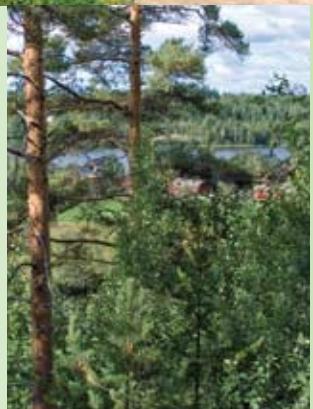




FINLAND'S NATIONAL FOREST PROGRAMME 2015

More Welfare from Diverse Forests -
Government Resolution



3b 2008



Finland's National Forest Programme 2015

More Welfare from Diverse Forests

Government Resolution

Finland's National Forest Programme 2015

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Preface

The decision to start the revision of the National Forest Programme was made in summer 2005. The reason for this were the significant changes in the operating environment of the forest sector since 1999, when Finland's National Forest Programme 2010 was drawn up. When making this decision, we had no idea how important this work would be. The impacts of global competition and Russian wood duties as well as climate and energy policy decisions of the EU, among other things, reinforce the need for revising the forest policy strategies and measures.

National forest programmes have been prepared since 1993 in accordance with the principles adopted at the Rio Conference on Environment and Development. The objective of the programmes is to promote the sustainable management and use of forests. In international contexts the Finnish programme has been considered to set an excellent example especially due to the diversified content and broadly-based preparation and implementation processes. These principles have been further deepened in the new Forest Programme 2015. A great variety of representatives of the different stakeholder groups participated in the work of the Forest Council, its Secretariat and four Working Groups. This was preceded by the drafting of regional forest programmes by the Forestry Centres together with the Regional Forest Councils. Altogether seven ministries and relevant agencies and institutions under these participate in the financing and implementation of the programme, and the role of the private sector is also significant.

The programme covers in a very comprehensive way the value chains of different products and services from forests to the consumers, whether we are concerned with further processing of wood, new "biodiversity products" or nature tourism. Efforts have been made to create a balanced whole for the different uses of forests, all this in full compliance with the principles of sustainable development.

The Forest Council approved the proposal for Finland's National Forest Programme 2015 on 25 January 2008. The financial frameworks were adjusted based on the proposals of a working group on the operating conditions of the forest industry and forest sector led by Esko Aho and Government decisions of 13 March 2008. The Government approved the programme as a Government Resolution on 27 March 2008 simultaneously with the Resolution on the Forest Biodiversity Programme for Southern Finland (METSO) 2008-2016.

I wish to thank all persons and parties involved in the preparation of Finland's National Forest Programme 2015 for a valuable job well done. Now we can get started with the programme implementation to ensure that forests as a valuable renewable resource continue to produce diversified welfare and prosperity to all of us.



Sirkka-Liisa Anttila
Minister of Agriculture and Forestry

Table of Contents

Executive Summary	7
TARGET STATE FOR THE FOREST SECTOR 2015	9
PRIORITIES, OBJECTIVES AND MEASURES	13
1 Securing a competitive operating environment for the forest industry and forest management	13
1.1 Increasing the value added and providing new products and services	13
1.2 Utilising the harvesting potential	13
1.3 Sustainability of roundwood production	15
1.4 Profitability and holding size in private forestry	16
1.5 Condition of transport networks	18
1.6 Sufficiency of labour and entrepreneurship	19
2 Enhancing the climate and energy benefits of forests	20
2.1 Energy from wood	20
2.2 Wood products	21
2.3 Climate change and forestry	22
3 Protecting the biological diversity and environmental benefits of forests	24
3.1 Biological diversity of forests	24
3.2 Water and soil	25
4 Promoting the use of forests as a source of recreation and culture	26
4.1 Ecotourism and the natural produce industry	26
4.2 Recreational use of forests and the right of public access	27
4.3 Culture based on forests and wood	27
5 Strengthening the skills, expertise and acceptability in the forest sector	29
5.1 Foresight work in the forest sector	29
5.2 Research and development in support of business and entrepreneurship	29
5.3 Professional training in the forest sector	30
5.4 Social acceptability of the forest sector	32
5.5 Forest-related knowledge and skills among children and young people	32
6 Promoting sustainable forest management in international forest policy	33
6.1 International forest policy	33
6.2 Forest affairs in the European Union	33
6.3 Development cooperation and other bilateral cooperation	34
IMPLEMENTATION, MONITORING AND FURTHER DEVELOPMENT OF THE PROGRAMME	35
PROGRAMME FUNDING	36
IMPACTS OF THE PROGRAMME	38
PREPARATION AND EVALUATION OF THE PROGRAMME	41
BACKGROUND MATERIAL	43
Participants in the preparation of Finland's National Forest Programme 2015	45
APPENDICES	48
Appendix 1 Dissenting opinion	48

Executive Summary

Finland's National Forest Programme 2015 was adopted as a Government Resolution on 28 February 2008. It aims to increase the welfare of Finnish citizens through the diverse use of forests in compliance with the principles of sustainable development.

The programme was drawn up in broad-based collaboration with interest groups steered by the Department of Forestry of the Ministry of Agriculture and Forestry and with support from the National Forest Council. The proposals of the interim report of the working group chaired by Esko Aho published on 15 February 2008 have also been taken into account.

The underlying idea in the programme is that forest-based manufacturing and service production can be expanded while securing the social acceptability, economic viability and ecological, social and cultural sustainability of the forest sector. As production in the forest sector must be market-oriented and based on customer needs, the private sector has a vital role to play. It is the task of the public sector to create such preconditions that forests can be managed in a competitive way.

The purpose of the National Forest Programme is to *increase welfare from diverse forests*. The vision, or target state, of the programme is set for 2015, when *Finland is a world pioneer in sustainable forest management, the competence of the sector has been refined into new competitive products and services, the use of domestic wood has increased significantly and forest biodiversity has improved*.

Finland's National Forest Programme 2015 is constructed upon six priorities:

- Securing a competitive operating environment for the forest industry and forest management;
- Enhancing the climate- and energy-related benefits of forests;
- Protecting the biological diversity and environmental benefits of forests;
- Promoting the use of forests as a source of culture and recreation;
- Strengthening skills, expertise and acceptability of the forest sector;
- Promoting sustainable forest management in international forest policy.

Each priority has its own objectives and measures to attain them have been proposed.

New products and services

New customer-oriented products and services can be created using wood and its constituent materials in the production of, for example, bioenergy, chemicals or pharmaceuticals, and by taking existing products and developing them further into highly sophisticated products and service chains. Forest-based entrepreneurship will be diversified by promoting opportunities for ecotourism, the use of natural produce and forest-based service entrepreneurship. The State will promote the creation of forest-based value chains by funding research and development programmes and investments by small and medium-sized enterprises.

The profitability of family forestry will improve in the future thanks to the traditional sale of timber and pulpwood, now supplemented with sale of wood for energy and trade in natural and recreation values. In the future, the forest carbon sink may become a tradable or leasable value.

Increasing the use of domestic wood

The aim is to increase the use of domestic wood by 10–15 million cubic metres per year. This calls for rapid action. Although timber trade is a matter for market participants, its preconditions can be improved by providing forest owners with up-to-date information on forest resources and advising them about the potential of their forests, by developing services for forest owners and revising taxation to offer better incentives. To enable year-round transportation for forestry and the forest industry, the State must in the near future begin to invest in the improvement and maintenance of all roads as well as the improvement of the rail network.

Increasing harvests and other silvicultural works, the production of energy from forests and the needs of the wood products industry, all call for more labour in the forest sector. Improving education and training in terms of dimensioning, content as well as more flexible forms of education is a central aspect of the programme.

The diversifying use of forests – further refinement of wood and energy production, conservation of biodiversity and the recreational use of forests, as well as forests as carbon sinks – all these demand an increase in growing stock. The minimum target for the increase set for 2015 is 100 million cubic metres per year. Given the current age structure of Finnish forests, heavy investment is needed in forest improvement to increase growth. Targets for seedling stand management, thinnings and ditch reconditioning have been raised considerably, while emphasising the need for better management of regeneration areas. The incentive for this is offered by higher financial support under the Act on the Financing of Sustainable Forestry.

Biological diversity and energy from wood

The conservation of forest biodiversity, particularly in southern Finland, calls for additional measures. In parallel with the National Forest Programme, a Forest Biodiversity Programme for Southern Finland 2008–2016 (METSO) was prepared. The policies and measures outlined in the METSO programme are an integral part of the range of instruments in the NFP to protect biological diversity in the future. The METSO programme contains a broad range of instruments based on voluntary measures, and an ambitious financing programme.

The role of forests in energy production and the mitigation of climate change occupy an important place in the National Forest Programme. Healthy, growing forests and the use of wood in construction contribute to the mitigation of climate change by sequestering carbon, and greenhouse gas emissions are reduced by the replacement of fossil energy sources with wood. The goals of the EU for increasing the use of renewable energy are challenging for Finland, but also offer many opportunities for the forest sector. The goal is to triple the use of forest chips in Finland. Attainment of this and other goals in the use of wood-based energy calls for concerted effort by several administrative sectors as well as the private sector. The National Forest Programme was drawn up in tandem with the preparation of the National Energy and Climate Strategy.

Funding from several ministries

More clearly than its predecessor, NFP 2010, Finland's National Forest Programme 2015 is a programme of ministries. The extra funding requirement for the programme is € 40 million per year from the Ministry of Agriculture and Forestry, €27 million from the Ministry of the Environment, and € 60 million from the Ministry of Transport and Communications. The need for additional funding for research in all administrative sectors is about €70 million. Corporate funding from the Ministry of Employment and the Economy and appropriations from the Ministry of Education are also vital for the attainment of the goals of the programme.

Wide-ranging impacts

The implementation of Finland's National Forest Programme 2015 has significant economic and social impacts. The value of production in the forest sector is estimated to grow by € 500–700 million per year, the annual amount of stumpage earnings and income from energy wood by € 400–500 million, annual State revenues by at least € 200 million, and the value of ecotourism by € 200 million per year. The sector will provide jobs for 5,000 people more compared to a situation without the programme measures.

Increasing the volume of roundwood and energy wood harvesting will have an impact on the forest environment. The best and most cost-effective methods available will be used to conserve forest biodiversity and to reduce environmental loads to water from forestry.

TARGET STATE FOR THE FOREST SECTOR 2015

Current status of forests in Finland

Forests are the most important economically exploited natural resource in Finland. The growing stock in our forests is healthy and productive. The annual increment is nearly 100 million cubic metres. Forests also yield diverse and abundant harvests of game, berries and mushrooms, in addition to being an important element of the living environment and recreation of Finns. Forests are also of growing regional importance to the tourist industry.

A considerable part of the species of flora and fauna in Finnish nature are dependent on forests, either directly or indirectly. 9% of all forest land in Finland is under conservation, a considerably higher percentage than in other European countries. In terms of conservation needs, however, conservation areas are distributed unevenly over the territory of Finland.

Forest ownership is distributed among many different groups. The majority of forests are owned by about 900,000 private families. The majority of forest owners live in the same region as their forests. Four fifths of stumpage earnings remain in the region where the forest they come from is located. Harvesting, transportation and silviculture are an important source of income in rural areas. Along with their value as recreation, berry collecting and hunting also have an economic value for the rural population. Forests are therefore a central factor in the maintenance of the vitality of the countryside and for balanced regional development.

The forest sector is extremely important for Finland. The combined contribution of the forest sector and furniture industry to the gross domestic product is nearly 8%, and they account for 3.5% the employed workforce. The average figures for the world are 1.2 and 0.4%, respectively. Income from forest industry exports accounts for more than a fifth of the national export income; the figure is tenfold compared to other countries of the world.

The Finnish forest industry's domestic production accounts for 5% of the global production of paper, paperboard and pulp, and 2.4%

of wood-based panels, in spite of the fact that the volume of growing stock in Finland is only 0.5% of the total growing stock of all forests in the world.

Finland is the leading country in the European Union in terms of using wood for energy production. Wood accounts for about 20% of the total energy consumption, which is five times the average in the EU.

Future importance of forests in Finland

With the increasing scarcity of non-renewable natural resources, the strategic importance of renewables increases as more and more countries seek to follow the principle of sustainable development.

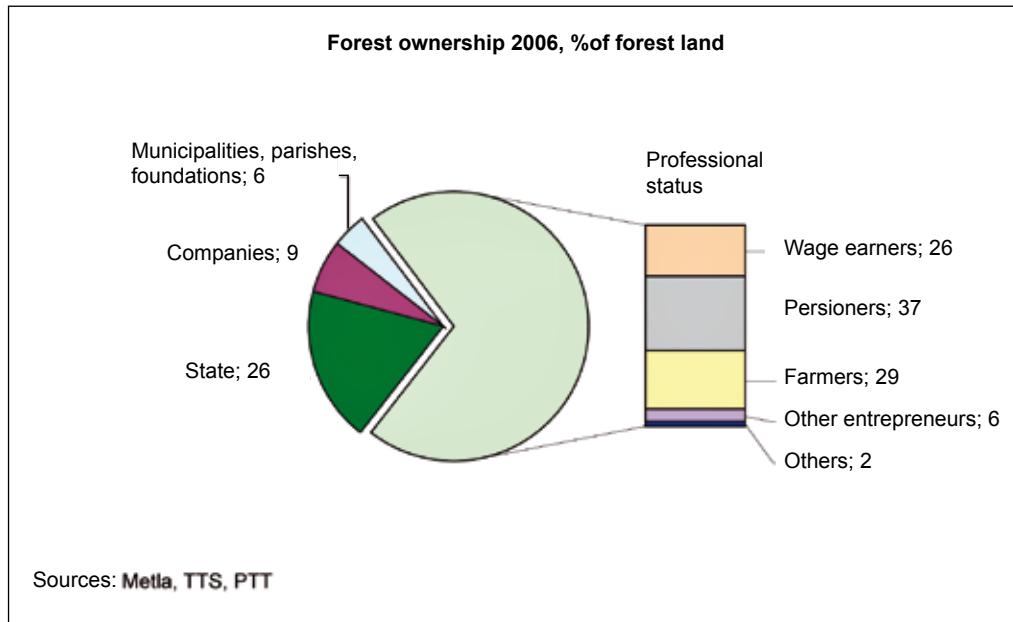
Forests provide renewable raw material to the forest industry as well as many other industries for the manufacture of existing and new products. Forests are also a source of many immaterial commodities which will become more important as the general standard of living and the amount of leisure time increase. The value of forests is also enhanced as we seek ways to mitigate climate change and produce energy.

The material and immaterial commodities of forests create new opportunities for many types of entrepreneurship, work and livelihood – for the general welfare of citizens. Transgenerationality, the core of sustainable development, demands that forest biodiversity be maintained as part of the forest management regime.

The increasing interest among citizens towards renewable commodities and energy and the growing importance of forests as a source of recreation and wellbeing create positive preconditions for an increasingly diverse and multiple use of forests, allowing a more positive public image to be created for wood processing and the entire forest sector.

Areas of protected forests and forests under restricted forestry use, 2006						
	Entire country		Southern Finland		Northern Finland	
	1,000 ha	Share %	1,000 ha	Share %	1,000 ha	Share %
Total land area (forests and scrub land, NFI 10, 2004–06)	22 914	100,0	11 560	100,0	11 355	100,0
Strictly protected forests	1 885	8,2	203	1,8	1 682	14,8
Protected forests where cautious fellings are possible	173	0,8	53	0,5	120	1,1
Protected forests (1+2)	2 058	9,0	257	2,2	1 802	15,9
Forests under restricted forestry use	823	3,6	165	1,4	657	5,8
Protected forests and forests in restricted forestry use, (1+2+3)	2 881	12,6	422	3,7	2 459	21,7

Source: Finnish Forest Research Institute



Private individuals own 59% or forest land, the State one fourth, forest companies slightly under one tenth, with the rest are owned by municipalities, parishes and foundations, or are in collective ownership. Ownership by pensioners and wage earners has increased, while the farmers' share has decreased markedly since the 1990s. The average age of family owners is 59. Data for private forest owners is from 2003.

Value of forest-based functions and services in 2006, mill. euro	
Pulp and paper industry, value of production ¹	14,639
Wood products industry, value of production ¹	6,279
Forestry, value of production ¹	3,431
- stumpage earnings, gross stumpage income ²	1,702
- harvesting and transportation, silviculture, services etc. value of production	1,729
Ecotourism, estimate of value added ¹	~ 800
Energy, horticultural and environmental peat, estimated turnover ³	~ 200
Forest chips + fuelwood, value on site of use + stumpage value ²	140
Berries, mushrooms, herbs and lichen, trade value + estimate of collecting for household use ²	~ 120
Game + reindeer husbandry, calculated value + slaughter income ²	87
The value of recreational use of forests is calculated by putting a price on visits to forests, the total coming to about a billion euro ²	

The figures are not completely commensurate, and some are based on estimates. Nevertheless they give an idea about the scale of the value of forest-based functions and services.

Source: ¹Statistics Finland, ²Finnish Forest Research Institute, ³Association of Finnish Peat Industries

National Forest Programme 2010 – attainment of key goals	Initial status 1998	Status 2006	Target 2010
Roundwood removals, mill. m ³ /yr	58	57	63–68
Use of forest chips, mill. m ³ /yr	0,8	3,4	5,0
Silvicultural investments, € mill/yr	227	241	285
Net result of private forestry, €/ha/yr	116	88	120
Forest sector exports, € bill/yr	12.8	12.8	14.9
Wood products industry exports, € bill/yr	2.9	2.9	5.7
Employed in forest sector, persons	95,000	89,400	80,000

Figures in 2007 prices, adjusted with cost of living index.

The short-term challenges include rising production costs, tightening international competition between forest industry companies, the need to increase the use of domestic roundwood, and the sufficiency of the workforce. The importance of using domestic wood is highlighted by factors that increase the uncertainty of roundwood imports.

Long-term challenges include the changing demographic structure, changes in economic structures brought on by globalisation, the depletion of non-renewable natural resources, as well as climate change and the globally growing need for energy, which are all deeply connected with each other. Nevertheless they offer the forest sector opportunities to expand into new areas and thereby to increase public welfare.

With respect to energy production and climate change, the forest sector has become increasingly important but also more complex – a fact viewed as a benefit by some, a disadvantage by others. The harmonisation and integration of the multiple functions of forests call for an open-minded and comprehensive examination of the ways in which forests are used today.

Changes in the operating environment of the forest sector could not be fully anticipated in the preparation of the Finnish Forest Programme 2010, and all of its goals will not be attained. This was one of the reasons for revising the programme. The next table presents the key goals of the forest programme and their attainment. The matter has been discussed more extensively in the Future Review for the Forest Sector (2006).

Finland's National Forest Programme 2015

Finland's National Forest Programme 2015 is a Government programme which aims to increase the welfare of Finnish citizens

through the diverse use of forests following the principles of sustainable development.

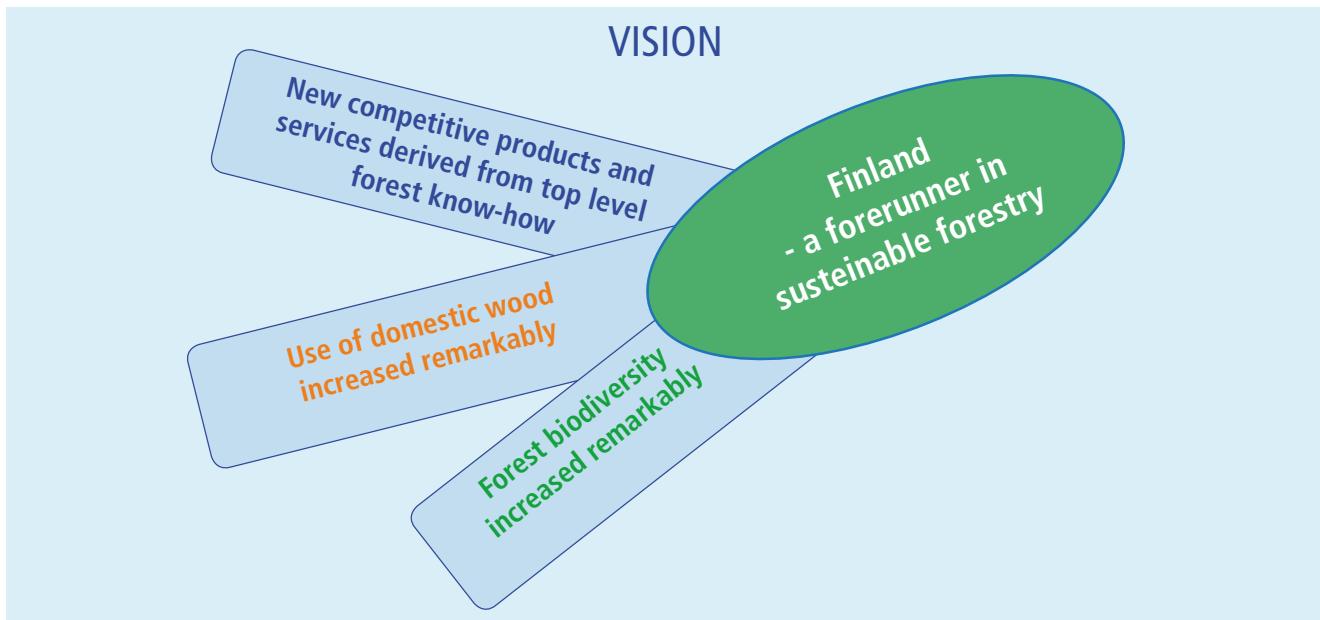
The programme has been prepared in broad collaboration with various interest groups, conscious of the fact that the forest sector is vital to the promotion of sustainable development. Those participating in the preparation of the programme share a broad view of the issue and the following values:

- *appreciation of nature* in all actions;
- recognition of *customer-orientation* as a key precondition for profitable and competitive operation;
- high-standard and diverse *expertise*;
- *collaboration* that is based on transparency and trust between the various actors.

The underlying principle in the programme is that manufacturing and service production based on forests and wood can be increased while maintaining the social acceptability, economic viability and ecological, social and cultural sustainability of the value chains of production from the forest to the market.

Another basic principle is that operations based on the increasing use of forests must be customer- and market-oriented. The private sector is therefore vital for the attainment of the programme objectives. It is the task of the public sector, however, to create such preconditions that forests can be used in a competitive way.

The general principle of the programme is that it is possible to achieve a balanced integration of the multiple uses of forests so as to benefit from the particular strengths of each region. Economically, socially and ecologically sustainable solutions will be used in forest management, following the internationally accepted ecosystem approach, to protect natural functions valuable to humanity and nature alike. In parallel with the National Forest Programme, the Forest Biodiversity Programme for Southern Finland 2008–2016



(METSO) has been prepared. The METSO programme is an integral part of the National Forest Programme.

The operating principle of the National Forest Programme is *more welfare from diverse forests*

In keeping with Finland's National Strategy for Sustainable Development, the aim of Finland's National Forest Programme 2015 is to ensure that forests as a renewable natural resource are used for economic operations and the promotion of welfare in a way that ensures the regeneration of forests from one generation to the next. Welfare here is a broad concept, consisting of many material and immaterial factors, such as health, employment, livelihood, recreation as well as a clean, healthy and vigorous environment. Biodiversity not only strengthens the vitality of forests but also enables the diverse and extensive use of forests.

The vision, the target state, of the National Forest Programme is for 2015, when *Finland is be a pioneer of sustainable forest management and expertise. The national competence has been refined into new competitive products and services, the use of domestic wood has increased significantly, and the biological diversity of forests has improved.*

The vision is challenging for the forest sector. Attaining it will require a great deal of work and resources. The development of a value chain from the forest to the consumer that covers all aspects of forests and incorporates current and new forest-based products and services; integration of the multiple uses of forests; and the conservation of biodiversity, all these require sustained and seamless cooperation between the private and the public sector, as well as active participation and willingness to change. Attaining the goal also calls for sustained research and development as well as education that meet the needs of the labour market. The attainment of the target state also calls for anticipatory and active na-

tional and international forest policies, as forest issues are simultaneously both local and international.

Finland's National Forest Programme 2015 is constructed upon six priorities:

- Securing a competitive operating environment for the forest industry and forest management;
- Enhancing the climate- and energy-related benefits of forests;
- Protecting the biological diversity and environmental benefits of forests;
- Promoting the use of forests as a source of culture and recreation;
- Strengthening the skills, expertise and acceptability in the forest sector;
- Promoting sustainable forest management in international forest policy.

Key measures in the short term involve increasing the use of domestic wood, improving the transportation network and ensuring the sufficiency of skilled labour for the harvesting and processing of both roundwood and energy wood. These measures must be complemented with future-oriented R&D to develop new products and services based on forests and wood, and to enable extensive commercialisation. Key measures during the programme period will be those designed to minimise damage to nature caused by forest management; implementation of the METSO programme; mitigation of climate change; and increasing the production of bioenergy.

Implementation of the programme increases the opportunities for the multiple use and management of forests. Direct beneficiaries of this will be companies whose business is based on the use of forests. Improvements in their operating conditions will benefit forest owners and general citizenry alike. Growth in economic activity will also be reflected in State revenues. Forest management practices designed to improve water protection and the conservation of forest biodiversity will produce significant environmental benefits

Key terms

Forestry	Denotes roundwood production, forest and nature management and harvesting.
Forest industry	Denotes mechanical forest industries (sawmill, board and other wood products) and chemical forest industries (pulp, paper and paperboard).
Forest sector	Comprises forestry and forest industry.
Forest cluster	Comprises the forest sector and closely related branches of mechanical engineering and chemical industry, automation and packaging systems operations, printing industries, power production as well as related research and consultation.
Extended forest cluster	In addition to the forest sector, includes also the production, processing and services as well as public goods based on both material and immaterial non-wood products. (In connection with education and training, the extended forest cluster has traditionally mainly denoted ordinary professions within forestry.)
Sustainable forest management	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.
Ecosystem approach	Denotes the framework of the UN Convention on Biological Diversity (CBD) which seeks to attain a holistic view in the sustainable management, stewardship and protection of natural areas. The approach emphasises the preservation of the structure and functioning of ecosystems so as to protect natural functions vital to humanity and nature alike in the future. According to a report of the Ministerial Conference on the Protection of Forests in Europe, in terms of the content the ecosystem approach reflects the sustainable management of forests.

PRIORITIES, OBJECTIVES AND MEASURES

1 Securing a competitive operating environment for the forest industry and forest management

1.1 Increasing the value added and providing new products and services

Wood is used in more ways than at present to provide customer-oriented, competitive products and services.

The competitiveness of the Finnish forest industry is based on customer-oriented products with high added value. The profitability of current products can be enhanced by improving the efficiency of both production and the use of raw materials, and by improving technology. New products and practices also need to be developed, as well as entirely new forms of business operation. Technological expertise needs to be complemented by improved commercial skills as well as the creation of new technological and service enterprises. Service provision and networking between major industrial players and the SME sector will become increasingly important.

Opportunities for new wood-based products exist in the wood products industry, construction industry, smart paper, bioenergy and biorefinery products, as well as the food and the pharmaceutical industries. The use of wood can be increased by the development of wood-based products in which the structure of wood has been modified chemically or physically, or wood is combined with other materials. Other business concepts can be combined with the manufacture of wood-based products, such as increasing the provision of services (installation, maintenance and servicing). Biorefineries are being planned to operate in conjunction with pulp mills, using biomass to manufacture raw material for biodiesel, ethanol and products for the chemical industry.

The exploitation of wood-related opportunities calls for R&D, willingness to change and take risks, and innovative cooperation across the entire forest cluster.

Necessary measures¹

- a) The Government will support research and development for improving the forest sector's innovation environment in ways specified in Section 5.2 (Ministry of Employment and the Economy, Ministry of Education, Ministry of Agriculture and Forestry).

- b) Companies in the forest sector will increase resources for R&D and direct them into the development of new products and services (companies in the forest sector).
- c) Actors in the forest sector will step up their cooperation in research, development and production, and small and medium-sized enterprises in particular will be supported to master the value chain from forest to market (Ministry of Employment and the Economy, Employment and Economic Development Centres, forest companies, universities, research institutions).
- d) The operating conditions of small forest product enterprises in rural areas will be improved through development and investment subsidies (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, Employment and Economic Development Centres).
- e) Depreciations for companies will be retained on at least the current level to encourage the adoption of new technologies (Ministry of Finance).
- f) Sales of forest industry products in export markets will be promoted by participating in international cooperation projects and by supporting sales promotion work in Finland and neighbouring regions (forest companies, interest organisations, Puuinfo, Ministry of Employment and the Economy).
- g) A programme will be drawn up for the development of service business operations in the forest sector (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry).

Target level for 2015

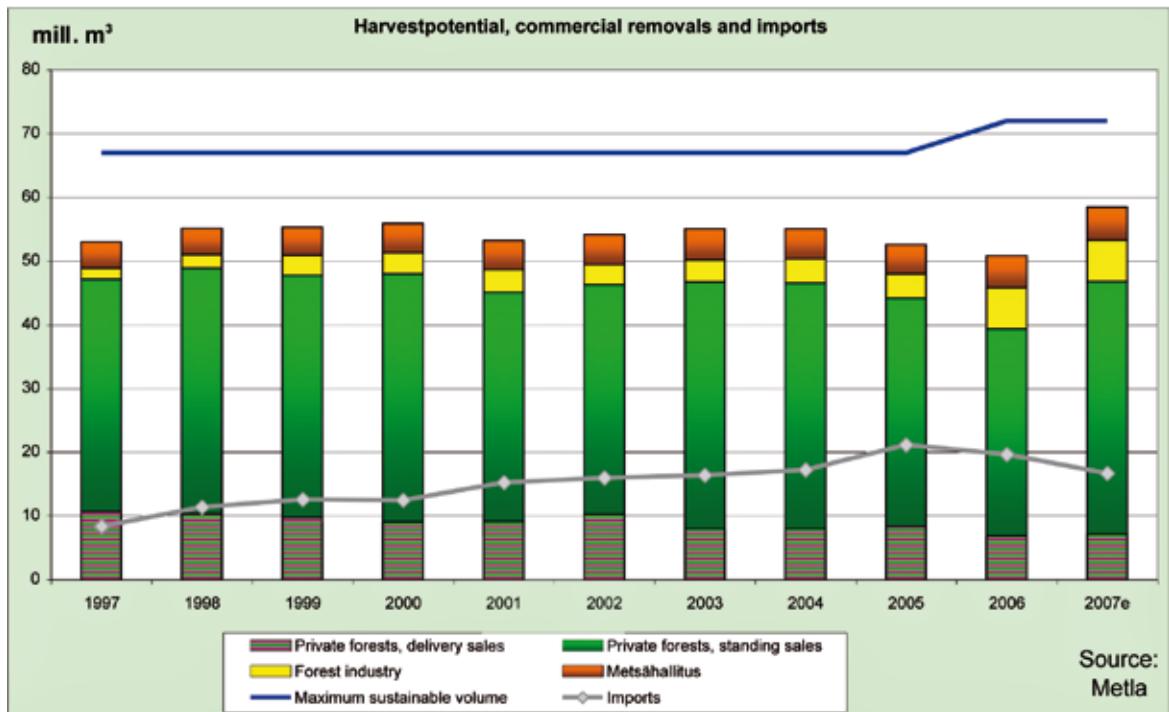
The value of the forest industries and wood products industries in Finland has increased by 20% (average increase €19,560 mill/year in 2002–2006).

1.2 Utilising the harvesting potential

The volume of annual fellings in Finland increases 10–15 million cubic metres.

The demand for domestic roundwood is expected to increase sharply due to reduced dependence on imported wood and EU goals for increasing the share of renewables in energy consumption. On average, the forest industry used 71 mill. cubic metres of

¹ The responsible actor is indicated after the measure in parentheses (underlined) as well as other principal actors. The actors will be listed in detail in the revised action plan.



Commercial fellings in private forests decreased up to 2006, whereas harvesting in forests owned by forest companies have been on the increase since 1997. The volume of imports more than doubled, but turned into decline in 2006.

roundwood per year in 2002–2006, of which the share of domestic wood was about 55 million.

According to the latest National Forest Inventory, the annual increment (98.5 million m³) would allow greater harvest volumes than at present. The annual harvestable volume without endangering the sustainability of roundwood production and without additional conservation is 72 million cubic metres. The added felling potential is mostly in private forests. Fellings can be increased particularly in areas dominated by pine and small-diameter stock as well as on peatlands. The central concern is that forest owners should have up-to-date information about the harvest potential and management needs of their forests.

Private forests (excluding forests owned by the industry and institutional organisations), also called family forests, account for 80% of all domestic roundwood used by the forest industry. The significance of State forests for roundwood supply is the greatest in northern and eastern Finland. Challenges to supply include the small size of family forest holdings, structural changes in their ownership and the need to focus fellings increasingly on thinnings and peatlands.

The area of forest land in southern Finland in particular will decrease as increasingly greater tracts of land are needed for development and transportation. Roundwood production and felling opportunities are restricted by land use planning and social obligations throughout the country. For example, the social obligations placed upon State forests under the Act on Metsähallitus for 2006 decreased fellings by Metsähallitus by 1.2 million cubic metres, the

value of which was estimated at €38 million. Fellings undertaken by Metsähallitus were 5.9 million cubic metres.

Objectives 1.2, 1.3 and 1.4 (utilisation of harvest potential, sustainability of roundwood production and profitability of forest management) are very much interdependent. As a result, any measures related to them support the attainment of all three objectives, and also have a bearing on the labour needs of the forest sector.

Necessary measures

- Management planning and advisory services for forest owners will be improved by ensuring that information about forest resources is up to date, and by stepping up and improving the methods of collecting and using that information. The use of other site-specific natural resource information systems will be increased (Ministry of Agriculture and Forestry, Forestry Development Centre Tapio, Forestry Centres, Forest Management Associations).
- Advisory services for forest owners will be developed and improved to ensure that forest owners are aware of the harvest potential and management needs of their forests as well as alternative methods for implementing management measures (Ministry of Agriculture and Forestry, Forestry Development Centre Tapio, Forestry Centres, Forest Management Associations, forest companies).
- Advisory services for forest owners provided by Forestry Centres will complete the changeover to electronic systems to produce electronic services based on forest resource data for forest owners and actors authorised by them (Ministry of

Definitions

Commercial removals	Roundwood acquired by the industry for its own use or for export.
Roundwood	Unprocessed wood that meets the dimensions for industrial use; sawlogs and pulpwood.
Small-diameter tree	Roundwood that does not meet the dimensions for industrial use. Often used for fuelwood.
Roundwood removal	All roundwood and small-diameter trees felled for industrial and household use as well as export.
Drain	Roundwood removals plus logging residue and deadwood (natural drain).
Increment	Increment includes both roundwood and small-diameter wood, but not branches, crowns or stumps.

Agriculture and Forestry, Ministry of Finance, Forestry Development Centre Tapio, Forestry Centres).

- d) To meet increasing obligations, public administration of the forest sector will be improved, the division of duties among forest actors will be clarified, and the preconditions of competitiveness will be improved (Ministry of Agriculture and Forestry).
- e) A comprehensive national programme for peatlands will be drawn up, as well as a development programme to improve the cost-effectiveness of increasing thinnings and peatland fellings (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Ministry of the Environment, Central Union of Agricultural Producers and Forest Owners, Forestry Development Centre Tapio).
- f) Management goals for commercial forests administered by Metsähallitus will be defined in conjunction with the preparation of the strategy and natural resource plans of Metsähallitus (Ministry of Agriculture and Forestry, Metsähallitus).
- g) The effects of land use restrictions on the exploitation of regional harvest potential will be studied (Ministry of Agriculture and Forestry, Finnish Forest Research Institute).

Target level for 2015

Annual fellings of roundwood increase to 65–70 million cubic metres (average volume in 2002–2006 was 44 million m³).

Holding-specific up-to-date forest management plans cover 75% of the area of forest land in private ownership (current figure 43% in 2006²).

1.3 Sustainability of roundwood production

The production conditions of forests improve and the annual increment increases.

Increasing the quality and quantity of roundwood production ensures the long-term conditions for the wood processing industry as well as the protection of biodiversity and the non-wood uses of

forests. The mitigation of climate change and growing use of renewable energy both require increased wood production.

The latest National Forest Inventory (2007) suggests that in 2006–2015 the need for seedling stand tending increases 1.6-fold and the need for first thinnings 2.2-fold compared to the use of labour in the preceding 10-year period. There is also great variation in the quality of forest regeneration, both regionally and as regards the methods employed. Increasing the use of domestic wood will also increase the amount of silvicultural works. Studies indicate that advisory services for forest owners and public financial support can bring about significant increases in the labour demand in forest management.

According to the latest NFI, moose populations have damaged seedling stands on 490,000 ha, or 12% of the total area. Compared to the previous inventory, the area of damages is 1.7 times greater. In many places, moose prevent regeneration with the most suitable tree species for the site, birch and pine. Another significant damage agent is root-rot fungus, which attacks spruce stands. The value of losses caused annually by root-rot is about €50 million. Climate warming facilitates the spreading of the root-rot fungus.

Necessary measures

- a) The attainment of goals for forest management and forest improvement (see Table) will be promoted by the means of financial support, advisory services and forest management planning (Ministry of Agriculture and Forestry, Forestry Development Centre Tapio, Forestry Centres, Forest Management Associations).
- b) The quality of regeneration will be improved by adopting a monitoring system for the quality of forest regeneration covering the entire country (Ministry of Agriculture and Forestry, Forest Management Associations, Forestry Centres).
- c) Measures to prevent root-rot fungus will be stepped up (Ministry of Agriculture and Forestry, Forest Management Associations, Forestry Centres, forest owners, buyers of wood).
- d) Implementation of the Tree Breeding Programme 2050 will continue, ensuring also the availability of forest reproductive material that is of suitable provenance for the site and meets the quality criteria for silviculture (Ministry of Agriculture and

² Includes the forests of municipalities and parishes and jointly-owned forests.

Annual target levels for forest management and improvement works		
Type of work	All forest owners, total	of which under funding for Sustainable Forest Management ¹
Artificial regeneration, ha	160,000	21,000
Management of seedling and young stands, ha	265,000	168,000
Ditch reconditioning, ha	100,000	80,000
Forest roads		
- improvement, km	4,000	3,000
- new roads, km	640	320
Fertilisation, ha	80,000	21,000
- remedial fertilisation, ha	30,000	21,000
- fertilisation for growth, ha	50,000	0
Prevention of root-rot, ha	65,000	51,000

¹Public funding covers only part of the overall cost of the works.

- Forestry, Finnish Forest Research Institute (Metla), seedling producers).
- e) The programme for the establishment of seed orchards for forest trees will be reviewed to bring it in line with the tree breeding needs dictated by increased regeneration fellings (Ministry of Agriculture and Forestry, Finnish Forest Research Institute, Forestry Development Centre Tapio, Metsähallitus).
 - f) Quantitative goals for the early management of seedling stands will be determined, and their attainment will be promoted using training and advisory services (Ministry of Agriculture and Forestry, Forestry Development Centre Tapio, Forestry Centres, Forest Management Associations).
 - g) Fertilisation for health and growth and also ash fertilisation will be increased in a way that prevents environmental loads to water, and fertilisation methods will be developed (Ministry of Agriculture and Forestry, Forestry Development Centre Tapio, Finnish Forest Research Institute, Metsähallitus, forest companies, forest owners).
 - h) A geographic information system (GIS) will be set up by 2010 that will cover the numbers of moose and the damages caused by them. Methods will be devised to reduce moose damage using active measures in both game and forest management. The Ministry of Agriculture and Forestry will draw up a national strategy for moose management and will review the moose damage compensation system (Ministry of Agriculture and Forestry, Game and Fisheries Research Institute, Forest Research Institute, Forestry Development Centre Tapio, Central Union of Agricultural Producers and Forest Owners).
 - i) The development and adoption of mechanised forest management methods will be promoted (Ministry of

Agriculture and Forestry, Ministry of Employment and the Economy, Forest Research Institute, Forestry Development Centre Tapio).

- j) It will be ensured that foreign pests do not spread in forests through coniferous chippings or sawn goods or packaging made of these (Ministry of Agriculture and Forestry, Finnish Food Safety Authority, customs).

Target level for 2015

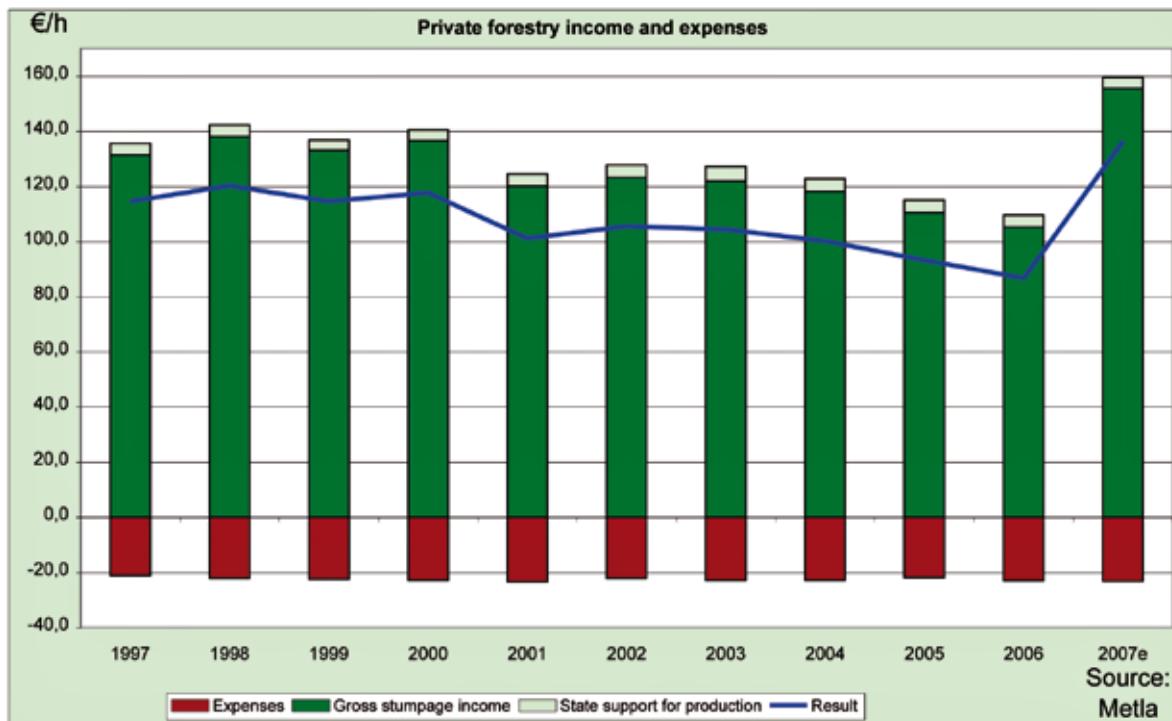
Of the area of seedling stands and young artificially generated forests, 80–85% are of good or satisfactory quality in terms of forest management (figure for 2006 was 69%).

The annual increment is at least 100 million m³ (98.5 mill. m³ in 2006).

1.4 Profitability and holding size in private forestry

The profitability of private forestry improves and the average size of holdings increases.

Two of the key factors affecting the profitability of forest management are market price of wood and sales volumes. Profitability can be improved by exploiting available harvest opportunities, conducting appropriately timed management works, developing the methods of forest management and improvement, promoting competition in the market for forest services, and by chaining sites slated for management and harvesting. Forest owners can also im-



The profitability (business income) of private forestry continued to decline up to 2006, whereas record prices for roundwood and harvests in 2007 pushed profitability to a higher level than ever before (2007 prices, living cost index).

prove profitability by performing management works on their holdings by themselves. Increasing the use of wood for energy and trade in ecological and recreation values also support the improvement of profitability.

In order to make use of the many opportunities offered by forests and to improve profitability, advisory services and education are needed as well as marketing of forest management services. These should be directed particularly for new forest owners, female owners and owners living in cities.

There are about 443,000 family forests holdings of at least two hectares in size, with the average size of 24 hectares. On smaller holdings it is difficult to engage in long-term silviculture profitably. Holdings are often divided into smaller lots in connection with generation transfers, but many estates also remain unpartitioned for a long time. A general trend since the 1990s has been for small holdings to become even smaller, although large ones have also grown bigger to a some extent. New, developed forms of joint ownership have rarely been applied to forest holdings.

The structure of private forest ownership is expected to change, with the average age of owners continuing to increase over the next ten years, and the proportion of urban and female owners increasing and that of farmers decreasing. The objectives of forest owners with regard to their forests become more diverse. With increasing levels of income and wealth, the share of forest income of the owner's total income will continue to decrease. One significant change in forest ownership will take place when

the forests owned by the baby boomer generation is passed on to the next generation after 2015.

Necessary measures

- Preconditions for generation transfers, increasing of holding size and forest management in general will be improved using taxation: revising inheritance and capital transfer taxation in line with the strategies of the Government Programme; extending the scope of tax deductions for forest management; exempting sales income from first thinnings from tax; raising the threshold of tax exemption for income from work performed on the holding; exempting from tax the harvesting of wood for energy by the owner; and removing the tax disadvantage of silvicultural works performed by the owner (Ministry of Agriculture and Forestry, Ministry of Finance).
- Possibilities for using extra tax deductions to support the implementation of final fellings, forest regeneration and management will be studied (Ministry of Agriculture and Forestry, Ministry of Finance).
- Legislation will be developed regarding the establishment of new forms of forest ownership, such as real estate and capital investment funds, and for shortening the time periods when holdings remain unpartitioned estates (Ministry of Agriculture and Forestry, Ministry of Finance).
- Practices for the redistribution of forest holdings will be developed with a view to improving plot structure. The joint ownership of forests will also be developed and related

information and advisory services will be increased (Ministry of Agriculture and Forestry, Forestry Development Centre Tapio, Forestry Centres, Forest Management Associations, District Survey Offices, joint owners of forests).

- e) Forest legislation will be reviewed so that it will support the goals of the National Forest Programme better than at present (Ministry of Agriculture and Forestry).
- f) The Finnish Forest Research Institute will study the structure of private forest ownership and draw up forecasts regarding the structural change and its impacts in order to facilitate the assessment of needs for the improvement of ownership structure and for developing services for forest owners (Ministry of Agriculture and Forestry, Finnish Forest Research Institute).
- g) An R&D programme improving the cost-efficiency and quality of silvicultural works will be carried out and the working methods developed within it will be put into practice by 2011 (Ministry of Agriculture and Forestry, Finnish Forest Research Institute, Forestry Development Centre Tapio).

Target level for 2015

The net result (operating result) of private forestry in Finland is at least €120/ha (2002–06 average was €98/ha, in 2006 prices).

The average size of private forest holdings increases to 50 hectares by 2050 (24ha in 2006).

1.5 Condition of transport networks

The transport network is maintained and developed to allow competitive forest-related transports round the year.

The forest sector is the single most significant user of transport services in Finland. The share of the forest industry of the overall volume of rail traffic is about 60%, about 30% of road haulage, and nearly one half of maritime transport. Long distances call for efficient logistics and a traffic network that is usable throughout the year.

To be able to increase the use of domestic wood and forest chips, the road and rail network must be in good condition. Growing volumes of roundwood acquisition will lengthen the transport mileage, which will increase the need for rail transport. Nearly 1,000 kilometres of Finnish railway lines stand at risk of being closed down, which would lead to more road transports and greater emissions.

In the first chain of the transport route roundwood and energy wood as well as harvesting equipment are transported with trucks, wearing forest roads in particular, as well as the low-volume road network and bridges. Undisturbed transportation of wood is not

possible without a transport network that is usable throughout the year. A significant part of that network consists of rural low-volume roads and private roads, all of which are important elements for the overall functioning of the traffic route network.

Improving the condition of roads serves agriculture and other livelihoods, the mobility of the rural population as well as the management and recreational use of forests. It is also a necessary precondition for reducing the seasonal fluctuation of harvesting volumes and long haulage of wood.

Necessary measures

- a) Deficiencies in the capacity of the main rail network will be rectified, and the proposals of the working group on securing timber transport on rail routes with low traffic volumes (2007) for the improvement of the rail network will be implemented (Ministry of Transport and Communications, Finnish Rail Administration).
- b) The safety and functionality of the main road network as well as the quality of public low-volume roads will be improved, the volume of repairs of frost damage will be increased, and winter maintenance of roads will be improved (Ministry of Transport and Communications, Finnish Road Administration).
- c) Sufficient inland and maritime waterways will be maintained to meet the needs of raw material supply and exports of the forest industry, and the lease on the Saimaa Canal will be extended (Ministry of Transport and Communications, Finnish Maritime Administration).
- d) Government support for private roads will be increased, road maintenance associations and services will be supported, and the principles for calculating road maintenance units will be reviewed (Ministry of Transport and Communications, Ministry of Agriculture and Forestry, Land Survey of Finland, Finnish Road Administration, Finnish Road Association, Forestry Centres).
- e) The condition of forest roads will be improved on the lands of all owner groups (Ministry of Agriculture and Forestry, Forestry Centres, private forest owners, Metsähallitus, forest companies).
- f) A programme for basic improvement of principal routes of road haulage of roundwood will be drawn up and implemented for private roads (Ministry of Transport and Communications, Ministry of Agriculture and Forestry, municipalities).

Target level for 2015

The combined length of roads subject to restrictions due to frost damage is at most 500 kilometres (911km in 2006).

As a result of the reconditioning of the rail network, not more than 550km remain in the lowest service class (Class T4, capacity less than 20 tonnes) (figure for Class T4 in 2006 was 759km).

The annual total volume of reconditioned forest roads is 4,000 kilometres (2,457 in 2006).

1.6 Sufficiency of labour and entrepreneurship

There are enough competent employees and entrepreneurs for the increasing and changing needs of the forest sector.

Current trends in the productivity of work will lead to a reduced need for labour. However, the demand for labour in forest management increases as a result of growing volumes of roundwood and energy wood harvesting and of silvicultural works. The competence requirements of the workforce increases as a result of the diversification of jobs. The increase will be particularly notable in the case of drivers of forest machinery and trucks, but the future outlooks in the wood products industry also indicate an increase in demand for labour.

Established as well as new ways of using forests will generate new opportunities for jobs and entrepreneurship. These opportunities will be particularly important in rural areas. There will be more opportunities available in many forest services, in the production of energy wood, in ecotourism and the processing and refinement of natural produce as well as in the field of health products and services. So far the proportion of women in the forest sector workforce has been rather small, although there are plenty of job opportunities in the growing sector.

Challenges to entrepreneurship include the periodic nature of employment in the sector, the availability of labour, deficiencies in expertise and education that support entrepreneurship and, in particular, the high investment costs in forest machinery, road transport and energy wood business.

Increasing dependence on technology, the reorganisation of tasks and diversifying job descriptions as well as internationalisation, all these call for continuous on-the-job training. The development of work methods and conditions, management methods and coping at work are among the key challenges in terms of the attractiveness of the forest sector for employees.

Necessary measures

- a) The methods, technology and operative models of forestry and roundwood acquisition will be developed to improve productivity and working conditions and to provide employment throughout the year (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Finnish Forest Research Institute, Forestry Development Centre Tapio, Work Efficiency Institute, Metsäteho, actors in this field).
- b) Employee welfare and capacity for work will be improved in companies and throughout the entire sector by making full use of the support and expertise of public sector development and financing organisations (Ministry of Social Affairs and Health, Ministry of Employment and the Economy, companies, labour market organisations).
- c) Marketing and recruitment will be targeted at young people, women, the urban population and immigrant as well as foreign labour (forest-based businesses, labour market organisations, education institutions).
- d) The scope and flexibility of apprenticeship training as well as vocational adult and further education will be enhanced, and the related funding models will be improved (Ministry of Education, Ministry of Employment and the Economy, companies in this field).
- e) Training, corporate and finance counselling as well as related research in marketing, management and business skills and risk management for forest entrepreneurs will be developed (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, Ministry of Education, education institutions, research institutions).
- f) Entrepreneurship in the forest sector will be promoted by developing legislation and corporate funding (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry).
- g) The compilation of statistics concerning the operations of small and medium-sized companies in the forest sector (e.g. the number of enterprises, workforce, income development, turnover and profitability) and the necessary information services will be improved (Ministry of Employment and the Economy, Statistics Finland, actors in this field).

Target level for 2015

Forestry provides employment for at least 23,000 and the forest industries for at least 50,000 people, and the proportion of women of the total workforce exceeds 25% (in 2006 the number of employed people in forestry was 22,700 and in forest industries 66,700, of which 18% were women).

2 Enhancing the climate and energy benefits of forests

2.1 Energy from wood

The overall use of wood-based energy increases and the volume of forest chips used for energy production rises to 8–12-million m³ per year.

Increasing renewable energy production is vital for the attainment of the climate and energy policy objectives and energy self-sufficiency in the EU. The most promising avenues for increasing the use of wood for energy are to increase the use of wood chips in heating plants and to develop the biorefinery concept at pulp mills. Since renewable energy creates opportunities for business and employment in rural areas in particular, regional policy considerations also support this aim. Increasing production of wood-based energy and the emergence of markets for energy wood will tighten the competition for wood. The challenge is to establish a controlled balance between the use of wood for manufacture and for energy.

5–6 million cubic metres of wood is used annually in small residential houses, in addition to which over three million cubic metres of wood chips is harvested from forests for energy production. Forest chips consists mainly of branches, crowns and stumps collected in conjunction with regeneration fellings as well as chips from trees felled in thinnings. In techno-economic terms, the potential produc-

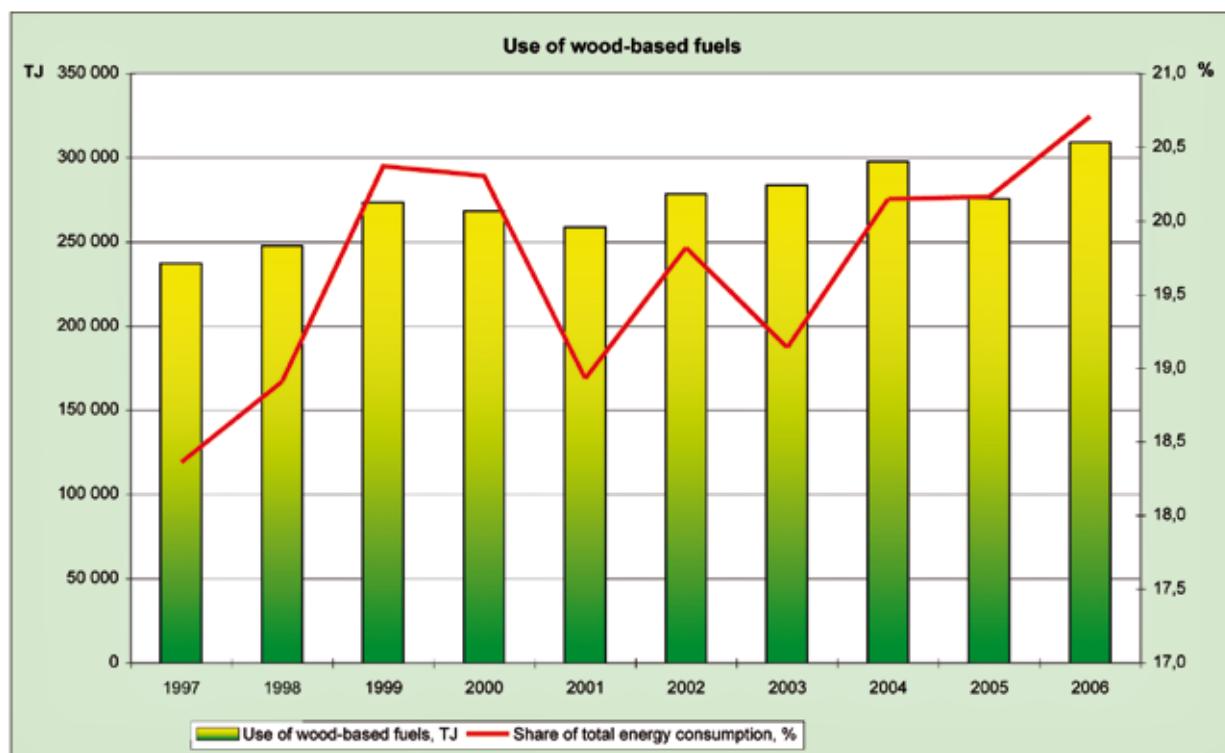
tion capacity of forest chips is estimated to be about 12–15 million cubic metres per year. About 350,000 tonnes of wood pellets are also produced per year, of which one fifth is used domestically.

Wood and peat are often burned simultaneously in heat production. Under the United Nations Framework Convention on Climate Change, peat is classified as a fossil fuel, producing fossil emissions. The European Parliament has proposed a new classification for peat. In IPCC reports, peat is in the category of "other fossil fuel". The classification is as yet unestablished, which makes it difficult to develop the use of peat as fuel.

The use of wood-based fuels and their share of total energy consumption has grown since 2001. In 2006, waste liquors and other by-products of the forest industry accounted for 52% of the consumption of wood-based fuels, 32% was in heating and power plants, and 16% in small residential houses.

Necessary measures

- a) The national Energy and Climate Strategy and the Bioenergy Programme to be based on this will promote the use of wood for energy, taking into account the operating conditions of the forest industry, formulate the policy for the use of peat, and determine the means for promoting decentralised



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Definitions

Firewood	Timber that has been cut, usually to specific lengths, and split, used mostly in homes and farms (logwood, small-diameter wood).
Chips	General term that can, depending on the context, refer to forest chips, sawmill chips, fuel chips, and chips used for pulp production.
Energy chips	Generic term for chips or hogfuel used as fuel.
Forest chips	Forest chips made from branches and crowns, small-diameter wood, stumps or stemwood.
Chips from small-diameter trees	Chips made from stems that do not satisfy the dimensions for roundwood, or from delimbed stems.
Whole tree chips	Chips made from the entire surface biomass of the tree (stem, branches, needles).
Sawmill chips	A by-product of the sawmill industry, with or without bark.
Pellets	Fuel made by compressing cutter shavings and/or sawdust into small pellets.

production of power and heat from wood (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry).

- b) Experimental, demonstration and commercialisation projects for expanding and improving the efficiency of wood-based energy production will be conducted, and methods for growing wood for energy will be developed (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, research institutions).
- c) The harvesting and chipping of small-diameter wood for energy production will be supported, and heating entrepreneurship will be promoted (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Employment and Economic Development Centres, Forestry Centres, Work Efficiency Institute).
- d) A national system for bioenergy advisory services will be organised and the provision and use of advisory services in energy and investment subsidies will be improved to promote the production and use of energy wood whilst ensuring that the subsidies do not distort competition (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Forestry Development Centre Tapio, Motiva, ProAgria, Forestry Centres).
- e) The practice of supporting the changeover of small residential buildings from electricity and oil-based heating systems to wood-based and other heating systems using renewable fuels will be continued (Ministry of the Environment, The Housing Finance and Development Centre of Finland).

Target level for 2015

Annual use of forest chips is 8–12 million m³ (3.4 mill. m³ in 2006).

2.2 Wood products

Carbon sequestration in wood products increases.

Wood construction and wood products manufacture represent sustainable uses of natural resources and long-term carbon sequestra-

tion. The greatest benefits in terms of the sustainable use of natural resources and the mitigation of climate change can be produced by using wood to replace other materials.

Most of the products of the wood products industry are used in construction and interiors. Wood is an energy-efficient and cost-efficient material. Apart from the increasing volume of housing construction, the growth potential of wood construction in Finland, East Europe and Russia derives from the environmental image of wood and the mitigation of climate change. Because a very large number of buildings in Finland are made of wood, their maintenance increases the need for renovation.

The development of advanced products made of sawn wood and wood boards, such as components for the carpentry and furniture industries, boards for interior design and decoration as well as structures for yards and other outdoor fixtures will increase the use of wood as part of normal habitation. Physically or chemically prepared wood composites will also increase the use of wood. Research as well as training are needed to develop new, cost-effective methods of manufacturing (see Section 5.2).

Necessary measures

- a) In line with the Government Resolution adopted on 17 March 2005, public funds will be allocated for measures implemented under the Industrial Policy Programme for the Wood Products Industry (2004–2010) and the Programme to Promote Wood Building (2004–2010) for promoting wood building and the use of wood (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, Ministry of the Environment).
- b) The necessary conditions for promoting the use of wood in construction will be ensured by reviewing and harmonising administrative regulation, construction codes in particular (Ministry of the Environment).
- c) Wood-based prefabricated housing and multi-storey housing solutions will be developed for urban areas, low-energy construction methods in particular (Ministry of the Environment, wood building products industry)

- d) Education and training in wood building and interior decoration as well as renovation will be increased (National Board of Education, providers of vocations training).
- e) The life cycle of products and the advantages of wood for sustainable development will be taken into consideration when reviewing instructions for public procurement (Ministry of the Environment, Ministry of Employment and the Economy, Ministry of Agriculture and Forestry).
- f) Methods will be developed for assessing the effects of carbon sequestration in wood products and the life cycle impacts of wood products (Ministry of Agriculture and Forestry, Finnish Forest Research Institute).
- g) The competitiveness of wood will be improved by participating in the harmonisation of the European single market and the standardisation of wood products (Ministry of Employment and the Economy, forest industry companies).

Target level for 2015

The annual consumption of sawn wood in Finland is at least 1,2 m³ per capita (0.94 m³ in 2006).

2.3 Climate change and forestry

Carbon sequestration is promoted in forest management and protection and preparations are made for responding to the impacts of climate change.

Carbon dioxide is sequestered and stored by forests. Forests are an important carbon sink. The ability of forests to act as carbon sinks can be protected by ensuring appropriate and well timed management and regeneration of forests, by the afforestation of treeless areas and by preventing the destruction of forests as a result of land use. Sustainable forest management together with increasing use of wood-based products offer an excellent way of mitigating climate change. The significance of forests in the calculation of CO₂ emissions is covered in the Kyoto Protocol (Articles 3.3 and 3.4)³.

Climate change is expected to lead to rising trends in both temperature and precipitation and to increase the occurrence of extreme weather events, such as increasing prevalence of heavy rain and hot spells with shortening periods of snow and frost. Trees are genetically adapted to the climate in their area. The more abundant and genetically diverse the tree population, the better it is able to adapt to changing climate conditions. However, climate change also increases the risk of many kinds of forest damage (storms,

snow, fungi, insects) as it improves the conditions for the reproduction and survival of many insects and fungi.

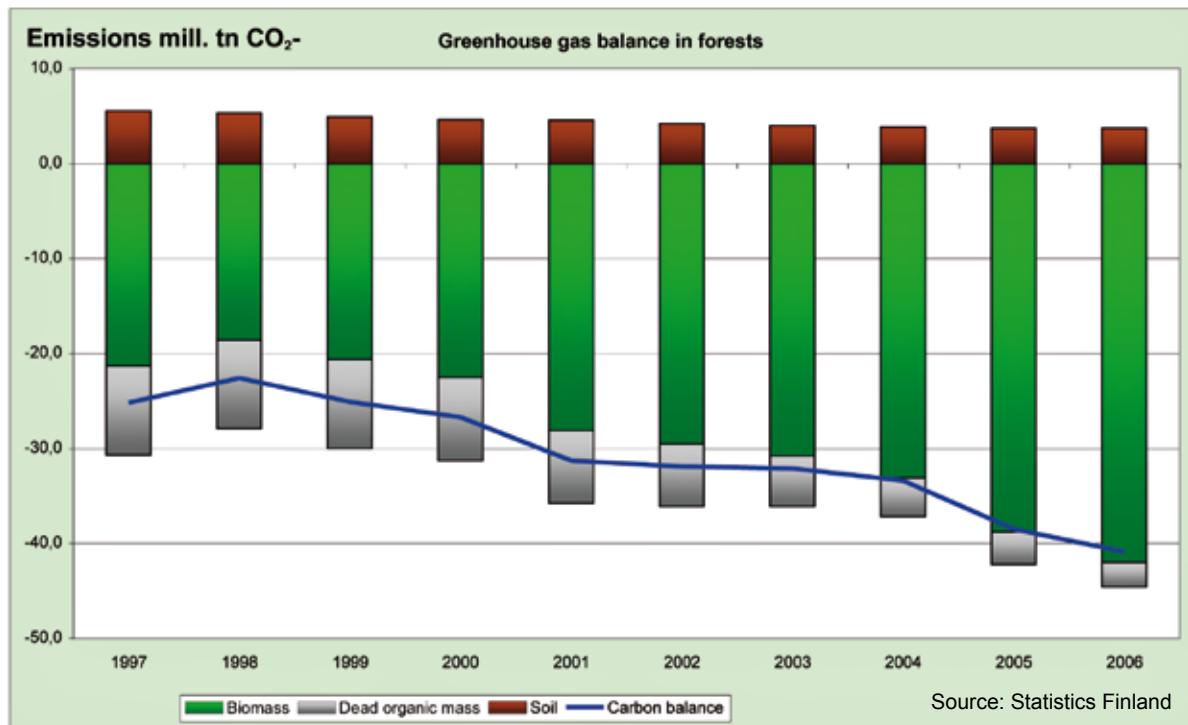
Climate warming affects the management of peatland forests more than those on heaths. The growth of trees accelerates and the growing stock sequesters more carbon, and the profitability of ditch reconditioning improves. On the other hand, the shorter period of ground frost causes difficulties in harvesting. Ditch reconditioning accelerates the decomposition of peat, which releases CO₂ into the atmosphere, although in peatlands where trees grow well this is compensated by the increase in growth.

Climate change can also have positive impacts, such as increased growth, faster regeneration and more reliable seed production. There is as yet not enough information about climate change and its overall impacts on forest ecosystems.

Necessary measures

- a) Forecasts will be prepared concerning the risk of forest damage caused by climate change, the forest damage monitoring system will be improved and emergency plans drawn up in case of forest damage (Ministry of Agriculture and Forestry, Ministry of the Interior, Finnish Forest Research Institute, Forestry Development Centre Tapio, Forestry Centres).
- a) Forest management recommendations and instructions will be reviewed on the basis of latest research results, with an emphasis on the vitality of forests, their impact as carbon sinks and measures to improve harvesting conditions (Forestry Development Centre Tapio, Central Union of Agricultural Producers and Forest Owners, Metsähallitus, forest companies, Forestry Centres).
- a) Former peat production areas will be converted into carbon sinks (Finnish Forest Research Institute, Vapo)
- a) The Climate Change Adaptation Research Programme 2006–2010 and the Functioning of Forest Ecosystems and Use of Forest Resources in Changing Climate Research Programme (MIL) for 2007–2011 will both be implemented, and research as well as best practices will be developed on the basis of their results (Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Forest Research Institute, universities).
- a) Models of operation for trade in or leasing of carbon sinks will be studied as well as other ways for increasing sequestration by forests (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, Ministry of the Environment, Central Union of Agricultural Producers and Forest Owners, research institutions).

³ Article 3.3 covers emissions and sinks due to afforestation and the destruction of forests, and Article 3.4 emissions and sinks resulting from forest management. Finland will apply both during the period 2008–2012 of the Kyoto Treaty.



Changes in growing stock volume is the greatest single factor in the greenhouse gas balance. When the drain is smaller than the increment, atmospheric carbon is sequestered by forests, which then function as a carbon sink (negative values in the graph). As greenhouse gases are released into the atmosphere in drained peatlands, the net effect is that forest soil becomes a source (positive values). When fellings are increased in line with the forest management programme, the capacity of stock to sequester carbon decreases temporarily, until regenerated young forests begin absorbing carbon. The net effect of using wood for energy production is slight, because forest litter would decompose in a short time in any case. The average gross CO₂ emissions of Finland in 2002–2006 were 78.2 mill. CO₂ equivalent tons and the carbon sink of forests 35.4 mill. CO₂ equivalent tons.

Target level for 2015

The annual carbon sink of growing stock and soil is at least 10–20 mill. ton CO₂ eqv (the average figure for 2002–2006 was 35.4 mill. ton CO₂ eqv).

3 Protecting the biological diversity and environmental benefits of forests

3.1 Biological diversity of forests

The deterioration of forest biotopes and species ceases and a stable positive trend of biodiversity is established.

International treaties on the conservation of forest biodiversity require the signatories to implement national measures to attain the goals set in the treaties. The national goals in Finland are laid down by the Government Resolution concerning the National Strategy for the Conservation and Sustainable Use of Biodiversity in Finland 2006–2016.

Forests are the primary habitat for more than a third of the endangered species in Finland. According to the latest assessment, carried out in 2000, 37.5% of all endangered species have their primary habitat in forests, mostly herb-rich forests and old heathland forests. More extensive measures to protect forest biodiversity are needed mostly in the southern parts of the country. Particularly important here is to take biodiversity into account in the management of commercial forests. Special agri-environmental support paid for the management of traditional biotopes enables the conservation and survival of grazed forests and wooded pastures.

The Forest Biodiversity Programme for Southern Finland 2008–2016 (METSO) was drawn up to supplement the NFP in the conservation of forest biodiversity. The key measures in the programme are the

improvement of the network of protected areas, the maintenance and further development of environmental management in commercial forests, as well as collaboration between forest and environmental organisations, counselling for forest owners and education and communication for forest professionals. The knowledge base on forest biodiversity and its conservation will also be developed using research and monitoring.

Principles for the conservation of the genetic diversity of forest trees and the related action plan are inscribed in the *National Programme on Plant Genetic Resources for Agriculture and Forestry*. The key goal of the programme is to protect the natural genetic variability of forests and to ensure the survival of sufficient diversity in breeding populations and artificially generated forests. The genetic resources of forest trees are in practice protected *in situ* in gene reserve forests and in genetic resource archives, which preserve genetic material collected from naturally grown forests.

Necessary measures

- a) Measures proposed in the METSO programme will be implemented (Ministry of the Environment, Ministry of Agriculture and Forestry).
- b) The implementation of old protection programmes will be completed in 2009 for the part of private forests (Ministry of the Environment).
- c) Biodiversity in commercial forests will be protected during harvesting and management through the use of a broad range of tools in compliance with the National Strategy and Action Plan for the Conservation and Sustainable Use of Biodiversity in Finland 2006-2016, Measure 2 (Ministry of Agriculture and Forestry, Forestry Centres, Forest Management Associations, forest owners).
- d) The impacts on forest biodiversity, water and the nutrient balance of soil of stepping up energy wood harvesting and of harvesting methods will be studied, and legislation and instructions will be amended as necessary (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Ministry of the Environment, Finnish Forest Research Institute, Forestry Development Centre Tapio, Central Union of Agricultural Producers and Forest Owners).
- e) Management methods that support both the conservation of biodiversity and the aims of forest owners regarding the use of their forests will be incorporated into the advisory services for forest owners (Forest Management Associations, Forestry Centres).
- f) The genetic diversity of forest trees will be protected in accordance with the National Programme on Plant Genetic



The Forest Biodiversity Programme for Southern Finland 2008-2016 (METSO) covers the key measures that are used to conserve the biodiversity of forests. The preliminary phase of the programme was conducted in 2002–2007 (logo at left) and served as the foundation of the programme being launched now.

- Resources for Agriculture and Forestry (Ministry of Agriculture and Forestry, Finnish Forest Research Institute).
- g) Finland will participate in the establishment and maintenance of a network for the conservation of forest tree genetic resources in Europe (Ministry of Agriculture and Forestry, Finnish Forest Research Institute).

Target level for 2015

The METSO programme has been carried through as set down in the Government Resolution.

3.2 Water and soil

Forestry contributes to the attainment of a sound ecological status of waters.

Forest management measures are carried out only a few times during the life cycle of a forest. Depending on the tree species composition and geographic location, the cycle varies from 60 to 120 years. In some cases, management results in increased loads of nutrients and suspended solids, especially in headwaters. Water protection measures can reduce such loads considerably. The goal of the EU Water Framework Directive, which in Finland is implemented under the Act on the Organisation of Water Management (1299/2004), is to achieve a good status of waters in the Member States by the year 2015. National aims and measures are defined in Regional Water Management Plans, which the Government is scheduled to ratify in 2009.

Increasing harvest volumes means increasing final fellings. Likewise, increasing the use of wood for energy will be reflected in the volumes of slash and stumps that is harvested. All these measures lead to changes in forest soil and soil micro-organisms. Mitigating the negative impacts of increased harvesting on forest biodiversity, the nutrient economy of soil and the production capacity of the forest, as well as the prevention of soil erosion will become ever more important aspects of the planning and implementation of forest management.

Climate change is estimated to increase annual precipitation and runoff, which in turn increase the risk of siltation and erosion, especially in fine-grained soils in connection with soil preparation, stump harvesting and ditch reconditioning. Climate change can also increase nutrient leaching and thereby weaken the quality of water.

The EU Soil Framework Directive currently under preparation will probably require that provisions on soil protection be included in national legislation. This is likely to necessitate more comprehensive data on soil and its micro-organisms.

Necessary measures

- a) Instructions and recommendations for water protection in forest management will be kept up to date using latest research and experiences (Finnish Forest Research Institute, Finnish Environment Institute, Forestry Development Centre Tapio, Metsähallitus, forest companies).
- b) Water protection in forest management will be implemented with cost-effective methods (Ministry of Agriculture and Forestry, actors in the forest sector).
- c) Small bodies of water in forests, such as brooks and springs, for which financing as nature management projects may be available in private forests will be reconditioned (Ministry of Agriculture and Forestry, forest owners, Forestry Centres).
- d) A national network for monitoring environmental loads to water caused by forestry will be established and maintained (Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Environment Institute, Finnish Forest Research Institute, Forestry Development Centre Tapio).
- e) Research on the environmental loads on water and soil caused by forestry will be conducted, in particular, from the perspective of climate change (Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Environment Institute, Finnish Forest Research Institute, Forestry Development Centre Tapio).
- f) A geographical information system (GIS) will be made available by 2010 which can be used to assess the risk of erosion caused by forest management and to illustrate the catchment properties that contribute to the emergence of the risk (Ministry of Agriculture and Forestry, Finnish Forest Research Institute, Finnish Environment Institute, Forestry Development Centre Tapio, Geological Survey of Finland, Land Survey of Finland).

Target level for 2015

The load to water caused by forestry and forest management decreases (the quality of water protection in harvesting and soil preparation in regeneration sites is excellent or good in 95% of the area by 2015; in 2007 the percentage of excellent and good sites was 96% in harvesting, and 82% in soil preparation)⁴.

⁴ Monitoring the quality of nature management in commercial forests 2007, Tapio and Forestry Centres.

4 Promoting the use of forests as a source of recreation and culture

4.1 Ecotourism and the natural produce industry

Entrepreneurship based on ecotourism is promoted and business based on the processing of natural produce is developed.

In 2003 the Government adopted a resolution on an action programme for the development of recreational use of nature and ecotourism (the so-called VILMAT programme). Among other things, the programme aimed at developing entrepreneurship in ecotourism and natural produce and increasing cooperation between actors in this field.

Factors contributing to the increasing volume of domestic ecotourism include urbanisation, ageing, increasing income levels and leisure time as well as awareness of wellness and health issues. The most important growth potential for ecotourism is in attracting more foreign tourists to Finland. This can be achieved only if tourism entrepreneurs actively develop and market services suitable for different customer groups. The demand for hunting tourism is also expected to grow. Ecotourism as a livelihood is currently most important in the regions of Lapland and Kainuu.

It is vital for the tourism industry to develop the practices and image of sustainable tourism. The goal of the Tourism and Experience Management competence cluster of the Centre of Expertise Programme is to increase the volume of business operations based on both domestic and international demand for tourism in compliance with the aims of sustainable development. The Centres of Expertise in Lapland, Southwest Finland and Savonlinna in particular specialise in developing services for ecotourism.

The strengths of the Finnish natural produce industry are tasty and verifiably healthy natural produce, especially berries and edible mushrooms. There is potential for using the health effects of natural produce in the development of health-promoting services within the wellness and tourism industry. Innovative further develop-

ment of natural produce requires cooperation with the food, cosmetics and pharmaceutical industries, among others.

Necessary measures

- a) The VILMAT development programme of Metsähallitus will be updated, and sustainable tourism and recreational use of nature reserves and other State-owned areas will be promoted based on this (Ministry of the Environment, Ministry of Agriculture and Forestry, Metsähallitus).
- b) The compilation of ecotourism statistics will be developed further, as well as the information required by nature-based entrepreneurship (Ministry of Employment and the Economy, Statistics Finland, actors in this field).
- c) Entrepreneurship will be promoted by improving legislation and corporate financing and by publishing information about funding opportunities (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, Employment and Economic Development Centres).
- d) An action programme will be drawn up for the natural produce industry with a view of establishing strong regional centres of expertise (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, Employment and Economic Development Centres, actors in this field).
- e) The operating conditions of ecotourism and other tourism will be ensured as part of the Competence Cluster of Tourism and Experience Management during the programme period 2007–2013 (Ministry of Employment and the Economy, tourism enterprises, universities and polytechnics).
- f) Assessment of the value of the immaterial benefits of forests as well as their commercialisation will be developed, (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Central Union of Agricultural Producers and Forest Owners, Forestry Development Centre Tapio, research institutions, universities and polytechnics, actors in this field).
- g) Research and development into the health effects of wood and other forest products will be stepped up (Ministry of Employment and the Economy, universities, research institutions, businesses).

Definitions

Ecotourism

does not have a precise definition. It is usually described as tourism of fairly extensive scope in which nature is the primary attraction.

Natural produce

refers to wild or semi-cultivated plants or mushrooms which can be used as such or with some processing. This also includes the by-products of trees and soil materials.

Natural produce industries

denotes activities relating to the above-mentioned produce (harvesting of raw material business operations, education and training, advisory services and research)

- h) Opportunities for regional specialisation in terms of the multiple uses of forests will be studied in conjunction with Regional Forest Programmes (Ministry of Agriculture and Forestry, Forestry Centres, Finnish Forest Research Institute).

Target level for 2015

The turnover in tourism and recreation services in rural areas is higher by 25% than in 2004 (2004 figure €510 mill.⁵).

4.2 Recreational use of forests and the right of public access

The traditional right of public access is retained and the needs of recreational use as well as of game management are taken into consideration in the management of forests.

The recreational use of forests is based on the right of public access, also known as Everyman's Right. Commercial forests offer many opportunities for enjoying nature in the great outdoors and for collecting wild berries and mushrooms. The right of public access can be retained also in the future only if all who exercise the right know how to do it without causing damage or disturbance to the landowner.

Challenges in the field of recreational use include the balance of supply and demand for recreation opportunities and the integration of the recreational and production use of forests. National parks, too, serve the needs of recreation, subject to the protection of nature. The greatest need for recreational forest areas is in southern Finland close to population centres. Forests near built-up areas are also important for everyday exercise and recreation. Guided and well-tended hiking routes and services create the necessary preconditions for the developing ecotourism industry. There is also a great need to improve contractual and compensation practices in the context of the recreational use of forests.

Hunting as a hobby and a lifestyle choice is important for many Finns. Relative to the population size, hunting is the most important in eastern and northern Finland.

The forest landscape is an important element of Finnish cultural heritage, of the attraction of rural areas and the business opportunities for tourism. Finland has ratified the European Landscape Convention whose aims are implemented by each country based on its own preconditions.

Necessary measures

- a) Teaching concerning the right of public access will be enhanced in comprehensive schools (National Board of Education, education institutions).
- b) Management plans for State recreation areas will be revised in 2008–2010, nature trails and related service structures will be maintained and constructed, and the availability of guide services will be ensured (Ministry of the Environment, Ministry of Agriculture and Forestry, Metsähallitus).
- c) Factors that will be taken into account in the planning of nature trails include their demand, the structure of land ownership and the continuity of maintenance (Regional Councils, municipalities, Forestry Centres, National Land Survey, landowners).
- d) The adoption of quality certification for nature trails will be developed and the availability of certified trails will be improved (Finnish Central Association for Recreational Sports and Outdoor Activities, Central Union of Agricultural Producers and Forest Owners).
- e) Municipal recreation forests will be developed, taking into account not only recreational aspects, but also the cultural and social values of forests (Association of Finnish Local and Regional Authorities, municipalities).
- f) Measures will be taken to improve the habitats of wild game in conjunction with fellings and other management work in forests, and to adapt the measures to the landscape as well as possible (landowners).
- g) Forest-owner oriented modes of operation will be adopted for the production of recreational values, such as trade in recreational values and contractual practices between landowners and buyers of recreational values (Ministry of the Environment, Ministry of Agriculture and Forestry, Central Union of Agricultural Producers and Forest Owners, Forestry Development Centre Tapio, private forest owners).
- h) The second national inventory of the recreational use of nature will be carried out (2008–2010) (Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Employment and the Economy, Finnish Forest Research Institute, Statistics Finland, universities).
- i) The social impacts of hunting and fishing on State land will be monitored and assessed, and recreational hunting and fishing by children and young people will be supported (Ministry of Agriculture and Forestry, Metsähallitus, Hunters' Central Organisation MKJ).

Target level for 2015

Contracts between landowners and buyers of recreational values are an established practice.

⁵ Rural Business Register <http://www.mtt.fi/tutkimus/talous/matkailu1.html>.



Forests are a source of culture in many ways. The Finlandia Hymn is today played in the Lahti Sibelius Hall built of wood.

Photo (c): Voitto Niemelä.

4.3 Culture based on forests and wood

Culture associated with forests is be honoured, cherished and developed further.

Forests have been important throughout the ages. This is attested to by prehistoric monuments as well as relics and structures dating back to forest management in the industrial age, such as former log floating channels and logging cabins. The preservation of old buildings and structures also supports new wood building. Knowledge and awareness of traditions promote the construction of pleasant residential areas. Industrial plants of the forest industry and the communities they have given rise to are part of the Finnish architectural heritage.

Religious customs and rites relating to forests and trees have moulded Finnish culture and been inscribed on our collective memory and nomenclature. Forests have played and continue to play an important role in music, literature and the visual arts. There are many traditions relating to forests also in the field of food and natural medicine. A culturally sustainable forest sector takes the traditional uses of forests into account, strengthens them and creates new ways of using forests. For instance, wood products and natural produce, wood structures as well as ecotourism are all currently creating new forms of forest culture. Forest-based culture represents a millennial continuum for business, leisure activities as well as a source for personal pleasure and experiences.

The Sámi culture is intimately connected to natural livelihoods. Under the Finnish Constitution, the Sámi, being an indigenous people, have the right to maintain and develop their own language and culture, and they have cultural autonomy with regard to their language and culture in the Sámi homeland. The International Labour Organ-

isation's Convention concerning Indigenous and Tribal Peoples was signed by Finland in 1989. In 1999, the EU Parliament decided that Sámi culture and reindeer herding can be developed on the terms of the Sámi themselves and by means of Community support.

Necessary measures

- a) A programme for the cultural heritage of forests will be drawn up (Ministry of Agriculture and Forestry, Ministry of the Environment).
- b) An inventory of cultural heritage sites in State forests managed by Metsähallitus will be conducted in 2008–2013, and collection of data in private forests will be launched (Ministry of Agriculture and Forestry, Ministry of Education, Metsähallitus, National Board of Antiquities, Forestry Development Centre Tapio, Forestry Centres, Forest Management Associations).
- c) Operating conditions of the Finnish forest museum Lustö will be ensured (Ministry of Education, Ministry of Agriculture and Forestry).
- d) Education and training in traditional wood building will be enhanced (National Board of Education, National Board of Antiquities).
- e) The rights of the Sámi to engage in their traditional livelihoods will be ensured on the basis of their cultural autonomy as set down in the Finnish Constitution (Ministry of Education, Ministry of Agriculture and Forestry, Ministry of the Environment, Sámi Parliament, Metsähallitus).

Target level for 2015

The cultural heritage sites in State forests have been inventoried, and the inventory in private forests is under way.

5 Strengthening the skills, expertise and acceptability in the forest sector

5.1 Foresight work in the forest sector

Future development in the forest sector and its operating environment as well as change factors are anticipated.

Foresight studies in the forest sector have become increasingly common in the 2000s. The Future Forum on Forests in Finland at the University of Joensuu has functioned as part of the implementation process of Finland's National Forest Programme 2010. Future studies on the forest sector have been conducted by many Finnish research institutions, consultancies, universities, forest industry corporations and interest groups in the sector. Foresight reports of other, closely related industries have also provided inputs for the foresight activities of the forest sector.

Foresight work in the forest cluster continues to be needed in the future. Anticipation prepares for changes in the operating environment and lays the foundation for future opportunities in forest-based entrepreneurship and business operations. Anticipation is active strategic work done in cooperation with other industries and sectors.

Necessary measures

- a) Foresight work will be adopted as an active part of the development of future operating conditions in the forest

sector, and the applications of foresight results will be supported (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Ministry of the Environment, Ministry of Education, universities and polytechnics, research institutions, development organisations, companies in the forest sector).

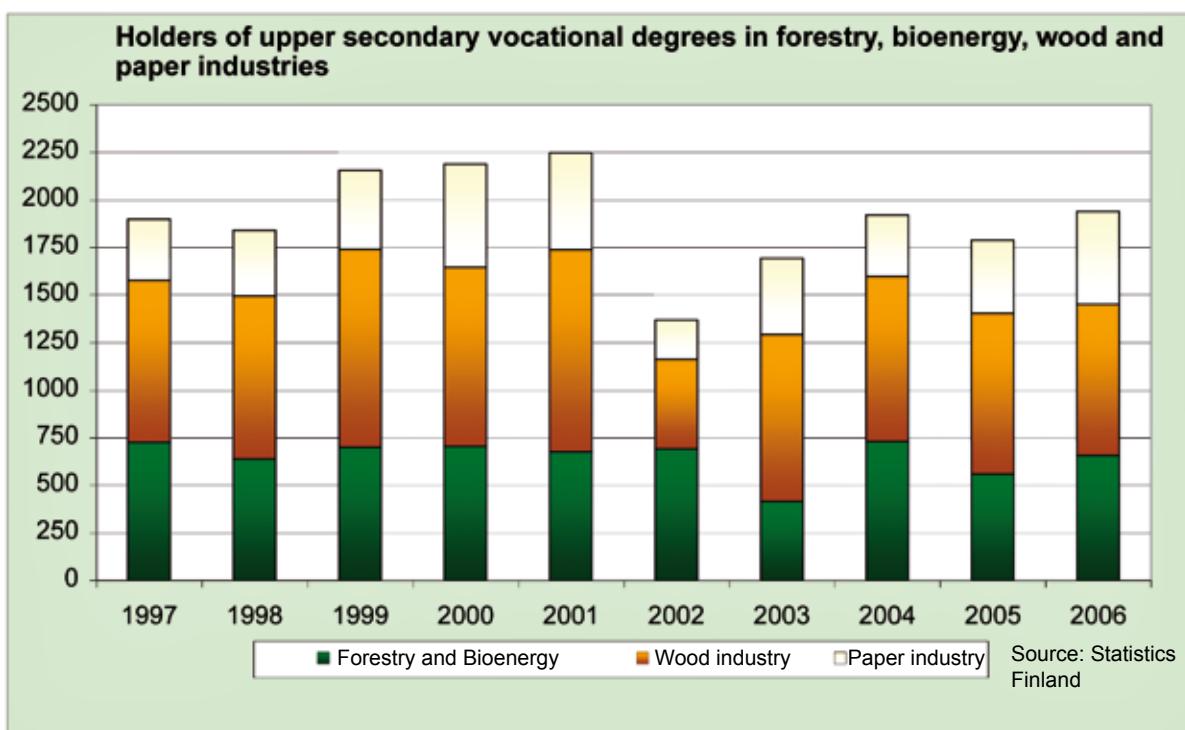
- b) Foresight will be integrated into the preparation of the development programme for industrial service production and of the National Climate Policy (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry).
- c) The contribution of the Forest Industry Future competence cluster in the Centre of Expertise Programme will focus especially on technology forecasting (Ministry of Employment and the Economy).

Target level for 2015

Foresight work in the forest sector improves.

5.2 Research and development in support of business and entrepreneurship

Research and development improves the competitiveness and renewal of the forest sector.



Forest and bioenergy would need about twice as many secondary graduates by 2015 than at present, the wood products industry about 50% more, and the paper industry about as many as graduates in the period 2002–2006 on average.

The continued maintenance of internationally high-class expertise in the forest sector and the success of businesses and corporations in this area call for applied research and development based on sustained high-quality basic research as well as high competence. The development of broad-based expertise relating to innovation and supportive research are important factors for the renewal of the forest sector. The challenge is to combine multidisciplinary expertise in such a way as to create scientific breakthroughs and opportunities for new businesses.

Innovations often emerge in the meeting of different disciplines, which makes close interdisciplinary interaction a necessity. Development needs of the innovation system focus on the entire forest cluster, including chemical forest industry, wood products industry, energy industry, recreation and ecotourism as well as the natural produce industry. More research is needed in the field of forest-based entrepreneurial and other economic activities, as well as in questions concerning the social significance of forests. The purpose of the *Forest Industry Future, Living Business and Energy Technology* competence clusters in the Centre of Expertise Programme is to exploit research results to promote especially the growth and internationalisation of small and medium-sized enterprises.

Clusters of strategic expertise are a new way of pulling scattered research resources together into areas that are vital for companies and society alike. Publicly funded research organisations can be developed so that they collaborate more actively with the business sector, ensuring that the needs for research will be communicated to knowledge producers and research results to the users of knowledge. It is important to ensure proper organisation of the communication of research results into practice.

A European Forest-Based Technology Platform offers an opportunity to carry out joint research projects with the forest sector and to influence the targeting of research programmes in the EU.

Necessary measures

- a) The operating conditions of the forest cluster's strategic competence cluster will be ensured and the research strategy for the wood products industry will be supported (Ministry of Employment and the Economy, Ministry of Agriculture and Forestry, National Technology Agency of Finland, Academy of Finland, forest industry companies)
- b) The operating conditions of the competence clusters (Forest Industry Future, Living Business and Energy Technology) will be ensured for the programme period 2007–2013 (Ministry of Employment and the Economy, forest industry companies, SMEs, research institutions, universities and polytechnics).
- c) Opportunities offered by EU funding will be put to use and efforts will be made to influence the content of EU research programmes by e.g. participating in the preparation of the Eighth Framework Programme to be initiated in 2014 (Ministry of Agriculture and Forestry, Ministry of Employment

and the Economy, Ministry of the Environment, Academy of Finland, National Technology Agency of Finland).

- d) The sectoral research system will be revised and resources for the natural produce industry and forest research will be ensured (Ministry of Agriculture and Forestry, Ministry of Education, Ministry of Employment and the Economy, Ministry of the Environment).
- e) Customer needs will be given a more prominent place when targeting research in the forest sector, and the efficient communication of results of the research to knowledge users will be ensured (Ministry of Agriculture and Forestry, Ministry of Employment and the Economy, Ministry of Education, Finnish Forest Research Institute, universities, Forestry Development Centre Tapio, actors in the forest sector).

Target level for 2015

The public appropriation for research and development in the forest sector is €200 million per year (€135 mill. in 2006)⁶.

5.3 Professional training in the forest sector

Competent and professional labour is trained for the forest cluster so as to meet the needs of the labour market.

Current education volumes are not in line with the needs of the labour market. In particular, too few forestry workers, forest machinery operators, timber haulage drivers as well as bioenergy and wood professionals graduate to meet the needs of the sector. By contrast, too many people with degrees from higher education institutions come on the market, with the exception of wood products industry.

Education in the forest sector is hampered by small units and the fragmentation of administration and the institutional network. Gathering education into units with robust resources and educational ability would enable the provision of diverse, high quality and cost-effective education. Networking education institutions will also contribute to this. The challenge to academic and vocational higher education institutions is to discover their own areas of strength.

The attractiveness of all disciplines in the forest sector need to be improved, and the percentage of dropouts reduced. Apprenticeship training and on-the-job learning give students a correct idea of the practices and needs of the workplace and promote the learning of practical professional skills. They also give students a positive view of forestry professions.

⁶ The appropriation comprises the overall funding for the Finnish Forest Research Institute, KCL and the Forest Department of the Work Efficiency Institute, the overall funding for forest sciences and wood processing technology in the higher education sector, except for the funding of the National Technology Agency of Finland and the funding of its forest cluster R&D.



Children's views about nature are formed at a young age. Above is Hanna Kilponen's interpretation of "Wild Life in the Forest", which won the second prize in a drawing competition organised in 2007 by the 4H organisation for school children in grades 1–3.

The increasingly technological working environment, diversifying jobs and the reorganisation of tasks, all these call for more versatile expertise as well as special skills in supervision and management. In order to develop the amount, structure, content and methods of teaching, attention needs to be focused on gender equality in the traditionally male-dominated sector. Forecasting the education needs of the forest sector has to be nationally coordinated and accomplished in cooperation with the business sector.

Necessary measures

- a) An education council for the forest sector will be founded and charged with coordinating, monitoring and supervising education in this field (Ministry of Education).
- b) To enhance the attractiveness of the forest sector, the public image of the sector as a field providing modern and diverse job opportunities will be strengthened (businesses in the sector, labour market organisations, Finnish Forest Association).
- c) The contents of education in the forest sector will be developed to reflect current and anticipated needs of the labour market, and an action programme will be drawn up for revising student intake numbers to reflect the needs (Ministry of Education, National Board of Education, universities and polytechnics, providers of vocational education, forest companies).
- d) Forest education will be gathered into units with robust expertise and resources, and the availability of sufficient

numbers of competent teachers will be ensured (Ministry of Education, National Board of Education).

- e) The university professorships necessary for the future of the forest sector will be ensured in fields such as wood building and architecture, packaging and printing technology, and biorefinery technology (universities, industry).
- f) A system for monitoring the placement of forest education graduates in the labour market will be developed and maintained, and future developments in the need for labour will be anticipated (Ministry of Education, Ministry of Employment and the Economy, National Board of Education, interest groups, Metsätaho).
- g) The preconditions and practices of on-the-job learning will be improved to make them better suited for areas predominated by SMEs (National Board of Education, providers of vocational education).

Target level for 2015

The number of graduates on all levels of education in forest management, bioenergy, wood and paper industry reflects the recruitment needs of the sector, about 3,000–3,500 persons per year⁷ (2,508 graduates in 2006).

⁷ The best forest, wood and paper expertise in the world. Developing education for the forest sector in Finland. Working group memoranda and reports of the Ministry of Education 2008:1.

5.4 Social acceptability of the forest sector

Operations of the forest sector are approved by the society at large.

Operations of the forest sector can only be developed in new directions if the sector enjoys public acceptability. Public acceptability must be achieved on ethical, social, political and economic levels. A key dimension of public acceptability is social responsibility. In addition to economic profitability, companies and administration must bear the responsibility for the environment and for society as a whole.

Acceptability can only be achieved by doing the right things using best possible professional expertise and by being open and truthful about actions. It is important to establish procedures that support public participation to allow all actors and individual citizens to express their views on forest management and to participate in decision making. Developing communication within and of the forest sector is a vital aspect of the sector's everyday operation.

Necessary measures

- a) In their own as well as joint communication, actors in the forest sector will take up the potential of forests for the improvement of the welfare of citizens, promoting sustainable development and mitigating climate change (Forest Council, Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Employment and the Economy, Ministry of Education, Finnish Forest Association, Finnish Forest Foundation, actors in the forest sector).
- b) New participatory planning procedures will be developed for the forest sector to be used in the preparation of, for example, Regional Forest Programmes and Natural Resource Plans (Ministry of Agriculture and Forestry, research institutions, Forestry Centres, Metsähallitus).

Target level for 2015

More than 90% of Finnish citizens are of the opinion that Finnish welfare will be based on forests also in the future (82% in 2007)⁸.

5.5 Forest-related knowledge and skills among children and young people

Children and young people develop a natural relationship to forests, sustainable forest management and forest products.

⁸ *Forest and Wood*, an opinion survey commissioned by the Finnish Forest Association from Taloustutkimus Oy, 2007.

Attitudes and views about forests are established in childhood and youth. The basic knowledge about the natural environment in forests, forestry and forest industry as well as forest culture gained at that stage in life constitute the foundation of forest-related knowledge and skills of the adult. That foundation has a bearing on the individual's choice of profession, leisure activities as well as participation in public debate and decision making in forest-related matters.

Actors in the forest sector have drawn up action plans for the territory of each Forestry Centre that aim to increase forest knowledge and skills among children and young people and to organise apprenticeship and on-the-job training positions for present as well as prospective students in the sector. The action plans are implemented in collaboration with forest actors as well as all interested parties.

Children's views about nature are formed at a young age. Above is Hanna Kilponen's interpretation of "Wild Life in the Forest", which won the second prize in a drawing competition organised in 2007 by the 4H organisation for school children in grades 1–3.

Necessary measures

- a) The action plans for the territories of the Forestry Centres for increasing forest-related knowledge and skills among children and young people and the number of apprenticeship and on-the-job training positions will be implemented (Forestry Centres, 4H, actors in the forest and environmental sectors, Finnish Forest Foundation).
- b) Teaching materials for teachers will be produced and updated in a coordinated way and the *On Expedition in the Forest* learning campaign will be continued (National Board of Education, Finnish Forest Association, Forestry Development Centre Tapio).
- c) Cooperation between forest sector companies and primary and secondary schools as well as education institutions in the forest sector will be increased to improve students' knowledge about work in the forest sector (National Board of Education, education institutions, enterprises, Finnish Forest Foundation).

Target level for 2015

The number of children and young people participating in forest-related events per year is 300,000 (195,000 in 2006)⁹.

⁹ Children and young people participating in events organised under the Action Plan for Forest Expertise and at the forest camps of the Guides and Scouts of Finland.

6 Promoting sustainable forest management in international forest policy

6.1 International forest policy

International forest policy promotes sustainable forest management and the operating conditions of the forest sector.

The range of forest-related aims and objectives has grown along with international forest processes. However, some of the goals defined in the processes have been mutually contradictory and have not always been in compliance with national guidelines for sustainable forest management.

Finland has promoted the sustainable management of its forests in international forest policy by supporting the attainment of the Millennium Development Goals of the UN, the use of wood as a replacement of non-renewable natural resources and as a source of energy, the protection of forests, and new innovative products and services based on sustainable forest management. Finland has promoted the prevention of illegal logging in several international processes.

The United Nations Forum on Forests (UNFF) adopted in 2007 a non-legally binding instrument on forests that aims to achieve four global forest-related goals: prevent the loss of forest cover, enhance forest-based benefits, increase the area of protected forests and other sustainably managed forests, and reverse the decline in development aid for sustainable forest management. Finland has systematically advocated the making of an international binding forest treaty among governments to promote these goals.

Necessary measures

- a) The work of the United Nations Forum on Forests and the development of the forest process towards an international treaty on forests will be promoted (Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of the Environment, Ministry of Employment and the Economy).
- b) Finland will participate in the preparation and implementation of forest-related international agreements (e.g. UNFCCC, CBD, UNCCD and ITTA) (Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry for Foreign Affairs, Ministry of Employment and the Economy).

- c) Expertise throughout the entire Finnish forest sector will be mobilised for the preparation and monitoring of international forest affairs (Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of the Environment, Ministry of Employment and the Economy, interest groups).
- d) The use of sustainably and legally produced wood products will be promoted, and national and international means for preventing illegal logging will be developed in accordance with the ENA FLEG Ministerial Declaration and the EU FLEGT Process, and a national action programme for these will be prepared (Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry for Foreign Affairs, Ministry of Employment and the Economy, universities, research institutions, interest groups).

Target level for 2015

Key ministries have sufficient personnel to manage international forest affairs.

6.2 Forest affairs in the European Union

Preparation and decision making in affairs affecting the forest sector are coordinated in the EU and the national characteristics of the sector are taken into account.

Many strategies and documents in the European Union refer to forests, and matters involving the forest sector come under the mandate of several Directories. Although common forest policy is not included in the Treaty on the European Union, individual regulations affecting forests are issued on the basis of trade, environmental and agricultural policies, for example. Such regulations may have been contradictory in some respects, because each of them was issued based on the particular perspective of the Directorate-General in question. The EU Forest Action Plan 2007–11 nevertheless seeks to bring matters pertaining to sustainable forest management and the preservation of the vitality of rural areas into a single document.

Finland has participated actively and on a broad front in the implementation of the EU Forestry Strategy (1998) and the EU Forest Ac-

Abbreviations of international agreements and organisations

CBD	Convention on Biological Diversity
ENA FLEG	European and North-East Asian Forest Law and Governance Process
EU FLEGT	EU Forest Law, Governance and Trade licensing scheme
UNCCD	United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests

tion Plan (2006) as well as in the Ministerial Conferences on the Protection of Forests in Europe and in Nordic cooperation in the forest sector. These will be key forms of action also in the future.

Necessary measures

- a) Finland will participate actively in the implementation of the EU Forest Action Plan, placing special weight on better coordination in forest matters (Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Employment and the Economy, interest groups).
- b) Finland will act towards ensuring that decision making affecting forests throughout the EU will promote sustainable forest management (Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Employment and the Economy).
- c) Finland will monitor and anticipate the effects on forest management of EU decisions other than those directly concerning forest policy, such as energy, climate and agricultural policy decisions (Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of Employment and the Economy).
- d) Finland will prepare, in cooperation with relevant interest groups, national initiatives and positions on issues addressed in the EU (Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of the Environment, Ministry of Employment and the Economy).
- e) Finland will underline the importance of research and development for the improvement of the competitiveness of the forest sector, support actions to promote the use of wood, and work proactively to improve the availability and comparability of information relating to forests in Europe (Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry for Foreign Affairs, Ministry of Employment and the Economy).

Target level for 2015

National activities affecting forests in the European Union are well coordinated and in line with the principles of sustainable forest management.

6.3 Development cooperation and other bilateral cooperation

Sustainable forest management is emphasised in development cooperation with the aim to mitigate poverty and improve the state of the environment.

Sustainable forest management can contribute to the mitigation of poverty and the prevention of environmental threats in developing countries. Finland has cooperation in forest matters with six long-term partner countries (Kenya, Tanzania, Zambia, Mozambique, Vietnam and Nicaragua). Finland also has bilateral cooperation in forest affairs with Laos, Peru and countries in the West Bal-

kan region. In addition to the above, developing countries are supported through multilateral forest cooperation.

The basic framework for development cooperation in the forest sector is provided by the Development Policy Programme adopted by the Government in 2007. Regional targeting of development cooperation is steered by the needs and demands arising from the target country on the national or regional level. In the future more attention will be paid to practical grass-roots application of the processes of international forest policy on the national level. The key areas in forest cooperation are national forest programmes of the target countries, strengthening of the significance of the forest sector in the mitigation of and adaptation to climate change, importance of forests in rural, land use and agricultural policies, and support for the processes of international forest policy. Development cooperation in the forest sector will seek to establish strategic partnerships with research institutions and institutions that finance development cooperation.

Finland has also reciprocal forest cooperation with Russia, China, Turkey, Indonesia, Mexico and Brazil. The content of such cooperation has developed in response to mutual interests and special characteristics of the forest sector in these countries. The principal themes in this cooperation are the promotion of sustainable forest management, education in forest and environmental sectors, forest research, inventories of forest resources, forest planning, forest certification, information systems in forest management, and seedling production.

Necessary measures

- a) National forest programmes will be supported (Ministry for Foreign Affairs, Ministry of Agriculture and Forestry).
- a) Actions to strengthen the role of the forest sector in climate change mitigation and adaptation will be supported (Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Employment and the Economy, universities and polytechnics, research institutions).
- a) Finland will ensure that due account is given to forests in rural, land use and agricultural policies (Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, Ministry of the Environment).
- a) Development cooperation in the forest sector will be centralised and strategic partnerships will be established with research and development funding agencies (Ministry for Foreign Affairs, universities and polytechnics, research institutions).
- a) Bilateral cooperation in forest affairs will be continued and developed further (Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of the Environment, universities and polytechnics, research institutions).

Target level for 2015

Sustainable forest management has increased in the target countries.

IMPLEMENTATION, MONITORING AND FURTHER DEVELOPMENT OF THE PROGRAMME

Implementation

A Government Resolution regarding Finland's National Forest Programme 2015 (NFP 2015) is adopted to steer the actions by ministries and their administrative sectors. The implementation of the programme is coordinated by the Ministry of Agriculture and Forestry, supported by the National Forest Council and its secretariat.

After the Government Resolution has been adopted, the Ministry of Agriculture and Forestry will prepare a revised action plan that specifies the responsibilities for the implementation of the programme, actors, schedule and Government funding. The Forest Council will modify the action plan on a yearly basis.

The NFP will be implemented in 2008–2015, taking into account any changes that may be necessary due to monitoring, mid-term evaluations or Government policies. The Regional Forest Programmes for 2006–2010 will be revised to bring them in line with the National Forest Programme by autumn 2008.

Funding for the NFP will be discussed and decided upon annually within the national framework budget process. The programme will be implemented within the frameworks of the national economy and appropriations in the State budget.

Finland's National Forest Programme 2015 consists of measures that are the responsibility of the public sector, the private sector or both together. The public sector is responsible for creating proper operating conditions for the forest sector. The means for this include legislation, operative and financial planning and budgeting, performance-based management, consultation and communication. The programme is implemented in coordination with the programmes of the administrative sectors and strategies covering several administrative sectors. Development measures aiming to improve the productivity of the national economy within national and local government and sectoral research will all be taken into consideration in the implementation of the programme.

Finland's National Forest Programme 2015 can only be implemented successfully if cooperation between the public and the private sector functions properly, because the future development of the forest sector is influenced by the actions of the forest industry, SMEs, forest owners, interest groups as well as other actors in the sector. All these actors can participate in the steering and monitoring of the programme in the National Forest Council on the national level, and in Regional Forest Councils on the regional level.

Regional special features are taken into account in Regional Forest Programmes. For this it is vital that proper cooperation exists

between organisations responsible for preparing other regional plans, such as the Regional Councils, Environment Centres, Employment and Economic Development Centres and organisations responsible for land use planning. The Regional Forest Programmes are developed in a continuous participatory process.

Monitoring and development

Monitoring reports are produced on the implementation of both the National and the Regional Forest Programmes. The reports outline developments in the forest sector, the progress of measures laid down in the programmes and their effects on the forest sector. They also present proposals for new measures.

External independent interim reports and thematic evaluations on the implementation of the NFP are also made when necessary. Issues examined in the evaluations include the need to alter the priorities of the programme because of changes in the operating environment, the effectiveness and sufficiency of the measures in relation to the programme goals, and the development needs for implementation. The results of evaluations of the METSO programme 2008–2016 will be taken into consideration in the implementation of the NFP 2015.

The implementation of the programme will be revised on the basis of the results of monitoring, evaluation and development projects on the programme, using also experiences gained from the implementation of forest programmes of other countries as well as results of the Future Forum on Forests and the Forest Academy for Decision-Makers. Attention will be paid particularly on the participation, communication and efficiency aspects of programme work. Development of the programme is the responsibility of the Ministry of Agriculture and Forestry and the National Forest Council.

Communication

National and international communication within the NFP aims at publicising the aims and measures of the programme, their implementation and the impacts of the programme on society and forestry. Communication will be target group oriented, open and participatory. Communication will be coordinated with the communication of cooperation partners and Regional Forest Programmes.

Open communication will promote the public acceptability of the forest sector and the programme, and is a vital part of the NFP 2015. A communication plan will be drawn up annually.

PROGRAMME FUNDING

The estimated need for funding of the NFP 2015 is compiled in the table presented below. The table covers the financing requirements of the ministries as presented in the annual Government Budget. Measures promoting the attainment of the aims of the programme are also financed from funds allocated to the Centre of Expertise Programme, which comes under the administrative sector of the Ministry of Employment and the Economy, as well as from regional development funds of the Regional Councils and through labour market training. Funding for the Ministry of Social Affairs and Health will be used in projects aiming to improve occupational safety and working conditions. In addition to the Government funds shown in the table, implementation of the NFP also calls for sizeable funding from the private sector.

Ministry of Agriculture and Forestry's funding needs arise from the need to increase seedling and thinning stand management, the management of peatland forests and the improvement of forest roads as well as harvesting and chipping of wood for energy. The needs of the Forestry Centres for Government subsidies increase especially due to planning that promotes sustainable forest management and biodiversity, the provision of advisory services for forest owners, and counselling in wood energy matters. The development of the forest resource information system and electronic services also calls for additional funding. The funding needed to protect forest biodiversity is in line with the proposal of the METSO working group. EU funding for the Rural Development Programme for Mainland Finland will be used for development support and business aid projects aiming to promote forest management, further processing of wood and the use of energy wood. The service structures required by the growing ecotourism industry will be improved on State lands in compliance with the VILMAT Development Programme. The supervision of hunting and fishing activities by Metsähallitus will be strengthened.

Ministry of the Environment's funding needs arise from the implementation of the METSO programme and the development of the recreational and ecotourism services of Metsähallitus.

Ministry of Employment and the Economy needs funding for start-up, development and investment subsidies that promote entrepreneurship, in particular, in the field of further refinement and energy use of wood, as well as for Finnvera subsidies and for R&D projects in the forest cluster funded by Tekes, the Finnish Funding Agency for Technology and Innovation.

Ministry of Education's funding needs arise from development measures to be taken on the basis of the report on the development of education in the forest sector, prepared by the Ministry.

The total amount of R&D funding for the forest sector will depend on the volume of financing applications that meet the award criteria. The financing frameworks of the administrative sectors of the Ministry of Employment and the Economy, the Ministry of Education, the Ministry of Agriculture and Forestry, and the Ministry of the Environment should enable a total expenditure of €200 million for R&D by the year 2015.

Ministry of Transport and Communications needs funding for improving the standard of the road and rail networks and inland and maritime waterways and for the improvement and maintenance of low-volume road network to meet the transportation needs of the forest sector. State subsidies for private roads need to be increased considerably to ensure that the condition of private roads is improved. Measures to improve the transportation network serve the entire economy and society at large.

In addition to the funding aspects outlined above, the aims of the NFP 2015 can also be promoted using *forest taxation*. Extending tax reductions for forest management would encourage forest owners to increase the size of their holdings and to take an active attitude towards forest management. Tax exemption for first thinnings, raising the exemption threshold of income from work performed on the holding, and tax reduction for voluntary forest management works, all these would encourage forest owners to increase logging and to manage their forests actively. Tax instruments require detailed preparation.

The implementation of Finland's National Forest Programme 2015 calls for a significant *financing contribution from the private sector*. For example, expenses incurred by forest owners for management and improvement works is more than four times as much as public funding. Private funding for research, and for development in particular, generally accounts for at least one half of total funding. However, there are also many private-sector R&D projects promoting the aims of the NFP that are conducted without any public funding. In recent years, the forest industry has used approximately €150 million per year for its own R&D.

Ministry	Object of funding	Item no	€ mill, in 2008	Need, € mill/yr
Ministry of Agriculture and Forestry	Act on the Financing of Sustainable Forestry - management and basic improvement of forests - use of wood for energy	30.60.44 57 6.5		75 10
	State subsidies for Forestry Centres	30.60.42	45	55
	Funding for the Finnish Forest Research Institute	30.60.01	41	40 ¹⁾
	Conservation of biodiversity	30.60.45	7	21
	Recreation services produced by Metsähallitus	30.63.50	6	7
	Development of rural areas ²⁾	30.10.61 30.10.62	16	16
Ministry of the Environment	Conservation of biodiversity	35.01.01 ³⁾ 35.10.21 ⁴⁾ 35.10.52 ²⁾ 35.10.63	39	66
	Recreational use of nature and ensuring the operating conditions for ecotourism ²⁾	35.10.52	10	13
Ministry of Employment and the Economy	Business subsidies ²⁾	32.30.40 32.30.42 32.30.45 32.70.64 32.70.65	1.5 79 ⁵⁾ 26) 6)	2 ⁶⁾ 6)
	Research and corporate funding from National Technology Agency ²⁾	32.20.27 32.20.40 32.20.83	47	
	Labour policy training ⁷⁾	32.80.51		6
	Energy subsidies ²⁾	32.60.40	13	8)
Ministry of Education	Forest education ²⁾	29.20.30 29.20.31 29.40.30 29.50.01	110	9)
Ministry of Transport and Communications	Maintenance and services of the road and rail networks - basic road maintenance - basic railway maintenance - maintenance of waterways	31.24.21 31.40.21 31.30.21	61 ¹⁰⁾ 51 ¹¹⁾ 2	20 35 2)
	State subsidies for private roads	31.25.50	18	25

¹⁾ As a result of the National Productivity Programme, funding for the operative costs of the Finnish Forest Research Institute will decrease, but the amount of external funding is estimated to increase. In the financial statement for 2006, the operating expenses appropriation for the Finnish Forest Research Institute was €38.9 mill. and total funding €52.4 mill.

²⁾ Sub-item; the table shows only the share used for the development of the forest sector.

³⁾ METSO, research

⁴⁾ METSO, cooperation network, organisation, inventories

⁵⁾ Finnvera loans, securities and guarantees to the forest industry.

⁶⁾ The amount of subsidy depends on the number of applications from research institutions and companies that meet the criteria. Current frameworks are not an obstacle to raise the subsidies.

⁷⁾ Necessary increase/year for the forest sector; in future planning the need to divide the amount between apprenticeship training (Ministry of Education) and labour policy training (Ministry of Employment and the Economy) must be examined.

⁸⁾ Determined in the context of the energy and climate strategy to be completed in spring 2008.

⁹⁾ Determined on the basis of the results of a working group on the education development needs for the forest, wood and paper industries, appointed by the Ministry of Education.

¹⁰⁾ Includes €20 million included in the State budget for 2008 and €41 million under decision of 13 March 2008 to safeguard timber transports.

¹¹⁾ Includes €42 million for the basic improvement of the railway between Savonlinna and Huutokoski and €9 million under decision of 13 March 2008 for starting the basic improvement of the railway between Pori-kylä and Vuokatti.

IMPACTS OF THE PROGRAMME

In parallel with the preparation of Finland's National Forest Programme 2015, an evaluation of its impacts was also made. The ex ante evaluation conducted by Indufor Oy assessed not only the content and quality of the programme, but also its impacts on the environment, forest biodiversity, regional development and gender equality. The Finnish Forest Research Institute prepared calculations on the social as well as economic and environmental impacts of actions in forestry and forest industry on the basis of five different future scenarios.

The evaluation of uncertainty factors was based on the Forest Research Institutes' alternative calculations mentioned above and on a risk analysis in the Bank of Finland's economic forecast for 2007–2008 concerning the effects of Russian export duties for roundwood. In addition to these, reports of the Forest Research Institute for the preparation of the Future Review for the Forest Sector and of the National Energy and Climate Strategy were also used, as well as reports of the Future Forum on Forests.

Economic impacts

Finland's National Forest Programme 2015 represents the Government's contribution to the creation of the preconditions for the operations of the forest industry and their development. Even if significant investment were made now in the development of new products, launching mass production would in practice not be possible within this decade. Production in the paper and pulp industry in the near future will therefore be based largely on existing products.

The first large-scale forest biorefineries and the manufacture of biodiesel will probably not be launched until towards the end of the programme period. The use of wood in thermoelectric power plants is expected to increase. The demand for raw material will focus on small-diameter wood, crowns and branches as well as stumps, the use of which is estimated to grow 3–4-fold compared to current levels. There are already good prospects for extensive commercialisation of new and highly processed products in the wood products industry.

In order to safeguard the raw material supply of the forest industry, the NFP 2015 creates preconditions for increasing logging in Finland by at least 10 million cubic metres to 65 million cubic metres per year. The structure of domestic production in the forest industry will change as the traditional forms of production are expected to decrease. It is estimated that, together with new energy and biorefinery products, the value of production may increase as much as 20%, to about €23 million per year.

If the harvest volume were to increase by 10–15 million m³ from 2006, the annual gross stumpage earnings of private forest owners would rise to €2.1–2.3 billion¹⁰. Increasing use of forest chips would entail an increase of approximately €120–220 million in

the turnover of forest owners and harvesting and transport entrepreneurs.

The value increment of production in the entire forest sector is expected to grow by €500–700 million to about €8.6–8.8 billion.

Owing to stumpage earnings and investments in forest management, annual State revenues from forestry would grow by about €160–200 million compared to 2006. The additional revenues from increased harvesting and transportation of roundwood and energy wood would be about €60–80 million per year.

The value added of Finnish tourism industry in 2005 came to a total of €3.3 billion, with ecotourism estimated to account for approximately one fourth of this, or €825 million. Increasing urbanisation, higher income levels and increasing leisure time are expected to lead to an increase in the recreational use of forests and in ecotourism, which will entail increasing demand for constructed recreation environments (accommodation, routes, resting places, waste management), guide services and motorised recreational experiences. Together with increasing volumes of other tourism these would push the additional value from ecotourism over one billion euro.

Social impacts

Improving productivity is absolutely vital to ensure the competitiveness of forestry and the forest industry. It would also relieve the labour shortage. Improved productivity and the rationalisation of production methods will lead to a reduction of approximately 15,000 jobs in the forest industry by the year 2015. Without the measures envisioned in the National Forest Programme for the creation of new products, this figure would be higher by about one thousand jobs. Improving the operating conditions of the forest industry will improve the continued survival of industry across the country.

Increased productivity in forestry will be offset for the most part by greater felling volumes and the increasing predominance of pulpwood harvesting and logging on peatlands, as well as by increasing volumes of forestry work and energy wood harvesting, keeping the number of people employed at almost the current level, or 23,000. The net impact of the NFP 2015 in terms of employment in forestry will therefore be about 1,500–2,000 jobs.

Forestry and the forest industry (furniture industry included) together are expected to employ approximately 83,000 people in 2015. Of this figure, energy production from wood would account for approximately 2,000–3,000 jobs. In areas outside the forest

¹⁰ The price elasticity of roundwood supply is assumed to be one. Due to economic fluctuation, the stumpage price level in 2007 was unusually high. Consequently, the accumulated stumpage earnings in the calculation is of the same magnitude, even though harvest volumes will be higher.

sector, the employment effect of the NFP would be about 1,000–1,500 jobs.

The National Forest Programme will improve the vitality of rural areas by creating jobs and business opportunities, which means that makes a positive contribution on regional development as well. Job opportunities from increasing harvesting and transportation, silvicultural and improvement works and energy production would mostly be created in forested areas with scattered settlement. Job opportunities in the improvement and maintenance of low-volume road and rail network would similarly benefit sparsely populated areas.

Growing harvest volumes together with structural changes in forest ownership would increase the need of action, not only by traditional forest organisations, but also other businesses specialising in forestry and nature management works. The economic and employment impacts of ecotourism vary regionally, and are already considerable in the regions of Lapland, Kuusamo and Kainuu. Increasing use is also expected for major recreation areas near growth centres in southern Finland. Increasing demand for ecotourism and related services will increase employment and business opportunities in the tourism sector.

Recreational use of forests improves the mental and physical welfare of the population. Surveys indicate that the value of recreational use of forests for Finns is in the order of one billion euro at least. As leisure time increases and the population ages, the recreation value of forests will grow accordingly. A significant aspect of this value is based on the right of public access.

Measures envisaged in the National Forest Programme allow the harmonisation of increased demands for the economic and recreational use and protection of forests as well as their cultural special features, including the Sámi culture with its distinctive livelihoods. The framework for the harmonisation of these needs on the regional and local level is created in the Regional Forest Programmes, in the Natural Resource Plans of Metsähallitus and in regional and master land use plans. Measures aiming at the protection of forests and ensuring their diversity will be implemented in cooperation with land owners using voluntary measures for the most part. The negative effects to forest owners of the use of forests for tourism will be compensated with solutions relying on trade in recreational values.

The age, gender and socio-economic structure of forest ownership is heterogeneous, which is reflected in the diversity of aims the owners set for their forests. The customer-oriented approach adopted in the NFP demands that this be taken into account in all services and products provided for forest owners.

Environmental impacts

As a result of the implementation of the measures proposed in the National Forest Programme, the overall nitrogen and phosphorus nutrient loads from forestry would not increase from current levels. The additional load caused by greater harvest volumes, regenera-

tion and ditch reconditioning can nevertheless be significant locally and regionally, especially in headwaters and small water bodies. The greatest risk in terms of environmental load is caused by harvesting, ditch reconditioning and fertilisation in peatlands, leading to higher loads of phosphorus, nitrogen and suspended solids. To mitigate such negative effects, the National Forest Programme includes several measures and development projects for reducing the environmental load on waters caused by forestry.

As yet there is not enough information on the impact on soil nutrient balance caused by the rapid increase in the use of wood for energy. The greatest risks come from whole tree harvesting in thinnings, when significant amounts of nitrogen are removed from the nutrient cycle with the branches and needles. This is also the case in the removal of stumps at regeneration sites. The increasing use of wood for energy can also reduce the amount of decaying wood in forests, which is important for the maintenance of biological diversity. The NFP includes measures designed to protect the soil, as well as measures to increase research on the effects on nutrient balance of whole wood and slash removal.

The carbon sink effect of forests and soil will decrease from current levels during the programme period. Even at maximum harvest volumes, however, the drain would be smaller than the increment, which means that forests would still function as carbon sinks. Greater slash harvests do not have a significant effect on carbon sinks. According to calculations by the Finnish Forest Research Institute, the reduction in carbon sink capacity will remain temporary. The capacity will begin to grow again in the 2020s, provided that forest management measures are implemented fully and on schedule.

The implementation of the National Forest Programme would be a significant step towards supporting the EU aim of increasing the use of renewable energy sources. Additional use of forest chips alone (appr. 5–9 mill. m³ annually) would bring about an increase of 2–3% in the share of renewable energy sources in primary energy production (25% in 2006). If the entire increment in the volume of forest chip utilisation were to be used to replace fossil fuels, a reduction of up to 6–7 million tons in carbon dioxide emissions could be attained annually.

The NFP includes many measures without which Finland would not be able to meet the requirements of energy and climate policy and of new environmental legislation, such as the EU Water Framework Directive and Soil Framework Directive currently under preparation.

Increasing use of forests in itself increases the risk of reducing forest biodiversity, as forests are the principal habitat for more than a third of all endangered species in Finland. In the preliminary national report required by the EU Habitats Directive, the conservation status of most forest biotopes was classified as "unfavourable-inadequate", and in the case of esker and flood forests, even "unfavourable-bad-decreasing". Implementation of the METSO programme 2008–2016, which is an integral part of the NFP, will improve the situation to some extent. Negative effects on forest biodiversity can be offset in part by increasing

biodiversity training for forest professionals and advisory services for forest owners.

Increasing regeneration fellings has some negative impacts on the forest landscape. Such impacts can be reduced by preparing landscape plans for fellings. The effects of thinnings and the increasing use of wood for energy on the recreational use of forests is perceived as positive, with the exception of stump harvesting.

Uncertainty factors

Finland's National Forest Programme 2015 has its sights set on the future at a time when the operating environment of the forest sector will be undergoing the most intense period of change in recent history. As the greatest forces of change are global and do not originate in Finland, the situation includes many factors of uncertainty for the successful implementation of the programme.

The demand and price of forest industry products are determined in international markets, which in turn is reflected in the demand of wood in Finland. Achieving the target for harvesting set in the NFP depends very much on how actors in the private sector, forest industry companies and forest owners in particular, assess the future development and current market situation, and how they will react to the conclusions they draw from that. There are uncertainties in the future development of both the demand and supply of wood.

Using calculations made by the Bank of Finland, we can evaluate the impacts of a possible downsizing of the operations of the forest industry, or in the event domestic fellings could not be increased in line with the targets set in the NFP. If roundwood imports from Russia were to decrease by 15 million cubic metres, and Finland would only manage to replace one half of it (7.5 mill. m³), the supply of wood would be reduced by about 10%, leading roughly to a 10% cut in the production volume of forest industry in Finland. The cascade effects would be felt in other branches of the economy, such as chemical industry, energy production and traffic. However, since roundwood imports would be mostly replaced with domestic wood, this would have the effect of increasing forestry work, and the multiplier effects of the decrease in industrial production on the gross domestic product would be offset almost completely. GDP would come down an estimated 0.5%, although the loss in the number of jobs would be about 8,000. Most of the impacts would be evident already in 2009 and 2010. Closures of production plants would have serious economic consequences regionally.

Although there is great unused harvest potential in Finnish forests, it is no guarantee that industry would have enough wood. Most forest holdings are quite small, and on the annual level, the income from stumpage sales remains small compared to other earnings. For many forest owners, the non-wood benefits of the forest are more important than stumpage earnings. Such factors diminish the willingness of owners to sell. Furthermore, weather conditions, the condition of roads and lack of available labour may even hamper the harvesting of wood already bought. The risk scenario is that the forest industry cannot secure a sufficient supply of wood.

The development and commercialisation of new forest-based products takes several years and entails financial risks. It is far from certain if the products being developed are just the right ones for the market to provide a sound foundation for profitable business. Public financial support for R&D and investment subsidies can allow actors to undertake high-risk development work and investments.

The targets for increasing the use of renewable energy, set for Finland by the EU, have a very close bearing on production in the forest industry. A decrease in the overall production capacity of the forest industry would have an immediate effect, obstructing the attainment of the objective.

Many of the goals in the NFP depend on the sufficient availability of competent labour. The successful implementation of education and labour policies in the forest sector are vital in this context. The risk of insufficient labour is particularly great in areas of negative net migration, where several sectors of the economy are competing for labour. A considerable proportion of the harvest potential in Finnish forests also lies in these areas.

Successful integration of the multiple uses of forests on the regional and local levels is crucial for the public acceptability for forest management and the extent of its impacts on welfare. There are uncertainties in how to establish successful interaction between the various parties.

Measures to protect forest biodiversity are for the most part based on the METSO programme, in which the key principle is voluntary participation by forest owners and the use of market mechanisms. Success depends largely on the sufficiency of public funding and decisions made by individual forest owners. It is impossible to know in advance whether the most valuable sites in terms of nature protection will be put up for conservation, nor where the offered sites will be located geographically. Uncertainties can be reduced by the application of the broad range of tools and methods presented in the METSO programme.

The specific processes of the carbon cycle in forest ecosystems and their interrelations are not known well enough. The same applies to the effects of climate change in forests. The assessment of CO₂ emissions from mineral soils and peatlands in particular involves major uncertainties. According to the latest research results, CO₂ emissions from the decomposition of organic matter in the soil have due to recent warm autumns been nearly as large as the increased carbon sinks of warm springs, suggesting that climate change might not increase the capacity of forests to function as carbon sinks.

The task of the Government is to ensure favourable operating conditions for the forest sector. Adequate public funding is a key condition for the attainment of many aims in the NFP. This is particularly important in the event that changes in the operating environment are more difficult than anticipated.

PREPARATION AND EVALUATION OF THE PROGRAMME

Open process of preparation

Finland's National Forest Programme 2015 was drawn up in collaboration among actors in the forest sector. The work involved representatives from Finnish ministries, forest administration, research and education, forest owners, forest industry, environmental organisations, employee organisations and entrepreneurs as well as youth and leisure organisations.

The preparation of the programme was coordinated by the Ministry of Agriculture and Forestry together with the National Forest Council, its secretariat and four working groups. Several ministries and a broad range of interest groups have representation in the Forest Council and its organs. In addition, the Ministry of Agriculture and Forestry has held separate hearings with interest groups and ministries, organised feedback seminars and presented the draft programme at several events organised by other actors. The draft versions of the programme have also been accessible for comment on the NFP website of the Ministry of Agriculture and Forestry. The ministry has also published information about the preparation in the media.

The preparation of Finland's National Forest Programme 2015 has made use of Regional Forest Programmes for 2006–2011 drawn up by the Forestry Centres for their territories in a participatory process and with support from the Regional Forest Councils. As background information for the preparation of the programme, the Ministry of Agriculture and Forestry commissioned the Finnish Forest Research Institute to prepare a report on the future of the forest sector, in addition to which other future reviews were used in the process, prepared by the Future Forum of Forests in Finland, the Technical Research Centre of Finland, the Finnish National Fund for Research and Development (Sitra) and the Forest Academy for Decision-Makers as well as various interest groups and administrative branches.

As part of the preparatory process, *Future Review for the Forest Sector – Outline of the Forest Council concerning priorities and objectives for the forest sector* was prepared, approved by the National Forest Council in September 2006. The review was drawn up in the same participatory process as the National Forest Programme. In accordance with the Government Programme of Prime Minister Matti Vanhanen's second Cabinet, the future review was used as the foundation for the preparation of the National Forest Programme.

The following strategies and guidelines, either in preparation or approved by the Government, were taken into consideration in

Finland's National Forest Programme 2015: National Strategy on the Preservation of Biodiversity and Sustainable Use of Nature, National Energy and Climate Strategy, Rural Development Strategy, Natural Resource Strategy, National Transportation Strategy, Development Cooperation Strategy, Government decisions on the promotion of wood products and wood building and guidelines for sectoral research, as well as corresponding international strategies and guidelines of the European Union. The METSO programme prepared in tandem with the NFP is included in the NFP. The proposals concerning the increase in the use of domestic wood presented in the interim report of the working group chaired by Esko Aho have also been taken into account.

To confirm the targets set in the NFP and to assess its impacts, in 2007 the Ministry of Agriculture and Forestry commissioned the Forest Research Institute to prepare calculations on the basis of five future scenarios: (1) business as usual; (2) roundwood imports will fall to less than one half, or about eight million cubic metres per year, the annual use of forest chips will rise to eight million cubic metres and the price of energy will rise 2% per year; (3) as in Scenario 2, except that the area of protected forests in southern Finland will increase to 5% of the total forest area and about 54,000 hectares of forest will be conserved in northern Finland; (4) as in Scenario 3, except that the use of forest chips will increase four-fold to 12 million cubic metres per year and the value of production in the forest sector will increase 1.5 times so that one third of the increment comes from new products; and (5) as in Scenario 3, except that harvests in the forests of all owner groups will be implemented following maximum potential for sustainable harvesting. The calculations took into account the economic, ecological and social impacts of the scenarios.

Ex ante evaluation of the programme

In parallel with the preparation of the NFP, an external *ex ante* evaluation of the programme was carried out by Indufor Oy from 1 March – 25 September 2007. The evaluation covered the structure of the draft programme, its content and quality as well as the functionality of the system for its implementation and monitoring. The evaluation also included an assessment of the preparation and content of the programme in accordance with Section 3 of the Act on the Environmental Impact Assessment of Public Authorities' Plans and Programmes (200/2005). The *ex ante* evaluation also included an assessment of the impacts of the NFP from the perspective of balanced regional development and gender equality.

The steering group for the *ex ante* evaluation comprised representatives of the Ministry of Agriculture and Forestry and the

evaluating organisation. Indufor prepared interim and final reports on the evaluation, whose results were discussed in the National Forest Council, its secretariat and working groups. Proposals for improving the structure of the programme and the efficiency of its implementation were taken into consideration by adding more emphasis on market orientation, revision of procedures and gender issues. The results of the Environmental Impacts Assessment were taken into consideration in both targets and measures of the NFP. The *ex ante* evaluation recommended the approval of the Regional Forest Programmes and regional development plans.

BACKGROUND MATERIAL

International strategies, treaties and regulations

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APPENDICES

Appendix 1 Dissenting opinion

To the Ministry of Agriculture and Forestry

Dissenting opinion / Finland's National Forest Programme 2015

The aim of the Finnish Association for Nature Conservation (FANC) with regard to Finland's National Forest Programme 2015 is to create a programme that is balanced in terms of nature and environmental protection and forest management. An essential element of this programme is the METSO Forest Biodiversity Programme for Forests in Southern Finland. METSO comprises the mechanism with which fellings are prevented in forest areas of conservation value.

According to available information at this time, the programme cannot be said to be balanced in the way presupposed by the FANC. No adequate measures to offset the negative environmental impacts from the massive increases in the efficiency of forest management are defined in the programme. In addition to the conservation of nature in forests, more attention should be paid to, for example, increasing the carbon stock in forests and the state of waters, and the impacts of the use of peat. The shortcomings are discussed in detail in FANC's official statement on Finland's National Forest Programme 2015 to the Ministry of Agriculture and Forestry (17 January 2008) and in its dissenting opinion on the report of the METSO Committee (7 January 2008).

Assessing the degree of balance of the programme is difficult, because there is at this time no clear idea about the funding or all implementation measures in the programme. Programme funding is still undecided for both conservation and forestry measures. However, the means of implementation are known for conservation, but partly unclear in the case of improving the efficiency of forestry. It can be seen already at this stage, however, that many measures intended to improve the efficiency of forestry will be more efficient than those aiming at conservation. More specific decisions concerning the implementation of the programme can at a later stage clearly contribute to a more balanced implementation of the programme.

Helsinki, 28 January 2008

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