat lisäksi nyt mukana entistä useammassa strategian hankkeessa.

Eri toimenpiteistä on muodostettu strateginen hankesalkku, jonka toteuttaminen edistää parhaalla tavalla metsäalan tuottaman hyvinvoinnin kasvua ja kestävyyden eri näkökulmien turvaamista. Päivitetyssä hankesalkussa on kymmenen hankekokonaisuutta.

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Författare	Uppdateringen av skogsstrategin har beretts genom ett omfattande samarbete mellan olika intressentgrupper under ledning av jord- och skogsbruksministeriet och med stöd av det nationella skogsrådet.		
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Statsrådet fastställde genom ett principbeslut av den 21 februari 2019 den av skogsrådet i december 2018 godkända uppdateringen av Finlands nationella skogsstrategi 2025. Visionen och målen för strategin som för första gången godkändes 2015 är i princip oförändrade, men projektdelen har uppdaterats så att den ligger i linje med den förändrade omvärlden.

Skogsstrategin genomför de skogsrelaterade målen i Agenda 2030 och strategin lyfter tydligare än tidigare fram bland annat klimatsäkerheten och skyddet av skogarnas biologiska mångfald.

Strategin beskriver de prioriterade områdena för utvecklingen av skogsbranschen och de åtgärder som det allmänna ska koncentrera sig på under de närmaste åren som en del av den gemensamma utvecklingen av skogsbranschen. Vissa av projekten i den ursprungliga strategin är redan klara och de har i stället ersatts med nya, aktuella helheter.

De helt nya projekt som tagits in i strategin handlar om klimatsäkert skogsbruk, internationell skogspolitik och EU-påverkan samt träbaserade produkter. Som genomgripande projekt i strategin betonas digitalisering och ökad växelverkan. Diversifiering av skogsvårdsmetoder, tryggande av den biologiska mångfalden, vattenskyddet och mångsidigare näringsverksamhet ingår nu i allt fler av projekten i strategin.

En strategisk projektportfölj har utformats utifrån de olika åtgärderna, och genomförandet av projektportföljen främjar på bästa sätt en ökning av den välfärd som skogsbranschen genererar och säkerställandet av olika hållbarhetsaspekter. I den uppdaterade projektportföljen ingår tio integrerade projekt.

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SUMMARY

The National Forest Strategy 2025 was adopted as a Government Resolution on 12 February 2015. Its strategic objectives are based on the Government Report on Forest Policy 2050, which was submitted to Parliament in 2014. The National Forest Strategy contains priority objectives and more detailed measures aiming to achieve the strategic objectives set in the Government Report on Forest Policy.

In the Forest Strategy, in addition to forestry and the wood-processing industry, forest-based business and activities also comprises the production, processing and services as well as public goods based on other forest products as well as tangible and intangible products.

This updated version of the National Forest Strategy updates the strategic project portfolio, which comprises measures that the forest sector has worked together to prioritise, so the portfolio meets with the recent changes to the operating environment. The update to the Forest Strategy was drawn up in broad-based collaboration with stakeholders directed by the Ministry of Agriculture and Forestry and with support from the National Forest Council.

Finland’s forest sector is undergoing a transformation. Digitalisation, climate change mitigation and adaptation, Asia’s importance to Finland’s forest sector, as well as securing sustainability and responsibility have become even more emphasised in the operating environment. Needs related to the forest and, as a result, the entire forest sector and management and use of forests will be more diverse, which offers opportunities for increasing the welfare derived from forests. The wood processing industry has grown substantially over the past few years with new investments and has integrated with other sectors such as the chemical and energy industries.

New investments in the wood processing industry have increased demand for Finnish wood and promoted our society's transition from fossil to renewable raw materials. At the same time, nature tourism and other forest-based services as well as demand for natural products has grown. Forest-based business and activities accounts for a substantial portion of Finland’s bioeconomy and circular economy, which are used to create sustainable economic growth and respond to global challenges.

The change in the operating environment emphasises the need to further strengthen the overall safeguarding of sustainability and to reconcile economic, ecological, social and cultural perspectives. In addition to overall sustainability, the strategy now takes the methods for safeguarding climate sustainability and forest biodiversity into account more clearly than before.

The vision of the Report on Forest Policy and the National Forest Strategy is:

The sustainable forest management is a source of growing welfare.

The Report on Forest Policy specifies three strategic goals, which are based on the vision. The strategic goals are:

1) **Finland is a competitive operating environment for forest-based business.**
2) **Forest-based business and activities and their structures are renewed and diversified.**
3) **Forests are in active, economically, ecologically, socially and culturally sustainable and diverse use.**

The updated National Forest Strategy highlights priority areas for developing the sector and the most urgent needs for changes that the public sector must focus on in the following years.

The three goals of the updated Forest Strategy will implement 27 objectives, which have been grouped into seven groups. The first part of the overall number shows the strategic objective.

Table 1. The National Forest Strategy 2025's objectives.

Objective groups	**Objectives**
1. Finland is a competitive operating environment for forest-based business.	
1.1 Forest sector enterprises and business are renewed and new enterprises are developed.	• Political decisions and legislation will improve the conditions for renewal and growth for enterprises and business in the forest sector. • Value added will grow and resources will be used efficiently. • The production of domestic wood-based energy will increase. Wood-based raw materials will replace fossil-based raw materials and energy. • Diverse forest-based business, including services and the natural products sector, are growing.
1.2 Supply of raw materials allows for increased sustainable use of forests and new investments.	• Forest resources will be abundant and healthy with good growth potential and respond to the growing needs of the bioeconomy[1]. • Wood and forest service markets will be balanced and competitive. There will be functioning markets for business based on ecosystem services other than wood production. • Service capacity, efficiency and functioning of transport routes and communications will improve.
1.3 International forest policy and influencing EU policies promote the attainment of sustainable development goals and the operating conditions for forest-based business and activities as well as reinforce international business opportunities.	• The role of forests, sustainable forest management and forest-based bioeconomy will be reinforced so that the objectives in Agenda 2030 can be attained. • The roles of coordination, forest expertise and the forest sector's position as solution providers will be strengthened. • The international business opportunities of forest-based business and activities will be strengthened.
2. Know-how on forest-based business and activities is versatile and responds to changing needs	
2.1 Know-how on forest-based business and activities is diverse and responds to changing needs.	• R&D activities and structures financed with public funding support, in an appropriate manner, the sustainability of forest-related bioeconomy, the development of business, the commercialisation of products and services, demonstration projects and anticipating changes in the markets and other changes in the operating environment.

[1] Bioeconomy comprises the sustainable use of natural resources and the use of biological and technological processes in production chains. In the bioeconomy, natural resources will be used in a sustainable manner, by applying and replicating biological processes.

	• Cooperation between education and training and working life will be reinforced. • The number of people completing education at different levels will correspond to the forest sector's needs relating to recruitment and know-how. • Research activities will correspond with bioeconomy's needs. • The competence of the staff will be up-to-date and occupational welfare improves.
2.2 Administration is flexible, effective and customer-oriented	• Administration, its cooperation and services will support the competitiveness of the field and respond to customer needs. • Forest-related information and statistics will be open, comprehensive and up-to-date, which will support their broad utilisation. • The administration's permit procedures will be quick and flexible and they will support the implementation of investment projects and maintain a high standard of environmental protection. • Planning and zoning support the opportunities for forestry and diverse business.
3. Forests are in active, economically, ecologically, socially and culturally sustainable and diverse use	
3.1 Forestry is active and business-like	• Active and business-like forestry will increase, the size of holdings will grow and forest ownership and property structure will support the active utilisation of forests. • Forestry's incentives scheme is appropriate and activates forest owners. • Opportunities of forest owners to engage in gainful activities increase through commercialisation of ecosystem services.
3.2 Forest biodiversity and ecological, social and cultural sustainability are reinforced	• Decline of forest biodiversity will be halted by 2020 and a favourable status of forest biodiversity will have been secured by 2050. • Impacts to waters caused by forestry will have been minimised by using the best available practices. • Increasingly diverse sustainable forest management will support climate change mitigation and adaptation. • The recreational use and health-promoting impacts of forests will increase, and forests will be accessible to all. • The use of forests, the forest environment and forest culture will be valued more than previously.

The National Forest Strategy is linked in certain sections to other central government strategies. In particular, the implementation of the Forest Biodiversity Programme for Southern Finland (METSO) 2014–2025 is important with regard to the realisation of the National Forest Strategy's objective. The

implementation of the bioeconomy, energy, climate and biodiversity strategies are closely linked to the attainment of the National Forest Strategy's objectives. Regional forest programmes implement the National Forest Strategy's objectives regionally.

The Forest Strategy also realises the Agenda 2030 goals at the national, EU and international levels. The global Agenda for Sustainable Development (Agenda 2030) aims to turn global development onto a path where people's welfare and human rights, a prosperous economy and a stable society are ensured in a sustainable manner from the perspective of the environment and extreme poverty is eradicated worldwide[2].

Figure 1. Agenda 2030 Sustainable Development Goals.

A strategic **project portfolio** has been constructed from the measures that are most important with regards to promoting the strategy's objectives. The implementation of the portfolio will promote the growth of the welfare produced by forest-based business and activities and safeguard the different perspectives of sustainability in the best possible way. The project portfolio in the updated strategy comprises ten projects of which Forest Data and the Platform Economy, and Interaction and Communication in Forest-based Business and Activities are the project portfolio's cross-cutting projects.

Some of the projects listed in the version of the strategy approved in 2015 have been completed. New, current projects have been prepared in their place. The completely new projects added to the Forest Strategy apply to climate sustainable forestry, international forest policy and influencing EU policies as well as to products made from wood.

[2] Government Report on the implementation of the 2030 Agenda for Sustainable Development. Prime Minister's Office Publications 11/2017.

Table 2. The strategic projects of the National Forest Strategy 2025.

Project	Objectives of the project	Responsible parties
A. Forest Data and the Platform Economy 	The project, which is a cross-cutting project, aims to improve the availability and usability of forest, nature and environmental data and facilitate their integration with other data sources. High-quality and up-to-date spatial data promote the development and utilisation of digitalisation in tools and services provided by forest-based business and activities.	Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Finance Other actors: Finnish Forest Centre, Natural Resources Institute Finland, National Land Survey of Finland, Finnish Environment Institute, Metsähallitus, Tapio Ltd, actors
B. Interaction and Communication in Forest-based Business and Activities 	The project, which is a cross-cutting project, aims to build trust and cooperation between various actors with pluralistic communication and interaction. People's understanding on sustainable forest management, forest-based products and services, as well as forest biodiversity and other environmental benefits forests provide will also improve as the project progresses. The forest cultural perspective will be included as a part of the forest sector's interaction and discussion on forests.	Responsibility: Ministry of Agriculture and Forestry, Ministry of Economic Affairs and Employment, Ministry of the Environment Other actors: Finnish Forest Association, Finnish Forest Centre, Natural Resources Institute Finland, Lusto – The Finnish Forest Museum, Finnish Wildlife Agency, schools and educational institutions, Ministry of Transport and Communications, Ministry of Education and Culture, actors.

C. Resource-efficient and Sustainable Forest Management 	Forest management will be developed with the help of R&D activities, education and the new geographical information tools developed as part of the project, which will increase forest growth and strengthen carbon sinks. At the same time, sustainable harvesting potential will also increase. The project also takes biodiversity and water protection as well their trade-offs and synergies with wood production into account[3]. Measures that improve the structure of forest holdings and ownership will support the sustainable utilisation of forests. New incentives schemes support sustainable and resource-efficient forest and nature management.	Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Justice Other actors: Natural Resources Institute Finland, Finnish Forest Centre, National Land Survey of Finland, Tapio Ltd, Finnish Wildlife Agency, Metsähallitus, actors
D. Nature Management in Commercial Forests and Forest Biodiversity 	Nature management in commercial forests will be developed so it has greater impact and is more fixed part of routine forest management and forest service entrepreneurship. An effort will be made to carry out nature management in connection with forestry operations. Spatial data and new applications will make it possible to better reconcile forest biodiversity, wood production and other ecosystem services. The genetic resources of forest trees will be ensured. The METSO Programme is being implemented and its resources will be seen to according to the objectives set for the programme.	Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Natural Resources Institute Finland, Finnish Environment Institute, Finnish Forest Centre, Tapio Ltd, Finnish Wildlife Agency, Metsähallitus, actors
E. Climate Sustainable Forestry 	The project aims to increase knowledge on the development of carbon storage and sequestration in forests as well as on the impacts of forests and forest management on climate change adaptation. New information will improve risk management by forestry and forest owners and create the foundation for the more effective consideration of the climate in management and use of forests.	Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Natural Resources Institute Finland, Finnish Environment Institute, Finnish Meteorological

[3] Cross effects refers to synergies or conflicts in how measures influence different objectives.

		Institute, Tapio Ltd, Finnish Forest Centre, Metsähallitus, Finnish Wildlife Agency
F. Forest Roads and the Accessibility of Forests 	The project will help improve the service level and usability of the road network, for example, by utilising spatial data. At the same time, it will improve the decision-making capability of road cooperatives and make it easier to contact shareholders in road cooperatives. The project also promotes the availability of reliable, fast and equal data connections throughout the country. Investments in infrastructure will promote the diverse utilisation of forests, the performance of rescue duties, recreational use and nature tourism, as well as other business in rural areas.	Responsibility: Ministry of Transport and Communications, Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Finnish Forest Centre, Metsähallitus, municipalities, actors
G. New Wood-based Products 	The project aims to develop new forest biomass-based solutions and to support their commercialisation. The project's activities focus, in particular, on the development of new high value added fibre and pulp products as well as on in the use of wood in wood building and timber products. The new product opportunities of wood biomass and its components are also being investigated. Support for research and innovation activities will speed up the growth of the bioeconomy and circular economy.	Responsibility: Ministry of Economic Affairs and Employment, Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Business Finland, the Academy of Finland, Natural Resources Institute Finland, VTT Technical Research Centre of Finland Ltd, Ministry of Transport and Communications, the sector's companies

H. Nature Tourism, Natural Products Sector and Other Nature-based Services 	The project improves operating conditions for nature tourism, forest-based health and welfare services and the natural products sector, for example by using new tools. New value chains and revenue models for forest owners will create new forest and nature-based business.	Responsibility: Ministry of Agriculture and Forestry, Ministry of Economic Affairs and Employment, Ministry of the Environment Other actors: Metsähallitus, Finnish Forest Centre, Natural Resources Institute Finland, Ruralia Institute, Tapio Ltd, Finnish Wildlife Agency, companies, landowners
I. Know-how and Education 	The project promotes cooperation between research, business and education with the aim of improving know-how in spatial data, wood technology, nature management in commercial forests, water protection, peatland forest management, the forest road network, entrepreneurship. Also, the quality of machine driver training in the forest sector will be developed.	Responsibility: Ministry of Education and Culture, Ministry of Agriculture and Forestry, Ministry of Economic Affairs and Employment Other actors: Finnish National Board of Education, education providers, Metsäkoulutus ry, Työtehoseura, companies and organisations in the sector, Natural Resources Institute Finland, Finnish Forest Centre, Business Finland, Academy of Finland, Metsähallitus, Lusto – The Finnish Forest Museum, Tapio Ltd

J. International Forest Policy and Influencing EU Policies 	The project will implement initiatives that will apply to international forest policy and EU policies and will promote international business opportunities (Appendix 1). At the same time, it will promote the attainment of the UN's Sustainable Development Goals in forest-based business and activities. The project also aims to safeguard operating conditions for forest-based business and activities and for sustainable forest management and to increase awareness on the importance of forest-based business and activities to climate and energy policy solutions.	Responsibility: Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of Economic Affairs and Employment, Ministry of the Environment, Ministry of Finance Other actors: Business Finland, Natural Resources Institute Finland, research institutes, organisations and companies, other countries, international organisations and processes

1 Forests offer solutions for human and societal needs

The current long-term changes in the global economy, population growth, the climate, ecosystems, technologies and social structures will bring about many types of transformations in global and national communities. Responding to the UN's Global Sustainable Development Goals (Agenda 2030) will require the balanced furtherance of all aspects of sustainability, a systemic change towards the circular economy and cut in the use of non-renewable natural resources. The use of non-renewable raw materials and non-renewable energy will be replaced with globally renewable and responsible solutions of bioeconomy and circular economy. The ongoing changes to the operating environment will permanently increase demand for sustainably produced forest-based products and services.

Finland's forest sector is internationally oriented. A significant portion of production is exported, and the forest sector's share of the total value of exports is substantial. Today, the export of wood-based products accounts for some 20 per cent of the total value of Finnish exports of goods. The significance to the national economy of forest bioeconomy production is stressed as the factors of production are mainly domestic. Companies and other actors are currently looking for new operating practices and aiming to develop products and services with high value added.

Changing global operating environment will increase demand for forest-based products and services from Finland. Environmental values and welfare are increasingly important as drivers of natural resources use. Factors that will be emphasised in the future will include the sustainability of operations, material and energy-efficiency as well as fast technological development. In the future, forest-based business and activities will be an increasingly important part of the Finnish bioeconomy and circular economy and the resolution of global challenges.

The advancement of IC technologies will change consumer habits, and thus, among other things, increase the demand for packaging materials and reduce the demand for printing paper grades. More than one third of the chemical industry companies operating in Finland are already using bio-based raw materials. Wood-based materials offer alternatives to plastics and chemicals, cotton, cement and steel in a growing number of places. Concern about microplastics from various sources ending up in water ecosystems has increased political pressure to ban the use of plastics in specific product groups. These development trends enable Finnish forest-based industry to develop new value added products.

Biomasses already play a significant role in the implementation of energy and climate policy objectives, and their significance will continue to grow. Well-managed and growing forests strengthen carbon sinks. An extensive increase in the harvesting of forests can in the short term lead to a decline in the size of our forests' carbon sinks even if the growth of their carbon stores continues. The use of renewable biomass will replace products that are based on non-renewable natural resources. The climate impact of long-lived forest products is more sustainable than that of short-lived products. The extreme weather phenomena and increased forest damages due to climate change will require active and multi-objective climate sustainable forestry.

Digital solutions create new opportunities for forest use that are in line with the objectives of forest owners, for more effective measures carried out in forests and for new services. This development is also reflected in how forest policy objectives and other policies that influence forest-based business and activities are set. Digitality, open spatial data and applications that simplify decision-making will increase productivity and help in ensuring sustainability. Finnish people will benefit from more active and sustainable forest management[4], for example, in the form of new jobs and earnings, revenue to meet central and local government expenditure, better opportunities for recreation and environmental benefits produced by forest, including improved forest biodiversity.

The importance of service business as part of the bioeconomy and circular economy will grow and forest-based services will also have substantial potential. The market for forest-based services is evolving, nature tourism and the use of forests for recreational and welfare purposes is growing in importance, and new services are being developed for these fields. At the local level, forests also produce welfare through their impacts on regional economies. The Regional Forest Programmes prepared on the basis of the National Forest Strategy emphasise the strengths of various regions so as to benefit fully the development opportunities of the increasingly diverse, multi-sectoral and sustainable forest management.

Ecosystem services - benefits to humans derived from nature - are a significant source of welfare for Finnish people. The forest biodiversity creates the foundation for the ecosystem services derived from forests. Safeguarding well-functioning ecosystems is of key importance in the long term in order to guarantee the availability of ecosystem services for future generations. Natural capital, meaning the biodiversity and ecosystem services, must be utilised wisely. It is essential to recognise the interdependencies between different ecosystem services and to control them sustainably by taking advantage of research.

The perspectives of cultural sustainability and relationship to forests will outline the use of forests in a completely new way. The forest-cultural perspective and the multidimensional relationship that individuals have with the forest must be understood, because discussions on forests, forest policy-related decision making and all forest-related activities always involve interaction between human and forest. The forests have always been a key part of our identity, history and culture from the times of hunter-gatherers till today's forest use and industries. Finnish forest culture is diverse and pluralistic as there have always been many ways for using and valuing forests.

National, EU and international policies relevant to forests and forest-based business and activities are linked to one another seamlessly and the implementation of policies will require consistency and coordination. Global sustainable development goals and the objectives contained in international agreements influence our national actions. National objectives and actions in turn influence the formation of international objectives and agreements.

[4] Sustainable forest management denotes the forest management and forest lands in a way that preserves their diversity, productivity, regenerative capacity and vitality as well as the opportunity to carry out now and in the future significant ecological, economic, social, and cultural activities on local, national and global levels in a way that does not harm other ecosystems. The term sustainable forest management also includes forest conservation.

The National Forest Strategy 2025, which was originally drawn up in 2015, was updated in spring 2018. The Finnish Government confirmed the updated strategy with a resolution on 21 February 2019. The National Forest Strategy will serve as Finland's National Forest Programme. It describes priority objectives and measures related to forests. Measures needed for to secure the growth of forest-based business and activities and thus the welfare of people. The development needs will be reassessed flexibly during the implementation of the strategy, and new strategic projects can be updated as required.

The vision of the National Forest Strategy, which sets the aim to 2050, comes directly from the Government Report on Forest Policy. This vision is:

Sustainable forest management is a source of growing welfare.

The vision highlights the diverse welfare derived from forests and the point that forests provide solutions to people´s and society´s needs. Through forest policy we can create a setting for a growing and responsible forest-based bioeconomy and circular economy as well as more diverse welfare.

In order to realise the vision and increase welfare derived from the forests, we must successfully implement key measures aiming to develop the forest sector. On the basis of the vision, the Report on Forest Policy sets the following strategic objectives (Figure 2):

1. **Finland is a competitive operating environment for forest-based business.**
2. **Forest-based business and activities and their structures are renewed and diversified.**
3. **Forests are in active, economically, ecologically, socially and culturally sustainable and diverse use[5].**

The change in the operating environment emphasises the need to further strengthen the overall safeguarding of sustainability and to coordinate economic, ecological, societal and cultural perspectives.

[5] In this context, the concept of forest use is understood in a broad sense and also includes conservation.

Figure 2. The forest strategy's vision and goals form a triangle the centre of which comprises growing welfare that the vision aspires for, while its corners represent the interlinked strategic objectives.

The strategic objectives of the report combine to form a whole where the growing welfare set as the target of the vision is viewed from three mutually complementary perspectives. Diverse growth in welfare will come from achieving these objectives. The competitiveness of forest-based business and activities in Finland rests upon successful and anticipatory reconciliation of all these issues in a changing operating environment.

The Updated National Forest Strategy will implement the UN Sustainable Development Goals (Agenda 2030) that are related to forests (Figure 1 on page 11). All the strategic projects listed in the National Forest Strategy are linked to one or more Agenda 2030 goals. As regards forests, the National Forest Strategy also supports the implementation of the Finnish Bioeconomy Strategy. Policies on forest issues are also laid down in other strategies and programmes (Figure 3 and Chapter 4.2). These include the Forest Biodiversity Programme for Southern Finland (METSO), Finland's National Energy and Climate Strategy 2030, Finland's National Biodiversity Strategy, and rural and regional policy strategies and programmes. Forest policy is also influenced by many international and EU policies. The Report on Forest Policy and the National Forest Strategy collate and reconcile the decisions and policies that apply to forests.

Figure 3. Connections between the National Forest Programme and other policies.

2 The operating environment for forest-based business and activities is undergoing a transformation

2.1 Megatrends and economic growth will increase demand related to forests and wood

Megatrends change the operating environment and the development of forest-based business and activities both in the short and the long term. By identifying global megatrends, we can examine possible future operating environment-related changes, problems, solution options and new opportunities. For this reason, we need good foresight and responsiveness.

Megatrends that impact forest-based business and activities include changes to the global economy's priorities, increasing scarcity of natural resources, climate change, a decline in nature's biodiversity, the increase in demand for energy especially in developing countries as well as rapid technological development, especially digitalisation (Figure 4). Population growth, gentrification, urbanisation, a rise in the standard of living and changes to consumer habits are the important driving forces of these trends. Megatrends alter society's values and attitudes, and out of these, new trends can evolve new values.

Megatrends are reflected in Finland's forest sector, for example, through the export of forest industry products, forest use as well as international policies that are related to and affect forests. An effort has been made respond to the increasing scarcity of natural resources, and changes to the climate and biodiversity by striving for the bioeconomy, a low-carbon society, resource-efficiency and recycling.

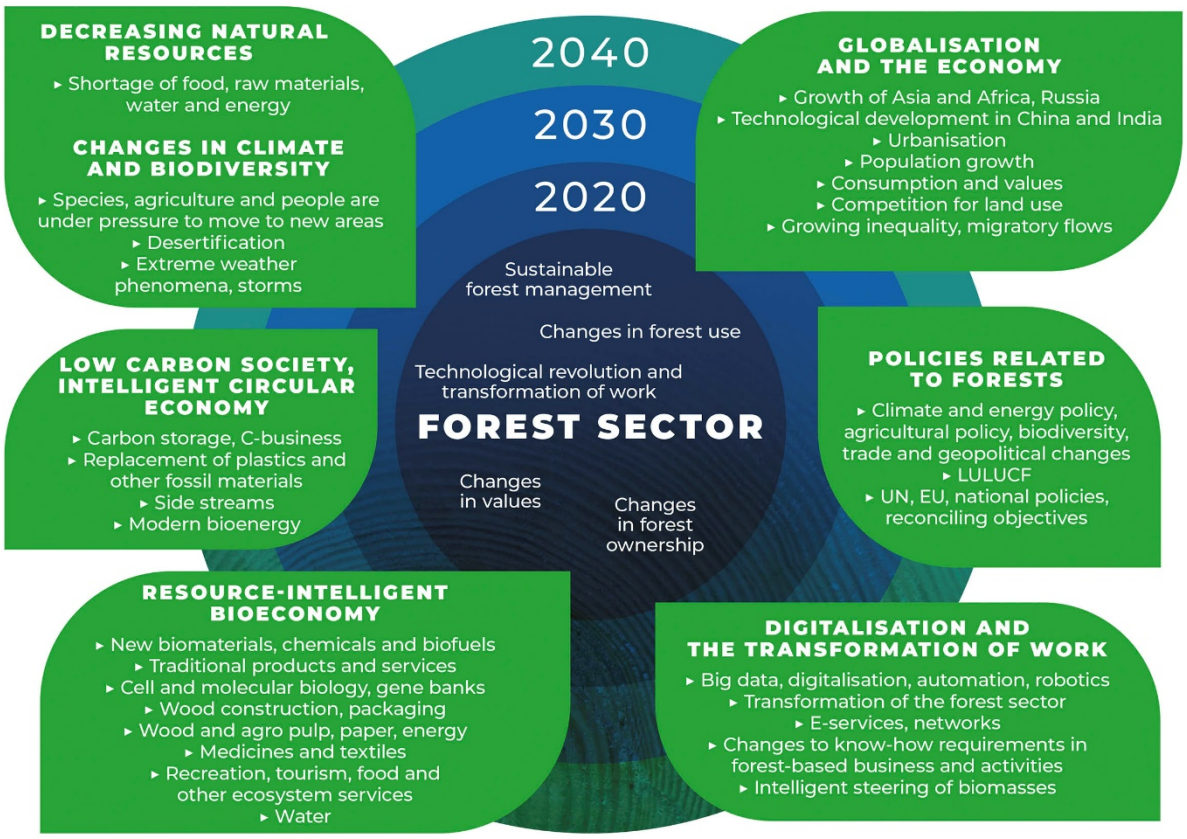


Figure 4. Key global megatrends that affect the forest sector. Source: Natural Resources Institute Finland

An effort is being made worldwide to respond to megatrends with the UN Sustainable Development Goals (Agenda 2030), which is supported with regard to forests by the UN Strategic Plan for Forests' 2017–2030 objectives concerning the sustainable management, use and conservation of forests. An effort will be made to use the UN Strategic Plan for Forests to also implement the objectives listed in the *Convention on Biological Diversity* (CBD). An effort is being made to tackle the rapid warming of the climate with the Paris Climate Agreement, which was ratified by 170 countries in November 2017. The EU's decision to include the land use sector (LULUCF) in the implementation of its climate policy means that land use by Member States must produce a carbon sink or emissions will in future be counted as part of the national emissions cut target. Finland has committed to international agreements and their implementation at a national level.

Finland's domestic forest sector is being required to have the ability to promote bioeconomy and circular economy and at the same time be able to competitively respond to demand for forest-based ecosystem services, consumer preferences and changing values. The condition for success is the sustainable use of natural resources, which is the basis for new bioeconomy investments, new business opportunities and for the creation of new products and services for the Finnish forest sector. Alongside wood materials-based business, issues that are emphasised in the future's bioeconomy and circular economy include welfare and environmental services such as the recreational and multiuse of forests, carbon binding, as well as safeguarding the forest biodiversity and reducing the impacts in water systems.

Megatrends have already affected Finland's forest sector through the allocation of investments, the sector's production structure, the export of products, the use of forests as well as changes to forest and climate policies. In the future, some of the impacts may be even stronger and develop in a surprising direction, for example, with changes to consumer habits, innovations or policy measures.

2.2 Investments in wood processing industry has recovered

Forest-based business and activities and their outlook in Finland are very different than they were five years ago. Numerous investment projects related to the wood processing industry have been implemented in Finland. The most significant individual investment project was a pulp plant and biorefinery in Äänekoski, which alone increased demand for pulpwood by some four million cubic metres. The positive investment atmosphere is also evident as the increased market value of listed forest-based businesses.

As the bioeconomy and circular economy develop, considerable additional investments in forest-based business and activities and the diversification of wood use can be expected. New investments in pulp and pulp-based textile fibre, and liquid biofuel production will contribute to increasing and diversifying wood use. New products can increase the value of production even in the short term and improve the competitiveness of traditional products and companies through, for example the utilisation of side streams. The share of companies' revenue comprised of new products that have been on the market for less than three years varies by company, but for certain companies this share is already close to ten per cent.

The good supply of wood and safeguarding the ecological and social sustainability of forest use, as well as flexible and fast permit procedures are key preconditions for the implementation of new investments. Due to investments, the use of domestic wood has grown around seven million cubic metres in a four year period. As a whole, it is expected that the annual demand for industrial roundwood will go up by over nine million cubic metres in Finland by 2020, compared to the year 2013. For the first time in decades, the supply of timber and sustainable harvesting opportunities set genuine limitations for new investment plans, which emphasises the importance of well-functioning wood markets as well as the need to increase increment of forests and investments in added value products. At the moment only a small share of the increase in wood use is covered with imported wood.

Industry that processes wood will establish new industrial production and service networks, where traditional sector boundaries are broken and the side streams from production by various companies are effectively utilised. New partnerships between various companies will be established in these networks and cooperation opportunities will be sought both for production and product development. The new production and service networks emphasise material-efficiency as well as increasing the processing grade of products. This is about a comprehensive change in mentality, and it will require a number of actors and sectors to commit to the development efforts.

Finland has a significant cluster of wood energy-related technology and expertise and wood energy export industry. In 2017, Finland's share of renewable energy of end consumption was the second largest among EU Member States. Wood fuels have overtaken oil-based products as the most important

energy source in Finland. They account for some 27 per cent of total energy consumption. A significant portion of this energy is created as a part of wood processing. The rise in wood energy consumption is the result of economic mechanisms that have encouraged a transition from fossil fuels to wood fuels. Also, investments in pulp production as well as combined production of heat and electricity have increased the use of wood-based energy. New investments in wood energy use are planned especially in the production of heat and transport fuels. Prohibiting or cutting down the use of alternative fuels such as coal, as well as an increase to the price of emission rights would further increase demand for wood fuels.

Finland has a prosperous machinery manufacturing industry that is based on wood processing. The predominant harvesting method used in Finland is cut-to-length system. Finland is the world's leading manufacturer of the applicable technology, and the sector has experienced good growth in the recent years.

2.3 China's importance to Finnish forest export to grow

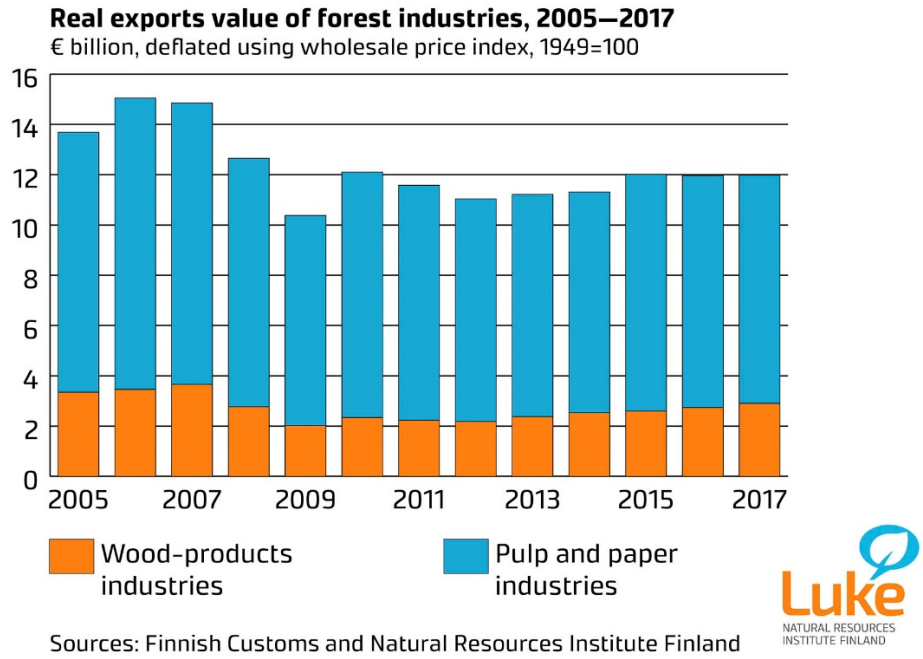
The centre of gravity of the world economy has changed significantly over the past few decades at China's lead. In addition to China, especially India, Brazil and South Africa are evolving into focus areas in the world economy alongside western countries. From 1980 to 2015, share of world economy growth by developing countries increased from 36 per cent to 58 per cent. The rapid growth of developing economies offers growth opportunities especially for the export of lower grade products.

The shift in the world economy's centre of gravity has also influenced forest-based business and activities both globally and in Finland. The increase in the demand and production of forest industry products and in investments made in these resulting from rapid economic growth has been centred in Asia and South America. In order to guarantee the availability of natural resources, China has strongly expanded its investments in Africa, the Middle East and South America, especially in the sectors of energy and raw materials. China's growing investments in high-tech companies in turn have caused concern in Europe recently. There are currently numerous investment plans based on Chinese capital ongoing in Finland, which if they are realised will increase interaction in forest-based business and activities between China and Finland.

China has become one of the most important destination countries for the export of Finnish forest industry products. The increase of forest exports to China has in great part been the result of growing demand for tissue paper and cardboard. Also, China's awakening to air quality problems in residential centres, the effects of climate change, the limited felling possibilities in the country's own forests, as well as the pressure to replace non-renewable raw materials with renewable ones have sped up the export of Finnish softwood pulp, cardboard and sawn wood to China. The growth in the export of sawn wood to China has in turn facilitated the increase of Finnish sawmill production volumes.

Finland's traditional export countries are still important

Increasing the value added of export will require that Finland is also able to compete in the long term and consistently in developed markets. Developed economies appreciate high standard value chains that are transparent, design and the linking of digital services with physical products and services. Existing relationships, export activities and logistics solutions as well as issues related to funding and customs will guarantee that our greatest export potential will remain with countries such as Germany, the United Kingdom, Sweden and the United States.



Trend in the value of forest and wood products exports in 2005-2017. More than 60 per cent of exports go to Europe.

China's ongoing urbanisation, improved standard of living, increased leisure time and changes to consumer behaviour will also increase demand for intangible services that forests have to offer, such as recreational, health and nature tourism services, which in turn will provide growth opportunities for forest-based tourism and wild product businesses in Finland. In 2017, the number of Chinese tourists to visit Finland increased by 63 per cent from the previous year.

2.4 Consumption habits are changing

In 2015, nearly 70 per cent of the world's population lived in cities, and this share continues to grow. An increase in income level and urbanisation will alter people's consumption habits also in the end product markets of the Finnish forest sector. A change in consumption habits and population growth will increase the demand for forest biomass, which will cause pressures for the sustainable use of forests and other natural resources as well as the coordination of user needs for different types of forests. The continuation of urbanisation will also change our relationship with nature, which may weaken our understanding of the importance of the use of forests to society and the causes and effects that affect forest development.

Population growth will increase the construction of residential buildings, which in turn will result in increased demand for wood products. Demand for pulp will increase due to an increase in income and the increased consumption of hygiene products and packaging papers and cardboards. Forest sector products will replace materials that are hazardous to the environment, decrease demand for plastic and the related waste problem and support economic growth based on renewable raw materials.

In addition to wood as a raw material, urbanisation will increase demand for other tangible and intangible ecosystem services produced by forests. Nature is considered a source of health and welfare. Growing international and domestic tourism will allow Finland to increase its forest-based nature tourism services. It is estimated that tourism to Northern Europe will increase at an annual average rate of 2.2 per cent in 2010–2020, and at an annual rate of 1.4 per cent in 2020–2030. Nature tourism is expected to grow at a faster pace than other tourism. Organic products and wild food[6] also interest a growing number of consumers, which opens up the possibility of also commercialising products that fall outside the scope of Everyman's Rights, such as chaga mushrooms, birch sap and products made from resin.

2.5 Megatrends change values and attitudes

A worldwide shift in ways of thinking, values and attitudes will also be reflected in Finland. Values have an impact on the use of forests, forest ownership, consumer behaviours and the production of products. It is important to take into consideration that different stakeholders have varying values and forest use-related objectives. The competition between the different uses of forests can lead to problems, if the social, cultural and ecological sustainability of forest use is not given enough consideration.

Changes in consumer values, attitudes and behaviours can increase demand for forest sector products and services that are sustainably and responsibly produced. Growing environmental knowledge is also visible in the increasing quality requirements set for products and services.

However, on average product prices and availability as well as learned behaviour models have the greatest impact on consumer decisions. For this reason, consumer behaviour is not always in line with changes that have been observed in values and attitudes. An increase to demand of bioeconomy products will require better environmental knowledge as well as the good quality and cost

[6] Wild food refers to eatable vegetables, herbs, berries, mushrooms, fish and game.

competitiveness of products and policies in both Finland and internationally that will improve the competitiveness of bioeconomy products.

The values and objectives of forest owners for forest management are already versatile, but these can be expected to become even more versatile. A growing number of forest owners live in cities far from the forests they own. The objectives of city-dwelling forest owners are typically more versatile than, for example, those of farmers who own forests. At the moment the average age of forest owners is rising, but generation transfers are expected to cause the average to drop in the future. Each new generation of forest owners always has a slightly different set of values and needs.

2.6 As needs set for forest use grow, the coordination of different forms of use will be necessary

Global megatrends increase competition for forest biomass. The growth in demand for wood-based products is reflected in the felling of forests and can along with other factors cause a decline in forest area globally. At the same time, the burden on the forest biodiversity is growing. From the global perspective, a decline in forest area as well as regional deforestation are the greatest threats to the ecological sustainability of forest use, the production of ecosystem services and the forest biodiversity. Deforestation and a decline in the quality of forests also has a large influence on the climate, as these cause a fourth of all global greenhouse emissions. In Finland, forestry does not cause the extensive deforestation described above, but as a result of changes to land use forms the forest area in Finland is also decreasing in size by about 10,000 hectares a year.

In addition to direct changes to land use, global deforestation is visible as a fragmentation of the natural environment, and as a decline in the living conditions of species and the proliferation of species. The pressure to fell natural forests is reduced by the fact that forest biomass can be accessed for industry's needs increasingly from fast-growing plantation forests with short rotation periods. On the other hand, tree plantations in developing countries often compete with land for food production, which limits the growth potential for the production of forest biomass.

The diverse objectives set at the global level for the use of forests will dictate objectives and requirements via international policy processes for the conservation of forest biodiversity and the coordination of forms of use of other forests and the rights of indigenous people also in Finland. The coordination of crossing objectives is required between an increase in the forest biodiversity, nature conservation, climate change mitigation and adaptation, biomass-based raw materials as well as other forest-based livelihoods (e.g. tourism, reindeer husbandry, fishing, hunting, gathering and traditional handicrafts). According to a report by Natural Resources Institute Finland and the Finnish Environment Institute,[7] an increase in the use of wood can only be realised in a manner that does not compromise biodiversity, in other words the protection of biodiversity and nature management in commercial forests are ensured better than at present.

[7] Korhonen et al. 2016: Biotalousskenaarioiden mukaisten hakkuiden vaikutukset metsien monimuotoisuudelle tärkeisiin rakennepiirteisiin. – Luonnonvara- ja biotalouden tutkimus 51/2016.

Special characteristics of the Sámi Homeland

The Sámi are the only indigenous peoples in the European Union's area. In Finland there are around 10,000 Sámi, of whom around 4,000 live in the Sámi Homeland. The Sámi Homeland comprises the municipalities of Enontekiö, Utsjoki and Inari as well as the Reindeer Owners' Association of Lapland in the northern part of Sodankylä Municipality. Approximately 90 per cent of the lands in the Sámi Homeland are state owned and under the administration of Metsähallitus. Of these, more than 90 per cent have been appropriated as protected areas and wilderness areas or natural economic areas and 9 per cent as forest industry used areas.

The most important pieces of Finnish national legislation that apply to the status and rights of the Sámi are the **Constitution of Finland** (the right to one's language and culture, section 17; the protection of basic rights and liberties, section 22; the right of the Sámi to linguistic and cultural self-government in their native region, section 121), the **Act on the Sámi Parliament**, the **Act on Metsähallitus** (the management, use and protection of natural resources under the administration of Metsähallitus must be harmonised with the Sámi Native Region in such a way that ensures the conditions for preserving the Sámi culture, section 6, the task of municipal consultative committees is to see to the sustainable use and management of state-owned land and water areas and their natural resources in the Sámi Homeland, section 39), the **Skolt Act,** the **Sámi Language Act**, the **Reindeer Husbandry Act** (The land in this the reindeer husbandry area may not be used in a manner that may significantly hinder reindeer herding, section 2), the **Land Use and Building Act**, the **Wilderness Act** and the **Nature Conservation Act**.

International agreements that apply to indigenous peoples include **The UN International Covenant on Civil and Political Rights** (CCPR), **International Covenant on Economic, Social and Cultural Rights** (CESCR), and **Convention on Biological Diversity** (CBD)**.** In addition to these, Finland has committed to the UN Declaration on the Rights of Indigenous Peoples.

Metsähallitus complies with the Akwé: Kon Guidelines, which were drafted together by nations and indigenous peoples during the Convention on Biological Diversity's conference of parties. The guidelines form the practices for how the Sámi people's traditional knowledge will be taken into consideration in management plans for protected areas and wilderness areas and the natural resource plan for the Sámi region. The practice has been used in the forest sector in the planning of the Juutua-Tuulispää recreational forest.

Traditional Sámi livelihoods include reindeer husbandry, fishing, hunting and gathering, Sámi handicrafts as well as their modern forms. The Sámi's traditional livelihoods are especially susceptible to the negative impacts of climate change.

At the national level, coordination of the objectives will require that preparation by different politicians is open and interactive. Coordination can be furthered with cooperation, effective planning and searching for synergies. There are significant regional differences on the emphasis placed on different uses of forests in Finland, which is why coordination procedures and the emphasis for solutions are going to differ from one another. At the global level, the challenge related to coordination is a poor base of spatial data. Finland could play a key role in improving this information base.

2.7 Climate change mitigation and adaptation to be emphasised in forest-based business and activities

Forests play an integral role in the mitigation of climate change. The Paris Climate Treaty requires that emissions and sinks are balanced by the latter half of this century. If we want to proceed in accordance with the 1.5 degree temperature rise development path outlined in the IPCC report, emissions and sinks must be balanced by the middle of this century. The land use sector is part of the EU's 2030 climate policy and the EU's minimum target of 40 per cent for emissions cuts. Climate policy affects legislation that applies to forests, which has a large impact on a forest-dominated country such as Finland. Carbon sinks will continue to play an important role in climate policy, which will be evident in national reviews concerning sustainable logging opportunities.

Active forest management can strengthen the forests' capacity to bind carbon and promote the replacement of fossil raw materials with wood-based products. Wood construction and wood products store carbon for long periods of time. Energy produced from the side streams of forestry and forest management will replace fossil energy sources. According to the World Energy Outlook recently published by the International Energy Agency (IEA), in 2017 use of modern bioenergy[8] was equal to the total increase in all other renewable energy sources. The objective for replacing fossil-based raw materials with renewable ones is also evident in the packaging, textiles and chemical industries due to the growing demand potential of wood-based and biodegradable products. Environmentally-conscious consumer choices will also have a strong role in mitigating climate change.

The changing climate is expected to improve the growth of trees especially in Northern Finland. On the hand the risks caused by climate change to the health of forests and this way to the production of wood will increase. As a result of climate change, extreme weather phenomena will become more common and their resulting damage can lead to temporary disruptions in the demand and supply of wood.

Both biotic and abiotic risks of damage will be influenced by the age structure of trees, tree types and forest management. Improvements to the climate sustainability of the forest industry will require active forest management, taking changing growth conditions into consideration when selecting tree species and their origin, and investing in research and forest tree breeding activities.

[8] Modern bioenergy refers to the modern use of biomass for heating/cooling, electricity production and transport.

The risk of forest damage will grow as a consequence of climate change

The increase in extreme weather phenomena (drought, rainy summers and autumns, warm winters, storm level winds, etc.) will increase the risk of abiotic damage and further damage resulting from these. Different types of biotic forest damage are also expected to become more common. However, the effect of climate change on pests are species-specific and depend on, for example, the insect specie's wintering habits.

The prevention of increasing forest damage caused by climate change will require good forest management, the continuous monitoring of forest health, as well as the effective and timely prevention of damage.

As it is believed that spruce will be more vulnerable to the rising number of storms and droughts caused by climate change than other tree species, forest management must be carried out in a manner that aims to create more mixed forests than at present and a forest landscape that is diverse in tree species. The decrease in the spread of spruce will require a decrease to the elk population.

The warming of the climate can affect pest populations either positively or negatively. For example, the potential for the engraver beetle to find food and reproduce will increase as the growth season becomes longer, which can significantly increase forest damage. On the other hand, the warming climate can increase the activeness of some species' (e.g. Autumnal Moth) enemies. There may also be significant interaction between the impacts of various damaging factors (storm winds, heterobasidion fungi, engraver beetle). The changing climate will also increase favourable conditions for the spread of alien or invasive species in land, which could be harmful to forestry.

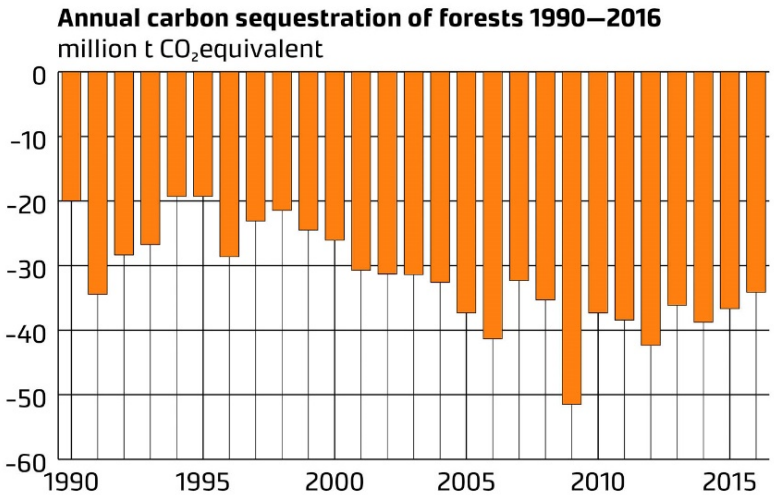
The forests' carbon sinks and carbon stores

The carbon sink, or the difference between the amount of carbon dioxide absorbed from the atmosphere and emitted from the forests, has fluctuated between 22 and 50 million tons in in Finland during the period 1990-2016 (million tons of CO_2 equivalent). The carbon stores of trees will build up when the annual increment exceeds the annual drain (also see Chapter 2.11). The size of the carbon stores in the soil vary depending on forest litter production, weather conditions and changes in harvesting volumes as well as management of the soil (tilling, drainage). Thick peatlands are of notable importance with regard to the soil's carbon store. The carbon stores of the Finnish forest flora and soils have built up; in other words, the forests have served as a carbon sink, even if some of the increment has been used for the manufacturing of wood products and bioenergy. The time line for a wood product's carbon binding varies according to the lifecycle of the product and whether it can be recycled.

The LULUCF Regulation provides that forests and the land use sector are now part of the EU's 2030 Climate Policy. In accordance with the regulation, Member States will calculate an estimate for their forests' carbon sink level i.e. a reference level. Finland's annual reference level for 2021–2025 is -34.77 million tonnes when wood products are included and -27.88 million tonnes carbon dioxide equivalent (CO_2-eq.) when wood products are not included. In accordance with criteria laid down in the LULUCF Regulation, an estimate on Finland's carbon sink level has been based on figures that describe actual use of forests over the 2000–2009 review period and the expectation that management practices will remain the same during the coming obligation period. Actual measurements on the forests' carbon sink values over this period were compared to the reference level. The advantage or disadvantage from the carbon sink is counted as part of the entire land use sector's climate objective. The calculated benefit from the forest carbon sink is strictly limited by a cap fixed to emissions in 1990, which was 2.5 million tonnes of carbon a year for Finland. In addition to forests the sector includes, emissions and sinks related to afforestation, forest loss and agricultural land.

The reference level for the carbon sink of forests specified in the Kyoto Protocol for 2020 without wood products is -19.3 and with wood products -20.5 million tonnes carbon equivalent. The measured carbon sink has been larger than this.

The Development of emissions and sinks in the agricultural and LULUCF sectors until 2050 project will be completed in February 2019.



Source: Natural Resources Institute Finland

The annual carbon sink of growing stock and soil in forests 1990–2016. The larger the negative number for annual carbon store, the larger a carbon sink the trees and soil are.

2.8 Utilisation of digitalisation plays a key role in the renewal of the forest sector

Digitalisation has affected consumer habits globally. The decline of print media and the growth of online shopping have been evident as an opposite development trend for printing paper and packaging cardboard. In Finland this trend has led to a radical structural change in the forest industry and significant impacts on regional economies. On the other hand, changes in demand for products have required adaptation leading to the successful reform of production and operating practice in the forest industry.

New digital solutions are an important opportunity for improving the Finnish forest sector's competitiveness and securing its sustainability. The greatest potential for digitalisation is related to improving efficiency and productivity, as well as in guaranteeing the sustainability of activities at different phases of forest-based value chains. For example, artificial intelligence, data collected by harvesters and drones-related solutions for the optimisation of forest resources, harvests and logistics will facilitate new applications.

Accurate information on forest resources and the utilisation of this information will increase activity in the timber market and forest management, and improve conditions for the allocation of nature management. Timely open data on forest resources and their owners will improve the efficiency of forestry processes. The Metsään.fi website maintained by the Finnish Forest Centre is an example of an open information portal that is financed with public funds and is widely used. The use of other electronic services intended for forest owners is also increasing at a fast pace. The Kuutio.fi website,

which was developed together by the forest-based sector's actors, is a unique electronic timber market place, which improves the effectiveness of timber market and trade parties. Geographical information-based solutions, such as information provided to forest owners on the Metsään.fi site will also help in safeguarding forest biodiversity and in the allocation of nature management methods and the coordination of the different ways in which forests are used.

A growing number of Finnish forest owners live in cities. When the distance between the forest and the owner's place of residence grows, independent forest management by the owner typically decreases and the need for outside forest services grows. At the same time, the significance of digital spatial data will be emphasised. The change will increase demand and the need for easy-to-use electronic services offered by forest professionals.

2.9 Ways of working and the need for workforce will change

The impacts of new technologies, robotisation and automation are compared to the changes caused by industrialisation in the 20th century. Issues that will come up in the near future will include changes to the content of work and the ways of working. The utilisation of information which is increasing at an exponential pace will change business models and place an emphasis on entrepreneurship. The content of work will change when part of work can be transferred to machines and algorithms. As globalisation and digitalisation progress, work can be dispersed and transferred where the best conditions and needed competence for it exist.

Machine vision and robotisation as well as increasing spatial data on and the integration of various information materials will increase the efficiency of wood procurement. Large technological reforms are not probable in forest regeneration and pre-commercial thinnings in the near future. As certain forest management and forest improvement work will remain labour intensive the jobs of many who earn their livelihood from the forest will be secured, which can be seen as one factors that maintains forestry's social and cultural sustainability.

The transformation of forest-based business and activities will increase the competence needs of employees' and entrepreneurs' in the sector. Forest-based business and activities is now employing more and more multidisciplinary experts and specialists from outside forest-based business and activities. New jobs will require new types of skills from workforce, which must be supported by reforming education and developing further education and retraining.

Employment in the forest sector

Forest-based business and activities provide a large amount of jobs throughout Finland. In 2017, the traditional forest industry and forestry employed 59,000 people. They indirectly employed four times this number.

Forest-based business and activities are experiencing a new upward trend, although the automation of processes and the mechanisation of harvesting have caused a decline in the need for workforce in the long term. The need for workforce per produced unit is smaller than previously in new forest industry investments. However, new job opportunities will open up in the forest-based and other natural resource sectors in the future as demand for forest-based products and services grows. An increase in information technology will create opportunities to promote the growth of forest-based ecosystem services other than wood production, such as nature tourism, recreational use, and the natural products sector.

The greatest growth potential for enterprise lies in planning and advisory services, nature tourism, the natural products sector as well as services related to forest management. The development of enterprise can also create new types of employment opportunities. For example, the Metsurit pilot (loggers pilot) has been launched as part of the Matkailudiili programme (tourism deal). The purpose of the pilot is to ensure year-round employment for loggers in Northern Finland by creating job opportunities from January to March, when conditions for practicing logging are challenging, but there is a shortage of workforce in the tourism sector.

A high standard of forest expertise and the export of forestry-related education also show great potential. Finnish business expertise is valued internationally. For example, consultancy work in the sector has expanded to the international market.

2.10 General economic development in Finland

Finland’s economy has developed favourably over the past few years. In it seems that the targets set by Prime Minister Sipilä for a 72 per cent employment rate and 110,000 new jobs will be achieved, which has supported both public finances and private consumption. Private consumption has been supported by the interest rate, which has remained unusually low. It is believed that economic growth will slow down in the future to under two per cent after having been at its highest in 2017 when it was at just over three per cent. The slowing down of economic growth is also visible, for example as a drop in the number of new construction projects.

Finland’s economic structure is in a continuous state of change. As the general level of wealth rises, the demand for products and services with a higher value added will increase, which will also be reflected in Finland’s economic structure. It has been estimated that the share that services make up of Finland’s gross domestic product will continue to grow, whereas their shares in the processing industry and primary production will decline. The services currently make up approximately 70 per cent of total production and total number of the employed people. The importance of services will also be emphasised in forest-based business and activities.

Good economic conditions have reduced the deficit and debt ratio of public finances. Also, adjustment measures decided on by Finland's Government have strengthen public finances. The public economy's fiscal position may be nearly completely balanced by 2020. In 2019, public debt in relation to the gross domestic product will fall to less than 60 per cent. However, the ageing of the population weakens the conditions for economic growth and adds public expenditure. Strict budget discipline will thus be needed to balance the public economy in the future. Due to public economy cutbacks, funds must now be allocated in a more goal-oriented and effective way, and at the same time, new funding models based on public-private partnerships must be sought. Balancing the public economy will require the continuous improvement of public sector efficiency.

2.11 Finland's forest resources, forestry and biodiversity

These days the growing stock in Finland's forests is increasing more than ever before. The discontinuance of selection forestry, investments in forest management and forest improvement, a growth in forest capital and an increase in the share of young forests has influenced the increment of forests. In addition to harvesting potential, the increase in growth will improve other forest use types including forest conservation. Increasing forest growth will require the more effective production of wood in a sustainable manner.

Harvesting volumes have been sustainable from the perspective of wood production at a level lower than harvesting potential for decades. The current harvesting volumes leave nearly of fourth of the annual growing stock in forests to increase forest capital. Harvesting potential is smaller than the sustainable maximum potential as regards wood production, if we take climate objectives into account (Figure 5). When estimating the amounts of wood used in practice we must also take into account that in the long term timber use will probably remain at a lower level than the sustainable harvesting potential in terms of timber production due to the different objectives of forest owners and the price flexibility in the timber market.

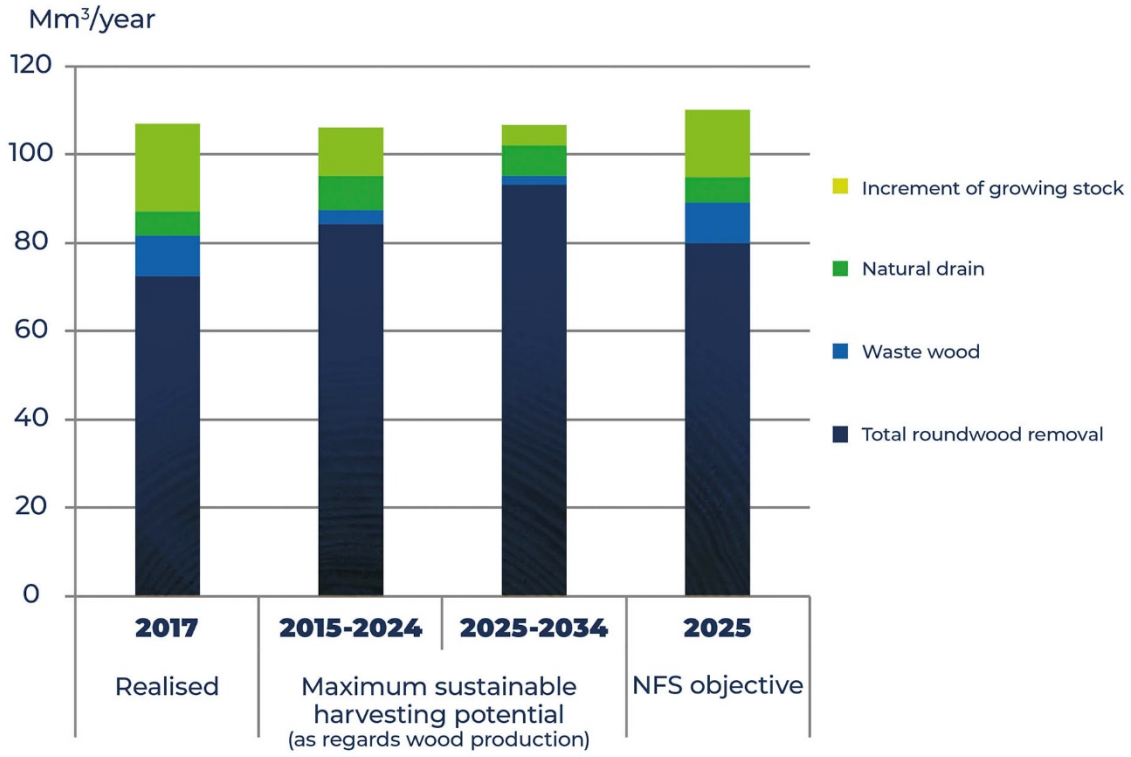


Figure 5. Estimate for annual increment of growing stock and growing stock drain. The figures shown in the columns for harvesting potential in the Maximum sustainable harvesting potential as regards wood production have been calculated with Natural Resources Institute Finland's MELA model: how much of the annual increment of stemwood can be felled sustainably taking into account technical and economic profitability and current conservation restrictions. The assumption behind harvesting potential estimates is that the renewal of forests will be seen to. Harvesting potential estimates calculated with the MELA model do not take into account the carbon sink obligation set for Finland's forests in 2021–2030. The NFS objective column illustrates the objectives for increment of commercial forests and roundwood removal. The columns are not directly comparable as increment has been calculated for all forests in the 2017 Realised column as well as in the Maximum sustainable harvesting potential as regards wood production column, while the NFS objective column shows the increment objective only for wood production land. The values used for natural drain and logging residue[9] in the calculation are estimated based in the situation in 2017. To increase the annual increment of commercial forests to 110 million m^3, positive impacts caused by measures implemented to increase the increment and by climate change are required, and forest damages need to stay at a low level. A majority of the carbon sink is comprised of the stands left to grow. Felling is the biggest factor that influences carbon sinks in addition to which natural drains affect the size of sinks.

[9] Logging residue refers to all stemwood that is left behind after harvesting: tree tops, stems of undersized trees, rejected butts and logs, oversized stumps and unharvested logs. No annual data is available on forest waste wood produced when harvesting or the natural drain that remains unused, and the figures in the drain statistics are based on less frequently produced reports and assessments.

Roundwood removal increased in 2017 to a record 72.4 million cubic metres. Around 80 per cent of this was felled from privately-owned forests. Stumpage earnings from private forests increased to EUR 1.91 billion. In 2018, annual stumpage earnings has exceeded EUR 2 billion.

The excessive density of young forests slows down the basal area increment of roundwood, and will limit future harvesting potential. The backlog in tending young stands has increased in recent years. According to the newest inventory data (NFI 12), there are a total of nearly 1.8 million hectares of seedling stands or young stands, where stand management or the first thinning are late in terms of optimal forest management. The land areas on which early management of seedling stands and young stands is carried out should be double from today's figures.

Forest improvement can help increase the increment of forests and help in adaptation to the impacts of climate change. Depending on the tree species and the degree of genetic improvement of the seeds, using genetically improved forest reproductive material adapted to different growing and climatic conditions may improve the annual stemwood increment by 15–30 per cent without compromising on quality. Forest tree improvement can also improve the quality of timber. Biotechnology offers promising methods for speeding up and accurately targeting the genetic improvement of trees.

A significant share of the species living in Finland are directly or indirectly dependent on the forests. The forest biodiversity has been secured more effectively by increasing the amount of protected forests, implementing the restoration of protected forests and developing the nature management of commercial forests. The trend of species in forests becoming threated has slowed somewhat but not halted[10]. As wood use increase, the existing measures for safeguarding biodiversity must be strengthened and new methods must be developed and adopted. A better knowledge base will also be needed on the cost-effectiveness and on the development of planning tools and operating models.

[10] Rassi, P., Hyvärinen, E., Juslén, A. & Mannerkoski, I. (ed.) 2010: The Red List of Finnish species 2010. The Ministry of the Environment & the Finnish Environment Institute Helsinki.

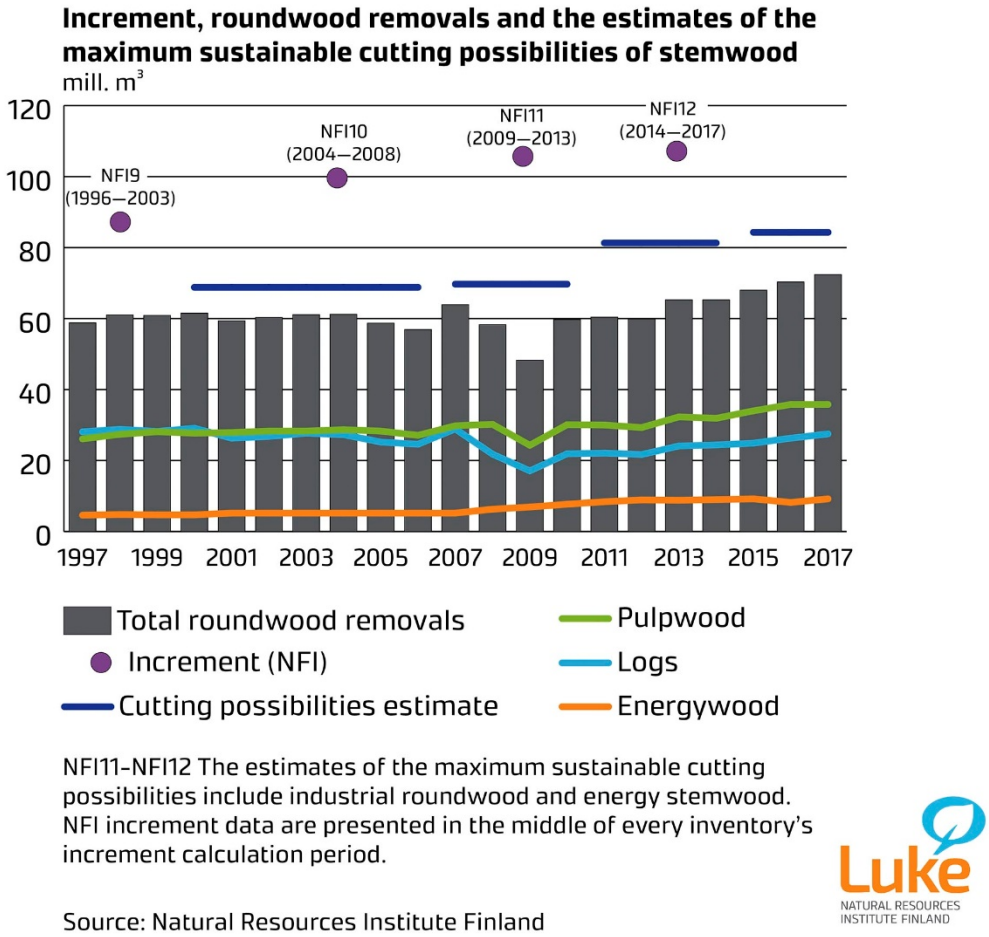
Increment of growing stock and roundwood removal

Three quarters of Finland's land area, meaning around 23 million hectares, is covered by forests. Approximately 20 million hectares this is forest land. There are more than 3 million hectares of low-productivity forestry land with few trees, such as open peatland and exposed bedrock. According to the 12th National Forest Inventory, growing stock volumes on forest land and poorly productive forest land are 2,473 million cubic metres.

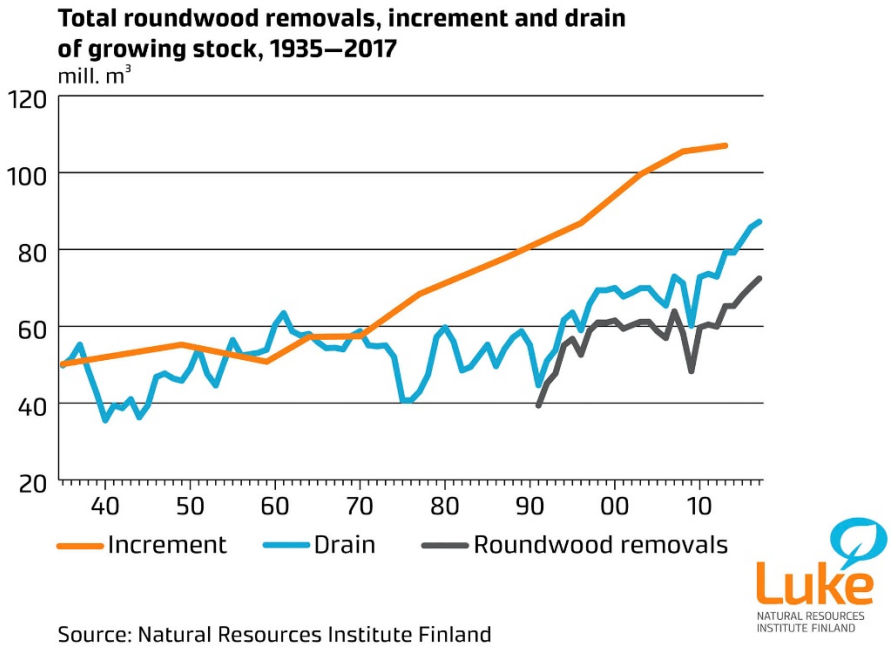
According to the 11th National Forest Inventory, the annual increment was 107 million cubic metres, of which increment in commercial forests accounted for some 100 million cubic metres. Compared to measurement results listed in the 11th National Forest Inventory, Finland’s growing stock has increased by 110 million cubic metres. The volume of pine, spruce and deciduous trees have all increased.

Climate change is likely to further accelerate growth of trees in Finnish forests, particularly in the north and in peatland forests. This has not been taken into consideration due to uncertainties in estimates on the increase in growing stock. Climate change is expected to increase the growth of stemwood in mineral soils by about ten per cent by 2020 and 29 per cent by 2050 compared to the year 2013. However, the risks posed by climate change to the health of forests must also be controlled.

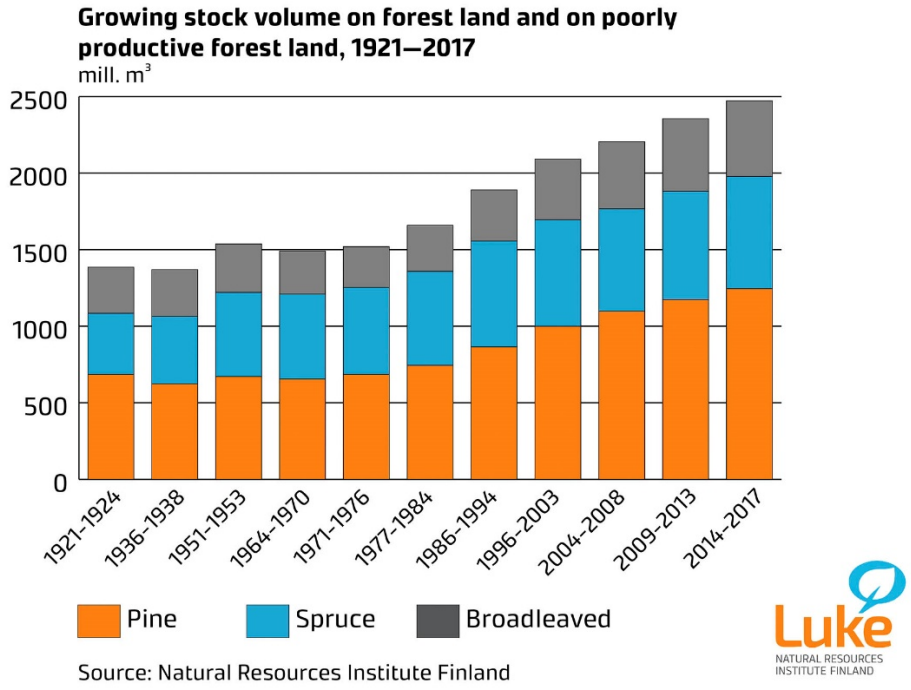
The use of domestic wood and felling have increased significantly over the past four years. In 2017, the volume of roundwood removal rose to approximately 72 million cubic metres, of which 26.6 million cubic metres was in logs. The maximum sustainable harvesting potential as regards wood production calculated for timber production forest land is approximately 84.3 million cubic metres annually for 2015–2024 and approximately 93 million cubic metres annually for 2025–2034. If harvesting is increased to the sustainable maximum potential as regards wood production, more contributions and investments would need also to be made to nature management and conservation than at present to maintain the forest biodiversity.



The increment of domestic industrial roundwood, the development of roundwood removal and the maximum sustainable harvesting potential as regards wood production 1975–2017.



Trend of annual increment of growing stock and growing stock drain in 1935-2017.



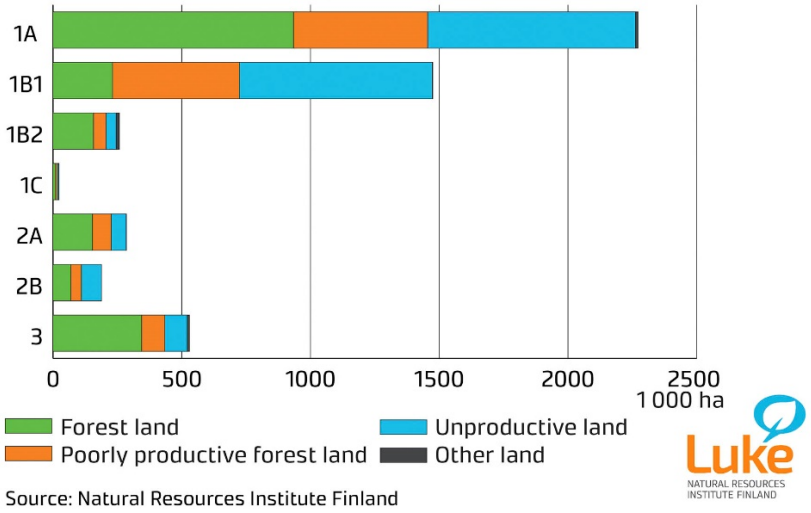
Trend in growing stock volumes in 1921-2017.

Forest conservation

One of the aims listed in the Aichi Targets related to the Convention on Biological Diversity (CBD) is that at least 17 per cent of terrestrial and inland water area will be protected. The international understanding of conservation as a concept is a broad one. In addition to actual conservation it includes other effective area-based means for safeguarding biodiversity such as park forests and recreational forests. This conservation area per centage has already been achieved[11] in Finland, but the shortcoming is that the majority of protected areas are centred in Northern Finland. This applies to total terrestrial and inland water areas as well as forest areas.

There are a total of 2.7 million hectares of protected forests in Finland in accordance with the national classification based on the IUCN's (International Union for Conservation of Nature) international criteria, (of which 1.6 million hectares is forest land), meaning 12 per cent of forest land and poorly productive forest land area. 7.7 per cent of forest land area is protected. The land area of protected forests is made up of forests in statutory conservation areas as well as specific commercial forests protected for biodiversity. Statutory protected areas cover 10.6 per cent of forest land and poorly productive forest land (6.6 percent of forest land area). The majority of protected forests are located in Northern Finland. 4.8 per cent of Southern Finland's forest lands and poorly productive forest lands are protected, while the same figure is 19.4 per cent in Northern Finland. Although forest refers to both forest land and poorly productive forest land, from the perspective of the reconciliation of forest use and conservation, it is essential to protect forest land used for forestry. Protected forest areas as well as forests in recreational and other special areas will support the safeguarding of biodiversity.

Area of statutory protected areas, biodiversity conservation sites of commercial forests, and special areas supporting conservation of nature values, 1.1.2016



Source: Natural Resources Institute Finland

1A: Nature conservation areas and areas reserved for nature conservation areas. 1B1: Other statutory protected areas. no fellings, 1B2: Other statutory protected areas, cautious felling possible, 1C: Protected areas that have been protected for a fixed period, 2A: Specific biodiversity sites in commercial forests, no forestry-use, 2B: Biodiversity sites in commercial forests, limited forestry-use, 3: Forests that support the protection of nature values, other special areas and sites, limited forestry-use.

[11] Fifth national report to Convention on Biodiversity, Finland, page 117 (https://www.cbd.int/doc/world/fi/fi-nr-05-en.pdf)

Assessment of threatened habitat types

The second assessment of threatened habitat types in Finland was published in December 2018. The methodology was revised to follow the new international criteria developed by the IUCN (IUCN Red List of Criteria for Ecosystems). Finland is a forerunner in the use of this methodology. The assessment compared changes in the amount and quality of habitat types as well as in their rarity over the past 50 years and compared to their preindustrial levels in the 1750s. An effort was also made to predict coming changes. Additionally, the assessment looked into whether the development trend of habitats was positive, stable or negative.

Of the 40 forest habitats identified in the assessment, 15 were herb-rich forests, 19 were heath forests and six were special types; of these six were collective specie types. The herb-rich forest habitats were divided according to their humidity and nutrient levels and in hardwood herb-rich forests on the basis of hardwood type. Heath forest types are based on the forests' growth site classification and the forest's succession phase. Special forest types include sunny slopes in esker forests, flood forests and cliff side forests.

Finnish forests have lost a substantial amount of their natural ecological traits. At the same time, the surface area of many forest habitats have decreased in size. As a result of these changes, 76 per cent of Finland's forest habitats are threatened, and an estimated 21 per cent are near threatened. On the basis of short-term criteria (50 years), 41 per cent of forest habitats are threatened; of these 11 are herb-rich habitats, three are heath forests and one is a special forest type.

Most often, the reason for the decline of heath forests is a long-term decline in the habitat's ecological quality. The change is evident especially in young forests where the amount of dead wood and mature wood have decreased to a fraction of what they are in forests which spring up naturally after forest fires or storms. Old-growth forests on the other hand have become threatened as a result of a decrease in their land area. The land area of forests in nutrient-poor habitats has decreased due to eutrophication. In the short-term this decline has predominantly happened in forests dominated by deciduous trees.

The majority of herb-rich forest habitats were evaluated as threatened. The spread of spruce trees and the clearing of herb-rich forests into fields are a couple of reasons for this decline.

[11] The Fifth national report to the Convention on Biodiversity, Finland, p. 117 states that at least 18 per cent of Finland's land area is protected.(https://www.cbd.int/doc/world/fi/fi-nr-05-en.pdf)

Threatened species in Finland

Of the 45,000 species known in Finland, almost one half live in forests on mineral soil meaning in heathland forests and herb-rich forests. Assessments on threatened species and habitats are carried out approximately every ten years, and they provide more detailed information on trends in threatened species trends. Assessments help us understand the decline in species and habitats and the factors that affect this provide information on where to allocate measures to protect them.

The fourth assessment of threatened species (2010) indicates that conservation measures do make a difference and that forest conservation and sustainable measures for the forest management have a positive impact on the forest biodiversity. According to the results of the National Forest Inventory, the amount of dead wood has increased recently in Southern Finland but decreased in Northern Finland. A decrease in the amount of dead wood in Northern Finland is due to the fact that the north does not have the same type of storms as Southern Finland.

Mineral soil forests are the primary habitat for a total of 814 threatened species, and 36.2 per cent of all threatened species live in these forests. On the other hand, an assessment of threatened species concluded that nine per cent of forest species were threatened. Some forest species have adapted to the changes brought by forestry, and some have even benefited from them. A total of 104 threatened species live in mires, including open bogs (4.6 per cent of all endangered species), and the primary habitat for some 25 per cent of these are pine mires or wooded mires. The next Assessment of threatened species will be published in March 2019.

The importance of herb-rich forests and old-growth forests is notable with regard to threatened species. A decrease in dead wood is the most common reason and factor for a forest species becoming threatened. Many of the structural features of habitats such as the amount of dead wood, mature trees and deciduous trees, as well as the share of old generations have changed with the use of forests. Often, changes are the result of historical development, which is related to changes in the use of forests and the needs of society.

3 Strategic objectives, targets and indicators

Objectives will be added to the National Forest Strategy the successful attainment of which will increase growth and welfare and in which the public sector plays a key role. The proposed measures (Chapter 4) will often require support from both the forest-based sector and other administrative sectors, as well as cooperation between them.

The measures will be carried out within the framework of the central government's financial plan and approved budgets, and it will thus be necessary to target the available funding at the most vital measures that promote the development of forest-based business and activities. Impact means achieving benefits for society.

Indirect forestry impact indicators are used for illustrating how well objectives are met. These cannot directly be influenced with strategic measures. One indicator in this strategy may describe the achievement of several objectives. In addition to using indicators, qualitative assessment of target achievement will be carried out. These assessments are utilised directly in the development of activities.

With regard to strategic goals and objectives, it is essential that forest policy is sufficiently long term in nature and predictive, and that adequate resources can be allocated to the necessary measures.

3.1 Finland is a competitive operating environment for forest-based business

The role of the public sector is to create a competitive operating environment for forest-based business. Public policies will promote innovations related to forests, forest ownership and the use of wood and other forest-based raw materials, entrepreneurship, new investments, growth of business and the creation of new jobs.

Finland’s roadmap for the circular economy identifies forest-based circulation as our country’s best area of expertise. In the future, resource-efficiency and renewal will be emphasised more and more in wood processing industry.

3.1.1 Forest sector grows, enterprises and business are renewed and new and growth enterprises are developed

New business opportunities are based on market demand resulting from changes to consumers’ values as well as on digitalisation and the new business models made possible by cooperation between companies. The public sector’s task is to support the operating conditions of companies and, on the other hand, to ensure the realisation of non-market social objectives. The sustainability of activities and its verification are in a key position backing the growth of forest-based business and activities.

In the future, successful large companies will provide a platform for a growing number of SMEs in forest-based business and activities. This operating environment offer good opportunities for growth-oriented and competence-centred SMEs to develop their bioeconomy and circular economy business. Large actors together with SMEs will form new industrial production and service networks where wood and production side streams will be processed into end products for various uses and where the value added and resource efficiency of production will increase. The significance of production waste and side streams as raw materials will increase, and they will become more important as a factor of competition. New industrial production and service networks will increase the resource-efficiency of forest-based business and activities.

Many business activities related to the bioeconomy and forest resources require at least a reasonable production volume and international service network in order to be successful in international markets. There are relatively few medium-sized companies that are seeking strong growth in Finland's forest bioeconomy sector. Attention must be drawn to establishing new companies, spin-off activities and digitalisation. Additionally, companies and their financial arrangements, which facilitate the growth of international medium-sized companies, are drawing more attention and additional measures.

To fully exploit the potential of the bioeconomy and circular economy, political decisions must support the creation of new enterprises and innovations, and the legislation or its interpretations must not create unnecessary barriers to the sustainable exploitation of forests and wood. Public funds must be allocated more than before to the development of information infrastructure required by digitalisation and to research and development activities (R&D). Unnecessary bottlenecks caused by current provisions that block bioeconomy and forest sector development should be addressed in various branches of administration. The policies should also have a long time span and be predictable while promoting sustainability, which is the premise for the bioeconomy as a whole.

Know-how in forest-based business and activities, sustainability, availability of wood and competitive factors of production, well-functioning infrastructures, and advanced technologies are key competition factors for forest-based business and activities. While conventional forest industry products still remain of key importance economically, new wood-based products such as biochemicals and materials are being developed and produced alongside these. Fibre and cellulose products with high value added, such as textiles and biocomposites meet with the global need for sustainable development-appropriate material solutions. Wood biomass and its components provide new product opportunities also in for the production of chemicals, packaging materials, films, insulation and filling materials as well as high value added lignin-based products. The production of wood-based energy will grow especially in the heat generation and biofuels.

The product development and commercialisation of new products must be accelerated. The Bioruukki piloting centre established by Technical Research Centre of Finland Ltd (VTT Oy) is a good example of a public sector investment that has helped in building the Nordic countries' largest bioeconomy research environment. New products will also increase the value added of forest-based business and activities. Exploitation of the raw material reserves yielded by the forests must increasingly be based on solutions that emphasize material and resource efficiency.

Wood construction offers expanding possibilities, for example, in housing construction. New wood construction techniques and materials mean significant export opportunities. Business development possibilities related, for example, to the beneficial health impacts of wood construction and furniture

made from wood could also be utilised better than at present in the export sector. Preconditions for fully exploiting the currently underused potential of various natural products include innovations, internationalisation, more advanced technologies and development of entrepreneurship in the natural products sector. Platforms for the reconciliation of supply and demand should be built to improve the functionality of the natural products and forest services markets.

Increasing the share of renewable energy is one of the key objectives for Finland's Energy and Climate Policy. Wood fuels as a source of renewable energy are crucial to Finland. By creating preconditions for wood processing industry investments, we also encourage wood-based energy production, as renewable energy is typically produced as part of the manufacturing process. Active forestry maintained by the wood processing industry will bring more wood chips suitable for energy use to the market. It is possible to increase the use of wood-based energy by implementing long-term and predictable energy policy. The objective is that the majority of wood-based energy will continue to be produced on market terms from the side streams of other wood use.

Finland has great potential for resource-efficient, decentralised energy production. We must safeguard the preconditions the production of wood-based energy, as it is the most cost-effective form of renewable energy in Finland. In 2017, a total of 136 TWh of renewable energy was produced in Finland, of which 74 per cent was produced with wood fuels. At the same time, 138 TWh of imported fossil energy was used.

In addition to climate benefits, the greatest advantage offered by wood-based energy production is that it is domestic. Wood energy and other domestic energy sources create jobs while also improving the security of supply in energy production and Finland's current account balance. Domestic energy production is not affected by external market disruptions, which improves the stability and predictability of the operating environment. The greatest uncertainty for wood-based energy is related to international energy and climate policy. The market prices of competing fuels as well as the price development of emissions rights will influence the competitiveness of domestic fuels and their demand.

Services in the sector of forest-based business and activities can be divided into services relating to wood processing products, services relating to forestry, and other services related to forests. The market for wood processing products will expand, and instead of conventional production, they will increasingly be about integrated service solutions. Forest owners will need increasingly individualised contracting services in wood production and in nature and landscape management. In addition to employment services, the range of services needed by forest owners that need to be developed include planning, investment and entrepreneurial services.

The most significant field of other forest-related services is nature tourism. Nature tourism can be developed relying on the network of conservation areas, but state-owned multi-use forests and private forests also have potential for tourism. The use of forests as social and health service environments, in the prevention of illnesses and in other health and welfare services creates opportunities for new forest-based business options. The development of nature tourism and other service business in private forests will require the development and introduction of operating models and contractual practices (see Chapter 3.3.1).

The total value of conventional natural products – berries, mushrooms and game – amounts to hundreds of millions of euros annually. The value added by game management and reindeer farming is also significant, and it can be further increased by extending the degree of processing of products and developing service production. Northern Finland's expansive protected areas and wilderness areas form an operational environment for the development of reindeer farming and tourism, the unique character of this environment can further exploited. Business in the natural products sector can be increased not only in traditional primary production but also in the food, biotechnology, cosmetics, pharmaceutical, and herbal medicine industries. The development of new business will require cooperation across sector interfaces and the networking of experts in different sectors. Developing business will also offer new income opportunities for the forest owners and potential for the employment of young people. As digitalisation progresses, it will facilitate new product and service production connected to the natural products sector and improve balance between supply and demand.

The development potential of forest-based new innovative products and services in sectors other than wood production must be recognised in decision making. It is essential to further develop methods for the coordination of wood production and other types of forest use (e.g. tourism, reindeer farming).

Objectives:

Political decisions and legislation will improve the conditions for renewal and growth for enterprises and business in the forest sector.

Value added will grow and resources will be used efficiently.

The production of domestic wood-based energy will increase. Wood-based raw materials will replace fossil-based raw materials and energy.

Diverse forest-based business including services and the natural products sector are growing.

Indicator	Initial level in 2013	Outcome 2016/2017	Target level in 2025
Trends in value added of forest-based business and activities by sector • Forest industry • Part of chemical industry included in the bioeconomy • Forestry • Wild products • Nature tourism	• Forest industry EUR 3.9 billion • Part of chemical industry included in the bioeconomy EUR 0.4 billion (2011) • Forestry EUR 2.9 billion • Wild products EUR 159 million • Nature tourism EUR 1.2 billion (2011)	• Forest industry: • Wood products industry EUR 1.2 billion Pulp and paper industry EUR 3.1 billion • Part of chemical industry included in the bioeconomy EUR 0.7 billion • Forestry EUR 3.5 billion • Wild products EUR 171 million (2016) • Nature tourism EUR 1.4 billion	Growing
Development in the revenue of forest-based business and activities by field • Forest industry • Part of chemical industry included in the bioeconomy • Forestry • Wild products • Nature tourism	• Forest industry EUR 25.7 billion Wood products industry EUR 6.4 billion, pulp and paper industry EUR 19.3 billion • Part of chemical industry included in the bioeconomy EUR 1.6 billion. (2011) • Forestry EUR 4.2 billion • Wild products EUR 230 million • Nature tourism EUR 2.7 billion (2011)	• Forest industry EUR 29.8 billion: Wood products industry EUR 6.9 billion, Pulp and paper industry EUR 22.9 billion (2017e) • Part of chemical industry included in the bioeconomy EUR 2.4 billion. • Forestry EUR 4.9 billion. • Wild products EUR 300 million (2016) • Nature tourism EUR 3.3 billion	Growing
Share of wood-based energy in total consumption	• 25%	• 26% (2016)	In keeping with energy and climate targets

Energy use of solid fuels, of which forest chips	• Solid wood fuels in total 19.4 million m^3 (38.8 TWh) • of which forest chips 8.7 million m^3 (17.4 TWh)[12]	• Solid wood fuels total 19.9 million m^3 (2017e) • of which forest chips 7.8 million m^3 (15.6 TWh) (2017e)	• Forest chip use in accordance with the scenario estimates for the Energy and Climate Strategy completed in 2016 is around 15 million m^3 in 2030

3.1.2 Supply of raw materials allows for increased sustainable use of forests and new investments

By investing in and encouraging the timely and resource-efficient forest management in commercial use in a manner that promotes nature values (see Chapter 3.3.1), the profitability of forestry can be improved, increment in the growing stock can be increased and the forest biodiversity and other environmental benefits can be secured. This way, we can also safeguard the supply of wood biomass for the wood processing industry, prevent the spread of forest damage and ensure that forests remain carbon sinks (see Chapter 3.3.2). In the future, we must also be able to provide special raw materials accurately and efficiently to new customer groups and various sectors of industry.

Preconditions for competition must be provided and market functioning ensured in the markets for wood and forest-related services. Additionally, market disruptions must be prevented. It is important to respond to development needs in various sectors of the bioeconomy in a broad-scoped manner. The efficiency of the current operating models can be improved by use of digitalisation, and trust can be built between the parties in timber trade, for example, by developing pricing models. The development of electronic market places will facilitate the more efficient balancing of supply and demand than at present. New operating models and electronic services will see the service market become more customer-oriented and diverse than before. The electronic market place for timber trade will be expanded to include forest services, and new market places will be created for business based on ecosystem services other than wood production.

Good condition of the road and other transport network and efficient communications will create a setting for diverse enterprising in forest-based business and activities and viability in rural areas. By

[12] Figures include forest chips used in small-scale housing 0.7 million m^3.

developing and maintaining Finnish infrastructures, we can promote competitiveness in forest-based business and activities and contribute to ensuring the supply of raw materials for wood processing industries. A well-functioning road network and better utilisation of geographical and road condition information than at present will also reduce seasonal fluctuations in wood procurement, promoting more efficient use of the current personnel and machinery resources. The increased risk of forest fires caused by climate change will requier agood condition of roads so that rescue services can reach fires quickly and limit their spread effectively.

The structure of forest holdings in part of Finland have become fragmented. In this type of areas, the holding-specific advantage is small in comparison to building costs. In areas with fragmented holding structures, the structure can be improved with the rearrangement of lands, in which case investments in forest roads will be profitable. The improved holding structure will facilitate the rational planning of forest management activities. Thus, also the optimal forest holding structure will have a positive impact on the supply of raw materials (see Chapter 3.3.1).

Effective transport and a decrease to seasonal fluctuations will require sufficient funding for the maintenance of the road network and for the development of information materials that describe the road network. Public infrastructure investments must be scaled to support the creation of well-functioning and cost-efficient transport chains from forests to processing sites and further from there, predictable increase in roundwood removal and more efficient harvesting and logistics. This will also create preconditions for new investments and for the continued growth of forest-based business and activities. A road network that is in good condition will also promote the recreational use of forests, nature tourism, industries based on natural products and efficient fighting of forest fires.

Effective and well-functioning telecommunications connections throughout Finland are a basic requirement for the development of activities. The management of operations will be based increasingly on “on-line” management, and various decision-making support systems and service entities that are dependent on functioning data networks are currently being built.

Objectives:

Forest resources are abundant and healthy with good growth potential and respond to the growing needs of bioeconomy.

Wood and forest service markets are balanced and competitive. There are functioning markets for business based on ecosystem services other than wood production.

Service capacity, efficiency and functioning of transport routes and communications will improve.

Indicator	Starting point in 2013	Outcome 2017/latest	Target level in 2025
Annual increment in the growing stock in commercial forests • Commercial forests • All forests in total	• Commercial forests 99 million m^3 (NFI11), average in 2009) • Total 105.5 million m^3 (NFI11, 2009-2013)	• Commercial forests approx.100 million m^3 (NFI12, average in 2013) • Total 107 million m^3	• 110 million m^3 (120–130 million m^3 in 2050) • Total 115 million m^3
Annual harvesting volumes • Roundwood removal • Logging residue and stumps[13]	• Roundwood removal 65 million m^3 • Logging residue and stumps 4 million m^3	• Roundwood removal 72.3 million m^3 (2017e) • Logging residue and stumps 2.9 million m^3 (2017e)	• Roundwood removal 80 million m^3 • Logging residue and stumps approximately 6–7 million m^3 (In accordance with the Energy and Climate Strategy scenarios estimate for 2030)
Investments in wood raw material use: investments in real terms and investment rate (value of investments in proportion to value added) • Forest industry (wood product industry, pulp and paper industry) • Part of chemical industry included in the bioeconomy • Nature tourism and recreation	• Wood products industry EUR 119 million • Pulp and paper industry EUR 616 million • Part of chemical industry included in the bioeconomy EUR 138 million • Nature tourism and recreation EUR 168 million	• Wood products industry EUR 170 million • Pulp and paper industry EUR 755 million • Part of chemical industry included in the bioeconomy EUR 167 million • Nature tourism and recreation EUR 219 million	Investments exceed depreciations

[13] Logging residue and stumps are included in forest chip use.

3.1.3 International forest policy and influencing EU policies promote the attainment of the sustainable development goals and the good operating conditions for forest-based business and activities as well as reinforce international business opportunities.

Finland has committed to the objectives in numerous international agreements and processes and acts actively and extensively in these. For example, the Convention on Biological Diversity (CBD) specifies national objectives for securing biodiversity and ecosystem services. The objective of the Climate Agreement is, for example, to reduce greenhouse gas emissions and to maintain, reinforce and sustainably use carbon sinks and stores.

The importance of cooperation has been recognised in influencing EU and international policies. The Finnish forest sector must be active, proactive and show initiative while working in close cooperation with international organisations, the European Commission and other countries. It must form connections with other forest-rich countries, which naturally have common objectives with Finland, and with countries for which the forest has a different significance. The premise should be that the strengthening of the forest sector's status in other countries will benefit Finland. Finland’s objective is to ensure that preparation and decision making in the EU that will influence forest-based business and activities is well-coordinated and it promotes sustainability and takes into account the sector’s special national characteristics. Finland will strive to coordinate the objectives of various sectors.

Finland’s strengths include effective cooperation between administration, research institutes and stakeholders. Close cooperation will help ensure consistent and balanced formation of opinions in all forest sector-related matters both in the EU and internationally. Continuous dialogue, on the other hand, will aim at a common vision and extensive influence in the forest sector. Although Finland is a small country, our forest sector actors are competent, active and well-networked. These strengths must be utilised as much as possible.

Cooperation with countries that will hold the EU Presidency in the near future is important. Cooperation makes it possible to find the most effective approaches from the forest sector’s perspective at all levels of the Council both with the Commission and the EU Parliament. Additionally, it is easier to enter into long-term planning of initiatives for coming years with countries that hold the EU Presidency, which is especially important for Finland as it prepares for its own EU Presidency during the second half of 2019.

The active development policy Finland is engaged in is an important part of Finland’s foreign and security policies. The objective of development policy is to support efforts by developing countries to eradicate poverty and inequality and promote development. Development cooperation is one of the forms for the implementation of development policy. Finland’s areas of emphasis are outlined in the Government Report on Development Policy drawn up in 2016. These areas of emphasis also include the use of natural resources such as forests.

Finland supports public, private, communal and small producers in the forest and other bioeconomy sectors. The objective is to increase the producers’ know-how, ability to gain partners and investments that will promote sustainable development as well as their ability to utilise new, clean technology.

When building a low-emissions future and bio-based circular economy, the forest sector must be seen as a solution provider. Finnish actors have a great deal of expertise to offer in the promotion of natural resources management and the sustainable use of forests. Meeting international requirements related to forests will offer Finland a competitive edge in forest-based business and activities.

With regard to international and EU forest issues, Finland's general objective until 2025 is to promote the attainment of sustainable development objectives and the operating conditions for forest-based business and activities, and to improve our international business opportunities. The operating areas are international forest policy and development policy, the EU's forest-related matters and the promotion of business opportunities. The operational priorities related to these are information and communication, cooperation and coordination. Substance priorities include the bioeconomy, climate change and bioenergy, legality and good administration as well as biodiversity and ecosystem services. Please see Appendix 1 for more detailed descriptions of priorities, objectives and initiatives.

The following perspectives are emphasised as approaches:

- The interdependencies between various sectors and the various objectives for sustainable development will be recognised and the need to foster consistency between different policies will be emphasised.
- Openness will be maintained and cross-sector cooperation between various actors will be fostered in Finland and internationally.
- Communication will be proactive, methodical and active both nationally and internationally.
- Information and competence will be utilised in lobbying, decision making and implementation.
- Operating practices will be assessed and revised and the utilisation of digitalisation will be promoted.
- A business-oriented approach and the development of business opportunities will be developed.

Objectives:

The role of forests, sustainable forest management and forest-based bioeconomy is reinforced so that the objectives in Agenda 2030 can be attained.

The roles of coordination, forest expertise and the forest sector's position as solution providers is strengthened.

The international business opportunities of forest-based business and activities will be strengthened.

3.2 Forest-based business and activities and their structures are renewed and diversified

Forest policy will support the renewal of the sector and its structures. Competence based on research and expertise is an elemental part of good governance as well as the drafting and implementation of forest policy and decision-making. Operating practices will be agile and cross-sectoral. The administration will become more customer oriented, and there will be more cooperation between administrative branches. Research and product development will be flexibly targeted as required. The industrial structure will diversify, multisectoral entrepreneurship will become more widespread, and the significance of service business will increase. Competences in the sector will meet the changing needs of companies and society. The significance of digitalisation and competence related to it as drivers of growth will increase.

3.2.1 Know-how on forest-based business and activities is diverse and responds to changing needs

The high standard of competence in forest-based business and activities is one of Finland's significant competitive factors. A great deal has been invested in research and competence in this field in Finland. This investment has produced well-being for our entire society. Growing competence requirements related to the fast pace of forest-based business and activities transformation, urbanisation and internationalisation, taking the diverse objectives of forest owners and other forest users into consideration in service provision, digitalisation and developing technologies as well as changes in ecosystems challenge entire forest bioeconomy and its related fields.

Renewal will not happen in a constantly changing operating environment without active R&D activities and updated education and training. To ensure that the sector's competence remains at the level required by the transformation, cooperation between research, business life and the education sector must be further increased.

Research activities must emphasise social impact and support for decision making. Public R&D funding must be allocated topics that are of key importance with regard to the transformation of forest-based business and activities, including the development of new business models, the promotion of the commercialisation of products and services as well as the research of markets. Product development with public funds must be demand driven and promote the introduction of new technologies. Research and product development related to forest management must promote an increase in profit from improved forest management, the utilisation of opportunities provided by ecosystem services and the coordination of different objectives for forest use. The diversification of forest management methods will require long-term work, a multidisciplinary approach and sufficient funding for determining which methods are appropriate and the resulting trade-offs and synergies to different objectives.

The significance of international research cooperation will continue to grow as globalisation advances. Natural Resources Institute Finland's extensive and high level of scientific expertise and VTT Ltd's new organisation, which promotes new enterprise provide excellent conditions for utilising the opportunities afforded by international research funding in a way that also benefits the Finnish forest sector. The Finnish Partnership for Research Institutes (Tulanet), which has expanded, can act to strengthen the

research of forest-based business and activities value chains from the perspective of both ecological and economic factors. Established in 2016, Metsäkoulutus ry aims to increase cooperation between education providers and the corporate world in order to develop forest sector education and respond to growing competence needs.

The preconditions for research must be reinforced by developing national and international research infrastructures that will support forest research and the bioeconomy over the long term as indicated in the Academy of Finland's Roadmap for Research Infrastructures 2014–2020.

The role of universities of applied sciences and universities in R&D activities that serve working life has grown. The importance of universities of applied sciences is highlighted, in particular, in R&D tasks related to regional development. A precondition for fast and efficient practical application of R&D results is that companies have the requisite competences.

The focus of research activities by universities has been shifted to national centres of excellence, of which there are several at present at our universities that represent forest sciences. The centres of excellence can provide research that is of high quality by international standards. A rising form of research organisation at universities comprises opening units that are formed around multidisciplinary research problems. The University of Helsinki's Helsinki Institute of Sustainability Science (HELSUS) is an example of one such unit.

The growth of forest-based business and activities and increasing competence requirements in this sector are creating pressure for the development of education at all levels of the education system. The number of people who graduate from different levels of the education system and their competence must meet with the needs and competence requirements of demand in forest-based business and activities, other sectors, society in general and internationally. Education must be flexible and customer-oriented. In addition to providing an education in forest-based business and activities based on the best possible data, it must provide the skills for entrepreneurship, for the development of new products and services as well as for customer-oriented efficient forest-based activities. Strategic partnerships between companies, research institutes and educational organisations will be required to strengthen compatibility between education and work.

The growth of forest-based business and activities is already evident in the problems encountered in recruitment of personnel. Companies need more competent workers, for example, in harvesting and transport as well as the further chemical processing of biomass. In order to support the growth of forest-based business and activities, we must ensure that there are a sufficient number of wood product sector experts, forestry equipment operators, excavator contractors and timber truck drivers available by, for example, renewing the channels through which people are employed. Solutions must be sought for problems encountered in the reconciliation of labour demand and supply. This means that the competitiveness and appeal of forest sector jobs must be improved and when the number of starting places is decided, the number of new graduates and experts already in the sector who will move to other sectors must be taken into account as well.

A large part of the update to forest sector competence will happen in personnel training not degree-oriented retraining and continuing educationor as vocational qualifications, all of which must be taken into consideration when developing areas of focus in education and training. The development of adult

education, retraining and specialisation studies will facilitate the life-long learning of forest professionals.

Many personnel groups that are crucial to forest-based business and activities will receive their education in extensive programmes, only some of which focus directly in this sector. Particular examples of these are various fields of the wood and process industry. Educational themes related to the use of wood and other forest-based should be linked to and utilised by education programmes of various fields more than at present. The conscious crossing of traditional sector boundaries is important in the development of education as forest-based business and activities needs more new experts from the interfaces of different fields and from entirely different fields.

A growing number of young people expect their workplace to stand for the values of sustainable development in their activities. Young people are also more and more becoming entrepreneurs. The enthusiasm and desire of young, new entrepreneurs to come up with new solutions, products and services must be supported. Cooperation between working life and schools must be increased to offer pupils a realistic understanding of the diverse study and career options in bioeconomy and circular economy and to ensure that the sector's recruitment base remains as extensive as possible (see Chapter 3.3.2).

The role of forests in providing welfare will grow, which will be evident in the transformation of the content of work. It is likely that the forest relationship of future forest professionals will be more pluralistic than it is at present. For example, immigration, the diversification of forest-based business and activities, and digitalisation form the foundation for the diversification of competence needs, and competence, as well as opportunities for the recruitment of labour force. An increase to people's understanding of forest culture is important at all levels of the education system, because this can help improve the ability of those working in the sector to engage in pluralistic interaction related to the forest and make it possible for the forest-based sector to better adapt to changes in society's values.

The greatest competitive advantage for the sector is motivated personnel, which means that occupational welfare and up-to-date personnel skills must be ensured. A reduction in seasonal variation is an example of a way to improve personnel's wellbeing at work. Seasonal variation is also an important topic with regard to the appeal of forest-based business and activities.

Objectives:

R&D activities and structures financed with public funding support, in an appropriate manner, the sustainability of forest-related bioeconomy, the development of business, commercialisation of products and services, demonstration projects and anticipating changes in the markets and other operating environment.

Cooperation between education and training and working life will be reinforced.

The number of people completing education at different levels will correspond to the forest sector's needs relating to recruitment and know-how.

Research activities will correspond with bioeconomy's needs.

The competence of the staff will be up-to-date and occupational welfare improves.

Indicator	Starting point in 2013	Outcome 2017/latest	Target level in 2025
Amount and qualitative assessment of public R&D funding	Public forest sector R&D funding is estimated at EUR 140 million.	Unknown	• Funding will increase • Quality meets the needs
Number and share of primary applicants • Higher education institutions • Universities of applied sciences • Initial vocational education	Unknown	• Institutions of higher education (Forest Sciences): 173 primary applicants, share 36% (2017) • Universities of applied sciences: 530 primary applicants, share 36% (2017) • Initial vocational education 496 primary applicants, share 34% (2017)	Share of primary applicants grows
The number of graduates and their employment rate one year after graduation • Higher education institutions • Universities of applied sciences • Initial vocational education	• Higher education institutions (Forest Sciences): 190 persons have completed degrees, 37% are in full-time employment, 5% are unemployed • Universities of applied sciences: 221 persons have completed degrees, 70% are in full-time employment, 15% are unemployed • Vocational education and training: 608 persons have completed degrees, 56% are in full-time employment, 21% are unemployed	• Institutions of higher education (Forest Sciences): 81 persons completed Bachelor's degrees, 87 completed Master's degrees and 15 completed Doctorates. Additionally, 16 people graduated from the University of Eastern Finland with Master's of Science degrees. (2017) • Universities of applied sciences: 198 graduates, who complete degrees (2014) • Vocational education and training: 745 graduates, who complete degrees (2015)	Meets the needs

3.2.2 Administration is flexible, effective and customer-oriented

To balance public finances, we need effective administration that is unbureaucratic and cost-effective. Cooperation between various branches of administration will be increasingly important in the future. We need to find new operating methods for lowering the fences between different sectors. As forest-based business and activities diversify, the administrations key services must be provided in a way that improves the customer experience for customers, meaning forest owners and the sector's actors, and makes access to services more flexible. When meeting with customers, it is important to take into account that forest owners have different objectives and to offer options and services in a forest-owner oriented manner. Effective and customer-oriented administration will create preconditions for developing forest-based business and new entrepreneurship. In order to appropriately dismantle administrative and legislative obstacles that obstruct the development of entrepreneurship, close dialogue will be needed between companies and the administration. Administration must utilise the opportunities enabled by digitalisation more than previously so that activities can be sped up and the administration's resources are used in a more appropriate manner for promoting business and industry and so that other social objectives can be attained.

In order for the activities of new county administration and the National Supervisory Authority (Luova) to be initiated, forest-based business and activities organisations must form close cooperation with these actors. Regions will be key actors for example in promoting and funding business and industry based on forests and as well as in the planning of land use. The role of the National Supervisory Authority in the enactment of environmental and nature conservation legislation includes many links to bioeconomy and circular economy measures that are based on forestry and more broadly the forest.

Geographical information on forest resources are one of the competitive advantages of forest-based business and activities in Finland. Up-to-date information on forests facilitates the verification of sustainability and an increase in the efficiency of various actors. Geographical information-based tools will help in the resource-efficient management of forests, safeguarding biodiversity, climate change mitigation and adaptation, improving the accessibility of forests and promoting the natural products sector, nature tourism and welfare services. The tools that are being developed can also be used for influencing international and EU policies and for increasing competence and developing education.

By improving the quality and accuracy of information and developing tools for utilising information, forest-based business and activities in Finland can build information utilisation into a significant competitive advantage over other countries. High-quality information on nature and the environment must be accessible to everyone, when planning and implementing forest and nature management measures.

At the moment, the geographical information collected by various actors is fragmented and sometimes poor in quality, and its accessibility is poor. In the future, it will be vital to create communication and service portals that will help ensure that public location-specific forest knowledge and other geographical information produced by other public or private sector actors can be accessed and utilised as widely as possible. A precondition for achieving this will be compatible information systems, effective interfaces between the systems, and interaction between the administration and actors with the aim of maintain the database. Geographical information that is adequately accurate and up-to-date is a

precondition for increased and more broad-scoped electronic timber trade and the development of new market places for ecosystem services-based business other than wood production.

The new inventory programme that will begin in 2020 will cut down the aerial photography cycle for forests from the current ten years to six years, which will somewhat improve the quality of information on forests. Also, the laser scanning cycle could be cut to six years, if funding is secured. Actors also need this more up-to-date information on forest resources which will necessitate the return of location-specific information on measures to public information on forest resources in accordance with a resolutions agreed on in autumn 2018. Especially the monitoring of the state of forest management in seedling stands will require the utilisation and return information collected during forest management and, possibly, the use of other means of inventory that supplement laser scanning.

Efficient permit procedures create certainty for willingness to invest. The turnaround time of these procedures can be sped up, without compromising on a good standard of environmental protection and risk management. The procedures can be accelerated by developing a preliminary negotiation process and a one-stop shop principle.

In the context of statutory land use planning and zoning, opportunities will be created for developing diverse forestry business. Planning and zoning reconcile different land use needs from the perspective of overall benefit, not forgetting the requirements of additional use of renewable energy. Planning and zoning do not need to be used as tools in areas where forestry is practiced if there is no need to coordinate different land use types in the area in question. This should also be noted when the Land Use and Building Act is amended. On the other hand, accessibility of forests for recreational use should be accounted for in planning and zoning in urban areas and areas important to tourism without endangering the property of land owners. The rights of the Sámi as an indigenous people, the conditions for preserving the Sámi culture and the traditional Sámi livelihoods all guaranteed by legislation are taken into account in land use and planning and zoning in the Sámi Homeland, and in the planning and target-setting related to forestry.

We must be able to recognise the cross effects of different objectives and genuine synergy potential. We must also be able to demonstrate and describe the impacts of the measures from the perspectives of different objectives. This will require the development of planning devices and tools to support decision making as well as the reinforcement of the knowledge base related to the impacts of the measures. Problems with coordination are the same at all levels of planning even though their scale and challenges might vary.

Objectives:

Administration, its cooperation and services will support the competitiveness of the field and respond to customer needs.

Forest-related information and statistics will be open, comprehensive and up-to-date, which will support their broad utilisation.

The administration’s permit procedures will be quick and flexible, and they will support the implementation of investment projects and maintain a high standard of environmental protection.

Planning and zoning support the opportunities for forestry and diverse business.

Indicator	Starting point in 2013	Outcome 2017	Target level in 2025
Customer satisfaction trends of the Finnish Forest Centre and Metsähallitus	Unknown	• Finnish Forest Centre: Education and training, forest owners – net promoter score 69% – grade 4.3 (1-5) Education, actors – net promoter score 53% – grade 4.1 (1-5) Work with customers, forest owners – net promoter score 71% Work with customers, companies and associations – net promoter score 45% • Metsähallitus: Overall image of Metsähallitus is positive according to a stakeholder study. The result has remained relatively stable over the past few years, but the result for 2017 was somewhat less than in 2016.	Customer satisfaction improves
The share of spatial data available accessible to actors	15.5% of collected forest resource data (the objective of the strategy approved in 2015 was related to forest resource data)	Finland's forest resource data has been comprehensively available to actors since 1 March 2018. The design	Spatial data moves according to the needs of administration and business life

		and development of a spatial data platform, which will improve the consolidation of geographical information from various actors, is underway.	

3.3 Forests are in active, economically, ecologically, socially and culturally sustainable and diverse use

Healthy and abundant forests with a high level of biodiversity enable the maintenance of ecosystem services and the increasing and diverse forest use. A precondition for increasing exploitation of renewable natural resources for bioeconomy needs is active, sustainable and diverse forest management. Reconciling various forest uses will facilitate obtaining growing welfare from the forests. Safeguarding the ecological, social and cultural sustainability of forests also plays a key role in ensuring that there will be a demand for the products and services of forest-based business and activities. Through voluntary forest certification schemes (PEFC, FSC), sustainability of forest management can be fostered.

Choices made in forest management form the foundation for the realisation and coordination of the various objectives set for the forest use. Although measures carried out in forests can for the most part be divided into forest management and nature management tasks, the result of forest management is always the sum of these measures.

3.3.1 Forestry is active and business-like

Forestry that is active, resource efficient and sustainable creates the foundation for the development of the Finnish forest bioeconomy. The supply of raw materials and the sustainable use of forests are preconditions for new investments (see Chapter 3.1.2). The majority the Finnish forests, around 60 per cent, are privately owned. It is important for forest-based business and activities that forest owners are encouraged to look after their property and make active decisions based on their own objectives. An active approach, felling-oriented activities and profitability as well as a competence in forest management and nature management of commercial forests are all emphasised in business-like forest ownership.

Active decisions concerning forest management increase forest owners opportunities to engage in gainful activities and create demand for companies that provide services to forest owners. Active forest management and investments in wood production and nature management that are in line with forest owners' objectives safeguard the growth potential and the quality of nature (see Chapter 3.3.2). Active decisions by forest owners also reinforce the supply of other forest-based products and services (see Chapter 3.1.2).

The increased increment of forests is the result of active forest management over past decades. High quality forest regeneration, the use of refined forest cultivation material, the management of seedling stands and the management of peatland forests and the nutrient economy, as well as correctly timed thinning make it possible for growth to continue to increase. The simultaneous development of forest-based business and activities and implementation of the objectives set for climate policy emphasises the need for increasing the increment of forests. Additionally, incentives must be created for the afforestation of non-productive land not used in food production. Increasing the efficiency of sustainable wood production will also require the coordination of forest biodiversity and other types of forest use (see Chapters 2.6, 3.1.1, and 3.3.2).

It is expected that in the future, a growing number of forest owners will be city-dwellers, who have a higher level of education, and are economically less dependent on forest income than before. This change will not necessarily affect the active forest management, if the potential for profitable forestry remains unchanged and forest owners are offered options and services that meet with their varying forest management needs.

The ambiguity of forest ownership objectives is often an obstacle for active forest management. The drop in the average age of forest owners due to early generation changes will increase activeness in forestry. Also, a reduction in the share of inherited estates might lead to an increase in active forest management. Instead an increase in remote forest ownership correlates more with a drop in independent forest management work than with active or business-like forestry. Up-to-date information is needed on the development of forest ownership and use of forests over the past decade. The previous Forest Owner Survey was carried out in 2009.

Increasing the activeness of forest management will require a service range that will satisfy the diverse needs of forest owners, new operating models for forest management and the utilisation of spatial data with modern means. Promoting earning opportunities for forest owners unrelated to wood production will require development and introduction of operating models (such as contractualisation) that will facilitate a balance in market demand and the supply forest owners have to offer.

The structure and ownership of forest holdings in Finland are highly fragmented in many areas, and thus less than optimal from the perspective of profitable forestry. The average size of forest holdings is some 30 hectares and the fragmented structure of forest holdings weaken the conditions for active forest and nature management.

The conditions for active and business-like forestry can be supported, for example, by developing taxation and improving the ownership and structure of forest holdings. Steps must be taken to make it easier to contact the heirs to estates that own forest, and more resources than at present must be allocated to the reorganisation of arable areas. The establishment and expansion of jointly-owned forests and the reorganisation of arable lands play an important role in improving the ownership and holding structure of forests. The aforementioned measures will make it possible to increase the size of stands marked for felling, to reduce forest transport distances and increase year-round harvesting.

The forestry incentive scheme must support the forest policy objectives laid down in this strategy. The incentive scheme will help to safeguard sustainable forestry on peatland, encourage timely management of seedling stands and promote a good nutrient balance of forests. The incentive scheme will also support preserving forest biodiversity and the development of forest road networks and promote cooperation between forest owners. Over the long term, the mechanism should in particular be geared towards activating forest owners and supporting non-market benefits and healthy forests.

Objectives:

Active and business-like forestry will increase, the size of forest holdings will grow and forest ownership and property structure will support active utilisation of forests.

Forestry's incentives scheme is appropriate and activates forest owners.

Opportunities of forest owners to engage in gainful activities increase through commercialisation of ecosystem services.

Indicator	Starting point in 2013	Outcome 2017	Target level in 2025
The share of private forest holdings and forests in joint ownership exceeding 50 ha in the total area	• Private ownership 56% • Forests in joint ownership 2.2%	No new information	Total 70%
Generation change age			Decreases
Investment yields for wood production from private forests	• 4.3% (change in stumpage prices not included) • 4.7% (change in stumpage prices included)	• 4.2% (change in stumpage prices not included (2017e) • 6.3% (change in stumpage prices included (2017e)	Increasing

Early management of seedling stands and management of young stands (ha)	• Early management of seedling stands: no data available • Management of young stands: 213,000 ha	Support for early management of seedling stands and management of young stands 147,334 ha	• Early management of seedling stands 140,000 ha • Management of young stands: Management needs to be indicated in the National Forest Inventory

3.3.2 Forest biodiversity and ecological, social and cultural sustainability are reinforced

The ecological sustainability can be improved by safeguarding the forest biodiversity and the factors that influence the functioning of ecosystems. The forest environment has value in itself, in addition to which versatile forests with a high level of biodiversity are the ecological foundation on which all forest management is based. Fostering biodiversity is a key part of sustainable forest management. Biodiversity must be protected from the perspective of genes, species and habitat types.

As the amount of wood raw material harvested grows, the protection and reconciliation of biodiversity and other wood production ecosystem services with wood production must be reinforced. Environmental issues and biodiversity will be considered both in forest and nature management as entities that support one another. The importance of having spatial data that is up to date and of high quality is also emphasised in the protection of biodiversity.

The National Forest Strategy supports the implementation of the National Biodiversity Strategy and its action plan. The National Biodiversity Strategy (Government Resolution on the Strategy for the Conservation and Sustainable Use of Biodiversity in Finland for the years 2012–2020, ‘Saving Nature for People') is based on the Convention on Biological Diversity (CBD) and the goals of the EU’s Biodiversity Strategy. The aim of the strategy is halting the loss of biodiversity by 2020 and securing a favourable status of forest biodiversity by 2050. It is now clear that we will not achieve this objective by 2020. The objective will be updated if necessary when new international and national objectives for protecting biodiversity after 2020 have been decided on. More detailed objectives concerning conservation and restoration will be given at that time. Measures for protecting habitats will be specified in detail in the Action plan for threatened habitat types.

As 90 per cent of our forests are available for forestry, it is essential to develop the nature management of commercial forests and making this a mainstream part of daily forest management. It is also essential to increase, for example the amount of mature and dead wood as well as the share of deciduous trees as well as the use of fire in commercial forests. Additionally, we must develop active nature management measures as separate nature management projects. The more extensive conservation of biodiversity than at present will be necessary particularly in the southern parts of the country because

our protected areas are centred in Northern Finland. In addition to increasing the number of protected areas and their land area we need to improve their quality.

The connectivity of forests and the reconciliation of various objectives will be promoted with the good planning of areas and natural resources use and by developing new operating models. The range of methods for conservation and nature management must be examined as a whole. For example, a drop in the amount of dead wood specifically in Northern Finland, where the protected land area is large, highlights the need for an overall examination.

The maintenance of drained peatland forests and taking nature values into account require careful planning of the areas' management. The exclusion of low-productivity sites from wood production or in some cases even the active restoration of these sites as well as the utilisation of the ecological special characteristics of the edge zones around mires and heaths offer the opportunity to simultaneously promote biodiversity, water protection and profitable forestry. According to the results of the LIFE PeatLandUse project, the restoration of low productivity mires will only produce benefits in the long term from the perspective of greenhouse gas emissions.

The protection and conservation of genetic resources of forest trees in genetic reserves and genetic stock collections guarantee the genetic diversity, vitality and adaptability of tree species, even in changing climatic conditions.

The pollutant load and especially sediment discharges in water systems from forestry may have significant local impacts on the status of water bodies, especially in headwaters, small ponds and streams and in river systems with few lakes. Fertilisation, restoration of ditches and forest regeneration carried out during active forestry activities will increase environmental load on waters. This in turn will also affect the fish population. Water protection in the scope of forestry has been developed continuously, but the combined effect of an increase to the area in which activities cause environmental loading and climate change mean that there is need for even more effective water protection. Recent research results indicate that pollutant loading from old drainage areas is more extensive than previously believed. This is especially important in areas where there are many drained mires. This matter must be looked into more thoroughly and methods for the management of pollutants from old drained mires must be sought and adopted.

The development of pollutant loading in water systems that has originated from forests that are either in their natural state or in commercial use is being observed with a monitoring network, which is made up of a group of forest catchment areas; 11 of which are in their natural state and 20 of which are in commercial use. The results of the monitoring will be used for the development of water protection in forestry as well as to determine the catchment impacts of the changing climate.

Management plans and programmes of measures adopted every six years by the Government, which are based on the EU Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy) also review the water protection measures needed in forestry. Sector-specific (e.g. forestry) instructions for planning work have been drawn up in cooperation with stakeholders.

The aim of **climate change mitigation** is to limit the change as much as possible. Climate change adaptation aims at predicting and solving problems caused by climate change. Finland's forests play an important role in climate change mitigation and adaptation. Finland has committed to the objectives indicated in the Paris Climate Treaty. The land use sector is part of the EU's climate and energy policy that will continue until 2030 which dictates that the minimum target for emissions cuts is 40 per cent. These objectives form the framework in which forests will be linked more closely than before to climate change mitigation and adaptation (see Chapter 2.7). Active forest management will also maintain the forests' health and ability to grow, which is also the basic precondition for a commercial forest's capacity to bind carbon.

According to estimates, the forests' carbon sink will shrink from its current level over the coming decade due to increasing wood use, but will grow after this, strengthening the forests' carbon sink in the long term. However, the carbon storage will not shrink even when its growth slows. The growing use of forests will somewhat increase the amount of carbon stored in products and this will be taken into account in the overall examination of carbon sinks.

According to estimates, the increment of forests in Finland will speed up as climate conditions change. However, at this same time, various forest damage risks will also grow. The changing climate makes it possible for not only new pests but existing ones to increase in number. To minimise the impact of damage to the health of forests, wood production and the functioning of the timber market, the monitoring of forest damage must be active and respond to damage early on. Sweden's large forest fires in 2018 as well as broad-scoped insect damage following previous storms have demonstrated that it is urgent that we be prepared for risks.

Climate change mitigation and adaptation are supported by diversifying forest management. Forest management methods must be adapted to new and changing climate conditions including the climate's impacts on soil. This will allow us to exploit the predicted positive impacts of climate change while minimising the risks associated with it. The impacts of forest management methods on greenhouse gas emissions must be determined and taken into account when deciding on a management method.

Domestic forest trees can adapt to the changing climate slowly over time. Adaptation can be sped up with selective breeding and the yield of forests can be guaranteed in the future. This will require effective testing in environments that are as different from one another as possible and the effective selection to find and utilise individuals that are as genetically stable as possible and will adapt to the future climate as well as possible in the production of forest cultivation materials. In addition to climate change adaptation, breeding can improve the growth, quality and health of trees. Refined forest reproductive materials are also genetically as diverse as natural forests.

Social sustainability includes taking care of employment, wellbeing at work and up-to-date competence as well as ensuring the diverse recreational and welfare use of forests. Promoting employment is covered in more details in Chapters 3.1.1, 3.1.2 and 3.3.1. Well-being at work is covered in more detail in Chapter 3.2.1.

Some 96 per cent of Finnish people take outdoor exercise and for example, around two million Finns pick wild mushrooms. Encouraging citizens to spend more time in the forests, can accentuate the **health and well-being impacts** produced by them. Research indicates that merely spending time in a forest

has positive impacts on our psychological health, and physical activity in the forest brings further health benefits. In order to the health and welfare impacts of forests to be utilised to their full potential, it is necessary to understand the benefits that the individual, communities and society as a whole gain from nature and utilise these when developing social, health and welfare services.

Easy access to the forest and Everyman's Rights are the most important preconditions for attaining the welfare and health impacts brought about by forests. The proximity of forests and green areas evens out socioeconomic health differences. A key role in the accessibility of forests is played by local forests, good trail networks and fixtures for outdoor exercise and hiking, as well as the availability of information. A large part of recreational use happens in normal commercial forests and normal multiuse forests owned by Metsähallitus. Developing the use of state-owned hiking areas and national parks, contributes to enabling a growth in recreational and well-being use of forests.

Hunting and fishing are significant forms of recreational commercial forest use. Depending on the calculation method, there are some 200,000–300,000 hunters in Finland. Game animal populations are a renewable natural resource that can be developed for each species with suitable forest management and the hunting and fishing economy can be developed alongside forestry. Game husbandry provides diverse welfare impacts and potential opportunities for rural entrepreneurs to generate revenue and for land owners to generate additional income from their lands. Forests also provide the preconditions for fishing, for example forest nature is important for small bodies of water, which are an important habitat for our Brown trout population.

Forests should also be observed in more from the perspective of **cultural sustainability**. Forests are a place for human activities, and people establish different practices, approaches and relationships in relation to forests. Every person adds their own personal relationship with the forest to our shared forest culture and adopts approaches, values and concepts moulded together by the group. Finnish forest culture is diverse and pluralistic as there have always been many ways for using, valuing and having an impact on forests. The Sámi have their own forest-related cultural characteristics, which must be taken into consideration when assessing cultural sustainability.

Cultural sustainability necessitates that cultural continuity is not interrupted, and the customs, practices and relationships related to the use of forests are passed on to the next generations in an appropriate form. Forest culture is a time-bound continuous process that develops as a result of human activities. When a longer time continuum from the past into the future is added to the conversation on forests, we can better understand their current state and make decisions concerning the future that are more sustainable and wiser.

Appreciation of forest use and the forest environment has a direct impact on achieving the growth in welfare that the forest strategy vision aspires for. It is important that people have the opportunity to form a pluralistic and well-reasoned understanding on the objectives related to forests, forest nature, forest use and the importance of forests to society that is based on reliable and researched information. High regard for forests also promotes the sustainable use of forests, where the perspectives of sustainability have been taken into consideration in a balanced manner.

A living forest relationship that we are aware of creates the backdrop for the appreciation of forest management. It is important to identify the different forest relationships people have in different

situations and to be able to communicate in a manner that the listener can understand and take into consideration the different characteristics of forest relationships. A forest relationship and the foundations for forest use and appreciation of forest nature is laid in childhood. The multi-level understanding that children and young people have of the forests is a precondition for forming a diverse relationship with the forest, diverse use of forests and appreciation of the forest environment. The accessibility of forests at all ages also plays a key role in building and keeping up a relationship with the forest. In this respect, local forests used by day-care centres and schools are of vital importance.

The implementation of all the strategic projects and increasing their impact will require interaction and communication, the aim of which is to increase pluralistic and two-directional dialogue that will maintain and increase appreciation for the sustainable forest management. The forest culture perspective and forest relationship thinking can improve our possibilities for constructive and pluralistic dialogue on forests as well as for the reconciliation of different forest-related objectives.

Children and young people will be the future workers, forest owners and consumers, and this is why they are important target groups for communication and interaction. The forest is a good learning environment and it provides the opportunity to implement multidisciplinary learning units in accordance with Finnish core curriculum for basic education. The teaching material must give a versatile idea of forest nature, forest management as well as of business and trade based on forests and timber. Promoting this objective will require that actors involved in forest-based business and activities actively contribute to school communities.

NGOs play a key role in achieving the targets related to the recreational and well-being use of forests and developing citizens' relationship with the forests. Cooperation between the administration in charge of forest-based business and activities and NGOs should thus be further developed.

Numerous actors that provide communication and interaction, work to reinforce the relationship that young people have with the forest. In addition to the amount of communication provided, the shared objectives for communication to young people must be measured and clarified. In order to improve the impact of activities and ensure that perspectives are versatile, the coordination of contact must be coordinated at the national but also the regional level. The Finnish Forest Centre is well-suited for this task due to its national organisation and its general duty to promote forestry.

Objectives:

The decline of forest biodiversity will be halted by 2020 and a favourable status of forest biodiversity will have been secured by 2050.

Impacts to waters caused by forestry will have been minimised by using the best available practices.

Increasingly diverse sustainable forest management will support climate change mitigation and adaptation.

The recreational use and health-promoting impacts of forests will increase and forests are accessible to all.

The use of forests, the forest environment and forest culture will be valued more than previously.

Indicator	Starting point in 2013	Outcome 2016/2017	Target level in 2025
Genuine changes of categories of forest species in the assessment of threatened species	• Positive trend for 81 species • Negative trend for 108 species	No new information. The next assessment of threatened species will be completed in 2019.	A positive trend has been recorded for twice as many species as a negative trend
Average volume of deadwood in forests • Southern Finland • Northern Finland	• Southern Finland 3.8 m^3/ha • Northern Finland 8.0 m^3/ha (NFI 11, average in 2009)	• Southern Finland 4.3 m^3/ha • Northern Finland 7.6 m^3/ha (NFI12, average in 2013)	• Southern Finland 5 m^3/ha • Northern Finland 10-11 m^3/ha (Over the long term, the volume of deadwood must be increased in excess of the target level set for 2025)
METSO programme implementation (ha)	• Ministry of Agriculture and Forestry: 28,629 ha • Ministry of the Environment: 28,798 ha	• Ministry of Agriculture and Forestry: environmental support and nature management 42,720 ha (cumulative 2008–2017) • Ministry of the Environment: 64,521 ha (2008–2017)	• Ministry of Agriculture and Forestry: 82,000 ha (2008–2025) • Ministry of the Environment: 96,000 ha
Sediment discharges from ditch network maintenance	57,000 tonnes / year	49,020 tonnes / year (2016)	Declining
Carbon sink • Growing stock in the forests and soil • Reserve of wood products	• Carbon sink of growing stock in forests and soil -36,1 million tonnes CO_2-eqv. • Carbon sink of wood products -2.4 million tonnes CO_2-eqv.	• Carbon sink of growing stock and soil in forests -34.1 million tonnes CO_2-eqv. (2016) • Carbon sink of wood products -3.6 million tonnes CO_2-eqv. (2016)	At least according to the forests' reference level • Carbon sink of growing stock and soil in forests,

			-27.88 million tonnes CO_2-eqv. • Carbon sink of wood products -6.89 million tonnes CO_2-eqv. (This will be amended with new figures to make it more accurate)[14]
Number of visitors to national parks and hiking areas, number of days spent hunting, fishing, trekking and snow-mobiling in the wilderness on state land and customer satisfaction	• 5.4 million visits to state-owned protected areas and hiking destinations maintained by Metsähallitus of which 2.6 million visits to national parks and hiking areas • Number of days spent in nature by hunters and fishers 350,000 (2015) • Customer satisfaction among visitors 4.3 (on a scale of 1–5)	• 6.7 million visits to state-owned protected areas and hiking destinations maintained by Metsähallitus of which 3.3 million visits to national parks and hiking areas (2017) • Number of days spent in nature by hunters and fishers 405,000 (2017) • Customer satisfaction: Licenced hunters 3.7 (1–5), fishers 3.7, visitors to nature centres and field services 4.3 (2017)	• Visitor numbers and number of days spent in the wild are increasing • Customer satisfaction is maintained the same or is improved
The number of times engaging in outdoor recreation locally in the national inventory of recreational use of nature (LVVI)	156 times/year/citizen who has taken exercise locally	No new information, the next one will be completed in 2020	Increasing

[14] The Development of emissions and sinks in the agricultural and LULUCF sectors until 2050 project will be completed in February 2019.

Number of children and young people who have taken part in forest-themed events	• Children and young people: 308,843 • Teachers: 13,378	• Children and young people: approximately 300,000 • Teachers and early childhood education personnel: approximately 15,000 (2016)	Increasing

4 Implementation of the strategy

The prioritised measures must be completed in order to implement the strategy. In addition to these measures, actions that support the achievement of National Forest Strategy objectives are carried out every day as part of routine development efforts and the implementation of other strategies and programmes (see Chapter 4.2). This strategy prioritises measures that would not be implemented in any of the other ways listed above.

A strategic project portfolio has been formed from the priority measures of the National Forest Strategy. By implementing these projects, better preconditions can be achieved for increasing the welfare produced by forest-based business and activities and for safeguarding economic, ecological, social and cultural sustainability.

The implementation of these strategic projects will require political will, competence and cooperation across sectoral boundaries and a new type of mentality within the sector. In addition, sufficient public funding will be required to implement certain strategic projects (see Chapter 6).

4.1 Forest Strategy project portfolio

The projects contained within the National Forest Strategy form a whole (Figure 6). Each project is related to at least two of the forest strategy's three strategic goals (see Chapter 7). The projects promote the competitiveness of the operational environment for forest-based business and activities and the renewal of the sector's structures as well as the sustainable and active forest management. It is important from the perspective of impact and the balanced attainment of objectives that all the projects are implemented. In order for the projects to be able to respond to the challenge of coordinating crossing objectives, specific consideration must be given during project management, implementation and monitoring to cooperation between the projects that promotes the overall sustainability of forest management.

The strategic projects vary in several ways including their scope, the parties responsible for their implementation and their timelines. Some of them may be implemented on a fast schedule, in which case the potential need for further measures in the same thematic area should be assessed. Chapter 5 on the organisation of strategy implementation and monitoring gives a more detailed description of the process that will be used to prioritise the order of implementation and supplement the project portfolio.

Figure 6. The updated National Forest Strategy includes ten strategic projects.

More detailed project descriptions:

Strategic project	**Objectives of the project**
A. Forest Data and the Platform Economy Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Finance Other actors: Finnish Forest Centre, Natural Resources Institute Finland, National Land Survey of Finland, Finnish Environment Institute, Metsähallitus, Tapio Ltd, actors	The project, which is a cross-cutting project, aims to improve the availability and usability of forest, nature and environmental data and facilitate their integration with other data sources. High-quality and up-to-date spatial data promote the development and utilisation of digitalisation in tools and services provided by forest-based business and activities.

Forest Data and the Platform Economy is a cross-cutting project in the National Forest Strategy's project portfolio. Forest Data and the Platform Economy aims to create a service platform that will promote information dissemination and utilisation as well as develop information systems, their information content and information quality so that it meets with the need that have emerged in the other projects. Forest Data is understood in this context to refer broadly to information that describes forests, nature, the environment and roads.

The project implements a development programme, which aims to build tools that will support the collection and use of information. The project will utilise technology used in other sectors and pilot applications that will facilitate completely new approaches and practices. New methods will help improve, in particular, the quality and timeliness of information. The development of technology will also require R&D activities. The construction of a forest knowledge service platform is an integral part of the development programme, as this will improve the availability and usability of information materials as well as how well they can be combined with other information sources. By developing rules for the update and use of data standards, interfaces and data, we can create conditions for the adoption and development of digitalisation in a cost-effective and equal manner for different actors involved in forest-based business and activities. It must be possible to use information as openly as possible, while taking into consideration requirements laid down in data protection legislation.

The collection of geographical information financed with public funds and services that facilitate its use form a stable and safe spatial data platform on top of which other actors can build applications and new business activities. New business opportunities and competition between actors in the development of new information-based applications and services will create new innovative operating models in forest-based business and activities.

Planning tools and decision supporting tools will be developed at different levels of planning to make it possible to identify the cross-effects and synergy opportunities of various objectives. It must be possible to demonstrate and describe the impacts of the measures from the perspectives of different objectives.

Strategic project	**Objectives of the project**
B. Interaction and Communication in Forest-based Business and Activities Responsibility: Ministry of Agriculture and Forestry, Ministry of Economic Affairs and Employment, Ministry of the Environment Other actors: Finnish Forest Association, Finnish Forest Centre, Natural Resources Institute Finland, Lusto - The Finnish Forest Museum, Finnish Wildlife Agency, schools and educational institutes, Ministry of Transport	The project, which is a cross-cutting project, aims to build trust and cooperation between various actors with pluralistic communication and interaction. People's understanding on sustainable forest management, forest-based products and services, as well as forest biodiversity and other environmental benefits forests provide will also improve as the project progresses. The forest cultural perspective will be included as part of the forest sector's interaction and discussion on forests.

and Communications, Ministry of Education and Culture, actors.	

Interaction and Communication in Forest-based Business and Activities is a cross-cutting project in the National Forest Strategy's project portfolio. The project will focus on providing communication on the importance and benefits of forests and on the National Forest Strategy in its entirety. The other strategic projects will in turn produce content for communication and interaction. The project will produce tools, knowledge base and operating methods for communication and interaction related to forest-based business and activities. Additionally, it will aim to develop the coordination and cooperation in communication to young people and other support cooperation and interaction between the forest sector and other sectors that affect forests. The content of communication and interaction is diverse and comprehensive, and it is based on the best available information. It will help build understanding, trust and cooperation between various actors.

For example, citizens will be told about the importance of forests and their social benefits with a targeted communication project or by collecting information on forests into on place (a national forest knowledge package or communication platform). Special attention must be given to the clarity of communication. The project will develop new kinds of experiential and interactive methods for the dissemination of forest knowledge, the utilisation of new channels and new ways to reach present and new audiences. This will require network-like cooperation and new types of partnerships, for example between research institutes, educational institutions, companies, the media sector, museums and science centres.

Communication will utilise research. Forest-based business and activities related innovations and cross-sector development of forest-based business and activities as well as the best practices for securing the sustainability of forestry can be emphasised using our existing knowledge base in communications. Communication will link the project portfolio's projects to one another, describe what projects have achieved and highlight how research results have been utilised in policy making. Additionally, NGOs and citizens will be encouraged to experience and record forest culture. More information will be provided on the importance of forests to the Sámi and their traditional livelihoods.

For example forest relationship thinking will be utilised in the development and introduction of new tools and operating models for pluralistic and customer-oriented dialogue and communication on forests and customer contact. The development of tools will also require an improvement to our knowledge base on the forest cultural perspective and the way we think about our relationship with the forest. An understanding of the content of Everyman's Rights is a part of the forest cultural perspective. The project will define and introduce the concept of cultural sustainability in forest management and strive to improve the forest cultural literacy of forest owners and forest professionals. At the same time, the concept of social sustainability and its links to cultural sustainability will be determined.

Cooperation and interaction between the forest sector and other forest-related sectors will be improved by supporting their mutual understanding. Steps will be taken to improve cooperation between, for example, the forest, environment, education, research and transport sectors. The project will aim to develop interaction at the regional and municipal levels between actors who makes decisions concerning forestry and actors involved in forest-based business and activities. The operating model of

the private roads forum, which comprises representatives of parties that work with matters related to private roads, will be continued to ensure the dissemination of information on possible development projects and needs concerning private roads and forest roads to various actors.

Youth communication and its coordination as well as cooperation between actors will be developed nationally and regionally. Coordination and cooperation will help maintain awareness on youth communication by various actors, will facilitate the dissemination of good practices, will help ensure that communications are interesting and that there are no overlooked areas in cooperation with schools or the themes that are communicated. Cooperation with schools and hobby organisations will be promoted by various means such as developing new methods and tools for youth work in regions. Additionally, the project will strengthen the influence of the forest cultural perspective in early childhood education and comprehensive education as well as in forest and nature sector training programmes. The project will ensure that young people are provided reliable and diverse information on the role forests play in climate change.

Attention will be given to the inclusion and participation of young people within the scope of all the strategic projects, and in particular in the Know-how and Education project with regard to the availability of competent labour force. A plan will be drawn up on the inclusion of children and young people. The image of forest-based business and activities can be influenced by providing information on the sectors jobs and work tasks and their transformation. This in turn will influence the availability of labour force.

Strategic project	**Objectives of the project**
C. Resource-efficient and sustainable forest management Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Justice Other actors: Natural Resources Institute Finland, Finnish Forest Centre, National Land Survey of Finland, Tapio Ltd, Finnish Wildlife Agency, Metsähallitus, actors	Forest management will be developed with the help of R&D activities, education and of the new geographical information tools developed as part of the project, which will increase forest growth and streghten carbon sinks. At the same time, sustainable harvesting potential will also increase. The project also takes biodiversity and water protection as well as their trade-offs and synergies with wood production into account. Measures that improve the structure of forest holdings and ownership will support the sustainable utilisation of forests. New incentive schemes support sustainable and resource-efficient forest and nature management.

The project will implement key research and development activities that can help increase timber production in commercial forests and improve the quality of forest management in a sustainable manner ensuring that the measures do not endanger the forest biodiversity or other forest-related ecosystem services and do not needlessly restrict other ways of using forests. The project's implementation will utilise the roadmap for more effective sustainable wood production prepared by Natural Resources Institute Finland. This will include measures that will sustainably and cost-efficiently increase tree growth, the maturity of trees, and the quality of trees in commercial forests. These measures include correctly timed forest management activities, improving the nutrient economy and tree breeding. The measures take into account the perspectives and cross-effects of nature management and climate sustainable forestry, which are examined in relation to the attainment of objectives for resource-efficient forestry. Additionally, this will involve the development of research-based growth and output models for forests with varying age structures and mixed tree species.

With regard to peatland forests, research and development activities will focus on the preconditions for the continuation of rational forestry. In particular, it will focus on the development of means of silviculture, forest renewal, seedling management, nature management and water protection with favourable cost-benefit ratios and the dissemination of the best practices. Different measures will be examined in relation to climate benefits and the objectives for improved water protection and quality of nature. Planning at the catchment area level and the operating models used to implement it, help in the practical coordination of the different types of forest use. More attention will also be given to nature management and migratory fish during basic improvements to forest roads and the construction of new forest roads.

The project charts up-to-date research-based information on the values held by forest owners and their objectives as well as the factors that influence decision making that applies to forests. This will add a knowledge base for which policy instruments and service structure changes can be used to encourage forest owners to take part in active and diverse forest management that will be appropriate with regard to society's objectives. The project will increase the provision of services based on intelligent customer data and create the conditions for the construction of decision-support applications that will serve the objectives of forest owners. Decision support applications promote profitable, resource-efficient and diverse forest management and the effective allocation of nature management in commercial forests. To support decision making, sites where the management of seedling stands and young forests is needed will be identified from spatial data and appropriate ways for managing these will be developed.

The project will continue the development of forest holding and forest ownership structure. The development of the forest holding structure will be promoted with the implementation of re-allotments, by establishing new jointly-owned forests and by expanding old ones. Forest ownership structure will be developed by increasing changes of ownership and generations during the initial owner's lifetime, using for example forest gift deductions, reducing the forest ownership of inherited estates and by promoting the sale of forest holdings on the free market.

Additionally, the new incentives scheme for forestry will be prepared and added to legislation within the scope of the project. The scheme will encourage private forest owners to implement active and timely forest and nature management as well as to maintain infrastructure. The system must be incentive for forest owners, simple, clear and unbureaucratic. The incentive scheme will promote the use of expert assistance in forest and nature management.

The diverse range of opportunities afforded by new technology, digitalisation and automation will be utilised in work that aims to achieve the project objectives.

Strategic project	Objectives of the project
D. Nature Management in Commercial Forests and Forest Biodiversity Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Natural Resources Institute Finland, Finnish Environment Institute, Finnish Forest Centre, Tapio Ltd, Finnish Wildlife Agency, Metsähallitus, actors	Nature management in commercial forests will be developed so it has greater impact and is a more fixed part of routine forest management and forest service entrepreneurship. An effort will be made to carry out nature management in connection with forestry operations. Spatial data and new applications will make it possible to better reconcile forest biodiversity, wood production and other ecosystem services. The genetic resources of forest trees will be ensured. The METSO Programme is being implemented and its resources will be seen to according to the objectives set for the programme.

The project will develop the nature management of commercial forests as part of forest management in a manner that will ensure that biodiversity, water protection, game, recreational and landscape values will be taken into account in forest management better than before. An effort will be made to carry out nature management in connection with forestry work. The project is closely linked to the Resource-efficient and Sustainable Forest Management project.

The project will utilise education, guidance and other forms of communication in an effort to increase people's competence to adopt forest and nature management methods and operating models that will reinforce biodiversity and ecosystems services. The project will adopt the operating models developed in the Monimetsä project, which promotes nature management and the use of geographical information in the planning of nature management and water protection in a manner that lines up with the objectives of the forest owners (issues related only to water protection in peatland forests are part of the Resource-efficient and Sustainable Forest Management project.

It will increase the nature management of commercial forests-related know-how of forest owners. The project will continue the development of cost-effective operating models for identifying important sites and for the optimal allocation of nature management measures in various silvicultural methods as well as at varying scales. The project will promote an increase to the amount of mature and dead wood and the share of deciduous trees as well as the use of fire in commercial forests.

The project also examines possibilities for developing methods and operating model that are suited for Finland's conditions for water protection in commercial forests and safeguarding of biodiversity at a scale that is larger than a single forest stand such as in a catchment area. The study examines the cost-effective and optimal allocation of nature management and conservation methods as a whole. This work will be carried out in cooperation with the Ministry of the Environment. The work must also take into

account for example land ownership structure, means based on voluntary involvement and funding models as well as climate change mitigation and adaptation.

The development of nature management and its optimal allocation as well as the coordination of different objectives will require an improved information base as well as the development of up-to-date, high quality spatial data, monitoring and incentives. The project will produce a knowledge base, for example, on the costs and benefits of nature management measures, the development needs for monitoring of nature quality, needs related to the content of geographical information for the Forest Data and the Platform Economy project as well as information that will support the development of incentives for the Resource-efficient and Sustainable Forest Management project.

The METSO Programme is a key method for the development of the conservation area network. Providing for the programme's resources and the development of methods are fundamental for the successful attainment of international and national objectives related to biodiversity. The use of environmental and forest resource data to channel financing under the METSO programme will be improved in the ecologically most appropriate manner and to nature management projects. Additionally, the future METSO programme will be developed so that it is also suited for other ecosystems, such as mires and wetlands. Also, measures contained in other biodiversity-related strategies, such as the restoration of conservation areas, will be needed for the development of the protected area network.

The gene resources of forest trees will be protected by guaranteeing resources for genetic reserves and genetic stock collections. Preservation techniques will be developed for the preservation of species that are especially susceptible to pests. Species-specific basic data will be produced on genetic variation, and this will be used for determining the optimal composition of genetic stock collections and for the assessment of the usability of materials.

Strategic project	**Objectives of the project**
E. Climate Sustainable Forestry Responsibility: Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Natural Resources Institute Finland, Finnish Environment Institute, Finnish Meteorological Institute, Tapio Ltd, Finnish Forest Centre, Metsähallitus, Finnish Wildlife Agency	The project aims to increase knowledge on the development of carbon storage and sequestration in forests as well as on the impacts of forests and forest management on climate change adaptation. New information will improve risk management by forestry and forest owners and create the foundation for the more effective consideration of the climate in management and use of forests.

The project will improve awareness on the development of forest carbon sequestration and carbon storage and on how forests adapt to climate change. The forest management and choice of tree species can be used to control the weather and climate risks related to forestry. Methods include the more precise timing of forest management methods and harvesting, favouring of mixed forests and trials for the cultivation different deciduous trees such as hardwoods. It will also update forest management

recommendations and introduce methods for the effective regulation of the elk population. The forest management recommendations will be updated and the effectiveness of communication concerning climate change adaptation, carbon binding by forests and carbon storage will be improved.

This project examines the management of peatland forests from the perspective of climate impacts. The project is closely linked to the research and development measures described in the Resource-efficient and Sustainable Forest Management project such as reports on the regeneration of peatland forests, nature management, water protection, the promotion of the nutrient economy. The results of the project will be taken into consideration in the cross impact reviews carried out as part of the Resource-efficient and Sustainable Forest Management project.

The project is developed for monitoring the forest damages and invasive species, including systems for predicting these as well as active methods and operating models for minimising damage risks. Related to the objective, the project assesses needs for changed to legislation related to the prevention of forest damage, promotes the use of spatial data materials and cross-administrative sector cooperation. Additionally, monitoring and prediction systems will be developed and tested.

The project is linked to the implementation of the LULUCF Regulation, where one of the focus areas are the measures needed by the land use sector such as the opportunities related to and suitability of an increase in afforestation and the decrease of forest loss. The possibility for developing, the impacts and the feasibility of a carbon sink compensation system will be assessed within the scope of the forest strategy. The project will also determine the combined and cross-impacts of climate policy and measures that aim to preserve biodiversity as well as the possibilities for improving the impact of favourable measures.

Strategic project	**Objectives of the project**
F. Forest Roads and the Accessibility of Forests Responsibility: Ministry of Transport and Communication, Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Finnish Forest Centre, Metsähallitus, municipalities, actors	The project will help improve the service level and usability of the road network, for example, by utilising spatial data. At the same time, it will improve the decision-making capability of road cooperatives and make it easier to contact shareholders in road cooperatives. The project also promotes the availability of reliable, fast and equal data connections throughout the country. Investments in infrastructure will promote the diverse utilisation of forests the performance of rescue duties, recreational use and nature tourism, as well as other business in rural areas.

The project will promote platform solutions for the collection and utilisation of road information, such as a service platform for private road information. This will include information on both primary and secondary roads. The project will be implemented jointly by actors involved in forest-based business and activities, the Ministry of Transport and Communications and its administrative branch. Timely

spatial data and information on the condition of roads collected with various methods combined with real-time traffic conditions data will improve the accessibility of forests and the planning and optimisation of logistics of wood procurement. Better information than at present will help road cooperatives and other actors target and scale repair investments for the lower-class road network. This will facilitate the cost-efficient maintenance and improvement of the network's level of service.

Maintenance of the road network will also be strengthened by promoting road maintenance associations and improving cooperation between road cooperatives. An effort will be made to make it easier to reach road cooperatives by compiling a list of their contact information. Decision making by road cooperatives and the contactability of road cooperative shareholders will be promoted with new education and awareness projects.

Sparsely populated areas are the core areas for forestry. For this reason, in addition to roads also the functionality of telecommunications infrastructure and services must be promoted in order to secure the operations of forest owners and companies. The Digital Infrastructure Strategy specifies the objectives for the development of Finland's digital infrastructure until 2025 and the means with which these objectives will be achieved. The construction of communication networks can be facilitated, for example by promoting cost-efficient investments in telecommunications cables.

The project will also promote the conditions for the recreational use of forests by investing in recreational use structures and off-road paths, by securing the accessibility of urban forests in land use planning and by developing cooperation with municipalities. The project will also work to eliminate the maintenance backlog for service equipment and recreational trails and snowmobile tracks in national parks and state-owned recreational areas.

Strategic project	**Objectives of the project**
G. New Wood-based Products Responsibility: Ministry of Economic Affairs and Employment, Ministry of Agriculture and Forestry, Ministry of the Environment Other actors: Business Finland, the Academy of Finland, Natural Resources Institute Finland, VTT Technical Research Centre of Finland Ltd, Ministry of Transport and Communications, the sector's companies	The project aims to develop new forest biomass-based solutions and to support their commercialisation. The project's activities focus, in particular, on the development of new high value added fibre and pulp products as well as on the use of wood in wood building and timber products. The new product opportunities of wood biomass and its components are also being investigated. Support for research and innovation activities will speed up the growth of bioeconomy and circular economy.

The project will support the development, piloting and demonstration of forest biomass-based material and product solutions, the commercialisation of new products, services and solutions, and an increase to the exploitation of wood in a diverse manner that produces additional value. The project focuses on

new fibre and pulp products and on wood construction and solid wood products. Also, the further development and commercialisation of products in the existing product portfolio will be taken into account.

High value added fibre and pulp products (textiles and biocomposites) will respond to global challenges. Wood biomass and its components provide new product opportunities also in for the productions of chemicals, packaging materials, films, insulation and filling materials as well as high value added lignin-based products.

New material and product solutions aim at the production of high-quality advanced products and expanding the use of these products to new areas. The project also focuses on the effective utilisation of wood raw materials and side streams and the development of the recycling potential of products. The development of wood construction and housing will focus on an increase to material-efficiency and user-safety, and the commercialisation of health, welfare and environmental impacts of wood. The potential of future product and service markets, the demands of end users and user experiences are examined in various product groups.

The nature and the scope of the transition to the low-carbon bioeconomy will require close and extensive cooperation between the business world, research and research financiers and the Finnish Government. Small and medium-sized companies will receive support for engaging in closer cooperation and for the commercialisation of new solutions at different phases of the value chain.

The export conditions for the wood product industry and wood construction will be improved by developing means, materials and products in a market-oriented manner based on systematic market research and with long-term promotion measures. Additionally, public sector wood construction will be promoted and the public sector's capacity for wood construction will be investigated together with the Ministry of the Environment.

The use of wood structures can be increased in transport infrastructure, which will increase the diverse use of timber, and decrease the carbon footprint and lifecycle costs of construction. Attainment of the objective will require the determination of international practices related to wood-using infrastructure construction and the elimination of lacking competence.

Strategic project	**Objectives of the project**
H. Nature Tourism, Natural Products Sector and Other Nature-based Services Responsibility: Ministry of Agriculture and Forestry, Ministry of Economic Affairs and Employment, Ministry of the Environment Other actors: Metsähallitus, Finnish Forest Centre, Natural Resources Institute Finland, Ruralia Institute, Tapio Ltd, Finnish Wildlife Agency, companies, landowners	The project improves the operating conditions for nature tourism, forest-based health and welfare services and the natural products sector, for example by using new tools. New value chains and revenue models for forest owners will create new forest and nature-based business.

The project will develop conditions for ecologically sustainable nature and adventure tourism, the natural products sector and other forest-based health and welfare services by implementing experimental projects and improving cooperation between companies and these sectors. The project will focus on the most important measures as well as ensure their appropriate scope and ecological sustainability and responsibility in order to achieve nation-wide impact. The development of nature and adventure tourism, the natural products sector and other forest-based services will require a range of different measures. Measures of key importance will include competence in entrepreneurship, networking of companies, productisation and the stronger recognition of market potential. It will be important to link the education and research activities developed in the Know-how and Education project to business and business services.

The project will create the conditions for the sustainable cross-sectoral growth, development and networking of the natural products sector, especially with regard to gathered natural products not covered by Everyman's Rights. Essential questions concerning the sector's development include the availability of high-quality raw materials, the organisation of sustainable growth and the balancing of supply and demand. Bottlenecks related to the availability of raw materials for companies in the natural products sector and the earnings of forest owners can be resolved by developing cooperation. Development of cooperation between the forest and natural products sectors can apply for example to the utilisation of digitalisation and open forest data in planning the procurement of raw materials.

Methods for expanding gathering areas in Southern Finland will be examined in order to improve the availability of organic-certified forest berries. The possibility for including the technical solution for the certification of organic natural products on the Metsään.fi website will be looked into.

Productisation and marketing are crucial from the perspective of nature tourism and other service business. Finland's strengths, including forests, clean air and water, silence, space and the changing of seasons, can now be productised better than ever. The coordination of the needs of various industries will be addressed by promoting cooperation between nature tourism operators and other nature entrepreneurs and actors in forest-based business and activities, for example with experimental projects and by developing and introducing contractual operating and financing models. The Forest Roads and the Accessibility of Forests project will support the better accessibility of protected areas and recreation areas.

New business activities may increase forest owners' opportunities for earning an income and thus create alternative models for forest use in addition to wood production. The project will develop value chains and forest owners' revenue logic for sustainable business other than the forms based on wood production ecosystem services. All different kinds of forest owners will be taken into consideration in this development. Contractual operating models will be promoted with means such as communication, a guidance service and new market places.

So that business opportunities can be utilised in the best possible way, the project will produce information on the value chains of business activities based on ecosystem services and the bottlenecks related to their coordination, and their joint impacts. The project will also produce information on the impacts of nature-based business activities to regional economy and their socioeconomic importance to the area's actors from land-owners to entrepreneurs. The knowledge base concerning the

coordination of forest-based business and activities is also linked to the Nature Management in Commercial Forests and Forest Biodiversity project.

Strategic project	**Objectives of the project**
I. Know-how and Education Responsibility: Ministry of Education and Culture, Ministry of Agriculture and Forestry, Ministry of Economic Affairs and Employment Other actors: Finnish National Board of Education, educational providers, Metsäkoulutus ry, Työtehoseura, companies and organisations in the sector, Natural Resources Institute Finland, Finnish Forest Centre, Business Finland, Academy of Finland, Metsähallitus, Lusto – The Finnish Forest Museum, Tapio Ltd	The project promotes cooperation between research, business and education with the aim of improving know-how in spatial data, wood technology, nature management in commercial forests, water protection, peatland forest management, the forest road network, entrepreneurship. Also, the quality of machine driver training in the forest sector will be developed.

The project will increase cooperation between research, business life and education. The development of education will also require research on the future's competence needs in the entire value chain for the bioeconomy and circular economy, and, on the other hand, what young people find interesting and what kind of expectations they have related to forest-based business and activities. Qualitative and quantitative compatibility between education or training and working life are monitored regularly and educational institutions respond to the results of this monitoring quickly.

Know-how will be fostered with adequate continuing education and conversion training as well as with changes to educational contents at all levels of the educational system. Areas of competence that will be reinforced at the beginning of the value chain include, in particular the use of geographical information, the safeguarding of biodiversity, water protection, peatland forest management, the maintenance of the low-volume road network and entrepreneurship. Know-how will be needed at the end of the value chain in areas such as the adoption of innovations, for example, in fields that aim to commercialise process technology, wood technology and the welfare impacts of wood and forests. The natural products sector will need continuing education for experts, the sector's developers and educators, so that the sector can respond to needs related to developing entrepreneurship, product development and the competence of entrepreneurs.

Cooperation between educational institutions will be improved, for example, by developing joint online studies. The opportunities afforded by digitalisation in the fostering of competence will be utilised. The learning environments for vocational education and training as well as the preconditions for learning on-the-job especially in SMEs will be developed to support the renewal of both vocational education and training and forest-based business and activities. New and innovative reorganisation of education

pilots will be carried out in cooperation with the Ministry of Education and Culture so that these meet with the needs of working life and the interests of young people.

The project aims to promote the gravitation of young people and others considering different career options to bioeconomy jobs and entrepreneurship. People are given comprehensive information on different options in a practical and clear manner. Operating models for motivating young people and others considering different career options to consider forest-based business and activities are developed and implemented and factors that will add to the appeal of the sector are ensured. The competence of company management and personnel as well as competence related to student mentoring, guidance and cooperation between working life and educational institutions will be updated. Means for utilising non-formal learning methods will be developed as new competence needs to grow in number. A closer connection between hobbies, educational institutions and working life will be supported. Hobbies that take place in the forest as well as the competence gained through working and entrepreneurship will be taken into account as methods of learning.

To ensure that forest-based business and activities have a sufficient supply of work force, the employment possibilities and competence of foreign students will be determined and the recruitment of foreign work force will be developed. To support year-round work, networking opportunities will be promoted, for example, between the tourism industry and property management sector. Statistics for wellbeing at work will also be developed.

It is fundamental that research, development and innovation activities produce a sufficient amount of information and competence to advance the entity formed by the forest strategy's project portfolio and to promote the bioeconomy and circular economy. The project supports the creation of multidisciplinary research programmes and projects that will serve the forest-based sector's information needs and the implementation of results, for example through pilots. The impact of development activities in forest-based business and activities will be improved by increasing project activities based on partnerships, where each actor's specialist knowledge is utilised in the manner required by customer needs.

Strategic project	**Objectives of the project**
J. International Forest Policy and Influencing EU Policies Responsibility: Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of Economic Affairs and Employment, Ministry of the Environment, Ministry of Finance Other actors: Business Finland, Natural Resources Institute Finland, research institutes, organisations and companies, other countries,	The project will implement initiatives that will apply to international forest policy and EU policies and will promote international business opportunities. At the same time, it will promote the attainment of the UN's Sustainable Development Goals in forest-based business and activities. The project also aims to safeguard operating conditions for forest-based business and activities and for sustainable forest management and and to increase awareness on the importance of forest-based business and to climate and energy policy solutions.

international organisations and processes	

The project will promote information-based decision making in international cooperation and development policy utilising research, development and innovation activities (RDI), expertise in forest-based business and activities as well as efficient and up-to-date information systems. The forest-based business and activities sector is a responsible trendsetter, which engages in open and active communication. The sector has a positive image internationally.

The project will coordinate the implementation of Agenda 2030 in the area of forests, sustainable forestry and the bioeconomy in international and EU cooperation. The multi-level e.g. UN-based cooperation and development policy related to forests and forest-based business and activities are efficient and effective. The operating conditions for forest-based bioeconomy and circular economy have become stronger and been secured. The EU Forest Strategy is the most important instrument for improving the coordination of initiatives that influence EU forests.

The utilisation of expertise related to forests is a clear operational objective for influencing international and EU policies. The utilisation of forest expertise will improve consistency and coordination. Measures related to this include systematic and long-term work to place experts in positions and tasks in international organisations such as the EU Commission that are essential to the forest sector. Cooperation with Finland's foreign missions and Business Finland, and the EU delegation's strong forest expertise must be guaranteed in the future.

An increase to understanding of forests will be promoted with various reports, effective communication and events, such as the EFI's ThinkForest and the Forest Academy for DecisionMakers that has been expanded to the EU. Additionally, Finnish research institutes and other actors will be encouraged to actively take part in their own international and EU networks, as well as to organise events and visits that will elevate the profile of the forest sector.

4.2 Achievement of objectives relevant to forest-based business and activities through other strategies and programmes

In addition to the strategic projects of the National Forest Strategy, many other strategies and programmes contribute to promoting the Forest Strategy objectives. Particular attention should be paid to the coordination and compatibility of and interfaces between the National Forest Strategy and other strategies. Continuous dialogue between the ministries and business life, in which all the various sectors exploiting forests can take part, will also play a key role.

Implementation of the Finnish Bioeconomy Strategy and the Energy and Climate Strategy have substantial links with achieving the objectives of the National Forest Strategy. With regard to forests the Energy and Climate Strategy keeps along the same lines as what is outlined in the National Forest

Strategy, in addition to which it includes actions for afforestation, forest loss and the energy use of biomass. Of the Finnish Bioeconomy Strategy measures, in particular increasing capital funding for and innovation investments in the bioeconomy and financing the piloting and demonstrations of new bioeconomy solutions will promote renewal in forest-based business and activities. Highlighting bioeconomy as part of Finland's country image will support growth and development in the sector.

Safeguarding forest biodiversity and the preservation of habitats for endangered forest species are supported by the resolution adopted by the Government on extending the Forest Biodiversity Programme for Southern Finland (METSO) to 2014–2025. The METSO programme is a key instrument in halting the loss of biodiversity and ensuring a favourable status of forest biodiversity. Another central strategy relevant to biodiversity is Government Resolution on the Strategy for the Conservation and Sustainable Use of Biodiversity in Finland for the years 2012–2020, ‘Saving Nature for People' (the so-called National Biodiversity Strategy) and the associated Action Plan. An evaluation on shortcomings and development needs of conservation will be produced to develop the network of conservation areas and its management, accounting for the impacts of climate change among other things.

Water protection measures in forestry will be carried out following the Programme of Measures for water management required by EU Water Framework Directive. Of particular importantance will be introducing an operating model for planning at the level of catchment areas and the planning of treatment wetlands and wetlands, developing and utilising a monitoring network for pollutant loading in water systems from forestry, and updating operating models and instructions for managing sediment discharges from forestry. Restoration of small water bodies will be carried out as part of forest environment management. It is especially important to provide educational and guidance material in, for example, online to those responsible for planning and implementation tasks. Practical examples and in-house control will make it possible for us to increase the success of water protection solutions.

The Ministry of Economic Affairs and Employment Doing more together - a road map for growth and renewal in Finnish tourism for 2015–2025 includes measures, for example, for the developing sustainable tourism and ensuring that paths and routes important to tourism and their supporting infrastructure are in good condition and that there are safe instructions and signs provided. The main focus areas selected for product development activities include welfare, culture, nature-based summer activities and winter. Roadmap for growth and renewal in Finnish tourism will be updated in spring 2019. Finland’s nature is a key factor for tourism that appeals and offers an operating environment for many tourism services.

Business Finland’s Visit Finland activity will speed up nature tourism in a diverse manner. Additionally, Business Finland’s Food From Finland Programme will run until 2023 and do its part to support nature tourism by adding food tourism and new Finnish organic healthy food culture to it.

The Rural Policy Committee works to promote business and industries in rural areas. The Rural Policy Programme 2014–2020 will contribute to the achievement of National Forest Strategy objectives in the context of infrastructures, planning and zoning, promoting entrepreneurship and ecosystem services. Business and development funding under the Rural Development Programme for Mainland Finland 2014-2020 can be exploited in a versatile manner for promoting competence and innovations, diversification of rural business and producing environmental benefits. This necessitates

communication about the possibilities offered by project funding and active participation by the stakeholders.

Regional Forest Programmes are in place to implement the National Forest Strategy in regions. Regional Forest Programmes for 2015–2020 have been approved by regional forest councils. In 2017, the measures that will implement the Regional Forest Programmes' objectives were updated. Regional Forest Programmes contain regional nature management implementation programmes, in other words plans drafted by the Finnish Forest Centre and its regions for the promotion of nature management that will target nature management procedures carried out with public funds. New Regional Forest Programmes will possibly be drawn up for 2021–2025. Regional Forest Programmes emphasise the regions' own vision on the areas in which forest-based business and activities require development, and their connection to regional programmes and strategies will be negotiated with the regions. These can also influence how funds from EU Regional Development Fund Programmes and Rural Development Programmes are directed to industries that are felt to be the most important as well as projects related to biodiversity and water protection.

The United Nations Forum on Forests (UNFF) is the key UN process that applies to forest policy. Its objective is to promote, monitor and assess the sustainable forest management including forest conservation. The Forum creates opportunities for international forest policy development and dialogue between countries, organisations and stakeholders. The United Nations Strategic Plan for Forests 2017–2030 directs the forest-related work of UN bodies and thus promotes the effect of forests on the implementation of Agenda 2030. In addition to the Forum, the Collaborative Partnership on Forests is an important player in International Arrangement on Forests.

Other international agreements and organisations that are significant with regard to forests include the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Climate Agreement, the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the Food and Agriculture Organization of the United Nations (FAO) as well as international and regional financial institutions. The most important regional organisations and processes are the UN Economic Commission for Europe (UNECE), the European Forest Institute (EFI), and the Forest Europe process (Figure 7).

Finland's EU membership requires that EU provisions must be taken into account in national legislation. The EU does not have an official shared forest policy, but many of its provisions for example concerning rural development, trade policy, energy and climate policy and environmental and nature conservation directly or indirectly also affect forestry and the forest industry. The EU division of the EU matters committee will provide assistance in the national preparation of initiatives that will influence EU forests.

The EU Forest Strategy is the most important instrument for improving the coordination of initiatives that influence EU forests. The updated strategy was published in 2013 and its action plan in 2015. The Commission published an intermediate assessment on the implementation of the EU Forest Strategy on December 2018. The EU Forest Strategy will be valid until 2020. It is of key importance to influence the update of the forest strategy in a way that would see its weight in relation to other policies and strategies to grow.

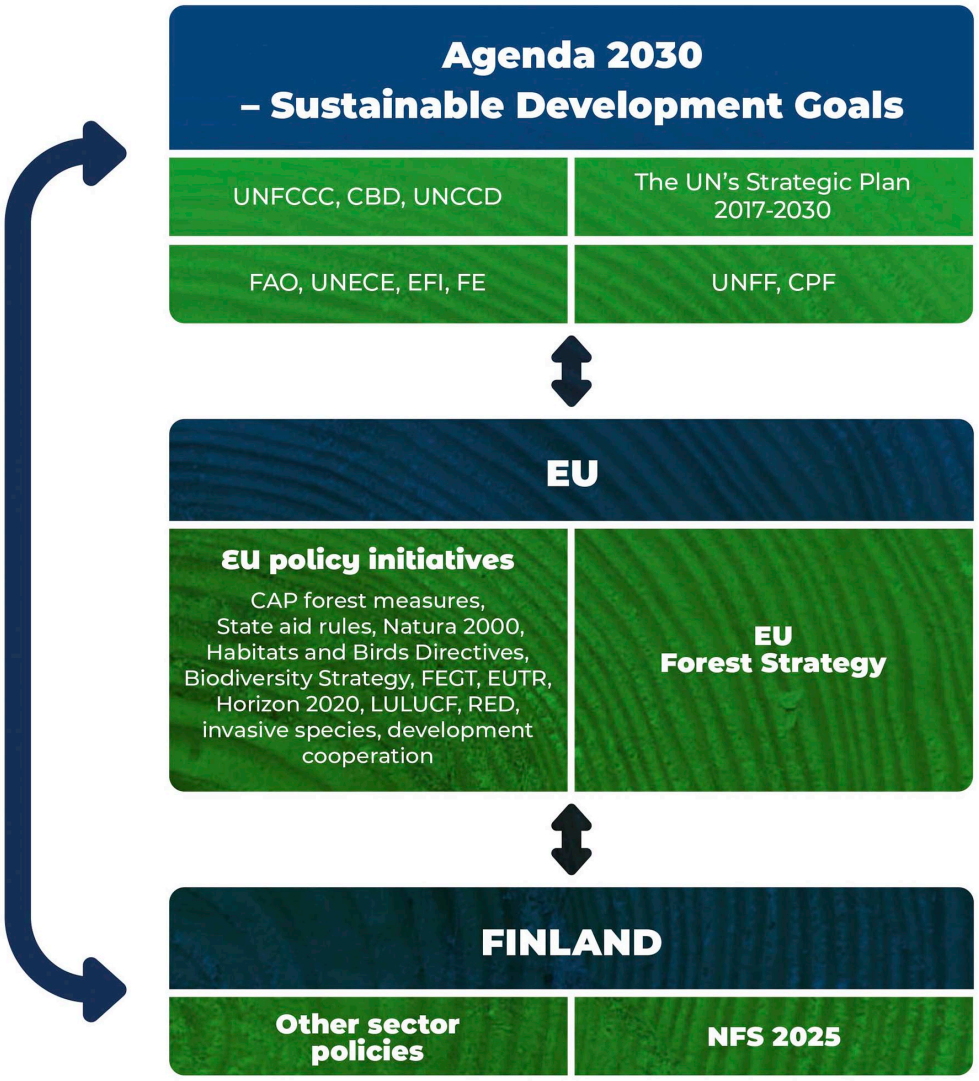


Figure 7. International, EU and national policy framework related to forests and sustainable forestry.

Pursuant to the Decree on the Development Plan for Education and University Research (987/1998), the Government adopts every four years a plan for developing education in the administrative branch of the Ministry of Education and Culture and research carried out at universities for the year in which the decision is made and the following five calendar years. The publication ”Suomi osaamisen kasvu-uralle: Ehdotus tutkintotavoitteista 2020-luvulle, (Publications of the Ministry of Education and Culture) 2015:14” provides guidelines on the development of education. The Ministry of Education is also developing measures relevant to on-the-job learning, including a reform of on-the-job learning and apprenticeship training for young people.

The Ministry of Transport and Communications has drafted the Digital Infrastructure Strategy, which will promote the development of more comprehensive data connections, which are important to forest-based business and activities. During the upcoming government term, the Ministry of Transport and Communications will draw up a transport system plan, at which time the forest sector's needs will be reviewed as part of the broader development of the transport system.

The strategies will be implemented in two directions. In addition to various strategies implementing the National Forest Strategy, the National Forest Strategy will facilitate the implementation of other strategies.

5 Organisation of strategy implementation and monitoring

Adopted as a Government Resolution, the National Forest Strategy 2025 will be implemented via strategic projects. Each strategic project is implemented with numerous subprojects. The Forest Strategy supports the activities of various ministries and their administrative branches in the implementation of projects.

National Forest Strategy implementation and monitoring will be coordinated by the Ministry of Agriculture and Forestry. The National Forest Council supports the Ministry of Agriculture and Forestry in far-reaching forest policy issues that are important in principle and acts as a cooperation forum for the public and private sectors in forest-related issues. In this role, the Forest Council monitors and promotes the implementation of the Forest Strategy and submits proposals for its comprehensively balanced development in a manner that takes into consideration various perspectives of sustainable development. In addition to the Forest Council, the Forest Strategy's implementation is promoted by a working committee under the Forest Council and the steering groups set up around the programme's strategic projects, whose terms of office will vary. Steering group members will include representatives of both the administration and stakeholders. Additionally, the Ministry of Agriculture and Forestry can use other groups and processes to further the implementation of the Forest Strategy. For example, the Roundtable process used for discussing the forest biodiversity has had a significant positive affect on the coordination of the views of various actor and on reinforcing the preservation of biodiversity. If necessary, working groups to address wider thematic areas may be appointed to evaluate, plan and promote strategy implementation.

To improve the monitoring and the impact of international forest policy, the Ministry of Agriculture and Forestry will establish an international forest policy group which will also act as a subgroup to the Forest Council. The civil officials in the group will include the members of the International Forest Public Servants Working Group. Parties from relevant ministries, administration, research institutes and stakeholders will be invited to join the broad based group. The monitoring of strategic projects may also rely on the EU Forest Division and the cooperation body for international natural resource policy.

Several ministries will participate in the implementation of the National Forest Strategy. The Ministry of Economic Affairs and Employment will assume special responsibility for developing the operating environment for forest-based business. Additionally, the development of the business potential of forest-based business and activities is granted under the remit of the Ministry of Economic Affairs and Employment, for example through Business Finland activities, such as the continuation of the Wood from Finland Programme. The promotion of nature tourism and the recreational use of forests will be implemented in cooperation by the Ministry of Economic Affairs and Employment, the Ministry of the Environment and the Ministry of Agriculture and Forestry. The implementation of the Forest Strategy is also supported with business and development funding under the Rural Development Programme for Mainland Finland, which is implemented by the Ministry of Agriculture and Forestry's administrative sector. The Ministry of Transport and Communications has a major role in infrastructure development, whereas the Ministry of Education and Culture will develop education, training and research. The Ministry of the Environment is responsible for issues related to planning and zoning, environmental permits, nature conservation, the conservation of waters and the climate, off-road traffic and

Everyman's Rights. Trade policy associated with international forest issues and implementation of the Development Policy Guidelines for forest sector are within the remit of the Ministry for Foreign Affairs.

The updated National Forest Strategy will be implemented in 2019–2025, taking into account any pressures for change arising from programme monitoring, interim evaluations and government programme policies. Regional Forest Programmes for 2021-2025, which are based on the National Forest Strategy, will be prepared by the end of 2020.

The Forest Council will annually review the implementation of strategy objectives and progress made in strategic projects. By analysing the Forest Strategy's indicators and objective achievement in relation to changes in the operating environment, the National Forest Strategy's impact and changes needed in its measures can be evaluated in connection with the annual monitoring exercise.

The most urgent projects in terms of achieving the National Forest Strategy objectives have been collected in the project portfolio. The Forest Council annually prioritises the areas of focus in the implementation of the project portfolio to promote the achievement of the National Forest Strategy objectives. External interim evaluations of the National Forest Strategy will also be produced as required.

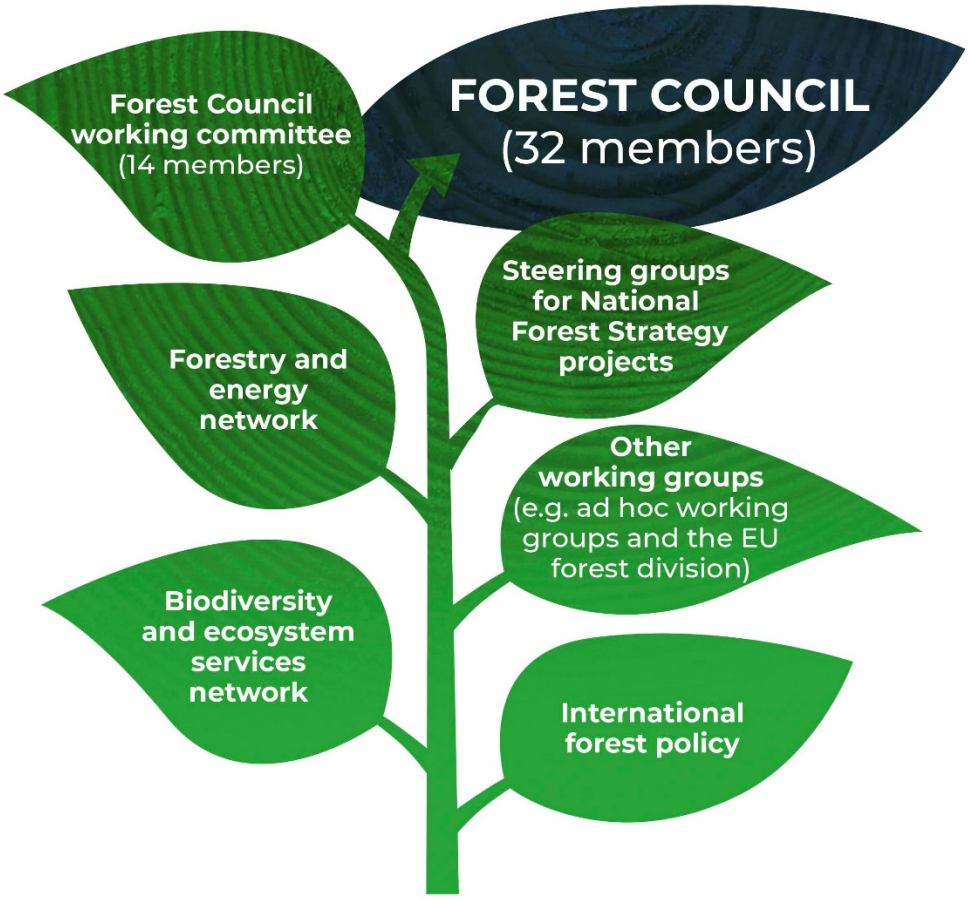


Figure 8. Organisation of the implementation of the National Forest Strategy.

6 Financing of the strategy

Questions concerning the financing of the strategic projects contained in the National Forest Strategy and the measures contained within these will be discussed and decided annually as part of the central government's spending limit and budget processes. The strategy will be implemented in accordance with the central government spending limits and budgets. EU project funding may also be applied for to implement projects.

Under the Ministry of Agriculture and Forestry the financing needed for the implementation of the revised project portfolio will likely be allocated for the following areas:

1. Effective implementation will require stronger investments than at present into to forest-based business and activities-related R&D activities. Researched data can be used to develop forest-based business and activities in the changing operating environment so that their sustainability is guaranteed despite the sector’s growth and diversification. Financial needs highlight, in particular climate-sustainable and resource-efficient forest management and the nature management of commercial forests and issues related to reconciliation of different forest uses.
2. Financial needs also apply to nature tourism and the recreational use of forests, such as the repair and development of infrastructure that supports recreational use maintained by Metsähallitus.
3. Investments in the promotion of digitalisation and the platform economy for forest-based business and activities can be considered be most important factors for the effective implementation of the National Forest Strategy.
4. Financing will be needed for the implementation of the METSO Programme, the promotion of the protection of the gene reserves for forest trees and forest improvement.
5. The ministry and its administrative branch must allocate adequate resources for the implementation of international and EU guidelines. Financing will also be required for reporting and development activities and international cooperation.

The realisation of the objectives listed in the National Forest Strategy will also require the allocation of resources to, for example, the administrative branches of the Ministry of Economic Affairs and Employment, the Ministry of the Environment, the Ministry for Foreign Affairs, the Ministry of Transport and Communications and the Ministry of Education and Culture. In addition to financing from the Ministry of Agriculture and Forestry, the implementation of international and EU policies will require, for example, the appropriation of development funds to forest-based business and activities, funding for the development of new business opportunities and the redirection of work by international financial institutions so that objectives can be attained.

7 Assessment of the strategy's impacts

The impact assessment was drawn up by research officers Tuula Packalen, Leena Finér, Mikko Jokinen, Mikko Kurttila, Antti Mutanen, Raisa Mäkipää, Miia Saarimaa, Pekka Saranpää, Jussi Uusivuori, Esa-Jussi Viitala and Jari Viitanen from the Natural Resources Institute Finland (Luke).

7.1 Background, objective and implementation of the impact assessment

The impact assessments related to the National Forest Strategy's processes have been carried out as a separate impact assessment ex post facto (Hildén et al. 1999), a separate estimate (Indufor 2007) and a built-in estimate (Ministry of Agriculture and Forestry 2015). Separate impact assessments (Hildén et al. 1999, Indufor 2007) were carried out for national forest programmes (Ministry of Agriculture and Forestry 1999; 2008), wherein objectives, objective-specific target levels and measures related to objectives were described. The structure of the National Forest Strategy 2025 (Ministry of Agriculture and Forestry 2015; this document) differs from the national forest programmes. The National Forest Strategy 2025 separates the objectives and their related indicators from the project portfolio, wherein the measures that support the objectives are described. Objectives were maintained, indicators reviewed and the project portfolio revised in this National Forest Strategy 2025 update.

Natural Resources Institute Finland selected a built-in process assessment as its approach for the assessment of the updated National Forest Strategy's impacts. The built-in process assessment monitored the process and its interactive implementation. In addition to this, the process was supported in predicting the impacts of the update in relation to the strategy's objectives already during the process. This meant that the update could, where necessary, respond, for example, to the possible cross and side effects of its parts or be prepared for identified uncertainties. Because the objectives of the strategy were not altered in the National Forest Strategy 2025 update, the impact assessment focuses on the assessment of the project portfolio in relation to the objectives.

This section describes the impact assessment as part of the update process (this Chapter 7.1), examines the societal significance and impact of the National Forest Strategy 2025 update (Chapter 7.2), and the uncertainties related to the changing operating environment (Chapter 7.3), and assess the revised project portfolio (Chapter 7.4).

The National Forest Strategy 2025 update included the following interactive work stages and events:

- Stakeholder seminars (3/2018, 9/2018, 10/2018)
- Project workshop (5/2018)
- Hearing of regions (9/2018)
- Ota kantaa survey (9/2018)
- Forest Council meetings (3/2018, 6/2018, 9/2018, 10/2018, 12/2018)
- Forest Council working committee meetings (4/ 2018, 5/2018, 8/2018 9/2018, 10/2018, 12/2018).

Natural Resources Institute Finland supported the National Forest Strategy 2025 update process in the following ways:

- Operating environment analysis (Hänninen 2018)
- Roadmap for the promotion of sustainable wood production (Hynynen et. al 2018)
- A workshop organised for the Forest Council's work committee for the assessment of projects (hereinafter project assessment workshop, as part of the Forest Council work committee's meeting 9/2018)
- An estimate presented to the Forest Council (10/2018) on the impacts of the projects portfolio at that time.

Natural Resources Institute Finland utilised the results of various processes in the following manner:

- The implementation of the National Forest Strategy 2025 monitoring reports from which highlighted areas of focus were identified.
- The indicators for the National Forest Strategy 2025 update and their target levels.
- Operating environment analysis (Hänninen 2018), which identifies the opportunities that can be reinforced and challenges that can be defeated with the National Forest Strategy's project portfolio.
- Road map (Hynynen et al. 2018) which identifies the challenges related to increases in the effectiveness of sustainable timber production.
- The project assessment table produced as part of the project assessment workshop, the results of which were analysed and reported to the Forest Council (10/2018) as feedback on the previous project portfolio. Special attention was drawn to the interfaces of projects and their possible cross impacts. Natural Resources Institute Finland updated changes to the project assessment table, which resulted from a new project decided on after the project workshop.
- The results of the Ota kantaa survey from which the respondents' priorities were identified. The analysis of the results took into consideration that the responses were not based on a statistically representative sample.
- A summary of regional hearings, from which the themes respondents wanted attention drawn to in the finalisation of the project portfolio were identified.

7.2 Social significance and impact of the National Forest Strategy

The National Forest Strategy aims to promote the welfare derived from forests, to increase vitality derived from the bioeconomy in Finland and to secure the economically, socially, culturally and ecologically sustainable use and utilisation of forests. An effort has been made to implement the objectives and goals outlined in the forest strategy with the strategic projects contained in the project portfolio. Progress in achieving the objectives can be assessed with quantitative and qualitative indicators. However, an overall assessment is difficult because project implementation costs and the monetary value of the direct and indirect benefits gained from the projects are unknown and they

cannot be measured. This also means that the overall cost efficiency of projects cannot be assessed either. Many of the indicators that assess the strategy and illustrate the economic situation are also sensitive to the international market situation of forest sector products.

7.2.1 Economic impacts

The use of Finnish forests and business activities that utilise wood biomass have experienced an extensive structural change over the past 15 years. Although income from paper still accounts for approximately one third of the value of forest industry product exports, the importance of printing and writing paper is continuing to decline due to a drop in global market demand and the digitalisation of communication. The focus of wood use in production has shifted to pulp, packaging materials as well as biofuels, which Finland now has increased production capacity for due to investments made in recent years. In addition to sawmill capacity, investments in the timber products industry have been allocated to more prefabricated elements (CLT and LVL products) as wood construction has grown. New investments, especially those that increase the use of pulpwood are being planned, but no investment decisions have yet been made. Decisions on investments will require certainty on the sufficient supply of raw materials at a price that will be determined by the world markets and production technology (Project A, C, F, G).

Good economic conditions, which have prevailed over the past few years have increased the revenue and value added of forest-based business and activities. This has been based predominantly on an increase in the production volume of pulp and cardboard. Additionally, the use of solid wood fuels in heating and power plants has increased. This increment has been based on the increase in forest industry by-products and burning of wood residues due to the increased use of wood raw materials. With the rise in emission rights prices competitiveness of forest chips in heat production will improve, but it will be difficult to achieve the total target for forest chip use specified in the forest strategy. Use would have to nearly double from its current level for this objective to be met by 2030. With regard to this objective, the National Forest Strategy 2025 update is linked to the Energy and Climate Strategy.

One of the objectives of the National Forest Strategy is to utilise digitalisation and develop and diversify services and service platforms in order to improve economic efficiency. For example, the Metsään.fi service maintained by the Finnish Forest Centre is based on open forest data on the basis of which numerous pilot-like services have already been built. Kuutio.fi, a timber sales site that utilises data from Metsään.fi, has established its position during its first year. Around one fifth of timber purchases are made through the site, and the majority of these are power of attorneys for wood sales and deliveries by forest management associations. An effort has been made to implement a strategy on the simplification, increased flexibility and effectiveness of administration by streamlining environmental impact assessment and permit procedures with the one-stop shop principle, and by amending the Act on Land Use and Building with regard to landscape permit requirements. All these will require the better availability and usability of forest, nature and environmental materials and their better consolidation with other information sources and IT tools (Project A).

According to the 12th National Forest Inventory (NFI12, Natural Resources Institute Finland 2018), the annual growth of Finland’s forests is 107 million cubic metres. This growth is based on good forest management that is sustainable for timber production, which has been carried out in Finland for decades. New investments in forest industry have seen the use of domestic wood grow, and it has

been predicted that roundwood removal will rise in 2018 to 77 million cubic metres. A significant portion of the input and multiplier impacts of growing roundwood removal will remain in the regional economies, which will increase their vitality. Harvesting is already close to the annual objective of 80 million cubic metre listed in the National Forest Strategy (2015) for 2025. The attainment of the objective for the annual increment in the growing stock in commercial forests at the same time with achieving the objective for roundwood removal will require resource efficiency in forest management (Project C) and nature management of commercial forests and safeguarding the forest biodiversity (Project D). Ensuring forest resilience is also important (Project E).

Climate change and declining natural resources will challenge the fossil economy, which is based on the use of non-renewable natural resources. Wood biomass-based new and existing products will help in the effort to divest the fossil economy. New business has been created in the forest sector, which includes service activities to support forest-based business and research and development activities for new wood-based products especially textile fibres, packaging materials, biofuels and wood construction. Some of these new products are already at a pilot stage of production. For the time being, the refining of biofuels is mostly production that produces little added value. The development of regional economies will also support the growth of other forest-based industry. These include for example the natural products sector and nature tourism. An increase in forest damage resulting from climate change is also a threat to the different uses of forests, forest-based industry and business and the health and welfare benefits derived from forests. The development of new products and services as well as the operating models related to them in a changing operating environment will require new data (Project G) and competence and new methods of learning (Project I). The role of pluralistic communication and interaction as a form of support for business and learning together will grow (Project B). More information on how to integrate climate sustainable forestry and its related different forms of forest use is needed (Project E).

The government has participated in forest sector’s structural change and improved operating conditions by improving infrastructure and such as the road network for Finland’s main roads and data communication connections. The forest road network is in some parts in poor condition and backlog in the management of seedling stands and harvesting further decrease operating conditions for forestry in the future. Securing operating conditions will require improvements to infrastructure (Project F) and an increase to forest management amounts (Project C).

The gross stumpage earnings from forests in 2017 was around EUR 2.2 billion, of which private forest owners amounted to EUR 1.9 billion. It is too early at this time to estimate the impact of the forest gift deduction that came into force at the beginning of 2017 and aimed to promote generation changes for forest holdings. During its first year, its significance remained very small: only a total of one million euros in forest gift deductions were granted, whereas tax deductions for entrepreneurs in forestry equalled EUR 54 million and forest tax deductions equalled EUR 210 million euros in this same time period. Taking into the business and enterprise perspectives of forestry into account in decision making will require new information on the economic potential and options of forests (Projects A, B, C, D, E, H).

7.2.2 Social and cultural impacts

The current demand for forest industry products and the economic situation as well as the growth of production and automation have a great impact on employment in the forest sector. The number of people employed by the forest industry has decreased with a change to the sector's structure, whereas forestry's growing harvesting volumes have slowed down a drop in its employment numbers. It has been estimated that due to the increasing forest management and improvement work as well as harvesting and transport activities, forestry will experience a slower drop in work force numbers than other areas of the forest industry. Growing other forms of business in the natural products sector and nature tourism as well as forest-related service activities will offer jobs. A significant share of new jobs will be created in Eastern and Northern Finland. The development of competence and education are important in adapting to this structural change in employment and enterprise (Project I).

As urbanisation progresses, a significant socially impacting factor is the estrangement of people and, in particular, young people from the forests, which may reflect on changes in operating practices, consumer preferences, valuation and attitudes on the use of forests and its forms of use. It has been found that the recreational use of forests has extensive health and well-being impacts. As urbanisation and populations are more and more centred in Southern Finland, it is important that at the same time accessibility to forests remains close. Everyman's Rights and an effort to increase the amount of protected areas, especially in the southern part of the country will ensure that citizens maintain their relationship with nature. An increase to the recreational use of forests and the growth of nature tourism has seen an increase in the amount of visitors to national parks and customer satisfaction has improved a bit. Through diverse means of communication (Projects A, B, E, G) and securing the diverse recreational and welfare use of forests, which is an objective of the strategy (Projects F, H) can have an impact on the forest awareness and forest relationships of citizens.

7.2.3 Ecological impacts

As roundwood removal increases the pressure to preserve biodiversity grows. A significant portion of our country's growing stock and harvesting potential is in thick peatlands. These are also very important with regard to carbon sequestered in forest soil. Issues related to the peatland management will be of key importance in the future when the carbon sink impacts of forestry are assessed. According to new research results, there are also large challenges related to water protection in drained peatlands. Forest operations in commercial forests such as felling and forest management must be developed so they are more environmentally friendly than at present (Project C), and the nature management of commercial forests and the forest biodiversity must be ensured (Project D) as must be the forest resilience (Project E).

According to current data, the speed at which species are becoming threatened in Finland's forests has slowed, but not yet stopped. More detailed research data on this will available once the fifth assessment on threatened species in Finland is completed in spring 2019. Although the newest inventory results show that the amount of dead wood has increased somewhat in Southern Finland, it has decreased in Northern Finland. The implementation of METSO programme received a total of over EUR 300 million in support in 2000–2017 with nature protection procurements (Ministry of the Environment) and environmental subsidies and nature management (Ministry of Agriculture and Forestry). Even so, there is still a very clear regional imbalance in the protection of forests. The number

of nature management projects and funding for these through support forms based on the Act on Financing of Sustainable Forestry in Finland (kemera) has remained very small in comparison to other forms of subsidies in forestry. In 2015–2017, a total of just under EUR 2.6 million were granted to nature management projects, whereas kemera support as a whole was EUR 150 million. Kemera support is also allocated to activities that weaken the biodiversity of forests and mires, add pollutant loading in water systems and the greenhouse gas emissions of the soil of areas in forestry use. The majority of forest management projects have been related to water protection or management. These days, nature management projects include prescribed burning although research data has shown that in addition to increasing dead wood, it is one of the most important measures ensuring the preservation of biodiversity. An effort has been made to promote prescribed burning with government support for some 25 years, but the results have been limited. In recent years and in the 2010s, prescribed burning has been implemented less than at any time after 1950. Minimising the negative impacts on forest operations in commercial forests will require seamless combination of forest resource, nature and environmental knowledge (Project A) to forest operations (Project C). Additionally, we will need increased management and restoration measures to safeguard the living habitats of threatened species in forests and mires (Project D) and the preservation of forest resilience (Project E). With regard to this objective, the NFS 2025 update is linked to the National Strategy for the Conservation and Sustainable Use of Biodiversity in Finland.

In addition to emissions cuts, discussion concerning the climate change mitigation has recently emphasised carbon sinks and an increase to these. In Finland, forests form our most significant carbon sink, which we can impact with harvesting and forest management. Wood can be used to replace fossil fuels and raw materials. The positive climate and environmental impacts of certain new biomaterials may remain smaller than expected, if the lifecycle of these materials or processed products is short or they cannot be recycled or composted effectively. From the perspective of climate change mitigation extending the lifecycle of wood products and the storage of carbon in them is important. The target structural change to the product portfolio will require new product and service solutions (Project G) and changes to consumer behaviour, which can be influenced with diverse communication (Project B).

7.3 Factors of uncertainty and a changing operating environment

The general objectives for the NFS 2025 are a competitive operating environment, the renewal of forest-based business and activities as well as the active, sustainable and diverse use of forests. However, the NSF 2025 objectives are challenged by many simultaneous changes in the forest sector’s operating environment, including globalisation, international economic development, competition for the scarcer natural resources, climate change, the decline of biodiversity, changes to the forest use and the coordination of different types of use. On the other hand, the NFS 2025 objectives are supported by the improved prosperity of the population, the effort to reduce use of fossil raw materials, digitalisation, new wood-based products and the many ecosystem services offered by forests.

Global megatrends have significantly altered and will continue to change the operating environment for forest-based business and activities in Finland, which will force the sector to reform and change. Globalisation and the change in the world economy's points of gravity will affect where trade flows are directed, cause tighter international competition and impact the pace and strength of market fluctuations between areas.

The importance of the Finnish forest industry's exports to China has grown rapidly over the past few years. The increase in the export of forest industry products, especially pulp and sawn timber, to China has been clearly visible as a rise in the forest industry's production rate and revenue and as the amount of felling carried out. At the same time, this dependency on a single country's markets has brought increased risks, as was noted with regard to sawn timber in 2018. An increase in demand for pulp and more generally wood fibres in China combined with the country's own limited forest resources has also created an increased interest by Chinese companies to make forest industry investments abroad. Numerous Finnish pulp and bio-refinery plant projects that are currently in the planning stages also include a Chinese party. However, the implementation of these projects is uncertain.

Over the past few years protectionist trade policies have grown in strength in numerous developed countries in response to globalisation. From the perspective of Finland's forest sector, which is dependent on export, the growth of protectionism, withdrawal from international trade agreements and possible trade wars would have considerable direct and indirect impacts on Finland's economy in its entirety.

The competitiveness and success of Finland's forest industry has been based above all else on long-fibre softwood pulp from Northern Finland and its properties. Its status as a basic raw material for the forest industry's key end and intermediate products will likely remain strong over the next few years. On the other hand, the rapid development of technology may also bring some surprises with it. Risks might be realised for example if it became possible to produce the same type of fibre traits with genetic technology in southern plantation forestry.

The strategic project aims to take into account the importance of interactive and pluralistic communication. Digitalisation has transformed communication, made production more efficient and facilitated the growth of global online trade. With the dawn of digitalisation, the amount of information that is easily accessible has become nearly limitless. Interaction between various stakeholders and an increase in cooperation will reduce unnecessary conflict. Improving the coherence of forest, environmental, industrial, climate and energy policies can lead to a decrease in conflicts and improve the cost-effectiveness of policy measures. This in turn will require that policy support such as the scenario and impact analyses used in strategy processes are transparent.

The increment of forests will facilitate a simultaneous increase in felling and carbon sinks. In the future, the sustainability of forest use and the coordination of different types of use will be emphasised even more, and an effort has been made to take this into account by including the cross impacts between different forms of use and objectives as an essential part of strategic projects and their examination. The examination of the terms of trade for different forms of use in planning of forest operations will require the digitalisation of research results for decision making purposes.

The sustainability and responsibility of forest use will also require an improvement to the quality of nature management in commercial forests and an increase to the number of protected areas, as well as the mitigation of pollutant loading to waters and climate impacts especially in peatlands. More research data on the climate and environmental impacts of the different forms of forest use and their management is needed to support decision making.

The update to the NFS 2025's strategic projects has seen new wood-based products emerge alongside traditional products more prominently than before. There are a great deal of expectations related to new pulpwood and hardwood products from the perspective of increasing the value added and resource-efficiency of the forest-based sector. More objective and up-to-date data is also needed on the climate and environmental impacts of new wood biomass products.

7.4 Assessment of project portfolio

7.4.1 General

The strategic projects have been selected to reinforce the factors that support the objectives in the National Forest Strategy and to prevent challenges. The cross-cutting projects support digitalisation (Project A Forest Data and the Platform Economy) and communication and interaction (Project B Interaction and Communication in Forest-based Business and Activities). In addition to these, other projects that can be considered cross-cutting develop competence and education (Project I Know-how and Education) or international lobbying on forest-related matters (Project H International Forest Policy and Influencing EU Policies).

The other projects aim to improve resource-efficiency, nature management and biodiversity, climate sustainability and the accessibility of forests, to support the development of new wood-based products, and to improve the operating conditions for services based on nature tourism, the natural products sector and nature. There are three strategic projects that aim to prevent challenges related to increasingly scarce natural resources and changes to the climate and biodiversity. Project C, Resource-efficient and Sustainable Forest Management is a broad-scoped entity (c.f. Hynynen et al. 2018) which aims to more effective forest and nature management taking into account a decrease to the waterway impacts of forestry. Parallel to this, Project D, Nature Management in Commercial Forests and Forest Biodiversity develops the integration of nature management and forest management. The third project linked to this entity is Project E Climate Sustainable Forestry, which aims to produce information on the role of the forests in climate change mitigation and adaptation. Although the entity has been divided into projects, it is extremely important to take into account the cross impacts between measures related to the increased and more efficient production of timber and other forms of forest use, when our aim is overall sustainability and a high level of welfare.

Project F, Forest Roads and the Accessibility of Forests aims to promote the development of infrastructure required by the diverse use of forests. Project G, New Wood-based Products supports the National Forest Strategy's objectives for the renewal and diversification of forest-based business and activities. Project H, Nature Tourism, Natural Products Sector and Other Nature-based Services aims to improve the preconditions for forest-based products and services. Project J, International Forest Policy and Influencing EU Policies works to influence the operating environment with regard to how EU forests will be included in climate policy.

After the New Wood-based Products project was added to the scope, the entity is now quite broad-scoped in relation to its objectives, in particular with regard to a competitive operating environment. The renewal and diversification of forest-based business and activities, and the related active, sustainable and diverse use of forests, will require the coordination of different forms of forest use at different levels, especially in programme and strategy work. Now, this has been included in the Forest Data and the Platform Economy project. To support decision making on forest operations, we need new information on what the new forms of forest use mean with regard to forest operations and what opportunities and challenges new technology, digitalisation, automation and robotisation will bring with them. It would be worthwhile to have a project that would look into systematic political instruments within one of the projects. So that the implementation and success of the projects can be monitored, the projects need a homogeneous monitoring criteria.

7.4.2 Project-specific assessment

Project	Project description and assessment of its impacts
A. Forest Data and the Platform Economy	*The project, which is a cross-cutting project, aims to improve the availability and usability of forest, nature and environmental data and facilitate their integration with other data sources. High-quality and up-to-date spatial data promote the development of digitalisation in tools and services provided by forest-based business and activities.*
Impact assessment	The project is necessary for the implementation of economic, social, cultural and ecological impacts. The project supports the strategic, tactical and operative planning of forest operations, mitigation of the environmental impacts of forest operations, coordination of different forms of forest use, planning of nature management in commercial forests and safeguarding forest biodiversity.
B. Interaction and Communication in Forest-based Business and Activities	*The project, which is a cross-cutting project, aims to build trust and cooperation between various actors with pluralistic communication and interaction. People's understanding on the sustainable forest management, forest-based products and services, as well as forest biodiversity and other environmental benefits forests provide will also improve as the project progresses. The forest cultural perspective will be included as part of the forest sector's interaction and discussion on forests.*
Impact assessment	The project is necessary for the implementation of economic, social, cultural and ecological impacts. The project supports the sustainable implementation of the forest sector's structural change and the development of citizens' understanding of the forest and their relationship with the forest through internal and external interaction for forest-based business and activities. Improved interaction will prevent forest conflicts also at the regional and local level as well as in the Sámi Homeland.
C. Resource-efficient and Sustainable Forest Management	*Forest management will be developed with the help of R&D activities, education and the new geographical information tools developed as a part of the project, which will increase forest growth and strengthen carbon sinks. At the same time, sustainable harvesting potential will also increase. The project also takes biodiversity and water protection as well as their trade-offs and synergies with wood production into account.* *Measures that improve the structure o forest holdings and ownership will support the sustainable utilisation of forests.* *New incentive schemes support sustainable and resource-efficient forest and nature management.*

Impact assessment	The project has economic, social, cultural and ecological impacts. The report on the objectives of forest owners supports the research of family-driven forestry and the related decision making. When planning the new incentive scheme for forestry, it will be important to predict the acceptableness of the policy in EU legislation. This will mean for example, a transition to a public goods incentive scheme. The various cross impacts, such as sediment discharges from ditch network maintenance, are a key challenge effecting the project. The project's implementation can be monitored, for example, by examining the change to timber production in relation to various biodiversity indexes and as the share of aid provided to public goods of the entire aid sum.
D. Nature Management in Commercial Forests and Forest Biodiversity	*Nature management in commercial forests will be developed so it has greater impact and is a more fixed part of routine forest management and forest service entrepreneurship. An effort will be made to carry out nature management in connection with forestry operations. Spatial data and new applications will make it possible to better reconcile forest biodiversity, wood production and other ecosystem services.The genetic resources of forest trees will be ensured. The METSO Programme is being implemented and its resources will be seen to according to the objectives set for the programme.*
Impact assessment	The project has direct ecological and indirect economic and cultural impacts. The METSO programme and its measures will play a key role in maintaining forest biodiversity. New initiatives and trials for the conservation of forest nature are needed, in particular, in Southern Finland. Methods have been developed for the consolidation of forest use types and examination of terms of trade. These can be used to improve the cost-efficiency of nature management and to coordinate timber production and other ecosystem services. New approaches must be developed for the division of costs and benefits of new and renewed forest operations related to nature management and safeguarding biodiversity. The project can be monitored using for example the METSO programme's land area (ha), the amount of dead wood, the amount of prescribed burning (ha), the share of forest nature management projects in Kemera support and similar (%). New, alternative means of nature management for commercial forests also make it easier to coordinate different types of use, such as forestry and reindeer husbandry and this way with regard to Sámi culture.
E. Climate Sustainable Forestry	*The project aims to increase knowledge on the development of carbon storage and sequestration in forests as well as on the impacts of forests and forest management on climate change adaptation. New information will improve risk management by forestry and forest owners and create the foundation for the more effective consideration of the climate in management and use of forests.*

Impact assessment	The project has economic, social, cultural and ecological impacts. Forest owners' understanding, how the forest management impacts on carbon binding, can be improved with training and guidance services. It is useful for forest owners to know how much planned alternative forest operations (forest and nature management measures) will influence the forests' carbon storage over different time periods and what other ecosystem services can be achieved at the same time. An assessment on the impacts and feasibility of the carbon rent of forests will provide valuable information from the perspectives of climate change mitigation and adaptation. The implementation of carbon rent must draw attention to the system's cost-effectiveness. The project can be monitored with the LULUCF sector's greenhouse gas emissions inventory and the occurrence of forest damage (ha).
F. Forest Roads and the Accessibility of Forests	*The project will help improve the service level and usability of the road network, for example, by utilising spatial data. At the same time, it will improve the decision-making capability of road cooperatives and make it easier to contact shareholders in road cooperatives. The project also promotes the availability of reliable, fast and equal data connections throughout the country. Investments in infrastructure will promote the diverse utilisation of forests, the performance of rescue duties, recreational use and nature tourism, as well as other business in rural areas.*
Impact assessment	The project has economic, social, cultural and ecological impacts. The road and data network support forest operations, the different forms of forest use and the provision of rescue services, which can help prevent the spread of forest damage. The increasingly comprehensive forest road network may also have negative impacts for example from the perspective of wilderness species, reindeer husbandry and the Sámi culture.
New Wood-based Products	*The project aims to develop new forest biomass-based solutions and to support their commercialisation. The project's activities focus, in particular, on the development of new high value added fibre and pulp products as well as on the use of wood in wood building and timber products. The new product opportunities of wood biomass and its components are also being investigated.Support for research and innovation activities will speed up the growth of the bioeconomy and circular economy.*
Impact assessment	The project has economic, social, cultural and ecological impacts. The project supports in particular the structural change in the forest sector so it is more economically and ecologically sustainable. The project's or the strategy's objectives can be monitored in the way the sector maintains its jobs or even experiences an increase in jobs. Social and cultural objectives can be monitored as a change in consumer behaviour: how will new products and solutions be received and how positive attitude will people have towards replacing fossil-based products with renewable options, with the possibility of added costs. Ecological sustainability will require thorough lifecycle analysis and cost calculations. The overall sustainability of new products must also be assessed, if we take into account the alternative use of the raw material. The development of the products in the current product portfolio must also be taken into account.

H. Nature Tourism, Natural Products Sector and Other Nature-based Services	*The project improves operating conditions for nature tourism, forest-based health and welfare services and the natural products sector, for example by using new tools. New value chains and revenue models for forest owners will create new forest and nature-based business.*
Impact assessment	The project has economic, social, cultural and ecological impacts. The project will support in particular forest-based diverse service business and the natural products sector as well as the recreational use of forests and their health impacts. Improving the preconditions for the natural products sector will support for example the preservation and development of the traditional livelihoods of the Sámi. Additionally, the project supports ecosystem services by commercialising the earning opportunities of forest owners. The objective of the project is in particular to increase the preconditions for activities and cooperation, which are partly indirect, but necessary means for achieving objectives. With regard to the natural products sector, it is important to increase awareness on broad-scoped raw material potential, increase the provision of raw materials for forest owners and to increase demand for different types of raw materials among the sector's companies by improving their operating conditions. In particular, measures should improve the balance between supply and demand and the efficiency of the sector's activities. With regard to nature tourism, commercialisation and marketing are important areas of development. Challenges caused to the sector's activities by demand for services, growth in the business of the sector's companies, as well as forms of forest use will require new types of contractual operating models the implementation of which will open new earning opportunities for forest owners. The development value added/revenue of forestry by field describes to some extent the project's direct impacts on nature tourism and natural product sectors. The development of the natural products sector can be monitored in Marsi statistics from the sector report produced by the Ministry of Economic Affairs and Statistics Finland's enterprise statistics. These should be systematically developed with the change to the sector (organic gathering, new products not included in Everyman's Rights). Statistics that describe the nature tourism sector's development are still lacking as nature tourism companies are not considered separately from other tourism companies in statistics. Demand for services can be monitored for domestic and foreign tourists with questionnaires (e.g. LVVI).
I. Know-how and Education	*The project promotes cooperation between research, business and education with the aim of improving know-how in spatial data, wood technology, nature management in commercial forests, water protection, peatland forest management, the forest road network, entrepreneurship. Also, the quality of machine driver training in the forest sector will be developed.*
Impact assessment	The project is necessary for the implementation of economic, social, cultural and ecological impacts. The general objectives for the NFS 2025 are a competitive operating environment, the renewal of forest-based business and activities as well as the active, sustainable and diverse use of forests. A precondition for exploiting the new opportunities brought by bioeconomy is finding new ways of operating and new business skills: for example, value networks, industrial ecosystems and symbioses. Traditional products will maintain their place alongside new products, but their recycling and cascade use will also require investment in research. The cascade use also required by the EU will emphasise new business cultures. Additionally, the Sustainable Development Goals listed in Agenda 2030 must be taken into account. Bioeconomy and circular economy solutions will require the reform of both research and education.

J. International Forest Policy and Influencing EU Policies	*The project will implement initiatives that will apply to international forest policy and EU policies and will promote international business opportunities. (Appendix 1). At the same time, it will promote the attainment of the UN's Sustainable Development Goals in forest-based business and activities. The project also aims to safeguard operating conditions for forest-based business and activities and for sustainable forest management and to increase awareness on the importance of forest-based business and activities to climate and energy policy solutions.*
Impact assessment	The project is necessary for the implementation of economic, social, cultural and ecological impacts. Promoting Finland's guidelines will require a more active and well-resourced approach to exerting influence with the EU Commission and Member States in forest related matters. The objective could be the development of a benchmark system for forests, which could be adopted as early as 2020, to make it a more efficient and more rewarding system. The following can be used for monitoring: The EU Member States' KHK inventories and the LULUCF sector's activities as indicators for the Agenda 2030 SDG. With regard to the Sámi, it is important that their rights as an indigenous people and their right to practice their own culture will be highlighted and taken into account also at the international level.

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Key terms

Bioeconomy	comprises sustainable use of natural resources and the use of biological and biotechnological processes in production chains. In the bioeconomy, natural resources will be used in a sustainable manner, by applying and replicating biological processes.
Carbon sink	is the difference between the amount of carbon dioxide absorbed by forests from the atmosphere during their growth and that emitted from the forests.
Carbon storage	is the amount of carbon bound by trees and stored in the soil. The size of the carbon storage in the soil vary depending on forest litter production, weather conditions and changes in harvesting volumes as well as management of the soil (tilling, drainage).
Cultural sustainability	can be viewed as the fourth dimension of sustainable development or it can be thought of as a factor that balances, describes and pass on economic, ecological and social sustainability. Culture can also be seen as the basis and structure of sustainable development in its entirety, which helps in the attainment of objectives for sustainable development. Cultural sustainability necessitates that cultural continuity is not interrupted, and the customs, practices and relationships related to the forest use are passed on to the next generations in an appropriate form. Forest culture is a time-bound continuous process that develops as a result of human activities.
Commercial timber	refers to a tree's log and pulpwood parts that are suitable for use in forestry.
Cross effects	refers to synergies or conflicts in how measures influence different objectives.

Ecosystem services	Are benefits to humans derived from nature. Many ecosystem services are vital to humans and other organisms. Biodiversity is the base of ecosystem services, as it helps nature to adapt and regenerate. Ecosystem services are divided into productive, regulating, cultural and supporting benefits. Examples of productive services include the production of timber, berries, mushrooms and game animals, regulating services include carbon sequestration and maintenance of soil productivity, cultural services include scenery, outdoor activities and recreation, and supporting services include photosynthesis and nutrient cycles. Supporting services are the base for other ecosystem services.
Extended forest cluster	In addition to the forest sector, they also comprise production, processing and services as well as public goods based on both tangible and intangible products. (In connection with education and training, forest-based business and activities have traditionally mainly denoted ordinary forestry professions. In the classification of fields of study, other tangible and intangible products and services are included in nature and environmental studies.)
Forest cultural perspective	creates an understanding of the interactive relationship between human and forest and the values linked to forests. The forest cultural perspective will create the conditions for the coordination of different forest-related objectives. Forest culture refers to operating practices, understandings, significance and values shared in social situations.
Forest industry	Denotes mechanical forest industries (sawmill, board and other wood products) and chemical forest industries (pulp, paper and paperboard).
Forest land	has an abundance of trees and the annual increment of growing stock is more than 1 m^3.
Forest sector	Comprises forestry and forest industry.
Forestry	Denotes roundwood production, forest and nature management and wood harvesting.
Maximum sustainable harvesting potential	refers to the maximum amount of harvesting when the sustainability of forestry is considered an objective. Aspects that will be taken into consideration when determining this limit include economic and timber production sustainability, forest management recommendations and implemented protection decisions.

Megatrends	are global large waves of development, guidelines or phenomena that have clear direction. Megatrends are strongly linked to one another and the boundary between them can be hazy. They can comprise numerous phenomena and trends, of which some scan be opposites of one another.
Poorly productive forest land	has few trees and the annual increment of growing stock is 0.1–1.0 m^3.
Relationship with the forest	is an individual's or society's direct or indirect living relationship with the forest. It is a part of the individual's more extensive relationship with their environment and their identity. The difference between this and a relationship with one's environment and nature, this includes the person's relationship to the use of forests.
Roundwood	refers to the wood material on the entire tree trunk; wood that can be used as logs, pulpwood and energy wood.
Sustainable forest management i.e. sustainable forestry	denotes the management of forests and forest lands in a way that preserves their diversity, productivity, regenerative capacity and vitality as well as the opportunity to carry out now and in the future significant ecological, economic and social activities on local, national and global levels in a way that does not harm other ecosystems. The concept sustainable forest management also includes forest conservation.
Wood processing industry	Denotes forest, energy and chemical industries that use wood.

Fact box

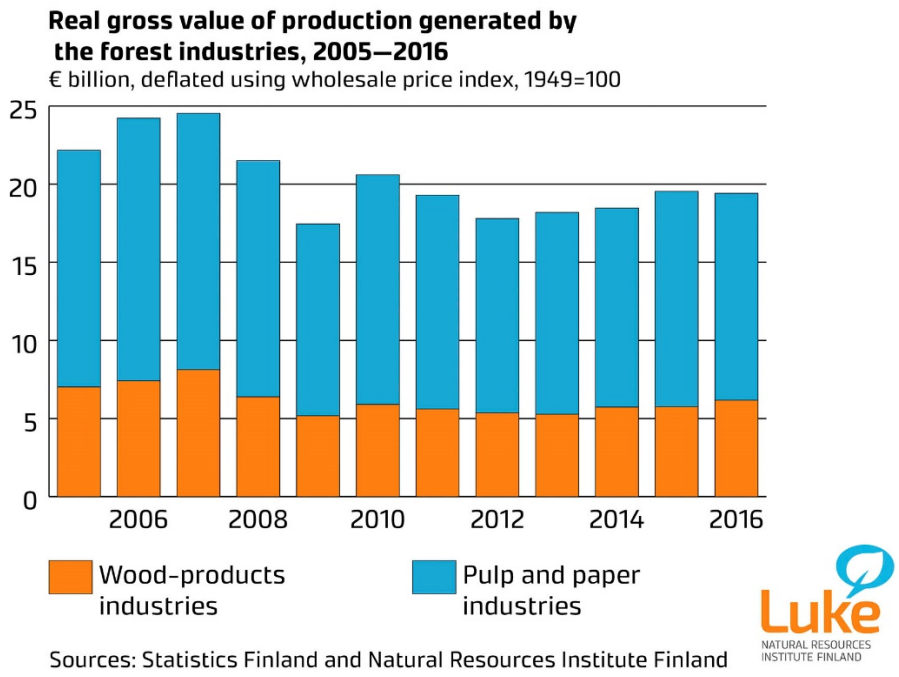

Figure 1. Trend in the value of forest industry production in 2005-2016.

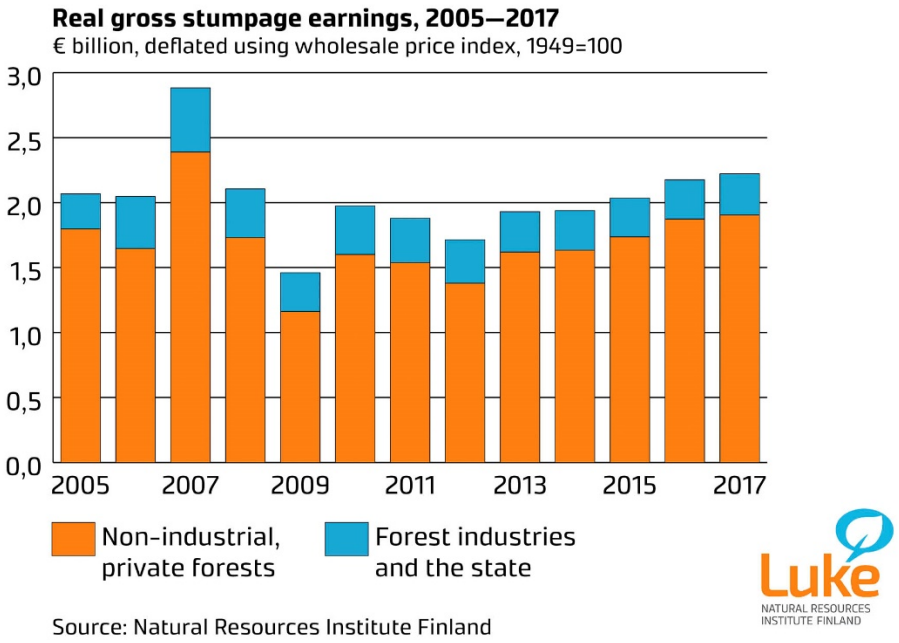

Figure 2. Trend in gross stumpage earnings in 2005-2017.

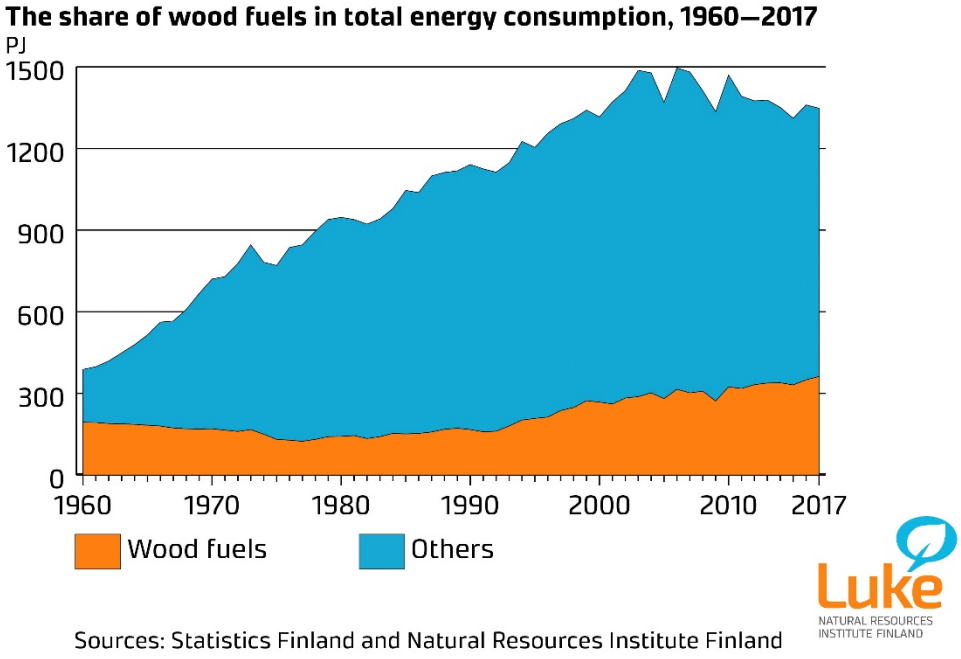

Figure 3. Share of wood fuels in total energy consumption in 1960 -2017.

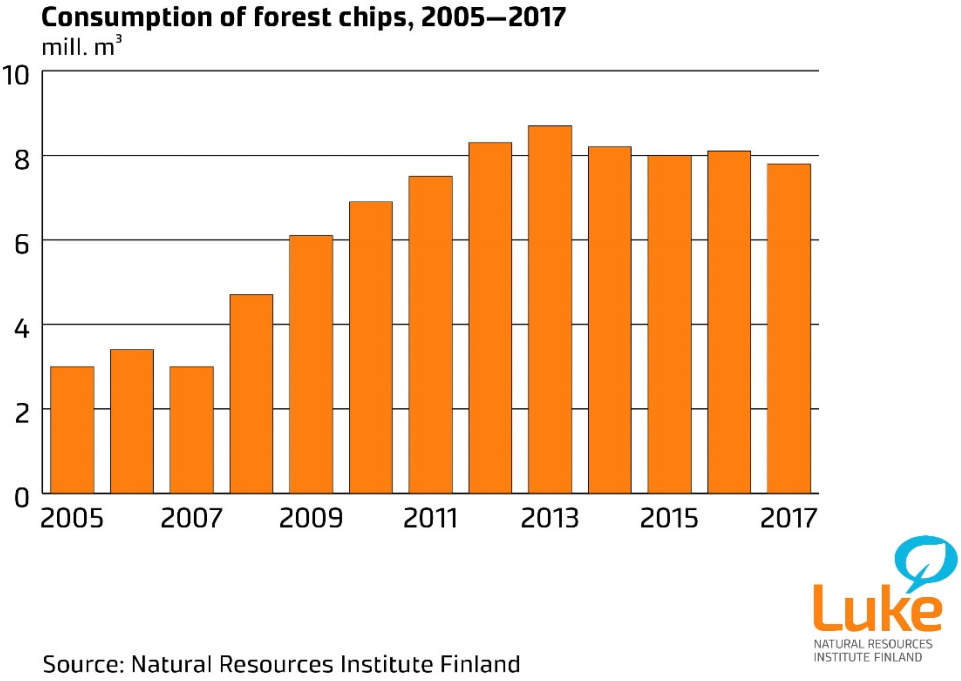

Figure 4. Development of forest use, 2005-2017. The figures include forest chip consumption in heating and power plants and in small-scale housing.

Table 1. Protected forest land and poorly productive forest land and lands in restricted use.

	Forest land						Forest land and poorly productive forest land, total					
	Finland total		Southern Finland		Northern Finland		Finland total		Southern Finland		Northern Finland	
	1000 ha	Percentage	1000 ha	Percentage	1000 ha	Percentage	1000 ha	Percentage	1000 ha	Percentage	1000 ha	Percentage
TOTAL AREA OF THE LAND CLASS (NFI 11)	20 264		11 141		9 123		22 767		11 505		11 260	
Protected forests, total (1A+1B+1C+2A+2B)	**1 553**	**7.7**	**455**	**4.1**	**1 098**	**12.0**	**2 737**	**12.0**	**549**	**4.8**	**2 188**	**19.4**
Statutory protected areas (1A+1B+1C)	**1 332**	**6.6**	**398**	**3.6**	**934**	**10.2**	**2 402**	**10.6**	**471**	**4.1**	**1 931**	**17.1**
1A Nature reserves and sites reserved for nature conservation	934	4.6	251	2.3	683	7.5	1 456	6.4	300	2.6	1 155	10.3
1B1 Other statutory protected areas, no felling	231	1.1	28	0.3	203	2.2	724	3.2	33	0.3	691	6.1
1B2 Other statutory protected areas, cautious felling possible	157	0.8	110	1.0	47	0.5	206	0.9	125	1.1	81	0.7
1C Fixed-term protection areas	10	0	9	0.1	1	0	17	0.1	14	0.1	3	0
Biodiversity conservation sites in commercial forests, total (2A+2B)	**222**	**1.1**	**57**	**0.5**	**164**	**1.8**	**335**	**1.5**	**78**	**0.7**	**257**	**2.3**
2A Special biodiversity sites in commercial forests, no forestry measures	153	0.8	23	0.2	130	1.4	225	1.0	31	0.3	194	1.7
2B Biodiversity sites in commercial forests, restricted forestry use	69	0.3	34	0.3	35	0.4	110	0.5	47	0.4	63	0.6
3 Forests supporting conservation of nature values, other special sites, restricted forestry use	**344**	**1.7**	**52**	**0.5**	**291**	**3.2**	**433**	**1.9**	**56**	**0.5**	**378**	**3.4**

Forest land and poorly productive forest land together form a wooded land area, forest
The area of forestry land is based on the 11th National Forest Inventory (NFI11), 2009-2013

Appendix 1. Priority areas, objectives and initiatives in international forest policy and EU forest matters

International forest policy and development policy: *The role of forests, sustainable forestry and forest-based bioeconomy will be reinforced so that the objectives in Agenda 2030 can be attained.*		**EU forest matters:** *The roles of coordination, forest expertise and the forest sector's position as solution providers will be strengthened*		**Promotion of business opportunities:** *The international business opportunities of forest-based business and activities will be strengthened*	
Objectives	**Initiatives**	**Objectives**	**Initiatives**	**Objectives**	**Initiatives**
Operational priority: Information and communication					
Research, development and innovation activities (RDI), expertise and education in forest-based business and activities, effective and up-to-date information systems promote information-based decision making in international cooperation and development policy	• Forest, sustainable forestry and bioeconomy-related statistics, monitoring and information systems (incl. indicators) maintained by international organisations (e.g. UN, FAO, UNECE) will be developed and strengthened. • RDI activities will be strengthened, research and open information systems will be developed through the means of development policy. • The position of research related to forests, forestry and the bioeconomy will be promoted as well its utilisation in international cooperation. • The activities of the European Forest Institute (EFI) and its position in the utilisation of research data will be maintained and developed. • The political visibility and weight of forest-related sustainable development will be maintained and	There is broad-scoped high-quality and comparable information available on the EU's forests and forest sector for use in decision making The significance of the EU's forests and the forest sector to the EU are better recognised in EU institutions and member states. The importance and special traits of Finland's forests and forest sector are recognised in EU institutions and other member states	• Research data will be made available to EU decision makers and stakeholders. • Construction of the EU's forest information system in a balanced manner so that all the pillars of sustainability are taken into consideration • Think Forest project and publications that EFI intends for the use of decision-makers in Brussels • Forest Academy for Decision-Makers courses for actors in Brussels together with Sweden in 2018 and 2019 • Inviting specific key EU actors to learn about Finland's forest sector • Events during Finland's EU Presidency such as the EU's forest director conference • Improving the effectiveness of Finnish Forest Association communication at the international and EU levels	Finnish competence in the forest and bioeconomy sectors is well-known worldwide	• Promoting the RDI activities of Finnish actors that are related to sustainable forestry and the bioeconomy in bilateral cooperation according to available resources as well as in Business Finland's activities. • The possibility for establishing a significant centre of competence for forest information that utilises digitalisation in Finland ("ecosystem for forest information) • Look into the possibility to continue and develop the export of Finnish forest-based business and activities expertise • Improve and foster communication related to forest-based business and activities so that Finland's forest-based sector and its actors are known as competent, progressive and responsible.

The forest-based business and activities sector is a responsible forerunner, engages in open and active communication and the sector's image is positive internationally	fostered as well as foster the acceptability of sustainable forestry through international cooperation incl. Agenda 2030 and the UN Strategic Plan for Forests. • Actively participate in and develop the activities of FAO's and UNECE's forest communications networks				
Operational priority: Cooperation					
The implementation of Agenda 2030 is well-coordinated with regard to forests, sustainable forestry and the bioeconomy Multilateral forest and forest-based sector related UN-led cooperation and development policy are effective and efficient	• Actively promote and develop the implementation of Agenda 2030 and UN forest cooperation, especially with via the UN Strategic Plan for Forests 2030 (UNSPF) and the UN's forest forum. • Active participation in UN Forest Forum work ensuring that at the time of the 2024 interim review, it will be possible to decide on forward-looking follow up policies on future operating forms and their content, such as the launch of global forest agreement negotiations. • Promote development policy based on forests, sustainable forestry and the bioeconomy in the EU and nationally • Active participation in talks that will possibly restart on a European Forest Agreement ensuring that the possible agreement would be geographically	Member States will work in cooperation with the EU to improve the processing and discussion on forest-related matters in EU bodies. Cross-sector cooperation and better cooperation between forest sector stakeholders Better cooperation with the European Parliament	• Cooperation with coming EU Presidents in forest-related matters with the objective if improving processing and discussion and elevate their profile. • The reinforcement of the Commission's permanent forestry committee by improving its methodical work, increasing the number of meetings the committee holds and establishing an *ad hoc* working group. • The better resourcing of the wood and cork committee's activities as part of the amendment of the EU Forest Strategy. • Gain the commitment of the new European Parliament which begins its term in 2019 to forest-related matters.	Central government, companies and organisations work in good cooperation to promote the forest-based sector's international business opportunities while also promoting the Sustainable Development Goals.	• Promote joint work between ministries (incl. foreign missions). Business Finland, companies and other organisations to increase the international business opportunities of forest-based business and activities. • Determine possible interest among Finnish actors (organisations, companies, associations) and the practices for launching a network/forum/association in Finland that would promote business and cooperation between forest-based sector actors [cf. Finnish Water Forum] • Determine the financing sources for the forest-based sector and international activities and the bottlenecks related to the access of Finnish actors to this funding.

	comprehensive, promote multilateral UN-led forest cooperation and would secure and promote the operating conditions for the forest sector and the implementation of sustainable forestry nationally, regionally and globally. • Develop and promote operating methods that will increase the cross-sector significance of forests in various nature resource sectors (incl. nexus) • Influence and lobby in the EU and nationally to ensure that development funding will be allocated to forests and the forest-based sector also in the future as part of the sustainable management of natural resources and that the funding would be effective.				
Operational priority: Coordination					
Ensure that cooperation between international organisations and processes as well as in their work are consistent, effective and impactful.	• Ensure the consistency of activities by Finnish representatives and promote the consistency of EU representatives in decision-making bodies that discuss forests in international organisations, agreements or processes. • Increase the effectiveness of CPF activities in the implementation of forest-related policies, the development of information systems	Better coordination and opportunities for exerting an influence in EU initiatives they influence the forest sector. The EU has clear and consistent objectives regarding forests in	• The EU's Forest Strategy reform for the period after 2020 will be included in the working programme for the Commission that will begin its work in 2019 • Including objectives related to international forest-related matters in the EU's post 2020 forest strategy, using the	Central government, companies and organisations work in good cooperation to promote the forest-based sector's international business opportunities while also promoting the Sustainable Development Goals.	• Continue the development of Business Finland's forest and bioeconomy-related activities and foster contact between ministries, companies and organisations.

	and the functioning of financing systems. • Promote the consistency, effectiveness and impact of European forest cooperation (FAO, UNECE, EFI, Forest Europe).	international processes related to the forest The EU's biodiversity objectives and policies for after 2020 as well as the EU's objectives for forest-based business and activities are consistent with one another	Agenda 2030 as a framework for the Sustainable Development Goals • The EU's biodiversity strategy reform for the period following 2020		
International forest policy and development policy		**EU forest issues**		**Promotion of business opportunities**	
Objectives	**Initiatives**	**Objectives**	**Initiatives**	**Objectives**	**Initiatives**
Areas of substantial focus: Bioeconomy					
The operating conditions for forest-based bioeconomy have become stronger and been secured Countries have progressed in transitioning towards a bio-based economy within the confines of sustainability	• We will maintain and foster international cooperation based on forests, sustainable forestry and the bioeconomy • We will secure consistency between international agreements and forest-related work by organisations • We will promote initiatives and policies that promote transitioning to the bioeconomy, where the sustainable use of renewable natural resources such as forests can replace	The EU's bioeconomy and circular economy policies promote wood-based solutions The EU's rural development policy will facilitate the diverse promotion and support of forestry	• The working plan for the Commission, which will begin its term in 2019, will promote the implementation of the EU's updated Bioeconomy Strategy. • We will look into the possibility of launching an EU level programme/project for increasing the use of wood in construction and instate measures to promote new forest-based high value added products. • A bioeconomy conference that the Finland will organise together with the	Bioeconomy actors who engage in international forest-based business and activities will promote the goals for sustainable development	• Promote the use of forest-based products and services ensuring that non-renewable or fossil raw materials are replaced with renewable means that secure the productivity of forests • The public sector and companies will work together to prepare a wood product/sawmill industry continuation programme/project (Wood from Finland) the aim of which is to increase the export of added value products • Ensure that Finnish actors act transparently and in

	fossil energy and non-renewable natural resources • Promote the implementation, assessment and verification of sustainability of the bioeconomy, which is based on forests and sustainable forestry.	The EU's state aid policy facilitates diverse support for forestry measures in accordance with national needs	commission during its EU Presidency • Negotiations on rural development measures for the EU's joint agriculture policy 2021–2027 • The guidelines for EU forestry related government aid 2021–2027 that will be reformed to meet with new objectives in the joint agriculture policy.		accordance with sustainability principles in Finland and internationally

Areas of substantial focus: Climate change and bioenergy					
The operating conditions for forests and sustainable forestry have been secured and the significance of forest-based business and activities is recognised in solutions in climate and energy policies. The world-wide downturn in forest-based business and activities has been turned around.	• We will actively take part in negotiating the rules for the Paris Agreement and in the implementation of the UN's Climate Agreement, in a way that takes into account the importance of the land use sector and forests and forestry in climate change mitigation and adaptation in a balanced manner and that the operating conditions for the forest sector are secured. • We will actively participate in cooperation that aims at a reduction of forest loss and is in accordance with sustainable forestry (incl. market mechanisms, REDD+, international financing systems) • We will work in international cooperation to promote renewable energy incl. the increased production and use of modern forest energy and energy-efficiency taking into account e.g. the perspectives of sustainability and health	The EU's Climate and Energy Policy facilitates the role of forests in climate change mitigation and adaptation and the increased use of forests within the limitations of sustainability The EU's renewable energy policy facilitates an increase in the production of sustainable wood bioenergy and will not increase bureaucracy Possible objectives related to EU forest loss are in line with national and other land use related policies, such as agriculture policy	• Country-specific reference levels will be set during 2018 and 2019 • The detailed planning and implementation of sustainability criteria for wood biomass referred to in the Renewable Energy Directive in 2019 and 2020 as part of the Ministry of Economic Affairs and Employment-led implementation of the Renewable Energy Directive. • The EU's initiative to minimise forest loss (the EU has been working for several years to prepare the *Deforestation Action Plan* which applies to products that often cause forest loss, such as soy)	Actors involved in international forest and energy sector business can utilise business opportunities related to climate change mitigation and adaptation as well as the increasing and sustainable use of bioenergy	• Promote the use of forest-based products and services ensuring that non-renewable or fossil raw materials are replaced with renewable means that secure the productivity of forests. • Promote the opportunities of Finnish actors to take part in (I) the development of modern and energy-efficient bioenergy production and use, (ii) work that will aim to tackle forest loss and a decline in the state of the forest and to promote sustainable forestry (REDD+), and (iii) cooperation that aims to increase forest cover

Areas of substantial focus: Legality and good administration					
Good administration related to forests and sustainable forestry has become stronger and promotes human rights	• FLEGT activities will be fostered nationally, regionally and globally, and an effort towards worldwide consistent FLEGT activities will be promoted • Promote (i) the fair and equal implementation of forest-related ownership and possession rights, (ii) democracy, participation and transparency in decision making concerning forests, and (iii) promote the position and rights of women, young people and minorities	EU measures to promote legal timber trade will apply equally to all actors	• Review of the products covered by the EU Timber Regulation and development of its implementation • Preparation and implementation of the FLEGT Work Programme (2018–2022)	Actors involved in forest-based business and activities will comply with legislation and promote the Sustainable Development Goals	• Open and active communication will be provided on Finland's and Finnish actors' social and environmental responsibilities

Areas of substantial focus: Biodiversity and ecosystem services (incl. recreation and health)					
International cooperation that aims to safeguard the forest biodiversity is active and effective.	• Active participation in assessing the attainment of biodiversity objectives (Aichi objectives) that also apply in part to forests and in determining possible new objectives • Participation in international cooperation to promote cost-efficient conservation, restoration and equal use of forests as a part of sustainable forestry	The EU's biodiversity strategy for after 2020 takes into consideration all the different areas of sustainability in a balanced manner	• The EU's biodiversity strategy reform for the period following 2020	Actors involved in forest-based business will develop ecosystem services-based international business opportunities	
Forest-based and forest-related ecosystem services have become stronger	• Promote the valuation and coordination of forest-related ecosystem services and the different operating methods related to these, such as development of market mechanisms • Emphasise and develop the recreational use of forests and the utilisation of their health impacts				

Publications of Ministry of Agriculture and Forestry 2019

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