UNECE

United Nations
Economic Commission for Europe

Food and Agriculture Organization
of the United Nations

GENEVA TIMBER AND FOREST DISCUSSION PAPER 34

THE POLICY CONTEXT OF THE EUROPEAN FOREST SECTOR

by

Carsten Thoroe, Tim Peck, Helena Guarin Corredor and Franz Schmithüsen

UNITED NATIONS

ECE/TIM/DP/34

United Nations Economic Commission for Europe/
Food and Agriculture Organization of the United Nations

UNECE

Timber Branch, Geneva, Switzerland

GENEVA TIMBER AND FOREST DISCUSSION PAPER 34

THE POLICY CONTEXT OF THE EUROPEAN FOREST SECTOR

A study prepared for the European Forest Sector Outlook Study (EFSOS)

by

Carsten Thoroe, Tim Peck, Helena Guarin Corredor and Franz Schmithüsen,

UNITED NATIONS
Geneva 2004

Note

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Abstract

This discussion paper describes the activities, methods and outcomes of a project, which includes the policy context of the European forest and forest products sectors. It is based on an inquiry addressed to major stakeholder groups in the sector. Based on these inputs the study develops major policy scenarios in qualitative terms and identifies links between the policy and the market scenarios

Acknowledgement

This study was carried out with significant financial support provided by the Swiss Agency for the Environment, Forests and Landscape (SAEFL). The European Forest Sector Outlook Studies (EFSOS) national correspondents, specialists in the field of policy analysis, policy decision makers and representatives of various stakeholder groups contributed to the report with comments and participation in meetings, and with replies to the inquiry. These contributions were essential for the report.

The secretariat expresses its appreciation to the main authors, Tim Peck, Franz Schmithüsen, Helena Guarin Corredor as well as to Carsten Thoroe, who has led the team. Special thanks should be addressed to Christian Küchli and Thomas Grünenfelder, who encouraged the secretariat in its policy analysis work and assisted it in providing the outcomes of this work as input to the European policy dialogue.

ECE/TIM/DP/34

UNITED NATIONS PUBLICATIONS

ISSN 1020-7228

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

BFH	Federal Research Centre for Forestry and Forest Products (Germany)
BUWAL	Swiss Forest Agency
CAP	Common Agriculture Policy of the European Union
CBD	Convention on Biological Diversity
CEECs	Central and Eastern European Countries
CEPI	Confederation of European Paper Industries
CFCs	Chlorofluorocarbons
CIS	Community of Independent States
CITs	Countries with economies in transition
CO_2	Carbon dioxide
EFC	FAO European Forestry Commission
EFSOS	European Forest Sector Outlook Studies
EFTA	European Free Trade Association
EMS	Environmental Management System
ETH	Eidgenössische Technische Hochschule, Zürich
ETTS	European Timber Trends and Prospects study
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAWS	Forest available for wood supply
FCCC	Framework Convention on Climate Change
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
ID	Identification code
IPCC	Intergovernmental Panel on Climate Change
MCPFE	Ministerial Conference on the Protection of Forests in Europe
NFP	National Forest Programmes
NGOs	Non-governmental organizations
PEFC	Pan-European Forest Certification scheme
PEST	Political, Economic, Social and Technological (analysis)
R&D	Research and development
SWOT	Strengths, Weaknesses, Opportunities, Threats (analysis)
TBFRA	Temperate and Boreal Forest Resources Assessment
TC	UNECE Timber Committee
ToS	Team of Specialists
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
WSSD	World Summit on Sustainable Development
WTO	Word Trade Organization

Preface

Forests cover a third of Europe's land area and provide a wide range of environmental, social and economic benefits to society. The forest sector provides livelihoods for many people in the UNECE region and can be an important engine of growth in transition countries.

The sector is driven by a variety of market and policy influences arising inside and outside the sector. There is an urgent need for a better understanding of these cross-sectoral linkages and to articulate to the public the forest sector's needs and concerns.

The interaction between society and forest is one of the main subjects of the European Forest Sector Outlook Studies (EFSOS) programme. The aim is to describe future possible developments of the forest sector, taking into account the challenges and uncertainties of different policies and market developments inside and outside the sector. The outcomes should help decision-making and understanding by policy makers, entrepreneurs, NGOs and the academic community.

The current paper identifies a set of policy and market issues, which are likely to have a significant influence on the forest sector in Europe.

The study provides policy relevant conclusions, which might enrich the policy dialogue in the region and foster the contribution of the forest sector to sustainable development.

European forest sector outlook studies (EFSOS) are jointly implemented under the UNECE Timber Committee and the FAO European Forestry Commission. This study, carried out in the framework of EFSOS, contributes to the sustainable integrated economic and social development in the UNECE region. It also provides an input to the global forest sector outlook study activities of FAO.

Mrs. Brigita Schmögnerová
Executive Secretary
UN Economic Commission for Europe

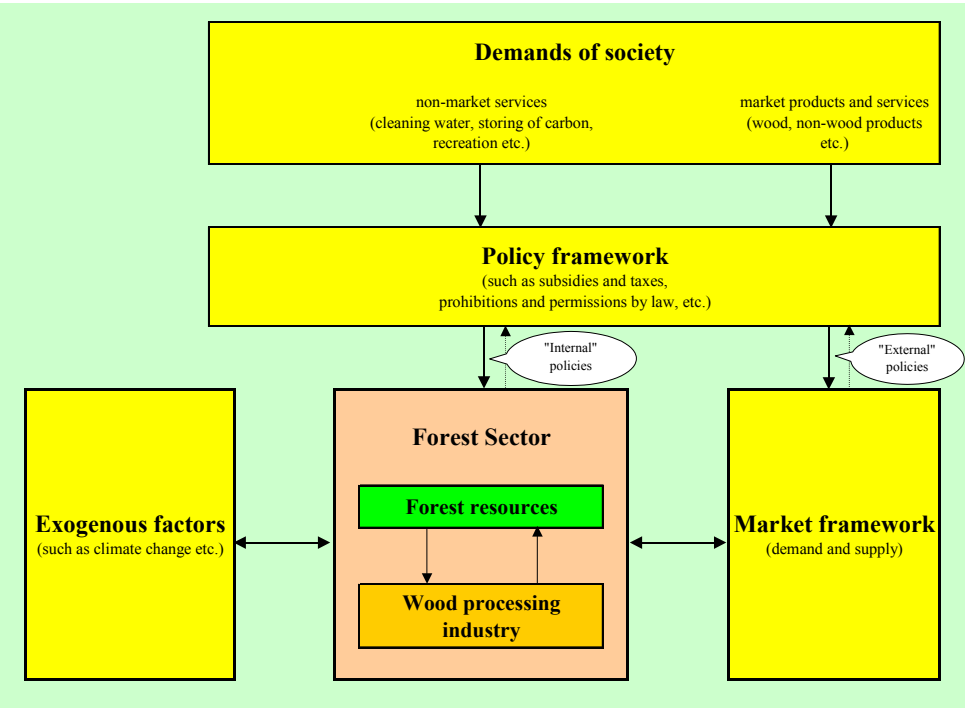
1 SUMMARY AND CONCLUSIONS

1.1 Background and goals

This study analyses current relationships between the forest sector and society, considering the role of various stakeholder groups and the standing of major sub-regions, their competitive advantages and possible disadvantages arising from changes in the policy framework. The goal is to identify policy and market scenarios with significant impacts on future developments of the European forest sector.

The forest sector depends on the policy framework, demographic developments, innovations, and changes of demand and supply that have an impact on the overall economy. Globalization plays an increasing role in economic efficiency, but also increases vulnerability of modern societies. Further, specific policies influencing the forest sector more directly can be differentiated as "internal" and "external" policies. "Internal" forest sector policies are directed towards the sector itself, e.g. policies addressing nature oriented forestry management and protection of forest areas. During recent years, the forest sector institutions in Europe have successfully emphasized the importance of such "internal" policies. "External" policies are not focussed directly on forestry issues. Policy areas like environment, energy and trade, however, are increasingly dealing with issues related to the forest sector and shape its market framework. Borders between relevant internal and external policy domains are vague and partly overlapping. Their objectives are complementary or quite often contradictory. Changes in energy policies, e.g. carbon taxes on fossil fuels, could, in the short-term, affect negatively the national economy and from there, the forest sector, while at the same time the competitiveness of wood as an energy source would improve. Figure 1 shows the complexity of the subject.

Figure 1: Scheme of terms used and interrelationships between major study subjects



The outcomes of the current study provide an input to the European dialogue about forest sector policy issues, in particular to the Ministerial Conference on Protection of Forest in Europe, and address a broad forum of forest sector stakeholders engaged in strategic decision making. The goal is to draw the attention of forest sector stakeholders and the public to policy issues that have significant impacts on the development of major forest sector parameters such as forest cover, and production, consumption and trade of forest products. Further the study is to be used as a basis for future analytical and policy relevant activities of the UNECE Timber Committee and the FAO European Forestry Commission.

The study was launched using the experiences from former UNECE/FAO outlook study activities, notably the fifth European Timber Trends and Prospects Study (ETTS V). The Swiss Agency for Environment, Forest and Landscape (BUWAL), Bern assisted the study with significant financial contributions. EFSOS is a part of the FAO global forest sector outlook study activities. It is closely linked to the other work areas of the Joint UNECE Timber Committee and FAO European Forestry Commission Integrated Programme of Work.

1.2 Complementing the scenario modelling approach

The baseline macroeconomic assumptions for the development of the EU/EFTA region are that technological progress will accelerate further, budgets on research and development will grow as in the past and migration processes will develop steadily. In the CEECs progress in political and economical stabilization combined with accession of more countries to the EU as well as a stable ratio between private and state property are assumed. The CIS countries are characterized by steadily advancing political stabilization, progress towards a market economy and a convergence of education to Western European levels. A steady reduction in the technological gap between East and West is expected. The anticipated growth rates for CIS are significantly higher and those for CEEC slightly higher in comparison with western European economies (NOBE, 2002).

The forest sector's specific framework is assumed to remain unchanged in the baseline scenario. The hypothesis is that the competitiveness of the sector will develop in the same way as in the past. There is historical evidence that real prices and cost factors of forest products are characterized by a rather high volatility but, at the same time, show no significant trend in their long term development (see e. g. Zhu et al, 1998). An exception is to be made for some products in the category of wood-based panels. Thus in the baseline scenario projections prices and raw material costs of product are set as constant (zero growth, see Kangas, Baudin, 2003).

The purpose of this study is to complement scenario modelling of forest resources and forest products markets, carried out and published separately. Its results can be used as an input to further modelling work, providing alternative scenario assumptions in terms of macroeconomic growth, competitiveness of forest products and the area of forest available for wood supply. The approach is that changes in the policy and market framework, which have significant influence on the forest sector, need to be reflected in the model steering parameters, and thus lead to different perspectives from the baseline scenario outlooks for the forest sector in Europe.

1.3 Project implementation

The EFSOS Team of Specialists together with the authors, assisted by the donor and the UNECE/FAO secretariat, constituted a "core group" of policy experts. The work started with an intensive research and analysis of available publications and policy documents. Possible forest sector developments, as derived from the literature review, were structured initially into 19 scenario "areas" (see Table 1), describing policy issues with relevance to the forest sector in Europe.

During a first inquiry, policy experts familiar with forest sector development in Europe were asked to provide their expectations about the importance of the identified scenario "areas". Based on their ranking, the core group selected 13 scenario "areas" marked during the inquiry with a high priority and proceeded with deeper analysis on them.

A second round of expert judgement was organized in the form of a "Delphi inquiry". It was addressed to a broader group of forest sector stakeholders from various countries and international organizations. They were asked: (1) to evaluate the probability of occurrence of each of the scenarios; (2) to estimate the expected impacts, in terms of variation from a "business-as-usual" base line scenario on various forest sector parameters (forest area, production, trade and consumption of forest products); and (3) to identify the specific driving forces for each of the expected scenarios.

The analytical outcomes of the chosen 13 scenario "areas" were grouped into the following 5 scenario "packages". The main reason for this grouping was to combine scenario "areas", which are similar in terms of issues, affected or involved stakeholders and policy experts dealing with these issues:

- Biodiversity, including nature conservation (shortened to 'Biodiversity' in the Inquiry).
- Globalization, innovation and market structures.
- Countries with economies in transition (CITs).
- Regional development.
- Energy and environment.

The inquiry results as well as a first draft report were presented to a meeting with policy experts and representatives of the major stakeholder groups in December 2001. Six national correspondents and 20 outlook study specialists attended the meeting. They discussed the study methods and draft outcomes in five working groups and provided comments on them. Comments and suggestions for corrections made at the meeting were incorporated into the current report.

The draft report was then presented during EFSOS meetings in May 2002 and in April 2003, where options for its use in terms of input to the international dialogue, namely to the Ministerial Conference on Protection of Forest in Europe, were discussed. Quantitative steering parameters were elaborated as an input to alternative policy and market driven scenarios.

The inquiry results as well as the findings of the study in general are systematically differentiated between three major sub-regions: EU/EFTA, the CEEC (including European countries other than EU/EFTA and CIS), and the CIS, as well as to relevant stakeholder groups: governments, business oriented NGOs (associations of the private industry), non-profit oriented NGO's, and the scientific community.

1.4 Main findings

The study confirms the importance of social and environmental benefits from forest land use and wood utilization, and their impact on the sustainable development of modern society. It describes the role of the various stakeholders in the diverse sub-regions, and in the context of current market developments and expected changes in the policy framework. The findings are a robust base for providing conclusions and recommendations to forest sector stakeholders and decision makers. They are also valuable for other policy domains, which have an influence on European forest development.

The results show that "internal" policy scenario areas, such as biodiversity or nature oriented forestry management, receive a rather high estimation as for their probability of occurrence, but a rather low assessment of impact. While the usefulness of the qualitative outcomes should not be overestimated, the current analysis provides a clear indication that the main impact for future

developments in the European forest sector is not expected to come from "internal" forest sector policies. They are more likely to come from changes in "external" scenarios, such as changes in agriculture policies, globalization and liberalization as well as from promotion of renewable energies. These issues and changes will influence the market-framework of the sector increasingly.

The study indicates the significance of developments in the CEEC and CIS. The scenario area "Strengthening policies to develop market framework in countries with economies in transition (CITs)" has received the highest priority in terms of expected impacts and probability of occurrence. In this scenario, it is assumed that the countries concerned, after the collapse of their planned economies at the beginning of the 1990s, will steadily progress towards democracy and market economy. Major impacts are expected in terms of increasing production, trade and consumption of forest products over the next decades. Statistical information from eastern European countries, in particular from CIS, confirms that exports of roundwood and primary products (sawnwood, pulp) as well as imports of final forest products are increasing rapidly. The intensity and duration of this impact depends on further stabilization of the market framework, investments in capacity building, and the development of domestic purchasing power in Eastern European countries.

Based on the assumptions about anticipated policy impact in each scenario "area", the study has elaborated three "mega-scenarios" depicting possible developments, which deviate to a marked extent from those that have been assumed for previous baseline scenarios. Various scenario "areas" have shown a comparable structure and direction of influences on the analysed forest sector parameters, whereas the quantitative impact varies significantly. The objective of the following three "mega-scenarios" is to bundle the quantitative outcomes of similar qualitative impacts on the sector, in order to use a relatively small number of alternative scenarios that could be run in further modelling work.

A. Accelerated shift to environmental conservation - "Conservation" scenario

This "mega-scenario" assumes further forest sector progress towards nature conservation and biodiversity, nature oriented forestry management and certification as well as reduction of negative impacts on forest stands from emissions, improving waste management, and policy support for renewable energy sources. Agricultural policies, and in particular production subsidies, will shift towards incentives for social and environmental benefits to society.

The macroeconomic assumptions for the EU/EFTA countries are that policies aiming at accelerating technological progress and enhancing the human capital are relatively weakened among others by environmental constraints. Basically, there is almost no progress compared to the current situation. Given the high stock of capital per employee, and therefore the low marginal productivity of capital, this leads to only a slow increase of GDP in the EU/EFTA region (low case OECD projection). For the CEEC and CIS, this scenario assumes slow progress in the political, social and economic stabilization, in particular because of additional environmental constraints, as well as a lack of policies aimed at enhancing domestic saving and investment, a low level of absorption of technology, and little investment in human capital. Such an unfavourable economic and social environment slows down the process of real convergence. Additionally, the slow real convergence is accompanied by unfavourable demographic trends (low UN demographic scenario) causing a stagnation or reduction of population coupled with strong ageing processes (NOBE, 2002).

B. Political impetus towards sustainable energy use – "Sustainable Energy" scenario

This "mega-scenario" is built up on assumptions of a significant increase in the use of renewable energy sources based on policies as well as innovations in the field of energy generation from wood and energy efficiency in general. Forest area for wood supply is assumed to increase more than in the baseline developments, in particular because of short-term plantations. This will be accompanied by measures for mitigation of climate change and specific incentives for social and environmental benefits of agriculture and forestry.

As for macroeconomic development, this scenario is characterized by moderate growth, slightly lower than in the baseline scenario, but somewhat higher than the "Conservation" mega-scenario.

C. Widespread acceptance of economic integration and liberalization – "Globalization" scenario

This "mega-scenario" focuses on macroeconomic assumptions of accelerated globalization and further market liberalization. It assumes additional economic growth, caused by a significant move towards technological progress and strengthening human capital in the EU/EFTA countries, by an increase of resources devoted to research and development activities and education, as compared with the baseline scenario. For the CEEC and CIS this mega-scenario means an accelerated progress towards a market economy in conjunction with economic, social and political stabilization in the region. The EU expansion will not only concern the countries currently engaged in membership negotiations, but also to Turkey and the Balkan states. Policies enhancing saving and investment, improving the human capital, as well as facilitating a technological catching-up, lead to the acceleration of convergence. Positive economic performance of the EU/EFTA countries (high OECD projections) and relatively good demographic trends (high UN demographic scenario) allow for a higher growth of GDP than in the baseline scenario (NOBE, 2002).

Further this "mega-scenario" is characterized by various forest sector-specific policy issues like accelerated innovations in the sector, increasing certification of forest and forest products, improving waste management, partly based on innovations, but also due to a shift in agriculture policies towards more environmental friendly production and products. Also in this scenario it was assumed that the forest area available for wood supply would increase not only from plantations but also by infrastructure measures, which would cause a shift in classification of forests currently not available for wood supply (e.g. in the Russian Federation) to forests available for wood supply.

1.5 Policy relevant conclusions

The study creates links between its qualitative and quantitative policy findings and the steering parameters of the forecast model on forest resources and forest products markets. Considering the macroeconomic assumptions, made in the long-term GDP forecast (NOBE, 2002), the alternative GDP "High" forecast is used for expressing the alternative macroeconomic policy implications from the present study quantitatively as for the mega-scenario "Globalization" and the "Low" forecast for the "Conservation" mega-scenario. At the same time, in some scenarios the specific competitive situation for wood utilization (for example as a source for energy generation) could change significantly, which is expected to be reflected by modifying price elasticities in the econometric models elaborated for the baseline scenario forecast.

The study outcomes allow the following policy relevant conclusions, which are to be considered at national, international and global levels of decision making by the forest sector stakeholders in Europe:

a. Dynamic developments in Eastern Europe and in particular in the CIS

Natural and economic potentials in Eastern Europe, in particular in Russia, in combination with further progress towards a market economy, are expected to result in further strong growth in the forest sector. These developments will have a notable impact on forest products trade and production in Western Europe and Asian markets. The depth and duration of this trend depend on the level of investments in the forest industry in Eastern Europe. The dialogue between East and West should be intensified in order to assist the sustainable development of the forest sector. Eastern European governments and other stakeholders need to be involved in the international and global policy dialogue. Mutual economic opportunities and challenges should be analysed more consistently in order to provide a base for reliable strategic decision making.

b. Importance of cross-sectoral policy dialogue between the forestry and other sectors

Forest sector stakeholders should focus the policy dialogue, making it increasingly open to public participation and drawing attention to the importance of other policy areas such as agriculture, trade and energy. They have to highlight the benefits from forestry land use and wood utilization towards the overall sustainable development of society. The Timber Committee, the European Forestry Commission, MCPFE and other national and international forest sector policy bodies, active in the region, can facilitate this dialogue substantially. The goal is to strengthen the position of the forest sector on the national and international policy scene and to increase its policy weight and influence.

The policy dialogue should be strengthened by organizing forums (e.g. "Round tables") with representatives of all stakeholder groups, whose impact is related to the development of the European forest sector. UNECE, with its unique sectoral structure, is an appropriate forum for this work, provided that the cooperation of other UNECE Principal Subsidiary Bodies can be obtained and the necessary resources are made available.

c. Position of the European forest sector in the global context

In a period of general globalization of companies, NGOs, economic, social and environmental agreements and processes (WSSD, CBD, Kyoto) one of the principal questions is: How can forest policy making still be focussed at the national level- while it is at the same time responding to the changing global environment? European forest sector stakeholders should strengthen their efforts on an international level. The European experience in sustainable forestry management needs to be promoted more actively on a global level, e.g. in discussions and activities concerning certification of forests and forest products.

d. Innovations and investments in the forest sector

It is essential to combine the internal energy of the European forest sector and to stimulate concerted actions by all branches of the sector, notably private industry. The goal is to make the necessary initial investments available for new infrastructure and innovations in forestry, wood processing industries and recycling, reducing the economic constraints for the utilization of so far unused potentials of roundwood supply and for promoting sustainable forestry land use and wood utilization as a joint activity.

1.6 Proposed further activities

a. In the framework of already available resources the secretariat will elaborate a set of forecast data, similar to the base line scenario data set (forest resources, removals, production, trade and consumption), using the three mega-scenarios and the quantitative links to the baseline scenario modelling. The current study provides a substantial contribution to the main EFSOS report. Depending on the availability of additional resources the following activities, so far developed as project proposals, could take place.

b. The methodology used in the present study and the Delphi-type exercise has shown their capabilities. Further policy analysis and activities should be more broadly addressed, including policy experts and decision makers in the environmental, agricultural, social, energy and other fields in the analysis. The inter-sectoral structure of UNECE provides the necessary infrastructure for such a kind of analysis. The identified scenarios could be subjects for more detailed market and policy analysis. Future analysis should aim at a more detailed description of scenario impacts, and the role of the various stakeholders in the different sub-regions.

c. A follow-up workshop could clarify how the results of the present study could be applied in order to strengthen the international forest sector policy dialogues in the UNECE region, and what options exist for forest sector strategies on the international and national levels. The aim would be to place forest and wood issues in the broader sustainable development context, to enlarge the international forest policy dialogue and to identify European forestry sector priorities, while focussing on the interactions with other sector policies and on integrated regional development in the UNECE region.

d. More emphasis should be given to identifying existing positive impacts of forestry and forests, and the existence of basic legislation guaranteeing the future availability of the benefits. An analysis of European forest related legislation should identify existing basic common rules in national legislations. The working hypothesis is that notable similarities exist between legislation in different countries. The recognition of common rules and major changes has implications for the international policy dialogue and strengthens the position of forestry in its relationship with other policy areas.

e. A more detailed analysis of the future impact of the ongoing stabilization of policy frameworks and progress towards market economies in Eastern European countries is needed. That study should analyse Eastern European forest products markets in detail, focussing on foreign and domestic investments as well as bilateral trade flows between the countries in the regions, and consider the macroeconomic, social and environmental aspects. Scenario analysis would be used to describe the likely outcomes of different policy options.

2 STUDY BACKGROUND

2.1 Introduction

The relationship between the forest sector and modern society in the 21st century is characterized by both challenges and uncertainties. Forestry and wood utilization have a vital impact on the future welfare of all, in terms of oxygen and water cycles, carbon storage, erosion protection, and biodiversity. Forestry and forest industries have a significant importance for the development of rural areas. However, except for some Nordic countries, the forest sector has a low share of economic activity [1].

Wood is a raw material and energy source with various advantages, the main one being its renewability. In comparison with fossil fuels, the sustainable use of wood and wood residues for energy generation influences the global carbon cycle in a neutral way. There is scope for considerable expansion of the volume of forest products consumed, notably to replace non-renewable raw materials, without threatening the sustainable use of the temperate and boreal forest resource: technical and technological innovations are available for creation of new products and for the use of more efficient production processes, and there are huge natural roundwood potentials in central, northern and eastern Europe

In general the sector has seen steady growth in production and consumption, with a slight slowing of growth over the last decade. The share of sawnwood production and consumption decreased, while trade of all products increased sharply from the mid 1960s through 2000. This overall picture was disturbed only episodically, notably the drop in consumption due to the energy crisis in mid 1970s, and the temporary increase of removals caused by large storms in 1990 and 2000. More significant was the fall in production and consumption of forest products in transition countries because of the collapse of the planned economies, whereas these countries are now in a process of recovery.

Forests represent a significant natural resource, covering one third of Europe. Beside the roundwood supply, some of the most important benefits provided by forests are recreational opportunities, which create external benefits to society as a whole, contributing to national health. Public access to the forests is an important fundamental right in many parts of Europe. Despite shortcomings in health and vitality of forest stands in some areas, some of which have been attributed to pollution, most of the forests in Europe represent well-functioning ecosystems with environmental advantages in comparison to other forms of land use. In almost all countries in Europe, forest resources have increased over the last decades in terms of area and growing stock.

At the same time the influence from exogenous factors, such as climate change, on forests leads to uncertainties in the further sustainable development of forest resources. Intensive silviculture has reduced the biodiversity in some forest areas. Society's needs for non-wood benefits from forestry are increasing rapidly, leading to an additional pressure on the economic viability of forest management in many areas.

Forest policies and institutions are mostly well developed and focus explicitly on the concept of sustainable forest management.

Within the Ministerial Conference on Protection of Forests in Europe, MCPFE, most of the European countries are participating in the development and implementation of criteria and indicators for sustainable forest management, both at the national and international levels. Over

[1] In accordance to the EFSOS programme the term “forest sector" is used here to describe forest resources, forestry and the production, trade and consumption of roundwood, sawnwood, wood based panels, wood pulp, paper and paperboard.

recent years many European countries have initiated a process to draw up (or revise) national forestry programmes (NFPs), using a participatory and holistic approach. The European Union supports sustainable forestry management and developments in rural areas of its member states, e.g. with financial assistance to forest owners in the framework of the Common Agriculture Policy and with the discussion and publication of a "Forest Strategy".

Environmental organizations and other NGOs, have initiated certification schemes, which certify that forests are managed in a sustainable way. Associated labelling indicates that products come from those certified, sustainably managed forests. Some other forest sector stakeholders, including retailers and forest owners, promote certification, considering the marketing opportunities from producing and selling an environmentally friendly product. The area of certified forest has increased rapidly in western and northern Europe, where the costs of certification could be covered more easily by the forest owners than in southern countries. Certified forests, however, still represents a relatively small portion of the total area of global forests.

The environmental and social benefits from forest land use and wood utilization are not adequately recognized by the public. The forest sector is a rather weak actor on the national and the international policy scene, e.g. in comparison with environmental and agriculture policy. Other policy areas are dealing increasingly with forest sector issues, sometimes without taking forest sector related consequences properly into account. Consequently during policy discussions the forest sector seems to be often in a defensive position.

The policy framework of Eastern European countries has developed dynamically over the past decade, progressing towards democracy, legal stability and market economy. Accelerated liberalization of markets and privatization of resources and capacities has led in some cases to uncertainties about the sustainability of forestry management, while in periods of economic recovery, as in transition processes, forestry plays an important role, contributing with an affordable, easily accessible resource to contribute to overall economic development.

2.2 Background and scope

Under the auspices of the UNECE Timber Committee and the FAO European Forestry Commission, a series of studies have been undertaken over the past 50 years on the trends and prospects for the European forest and forest industries sector (the ETTS series). In the most recently published one (ETTS V, 1996) [2], special attention was devoted to the policy areas, inside and outside the sector, which may have a significant impact on its development. Scenarios were drawn up, describing developments considered the most likely to occur, and estimates made of the direction and magnitude of the changes in the sector, which might result from the changes in these policies [3]. The 'internalization' of the discussion of the policy context within ETTS V was a significant new departure compared with the earlier studies and reflected the increasing importance attached by the sponsoring bodies to the need to link long-term forecasts for the sector to an analysis of the policy making processes having an impact on it.

The current study was initiated by the EFSOS Team of Specialists (ToS), representing officially nominated national correspondents, major stakeholder groups in the forest sector and outlook specialists. In drawing up plans for the successor to ETTS V (European Forest Sector Outlook Studies (EFSOS), in other words "ETTS VI"), the Team of Specialists agreed to build on the positive experience in ETTS V by including a study on the major influences affecting the

[2] European Timber Trends and Prospects: Into the 21st century. UNECE/FAO UNECE/TIM/SP/11, 1996.
[3] The policy context for the development of the forest and forest industries sector in Europe. T. J. Peck and J. Descargues. UNECE/TIM/DP/11, 1997.

development of the forest and forest industries sector. The study was launched on the basis of a project proposal drafted by the secretariat in close co-operation with F. Schmithüsen, ETH, Zürich. The project was funded by BUWAL, Swiss government. It focuses on influences from external as well as from internal policies, as these may influence both policy measures, such as laws, regulations and economic instruments, as well as market forces. One expected outcome of this work is an indication of how the base line scenario, which will be developed separately under the assumption "business as usual" might be affected, considering the impacts from changes in national policy frameworks relevant to the European forest sector.

2.3 Objectives

In the light of the above, the objectives of the study are as follows:

(1) To identify scenarios with major impacts on the European forest sector as part of the EFSOS baseline study;

(2) To describe the driving forces for the various scenarios, the stakeholders involved, and the changes expected to result from those forces;

(3) On the basis of the various scenarios, to provide guidance for alternative (to the baseline scenario) projections of roundwood supply and demand of forest products.

The EFSOS main report, being published separately, contains projections of the consumption, production and trade of forest products to the year 2020 and of the forestry situation to 2030 in Europe, including some major CIS countries. The projections are derived from models, which are based on observations of the historical relationships between the trends of certain explanatory variables (such as GDP and prices) and production, trade and consumption volumes. The baseline scenarios are determined by authoritative forecasts and assumptions as to how those exogenous variables will develop in the future. While the GDP forecasts cover all changes in the macroeconomic framework, the forecasts for prices reflect possible substitution effects for various forest products, depending on expected changes in the forest market framework.

In consequence, the resulting baseline projections provide a 'business-as usual' outlook scenario considering that the forest sector will change steadily under the influence of the currently existing market and policy framework. During the latter part of the 20th century the pace of change in society accelerated, both quantitatively and qualitatively. Quantitatively, there has been, for example, the rapid development of technology and of globalization. Qualitatively, there has been the marked change in people's attitudes towards such things as environmental protection, the threat of global warming and the sustainability of natural resources. Particularly in the case of qualitative changes, it has been felt that market forces alone would be insufficient to act in time to avoid possible negative, even catastrophic consequences, and that therefore policy initiatives must be taken to channel developments in what are popularly seen as desirable directions. There is no reason to suppose that the pace of change will slow down during the first part of the 21st century.

Experience with previous studies has shown that development in the policy framework with direct influences on the sector cannot be built easily into quantitative models. Huge resources would be needed or it would be even impossible to build up quantitative models, which would be able to describe the consequence of certain changes in the policy framework for the development of the forest sector comprehensively. Assumptions and simplifications are required and used in the current study to overcome this problem.

2.4 Approach

Based on the suggestions of the Team of Specialists, a core group (Carsten Thoroe as project leader, Tim Peck, Franz Schmithüsen and Helena Guarin Corredor) was established to provide expert guidance on how to organize the study work. It was agreed to involve national correspondents, stakeholders and other interested parties from the beginning on the process of identifying scenario areas, which appeared likely to have significant impacts on the forest sector.

The work started in March 2001 with an intensive search of publications and an analysis of policy documents by the secretariat, to provide a base for further analysis. Firstly, the main policy messages were extracted from these sources corresponding to the goals of this study.

An initial meeting of the core group of policy experts with the secretariat, held in April 2001, discussed policy and market issues, which are the subject of debate between forest sector stakeholders and could influence the future forest sector framework. The outcome was subsequently structured into 19 scenario "areas" (see Table 1), considering significant specifics in terms of policy issues, regional applicability and specifics in the role of stakeholders. The outcome of the literature search was restructured according to the proposed structure of scenario areas.

During a first inquiry, policy experts were asked to provide their expectations about the importance of the scenario area impacts. Based on the results of this inquiry the secretariat together with the core group selected 13 scenario "areas" for a further deeper analysis.

A second inquiry (see the annex) was organized in the form of a "Delphi inquiry" in autumn 2001. It was sent to over 300 representatives of forest sector stakeholders from various countries and international organizations, who were asked (a) to evaluate the probability of occurrence of each of the scenarios; (b) to estimate the expected impact on major forest sector parameters (forest area, removals, production, consumption and trade of wood products), in terms of variation (growth/decrease) from a "business-as-usual" base line scenario; and (c) to identify the specific driving forces for the expected scenarios.

Replies were received from 42 addressees, representing stakeholder groups and regions of the European forest sector. Depending on the level of expert knowledge, the replies refer in most cases to the situation in the respondents' own countries, while a few, working on a regional or international level covered one or another of the three sub-regions of Europe: EU/EFTA; the CEECs; and the CIS. Although these replies are not valid from the statistical point of view, they may be considered to be reasonably acceptable for the sector as a whole. Experts from government agencies formed the largest group with 40% of the replies, followed by the representatives of profit oriented NGOs with 24%. In general non-profit organizations and representatives from the CIS region were underrepresented with only 5 and 6 replies respectively.

Due to a tight timetable, this inquiry had to be set up before the baseline study report had clearly defined the assumptions used in the business-as-usual "baseline scenario". A meeting with 26 policy experts and forest sector stakeholders was organized in December 2001, with the goal of verifying the inquiry outcomes and providing guidance to the secretariat for the next steps to be taken. The meeting agreed on the study's goals. It supported the approach, but drew attention to some serious methodological problems related to the representation of stakeholder groups during the inquiries and to the understanding of the inquiries by the addressees. There was a high motivation to support the study outcomes.

The analytical outcomes on all 13 scenario "areas" were synthesized into 5 scenario "packages". The reason for this grouping was to combine scenario "areas", which were felt to be similar in terms of issues, effects on involved stakeholders and policy expert judgment. The following scenario packages have been identified:

- Biodiversity, including nature conservation,
- Globalization, innovation and market structures,
- Countries with economies in transition,
- Regional development,
- Energy and environment.

Each of the five packages consists of a number of scenario areas.

The work of the December 2001 meeting was organized under Working Groups according to these scenario packages. Working in groups improved the efficiency of this meeting. Because the Working Groups operated independently, the estimates of one Working Group are not necessarily comparable with those of another. Thus, it is considered preferable to treat the estimates presented in this report as indicative. Nevertheless, the usefulness of the second inquiry and the value of the review by the expert meeting should not be underestimated. The process takes into account the considered views of a large number of experts on possible impacts on the forest sector in the future.

One scenario area: "Social and demographic developments (4.3)" was excluded from further analysis, because the corresponding assumptions for this scenario were found to be included in the long-term forecast of macroeconomic growth (GDP forecast) carried out as in input to the baseline scenario in the form of a separate study (NOBE, 2002).

The results were used to elaborate the inputs for the alternative scenario modelling, in terms of model steering parameters (GDP growth rates, income and price elasticities) as well as in terms of additional growth or decrease of major forest sector parameters.

While the whole study was up to this stage analytical and had the goal of describing expected developments, its outcome has also contributed to the international policy dialogue, provided a basis for making conclusions and recommendations addressed to forest sector stakeholders, and draws attention to expected changes in the market framework and high dynamics in some policy areas. In addition the study results have provided guidance for further activities by the UNECE Timber Committee and other institutions dealing in this area.

Table 1: Summary of first inquiry results (Evaluation of scenario areas' estimated impact on the forest and forest industry sector)

Scenario areas	Impact (Evaluation of likely impact by the scenario area - **1** (highest priority) and **5**(lowest priority))	Rank	Standard deviation	Regional level			
				local	national	European	global
Nature conservation	**2.09**	**1=**	**0.98**	x	x	x	
Nature-oriented forest management	**2.09**	**1=**	**1.02**		x	x	x
Promotion of social/environmental benefits from forestry	**2.14**	**3**	**0.76**		x	x	
Competitiveness	**2.17**	**4**	**0.92**		x	x	x
Stabilization in Eastern Europe	**2.46**	**5**	**1.20**		x	x	
Changes in land use	**2.48**	**6**	**1.09**	x	x	x	
Energy policy	**2.50**	**7**	**1.20**		x	x	
Global trade liberalization	**2.54**	**8**	**1.15**		x	x	x
EU enlargement	**2.64**	**9**	**0.74**		x	x	
Waste management	**2.67**	**10**	**0.98**		x	x	
Innovations in wood processing technologies and in wood products	**2.79**	**11**	**1.08**		x	x	
Climate change	**2.79**	**12**	**1.26**			x	x
Consequences of international negotiation processes	**2.82**	**13**	**1.40**		x	x	x
Pollution	**2.91**	**14**	**1.16**		x	x	
Social and demographic developments	**2.96**	**15**	**1.25**	x	x		
Changes in institutions and administration of the forest sector	**3.02**	**16**	**1.39**		x		
Innovations in harvesting and transport	**3.15**	**17**	**1.09**		x		
Trends in renovation and modernization of housing facilities	**3.20**	**18**	**1.09**		x		
Innovations in information technologies	**3.26**	**19**	**1.30**		x		

3 REVIEW OF IMPACT OF POLICIES AND OTHER DEVELOPMENTS ON THE FOREST AND FOREST INDUSTRIES SECTOR IN EUROPE

In this chapter the results of the inquiry are shown (3.1), the scenario areas and their impact on the forest sector are described and discussed (3.2), and the scenario areas having the most impact from changes in the policies and market framework on the forest area, removals, and production, consumption and trade of wood products are reviewed by subgroups of countries (3.3).

3.1 Inquiry results

3.1.1 Probability of occurrence of the scenario areas

During Inquiry 2 addressees were requested to provide their estimations for the probability of occurrence of the various predefined scenarios. Table 2 shows the estimates of probability (in percent), structured by scenario areas, packages and sub-regions. It summarizes the results of the process outlined in the preceding paragraphs (see 2.4) as well as the review provided by the meeting of experts Working Groups. The percentages range from 100%, e.g. for all scenario areas in all sub-regions in scenario package 5 – "Energy and environment" to 20-30% for the scenario area "Increasing demand for certification in the CEECs and CIS sub-regions". 100% means that, in the opinion of the inquiry addressees and the Working Group experts, it seems certain that the scenario will most likely occur. A rating of 20-30%, on the other hand, means that the probability is low.

Further all scenario areas were grouped by the estimated occurrence. The following list provides an overview of the scenario areas, where the probability of occurrence was evaluated at more than 70%, meaning that it is assumed that the scenario is expected to occur in most of the countries in each sub-region and have a significant impact on their forest sectors. This grouping makes it possible to concentrate on these scenario areas in subsequent analysis.

EU-EFTA:

1.1 - More emphasis on nature conservation and promotion of biological diversity in forest ecosystems
1.2 - More emphasis on nature-oriented forest management in the northerly countries of the sub-region
4.2 - Changes in agricultural, rural and regional development policies
5.1 - Promotion of renewable energy resources
5.2 - Improvement of waste management and emission controls
5.3 - Climate change.

CEECs:

3.1 - Strengthening policies to develop market framework in countries with economies in transition
3.2 - Progress in EU enlargement
4.2 - Changes in agricultural, rural and regional development policies
5.1 - Promotion of renewable energy resources
5.2 - Improvement of waste management and emission controls
5.3 - Climate change.

CIS:

2.2 - Intensified innovations and changes in competitiveness of wood products
3.1 - Strengthening policies to develop market framework in countries with economies in transition
4.3 - Social and demographic development
5.1 - Promotion of renewable energy resources
5.2 - Improvement of waste management and emission controls
5.3 - Climate change

It is striking that the only scenario areas with the highest probability rating throughout the European region are the three scenario areas of the package number 5 'energy and environment'. At the other extreme, demand for certification of forest management and wood products obtained a relatively low rating in all sub-regions. On a weighted basis, the scenario areas with the highest probability ratings were 5.1, 5.2 and 5.3, followed by 1.1, 2.2, 4.2 and 4.3, then 1.2, 2.1 and 4.1. To these should be added scenario areas 3.1 and 3.2 in the 'economies in transition' package with their high scores in the CEECs, as well as 3.1 in the case of CIS. Without overlooking the other scenario areas entirely, this list can provide guidance on which scenario areas should receive particular attention in considering impacts and driving forces in the following sections.

Table 2: Estimates a/ of the probability of occurrence of scenario areas (percent probability)

Package	Scenario area	EU-EFTA	CEECs	CIS
1. Biodiversity, including nature conservation				
1.1	More emphasis on nature conservation & promotion of biological diversity of forest ecosystems	>90	50-70	50-70
1.2	More emphasis on nature oriented forest management	North >90; South 50-70	50-70	50-70
1.3	Increasing demand for certification of forest management & wood products	~50	20-30	20-30
2. Globalization, innovation and market structures				
2.1	Impact of globalization on the competitiveness of the European forest & forest industry sector	50	60	70
2.2	Intensified innovations and changes in competitiveness of wood products	60	70	75
3. Countries with economies in transition				
3.1	Strengthening policies to develop market framework in countries with economies in transition	n.r. (75 b/)	90	80
3.2	Progress in EU enlargement	n.r. (80 b/)	100	50
4. Regional development				
4.1	Incentives for social/environmental benefits from forestry and wood products use	65	60	50 b/
4.2	Changes in agricultural, rural and regional development policies	80	80	40 b/
4.3	Social and demographic developments	50	70	90 b/
5. Energy and environment				
5.1	Promotion of renewable energy resources	100	100	100
5.2	Improvement of waste management and emission controls	100	100	100
5.3	Climate change	100	100	100

a/ Established by the Working Groups of the 5-7 December 2001 meeting of the Team of Experts (see text)
b/ Secretariat estimates
n.r. = not relevant

3.1.2 Impacts on parameters

The respondents to Inquiry 2 were asked to assess whether the scenario areas would cause the baseline projections or forecasts in EFSOS to be pushed upwards (an increase in the rate of growth or decrease in the rate of decline) or downwards (a decrease in the rate of growth or increase in the rate of decline) and by how much. In their task they have had to apply their own assessments to the historical trends, possibly extrapolated into the future, or the projections in ETTS V (published in 1996), because the updating of the baseline scenario for the new ETTS study was still in progress. This was probably the hardest part of the inquiry to answer, especially estimating the extent of the impacts on the various parameters. It also explains the often wide range in individual assessments, which complicated the task of the Working Groups in arriving at estimates for the three sub-regions. In some cases, in fact, the Working Groups were not able to agree on an estimate.

Estimates were made of impacts of policies and market developments in each scenario area on the main parameters in the forest sector, namely: the area of forest available for wood supply; the volume of production, distinguishing where possible between roundwood production (removals) and production of wood products; volume of consumption of wood products; and volume of trade (exports and imports). The qualitative results for the period 2001 to 2015 are summarized in Table 3A-E, which are structured by scenario packages and the three sub-regions, while the quantitative results, expressed as the changes in percentage points per annum compared with the baseline scenario trend, are found in the more detailed annex tables. In Table 3A-E, some of the estimates are shown in bold type, which indicates that the scenario area in question came into the highest probability category (> 70%) in Table 2 and should thus be considered as generally more significant. Those in brackets indicate that the scenario area came into the lowest probability category (< 30%).

The qualitative results, expressed as 'much higher', 'higher', 'baseline' (i.e. no change from the baseline scenario), 'lower' or 'much lower' are obviously far less precise than quantitative ones, but probably more reliable as indicators of possible trends. They are discussed below for each of the scenario areas.

Table 3A describes the estimated impact on the parameter "**Area of forest available for wood supply".** The term "baseline" for most of the scenario areas in Table 3A indicates that no tremendous impacts should be expected on this parameter. Only for the scenario package 1 "Biodiversity, including nature conservation" a lower growth rate than in the baseline scenario is estimated for scenario areas 1.1 (EU/EFTA and CEEC sub-regions) and 1.3 (all sub-regions). Changes in "Agriculture, rural and regional development policies" are expected to have an impact on forestry land use causing a higher growth than in the baseline scenario for the EU/EFTA sub-region as well as for the CEECs. The same effect is likely for countries in the CEEC and CIS sub-regions because of further "Strengthening policies to develop market framework in CITs".

Table 3B and 3C give the outcomes of the inquiry for the parameters "**Roundwood removals**" and "**Production of wood products**" respectively. The outcomes in these two tables are nearly identical. The estimated impact on this parameter confirms for most of the scenario areas the baseline scenario developments. Only in a few cases additional growth ("higher" or "much higher") or decrease ("lower") in comparison to the baseline scenario is likely. In the longer term, increasing nature conservation measures, mainly in the EU/EFTA sub-region, could slow down the production of wood products, which should be seen in relation with the estimated drop of forest area available for wood supply (see Table 3A). An additional (to the baseline study) growth of production of wood products was estimated for the scenario packages 2 "Globalization, innovation and market structures" for all sub-regions, which corresponds to the expectations, expressed in most of the earlier outlook studies, whereas the real development often remained much lower. Also for the scenario package 3 "Countries with economies in transition" higher growth was estimated, which confirms the recent dynamic developments for CEEC and CIS countries shown by historical statistics. Considering further

strengthening of policies to develop market framework in CITs and further progress in EU enlargement policies "Roundwood removals" in the CEECs are analysed as "higher" than in the baseline scenario while the parameter "Production wood products" is estimated even as "much higher" than in the baseline. Also for the scenario areas 5.1 "Promotion of renewable energy resources" and 5.3 "Climate change" a higher production is predicted for all sub-regions.

Table 3D shows the estimated impacts on **exports and imports** of wood products in comparison with the baseline scenario. No significant impact on trade of forest products is expected to result from biodiversity and conservation policies as well as from scenario areas in package 4 "Regional development". "Much higher" trade is estimated for the scenario area 3.1 "Strengthening policies to develop a market framework in CITs" effecting probably all sub-regions. Also the scenario 3.2, which is aiming for further progress in EU enlargement policies, describes the development of trade as "higher" than in the baseline scenario for all sub-regions. The "Promotion of renewable energy resources" could have a significant impact on forest products trade in all sub-regions.

Table 3E, which provides the inquiry results for **consumption of forest products**, shows that all scenario areas of package 2 "Globalization, innovation and market structures" will probably influence the consumption of wood products. Only a rather low impact is estimated for the scenarios in package 1. "Biodiversity, including nature conservation" and 4 "Regional development". At the same time scenario area 3.1 "Strengthening policies to develop market framework in CITs" is likely to increase consumption "higher" than in the baseline for CEECs and even "much higher" for CIS.

Table 3A: Estimates of the impacts of policies and other developments on forest and forest industry sector parameters compared to baseline scenario, 2001 to 2015 (*Impact compared with baseline scenario)* [a/]: ***Area of forest available for wood supply***

Package	Scenario area	EU-EFTA	CEECs	CIS
1. Biodiversity, including nature conservation		b/	b/	b/
1.1	More emphasis on nature conservation & promotion of biodiversity in forest ecosystems	**lower**	lower	baseline
1.2	More emphasis on nature oriented forest management	**baseline**	baseline	baseline
1.3	Increasing demand for certification of forest management & wood products	lower	(lower)	(lower)
2. Globalization, innovation and market structures				
2.1	Impact of globalization on the competitiveness of the European forest sector	baseline	higher	baseline
2.2	Intensified innovations & changes in competitiveness of wood products	baseline	baseline	**baseline**
3. Countries with economies in transition (CITs)				
3.1	Strengthening policies to develop market framework in CITs	baseline	**higher**	**higher**
3.2	Progress in EU enlargement	baseline	**higher**	baseline
4. Regional development				
4.1	Incentives to social/environmental benefits from forestry and wood products use	baseline	baseline	baseline c/
4.2	Changes in agricultural, rural and regional development policies	**higher**	**higher**	baseline c/
4.3	Social and demographic developments	baseline	baseline	**baseline c/**
5. Energy and environment				
5.1	Promotion of renewable energy resources	**baseline**	**higher**	**baseline**
5.2	Improvement of waste management and emission controls	**baseline**	**baseline**	**baseline**
5.3	Climate change	**higher**	**baseline**	**baseline**

a/ Established by Working Groups of the 6-7 December 2001 meeting of the EFSOS Team of Experts

b/ Brackets indicate that the scenario area came into the lowest probability category in Table 2; bold type indicates that the scenario area came into a high probability category in Table 2.

c/ Secretariat estimates

Table 3B: Estimates of the impacts of policies and other developments on forest and forest industry sector parameters compared to baseline scenario, 2001 to 2015 (Impact compared with baseline scenario) [a/]: ***Roundwood removals***

Package	Scenario area	EU-EFTA	CEECs	CIS
1. Biodiversity, including nature conservation		b/	b/	b/
1.1	More emphasis on nature conservation & promotion of biodiversity in forest ecosystems	**lower c/**	baseline c/	baseline c/
1.2	More emphasis on nature oriented forest management	**lower c/**	baseline c/	baseline c/
1.3	Increasing demand for certification of forest management & wood products	baseline c/	(baseline) c/	(baseline) c/
2. Globalization, innovation and market structures				
2.1	Impact of globalization on the competitiveness of the European forest sector	higher	higher	higher
2.2	Intensified innovations & changes in competitiveness of wood products	higher	higher	**much higher**
3. Countries with economies in transition (CITs)				
3.1	Strengthening policies to develop market framework in CITs	baseline	**higher**	**much higher**
3.2	Progress in EU enlargement	baseline	**higher**	higher
4. Regional development				
4.1	Incentives to social/environmental benefits from forestry and wood products use	baseline	baseline	higher c/
4.2	Changes in agricultural, rural and regional development policies	**baseline**	**higher**	baseline c/
4.3	Social and demographic developments	baseline	baseline	**baseline c/**
5. Energy and environment				
5.1	Promotion of renewable energy resources	**higher**	**higher**	**higher**
5.2	Improvement of waste management and emission controls	**baseline**	**baseline**	**baseline**
5.3	Climate change	**higher**	**higher**	**higher**

a/ Established by Working Groups of the 6-7 December 2001 meeting of the EFSOS Team of Experts

b/ Brackets indicate that the scenario area came into the lowest probability category in Table 2; bold type indicates that the scenario area came into a high probability category in Table 2.

c/ Secretariat estimates

Table 3C: Estimates of the impacts of policies and other developments on forest and forest industry sector parameters compared to baseline scenario, 2001 to 2015 (Impact compared with baseline scenario) [a/]*:* ***Production of wood products***

Package	Scenario area	EU-EFTA	CEECs	CIS
1. Biodiversity, including nature conservation		b/	b/	b/
1.1	More emphasis on nature conservation & promotion of biodiversity in forest ecosystems	**lower** c/	baseline c/	baseline c/
1.2	More emphasis on nature oriented forest management	**lower** c/	baseline c/	baseline c/
1.3	Increasing demand for certification of forest management & wood products	baseline c/	(baseline) c/	(baseline) c/
2. Globalization, innovation and market structures				
2.1	Impact of globalization on the competitiveness of the European forest sector	higher	higher	higher
2.2	Intensified innovations & changes in competitiveness of wood products	higher	higher	**much higher**
3. Countries with economies in transition (CITs)				
3.1	Strengthening policies to develop market framework in CITs	lower	**much higher**	**much higher**
3.2	Progress in EU enlargement	lower	**much higher**	much higher
4. Regional development				
4.1	Incentives to social/environmental benefits from forestry and wood products use	baseline	baseline	higher c/
4.2	Changes in agricultural, rural and regional development policies	**baseline**	**higher**	baseline c/
4.3	Social and demographic developments	baseline	baseline	**baseline** c/
5. Energy and environment				
5.1	Promotion of renewable energy resources	**higher**	**higher**	**higher**
5.2	Improvement of waste management and emission controls	**baseline**	**baseline**	**baseline**
5.3	Climate change	**higher**	**higher**	**higher**

a/ Established by Working Groups of the 6-7 December 2001 meeting of the EFSOS Team of Experts

b/ Brackets indicate that the scenario area came into the lowest probability category in Table 2; bold type indicates that the scenario area came into a high probability category in Table 2.

c/ Secretariat estimates

Table 3D: Estimates [a/] of the impacts of policies and other developments on forest and forest industry sector parameters compared to baseline scenario, 2001 to 2015 (Impact compared with baseline scenario) [a/]: ***Exports/ imports of wood products***

Package	Scenario area	EU-EFTA	CEECs	CIS
1. Biodiversity, including nature conservation		b/	b/	b/
1.1	More emphasis on nature conservation & promotion of biodiversity in forest ecosystems	**baseline c/**	baseline c/	baseline c/
1.2	More emphasis on nature oriented forest management	**baseline c/**	baseline c/	baseline c/
1.3	Increasing demand for certification of forest management & wood products	higher c/	(baseline) c/	(baseline) c/
2. Globalization, innovation and market structures				
2.1	Impact of globalization on the competitiveness of the European forest sector	higher	higher	much higher
2.2	Intensified innovations & changes in competitiveness of wood products	higher	higher	**higher**
3. Countries with economies in transition (CITs)				
3.1	Strengthening policies to develop market framework in CITs	much higher	**much higher**	**much higher**
3.2	Progress in EU enlargement	higher	**higher**	higher
4. Regional development				
4.1	Incentives to social/environmental benefits from forestry and wood products use	baseline	baseline	higher c/
4.2	Changes in agricultural, rural and regional development policies	**baseline**	**higher**	baseline c/
4.3	Social and demographic developments	baseline	baseline	**higher c/**
5. Energy and environment				
5.1	Promotion of renewable energy resources	**higher**	**higher**	**higher**
5.2	Improvement of waste management and emission controls	**baseline**	**higher**	**baseline**
5.3	Climate change	**higher**	**baseline**	**baseline**

a/ Established by Working Groups of the 6-7 December 2001 meeting of the EFSOS Team of Experts

b/ Brackets indicate that the scenario area came into the lowest probability category in Table 2; bold type indicates that the scenario area came into a high probability category in Table 2.

c/ Secretariat estimates

Table 3E: Estimates of the impacts of policies and other developments on forest and forest industry sector parameters compared to baseline scenario, 2001 to 2015 (Impact compared with baseline scenario) [a/]*:* ***Consumption of wood products***

Package	Scenario area	EU-EFTA	CEECs	CIS
1. Biodiversity, including nature conservation		b/	b/	b/
1.1	More emphasis on nature conservation & promotion of biodiversity in forest ecosystems	**baseline**	baseline	baseline
1.2	More emphasis on nature oriented forest management	**baseline**	baseline	baseline
1.3	Increasing demand for certification of forest management & wood products	higher c/	(baseline) c/	(baseline) c/
2. Globalization, innovation and market structures				
2.1	Impact of globalization on the competitiveness of the European forest sector	higher	higher	higher
2.2	Intensified innovations & changes in competitiveness of wood products	higher	higher	**higher**
3. Countries with economies in transition (CITs)				
3.1	Strengthening policies to develop market framework in CITs	higher	**higher**	**much higher**
3.2	Progress in EU enlargement	higher	**higher**	baseline
4. Regional development				
4.1	Incentives to social/environmental benefits from forestry and wood products use	baseline	baseline	higher c/
4.2	Changes in agricultural, rural and regional development policies	**baseline**	**higher**	baseline c/
4.3	Social and demographic developments	baseline	baseline	**higher c/**
5. Energy and environment				
5.1	Promotion of renewable energy resources	**higher**	**higher**	**baseline**
5.2	Improvement of waste management and emission controls	**baseline**	**baseline**	**baseline**
5.3	Climate change	**baseline**	**baseline**	**baseline**

a/ Established by Working Groups of the 6-7 December 2001 meeting of the EFSOS Team of Experts

b/ Brackets indicate that the scenario area came into the lowest probability category in Table 2; bold type indicates that the scenario area came into a high probability category in Table 2.

c/ Secretariat estimates

3.1.3 Driving forces

Respondents were also invited to indicate which were the driving forces most probably having an impact in the thirteen scenario areas, the probability of their occurrence and whether they would act as a result of laws and regulations, economic instruments or market forces. As with the question on impacts, these were not easy for respondents to handle, but the inquiry elicited a large amount of interesting information. The replies are set out in the annex tables. The results on the probability of the driving forces occurring are summarized in Table 4. In order to concentrate on what the estimates suggest will be the most significant driving forces, the comments that follow deal mainly with those where there is both the highest probability of the scenario areas occurring (as seen from Table 2) and where the estimates suggest a significant impact on the sector parameters in comparison with the baseline scenario (as seen from Table 3A-E). Furthermore, within a scenario area, not all driving forces are expected to be of the same importance. Table 5 shows the number of respondents' replies to the question about the instruments inducing the driving forces - laws and regulations, economic instruments, and market forces - thereby providing an indication of the likely relative importance of each.

1. Biodiversity, including nature conservation

The most significant driving forces for this scenario packages are the increase of the area protected for nature conservation and the reduction of harvesting and the elimination or reduction of clear cuttings and the extent of selective harvesting systems induced mainly by laws, the reduction of use of chemicals in forests by laws and economic instruments and the certification of sustainable forest management by market forces. At the same time measures for certification of the wood processing industry as well as abandonment or reduction of drainage systems received the lowest evaluation.

2. Globalization, innovation and market structures

There is a slight preference given to new, engineered wood products to be recognised as a driving force for this scenario package. Apart from this there is not any clear preference in driving forces for the scenario areas of the package. Most of the listed driving forces get an estimated probability of about 70% in EU-EFTA, 75% in CEEC's and 80% in CIS. The scenarios in this package are mainly market driven. Only a few driving forces are estimated to be induced by economic instruments.

3. Countries with economies in transition (CITs)

The countries in the CEEC and CIS sub-regions are still in the phase of recovery after the earlier collapse of their planned economies. The inquiry outcomes give the impression that the overall economic recovery of the forest sectors drives the future development more than privatization or restitution of forestland. The scenario area "Strengthening policies to develop a market framework in CITs" is likely to be induced by laws, economic instruments as well as market forces.

There is a clear indication for this scenario package that the EU enlargement could happen not only by accession of the already planned CEECs but also by other European countries (CIS) to the European Union. Evaluating these estimations one should have in mind that the inquiry covers the forecast period up to the year 2030, which makes such results a bit more likely.

4. Regional development

The main impacts on the scenario areas in this package are expected to come from decreases in rates of subsidizing agricultural production and exports induced by changed economic instruments and partly by specific laws. It seems that the expectation is that only strict measures in agricultural policies would have a significant impact on the sector, because the driving force 4.2.2 'Extension of CAP elements into forestry' received the lowest evaluation. Also the incentives for protective and recreational services of forest will drive the sector in the direction as described above. Mainly economic instruments and laws are likely to induce these incentives.

5. Energy and environment

The analysis of replies to the scenario packages 5 “Energy and environment” demonstrates the problems of the inquiry. The forest sector community mainly replied to the inquiry. The outcomes here reflect the high expectations about impacts of policy areas outside the sector. The goal was to get an indication about the different contribution of various driving forces to a specific scenario area. In the light of that, the replies to this package indicate only that all mentioned driving forces have nearly the same, presumably a very high, importance and, because no additional forces were indicated by the addressees, there is no other driving force expected to have a significant importance when it comes to the particular scenarios of this package. Only the analysis of instruments gives some indication that measures with the goal of increasing recycling of waste paper and wood, to implement pollution control and mitigation as well as the increasing acceptance of forest and wood as sinks for the compliance of emission reduction are recognized as driving forces. While the measures for improvement of waste management are expected to be mainly market driven, the measures related to mitigation of climate change are likely to be induced by laws and economic instruments.

As an overall outcome from these tables (see scenario package 1 and 2) one can recognize that measures which are expected to be induced by laws and economic instruments could have a higher importance in western European countries, while in the CEECs and CIS the main impact is expected to come from market forces.

Table 4: Estimates of the probability of the forces driving impacts on the forest and forest industry sector occurring (percent)

Scenario area	Driving force	EU-EFTA	CEECs	CIS
		c/	c/	c/
1.1	**More emphasis on nature conservation & promotion of biodiversity in forest ecosystems**			
1.1.1	Increase area protected for nature conservation, reduction of harvesting in such areas	**90 b/**	75 b/	75 b/
1.1.2	Building of ecological networks including core areas, corridors, buffer areas & restoration areas	**60 b/**	60 b/	60 b/
1.1.3	Diversification of species composition & structure of ecological communities in forests	**70 b/**	70 b/	50 b/
1.1.4	Intensified fire protection	**60 b/**	60 b/	70 b/
1.2	**More emphasis on nature oriented forest management**			
1.2.1	Eliminate/reduce clear cutting, extend selection systems of harvesting	**60 b/**	80 b/	70 b/
1.2.2	Plant endemic/indigenous species, combinations of conifer & broadleaved species	**50 b/**	60 b/	50 b/
1.2.3	Increase rotation lengths	**50 b/**	60 b/	70 b/
1.2.4	Abandonment/reduction of drainage systems	**40 b/**	50 b/	60 b/
1.2.5	Reduction of use of chemicals (e.g. biocides) in forests	**75 b/**	60 b/	50 b/
1.3	**Increasing demand for certification of forest management & wood products**			
1.3.1	Certification of forest management	80 b/	(75 b/)	(60 b/)
1.3.2	Certification of forest products	70 b/	(70 b/)	(50 b/)
1.3.3	Certification in wood processing industry	40 b/	(40 b/)	(30 b/)
2.1	**Impact of globalization on the competitiveness of the European forest sector**			
2.1.1	Increasing international flows of capital	70	70	80
2.1.2	International relocation of capacities	70	80	90
2.1.3	International merging of companies	70	70	80

Table 4 (continued)

Scenario area	Driving force	EU-EFTA	CEECs	CIS
		c/	c/	c/
2.2	**Intensified innovations & changes in competitiveness of wood products**			
2.2.1	Innovations in harvesting techniques and facilities	70	75	**80**
2.2.2	Innovations in wood processing technologies	70	75	**80**
2.2.3	Development of new wood products (e.g. engineered wood)	75	80	**85**
2.2.4	Progress in transport & logistics	70	75	**80**
2.2.5	Innovations in information technologies	70	75	**80**
2.2.6	Introduction of new non-wood commodities	60	65	**70**
2.2.7	Development of new fields of application	50	55	**60**
3.1	**Strengthening policies to develop market framework in CITs**			
3.1.1	Recovery of forest sector in CITs	n.r. (90 b/)	**90**	**90**
3.1.2	Changing ownership of forest land (e.g. privatization & restitution	n.r.(60 b/)	**70**	**30**
3.2	**Progress in EU enlargement**			
3.2.1	Accession of the CEECs to the EU	n.r. (90 b/)	**100**	n.r. (80 b/)
3.2.2	Accession of other European countries to the EU	n.r. (40 b/)	**100**	50
4.1	**Incentives for social/environmental benefits from forestry & wood products use**			
4.1.1	Economic incentives for protective & recreational services of forests	70	65	60 b/
4.1.2	Economic incentives for nature oriented management of forests	55	55	50 b/
4.1.3	Economic incentives for conversion of FAWS to forests protected for nature conservation	60	60	50 b/
4.2	**Changes in agricultural, rural & regional development policies**			
4.2.1	Changes in rates of subsidization in agricultural production & exports	**85**	**80**	(50 b/)
4.2.2	Extension of CAP elements into forestry; I.e. afforestation of agricultural land	**55**	**70**	(20 b/)
4.2.3	Implementation of forestry measures in agriculture, e.g. biomass production	**65**	**60**	(40 b/)
4.2.4	Promotion of forest sector as an integral part of rural development	**60**	**55**	(40 b/)

Table 4 (continued)

Scenario area	Driving force	EU-EFTA	CEECs	CIS
		c/	c/	c/
4.3	**Social and demographic developments**			
4.3.1	Migration of rural populations	60	80	**70 b/**
4.3.2	International emigration/immigration	70	70	**80 b/**
4.3.3	Ageing of populations	90	80	**70 b/**
5.1	**Promotion of renewable energy sources**			
5.1.1	Emphasise use of wood biomass as a source of energy	**100**	**100**	**100**
5.1.2	Taxing fossil energy sources & utilization	**60**	**60**	**30**
5.1.3	Abandonment of nuclear power stations	**50**	**40**	**20**
5.1.4	Promotion of energy saving technologies	**100**	**100**	**100**
5.2	**Improvement of waste management & emission control**			
5.2.1	Increase of recycling of waste paper & waste wood	**100**	**100**	**100**
5.2.2	Implementation of best practices (cleaner production or waste minimization) in wood processing industry	**100**	**100**	**100**
5.2.3	Implement/extend integrated pollution control	**100**	**100**	**100**
5.2.4	Rationalize use of wood products	**100**	**100**	**100**
5.2.5	Reduction of harvesting and transport losses of roundwood	**100**	**100**	**100**
5.3	**Climate change**			
5.3.1	Impacts of climate change on forest growth (higher temperatures, more frequent storms)	**100**	**100**	**100**
5.3.2	Acceptance of forests as natural sinks for the compliance of emission reduction commitments	**100**	**100**	**100**
5.3.3	Acceptance of wood products as natural sinks for the compliance of emission reduction commitments	**100**	**100**	**100**

a/ Established by the Working Groups of the 6-7 December 2001 meeting of the EFSOS Team of Experts
b/ Secretariat estimates
c/ For explanation of figures in bold and brackets, see text
n.r. Not considered relevant by Working Group

Table 5: Specification of instruments inducing driving forces in scenario areas (number of replies a/)

		EU-EFTA			CEECs			CIS	
	Scenario area / Driving force	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces
1.1	**More emphasis on nature conservation & promotion of biodiversity in forest ecosystems**									
1.1.1	Increase area protected for nature conservation, reduction of harvesting in such areas	18	10	7	11	4	2	6	1	0
1.1.2	Building of ecological networks including core areas, corridors, buffer areas & restoration areas	19	8	3	10	1	2	6	0	0
1.1.3	Diversification of species composition & structure of ecological communities in forests	14	7	4	9	3	2	2	1	2
1.1.4	Intensified fire protection	9	6	1	8	3	2	1	5	0
1.2	**More emphasis on nature oriented forest management**									
1.2.1	Eliminate/reduce clear cutting, extend selection systems of harvesting	13	7	11	12	1	1	4	1	2
1.2.2	Plant endemic/indigenous species, combinations of conifer & broadleaved species	15	13	8	9	5	4	3	2	1
1.2.3	Increase rotation lengths	11	9	6	11	1	3	2	3	1
1.2.4	Abandonment/reduction of drainage systems	9	4	4	2	4	4	3	1	0
1.2.5	Reduction of use of chemicals (e.g. biocides) in forests	14	6	9	10	3	5	4	1	1
1.3	**Increasing demand for certification of forest management & wood products**									
1.3.1	Certification of forest management	4	4	19	10	7	9	4	2	5
1.3.2	Certification of forest products	1	6	20	4	5	13	1	3	6
1.3.3	Certification in wood processing industry	1	4	17	4	4	12	0	4	5

a/ Made by respondents for the second inquiry

		EU-EFTA			CEECs			CIS	
	Scenario area / Driving force	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces
2.1	**Impact of globalization on the competitiveness of the European forest sector**									
2.1.1	Increasing international flows of capital	1	3	17	1	0	11	0	5	3
2.1.2	International relocation of capacities	1	4	16	1	1	10	0	2	5
2.1.3	International merging of companies	0	3	19	1	1	9	2	2	3
2.2	**Intensified innovations & changes in competitiveness of wood products**									
2.2.1	Innovations in harvesting techniques and facilities	3	8	17	1	1	10	1	4	2
2.2.2	Innovations in wood processing technologies	0	8	18	1	1	10	0	3	4
2.2.3	Development of new wood products (e.g. engineered wood)	0	5	21	1	1	11	0	2	5
2.2.4	Progress in transport & logistics	2	5	18	2	3	10	1	4	3
2.2.5	Innovations in information technologies	0	7	18	0	1	9	0	3	4
2.2.6	Introduction of new non-wood commodities	1	6	15	0	2	9	0	2	4
2.2.7	Development of new fields of application	0	6	15	1	1	8	0	3	3
3.1	**Strengthening policies to develop market framework in CITs**									
3.1.1	Recovery of forest sector in CITs	6	13	18	3	4	6	3	5	2
3.1.2	Changing ownership of forest land (e.g. privatization & restitution	16	8	12	6	2	2	6	2	2

		EU-EFTA			CEECs			CIS	
	Scenario area / Driving force	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces
3.2	**Progress in EU enlargement**									
3.2.1	Accession of the CEECs to the EU	15	6	7	8	4	7	1	2	3
3.2.2	Accession of other European countries to the EU	10	7	7	5	1	4	2	2	2
4.1	**Incentives for social/environmental benefits from forestry & wood products use**									
4.1.1	Economic incentives for protective & recreational services of forests	10	16	6	6	8	1	3	4	1
4.1.2	Economic incentives for nature oriented management of forests	9	16	9	6	8	0	3	3	2
4.1.3	Economic incentives for conversion of FAWS to forests protected for nature conservation	12	14	5	10	6	1	4	3	1
4.2	**Changes in agricultural, rural & regional development policies**									
4.2.1	Changes in rates of subsidization in agricultural production & exports	11	17	7	5	4	3	1	4	0
4.2.2	Extension of CAP elements into forestry; I.e. afforestation of agricultural land	12	12	4	6	8	3	3	1	1
4.2.3	Implementation of forestry measures in agriculture, e.g. biomass production	10	17	12	4	10	6	1	3	1
4.2.4	Promotion of forest sector as an integral part of rural development	10	15	7	6	7	2	3	1	3
4.3	**Social and demographic developments**									
4.3.1	Migration of rural populations	0	4	14	0	3	8	2	3	1
4.3.2	International emigration/immigration	6	2	10	1	2	8	4	2	2

		EU-EFTA			CEECs			CIS	
	Scenario area / Driving force	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces	Laws	Economic instruments	Market forces
4.3.3	Ageing of populations	3	3	11	2	6	5	1	2	2
5.1	**Promotion of renewable energy sources**									
5.1.1	Emphasize use of wood biomass as a source of energy	12	16	11	5	8	5	1	3	2
5.1.2	Taxing fossil energy sources & utilization	12	19	5	7	7	3	2	4	1
5.1.3	Abandonment of nuclear power stations	11	3	4	6	2	1	5	2	0
5.1.4	Promotion of energy saving technologies	8	18	12	4	9	5	1	3	2
5.2	**Improvement of waste management & emission control**									
5.2.1	Increase of recycling of waste paper & waste wood	14	12	17	6	8	3	0	3	4
5.2.2	Implementation of best practices (cleaner production or waste minimization) in wood processing industry	6	14	14	1	6	4	1	4	2
5.2.3	Implement/extend integrated pollution control	15	10	6	10	4	1	5	1	0
5.2.4	Rationalize use of wood products	3	7	14	2	5	9	0	3	3
5.2.5	Reduction of harvesting and transport losses of roundwood	2	7	15	0	5	7	0	4	2
5.3	**Climate change**									
5.3.1	Impacts of climate change on forest growth (higher temperatures, more frequent storms)	1	3	7	0	2	4	2	2	0
5.3.2	Acceptance of forests as natural sinks for the compliance of emission reduction commitments	12	14	7	4	7	3	2	3	1
5.3.3	Acceptance of wood products as natural sinks for the compliance of emission reduction commitments	12	15	10	4	6	3	2	3	1

3.2 Description of scenario areas and scenario packages

3.2.1 Scenario package 1 - Biodiversity and nature conservation

Compared with other forms of land use, forest ecosystems are generally richer in flora and fauna and are appreciated for their biodiversity, although the extent of biodiversity in forests varies. There is a widely held perception, especially amongst environmental NGOs, that biodiversity (biological diversity) has suffered in Europe's ecosystems, forest and other, over the long term as a result of interventions of one kind or another by man. There has been large-scale loss of forest land, and as a result also of biodiversity in the past to other uses such as agriculture and urban development. Biodiversity in forest has been influenced negatively by air pollution. Also forestry management led to reductions of biodiversity in forests by e.g. the adaptation of stand composition to concentrate on a limited number of commercially important species, the establishment of plantation monocultures, or the use of exotic species.

In matters concerning the conservation of biodiversity, there are several stakeholder groups with differing interests. Forest owners would like to maximize the benefits, financial or otherwise, of ownership. While private owners mostly depend on the incomes from forestry and manage their forest for profitability, public owners could cover additional expenditure for biodiversity measures from public budgets, referring to social and environmental benefits. Government authorities responsible for policy making are involved, both at the national and local levels, mainly because of their responsibilities to provide non-wood services to society. Because of the interplay between biodiversity and availability of wood supply, the wood-processing industries, *c*ommercial interests and the consumer are concerned. NGOs, both those representing specific interests in the forest sector, such as forest owners or industries, and others, notably environmental NGOs, have important roles to play in the dialogue.

Since cross-border issues are often involved, international bodies are also interested parties. Virtually all European countries are signatories to the Framework Convention on Biodiversity and to Helsinki Resolution H2 on General Guidelines for the Conservation of the Biodiversity of European Forests and are taking steps to implement their provisions.

Five levels of biodiversity are commonly identified: (a) genetic diversity, referring to the genetic variation within a species; (b) species diversity, referring to the variety of species within an area; (c) community or ecosystem diversity, referring to the variety of communities or ecosystems within an area; (d) landscape diversity, referring to the variety of ecosystems across a landscape; and (e) regional diversity, referring to the variety of species, communities, ecosystems or landscapes within a specific geographic region. Furthermore, each level of biodiversity may have three components: (i) compositional diversity or the number of parts or elements within a system; (ii) structural diversity or the variety of patterns or organizations within a system; and (iii) structural diversity or the number of ecological processes within a system. All of these levels and components are relevant to forests.

Loss of biodiversity may be observed in varying degrees. In its most extreme form it involves the extinction of species of fauna or flora. Less extreme, it means the disappearance of a species or species from a given ecosystem or habitat or at least the reduction in the population of a species in a given ecosystem or habitat, compared with the situation before some sort of disturbance occurred. Loss of biodiversity may also be considered to have occurred if the species composition has changed from that found in a natural or more or less undisturbed ecosystem, even if the total numbers and population of species found in the ecosystem have been maintained. The problem of determining whether there has been a loss of biodiversity is complicated when a natural phenomenon has occurred, such as a wildfire or storm. Apart from the CIS countries, there are few forest ecosystems undisturbed by forestry measures left in the rest of Europe.

The need to conserve biodiversity has been one of the principal elements of several key international agreements. At the global level the *Framework Convention on Biodiversity* and the *Non-legally binding authoritative statement for a global consensus on the management, conservation and sustainable development of all types of forest* adopted at UNCED 1992, together with *Agenda 21* and a *General Declaration*. These provided a basis for a number of initiatives taken at the international, national and local levels. For example, at the pan-European level, the 1993 Helsinki Ministerial Conference on the Protection of Forests in Europe adopted Resolution H2 "*General Guidelines for the Conservation of the Biodiversity of European Forests*", which was followed up by the endorsement at the 1998 Ministerial Conference in Lisbon of a *Work-Programme on the Conservation and Enhancement of Biological and Landscape Diversity in Forest Ecosystems 1997-2000*".

At the sub-European level, a communication from the European Commission to the Council and the European Parliament (5 February 1998) on a *European Community Biodiversity Strategy* establishes a general framework in which appropriate Community policies and instruments are worked out to meet the obligations of the UNCED Convention on Biological Diversity. Forests have been identified as one of the important sectors for the conservation and sustainable use of biodiversity. Several objectives have been identified, including the conservation of biodiversity as an element of sustainable forest management and an increase in forest area. The international initiatives acted as stimuli to the process already in hand in many European countries of adapting policies and practices at the national and local level. Forest Laws are being adapted to take account of countries' international commitments, and measures introduced to encourage their application in privately as well as publicly owned forests.

To assess the impacts, which such developments have on the forest sector over the long term, Inquiry 2 identified three scenario areas and for each a set of the most relevant driving forces (see Table 4):

1.1 More emphasis on nature conservation and promotion of biological diversity of forest ecosystems

Driving forces:

1.1.1 Increase area protected for nature conservation, reduction of harvesting in such areas;

1.1.2. Building of ecological networks including core areas, corridors, buffer areas and restoration areas;

1.1.3 Diversification of species composition and structure of ecological communities in forests;

1.1.4 Intensified fire protection.

1.2 More emphasis on nature oriented forest management

Driving forces:

1.2.1 Eliminate/reduce clear cutting, extend selection system of harvesting;

1.2.2 Plant endemic/indigenous species, combinations of coniferous and broadleaved species;

1.2.3 Increase rotation lengths;

1.2.4 Abandonment/reduction of drainage systems;

1.2.5 Reduction of use of chemicals (e.g. biocides) in forests).

1.3 Increasing demand for certification of forest management and wood products

Driving forces:

1.3.1 Certification of forest management;

1.3.2 Certification of forest products;

1.3.3 Certification in wood processing industry.

Scenario area 1.1 - More emphasis on nature conservation and promotion of biological diversity in forest ecosystems

Pressure to put more emphasis on nature conservation and the preservation of biodiversity has come mainly from environmental NGOs, some following a holistic approach, others more concerned with particular aspects of the problem. Forest owners, while generally sympathetic to these objectives, have tended to be resistant to measures that would place additional constraints on their management and on their possibilities to obtain a reasonable economic return. Debate has often turned to the ways in which owners could be compensated for any loss of income resulting from a reduction in their wood production operations.

Given the forces that are expected to drive changes in this scenario area, it could be expected that the area of forest available for wood supply (FAWS) in Europe would tend to decrease, as more forest land became allocated to nature conservation. The probability of more emphasis being put on biodiversity is rated to be the highest of the three scenario areas in the biodiversity package.

The biodiversity scenario is not expected to have a significant impact on the trend of wood supply (removals) in Europe over the coming decades. It could probably cause a diminution in growth, linked with a declining area of forest available for wood supply, but also because of lesser use of chemicals and a reduction in the area of clear-cutting. Changes in cutting regimes are also expected to occur in the other sub-regions.

Demand for certification may increase, at least in some countries, but it is not generally expected to result in a significant change in trends, either in the area of forest available for wood supply or of wood removals. Perhaps some rise in removals of certified wood may be offset by lower demand and removals of non-certified.

In all three sub-regions of Europe the impact of this scenario on the forest sector is expected to be a decline in the area of forest available for wood supply (FAWS) compared with the baseline scenario, but only in the EU-EFTA sub-region is its occurrence rated to be high probability. It could also lead to a lowering of the volume of removals in the EU-EFTA (high probability) and the CEECs (intermediate probability). It is not considered likely to have a significant impact on the other parameters (production, consumption and trade of wood products). The most important driving force in the EU-EFTA sub-region is expected to be increasing the area protected for nature conservation and the reduction of harvesting in such areas (1.1.1 in Table 3) followed by diversification of species composition and structure of ecological communities in forest ecosystems (1.1.3), which would tend to alter the trends in the area of FAWS and of roundwood removals below the baseline scenario. The main instruments in both driving forces would be laws and regulations, followed by economic instruments.

Scenario area 1.2 - More emphasis on nature oriented forest management

Whereas scenario 1.1 was concerned with changes in the way in which forest land might be used, this scenario area is particularly concerned with changes in silvicultural and management practices in forests already under management, rather than with the preservation of forests still undisturbed by man or those that might be withdrawn from commercial harvesting for

environmental or social reasons. It is in consequence a rather less drastic way of adapting forest utilization than scenario 1.1.

Scenario 1.2 is exemplified by the *Pro Sylva* movement, which is supported by scientific institutions in quite a number of European countries and which seeks to adapt silvicultural practices to a more natural or environmentally-friendly system. Such institutions are therefore important stakeholders, together with forest owners, who have to balance the pressure towards nature oriented systems of management with their basic ownership objectives. The intention of nature oriented systems is to introduce forms of forest management that are more sustainable from the environmental and social, as well as economic, points of view. Changes to existing practices may include one of more of the following:

a) replace clear-cutting systems by selection felling and of even-aged by uneven-aged stands and a continuous cover forestry system;

b) where clear felling remains the appropriate system, ensure that the areas involved are restricted to ensure proper regeneration;

c) restrict the use of exotic species, including species not obtained from local provenances, in artificial regeneration of stands;

d) encourage the use of a wider variety of species in stands, notably of broadleaved species in predominantly coniferous stands;

e) adapt the rotation lengths of stands to enhance their environmental and social functions, which in many cases will involve a lengthening of the rotation;

f) avoid, where possible, practices that may cause damage to the ecosystem and biodiversity, even if they may achieve increases, generally unsustainable, in wood yield. Such practices may include drainage, the use of chemicals (herbicides, fertilisers, pesticides, etc.).

The results of such changes may take a long time to achieve, i.e. up to the rotation length of the stand. There should be little impact on the area of forest available for wood supply, but on the other hand there could be some impact, usually a reduction, on the quantitative yield per hectare (net annual increment) and hence on the potential volume for harvesting. This would, however, become apparent only in the very long term. At the same time there could be some change in the qualitative yield, e.g. as a result of an increased proportion of broadleaved species, which might even have a positive effect on the financial yield, as well as the provision of non-wood goods and services. Usually adaptations to silviculture and to the yield of the stand would have some cost implications, but their economic dimension may not become visible until much later.

This scenario area is expected to have a high probability of lowering the volume of removals in the EU-EFTA sub-region (and in fact only in the northerly countries of the sub-region) below the baseline trend, but to result in no change compared with the baseline for the other parameters. In the other sub-regions the scenario area is also not expected to result in a changed trend in any of the parameters. According to the inquiry results the most important driving force could be a reduction in the use of chemicals in forestry operations (1.2.5), followed by the elimination or reduction of clear felling and the extension of the use of selective felling systems of harvesting (1.2.1). Laws and regulations would be the most important instruments, closely followed by market forces.

Scenario area 1.3 - Increasing demand for certification of forest management and wood products

Pressure to introduce forest certification arose from the concern aroused by environmental NGOs about the alarming rate of loss and degradation of tropical forests, as well as damage to forests in the temperate and boreal regions from pollution, fire, disease and other causes. Forest certification was perceived as one of the tools with which to promote the sustainability of forest management

and therefore to arrest these trends. It is the process by which forest owners voluntarily submit their forests to inspection by an independent certification body to determine whether the management meets clearly defined criteria. It may also include certification of wood products and wood-processing industries along the chain-of-custody from the forest to the point of sale to the ultimate customer, if it is the intention to sell the product as coming from a certified source. The consumer is thereby able to identify the product as having come from forests managed according to certain standards, e.g. the principles of sustainable forest management, and also processed according to certain standards. Two of the principal objectives of certification have been stated to be:

(1) To improve the environmental, social and economic quality of forest management;

(2) To ensure market access for certified products, particularly in markets with high sensitivity to environmental concerns.

From among a number of definitions of sustainable forest management (SFM), the following is taken from a resolution adopted by the Helsinki Ministerial Conference on the Protection of Forests in 1993 (Resolution H1):

"Sustainable management means the stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biological diversity, productivity, regenerative capacity, vitality and their capacity to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems".

An important output from the Helsinki process was the establishment of a set of six criteria and twenty quantitative indicators, with which to monitor progress in implementation of the resolution. These also formed the basis for several certification schemes at the international level, including the Forest Stewardship Council (FSC), the ISO 14001 EMS (Environmental Management System), the Pan-European Forest Certification scheme (PEFC), as well as at the national level. The systems used differ considerably, which complicates the problem of trying to achieve harmonization between them or even mutual acceptance.

By mid-2001 about 80 million hectares of forests had been certified worldwide or some 2% of the total forest area. More than half the certified area was in Europe, with the largest areas in Finland, Sweden and Norway. The pace of certification accelerated in 2000 and 2001. Although pressure for the introduction of certification arose particularly from concerns about tropical deforestation, progress in establishing schemes in tropical countries has so far been limited, with a number of exceptions. Demand for certified wood products has grown, notably in the United Kingdom, Germany and the Netherlands, but the volumes involved so far represent a small part of the total European market. For established suppliers of certified wood products, the main driver often seems to be image and credibility, in addition to pressure from environmental NGOs. Generally speaking, enthusiasm for certification on the part of actual consumers has been muted.

In light of the inquiry results this is expected to lead to growth in consumption and trade of wood products somewhat above that of the baseline scenario in the EU-EFTA and CEECs and others sub-regions. In those sub-regions and the CIS its impact on the area of FAWS could likely be negative, but the occurrence of this scenario area is rated at no more than of intermediate probability in EU-EFTA and low probability in the others.

3.2.2 Scenario package 2 - Globalization, innovation and market structures

Globalization is one of the most ubiquitous processes taking place at the turn of the millennium, and also one of the most misunderstood. While by no means a new phenomenon, the process, which is essentially a market driven one, has gathered pace in recent decades as a result of major technological developments in manufacturing, communications and transport. Trends towards the

liberalization of international trade have been helped by the spread of regional integration and by the lowering of tariff and non-tariff barriers under the aegis of GATT (now replaced by the WTO). As globalization has become increasingly pervasive, disquiet about its disadvantages, real or imagined, has grown, and has been expressed by public demonstrations organized by many different NGOs during a number of major international meetings in recent years, including those of the WTO, World Bank and G7.

In an increasingly competitive climate, it has become unavoidable for companies operating at the international level to take advantage of the possibilities of locating their operations in an optimum way in relation to their markets and sources of inputs in order to reduce costs. In practice, this has often meant transferring production, or part of it, to places with a favourable mix of factors (labour, capital, know-how, energy, raw materials, etc.). The overall growth in trade has been accompanied by a shift from inter-industrial trade to intra– industrial trade over the last decades, for example of components for the electronics or vehicle-building industries. Consumers have benefited from lower prices. The downside has included closure of industries in some 'traditional' producing areas with loss of jobs, and social and environmental abuses such as the use of child labour and uncontrolled emissions of pollutants.

There is an increasing trend towards the globalization of standards, bringing benefits to industry along the stages of production and to the final consumer.

The capacity of a country's population and industrial sector to benefit from globalization is associated with the ability to innovate technology or to adopt it by importing it from elsewhere. This is linked to a country's capacity to attract and utilize effectively the appropriate factors of production, notably capital. Most of the industrially advanced countries, including most of Western Europe, fall into the group of technological innovators. The Iberian Peninsula and some central and eastern European countries are in the group of technological adopters. Most of the CIS countries are in the technologically excluded group. The ability or inability to benefit from technological developments appears to be a major factor leading to the widening gap between rich and poor countries. The reversal of this trend requires the application of development strategies that enable the latter also to have better access to technological innovation.

Virtually everyone is a stakeholder in the processes of globalization and innovation, but particularly concerned within the forest sector are the wood-processing industries and trading enterprises, as well as their employees and their representatives, the trade unions. Governments, and in particular those departments dealing with company law, industrial development and negotiations on international trade, are also concerned because of their involvement in company and trade legislation. Several international bodies are also stakeholders, for example, the Commission of the European Union because of its programmes on innovation. Consumers are important stakeholders, while scientific and educational institutions also have a significant role to play in the development of new technology and its transfer and application. Financial institutions and international organizations involved in development assistance and capital transfer have a direct interest as well.

The two scenario areas within scenario package "Globalization, innovation and market structures" are:

2.1 Impact of globalization on the competitiveness of the European forest and forest industry sector

Driving forces:

2.1.1 Increasing international flows of capital;

2.1.2 International relocation of capacities;

2.1.3 International merging of companies.

2.2 Intensified innovations and changes in competitiveness of wood products

Driving forces:

2.2.1 Innovations in harvesting techniques and facilities;

2.2.2 Innovations in wood processing technologies;

2.2.3 Development of new products, e.g. engineered wood;

2.2.4 Progress in transport and logistics;

2.2.5 Innovations in information technologies;

2.2.6 Introduction of new non-wood commodities;

2.2.7 Development of new fields of application.

Scenario area 2.1 - Impact of globalization on the competitiveness of the European forest and forest industry sector

In the global context, two types of competitor to the European forest and forest industry sector may be distinguished: the same sector in other regions of the world; and other (non-wood) industrial sectors, either within Europe or elsewhere. The factors determining the competitiveness of a sector, or an industry, fall into two main groups: quantitative and qualitative. Quantitative factors include the differences between competitors in input costs, such as those of raw material, labour, distribution, energy and capital, as well as the degree of industrial development, conversion efficiency and location and proximity to markets, all of which can vary within and between countries and enterprises. Qualitative factors include levels of know-how, the skill and structure of the labour force, product quality and performance, application of new technology, infrastructural support, national policies and environmental protection, amongst others. The assessment of how these have an impact on competitiveness is assisted by the use of SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis, in which each factor can be placed in the appropriate part of a quadrant, allowing relative strengths and weaknesses to be compared and conclusions to be drawn about possible measures to exploit the strengths and opportunities and mitigate the weaknesses and threats. Another measure of assessment of countries' or regions' ability to take advantage of globalization is through PEST (Political, Economic, Social and Technological) analysis.

Comparing as diverse a region as Europe (including the CIS) with other regions, neither SWOT nor PEST analysis is likely to be effective; inter-country comparisons would be more meaningful. However, at the level of the three sub-regions (EU/EFTA, CEECs and others, CIS) some general observations could be made. For example, the high cost of wood and of labour (quantitative factors) may be considered a weakness within EU/EFTA, but high levels of skills and know-how, good infrastructure and availability of new technology (qualitative factors) are strengths. Those same qualitative factors would be weaknesses in the CIS and some CEECs, while the cost of raw material and labour would generally be a strength or at least neutral.

Parts of the European wood-processing sector have been adapting to increase their competitiveness, for example by undergoing a process of concentration in recent years. This has been particularly the case with the pulp and paper sector in northern Europe, which is now dominated by a few companies that have expanded through mergers and acquisitions, also outside northern Europe, to become among the largest in the world. This globalization of the industry has helped it to compete successfully on the world market, but nevertheless the extent to which it has become concentrated has not been as great as in some other major industries. Especially in the case of paper-making, there still exist a large number of relatively small producers in many European countries. In the sawmilling sector also, despite a marked trend towards fewer and larger mills in

many countries, there are still a large number of small and medium-sized mills often serving local or regional markets: globalization of the industry hardly exists as yet.

Nearly all the wood-processing capacity in the CIS countries is located in the Russian Federation, where most industries have been turned into joint stock companies since the process of transition began in the early 1990s. Some much needed modernization has taken place, in which foreign capital has played a part in a number of instances. Nevertheless, because of the slow pace of introducing company law affecting foreign ownership, as well as other problems such as inadequacies in infrastructure, it cannot be said that globalization has had an impact on the Russian wood-processing sector yet to any marked extent. In the right circumstances, it could have an immense impact in the future.

The impact of this scenario area is expected to be positive (higher growth than foreseen in the baseline scenario) for production, consumption and trade in all three sub-regions. However, the probability of its occurrence is estimated at an intermediate level, but increasing from EU/EFTA over CEECs to CIS. Increasing globalization is mainly expected in Eastern Europe, which is probably related to higher dynamics in economic developments in CEECs and CIS sub-regions. The most important driving force in the CIS is expected to be the international relocation of wood-processing capacities (2.1.2) to take advantage of the availability of large quantities of raw material as well as cheap labour in the Russian Federation, but increasing international flows of capital and international merging of companies (2.1.1 and 2.1.3 respectively) are also seen as important. Trade (exports) received a high evaluation during the inquiry, what can be interpreted that there is an expectation about a greater impetus than the other forest parameters.

Scenario area 2.2 - Intensified innovations and changes in competitiveness of wood products

As a generalization, it could be said that there are extremes in the extent to which the European wood-processing industries, as well as forestry, have introduced innovations in their technologies. Some are at the forefront of technological development, notably the more modern pulp, paper, wood-based panels and sawmilling industries. Others, especially many small and medium-sized sawmills that have been operating for many years, have hardly changed their production methods, often for lack of capital with which to install more up-to-date machinery. The same extremes exist for roundwood harvesting and other forest operations. The potential exists for the more universal application throughout Europe of more efficient technologies and methods of production. There are, however, a number of inhibiting factors. Much of the forest estate and of the wood-processing industries is small scale and fragmented, making the introduction of innovations problematical from the financial and practical points of view. Concentration into fewer, larger units would ease this problem, but especially in forestry this is unlikely to occur. There would also be social consequences to consider, including the loss of jobs.

Innovation may have a number of consequences so far as the production and consumption of wood and wood products are concerned. It may result in improvements in yield, efficiency or performance, the outcome of which could be reduced cost and hence greater competitiveness (and greater consumption) and/or reduced use of the product per application (and reduced consumption). Innovations in other (non-wood) products or services could reduce or eliminate wood products' market share, as happened in the past with railway sleepers and pit props, or could increase wood products consumption, for example the growth in the use of new types of office papers as a result of the emergence of desktop printing and fax machines and computers. The driving motors are almost always market forces, but these can be affected by research and development (R&D), which in turn can be guided by other influences, for example availability of the factors of production (labour, raw materials, capital, etc.). Rising costs or shortages of labour have been a major driving force in innovation, changes in raw material quality or availability also to some extent.

In this connexion, the growing acceptance of the fact that Europe's forests have the potential to provide substantially higher volumes of wood on a sustainable basis than at present and that wood is an environmentally friendly material could direct R&D towards seeking new uses for wood, new types of products. Engineered wood products and wood-oriented design and architecture could lead, indeed already are leading the way.

Another area with potential for innovation is the harvesting of wood from small forest holdings. The problem here is partly economic, partly technical, and partly institutional. Harvesting technology has been highly developed for use in large forest stands and terrain accessible to wheeled or tracked vehicles. There is a major challenge to adapt technology to make it economically usable on small areas, especially those in difficult conditions (steep slopes, etc.). Besides developing appropriate techniques, there is also the need to foster active cooperation between forest owners, for example through sharing of equipment, exchanging expertise, joining in marketing cooperatives, and using contractors. There are between 10 and 15 million private forest owners in Europe (excluding the CIS), most of them with holdings of 5 hectares or less, which account for about half the forest area. Consequently, there are good social reasons to support this important segment of the population as well as economic ones. This is also discussed under scenario area 4.1 - Incentives for social/environmental benefits from forestry and wood products use.

There is a major challenge for research and development (R&D) not only to devise technologies and systems that could be applied more widely in the European forestry and wood-processing sector, but also to find ways of having them actually put into effect, especially in small and medium-sized enterprises. R&D also has an important role in the development and application of technological innovations in creating new products or improvements in existing ones and in finding new markets and applications.

While this scenario area is expected to result in positive impacts on production, consumption and trade in all three sub-regions, its probability of occurrence is rated to be high in the CIS, and at an intermediate level in the others. Its impact could be especially marked in the CIS for roundwood removals and production of wood products. Of the driving forces, the development of new wood products (2.2.3) is given the highest estimate of probability in the CIS, but innovations in harvesting techniques (2.2.1), innovations in wood-processing techniques (2.2.2), progress in transport and logistics (2.2.4) and innovations in information technologies (2.2.5) rank almost as high. In many cases these advances will be the result of introducing technologies from other countries. Market forces and economic instruments are expected to be almost equally important as instruments; laws are only of minor importance.

3.2.3 Scenario package 3 - Integration of the former planned economies in the global market

All twelve countries of the CIS and the fifteen in central and eastern Europe are in the process of transition from planned economies to various forms of market economy, following the breakdown of their former political regimes at the beginning of the 1990s. This far-reaching development is directly affecting the livelihoods of well over half the population of Europe (including the CIS) and is having some impacts on the rest. In terms of land area, the transition process is taking place on 88% of Europe's surface, but in terms of its economy the proportion directly involved is relatively small, around 25%. Of Europe's total area of forest and other wooded land of about 1150 million hectares, the countries in transition account for 980 million or 85%, and the Russian Federation alone for 77%. These countries' share of Europe's wood processing is more modest: in the case of sawnwood production about 33% in 2000 and less for other product groups. Excluding the Russian Federation the share of sawnwood production drops to 17%.

At the time the transition process began in the early 1990s, forests were largely owned and managed by the State (100% in many of them). Based on central European forestry traditions, the

quality of management in many countries was good, although lack of investment possibilities often meant that forest operations were often technologically backward. The same problem faced the wood-processing industries, which were under-capitalized and operating on obsolete equipment. Most of these industries were State-owned and managed according to central planning principles. Production was generally based on quantitative targets, with quality and the needs of the market secondary considerations.

The pace of transition, including the restitution and privatization of some forests and industries, has varied considerably from country to country, depending on the policies adopted, the possibilities for change and the need to seek access to external markets, especially in western Europe. In the Russian Federation, for example, the forests have remained under State ownership, while much of the wood-processing sector has been transferred to joint stock companies. In Slovenia, 70% of forests are now privately owned. The proportion in Poland of 17% is much the same as before transition began, while in Slovakia it is 44% and will rise further. Privatization and restitution have resulted in a considerable increase in the number of small-sized forest units, many of which owned by persons without forestry experience. Some have been tempted to exploit their forests for short-term gain without consideration of the environmental consequences or of sustainability.

The economies of the transition countries suffered serious declines in the early 1990s with many industries closing down, sharp increases in unemployment and falls in standards of living. The Council for Mutual Economic Assistance (CMEA), to which most of the planned economy countries belonged, ceased to be active. Economic stabilization and the timing and pace of recovery varied from country to country and only a few economies had returned to their pre-transition levels by the turn of the century; Poland's was one. Progress towards creating market-based economies was a major criterion in determining whether a number of countries' applications join the European Union would be accepted for negotiation. The extent of the problems to be overcome in the transition process had generally been underestimated, so that the length of time required is proving much longer than originally expected or hoped.

The principal stakeholders in the process of integration of the former planned economies into the global market are the populations of the countries involved and their governments, institutions, industries and trading companies. Also involved are countries and international organizations providing assistance to the process, in particular the European Union and its member countries, who will also decide on the enlargement of the EU, the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB). Other stakeholders are companies in partner countries, including those interested in direct foreign investment in the CITs, as well as certain NGOs, particularly those concerned with environmental protection. A large part of CITs' trade in forest products is conducted with companies in the EU, which is consequently affected by business cycles in the latter.

Two scenario areas have been defined under this scenario package:

3.1 Strengthening policies to develop market framework in countries with economies in transition (CITs)

Driving forces:

3.1.1 Recovery of forest and forest industry sector in CITs;

3.1.2 Changing ownership of forest land (e.g. privatization and restitution).

3.2 Progress in EU enlargement

Driving forces:

3.2.1 Accession of the CEECs to the EU;

3.2.2 Accession of other European countries.

Scenario area 3.1 - Strengthening policies to develop market framework in countries with economies in transition (CITs)

One of the most important, but also the most difficult, steps towards strengthening the market framework in the CITs is to create, or recreate, the political climate that allows private enterprise to develop. In the first place, legislation has to be enacted to enable enterprises to compete in an open market, without political interference, what might be termed 'creating a level playing field'. There has to be, of course, some general legislation to cover social, environmental and other needs, for example relating to employment and pollution, but it must be made non-discriminatory. Similarly the taxation system has to be fair and to function effectively. This applies particularly if foreign investment is to be attracted with which to modernize existing enterprises or to build new ones. A disincentive in this respect might be the existence of exchange controls that would restrict the refunding of profits to the investor's home country.

Another essential policy to strengthen the market framework is to improve the financial, as well as the physical, environment within which enterprises have to operate. Such services as banking and insurance, amongst others, were often poorly developed under central planning systems. Roads, railways and telecommunication systems were generally inadequate to cope with the needs of a modern industrialized society. Besides the introduction of enabling legislation, including where appropriate measures to encourage the involvement of the private sector and foreign investors, the necessary funding has to be found.

Last but not least, the forest and forest industry sector has to compete with all the other industrial sectors to attract the funds for its development. In this respect, the sector in the CITs is probably in a situation not very different from that in many other countries, that is to say, it is not perceived as being among the more profitable and dynamic ones. On the other hand, in some countries, notably the Russian Federation, there is the attraction of a potentially very large forest resource, which could provide the basis for substantial growth of the wood-processing industries.

Not surprisingly, the probability of this scenario occurring is rated at a high level in both the CEEC and the CIS sub-regions, where its impact is expected to result in trends in all five parameters above the baseline scenario. In the case of the CEECs and others the trend could be much higher for the production and trade (export) of wood products, and in the CIS for roundwood removals and consumption as well. These developments could be reflected in higher than baseline trends in consumption and trade (imports), but lower than baseline trends in wood products output as a result of greater competition from imports, in EU-EFTA. In the other sub-regions, the most important driving force is expected to be the recovery of the forest sector (3.1.1). Market forces could be the most important instrument in the CEECs and others, and economic instruments, followed by laws and regulations, in the CIS.

Scenario area 3.2 - Progress in EU enlargement

In March 1998 the EU formally launched the process that will make enlargement possible. It embraces the following countries in transition: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia (10 countries), and three other countries: Cyprus, Malta and Turkey. Accession negotiations were formally opened at that time with six countries: Czech Republic, Estonia, Hungary, Poland, Slovenia as well as Cyprus. Two

years later negotiations were launched with a further six: Bulgaria, Latvia, Lithuania, Romania, Slovak Republic, as well as Malta. Negotiations with candidate countries are being conducted individually, and the pace of each negotiation and the timing of eventual accession depend on the degree of preparation of each country and the complexity of the issues to be resolved. One of the most difficult issues to be resolved is that of support for the agricultural sector, including forestry, in the candidate countries.

Various financial and technical assistance programmes exist from the EU to CITs, such as SAPARD (Special Accession Programme for Agriculture and Rural Development), PHARE and ISPA (Instrument for Structural Policies for Pre-Accession), are helping to consolidate economic reform and strengthen business by creating a supportive and transparent regulatory environment. Alignment with the rules of the EU's internal market and adoption of a legal framework containing trade and investment rules is already paying dividends by attracting new investment. However, accession of the successful candidate countries, when it occurs[4], should provide an additional boost to economic growth, from which all industries, including the wood-processing sector, will benefit. Rationalization of the agricultural sector, which in several candidate countries still accounts for a disproportionately large share of GDP and the workforce, may involve, among other things, more support for forestry, for example for afforestation of abandoned agricultural land.

This scenario area is estimated to have the greatest probability of occurrence and the greatest impact on the forest sector of the CEECs and others, with all the parameters expected to show trends above the baseline scenario, especially the production of wood products. In the other sub-regions, the probability of occurrence is rated at an intermediate level, and the impact in EU-EFTA would be mainly be seen as increases in the consumption and trade (imports) of wood products and lower production; and in the CIS increases in all parameters except the area of FAWS. The accession of CEECs as well as other European countries to the EU (3.2.1 and 3.2.2) are expected to be an important driving force. Laws and regulations, followed by market forces, are considered to be the most important instruments.

3.2.4 Scenario package 4 - Regional and rural development

At the world level, the available area of land is having to be shared amongst an increasing number of people. Therefore, as underlined in UNCED Agenda 21, an integrated approach to the planning and management of land resources is essential. In Europe, with the exception of the CIS, population density is already very high, and there is constant pressure on rural areas for changes in land use, for example from demand for land for building and communication infrastructure. At the same time, rural populations have been migrating to the cities to seek better paid jobs and higher standards of living. Especially in the more remote regions of southern Europe, communities have been depopulated and farming land abandoned, with a serious weakening of the social infrastructure.

The relative importance of agriculture, forestry and other forms of land use varies from country to country, depending on geographic and climatic conditions, as well as historical, social and economic conditions. For several millennia until the early 19th century, the area of forest was in decline (with occasional breaks, such as at the time of the Black Death), as it made way for agriculture as well as urbanization. Over the past two hundred years, its area has recovered, gradually overall, dramatically in some countries such as France where it has more than doubled since the early 1800s. There has been a combination of natural recolonization and artificial afforestation (plantations) to create the landscapes of today. Part of the afforestation was carried out for ecological reasons, notably for soil protection from water and wind erosion, and part to augment

[4] The following ten countries will join the EU on 1 May 2004: Czech Republic, Estonia, Hunhary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia, Cyprus and Malta.

wood supply. Governments in many countries have supported through subsidization, tax incentives and other measures the expansion in the area of forest for social and environmental, as well as economic, reasons. In recent years, as it has become increasingly apparent that availability of wood is no longer a pressing problem, and the emphasis has switched to boosting the social and environmental functions of forests.

Many governments have expended large sums on policies to preserve social structures in rural areas, mainly through the subsidization of agriculture. Partly as a result of this, partly through market forces, productivity has increased greatly, to the point where employment in agriculture has fallen to account for only a small percentage of the total national labour forces and, especially in the EU, food production exceeds demand. The need to react to this situation has been recognized for some time, and moves have been initiated to reform the EU's Common Agricultural Policy (CAP). The practical difficulties of implementing such a major change in policy have proved immense, however, not least in finding ways to avoid damaging the social fabric in rural areas and to maintain employment and living standards. It has been envisaged that increased forestry activity, including afforestation, should be one of the solutions in certain areas. The fact that the social and environmental functions of the forest are mostly not income-generating (hunting, the commercial harvesting of non-wood forest products and some forms of recreation can be exceptions), coupled with the fact that in most western European countries the major part of the forest area is privately owned, raises the issue of how the provision of those functions is to be financed. The profitability of wood production is generally insufficient to support the non-wood functions.

The main stakeholders in this scenario package are the owners of land, including forest owners, whether State, municipal, private or other; national and local authorities; forest services in their policy making role and their counterparts dealing with other sectors of rural and urban development; farmers and other land users; NGOs concerned with the countryside, nature protection and natural resources; and those employed in the countryside, including farm and forestry workers, and their labour unions. Members of the general public, both town and countryside dwellers, are also stakeholders in their role of 'beneficiaries' of the goods and services which forests and landscapes provide.

Three scenario areas are considered within this scenario package:

4.1 Incentives for social/environmental benefits from forestry and wood products use

Driving forces:

4.1.1 Economic incentives for protective and recreational services of forests;

4.1.2 Economic incentives for nature-oriented management of forests;

4.1.3 Economic incentives for conversion of forests used for wood production to forests protected for nature conservation)

4.2 Changes in agricultural, rural and regional development policies

Driving forces:

4.2.1 Changes in rates of subsidization in agricultural production and exports;

4.2.2 Extension of Common Agricultural Policy (CAP) elements into forestry, i.e. afforestation of agricultural land;

4.2.3 Implementation of forestry measures in agriculture, e.g. biomass production;

4.24 Promotion of forest and forest industry sector as an integral part of rural development)

4.3 Social and demographic developments

Driving forces:

4.3.1 Migration of rural population;

4.3.2 International emigration/immigration;

4.3.3 Ageing of population.

Scenario area 4.1 - Incentives for social/environmental benefits from forestry and wood products use

Demand for the social and environmental benefits from forestry is rising virtually everywhere in absolute terms and relative to the demand for wood, although it is not easy to measure it in concrete terms. Some forests, depending on their type, may perform a combination of functions, for example wood production, avalanche control and recreation (skiing). Others may be more or less uni-functional, e.g. industrial plantations. The possibilities for changes in management or silviculture to broaden their use to include a wider or different range of functions will vary according to circumstances, and the changes will generally take a long time to take effect. Exceptions may be where a policy decision is taken to remove an area of forest from wood production and use it for nature conservation or some other ecological or social purpose. In either case, there are likely to be costs involved, which the forest owner is unable or unwilling to cover. The carrying out of the policy may therefore require the owner to be compensated by society either for loss of earnings from wood production or for the costs of management changes. Some countries, as well as the EU, already provide grants or loans for this purpose, for example to enable the introduction of more broadleaved species into a stand.

The probability of this scenario area's occurrence is rated at an intermediate level in all three sub-regions and it is generally not expected to result in significant changes from the baseline scenario. The exception could likely be somewhat higher than baseline trends in roundwood removals and consumption and trade of wood products in the CIS. The impact of this scenario area is likely to be important on the non-wood functions of the forest, including non-wood goods and services, which are not covered in this report. The main driving forces here are expected to be incentives for protective and recreational services of forest. Mainly economic instruments and laws will likely induce these incentives. The impact in CEECs and CIS is considered to be rather minor in comparison to the EU/EFTA sub-region.

Scenario area 4.2 - Changes in agricultural, rural and regional development policies

There has been an assumption that the changes being made in agricultural policies, such as those to the CAP, would result in a considerable decline in the area under cultivation, which would require alternative uses being found for them. It has also been assumed that one such use would be forestry, that is to say afforestation on abandoned agricultural land, and in some countries grants are available to farmers for that purpose. Such a basic change in land use is not always favoured by farmers, even with incentives, and it is difficult to predict how extensive an area of farmland might eventually be put under forestry at the European level. It could happen, for example, that farmers might react to loss of subsidies for food production not by reducing the area under cultivation but by going in for more extensive farming with reduced yields per hectare, which might also be compatible with more sustainable and biologically sound systems of production (organic farming).

In recent decades a slight increase of forestry land use in Europe can be observed, possibly as a result of changed agricultural policies and financial support to forest owners using nature oriented forestry management approaches. While these measures are partly destined for increasing of wood

production, it would take quite a long time before there would be a noticeable impact on the availability of wood for the market. Only some of the planting would be of fast-growing species.

Forestry development, i.e. afforestation, has been undertaken in some countries for social reasons, namely as a means for maintaining employment in rural areas. The evidence seems to be mixed whether it has been effective in this respect. It depends partly on whether it has been possible also to attract industry and services such as tourism and recreation to the area, including ancillary activities such as transportation. Where forests already exist, it may be possible to boost local employment by encouraging tourism, including work for people in visitor centres, restaurants, hotels, etc. This necessitates an integrated planning and management approach, in which foresters work closely with other rural managers and entrepreneurs.

The current tendencies in CAP reforms of EU are related to assist farmers in their intentions to bring additional services and "new" value added products to the markets, mainly products which are coming from a more natural and ecologically oriented agriculture. This approach is more consumer-, than production and income-oriented. The overall goal is to contribute to an integrated regional development in rural areas.

In the EU-EFTA and CEECs sub-regions the probability of occurrence of this scenario area is rated high. Its impact in EU-EFTA is estimated to be mainly on the area of FAWS, which could expand slightly more than foreseen in the baseline scenario. In the light of the inquiry results, its impact could be to raise all analysed parameters in the CEECs above the baseline trend. In EU-EFTA the most important driving force is expected to be changes in rates of subsidization of agricultural production and exports (4.2.1), in which economic instruments would play the greatest role followed by laws and regulations. This driving force, together with extension of elements of the EU Common Agricultural Policy in forestry (4.2.2) are estimated to be the most important driving forces in the CEECs and others. In the CIS, the occurrence of the scenario area is rated as of low probability and its impact on the forest parameters not to be significant.

Scenario area 4.3 - Social and demographic developments

The populations in many European countries have become largely urbanized, especially in western Europe. The tendency in some is still a drift from the countryside into towns to seek employment and a better standard of living, leaving the older people behind. Infrastructural changes, such as improvements in roads, schools and social services and the development of telecommunications, especially the internet, are tending to halt or even reverse this trend, as people are able to live further away from their work or, more and more, to work from home. This is also helped by the fact that an increasing share of employment is in the services sector. Nevertheless, in the more densely populated parts of Europe, much of the population has become 'out of touch' with the countryside, its contacts being largely from occasional visits at weekends to local beauty spots or from walks or picnicking or some other recreational activity. Perceptions of the value of forests and the uses to which they should be put often differ sharply between urban and rural citizens.

Internal migration has been taking place for centuries. The movement of peoples between countries and continents has also been occurring for a long time, but until fairly recently Europe was a region of net emigration, as people sought better opportunities across the seas. In recent decades, however, the growing disparity between standards of living in western Europe and in other parts of Europe as well as in countries outside Europe, notably also the influence of local wars, has resulted in a rising tide of immigration into the former to the extent that in some cases it has caused social tensions. There has been concern, for example, that immigrants have been taking away jobs from the less skilled local workers. In many instances, however, immigrants have been taking jobs which local workers have been reluctant, for one reason or another, to undertake or sometimes do not have the necessary skills for. Quite a number of these jobs, including seasonal ones, have been

in agriculture and forestry, and immigrants have played an important role in filling labour shortages in the countryside left by the drift to the cities.

Movement of labour between countries of the EU has, in theory, been largely liberalized and, depending on the outcome of negotiations with candidate countries, this could be extended to them in the future. Experience has shown, however, for example after the December 1999 storm damage to forests, that difficulties can arise over intra-EU labour movements and even more so with importing labour from other countries. Several countries have become concerned about the pressure of would-be immigrants from other countries, such as North Africa and the Middle East, to the extent of seeking to tighten immigration laws.

Because they are largely of working age, immigrants are in fact helping to offset a demographic trend that is common to most European countries, namely the ageing of the population. With birth rates falling below replacement levels, the proportion of the population of school and working age is falling and that of pensioners rising, which will put increasing pressure on the financing of the social services. There are also important implications for the labour market and long-term growth in the economy. The changing demographic profile may also have an impact on spending and consumption patterns, for example in the type of housing required, and hence on the quantity and type of forest products used.

To summarize, social and demographic developments do not usually take place abruptly, but smoothly over decades. Demographic forecasts can be made with a rather high significance. Considering the assumptions made in the special study on macroeconomic growth (NOBE 2003), this scenario area is not discussed further. It is assumed that its elements have been adequately incorporated in the assumptions underlying the GDP forecasts in the NOBE report and will therefore adequately considered in the baseline scenario modelling.

3.2.5 Scenario package 5 - Energy and environment

Until the Industrial Revolution wood was the most important source of energy in Europe, and it continues to be in most developing countries. The tremendous growth in the use, first of coal, later of oil and natural gas, provided the energy basis for the industrial expansion during the 19^{th} and 20^{th} centuries. It was only in the latter part of the 20^{th} century that the non-renewability of fossil fuels began to be a matter of serious concern, especially in the light of the two oil price shocks in the 1970s. At about the same time, the negative environmental effects of burning fossil fuels, in particular atmospheric pollution and the accumulation of CO_2 and other greenhouse gases in the atmosphere began to cause concern, culminating in the global debate, which is still in progress, on the causes and effects of climate change.

The last has been the subject of considerable environmental concern after the Chernobyl disaster and other incidents. Strong intentions could be recognized in some countries to abandon production of energy based on nuclear power. NGOs together with ecologically oriented political parties, with support from citizens, located close to nuclear power stations, are struggling increasingly against this type of energy generation. Referring to the environmental risks and to the financial burdens for state budgets, some governments in Western Europe have passed legislation to abandon nuclear energy generation and to close nuclear power stations. In few cases the time horizon for an exit from this technology is close to the forecast period chosen for the current study. It is to be expected that these commitments will certainly influence the energy market in general and could, considering all the ecological advantages, open up new opportunities for energy generation from renewable resources, including wood.

It is estimated that the consumption of wood for energy use, including fuelwood, wood residues, pulping liquors, etc. but excluding some quantities of waste paper, amounted to over 200 million m^3 EQ in Europe in 1990, which was the equivalent to about 47% of annual removals. Thus, although

wood-based energy accounted for only about 3% of Europe's total energy consumption, its share of total domestic wood supply was considerably more important. This suggests that should policies be implemented to raise the share of wood in total energy use, even modestly, it could have a noticeable impact on the supply side. In particular, greater use of roundwood (fuelwood), wood residues and waste paper and waste wood for energy could reduce the availability of wood raw materials for pulping and wood processing industry, including the lower qualities of industrial roundwood (pulpwood). In fact, in recent decades availability of these qualities in many European countries has tended to exceed demand, resulting in weak prices and a backlog in thinnings. Competition for lower quality wood between industrial users and users for energy may be more a matter of the price they can afford to pay rather than availability.

UNCED in 1992 adopted the Framework Convention on Climate Change, in which signatory countries supported measures to bring the causes of climate change under control, notably by slowing down or arresting the net emissions of greenhouse gases. This could be achieved by greater efficiency in the use and conservation of energy, by increasing the use of alternative fuels (that is, alternative to fossil fuels), and by taking measures to re-absorb CO_2 from the atmosphere. Forestry and the forest industry sector could play a role in all of these. For example, the production of sawnwood and wood-based panels requires considerably less energy than that of competing construction materials, such as steel, concrete, glass and plastics, and the former have good thermal insulation properties. They also come from a renewable resource. The burning of wood is generally considered to be neutral so far as its impact on the environment is concerned, because the main emission is CO_2, which is taken back into biomass by the process of photosynthesis. And if established on a sufficiently large scale, plantations act as net carbon sinks. Furthermore an eventual halt to tropical deforestation would make a measurable contribution to slowing down the increase in atmospheric CO_2 concentrations.

The principal stakeholders in scenario package 5 are governments, which have the responsibility of setting the environmental standards for the production and use of energy, the producers and users of all types of energy, consumers and consumer groups, the wood-processing industries and users of wood products, such as the construction sector. Environmental NGOs play active roles in raising public awareness of the issues involved and in putting pressure on the policy makers. The forestry sector is a major stakeholder as a provider of wood fuel and, potentially in the future, in the sequestration of carbon.

In this scenario package three scenario areas are identified:

5.1 Promotion of renewable energy sources

Driving forces:

5.1.1 Emphasize use of wood biomass as a source of energy;

5.1.2 Taxing fossil energy sources and utilization;

5.1.3 Abandonment of nuclear power stations;

5.1.4 Promotion of energy saving technologies.

5.2 Improvement of waste management and emission control

Driving forces:

5.2.1 Increase of recycling of waste paper and waste wood;

5.2.2 Implementation of best practices (cleaner production or waste minimization) in wood processing industry;

5.2.3 Implement/extend integrated pollution control;

5.2.4 Rationalize use of wood products;

5.2.5 Reduction of harvesting and transport losses of roundwood

5.3 Climate change

Driving forces:

5.3.1 Impacts of climate change on forest growth (higher temperatures, higher precipitation, more frequent and stronger storm occurrences);

5.3.2 Acceptance of forests as natural sinks for the compliance of emission reduction;

5.5.3 Acceptance of wood products as sinks for the compliance of emission reduction commitments.

Scenario area 5.1 - Promotion of renewable energy sources

The price of energy from non-fossil fuel sources has generally speaking been well above that from fossil fuels, and this has been a critical factor limiting investment in the former. Over the past 2-3 years the price of oil has fluctuated considerably from around $10/barrel to over $30. It has been said that oil prices would have to stay consistently above $30/barrel for a prolonged period for greater interest to be shown in other sources, which might occur if a major disruption in international supplies happened. Alternatively, price differentials could be reduced by taxing the use of fossil fuels - a few countries have introduced or are considering carbon taxes - or by subsidizing the use of alternative fuels - which is also happening in some countries. Besides biomass, including wood, the latter include hydro, wind, solar.

A number of governments, including France, Sweden and Switzerland, are giving support to the development of alternative energy sources, including biomass, through subsidies or grants. Official support or appropriate legislation has also been given to energy-saving measures, such as improved heat insulation in buildings, where wood products often have a marked advantage over other materials. There do not appear to be serious technical barriers to greatly increasing the production and use of wood fuels; rather, the problem has been economic. Apart from price competitiveness, problems also include economies of scale (supply may be scattered), convenience of use and sometimes the attitudes of users. To some extent these can be overcome by concentrating power generation, for example providing electricity and hot water for communities, hospitals, etc.

In all three sub-regions the probability of occurrence of this scenario is rated as high. Its impact is estimated to be to raise the trend of all five parameters about the baseline scenario in the CEECs, of all except the area of FAWS in EU-EFTA, but just of roundwood removals in CIS. The driving forces with the highest probability are estimated to be increasing emphasis on the use of wood biomass as a source of energy (5.1.1) in all sub-regions, as well as promotion of energy saving technologies (5.1.4). Economic instruments are generally considered likely to be the most important instruments behind the driving forces, but market forces and laws and regulations are also important. The inquiry shows that among the respondents there is only a low expectation about the influence of carbon taxes on supply, trade and consumption of forest products.

Compared to a baseline scenario (no additional incentives) this scenario would influence the sector in two partly contradictory dimensions: one would recognize that such incentives could have an impact on the national economic development in terms of an overall decrease of production, trade and consumption. This should be considered in the assumptions for the base line scenario modelling, reducing the main steering parameter: GDP growth. At the same time there will be competitive advantages for the use of wood for energy generation, which is expected to lead to increasing prices for fuel and to an increase of its production and consumption.

Scenario area 5.2 - Improvement of waste management and emission control

In many European countries considerable progress has been made to reduce the quantities of waste in wood products manufacture and use and to recycle residues; as well as to reduce or eliminate water and air pollutants. In the packaging sector, efforts are being made, backed by legislation, to reduce the quantities of materials used, and wherever possible in paper and paperboard production to increase the proportion of recycled waste paper. Particularly with regard to pollutants, increasingly strict legislation has ensured emissions from modern mills have been largely eliminated, while progress has been made to install the necessary equipment in older mills, which is a more difficult and costly process.

The rate of recovery of waste paper (the percentage of paper and paperboard consumption that is recovered for re-use) has been rising steadily in recent decades and by the late 1990s it had reached about 42% in Europe (excluding the CIS) and 33% in the CIS. The utilization rate (the percentage of waste paper in total fibre furnish) has also been increasing, to about 42% and 27% respectively. There are limits to the proportion that can be recovered and used, and in some European countries, such as the Netherlands, it is possible that those limits are being approached, while in others, especially in the CIS and parts of central and eastern Europe, there is still a long way to go. Furthermore, while waste paper can be recycled a number of times, each time there is some loss of fibre strength, so that it is necessary to incorporate virgin fibres, either from fresh roundwood or industrial residues, into the furnish on a continuing basis in order to maintain its overall quality of the final product.

Not all the volume of the felled tree reaches the processing mill or other roundwood consumer; there are some losses in extraction and transportation. The proportion of these losses has been declining in most countries, as a result of improvements in harvesting and transport technology, and codes of practice have been introduced to raise standards of silviculture and logging. Harvesting losses in the former USSR were reportedly high, but the situation in the Russian Federation and other CIS countries has been improving. The application of full-stem or full-tree logging methods partly depend on the possibilities for the receiving mills to utilize all parts of the tree, even the foliage, for example for energy production, although the law of diminishing returns may apply so far as the costs of reducing harvesting losses are concerned.

Although the probability of occurrence of this scenario area is expected to be high in all sub-regions, it is not generally speaking estimated to result in significant changes in trends in any of the forest sector parameters, apart from trade (exports) in the CEECs. All the indicated driving forces in are considered important: recycling (5.2.1), implementation of best practices in wood processing (5.2.2), integrated pollution control (5.2.3), rational use of wood products (5.2.4), and reduction of harvesting and transport losses (5.2.5). Economic inducements are the most important instruments for these driving forces.

Scenario area 5.3 - Climate change

The third Conference of the parties to the Framework Convention on Climate Change adopted the Kyoto Protocol in December 1997, which laid down further steps to implement the FCCC. The Protocol makes explicit reference to land use change and forestry in several of its articles. To be effective, however, it needed to be strengthened in certain respects, for example in recognizing the positive role that intensification of forest management other than planting could play in carbon sequestration as well as in the improvement of the environment, the role of long-term storage of carbon in wood products in, for example, construction, and the use of wood energy as a substitute for fossil fuels. Follow-up conferences in The Hague in 2000 and Berlin in 2001 failed to make significant progress in resolving points of contention between countries, although the conference in Marrakech in November 2001 did appear to have resulted in agreements on some of the main outstanding issues. However, the unwillingness so far of by far the largest user of fossil fuels and emitter of greenhouse gases, the United States, to endorse the Kyoto Protocol is likely to limit the beneficial impact of the agreements.

The Intergovernmental Panel on Climate Change (IPCC), created to follow up the FCCC, reached a number of conclusions on the possible effects on forests:

a) Even a relatively small change in climate can cause changes in growth and the regenerative capacity of trees;

b) Slow-growing species are more vulnerable to changes in climate than fast-growing and more 'mobile' species;

c) Stands in extreme conditions of water availability are particularly susceptible to changes in climate.

It has been shown that, at least for Norway spruce stands in many parts of Europe, there has been a measurable increase in the rate of net annual increment per hectare in recent decades. Investigations are currently in hand to determine the likely causes of this, including the possibility that it is linked to global warming and the increase in atmospheric CO_2.

It is also thought that the greatest impacts of possible global warming on forests are likely to occur in the boreal region, because warming is expected to be especially noticeable at high latitudes. Northern tree lines are likely to advance slowly northwards into areas, which are currently covered by tundra vegetation. In the tropics, however, human-induced deforestation will be much more important than changes in climate. Studies prepared for the IPCC distinguish in order of magnitude the effects that forestry measures could have on the carbon balance:

(1) Conservation management, being actions that result in the safeguard of existing carbon reservoirs in forests;

(2) Storage management, or actions resulting in an increase of the carbon reservoir in forests;

(3) Substitution management, or actions in the forest and wood sector which, in one way or another, result in compensating fossil fuel use by increased use of wood-based materials.

This scenario area is in the high probability of occurrence category for all three sub-regions. For EU-EFTA it is expected to result in trends above the baseline scenario for all parameters except consumption of wood products, and in the CEECs and the CIS in roundwood removals and production of wood products. All the driving forces indicated in Table 4 are considered to be important, namely impacts of climate change on forest growth (5.3.1), acceptance of forests as natural sinks for the compliance of emission reduction legislation (5.3.2) and acceptance of wood products as sinks (5.3.3). Economic instruments are expected to be particularly important as inducements, followed by laws and regulations.

3.3 Review of impacts by sub-region and by parameters

3.3.1 Most affected scenario areas by sub-region

3.3.1.1 EU-EFTA sub-region

The scenario areas expected to be most affected in the EU-EFTA sub-region by driving forces are 1.1 (Nature conservation, biodiversity), 1.2 (Nature oriented forest management), 4.2 (Changes in agricultural, rural, etc. development policies), 5.1 (Renewable energy resources) and 5.3 (Climate change).

In scenario area **1.1**, the most important driving force is expected to be increasing the area protected for nature conservation and reduction of harvesting in such areas (1.1.1), followed by diversification of species composition and structure of ecological communities in forest ecosystems (1.1.3), which would tend to shift the trend in the area of FAWS and of roundwood removals below the baseline scenario. The main instruments in both driving forces would be laws and regulations, followed by economic instruments. In scenario area **1.2**, the most important driving force could be a reduction in the use of chemicals (1.2.5), followed by the elimination or reduction of clear felling and the extension of selection felling systems of harvesting (1.2.1). Laws and regulations would again be the most important instruments, closely followed by market forces.

In scenario area **4.2**, the most important driving force could be changes in rates of subsidization of agricultural production and exports (4.2.1), in which economic instruments would play the greatest role followed by laws and regulations. The impact would be to raise the area of FAWS above the baseline scenario. In scenario area **5.1**, driving forces with the highest probability are emphasis on the use of wood biomass as a source of energy (5.1.1) and promotion of energy saving technologies (5.1.4). All the instruments are likely to play a role in achieving results, with economic instruments somewhat higher in rating than laws and regulations and market forces. In scenario area **5.3**, all three indicated driving forces are considered to be important: impacts of climate change on forest growth (5.3.1), acceptance of forests as natural sinks for the compliance of emission reduction (5.3.2) and acceptance of wood products as sinks (5.3.3). For 5.3.2 and 5.3.3, economic instruments are expected to be particularly important, followed by laws and regulations. Fewer respondents could give a reply on 5.3.1, but the majority of those that did so considered market forces to be the most important driving force. The impact of 5.3.1 would be to raise all parameters except the area of FAWS above the baseline trend; that of 5.3.3 to raise all of them with the exception of consumption of wood products.

3.3.1.2 CEEC sub-region

The scenario areas most expected to be affected in the CEEC sub-region are 3.1 (Strengthening policies to develop market frameworks in CITs), 3.2 (Progress in EU enlargement), 4.2 (Changes in agricultural, rural, etc. development policies), 5.1, 5.2 and 5.3 (Renewable energy sources, improvement of waste management and emission control, and climate change respectively).

For **3.1**, the most important driving force is expected to be the recovery of the forest and forest industry sector (3.1.1), the effect of which could probably be to raise the trend of all parameters, but particularly production and trade of wood products, above the baseline scenario. Market forces would be the most important instrument. For **3.2**, the accession of both the CEECS and of other European countries (3.2.1 and 3.2.2), are expected to be important driving forces, leading to higher than baseline trends for all parameters, particularly of production of wood products. Laws and regulations, followed by market forces, are considered to be the most important instruments. For **4.2**, changes in rates of subsidization of agricultural production and exports (4.2.1) and extension of elements of the EU Common Agricultural Policy in forestry (4.2.2) are estimated to be the most important instruments,

leading to higher trends for most parameters, including the area of FAWS. Laws and regulations are the more important instrument for 4.2.1 and economic instruments for 4.2.2.

For **5.1**, the driving forces considered most important are the use of wood biomass as a source of energy (511) and energy saving technologies (5.1.4), which could, in the light of the inquiry, have a positive impact on all the parameters. Economic instruments are expected to play the most important role, but laws and regulations and market forces are also significant. For **5.2**, all the indicated driving forces are considered important, recycling (5.2.1), implementation of best practices in wood processing (5.2.2), integrated pollution control (5.2.3), rational use of wood products (5.3.4) and reduction in harvesting and transport losses (5.2.5), the impact probably being on trade, a positive effect on exports, more than on the other parameters. The importance of instruments varies according to the driving force: economic instruments are the most important for 5.2.1 and 5.2.2, laws and regulations for 5.2.3 and market forces for 5.2.4 and 5.2.5. For **5.3** also, all the driving forces are felt to be important, impacts of climate change on forest growth (5.3.1), acceptance of forests as natural sinks (5.3.2) and acceptance of wood products as natural sinks (5.3.3), the main impacts being expected to raise roundwood removals and production of wood products above the baseline trend. Economic instruments could be the main instrument, followed by laws and regulations.

3.3.1.3 CIS sub-region

The scenario areas expected to be most affected in the CIS sub-region by driving forces are 2.2 (Intensified innovations and changes in competitiveness of wood products), 3.1 (Policies to develop market frameworks in CITs), 4.3 (Social and demographic changes), 5.1 (Renewable energy sources) and 5.3 (Climate change). Scenario area 2.1 (Globalization), with high estimates of probability of the driving forces having impacts, could be added as virtually meeting the other criteria for selection as described earlier.

In scenario area **2.1**, the most important driving force is expected to be the international relocation of wood-processing capacities (2.1.2) to take advantage of the large availability of raw material as well as cheap labour in the Russian Federation, but increasing international flows of capital and international merging of companies (2.1.1 and 2.1.3 respectively) are also seen as important. The impact is expected to be positive, that is a trend above the baseline scenario for all parameters except the area of FAWS, with the greatest impact on trade (exports). The most important instrument would be market forces. In scenario area **2.2**, the development of new wood products (2.2.3) is given the highest estimate of probability, but innovations in harvesting techniques (2.2.1), innovations in wood processing techniques (2.2.2), progress in transport and logistics (2.2.4) and innovations in information technologies (2.2.5) rank almost as high. As with 2.1, the impact is expected to be positive for all parameters, but the greatest impact could be for roundwood removals and the production of wood products. Market forces and economic instruments are expected to be almost equally important as the instruments.

In scenario area **3.1**, the main driving force is expected to be the recovery of the forest and forest industries sector (3.1.1), which could lead to trends much higher than the baseline scenario for all parameters except for the area of FAWS, for which it could still be higher. Economic instruments are expected to be the main instrument leading to changes, followed by laws and regulations. In scenario areas **5.1**, the use of wood biomass for energy and energy saving technologies (5.1.1 and 5.1.4 respectively) are the main driving forces, and in **5.3** it is impacts of climate change on forest growth (5.3.1), acceptance of forests as natural sinks (5.3.2) and acceptance of wood products as natural sinks (5.3.3). These are estimated to have a positive impact on roundwood removals as well as probably on the production of wood products. For 5.1 economic instruments are seen as the most important instruments, and for 5.3 a combination of laws and regulations and of economic instruments.

3.3.2 Impacts of changes in the policies and market framework on the main parameters

Inquiry 2 asked respondents to assess the impact of scenario areas on five main market components of the forest sector, called here "parameters". There are: (1) the area of forest available for wood supply (FAWS); (2) roundwood removals, (3) production of wood products (sawnwood, wood-based panels, paper and paperboard); (4) consumption of wood products; and (5) trade of wood products. The following paragraphs present the results of the inquiry, which have been set out in the previous sections by scenario areas and sub-regions, as they apply to these parameters.

3.3.2.1 Area of forest available for wood supply (FAWS)

The area of FAWS has remained relatively stable in most parts of Europe in recent decades, with increases in some countries as a result of afforestation being offset by decreases in many countries, partly from changes to other forms of land use or withdrawal of forest from wood production for environmental reasons. The estimates suggest that these tendencies could persist in the future in all three European sub-regions. Two of the scenario areas in the biodiversity (including nature conservation) package could likely result in an area of FAWS less than that of the baseline scenario, namely that giving more emphasis to nature conservation and the promotion of biodiversity (**1.1**) and that for increasing demand for certification (1.3) but only low impact. The scenario area giving more emphasis to nature oriented forest management (1.2) shows no change from the baseline scenario. Other scenario area estimates lead to higher areas of FAWS than those of the baseline scenario, but they do not vary significantly between the sub-regions. For the EU-EFTA, this arises from changes in agricultural, rural and regional development policies (**4.2**) and climate change (**5.3**). In the CEECs and other European countries, it is from the impact of globalization (2.1), strengthening policies to develop market frameworks in the CITs **(3.1**), progress in enlargement of the EU (**3.2**), changes in agricultural and other development policies (**4.2**) and promotion of renewable energy sources (**5.1**); in the CIS countries it is from strengthening policies to develop market frameworks (**3.1**). (The indicative numbers of the scenario areas with the highest probability ratings are shown in bold type.) In summary, only minor increase in forest area can be expected with a focus on Western Europe.

3.3.2.2 Roundwood production (removals)

The trend of roundwood removals in most of Europe in recent decades has been gradually upwards, and ETTS V (1996) expected this trend to continue into the 21st century. Growth in removals has been and will continue to be quite strong in a few countries, e.g. those with plantations coming into production, such as Ireland and the United Kingdom. An exception to the general trend was removals in countries with economies in transition (CITs), in some of which removals fell abruptly in the early 1990s before stabilizing and beginning to recover. The collapse was particularly marked in the Russian Federation, the main component of the CIS sub-region.

Inquiry 2 did not distinguish between roundwood production and production of wood products (sawnwood, wood-based panels, paper and paperboard), but it was found desirable to do so by some of the Working Groups, which reviewed the results of the inquiry. In fact it is usually possible from the nature of the scenario area to say whether its impact is more likely to be on one or the other or on both. For example, the scenario areas in the biodiversity and regional development packages will probably have an impact, if any, mainly on roundwood production, while those of the globalization and innovation package would be more on wood products production than roundwood, and those of the energy and environment package would be on both roundwood and wood products production.

Most of the scenario areas are estimated to have a positive impact on removals, in some cases strongly positive, in the three sub-regions, the exceptions being the nature conservation scenario

(1.1) in the EU-EFTA and that scenario and the nature oriented forest management scenario (**1.1** and **1.2**) in the CEECs. High probability scenarios for higher than baseline trends in the CEECs are policies to develop market frameworks (**3.1**), progress in EU enlargement (**3.2**), changes in agricultural, etc. policies (**4.2**), promotion of renewable energy (**5.1**) and climate change (**5.3**); and those with intermediate probability are globalization (3.1) and innovation (3.2). For the CIS, estimates of 'much higher' than the baseline trend are given for high probability scenario areas **2.2**, innovations, and **3.1**, policies to develop market frameworks, and 'higher' for **5.1**, renewable energy sources, and **5.3**, climate change. In the intermediate probability category, 'higher' estimates are given for 2.1, globalization, 3.2, progress in EU enlargement, and 4.1, incentives for environmental/social benefits.

3.3.2.3 Production of wood products

The long-term trend of production has been upward in most parts of Europe, with growth in output of wood-based panels and paper and paperboard more marked than that of sawnwood. This trend was expected in ETTS V to continue into the 21st century. As with roundwood removals, the main exception is the CITs, especially the Russian Federation, where production, notably of sawnwood, slumped in the early 1990s, which has been followed by a partial recovery.

Estimates for the EU-EFTA sub-region indicate that scenarios in two packages could result in increases in production above the baseline trend, namely promotion of renewable energy sources (**5.1**) and climate change (**5.3**) in the energy and environment package, and globalization (2.1) and innovations (2.2) in the globalization, innovations and market structures package. On the other hand, the scenarios in the countries with economies in transition package could lead to lower than baseline trends in the EU-EFTA sub-region, i.e. strengthening policies to develop market frameworks in the CITs (3.1) and progress in EU enlargement (3.2), as a result of increased competition from producers in CEECs and the CIS. This is reflected in the estimates for the CEEC sub-region: scenario areas **3.1** and **3.2** could lead to growth much higher than in the baseline scenario in that sub-region. Scenario areas **5.1** and **5.3** (promotion of renewable energy and climate change respectively) and 2.1 and 2.2 (globalization and innovations respectively) could also result in higher than baseline trends. For the CIS sub-region, three scenario areas could result in trends much higher than the baseline, namely **2.2**, innovations, **3.1**, policies to develop market frameworks in CITs, and 3.2, progress in EU enlargement; and another in higher than baseline trends, namely 2.1, globalization.

3.3.2.4 Consumption of wood products

The trend of consumption of wood products in Europe over recent decades has generally followed that of production quite closely, and ETTS V expected it to continue to do so. That is to say, there should be gradual growth, more dynamic for wood-based panels and paper and paperboard than for sawnwood. The sharp decline in consumption in the CIS, especially of sawnwood, in the early 1990s has been followed by gradual recovery, which should continue.

For all three sub-regions the results of Inquiry 2 suggest that all scenario areas will lead to trends similar to or higher than the baseline scenario; no scenario results in a lower than baseline trend. In the case of EU-EFTA, estimates give higher than baseline trends for promotion of renewable energy (**5.1**), globalization and innovations (2.1 and 2.2 respectively), policies to develop market frameworks in the CITs (3.1) and progress in EU enlargement (3.2). For the CEECs and others, the higher than baseline estimates are for **3.1** and **3.2**, **5.1** (renewable energy), 2.1 and 2.2 (globalization and innovation respectively). In the CIS policies to strengthen market frameworks (**3.1**) could lead to growth much higher than the baseline trend, and to higher than baseline for **2.2** (innovations), **4.3**

(social and demographic developments), 2.1 (globalization) and 3.2 (progress in EU enlargement). Otherwise, the scenario areas are expected to have no impact, compared with the baseline scenario, on consumption trends.

3.3.2.5 Exports and imports of wood products

European trade in wood products has expanded faster than production and consumption, and ETTS V expected this trend to continue into the 21st century. It also expected imports to grow somewhat faster than exports, leading to a widening of the gap between imports and exports (net imports). This would in fact represent a change from recent historical developments: exports in Europe as a whole have risen at approximately the same rate as imports, resulting in net imports remaining rather stable for wood products overall. That trend reflected the build-up of capacity and production in some parts of Europe to take fuller advantage of available wood and secondary wood fibre resources as well as increasing supply difficulties and growing domestic consumption in some other regions.

Inquiry 2 did not ask respondents to distinguish between exports and imports in making estimates of the scenario area's impacts. It is generally possible, however, to make some inferences from the source of the estimates as to whether or not the estimates refer to exports, imports or both. There are only four major net exporters in Europe, Austria, Finland and Sweden in the EU-EFTA sub-region and the Russian Federation in the CIS. There are also a number of smaller net exporters, including Norway and Portugal in EU-EFTA, and the Czech Republic and Poland in the CEECs. Otherwise, European countries are net importers, heavily so in the case of Belgium-Luxembourg, Denmark, Italy, the Netherlands, Spain and the United Kingdom in EU-EFTA. France and Germany, also in the EU-EFTA sub-region, although net importers, are also very large exporters of wood products. The EU-EFTA sub-region is a major importer and exporter of wood products although imports largely outweigh exports; the CEECs are approximately in trade balance, while the CIS is a net exporter.

Several of the scenario areas are estimated to lead to trade rising more than they would in the baseline scenario, much more so in the case of policies to develop market frameworks in the CITs (3.1): in this case this would refer to EU-EFTA imports from the CITs. Those scenarios resulting in higher trade in the EU-EFTA sub-region than foreseen in the baseline scenario include promotion of renewable energy (**5.1**), climate change (**5.3**), globalization (2.1), innovations (2.2), and progress in EU enlargement (3.2). Scenario **3.1** also leads to much higher trade in both the CEECs and the CIS, in these cases of exports, and to higher trade in the CEECs as a result of **3.2,** EU enlargement, **5.1**, renewable energy, **5.2**, improvement of waste management and emission controls, and 2.1 and 2.2, globalization and innovations respectively. Some of these scenario areas could favour both imports and exports, although generally more so exports than imports. The picture is rather similar for the CIS: globalization (2.1) could lead to much higher exports and scenario areas **2.2** (innovations) and **4.3** (social and demographic developments), 3.2 (progress in EU enlargement) and 4.1 (incentives to social/environmental benefits from forestry and wood products use) also to higher exports.

The general impression obtained from a survey of the results of Inquiry 2, so far as the impacts of scenario areas on the different forest sector parameters is that, with the possible exception of the area of forest available for wood supply, the expectation is that, where they would result in a change in the rate of development different from that foreseen in the baseline scenario, that change would be upwards rather than downwards. In other words, they could have positive impacts on the production, consumption and trade of wood products in the three sub-regions of Europe.

Summarizing section 3.3, out of 180 possible impacts (12 scenario areas [5] *times* 5 parameters *times* 3 sub-regions), 42 or 22% meet the criterion of high probability of occurrence combined with an impact other than no change on the baseline scenario (Table 6). This number roughly doubles if the combination of intermediate probability and impact other than no change is added. All but three out of the 42 impacts are estimated to be positive (higher or much higher than the baseline scenario), those three being in the EU-EFTA sub-region and related to the area of forest available for wood supply (FAWS) and roundwood removals. The conclusion to be drawn is that, generally speaking, the impact of the high probability scenario areas (and in fact also a large majority of those with intermediate probability) is expected to be positive.

Table 6: Scenario areas with high probability of occurrence and impacts estimated to lead to changes in forest and forest industry sector parameters compared to baseline scenario

Sub-region	Area of FAWS	Roundwood removals	Prod. wood products	Cons. wood products	Exports/ Imports
EU-EFTA					
1.1 Nature conservation, biodiversity	lower	lower	lower	baseline	baseline
1.2 Nature oriented management	baseline	lower	lower	baseline	baseline
4.2 Changes in agric. Policies	higher	baseline	baseline	baseline	baseline
5.1 Renewable energy sources	baseline	higher	higher	higher	higher
5.3 Climate change	higher	higher	higher	baseline	higher
CEECs and others					
3.1 Strengthening market framework	higher	higher	much higher	higher	much higher
3.2 EU enlargement	higher	higher	much higher	higher	higher
5.1 Renewable energy sources	higher	higher	higher	higher	higher
5.2 Waste management/emissions	baseline	baseline	baseline	baseline	higher
5.3 Climate change	baseline	higher	higher	baseline	baseline
CIS					
2.2 Innovations/competitiveness	baseline	much higher	much higher	higher	higher
3.1 Strengthening market framework	higher	much higher	much higher	much higher	much higher
5.1 Renewable energy sources	baseline	higher	higher	baseline	higher
5.3 Climate change	baseline	higher	higher	baseline	baseline

[5] Scenario area 4.3 - Social and demographic developments has been excluded for reasons explained earlier.

4 ALTERNATIVE SCENARIO MODELLING

4.1 Three "Mega-scenarios"

Various scenario "areas", described above, have shown a comparable structure and direction of influences on the analysed forest sector parameters, whereas the quantitative impact is varying quite significantly between them. The objective of creating a few "mega-scenarios" was to bundle the quantitative outcomes of similar qualitative impacts on the sector, in order to elaborate a relatively small number of alternative scenarios, which could be run in the further modelling work.

This was in fact suggested by the Team of Experts meeting in December 2001. To do so requires first taking into account that the baseline scenario itself already incorporates assumptions regarding the continuation of policies already being acted upon and historical developments into the future, and that these assumptions have been incorporated in the models. What is being considered here, therefore, is what significant changes in policy direction or what major new developments might occur. Out of a number of possibilities, three such mega-scenarios have been selected for further discussion:

a) An accelerated shift towards environmental conservation – "Conservation" mega-scenario

b) Political impetus towards sustainable energy use – "Sustainable Energy" mega-scenario

c) More widespread acceptance of economic integration and market liberalization – "Globalization" mega-scenario.

Each of the thirteen scenario areas is relevant to one or more of these mega-scenarios, as may be seen in Table 7. The conditions in which each of these mega-scenarios might arise and its impact on the forest sector is considered below.

Table 7: Relevance of the 13 high probability scenario areas to the three selected mega-scenarios

Scenario area (abbreviated titles)	**"Conservation"**	**"Sustainable Energy"**	**"Globalization"**
	a/	a/	a/
1.1 Nature conservation/biodiversity	**XX**		
1.2 Nature oriented management	**XX**		
1.3 Certification	XX		XX
2.1 Globalization			XX
2.2 Innovations		**XX**	**XX**
3.1 Market frameworks in CITs			**XX**
3.2 EU enlargement			**XX**
4.1 Incentives for social & environmental benefits	XX	XX	
4.2 Agricultural etc. policies	**XX**	**XX**	**XX**
4.3 Social and demographic developments			
5.1 Renewable energy sources	**XX**	**XX**	
5.2 Waste management/emissions	**XX**	**XX**	**XX**
5.3 Climate change	**XX**	**XX**	

a/ **XX** (in bold type) shows scenario areas given in Table 6.

4.1.1 An accelerated shift towards environmental conservation

The general public and policy makers have been made increasingly aware of and concerned about the importance of environmental conservation and the threats posed to it by human activities. This scenario package is in no small measure due to the scientific evidence collected by research institutions and pressure from environmental NGOs. Considerable progress has been made over the past quarter century through legislation and other means to reduce negative impacts on the environment. There is still a very long way to go, and the extent to which progress has been made varies considerably from one country to another and one sector of economic activity to another. Sometimes, the conservation of the environment is perceived to be achieved at the expense of economic or social well-being (whether or not this is actually the case), and therefore is resisted by some actors on those grounds. For example, the short-term urgency to provide the bare necessities of life to the poorer segments of the population may over-ride the principles of environmental protection. On the other hand, UNCED and the many follow-up events to it brought general recognition that in the long run sustainable economic and social development is not possible in the absence of a sustainable environment.

The policies already in place will result in further progress towards environmental conservation. For a number of reasons, however, progress is likely to fall short of what will be needed. Among the reasons the gap between good intentions, as expressed by legislation, and its practical application are: indifference, fatalism or ignorance among parts of the population in many countries; insufficient political commitment and leadership to carry out the measures required; bureaucratic inertia; and inadequate scientific proof or knowledge about the real state of the environment and the appropriate measures to deal with it. Even among some of those committed to environmental conservation; there has been perhaps a slight tendency in recent years to 'take the foot off the accelerator'.

The mega-scenario "An accelerated shift towards environmental conservation" assumes that social or economic developments will occur that will re-ignite the debate on the environment and result in a renewed impetus being given to its conservation. It might, for example, be the growing realization of the impending shortages of good quality water or an unexpected increase of fossil fuels production costs. Perhaps the most plausible development likely to stimulate universal action is the increasing impact of climate change on the global environment. But it could also be an environmental catastrophe, such as another meltdown of a nuclear power station. The result of these events would be to galvanize policy makers, not only to deal with the immediate problem, but through public pressure, to take a holistic and coordinated approach to environmental conservation.

It could be argued that major events in the past, such as Chernobyl, have seldom lead to significant and long-lasting changes in policy and that, even when there is widespread acceptance of the need for change, it has proved extremely difficult to arrive at an international consensus on the measures to be taken, as has proved the case with the Kyoto Protocol. On the other hand, an example of probable success (it will take many years to see the full effects) is the agreement on measures to restore the ozone layer, which was being destroyed by CFCs. Here, it is assumed that, when faced with overwhelming evidence, governments will initiate and implement the necessary policies to conserve the environment. Such a policy induces innovations, which could calm potential long-term conflicts between economic and social well-being. It should be noted that in short and medium terms these policies will bind resources, which then are not available for the satisfaction of direct market demands of society. This mega-scenario is mainly policy driven; instruments are laws and incentives paid through the budgets.

This type of mega-scenario would affect the forest sector framework and forestry management directly, as this was shown in scenario area 1.1 and 1.2. For example certification could become

widely applied, if an orientation towards environmental issues would be supported not only by NGOs and policy decision makers, but also by private consumer behaviour.

A fundamental reorientation towards environmental goals would firstly affect agriculture policy as well as agriculture. In general such an approach would lead to more extensive use of former agricultural land and reduce afforestation expected in the base line scenario modelling. An accelerated shift towards environmental conservation would certainly assist policy to promote the use of renewable energy sources, as this was described in scenario area 5.1. Further this could intensify the waste management and the reduction of emissions (scenario area 5.2) as well as increase activities towards the protection of the global climate (scenario area 5.3). In the framework of this type of policy approach an increase of energy prices has to be assumed, leading to lower overall economic growth and because of this to lower production, trade and consumption of forest products.

What might be the impacts of this mega-scenario on the forest sector?

- Forest available for wood supply (FAWS). The slow increase of the area of forest in the baseline in total Europe would be strengthened by incentives for afforestation resulting from the promotion of renewable energy sources (5.1) and climate change (5.3), whereas tendencies to more extensive agricultural production would work in the opposite direction. Promotion of bio-diversity of forest ecosystems as well as certification would cause some forest areas to become unavailable for wood supply. The net impact could be a modest decline in the area of FAWS.
- Roundwood removals. Apart from the collapse of roundwood removals in some CITs, especially the Russian Federation, after 1990, there has been a gradual rise in removals in Europe, which is expected to continue. Nature and biodiversity protection measures (1.1, 1.2) would result in the concentration of fellings to certain areas, cause some shifts in felling methods, e.g. from clear felling to selection felling, and postpone some fellings (longer rotation periods). On the other hand, greater demand for energy wood (5.1) and the impact of climate change on forest growth (5.3) would raise the volume of removals, most of the increase being destined for energy use rather than for use as industrial raw material. Roundwood removals could increase significantly in north, central and western European countries, if economic measures and the introduction of innovations in timber harvesting and transport would improve economic efficiency. As a net result roundwood removals would show some higher growth in all sub-regions. In the latter, reduced harvesting and transport losses (5.2) would result in an increase in volumes of wood delivered to mill and to potential energy producers.
- Production of wood products. The wood-processing industries would take further steps to meet increasingly stringent environmental legislation by reducing waste and pollutant emissions (5.2). In many cases this would raise productivity and even profitability, but the industries have to meet higher energy costs and perhaps higher prices for wood due to increasing wood-demand for energy. Should all countries follow the same lines of a more environmentally oriented policy, the relative competitive position of their forest industry would remain unchanged, apart from the expected slight decrease of production of wood products. Only if such an environmentally oriented policy would be applied with different intensity in the European countries would production costs be influenced differently, which could lead in the medium term to some relocation of production capacities.
- Consumption of wood products. The impacts on consumption of wood products would be quite variable. The lower growth rate of GDP would result in a somewhat lower demand for wood products as well as price increases of round wood due to increased demand of wood for energy, which would result in higher prices of wood products. Demand for forest products could increase if consumers were to support the mega-scenario based on more environmentally oriented consumer behaviour. Backed by more active market promotion based on environmental

considerations, public acceptance of wood products as using renewable and non-polluting materials would enhance their utilization in certain end-uses, such as construction and furniture, or at least reduce the rate of substitution by other materials (1.3, 2.2). This will be apparent more in EU-EFTA than in the other sub-regions.

- Exports and imports of wood products. Greater acceptance of certification of wood products (1.3) would cause changes in trade flow patterns favouring those suppliers offering certified products, but probably not so much the overall volume of trade. More impacts could be expected for international trade of forest products, if the reorientation towards energy policy were not to be supported by all countries in the region simultaneously, but only from a few countries. In this case the competitive situation of the forest industry would change, which would lead to a certain change in trade flows.

4.1.2 Political impetus towards sustainable energy use

Major concern about the availability and use of energy could be reflected in increasingly stringent legislation and the operation of market forces, notably higher energy prices. A general effect would be to curtail to a greater or lesser extent overall economic development (GDP), with corresponding impact on the forest sector as well as all other sectors of economic activity. Whether the forest sector would be more or less affected than others, would depend on the energy situation in individual countries, including their dependence on imported energy supplies and their potential to use domestic supplies, both of woody biomass and other sources of energy. In most European countries wood accounts for only a small percentage of total energy use but even in Europe a substantial proportion of total wood supply, including fuelwood, wood residues, pulping liquors and waste paper, ends up being used for energy. Even a modest increase in wood's share of energy would have important implications for the overall wood supply-demand balance in the region.

For as long as the price of fossil fuels has remained relatively low, there has been little economic incentive to promote greater use of alternative forms of energy, including biomass. Several governments have supported research and development on the production and use of alternative energy forms, including wood, and have subsidized such alternative energy generation on a pilot or even commercial scale. The result so far has been only a modest rise in the share of alternative forms in total energy use. In some countries nuclear power generation now accounts for an important share of the total, but there remains unease among the public and politicians about the safety of this form of energy and its long-term future remains uncertain.

The mega-scenario "Political impetus towards sustainable energy use" assumes that an event or events will occur sooner or later that will force governments and the market to accelerate the trend away from the use of fossil fuels as well as nuclear power generation and towards alternative energy sources. What such an event might be is in the realms of speculation, but it could be a major political upheaval or act of terrorism in a major supplying region, such as the Middle East, which would cut off oil supplies to world markets for more than a short period of time. Alternatively, it might be another 'Chernobyl' with even further reaching consequences. The more gradual emergence of an energy crisis might possibly have the same effect on policy thinking over the longer term, such as the impact of climate change or the drying up of the traditional sources of oil, which has long been predicted but so far failed to materialize.

Whatever the event, it would have to be of such a scale to make it necessary for governments to take concerted and drastic action to create a 'new order' in energy supply and use. It has to be admitted that none of the crises in the last thirty years (the two oil crises in the 1970s, the Gulf War, 11 September 2001, the Iraq war, etc.) have been sufficient to induce such a wholesale change in policy, even if after each a number of important steps towards greater energy conservation and the

protection of the lines of supply were implemented. None of these, however, has really resulted in a permanent shift towards reliance on sustainable energy sources and use.

The appearance of such a policy could have some major impacts on the forest sector:

- Forest available for wood supply. The concept of energy plantations has been widely debated but very little applied in Europe, mainly for economic reasons (5.1). Investment would more likely be directed to those regions with substantial areas of plantable land, more favourable climate for vegetative growth and lower cost structures. For similar reasons, the establishment of plantations to act as carbon sinks is unlikely to become widespread in Europe (5.3). In this mega-scenario, the area of FAWS in Europe would not change significantly, at least within the timeframe of the current outlook study round (EFSOS). In the very long term, anything is possible, but a significant expansion of FAWS for energy reasons would largely depend on the allocation of areas of agricultural land for this purpose and a major change in agricultural and rural policies (4.2).
- Roundwood removals. Greater demand for wood for energy would result in growth in roundwood removals higher than foreseen in the baseline scenario in all sub-regions of Europe (5.1), which would also be the outcome of efforts to make fuller use of the additional forest growth resulting from the impact of climate change (5.3). Thinnings and the harvesting of other small-sized and lower quality wood, notably broadleaved species, would be accentuated.
- Production of wood products. Increased availability of wood raw material would be reflected in higher output of wood products than projected in the baseline scenario in EU-EFTA and CEECs, and also possibly in the CIS (5.1, 5.3). This would include products for energy use, such as chips, pellets, etc. Fuller use will be made of industrial wood residues, both as industrial raw material and for energy. Another important positive factor would be the energy efficiency of wood-processing and utilization, which in terms of energy consumed per unit of output is generally favourable compared with competing materials.
- Consumption of wood products. The good insulation (energy conservation) properties of wood would be better appreciated, which would be reflected in some gains in its competitive position vis-à-vis some of its competitors, especially in dwelling construction and other building applications in EU-EFTA and CEECs (5.1). This would boost consumption of sawnwood and wood-based panels above the baseline trend in these sub-regions.
- Exports and imports of wood products. Being bulky, the unit cost of transport of wood products is often an appreciable component of their c.i.f. value. Higher energy prices, as well as the burning of fossil fuels in transport, would have a negative impact on the international trade in wood products, and favour the use of locally produced products (5.1, 5.2). On the other hand, increases in production and consumption would be reflected in growth in trade. Whereas in the past trade usually expanded at a faster rate than production and consumption, the net effect of impacts on trade could be to limit growth to no more than that for production and consumption.

4.1.3 More widespread acceptance of economic integration and market liberalization

This mega-scenario embraces several important aspects. There is the trend towards greater globalization. Within Europe, as well as in other regions, there is the impact of expanding integration of national economies, the most significant development being the likely doubling of the number of members of the EU within the next decade or so. There is also the seemingly continuous progress in technology, leading to innovations in all economic spheres. Among the questions that need to be asked are to what extent have these developments already been internalized in the EFSOS baseline scenario, that is to say, have they been sufficiently taken into account in the

assumptions; are there possible events that may go beyond what is currently being envisaged; and what could be the impact of such events on the forest sector?

There seems to be an implicit assumption in the NOBE forecasts of GDP that six CEECs will join the EU within the next five years and that a further number, perhaps four or five within a decade. The two largest economies for which the likelihood and timing of accession remain uncertain are the Russian Federation and Turkey. The former has not yet even announced its interest in becoming a candidate. It might be envisaged that other European countries that are not at present considering candidacy might do so sooner or later, such as Iceland, Norway and Switzerland (members of EFTA) and even non-European countries such as some of those along the southern rim of the Mediterranean. This mega-scenario assumes that the pace of accession and the process of economic market liberalization will be fairly brisk, which tendency will accelerate in the future, meaning that the reticence on the part of both some present members and of candidates over the conditions of accession will be overcome and that by 2015 EU membership will be at least 27 countries compared with the present fifteen and already 25 as from 1 May 2004; also that trade barriers will have been removed with several others. Beside the accession process, integration of European countries is an important issue, e.g. with regard to such countries as Russia and Turkey.

With regard to innovation, it is assumed that increasing recognition of wood as a sustainable, renewable and versatile raw material will be reflected in proportionately greater sums of money being made available for R & D in the forest sector and in the sector becoming more eager to put into commercial practice the results of R & D and in more aggressive promotion and marketing. In more mature markets, such as EU-EFTA, this will help to maintain wood products' market share or even to raise it slightly, while in the other sub-regions it will strengthen their competitiveness and help growth in production and consumption to rise at a rate higher than envisaged in the baseline scenario.

All in all, the mega-scenario is optimistic about the market climate for wood products in Europe, as a result of both brisk progress in the integration of the economies of the region and of their potential for benefiting from globalization and of the forest sector showing greater dynamism in the fields of R & D, promotion and marketing. The impacts on the main parameters of the forest sector could be:

- Forest available for wood supply. Investment in plantations in the CEECs and CIS would raise the rate of their expansion above that in the baseline scenario. Greater competition from these sub-regions would be a disincentive to afforestation in EU-EFTA, which could however be offset by some additional planting in some countries with good growing conditions.
- Roundwood removals. These would expand in the CEECs and especially in the CIS at rates higher than given in the baseline scenario, but not in EU-EFTA because of the competition from the former.
- Production of wood products. The same scenario could occur as for roundwood removals, possibly even somewhat more accentuated as more emphasis is given to value added products in the CEECs and the CIS and their exports of these products grow at the expense of exports of raw materials and semi-processed products (roundwood and sawnwood). Even in EU-EFTA production would increase at a rate above the baseline scenario, as industries would take advantage of the greater market dynamism and, thanks to technological innovation, maintain their competitiveness.
- Consumption of wood products. Throughout Europe consumption of wood products would expand more than foreseen in the baseline scenario as a result of greater market dynamism, more open competition and lower prices. The improvement would be especially marked in the CIS.

- Exports and imports of wood products. Like production and consumption, European trade in wood products would grow faster than envisaged in the baseline scenario. Furthermore, in contrast to the 'sustainable energy use' mega-scenario, trade would grow more strongly than production and consumption as a result of the opening of markets and increasing competition. This would result in some noticeable changes in trade flow patterns, for example, increased imports by EU-EFTA from CEECs and CIS would be at the expense of trade between EU-EFTA countries, but at the same time exports from EU-EFTA of some products would increase to the CEECs and CIS. The tendency generally would be for trade in raw materials and semi-processed products to stagnate or decline, while that of further manufactured products would increase.

In summary, the three mega-scenarios presented above would have impacts on the forest sector, which would vary in extent and in manner. While all three envisage growth in most of the forest parameters, the least expansionary is the 'environmental conservation' one, which also expects a decline in the area of forest available for wood supply. Th

e 'integration and liberalization' mega-scenario would have the greatest positive impact on the sector, especially on trade patterns and volumes. An attempt will be made in the following section to apply these qualitative scenarios in quantitative terms.

4.2 Application of analysis outcomes for long-term modelling

4.2.1 Quantitative outcomes of the analysis

One of the goals of the study is to provide input to the scenario modelling, using models for a quantitative description of the future development of the sector in terms of forest resources (area, growing stock, removals etc.) and in terms of market developments (production, trade and consumption of forest products). Now the moment has come to try to apply the findings of this study to the projections and forecasts for the supply and demand for wood and wood products in EFSOS.

In Inquiry 2 respondents were asked to predict by how much the impact of a given scenario area would cause the EFSOS outlook to deviate above or below the baseline scenario for five main parameters: area of forest available for wood supply, roundwood removals, and the production, consumption and trade of wood products. Their predictions were to be expressed in percentage points per annum (p.p.p.a.) in comparison to the baseline scenario. The results of this exercise, given in the annex tables, show considerable variability in the responses, reflecting respondents' differing views on the likely impacts but also the difficulties they experienced in finding a satisfactory way of arriving at their forecasts. Table 8 provides the outcome of an attempt to extract from the inquiry and the discussions during the December 2001 meeting additional (to baseline) forecasts of growth rates for the three mega-scenarios, structured by forest sector parameters and sub-regions.

Table 8: Quantitative estimates of impacts on the forest and forest industry sector by sub-regions of Europe, mega-scenarios and parameters, 2001 to 2015 (percentage points increase per annum compared with baseline scenario)

Mega-scenarios	Area of FAWS	Roundwood removals	Production of wood products	Consumption of wood products	Trade of wood products
"Conservation"					
EU-EFTA	0.1	0.6	0 (0.4 c/)	0.4	0.4 a/
CEECs	0.1	0.5	0.5	0.9	0.8 b/
CIS	0	0.3	0 (0.3 c/)	0	0
"Sustainable Energy"					
EU-EFTA	0.2	0.6	0 (0.4 c/)	0.4	0.4 a/
CEECs	0.1	0.5	0 (0.4 c/)	0.4	0.3 b/
CIS	0.05	0.5	0.3	0.3	0.2 b/
"Globalization"					
EU-EFTA	0.1	0.2	0	0	0
CEECs	0.2	1.4	1.5	1.0	2.6 b/
CIS	0.05	1.2	1.3	1.3	1.7 b/

a/ Net imports
b/ Net exports
c/ Estimates in brackets included to improve consistency with those for other parameters

The results of such an exercise show that:

1. All the estimates are positive, that is to say the expectations are that they will all result in increases compared with the baseline scenario. This is the case even for the area of forest available for wood supply in EU-EFTA under the "environmental conservation" mega-scenario, despite the fact that scenario 1.1 (Nature conservation and biodiversity) was forecast to result in a decrease in the area of FAWS. The explanation is that this decrease could be more than offset by increases arising from other scenario areas, namely 4.2 (Agricultural and rural policies) and 5.3 (Climate change).
2. In the majority of cases, the expected changes are reasonably consistent with each other that is a rise in roundwood removals is reflected in one of production of wood products, and the changes for production, consumption and trade of wood products seem fairly consistent with each other. In a number of cases, however, there does seem to be a lack of consistency, for example where no change in production of wood products is estimated, while removals and consumption are estimated to rise. In those cases alternative estimates of production made by the secretariat have been discussed with the experts during the December 2001 meeting and added in brackets in Table 8.
3. While respondents were asked to make estimates for changes in trade, without specifying whether they referred to exports or imports, their replies have been interpreted in such a way that for EU-EFTA as a whole they refer to net imports and for the other sub-regions to net exports. It might be expected that changes in those sub-regions' net exports would offset net imports in EU-EFTA, reflecting some shift in trade flow patterns, as discussed earlier. At the best of times, forecasting trade trends is hazardous, and especially so predicting changes in trends, as is being attempted here. Perhaps the best use of the trade estimates in Table 8

would be as a cross-check with the estimates of changes in production and consumption of wood products.

4. Table 8 provides estimates of impacts only for the period 2001 to 2015, while respondents were asked to give estimates also for 2016 to 2030. For the record the synthesis of the latter is given in the annex tables, but they are not being discussed here. The reason is that, with the possible exception of forest area, the further into the future estimates go the less reliable they become, and this is especially the case with the type of estimates being made in this exercise.

4.2.2 Link to the modelling of forest resources and roundwood supply

Potential roundwood removals are determined mainly by the existence of forest stands, their growth and by the possibilities to enlarge the forest area, e.g. by afforestation. The intensity of use of these potential removals depends on costs of harvesting and transport, wood prices, legal constraints on harvesting and the behaviour of the forest owners.

The modelling of forest resources in EFSOS was carried out with the EFISCEN model (see Nabuurs and Schelhaas). As an outcome this model projects potential roundwood removals, not an economically based roundwood supply. The EFISCEN model simulates the growth of existing forests assuming the continuation of traditional approaches in forestry management. Also existing constrains from legislation, e.g. in terms of protected forest areas, are assumed. In the light of the results of the inquiry, expectations about changes of forest area through afforestation and reduced harvesting opportunities based on legal constraints could be introduced as assumptions as well as changes in tree species composition, rotation age of tree species, thinning intensity, etc.

Economic reasoning in terms of cost-price-relationships, caused for example by innovations in harvesting technologies or by increasing demand, as well as possible changes in the behaviour of forest owners (e.g. based on certification) are not implemented in the EFISCEN model. Such changes cannot be described with alternative runs of the model and must be interpreted during an analysis of interrelationships between the market model and the resources model.

Increases of forest area available for wood supply are expected mainly as a result of changes in agricultural and rural policies, as well as policies promoting renewable energy sources. Further this increase of forestland is assumed to happen following the accession of various CEECs to the EU and later some countries of the CIS sub-region. But an expansion of forest land use based on conventional forestry management and tree species with a rotation age of 80 or more years does not affect the volume of potential removals over the next decade or two significantly. One gets a different picture if former agriculture land would be used for short rotation plantations. This is to be expected firstly in the mega–scenario “Political impetus towards sustainable energy use”. In the EFISCEN model only conventional forest stands could be modelled; it cannot be used for the modelling of short rotation plantations. Therefore also this important scenario of short rotation plantations would have to be treated specifically, and separated from a purely quantitatively oriented approach.

As for a modelling approach the main focus could therefore only be put on assumptions about reduced possibilities for harvesting caused by increasing ecological constrains. Based on this assumption it would be reasonable to assume an additional (to the base line scenario) decrease of 15% of the forest area available for wood supply over the coming three decades (7.5% up to 2015 and another 7.5% from 2015 to 2030). In the framework of the current analysis it seems to be difficult to differentiate this decrease between individual countries as a result of their policies towards biodiversity and nature conservation. It is expected that the country-specific rates of decrease will differ significantly from the average proposed here, which could be also seen from the inquiry results. At the same time it has to be mentioned that the baseline scenario already contains

certain constraints on harvesting, where country-specific policy approaches are reflected in terms of nature conservation and biodiversity.

4.2.3 Link to the modelling of forest products markets

The policy framework influences the development of forest products demand, partly via direct legal measures, but more significantly, indirectly via changes in price relations as well as available incomes. In the baseline scenario the development of demand is derived, based on the econometric model techniques and assumptions. The model describes the relationships between demand of forest products and the development of incomes and prices based on consumer preferences, and legal constraints as they affected the sector in the past.

With the goal to use this type of model for an analysis of impacts from different policy scenarios on the forest sector, the changes in policy need to be transformed into steering parameters of the market model. It is useful to recall that the development of consumption, trade and production in the econometric model is steered by:

- income elasticities (differentiated by countries or country groups respectively),
- price elasticities (differentiated by countries or country groups respectively)
- assumptions about the future development of incomes (country specific forecasts of GDP, (NOBE, 2002),
- assumptions about the future development of roundwood prices.

The NOBE projections provide three scenarios (base, low and high), assuming for each of them specific policy developments. The "Low" and "High" alternatives partly contain policy assumptions, which have been discussed as scenario areas in the chapters above.

Considering the problems from following the approach described in section 4.2.1 above, the expert meeting held in December 2001 discussed possibilities to link the outcomes from the current analysis with the assumptions made by NOBE for the long-term outlook of GDP growth in European countries. The results of this exercise for two of the mega-scenarios are shown in Table 9, in columns "GDP". "0" describes the growth assumed for the baseline scenario, "+" for the "High" and "-" for the "Low" scenario. The third mega-scenario "Sustainable Energy" was dropped from this approach, because the assumptions would lead to a scenario somewhere between the Baseline and the Conservation scenario. The meeting had suggested focussing on a few extreme scenarios, rather than describing a larger variety of possible scenarios.

The meeting outcome also provided indications about the possible development of relative prices for forest products. The general conclusion was that in EU/EFTA and in CEEC sub-regions relative prices would slightly decrease, while prices in CIS countries are expected to grow moderately. This additional assumption seems to be useful for the EFSOS scenario modelling, as prices in the GDP forecast of NOBE are kept constant in the baseline scenario.

Table 9: Impacts of scenario items on growth of GDP and prices of forest products, 2001 to 2015, alternative scenarios from NOBE

Conservation mega-scenario

	EU/EFTA		CEEC		CIS	
	GDP	Prices	GDP	Prices	GDP	Prices
Nature conservation	0/-	0/+	0/-	0/+	0/-	0/+
Nature-oriented Management	0	0/+	0	0/+	0	0/+
Certification	0	0/+	0	0/+	0	0/+
Non-market benefits	0/-	0/+	0/-	0/+	0/-	0
Agricultural policies	0/-	0	0/-	0	0	0
Renewable energy	-	+	-	+	0	0
Waste management/emissions	-	0/-	-	0/-	-	0/-
Climate change	0	-	0	-	0	-

Globalization mega-scenario

	EU/EFTA		CEEC		CIS	
	GDP	Prices	GDP	Prices	GDP	Prices
Certification	0	0/+	0	0/+	0	0/+
Globalization	+	-	+	-	+	+
Innovations	+	-	+	-	+	-
Market framework in CITs	0/+	-	+	-	+	-
EU enlargement	0/+	-	+	+	+	+
Agricultural policies	+	0	0	0	0	0
Waste management/emissions	0	0/-	0	0	0	0

Net impact of scenario items in conservation and globalization mega-scenarios

	EU/EFTA		CEEC		CIS	
	GDP	Prices	GDP	Prices	GDP	Prices
Conservation	-	+	-	+	-	+
Globalization	+	-	+	-	+	+

In particular the mega-scenario "More widespread acceptance of economic integration and market liberalization" contains policy developments, which are mainly identical with the assumptions described for the "High" scenario in the GDP forecast from NOBE. Thus it does not seem to be useful to redefine country specific model steering parameters in order to reflect the assumptions in this mega-scenario, but to utilize the "High" scenario from NOBE for the description of the globalization scenario.

Further, the NOBE alternative "Low" combines implicitly or explicitly policy elements reflecting a certain slowing down of macroeconomic income developments. Therefore it does not seem necessary to elaborate, besides the NOBE alternative scenario "Low", an additional variation of model steering parameters in order to reflect the major income effects from the mega-scenario

"Political impetus towards sustainable energy use" on the demand of forest products. It can be assumed that the NOBE "Low" scenario covers these kinds of income effects.

At the same time there seems to be additional needs for modelling the specific impacts, which influence forest products markets directly (not via income) caused by an accelerated use of wood for energy generation as assumed in the mega-scenario "sustainable energy use". An assumed rapid increase of demand of wood for energy generation caused by changes in the policy framework can not be described adequately for most of the analysed countries by income and price elasticities estimated from developments in the past.

For wood for energy demand there are no econometric estimations available for most of the countries. In the light of that it has to be stated that the necessary prerequisites are missing for a description of consequences from energy policies based on scenario modelling approaches.

The inquiry has shown, that incentives for energy supply from renewable sources could lead to an additional 0.5 p.p.p.a. growth of wood demand. At first glance this looks rather small. But considering that current fuelwood consumption has a rather low share of the overall roundwood demand in most countries, the proposed additional growth rate is rather high, when it is related only to fuelwood consumption.

If one would transform the outcome of the inquiry into the market model, it would be necessary for the mega-scenario "sustainable energy use" to increase the country specific income elasticity, derived from demand analyses, by 0.5 divided by the country specific GDP growth rate. The derived additional demand should be shown as "additional demand for energy generation". The feedback from this enlargement of demand on the material use of wood in other branches of the sector should be described based on changes in price.

Kangas and Baudin apply these assumptions regarding policy to their econometric model for consumption of trade and forest products. Readers are referred to 2.6 and 2.7 of Modelling and Projections of Forest Products Demand, Supply and Trade in Europe, ECE/TIM/DP/30.

ANNEX

INQUIRY APPROACH AND RESULTS

ANNEX CONTENTS

A.1 FIRST INQUIRY

The proposal for the first inquiry questionnaire was made by the Timber Branch and commented on by the project team. The selection of 19 scenario areas was made on the basis of an earlier ETTS working paper "The Policy Context for the Development of the Forest and Forest Industries Sector in Europe". The first inquiry was aimed at establishing priorities for relatively broad scenario areas, defining their geographical importance and identifying contact persons or institutions for further inquiries. Experts were also invited to add other scenario areas that they considered to be important for the future development of the forest and forest industry sector.

The first inquiry was sent out at the end of May 2001 to the EFSOS national correspondents and in the case that the country had not nominated yet its national correspondent to the contact person of the Timber Committee. The inquiry was also sent to forest sector experts in the international organizations and universities. In total the first inquiry was addressed to 75 experts and organizations.

The Timber Branch received back 22 completed questionnaires – 15 from national authorities (mainly ministries of agriculture or environment in charge of forestry issues and forest research institutes), 5 from international organizations (FAO, European Commission – DG Environment, UNEP, ITTO and EFI), 1 from a university and 1 from a forest products association. The respondents evaluated the importance of the likely impact of each scenario area on the forest and forest industry sector, defined the regional level of impact and identified contact persons or institutions for further inquiries. They also indicated which issues were particularly important, and what kind of impact scenario areas would have on the forest and forest industry sector.

The questionnaires were analysed in July 2001. All information received from respondents was entered into Excel sheets, mainly because of the possibility of their statistical evaluation. The scenario areas were ranged: prioritization was made according to the respondents' average evaluation of scenario areas impact on the forest sector. In general, the respondents gave a high importance to the areas concerning nature protection and environment issues, economic development, and changes in land use and energy policy (see Table 1 in the main report).

As forestry and environment experts dominated the list of respondents, the chosen priorities for the scenarios were mainly "supply" oriented. Therefore the results were interpreted in light of the structure of respondents. The project team, meeting in July 2001, reviewed the scenario areas identified by the first inquiry and proposed a slightly modified list of scenario areas as an input to the second inquiry.

A.2 SECOND INQUIRY

The second inquiry questionnaire was proposed by the project team meeting in July 2001. Based on the responses from the first inquiry, the project team:

- Reviewed the scenario areas and grouped them into broader scenario "packages":
- Identified the major forces driving changes in these scenario areas (see table A.2.1: List of scenario packages, scenario areas and forces driving changes in scenario areas (second inquiry)).

The meeting also proposed to cluster the inquiry results by regions (EU/EFTA, CIS, CEEC and other Europe) and by product groups (roundwood, sawnwood woodpulp, paper and paperboard, recovered paper, wood-based panels) and to take this aspect into account during gathering of addressees for the second inquiry.

Based on the project team suggestions, the Secretariat elaborated a proposal for the second inquiry questionnaire and circulated it for comments among the experts involved in the project. The second inquiry sought for elicit expert opinions on the identified scenario areas, defining which parameters would be the most affected, and making estimates of the expected impact on them. The second inquiry invited respondents to:

- Indicate probability of occurrence of each scenario area;
- Give a brief description of this scenario area, as it exists in their country/region, and to make any comments related to this area;
- Give an estimation of the impact of policies and developments in the scenario areas on the decrease/growth of parameters, which describe forest resources (forest area available for wood supply) and forest products markets (production, consumption, export/imports), and specify the product group on which the particular scenario area will have an impact (roundwood, sawnwood, wood pulp, paper and paperboard, recovered paper, wood-based panels);
- Identify the most important forces driving changes in the scenario areas, estimate the probability of these driving forces occurring and to specify by which kind of instruments they are induced (either by policy measures as laws and economic instruments (e.g. subsidies and taxation) or by market forces such as competition, development of offer and demand for wood products);
- Specify to which country/region their reply refers (e.g. European Union and European Free Trade Association (EU-EFTA), Central and Eastern European Countries (CEECs), Community of Independent States (CIS)).

The second inquiry was addressed to all groups of stakeholders in the forest sector (governments and intergovernmental organizations (GOV), forest sector associations (NGO-bus), non-profit non-governmental organizations (NGOs-np) and scientific community (SCI)). The inquiry was sent out at the beginning of September 2001 in total to 322 experts and organizations. The Timber Branch received back 42 filled questionnaires – 17 from GOV, 10 from NGO-bus, 5 from NGOs-np and 10 from SCI. 21 respondents referred their reply to the countries from EU-EFTA region, 12 to the CEECs, 6 to the CIS and 3 experts responded for the whole Europe (see table A.2.2).

Table A.2.1 *List of scenario packages, scenario areas and forces driving changes in scenario areas (second inquiry)*

ID	Scenario package / scenario area / force driving changes in scenario areas
1	**Biodiversity**
1.1	**More emphasis on nature conservation and promotion of biological diversity of forests ecosystems**
1.1.1	Increase area protected for nature conservation, reduction of harvesting in such areas
1.1.2	Building of ecological networks including core areas, corridors, buffer areas and restoration areas
1.1.3	Diversification of species composition and structure of ecological communities in forests
1.1.4	Intensified fire protection
1.2	**More emphasis on nature oriented forest management**
1.2.1	Eliminate/reduce clear cutting, extend selection system of harvesting
1.2.2	Plant endemic/indigenous species, combinations of coniferous and broad-leaved species
1.2.3	Increase rotation lengths
1.2.4	Abandonment/reduction of drainage systems
1.2.5	Reduction of use of chemicals (e.g. biocides) in forests
1.3	**Increasing demand for certification of forest management and wood products**
1.3.1	Certification of forest management
1.3.2	Certification of forest products
1.3.3	Certification in wood processing industry
2	**Globalization & Innovation**
2.1	**Impact of globalization on the competitiveness of the European forest and forest industry sector**
2.1.1	Increasing international flows of capital
2.1.2	International relocation of capacities
2.1.3	International merging of companies
2.2	**Intensified innovations and changes in competitiveness of wood products**
2.2.1	Innovations in harvesting techniques and facilities
2.2.2	Innovations in wood processing technologies
2.2.3	Development of new wood products (e.g. engineered wood)
2.2.4	Progress in transport and logistics
2.2.5	Innovations in information technologies
2.2.6	Introduction of new non-wood commodities
2.2.7	Development of new fields of application
3	**Economies in transition**
3.1	**Strengthening policies to develop market framework in countries with economies in transition (CITs)**
3.1.1	Recovery of forest and forest industry sector in CITs
3.1.2	Changing ownership of forest land (e.g. privatization and restitution)
3.2	**Progress in EU enlargement**
3.2.1	Accession of the CEECs to the EU
3.2.2	Accession of other European countries
4	**Regional development**
4.1	**Incentives for social/environmental benefits from forestry and wood products use**
4.1.1	Economic incentives for protective and recreational services of forests
4.1.2	Economic incentives for nature oriented management of forests
4.1.3	Economic incentives for conversion of forests used for wood production to forests protected for nature conservation
4.2	**Changes in agricultural, rural and regional development policies**
4.2.1	Changes in rates of subsidization in agricultural production and exports
4.2.2	Extension of Common Agricultural Policy (CAP) elements into forestry; i.e. afforestation of agricultural land
4.2.3	Implementation of forestry measures in agriculture, e.g. biomass production
4.2.4	Promotion of forest and forest industry sector as an integral part of rural development
4.3	**Social and demographic developments**
4.3.1	Migration of rural population
4.3.2	International emigration/immigration
4.3.3	Ageing of populations
5	**Energy & Environment**
5.1	**Promotion of renewable energy sources**
5.1.1	Emphasise use of wood biomass as a source of energy
5.1.2	Taxing fossil energy sources utilization
5.1.3	Abandonment of nuclear power stations
5.1.4	Promotion of energy saving technologies
5.2	**Improvement of waste management and emission control**
5.2.1	Increase of recycling of waste paper and waste wood
5.2.2	Implementation of best practices (cleaner production or waste minimization) in wood processing industry
5.2.3	Implement/extend integrated pollution control
5.2.4	Rationalize use of wood products
5.2.5	Reduction of harvesting and transport loses of roundwood
5.3	**Climate change**
5.3.1	Impacts of climate change on forest growth (higher temperatures, higher precipitation, more frequent and stronger storm occurrences)
5.3.2	Acceptance of forests as natural sinks for the compliance of emission reduction commitments
5.3.3	Acceptance of wood products as sinks for the compliance of emission reduction commitments

All information received from respondents was entered into an Access database. The database is available in the Timber Branch secretariat. The Timber Branch prepared a form presenting the complete evaluation from each respondent and several reports to compare and analyse the respondents' evaluations grouped by regions and/or interest groups.

Table A.2.2 *Second inquiry respondents clustered by region and interest*

Region	Interest				
	GOV	NGO-bus	NGO-np	SCI	Grand Total
EU/EFTA	6	7	1	7	21
CEECs and other Europe	8	1	2	1	12
CIS	1	2	2	1	6
Europe	2			1	3
Grand Total	17	10	5	10	42

The basic report (approx. 500 pages) from the database gives detailed overview on the inquiry results. The basic report is available as hard copy with the Timber Branch secretariat. It is structured into 3 sub-reports:

- Probability of the scenario areas occurrence;
- Impact of policies/developments in the scenario areas on the forest sector parameters;
- Forces driving changes in scenario areas.

The sub-reports are sorted by scenario area and region.

In some cases it was recognisable that the addressee had problems in understanding the inquiry (e.g. rate of change of parameters, relationships between product groups and forecasts). The analysis has also shown some difficulties in explaining the inquiry results, in particular the estimated rates of change. The intention was to get an estimation, which would describe the decrease or increase of growth in comparison to the development in the baseline scenario, in which the main assumption is that there would not be any additional specific changes in the policy framework related to the forest sector. In other words, the policy framework of the baseline scenario is influencing the sector in the future in the same way as currently. The impacts of policies and developments in the scenario area on the decrease or growth of the forest sector parameters have therefore to be interpreted as additional to the baseline scenario growth or decrease.

With the goal to support the understanding of this approach the Timber Branch secretariat made its own estimations of impact of policies/developments in the scenario area on the decrease or growth of the forest sector parameters compared to the baseline scenario (much lower, lower, baseline, higher, much higher). Since no new baseline scenarios have been developed yet, the ETTS V (1996) scenarios were used as a baseline for this exercise. The report comparing average estimations by the second inquiry respondents with the secretariat estimations was provided to the EFSOS national correspondents and experts in December 2001 with the goal to review the results of the second inquiry. The consensus estimates provided by the December meeting working groups and the secretariat expert estimates were therefore used for the quantitative study forecasts.

A.3 INTRODUCTION TO THE RESULTS TABLES OF THE SECOND INQUIRY

The following tables are structured into three sections, and are sorted by scenario area package and region to which the responses refer.

1. **"Probability of the Scenario Areas Occurrence" (tables A.3.1.1 – A.3.1.5):**
   - Respondents' average estimation of the probability of the scenario occurring (in %);
   - Respondents', minimum estimation of the probability of the scenario occurring (in %);
   - Respondents' maximum estimation of the probability of the scenario occurring (in %);
   - The secretariat's estimation of the probability of the scenario occurring (in %);
   - Meeting participants' estimation of the probability of the scenario area occurring (in %).
2. **"Impact of Policies/Developments in the Scenario Areas on the Decrease/Growth of the Indicated Forest Sector Parameters" (tables A.3.2.1 - A.3.2.13).**

The forest sector parameters describe:

- Forest resources: forest area available for wood supply (FAWS), and
- Forest products markets: production (P), consumption (C) and export/imports (E/I) of forest products in general, whereas the estimations were made for two periods: 2001-20015 and 2016-2030 compared to the situation in 2001 and 2016 respectively.

There are two types of estimations:

- Qualitative: estimation of the impact of policies and developments in the scenario area on the decrease or growth of the indicated forest sector parameters (strong decrease, low decrease, no impact, low growth, strong growth), and
- Quantitative: rate of change of the indicated forest sector parameters due to the impact of policies and developments in the scenario area.

The secretariat and participants of the EFSOS national correspondents and experts meeting in December 2001 made estimations of the impact of policies and developments in the scenario area on the decrease or growth of the forest sector parameters **compared to a baseline scenario** (much lower, lower, baseline, higher, much higher). The baseline scenario aims to provide a description of the future forest sector developments in the current policy and market framework, assuming there will be a steady development. The baseline scenario was developed in the baseline study "European Timber Trends and Prospects: Into the 21st Century" (ETTS V, 1996) and is updated in the new successor study of European timber trends and prospects (EFSOS).

The tables contain information on:

- Respondents' average estimation of the impact of policies/developments in the scenario area on the decrease/growth of the indicated forest sector parameters;
- Respondents' minimum estimation of the rate of change of forest sector parameters (in %);
- Respondents' maximum estimation of the rate of change of forest sector parameters (in %);
- The secretariat's estimation of the impact of policies and developments in the scenario area on the decrease or growth of the indicated forest sector parameters compared to the baseline scenario;
- Meeting participants' estimation of the impact of policies and developments in the scenario area on the decrease/growth of the indicated forest sector parameters compared to the baseline scenario; and
- Meeting participants' estimation of the rate of change of forest sector parameters due to the impact of policies/developments in the scenario area, compared to the baseline scenario (in percentage points per annum - p.p.p.a.[*]).

3. "Forces Driving Changes in Scenario Areas" (tables A.3.3.1-A.3.3.13):

- Number of respondents replies specifying laws / economic instruments / market forces as instruments inducing the driving force;
- Respondents' average estimation of the probability of the driving force occurring (in %);
- Respondents' minimum estimation of the probability of the driving force occurring (in %);
- Respondents' maximum estimation of the probability of the driving force occurring (in %);
- The secretariat estimation of the probability of the driving force occurring (in %);
- The meeting participants estimation of the probability of the driving force occurring (in %).

[*] Additional percents to the baseline study estimation of the rate of change of the corresponding parameter

Table A.3.1.1

Probability of the Scenario Areas Occurrence

Scenario Package 1 **Biodiversity**

Region	Probability of scenario area occurring, %				
	Avg. estimation	Min. estimation	Max. estimation	Secretariat estim.	Meeting revision
11 More emphasis on nature conservation and promotion of biological diversity of forests ecosystems					
EU-EFTA	74	50	100	90	>90
CEECs and others	71	8	100	75	50-70
CIS	25	5	70	70	50-70
Average Europe	66	5	100	78	70
12 More emphasis on nature oriented forest management					
EU-EFTA	80	50	100	75	North:>90; South: 50-70
CEECs and others	66	10	100	70	50-70
CIS	38	10	80	65	50-70
Average Europe	69	10	100	70	65
13 Increasing demand for certification of forest management and wood products					
EU-EFTA	58	20	100	50	~50
CEECs and others	61	2	100	60	20-30
CIS	50	10	70	50	20-30
Average Europe	58	2	100	53	33

Table A.3.1.2

Probability of the Scenario Areas Occurrence

Scenario Package 2 **Globalisation & Innovation**

Region	Probability of scenario area occurring, %				
	Avg. estimation	Min. estimation	Max. estimation	Secretariat estim.	Meeting revision
21 Impact of globalisation on the competitiveness of the European forest and forest industry sector					
EU-EFTA	76	20	100	70	50
CEECs and others	60	0	90	60	60
CIS	43	15	80	70	70
Average Europe	65	0	100	67	60
22 Intensified innovations and changes in competitiveness of wood products					
EU-EFTA	53	10	100	40	60
CEECs and others	61	0	100	60	70
CIS	72	50	90	65	75
Average Europe	59	0	100	55	68

Table A.3.1.3

Probability of the Scenario Areas Occurrence

Scenario Package 3 **Economies in transition**

Region	Probability of scenario area occurring, %				
	Avg. estimation	Min. estimation	Max. estimation	Secretariat estim.	Meeting revision
31 Strengthening policies to develop market framework in countries with economies in transition (CITs)					
EU-EFTA	70	40	100	75	not relevant
CEECs and others	68	0	100	85	90
CIS	75	30	100	80	80
Average Europe	70	0	100	80	85
32 Progress in EU enlargement					
EU-EFTA	83	60	100	80	not relevant
CEECs and others	80	10	100	80	100
CIS	35	10	70	10	50
Average Europe	77	10	100	57	75

Table A.3.1.4

Probability of the Scenario Areas Occurrence

Scenario Package 4 **Regional development**

Region	Probability of scenario area occurring, %				
	Avg. estimation	Min. estimation	Max. estimation	Secretariat estim.	Meeting revision
41 Incentives for social/environmental benefits from forestry and wood products use					
EU-EFTA	68	25	100	65	65
CEECs and others	60	10	80	60	60
CIS	58	30	90	50	50
Average Europe	64	10	100	58	58
42 Changes in agricultural, rural and regional development policies					
EU-EFTA	75	10	100	70	80
CEECs and others	74	8	100	70	80
CIS	41	10	70	40	40
Average Europe	69	8	100	60	67
43 Social and demographic developments					
EU-EFTA	53	0	100	70	50
CEECs and others	51	0	90	90	70
CIS	38	20	60	90	90
Average Europe	50	0	100	83	70

Table A.3.1.5

Probability of the Scenario Areas Occurrence

Scenario Package 5 **Energy & Environment**

Region	Probability of scenario area occurring, %				
	Avg. estimation	Min. estimation	Max. estimation	Secretariat estim.	Meeting revision
51 Promotion of renewable energy sources					
EU-EFTA	75	40	100	75	100
CEECs and others	68	5	100	65	100
CIS	47	15	80	50	100
Average Europe	69	5	100	63	100
52 Improvement of waste management and emission control					
EU-EFTA	73	10	100	60	100
CEECs and others	67	5	100	60	100
CIS	43	15	100	50	100
Average Europe	66	5	100	57	100
53 Climate change					
EU-EFTA	70	0	100	70	100
CEECs and others	52	0	100	65	100
CIS	35	5	80	50	100
Average Europe	59	0	100	62	100

Table A.3.2.1

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

11 More emphasis on nature conservation and promotion of biological diversity of forests ecosystem

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change
EU-EFTA							
FAWS	2001-2015	no impact	-5	1	lower	lower	
FAWS	2016-2030	no impact	-5	6	lower	lower	
P	2001-2015	no impact	-1.5	3	lower		
P	2016-2030	no impact	-1.5	1	lower		
C	2001-2015	no impact	-1.5	2	baseline	baseline	
C	2016-2030	no impact	-1.5	1	baseline	baseline	
E/I	2001-2015	low growth	0	3	baseline		
E/I	2016-2030	low growth	0	2	baseline		
CEECs and others							
FAWS	2001-2015	no impact	-5	2	lower	lower	
FAWS	2016-2030	no impact	-0.2	5	lower	lower	
P	2001-2015	no impact	-5	5	baseline		
P	2016-2030	low growth	-0.5	10	baseline		
C	2001-2015	no impact	0	5	baseline	baseline	
C	2016-2030	low growth	0	10	baseline	baseline	
E/I	2001-2015	no impact	0	5	baseline		
E/I	2016-2030	no impact	0	5	baseline		
CIS							
FAWS	2001-2015	no impact	-3	0	lower	baseline	
FAWS	2016-2030	no impact	-2	0	lower	baseline	
P	2001-2015	no impact	-1.5	7.5	baseline		
P	2016-2030	no impact	-4	11	baseline		
C	2001-2015	low growth	-1.5	11	baseline	baseline	
C	2016-2030	no impact	-4	15	baseline	baseline	
E/I	2001-2015	no impact	-7.5	4	baseline		
E/I	2016-2030	no impact	-7.5	11	baseline		

Table A.3.2.2

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

12 More emphasis on nature oriented forest management

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change
EU-EFTA							
FAWS	2001-2015	no impact	-5	1	baseline	baseline	
FAWS	2016-2030	no impact	-2	6	baseline	baseline	
P	2001-2015	no impact	-6.5	2	lower		
P	2016-2030	no impact	-2	5	lower		
C	2001-2015	no impact	-1.5	2	baseline	baseline	
C	2016-2030	no impact	-1.5	1	baseline	baseline	
E/I	2001-2015	low growth	-5	3	baseline		
E/I	2016-2030	low growth	0	2	baseline		
CEECs and others							
FAWS	2001-2015	no impact	-5	5	baseline	baseline	
FAWS	2016-2030	no impact	-1	5	baseline	baseline	
P	2001-2015	no impact	-5	25	baseline		
P	2016-2030	no impact	-1	30	baseline		
C	2001-2015	no impact	0	25	baseline	baseline	
C	2016-2030	low growth	0	25	baseline	baseline	
E/I	2001-2015	no impact	0	5	baseline		
E/I	2016-2030	no impact	0	5	baseline		
CIS							
FAWS	2001-2015	no impact	-4	2	baseline	baseline	
FAWS	2016-2030	no impact	-4	2	baseline	baseline	
P	2001-2015	no impact	-7.5	7.5	baseline		
P	2016-2030	no impact	-25	11	baseline		
C	2001-2015	low growth	-7.5	11	baseline	baseline	
C	2016-2030	no impact	-25	15	baseline	baseline	
E/I	2001-2015	no impact	-7.5	4	baseline		
E/I	2016-2030	no impact	-25	13	baseline		

Meeting proposed a new parameter - INCREMENT: can be expected a minor reduction

Table A.3.2.3

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

13 Increasing demand for certification of forest management and wood products

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change
EU-EFTA							Assumption: the demand leads to certified forests
FAWS	2001-2015	no impact	-12.5	1	baseline	lower	
FAWS	2016-2030	no impact	-3	7.5	baseline	lower	
P	2001-2015	no impact	-7.5	1	baseline		
P	2016-2030	no impact	-3	6	baseline		
C	2001-2015	no impact	-2	1	higher		
C	2016-2030	no impact	-3	1	higher		
E/I	2001-2015	no impact	-10	2	higher		
E/I	2016-2030	no impact	0	2	higher		
CEECs and others							
FAWS	2001-2015	no impact	-5	0.1	baseline	lower	
FAWS	2016-2030	no impact	-0.3	5	baseline	lower	
P	2001-2015	no impact	0	1	baseline		
P	2016-2030	no impact	0	5	baseline		
C	2001-2015	no impact	0	1	baseline		
C	2016-2030	no impact	0	5	higher		
E/I	2001-2015	no impact	0	3	baseline		
E/I	2016-2030	no impact	-1	5	higher		
CIS							
FAWS	2001-2015	no impact	-3	4	baseline	lower	
FAWS	2016-2030	no impact	-4	1.5	baseline	lower	
P	2001-2015	no impact	-6.5	4	baseline		
P	2016-2030	no impact	-30	13.5	baseline		
C	2001-2015	no impact	-6.5	6.5	baseline		
C	2016-2030	no impact	-30	17.5	baseline		
E/I	2001-2015	no impact	-6.5	7	baseline		
E/I	2016-2030	low growth	-30	11	baseline		

Table A.3.2.4

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

21 Impact of globalisation on the competitiveness of the European forest and forest industry sector

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.*)
EU-EFTA						R - removals P - production of wood products	
FAWS	2001-2015	no impact	-1	1	baseline	baseline	0
FAWS	2016-2030	no impact	-1	7.5	baseline	baseline	0
P	2001-2015	no impact	-7.5	2	higher	R - higher P - higher	R 0.1 P 0.2
P	2016-2030	no impact	-1	2.5	higher	R - baseline P - higher	R 0 P 0.2
C	2001-2015	low growth	0	7.5	higher	higher	0.15
C	2016-2030	low growth	0	4	higher	higher	0.15
E/I	2001-2015	low growth	-7.5	3	higher	higher	0.3
E/I	2016-2030	low growth	-5	3	higher	higher	0.3
CEECs and others							
FAWS	2001-2015	no impact	-1	10	higher	higher	0.1
FAWS	2016-2030	no impact	-1	5	higher	higher	0.1
P	2001-2015	no impact	-2	10	higher	higher	R 0.2 P 0.3
P	2016-2030	no impact	-1	5	higher	higher	R 0.2 P 0.3
C	2001-2015	low growth	0	5	higher	higher	0.2
C	2016-2030	low growth	0	5	higher	higher	0.2
E/I	2001-2015	low growth	0	10	higher	higher	0.4
E/I	2016-2030	low growth	0	10	higher	higher	0.4
CIS							
FAWS	2001-2015	no impact	-3.5	0	baseline	baseline	0
FAWS	2016-2030	no impact	-3.5	-1.5	baseline	baseline	0
P	2001-2015	no impact	-3	1.5	higher	higher	R 0.1 P 0.2
P	2016-2030	no impact	-3	2.5	higher	higher	R 0.1 P 0.3
C	2001-2015	no impact	-3	2.5	higher	higher	0.2
C	2016-2030	no impact	-3	3.5	higher	higher	0.3
E/I	2001-2015	no impact	-3	2.5	higher	much higher	0.4
E/I	2016-2030	no impact	-3	3.5	much higher	much higher	0.4

* p.p.p.a. - percentage points per annum

Table A.3.2.5

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

22 Intensified innovations and changes in competitiveness of wood products

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA						R - removals P - production of wood products	
FAWS	2001-2015	no impact	0	2.5	baseline	baseline	0
FAWS	2016-2030	low growth	0	2.5	baseline	baseline	0
P	2001-2015	low growth	-0.2	3	higher	higher	R 0.1 P 0.1
P	2016-2030	low growth	-0.2	3	higher	higher	R 0.1 P 0.1
C	2001-2015	low growth	0	10	higher	higher	0.2
C	2016-2030	low growth	0	10	higher	higher	0.2
E/I	2001-2015	low growth	-7.5	3	higher	higher	0.1
E/I	2016-2030	low growth	-7.5	3	higher	higher	0.1
CEECs and others							
FAWS	2001-2015	no impact	0	5	baseline	baseline	0
FAWS	2016-2030	no impact	0	5	baseline	baseline	0
P	2001-2015	low growth	0	5	higher	higher	R 0.1 P 0.2
P	2016-2030	low growth	0	5	higher	higher	R 0.1 P 0.2
C	2001-2015	low growth	0	5	higher	higher	0.3
C	2016-2030	low growth	0	5	higher	higher	0.3
E/I	2001-2015	no impact	-2	5	higher	higher	0.2
E/I	2016-2030	no impact	0	5	higher	higher	0.2
CIS							
FAWS	2001-2015	no impact	-15	2	baseline	baseline	0
FAWS	2016-2030	no impact	-15	4	baseline	baseline	0
P	2001-2015	no impact	-7	7.5	higher	much higher	R 0.2 P 0.3
P	2016-2030	low growth	-7	12.5	much higher	much higher	R 0.25 P 0.3
C	2001-2015	no impact	-5	9	higher	higher	0.3
C	2016-2030	low growth	-5	16.5	higher	higher	0.3
E/I	2001-2015	no impact	-3	4	higher	higher	0.2
E/I	2016-2030	low growth	-3	11	higher	higher	0.2

Table A.3.2.6

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

31 Strengthening policies to develop market framework in countries with economies in transition

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA						R - removals P - production of wood products	
FAWS	2001-2015	no impact	-3	5	baseline	baseline	0
FAWS	2016-2030	no impact	-0.1	1	baseline	baseline	0
P	2001-2015	no impact	-5	4	higher	R - baseline P - lower	R 0 P -0.5
P	2016-2030	no impact	-1	1	baseline	R - baseline P - lower	R 0 P -0.5
C	2001-2015	no impact	-1.5	4	higher	higher	0.5
C	2016-2030	low growth	0	5	higher	higher	0.5
E/I	2001-2015	low growth	-1	4	higher	much higher	1.5
E/I	2016-2030	low growth	-7.5	4	higher	much higher	1.5
CEECs and others							
FAWS	2001-2015	no impact	0	10	baseline	higher	0.1
FAWS	2016-2030	low growth	0	5	higher	higher	0.1
P	2001-2015	no impact	-1	5	higher	R- higher P- much higher	R 0.5 P 1.0
P	2016-2030	no impact	-1	5	higher	R- higher P- much higher	R 0.5 P 1.0
C	2001-2015	no impact	0	4	higher	higher	0.5
C	2016-2030	low growth	0	5	higher	higher	0.5
E/I	2001-2015	no impact	-1	10	much higher	much higher	1.5
E/I	2016-2030	no impact	-0.1	5	higher	much higher	1.5
CIS							
FAWS	2001-2015	low growth	1.5	3.5	baseline	higher	0.05
FAWS	2016-2030	low growth	1.5	6.5	higher	higher	0.05
P	2001-2015	low growth	2.5	2.5	higher	much higher	R 1.0 P 1.0
P	2016-2030	low growth	11	11	much higher	much higher	R 1.0 P 1.0
C	2001-2015	low growth	6.5	6.5	higher	much higher	1.0
C	2016-2030	low growth	16	16	much higher	higher	0.5
E/I	2001-2015	low growth	6.5	6.5	higher	much higher	1.5
E/I	2016-2030	low growth	13.5	13.5	much higher	much higher	1.5

Table A.3.2.7

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

32 Progress in EU enlargement

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA						R - removals P - production of wood products	
FAWS	2001-2015	no impact	-3	2	higher	baseline	0
FAWS	2016-2030	no impact	-0.5	1	baseline	baseline	0
P	2001-2015	low growth	-1	1	higher	R - baseline P - lower	R 0 P -0.5
P	2016-2030	low growth	-1	1	baseline	R - baseline P - lower	R 0 P -0.5
C	2001-2015	low growth	0	5	higher	higher	0.5
C	2016-2030	low growth	0	5	higher	higher	0.5
E/I	2001-2015	low growth	-10	2	higher	higher	1.0
E/I	2016-2030	low growth	-10	2	higher	higher	1.0
CEECs and others							
FAWS	2001-2015	no impact	-5	0.5	baseline	higher	0.1
FAWS	2016-2030	no impact	-0.1	0.1	baseline	higher	0.1
P	2001-2015	no impact	-3	2	higher	R- higher P- much higher	R 0.5 P 1.0
P	2016-2030	no impact	-3	1.5	higher	R- higher P- much higher	R 0.5 P 1.0
C	2001-2015	no impact	0	2	higher	higher	0.5
C	2016-2030	no impact	0	2	higher	higher	0.5
E/I	2001-2015	no impact	-3	10	higher	higher	1.0
E/I	2016-2030	no impact	0	5	higher	higher	1.0
CIS							
FAWS	2001-2015	no impact	0	0	baseline	baseline	0
FAWS	2016-2030	no impact	0	0	baseline	baseline	0
P	2001-2015	no impact	0	0	baseline	R- higher P- much higher	R 0.5 P 1.0
P	2016-2030	low growth	2.5	2.5	higher	R- higher P- much higher	R 0.5 P 1.0
C	2001-2015	no impact	1.5	1.5	baseline	baseline	0
C	2016-2030	low growth	2.5	2.5	baseline	higher	0.5
E/I	2001-2015	no impact	2.5	2.5	higher	higher	1.0
E/I	2016-2030	no impact	2.5	2.5	higher	higher	1.0

Table A.3.2.8

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

41 Incentives for social/environmental benefits from forestry and wood products use

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA							
FAWS	2001-2015	no impact	-7.5	1	baseline	baseline	0
FAWS	2016-2030	no impact	-1	1	baseline	baseline	0
P	2001-2015	no impact	-1	7.5	higher	baseline	0
P	2016-2030	no impact	-1	5	higher	higher	0.2
C	2001-2015	no impact	-0.2	15	higher	baseline	0
C	2016-2030	low growth	-0.2	7.5	higher	baseline	0
E/I	2001-2015	no impact	-7.5	3	higher	baseline	0
E/I	2016-2030	low growth	0	5	higher	baseline	0
CEECs and others							
FAWS	2001-2015	no impact	-5	1	baseline	baseline	0
FAWS	2016-2030	no impact	-1	0.1	lower	baseline	0
P	2001-2015	no impact	-5	1	higher	baseline	0
P	2016-2030	no impact	-1	1	higher	baseline	0
C	2001-2015	no impact	0	3	baseline	baseline	0
C	2016-2030	low growth	0	3	higher	baseline	0
E/I	2001-2015	low growth	0	5	higher	baseline	0
E/I	2016-2030	low growth	0	5	higher	baseline	0
CIS							
FAWS	2001-2015	no impact	-10	1.5	baseline	baseline	0
FAWS	2016-2030	no impact	-10	1.5	baseline	baseline	0
P	2001-2015	no impact	-5	2.5	higher	higher	
P	2016-2030	low growth	-5	7.5	higher	higher	
C	2001-2015	no impact	0	2.5	higher	higher	
C	2016-2030	low growth	0	4	higher	higher	
E/I	2001-2015	low growth	0	4	higher	higher	
E/I	2016-2030	low growth	0	7.5	higher	higher	

Table A.3.2.9

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

42 Changes in agricultural, rural and regional development policies

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA							
FAWS	2001-2015	low growth	0	15	higher	higher	0.1
FAWS	2016-2030	low growth	0	5	higher	baseline	0
P	2001-2015	no impact	0	1	baseline	baseline	0
P	2016-2030	low growth	0	12.5	higher	baseline	0
C	2001-2015	no impact	0	0.5	baseline	baseline	0
C	2016-2030	no impact	0	10	baseline	baseline	0
E/I	2001-2015	no impact	0	1	baseline	baseline	0
E/I	2016-2030	no impact	0	7.5	baseline	baseline	0
CEECs and others							
FAWS	2001-2015	low growth	-0.3	2	higher	higher	0.15
FAWS	2016-2030	low growth	-0.1	2	higher	higher	0.05
P	2001-2015	no impact	-1	1	higher	higher	0.2
P	2016-2030	low growth	0	2	higher	higher	0.2
C	2001-2015	no impact	0	1	higher	higher	0.2
C	2016-2030	no impact	0	2	higher	higher	0.3
E/I	2001-2015	no impact	0	1	higher	higher	0.1
E/I	2016-2030	no impact	0	0.5	higher	higher	0.1
CIS							
FAWS	2001-2015	no impact	-5	4	baseline	baseline	0
FAWS	2016-2030	no impact	-5	7.5	baseline	baseline	0
P	2001-2015	no impact	-3	1.5	baseline	baseline	0
P	2016-2030	low growth	-3	1.5	higher	higher	
C	2001-2015	low growth	0	1.5	baseline	baseline	0
C	2016-2030	low growth	0	1.5	higher	higher	
E/I	2001-2015	no impact	0	2	baseline	baseline	0
E/I	2016-2030	low growth	0	2	higher	higher	

Table A.3.2.10

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

43 Social and demographic developments

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA							
FAWS	2001-2015	no impact	0	0.5	baseline	baseline	0
FAWS	2016-2030	no impact	-7.5	1	baseline	baseline	0
P	2001-2015	no impact	-0.5	1	baseline	baseline	0
P	2016-2030	no impact	-1	1	baseline	baseline	0
C	2001-2015	no impact	-0.5	0	baseline	baseline	0
C	2016-2030	no impact	-1	7.5	baseline	baseline	0
E/I	2001-2015	no impact	0	0	baseline	baseline	0
E/I	2016-2030	no impact	-7.5	0	baseline	baseline	0
CEECs and others							
FAWS	2001-2015	no impact	0	1	baseline	baseline	0
FAWS	2016-2030	no impact	0	1	baseline	baseline	0
P	2001-2015	no impact	-1	0.5	baseline	baseline	0
P	2016-2030	no impact	-1	0.25	baseline	baseline	0
C	2001-2015	no impact	0	1	baseline	baseline	0
C	2016-2030	no impact	0	1	baseline	baseline	0
E/I	2001-2015	no impact	-0.1	2.5	baseline	baseline	0
E/I	2016-2030	no impact	-0.1	2.5	higher	baseline	0
CIS							
FAWS	2001-2015	no impact	-4	0	baseline	baseline	0
FAWS	2016-2030	no impact	-3	0	higher	higher	
P	2001-2015	no impact	0	4	baseline	baseline	0
P	2016-2030	low growth	0	10	baseline	baseline	0
C	2001-2015	no impact	0	10	higher	higher	
C	2016-2030	low growth	0	13.5	baseline	baseline	0
E/I	2001-2015	low growth	2.5	5	higher	higher	
E/I	2016-2030	low growth	3	9	higher	higher	

Table A.3.2.11

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

51 Promotion of renewable energy sources

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA							
FAWS	2001-2015	no impact	0	1	baseline	baseline	0
FAWS	2016-2030	low growth	-0.3	2	baseline	higher	0.2
P	2001-2015	no impact	-1	2	baseline	higher	0.4
P	2016-2030	low growth	-1	2	baseline	higher	0.5
C	2001-2015	no impact	-2	1.3	baseline	higher	0.4
C	2016-2030	no impact	-3	1	baseline	higher	0.5
E/I	2001-2015	no impact	0	3	baseline	higher	0.2
E/I	2016-2030	no impact	-0.2	1	baseline	higher	0.3
CEECs and others							
FAWS	2001-2015	low growth	0	3	baseline	higher	0.1
FAWS	2016-2030	no impact	0	3	higher	higher	0.2
P	2001-2015	low growth	0	3	higher	higher	0.4
P	2016-2030	low growth	0	3	higher	higher	0.5
C	2001-2015	low growth	0	3	higher	higher	0.4
C	2016-2030	low growth	0	3	higher	higher	0.5
E/I	2001-2015	no impact	0	3	higher	higher	0.2
E/I	2016-2030	no impact	0	0.5	baseline	higher	0.3
CIS							
FAWS	2001-2015	no impact	-15	4	baseline	baseline	0
FAWS	2016-2030	no impact	-20	20	higher	baseline	0
P	2001-2015	no impact	-5	4	higher	higher	0.2
P	2016-2030	no impact	-15	6.5	higher	higher	0.3
C	2001-2015	no impact	-12	0	higher	baseline	0
C	2016-2030	no impact	-12	0	higher	baseline	0
E/I	2001-2015	no impact	-5	0	baseline	higher	0.2
E/I	2016-2030	no impact	-5	0	baseline	higher	0.3

Table A.3.2.12

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

52 Improvement of waste management and emission control

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA							
FAWS	2001-2015	no impact	0	7.5	baseline	baseline	0
FAWS	2016-2030	no impact	0	0.3	baseline	baseline	0
P	2001-2015	no impact	-1	2	baseline	baseline	0
P	2016-2030	no impact	-1	5	baseline	baseline	0
C	2001-2015	no impact	-1	0	baseline	baseline	0
C	2016-2030	no impact	-1	0	baseline	baseline	0
E/I	2001-2015	no impact	-1	5	baseline	baseline	0
E/I	2016-2030	no impact	-1	0	baseline	baseline	0
CEECs and others							
FAWS	2001-2015	no impact	0	2	baseline	baseline	0
FAWS	2016-2030	no impact	0	1	baseline	baseline	0
P	2001-2015	low growth	0	10	higher	baseline	0
P	2016-2030	low growth	0	10	higher	baseline	0
C	2001-2015	low growth	0	5	higher	baseline	0
C	2016-2030	low growth	0	20	higher	baseline	0
E/I	2001-2015	no impact	-0.1	1	higher	higher	0.1
E/I	2016-2030	no impact	0	10	higher	higher	0.1
CIS							
FAWS	2001-2015	no impact	0	4	baseline	baseline	0
FAWS	2016-2030	no impact	-1.5	7.5	baseline	baseline	0
P	2001-2015	no impact	2.5	2.5	baseline	baseline	0
P	2016-2030	no impact	2.5	2.5	baseline	baseline	0
C	2001-2015	no impact	0	0	baseline	baseline	0
C	2016-2030	no impact	0	0	higher	baseline	0
E/I	2001-2015	no impact	0	0	baseline	baseline	0
E/I	2016-2030	no impact	0	0	baseline	baseline	0

Table A.3.2.13

Impact of Policies/Developments in the Scenario Areas on the Forest Sector Parameters

53 Climate change

ID Parameter	Period	Avg. estimation of impact	Rate of change, % per year		Secretariat estimation of impact	Meeting revision of	
			Min.	Max.		Impact estim.	Rate of change (in p.p.p.a.)
EU-EFTA							
FAWS	2001-2015	no impact	-5	2	higher	higher	0.1
FAWS	2016-2030	low growth	-5	10	higher	higher	0.1
P	2001-2015	no impact	-1	2	higher	higher	0.2
P	2016-2030	low growth	-1	10	higher	higher	0.2
C	2001-2015	no impact	0	1	baseline	baseline	0
C	2016-2030	no impact	0	10	higher	higher	0.2
E/I	2001-2015	no impact	-7.5	1	higher	higher	0.2
E/I	2016-2030	no impact	-7.5	1	higher	higher	0.2
CEECs and others							
FAWS	2001-2015	no impact	0	0.5	higher	baseline	0
FAWS	2016-2030	no impact	-1	0.3	higher	baseline	0
P	2001-2015	no impact	-0.5	0.2	baseline	higher	0.1
P	2016-2030	no impact	-2	0.2	baseline	higher	0.1
C	2001-2015	no impact	-0.1	0	baseline	baseline	0
C	2016-2030	no impact	-0.2	0	baseline	baseline	0
E/I	2001-2015	no impact	0	0.5	baseline	baseline	0
E/I	2016-2030	no impact	0	1	baseline	baseline	0
CIS							
FAWS	2001-2015	no impact	0	3	baseline	baseline	0
FAWS	2016-2030	no impact	0	3	baseline	baseline	0
P	2001-2015	no impact	-5	1.5	baseline	higher	0.1
P	2016-2030	no impact	-5	1.5	baseline	higher	0.1
C	2001-2015	no impact	-5	1.5	baseline	baseline	0
C	2016-2030	no impact	-5	1.5	baseline	baseline	0
E/I	2001-2015	no impact	-5	1.5	baseline	baseline	0
E/I	2016-2030	no impact	-5	1.5	higher	baseline	0

Table A.3.3.1

Forces Driving Changes in Scenario Areas

11 More emphasis on nature conservation and promotion of biological diversity of forests ecosystems

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
111	Increase area protected for nature conservation, reduction of harvesting in such a	18	10	7	71.39	10	100	90.00	
112	Building of ecological networks including core areas, corridors, buffer areas and	19	8	3	67.65	5	100	60.00	
113	Diversification of species composition and structure of ecological communities i	14	7	4	52.65	0	100	70.00	
114	Intensified fire protection	9	6	1	35.00	0	90	60.00	
CEECs and others									
111	Increase area protected for nature conservation, reduction of harvesting in such a	11	4	2	71.25	0	100	75.00	
112	Building of ecological networks including core areas, corridors, buffer areas and	10	1	2	66.36	10	100	60.00	
113	Diversification of species composition and structure of ecological communities i	9	3	2	66.75	0	100	70.00	
114	Intensified fire protection	8	3	2	61.42	0	100	60.00	
CIS									
111	Increase area protected for nature conservation, reduction of harvesting in such a	6	1	0	53.00	5	90	75.00	
112	Building of ecological networks including core areas, corridors, buffer areas and	6	0	0	61.00	25	90	60.00	
113	Diversification of species composition and structure of ecological communities i	2	1	2	42.00	10	70	50.00	
114	Intensified fire protection	1	5	0	66.00	30	100	70.00	

Table A.3.3.2

Forces Driving Changes in Scenario Areas

12 More emphasis on nature oriented forest management

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
121	Eliminate/reduce clear cutting, extend selection system of harvesting	13	7	11	55.53	0	100	60.00	
122	Plant endemic/indigenous species, combinations of coniferous and broad-leaved	15	13	8	64.75	25	100	50.00	
123	Increase rotation lengths	11	9	6	45.95	0	100	50.00	
124	Abandonment/reduction of drainage systems	9	4	4	49.25	0	100	40.00	
125	Reduction of use of chemicals (e.g. biocides) in forests	14	6	9	59.44	0	100	75.00	
CEECs and others									
121	Eliminate/reduce clear cutting, extend selection system of harvesting	12	1	1	71.58	0	100	80.00	
122	Plant endemic/indigenous species, combinations of coniferous and broad-leaved	9	5	4	73.92	2	100	60.00	
123	Increase rotation lengths	11	1	3	42.33	0	100	60.00	
124	Abandonment/reduction of drainage systems	2	4	4	36.67	0	80	50.00	
125	Reduction of use of chemicals (e.g. biocides) in forests	10	3	5	61.64	3	100	60.00	
CIS									
121	Eliminate/reduce clear cutting, extend selection system of harvesting	4	1	2	85.00	70	90	70.00	
122	Plant endemic/indigenous species, combinations of coniferous and broad-leaved	3	2	1	50.00	10	90	50.00	
123	Increase rotation lengths	2	3	1	90.00	80	100	70.00	
124	Abandonment/reduction of drainage systems	3	1	0	65.00	50	75	60.00	
125	Reduction of use of chemicals (e.g. biocides) in forests	4	1	1	61.67	30	80	50.00	

Table A.3.3.3

Forces Driving Changes in Scenario Areas

13 Increasing demand for certification of forest management and wood products

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
131	Certification of forest management	4	4	19	73.25	20	100	80.00	
132	Certification of forest products	1	6	20	69.00	20	100	70.00	
133	Certification in wood processing industry	1	4	17	69.17	10	100	40.00	
CEECs and others									
131	Certification of forest management	10	7	9	83.85	50	100	75.00	
132	Certification of forest products	4	5	13	77.31	30	100	70.00	
133	Certification in wood processing industry	4	4	12	71.67	30	100	40.00	
CIS									
131	Certification of forest management	4	2	5	76.00	50	100	60.00	
132	Certification of forest products	1	3	6	66.00	30	100	50.00	
133	Certification in wood processing industry	0	4	5	56.00	20	100	30.00	

Table A.3.3.4

Forces Driving Changes in Scenario Areas

21 Impact of globalisation on the competitiveness of the European forest and forest industry sector

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %					
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision	
EU-EFTA										
211	Increasing international flows of capital	1	3	17	67.86	20	100	80.00	70	a/
212	International relocation of capacities	1	4	16	66.88	10	100	80.00	70	
213	International merging of companies	0	3	19	78.24	10	100	80.00	70	
CEECs and others										
211	Increasing international flows of capital	1	0	11	67.73	0	100	70.00	70	
212	International relocation of capacities	1	1	10	60.45	0	100	70.00	80	
213	International merging of companies	1	1	9	62.70	0	100	85.00	70	
CIS										
211	Increasing international flows of capital	0	5	3	70.00	40	100	70.00	80	b/
212	International relocation of capacities	0	2	5	65.00	30	100	90.00	90	
213	International merging of companies	2	2	3	65.00	30	100	80.00	80	

a/ Including intra - EU - EFTA flows

b/ Inflow of capital

Table A.3.3.5

Forces Driving Changes in Scenario Areas

22 Intensified innovations and changes in competitiveness of wood products

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
221	Innovations in harvesting techniques and facilities	3	8	17	63.00	5	100	60.00	70
222	Innovations in wood processing technologies	0	8	18	64.11	3	100	75.00	70
223	Development of new wood products (e.g. engineered wood)	0	5	21	62.50	10	100	65.00	75
224	Progress in transport and logistics	2	5	18	58.42	10	100	70.00	70
225	Innovations in information technologies	0	7	18	71.25	10	100	70.00	70
226	Introduction of new non-wood commodities	1	6	15	58.82	10	100	50.00	60
227	Development of new fields of application	0	6	15	52.19	20	100	40.00	50
CEECs and others									
221	Innovations in harvesting techniques and facilities	1	1	10	50.00	0	100	70.00	75
222	Innovations in wood processing technologies	1	1	10	69.58	0	100	80.00	75
223	Development of new wood products (e.g. engineered wood)	1	1	11	60.42	0	100	70.00	80
224	Progress in transport and logistics	2	3	10	58.75	0	100	70.00	75
225	Innovations in information technologies	0	1	9	69.58	0	100	80.00	75
226	Introduction of new non-wood commodities	0	2	9	53.64	0	100	65.00	65
227	Development of new fields of application	1	1	8	53.18	0	100	50.00	55
CIS									
221	Innovations in harvesting techniques and facilities	1	4	2	56.25	5	100	80.00	80
222	Innovations in wood processing technologies	0	3	4	67.50	30	100	75.00	80
223	Development of new wood products (e.g. engineered wood)	0	2	5	48.75	5	100	65.00	85
224	Progress in transport and logistics	1	4	3	42.50	10	100	75.00	80
225	Innovations in information technologies	0	3	4	57.50	10	100	75.00	80
226	Introduction of new non-wood commodities	0	2	4	48.75	5	100	65.00	70
227	Development of new fields of application	0	3	3	47.50	10	100	60.00	60

Table A.3.3.6

Forces Driving Changes in Scenario Areas

31 Strengthening policies to develop market framework in countries with economies in transition (CITs)

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
311	Recovery of forest and forest industry sector in CITs	6	13	18	72.50	25	100	90.00	not relevant
312	Changing ownership of forest land (e.g. privatisation and restitution)	16	8	12	71.76	25	100	60.00	not relevant
CEECs and others									
311	Recovery of forest and forest industry sector in CITs	3	4	6	59.50	0	100	90.00	90
312	Changing ownership of forest land (e.g. privatisation and restitution)	6	2	2	67.50	0	100	70.00	70
CIS									
311	Recovery of forest and forest industry sector in CITs	3	5	2	72.50	40	100	90.00	90
312	Changing ownership of forest land (e.g. privatisation and restitution)	6	2	2	77.50	60	100	30.00	30

Table A.3.3.7

Forces Driving Changes in Scenario Areas

32 Progress in EU enlargement

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
321	Accession of the CEECs to the EU	15	6	7	83.75	50	100	90.00	not relevant
322	Accession of other European countries	10	7	7	61.07	20	100	40.00	not relevant
CEECs and others									
321	Accession of the CEECs to the EU	8	4	7	84.50	50	100	90.00	100
322	Accession of other European countries	5	1	4	75.00	40	100	40.00	100
CIS									
321	Accession of the CEECs to the EU	1	2	3	75.00	50	100	80.00	not relevant
322	Accession of other European countries	2	2	2	75.00	50	100	10.00	50

Table A.3.3.8

Forces Driving Changes in Scenario Areas

41 Incentives for social/environmental benefits from forestry and wood products use

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
411	Economic incentives for protective and recreational services of forests	10	16	6	64.71	10	100	70.00	70
412	Economic incentives for nature oriented management of forests	9	16	9	62.65	5	100	60.00	55
413	Economic incentives for conversion of forests used for wood production to fores	12	14	5	55.88	5	100	75.00	60
CEECs and others									
411	Economic incentives for protective and recreational services of forests	6	8	1	64.55	20	100	70.00	65
412	Economic incentives for nature oriented management of forests	6	8	0	66.82	15	100	60.00	55
413	Economic incentives for conversion of forests used for wood production to fores	10	6	1	63.64	0	100	60.00	60
CIS									
411	Economic incentives for protective and recreational services of forests	3	4	1	52.50	30	100	60.00	60
412	Economic incentives for nature oriented management of forests	3	3	2	50.00	20	100	50.00	50
413	Economic incentives for conversion of forests used for wood production to fores	4	3	1	35.00	10	50	50.00	50

Table A.3.3.9

Forces Driving Changes in Scenario Areas

42 Changes in agricultural, rural and regional development policies

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
421	Changes in rates of subsidisation in agricultural production and exports	11	17	7	68.68	5	100	75.00	85
422	Extension of Common Agricultural Policy (CAP) elements into forestry; i.e. affo	12	12	4	30.56	0	75	70.00	55
423	Implementation of forestry measures in agriculture, e.g. biomass production	10	17	12	42.94	0	90	60.00	65
424	Promotion of forest and forest industry sector as an integral part of rural develop	10	15	7	61.89	10	100	60.00	60
CEECs and others									
421	Changes in rates of subsidisation in agricultural production and exports	5	4	3	77.50	50	100	75.00	80
422	Extension of Common Agricultural Policy (CAP) elements into forestry; i.e. affo	6	8	3	75.00	30	100	70.00	70
423	Implementation of forestry measures in agriculture, e.g. biomass production	4	10	6	67.50	10	100	50.00	60
424	Promotion of forest and forest industry sector as an integral part of rural develop	6	7	2	52.00	20	100	40.00	55
CIS									
421	Changes in rates of subsidisation in agricultural production and exports	1	4	0	55.00	40	70	50.00	50
422	Extension of Common Agricultural Policy (CAP) elements into forestry; i.e. affo	3	1	1	23.33	10	30	20.00	20
423	Implementation of forestry measures in agriculture, e.g. biomass production	1	3	1	35.00	30	40	40.00	40
424	Promotion of forest and forest industry sector as an integral part of rural develop	3	1	3	72.50	50	100	40.00	40

Table A.3.3.10

Forces Driving Changes in Scenario Areas

43 Social and demographic developments

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
431	Migration of rural population	0	4	14	64.69	5	100	50.00	60
432	International emigration/immigration	6	2	10	57.00	0	100	70.00	70
433	Ageing of populations	3	3	11	72.00	5	100	90.00	90
CEECs and others									
431	Migration of rural population	0	3	8	79.00	50	100	50.00	80
432	International emigration/immigration	1	2	8	39.00	0	100	60.00	70
433	Ageing of populations	2	6	5	78.89	30	100	80.00	80
CIS									
431	Migration of rural population	2	3	1	57.50	30	100	70.00	70
432	International emigration/immigration	4	2	2	75.00	60	100	80.00	80
433	Ageing of populations	1	2	2	70.00	10	100	70.00	70

Table A.3.3.11

Forces Driving Changes in Scenario Areas

51 Promotion of renewable energy sources

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
511	Emphasise use of wood biomass as a source of energy	12	16	11	64.17	20	100	80.00	100
512	Taxing fossil energy sources utilization	12	19	5	63.95	10	100	50.00	60
513	Abandonment of nuclear power stations	11	3	4	27.19	0	70	50.00	50
514	Promotion of energy saving technologies	8	18	12	78.61	30	100	75.00	100
CEECs and others									
511	Emphasise use of wood biomass as a source of energy	5	8	5	73.00	0	100	75.00	100
512	Taxing fossil energy sources utilization	7	7	3	61.00	0	100	50.00	60
513	Abandonment of nuclear power stations	6	2	1	32.50	5	80	45.00	40
514	Promotion of energy saving technologies	4	9	5	76.00	30	100	60.00	100
CIS									
511	Emphasise use of wood biomass as a source of energy	1	3	2	67.50	30	90	70.00	100
512	Taxing fossil energy sources utilization	2	4	1	42.50	20	70	30.00	30
513	Abandonment of nuclear power stations	5	2	0	43.33	20	80	40.00	20
514	Promotion of energy saving technologies	1	3	2	82.50	40	100	60.00	100

Table A.3.3.12

Forces Driving Changes in Scenario Areas

52 Improvement of waste management and emission control

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA								time horizont : 30 years	
521	Increase of recycling of waste paper and waste wood	14	12	17	64.72	10	100	80.00	100
522	Implementation of best practices (cleaner production or waste minimisation) in	6	14	14	68.24	30	100	60.00	100
523	Implement/extend integrated pollution control	15	10	6	69.33	30	100	60.00	100
524	Rationalize use of wood products = ecoefficiency	3	7	14	61.00	10	100	70.00	100
525	Reduction of harvesting and transport loses of roundwood	2	7	15	58.00	0	100	70.00	100
CEECs and others									
521	Increase of recycling of waste paper and waste wood	6	8	3	71.00	30	100	80.00	100
522	Implementation of best practices (cleaner production or waste minimisation) in	1	6	4	67.50	30	100	70.00	100
523	Implement/extend integrated pollution control	10	4	1	65.50	10	100	60.00	100
524	Rationalize use of wood products	2	5	9	59.00	10	100	70.00	100
525	Reduction of harvesting and transport loses of roundwood	0	5	7	61.00	10	100	70.00	100
CIS									
521	Increase of recycling of waste paper and waste wood	0	3	4	65.00	15	100	60.00	100
522	Implementation of best practices (cleaner production or waste minimisation) in	1	4	2	56.67	40	80	40.00	100
523	Implement/extend integrated pollution control	5	1	0	40.00	5	75	40.00	100
524	Rationalize use of wood products	0	3	3	48.33	10	75	60.00	100
525	Reduction of harvesting and transport loses of roundwood	0	4	2	73.33	30	100	70.00	100

Table A.3.3.13

Forces Driving Changes in Scenario Areas

53 Climate change

IDForce	Driving Force	Instruments, number of replies			Probability of driving force occuring, %				
		Laws	Economic Instruments	Market Forces	Avg. estimation	Min. estimation	Max. estimation	Secretariat estimation	Meeting revision
EU-EFTA									
531	Impacts of climate change on forest growth (higher temperatures, higher precipit	1	3	7	48.00	0	100	65.00	100
532	Acceptance of forests as natural sinks for the compliance of emission reduction	12	14	7	63.84	10	100	60.00	100
533	Acceptance of wood products as sinks for the compliance of emission reduction	12	15	10	51.32	10	100	70.00	100
CEECs and others									
531	Impacts of climate change on forest growth (higher temperatures, higher precipit	0	2	4	68.57	10	100	65.00	100
532	Acceptance of forests as natural sinks for the compliance of emission reduction	4	7	3	68.75	10	100	60.00	100
533	Acceptance of wood products as sinks for the compliance of emission reduction	4	6	3	71.43	10	100	65.00	100
CIS									
531	Impacts of climate change on forest growth (higher temperatures, higher precipit	2	2	0	8.33	5	10	60.00	100
532	Acceptance of forests as natural sinks for the compliance of emission reduction	2	3	1	48.75	20	80	60.00	100
533	Acceptance of wood products as sinks for the compliance of emission reduction	2	3	1	32.50	5	80	60.00	100

Some facts about the Timber Committee

The Timber Committee is a principal subsidiary body of the UNECE (United Nations Economic Commission for Europe) based in Geneva. It constitutes a forum for cooperation and consultation between member countries on forestry, forest industry and forest product matters. All countries of Europe; the former USSR; United States, of America, Canada and Israel are members of the UNECE and participate in its work.

The UNECE Timber Committee shall, within the context of sustainable development, provide member countries with the information and services needed for policy- and decision-making regarding their forest and forest industry sector ("the sector"), including the trade and use of forest products and, when appropriate, formulate recommendations addressed to member Governments and interested organizations. To this end, it shall:

i. With the active participation of member countries, undertake short-, medium- and long-term analyses of developments in, and having an impact on, the sector, including those offering possibilities for the facilitation of international trade and for enhancing the protection of the environment;
ii. In support of these analyses, collect, store and disseminate statistics relating to the sector, and carry out activities to improve their quality and comparability;
iii. Provide the framework for cooperation e.g. by organizing seminars, workshops and ad hoc meetings and setting up time-limited ad hoc groups, for the exchange of economic, environmental and technical information between governments and other institutions of member countries that is needed for the development and implementation of policies leading to the sustainable development of the sector and to the protection of the environment in their respective countries;
iv. Carry out tasks identified by the UNECE or the Timber Committee as being of priority, including the facilitation of subregional cooperation and activities in support of the economies in transition of central and eastern Europe and of the countries of the region that are developing from an economic point of view;
v. It should also keep under review its structure and priorities and cooperate with other international and intergovernmental organizations active in the sector, and in particular with the FAO (Food and Agriculture Organization of the United Nations) and its European Forestry Commission and with the ILO (International Labour Organisation), in order to ensure complementarities and to avoid duplication, thereby optimizing the use of resources.

More information about the Committee's work may be obtained by writing to:

Timber Branch
Trade Development and Timber Division
UN Economic Commission for Europe
Palais des Nations
CH - 1211 Geneva 10, Switzerland
Fax: + 41 22 917 0041
E-mail: info.timber@unece.org

http://www.unece.org/trade/timber

UNECE/FAO
Publications

Timber Bulletin* Volume LVI (2003) ECE/TIM/BULL/2003/...

1. Forest Products Prices, 2000-2002 (web data release expected March 2004, hard copy expected May 2004).
2. Forest Products Statistics, 1998-2002 (database since 1964 on website, publication available on the web March 2004, hard copy expected April 2004).
3. Forest Products Annual Market Analysis, 2002-2004 (available on web, hard copy expected March 2004).
4. Forest Fire Statistics, 2000-2002 (web data release expected March 2004, hard copy available May 2004).
5. Forest Products Trade Flow Data, 2000-2001 (tables available on web, no hard copy available).
6. Forest Products Prospects for 2004 (available on web, hard copy expected February 2004).

**Timber Bulletin series is currently under review*

Geneva Timber and Forest Study Papers

Forest policies and institutions of Europe, 1998-2000	ECE/TIM/SP/19
Forest and Forest Products Country Profile: Russian Federation	ECE/TIM/SP/18
(Country profiles also exist on Albania, Armenia, Belarus, Bulgaria, former Czech and Slovak Federal Republic, Estonia, Georgia, Hungary, Lithuania, Poland, Romania, Republic of Moldova, Slovenia and Ukraine)	
Forest resources of Europe, CIS, North America, Australia, Japan and New Zealand	ECE/TIM/SP/17
State of European forests and forestry, 1999	ECE/TIM/SP/16
Non-wood goods and services of the forest	ECE/TIM/SP/15

The above series of sales publications and subscriptions are available through United Nations Publications Offices as follows:

Orders from Africa, Europe and the Middle East should be sent to:

Sales and Marketing Section, Room C-113
United Nations
Palais des Nations
CH - 1211 Geneva 10, Switzerland
Fax: + 41 22 917 0027
E-mail: unpubli@unog.ch

Orders from North America, Latin America and the Caribbean, Asia and the Pacific should be sent to:

Sales and Marketing Section, Room DC2-853
United Nations
2 United Nations Plaza
New York, N.Y. 10017, United States, of America
Fax: + 1 212 963 3489
E-mail: publications@un.org

Web site: http://www.un.org/Pubs/sales.htm

* * * * *

Geneva Timber and Forest Discussion Papers ***(original language only)***

Value-Added Wood Products Markets	ECE/TIM/DP/36
Trends in the Tropical Timber Trade, 2002-2003	ECE/TIM/DP/35
The Policy Context Of The European Forest Sector	ECE/TIM/DP/34
Biological Diversity, Tree Species Composition and Environmental Protection in the Regional FRA-2000	ECE/TIM/DP/33
Forestry and Forest Products Country Profile: Ukraine	ECE/TIM/DP/32
The Development of European Forest Resources, 1950 To 2000: a Better Information Base	ECE/TIM/DP/31
Modelling and Projections of Forest Products Demand, Supply and Trade in Europe	ECE/TIM/DP/30
Employment Trends and Prospects in the European Forest Sector	ECE/TIM/DP/29
Forestry Cooperation with Countries in Transition	ECE/TIM/DP/28
Russian Federation Forest Sector Outlook Study	ECE/TIM/DP/27
Forest and Forest Products Country Profile: Georgia	ECE/TIM/DP/26
Forest certification update for the UNECE region, summer 2002	ECE/TIM/DP/25
Forecasts of economic growth in OECD and central and eastern European countries for the period 2000-2040	ECE/TIM/DP/24
Forest Certification update for the UNECE Region, summer 2001	ECE/TIM/DP/23
Structural, Compositional and Functional Aspects of Forest Biodiversity in Europe	ECE/TIM/DP/22
Markets for secondary processed wood products, 1990-2000	ECE/TIM/DP/21
Forest certification update for the UNECE Region, summer 2000	ECE/TIM/DP/20
Trade and environment issues in the forest and forest products sector	ECE/TIM/DP/19
Multiple use forestry	ECE/TIM/DP/18
Forest certification update for the UNECE Region, summer 1999	ECE/TIM/DP/17
A summary of "The competitive climate for wood products and paper packaging: the factors causing substitution with emphasis on environmental promotions"	ECE/TIM/DP/16
Recycling, energy and market interactions	ECE/TIM/DP/15
The status of forest certification in the UNECE region	ECE/TIM/DP/14
The role of women on forest properties in Haute-Savoie (France): Initial researches	ECE/TIM/DP/13
Interim report on the Implementation of Resolution H3 of the Helsinki Ministerial Conference on the protection of forests in Europe (Results of the second enquiry)	ECE/TIM/DP/12
Manual on acute forest damage	ECE/TIM/DP/7

International Forest Fire News *(two issues per year)*

Timber and Forest Information Series

Timber Committee Yearbook 2004	ECE/TIM/INF/11

The above series of publications may be requested free of charge through:

UNECE/FAO Timber Branch
UNECE Trade Development and Timber Division
United Nations
Palais des Nations
CH - 1211 Geneva 10, Switzerland
Fax: + 41 22 917 0041
E-mail: info.timber@unece.org

Downloads are available at http://www.unece.org/trade/timber

UNECE/FAO TIMBER AND FOREST DISCUSSION PAPERS

The objective of the Discussion Papers is to make available to a wider audience work carried out, usually by national experts, in the course of UNECE/FAO activities. The Discussion Papers do not represent the final official output of the activity but rather a contribution which because of its subject matter or quality etc. deserves to be disseminated more widely than the restricted official circles from whose work it emerged. The Discussion Papers are also utilized when the subject matter is not suitable (e.g. because of technical content, narrow focus, specialized audience) for distribution in the UNECE/FAO Timber and Forest Study Paper series. Another objective of the Discussion Papers is to stimulate dialogue and contacts among specialists.

In all cases, the author(s) of the discussion papers are identified, and the papers are solely their responsibility. The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. The UNECE Timber Committee, the FAO European Forestry Commission, the governments of the authors' country and the FAO/UNECE secretariat, are neither responsible for the opinions expressed, nor the facts presented, nor the conclusions and recommendations in the Discussion Paper.

In the interests of economy, Discussion Papers are issued in the original language only, with only minor languages editing and final layout by the secretariat. They are distributed automatically to nominated forestry libraries and information centres in member countries. It is the intention to include this discussion paper on the Timber Committee website at: http//www.unece.org/trade/timber.

The Discussion Papers are available on request from the secretariat. Those interested in receiving the Discussion Papers on a continuing basis should contact the secretariat. Your comments are most welcome and will be referred to the authors:

UNECE/FAO Timber Branch
UN–Economic Commission for Europe
Palais des Nations
CH-1211 Geneva 10, Switzerland
Fax: +41 22 917 0041
E-mail: info.timber@unece.org
http://www.unece.org/trade/timber

The Policy Context Of The European Forest Sector

This discussion paper describes the activities, methods and outcomes of a project, which includes the policy context of the European forest and forest products sectors. It is based on an inquiry addressed to major stakeholder groups in the sector. Based on these inputs the study develops major policy scenarios in qualitative terms and identifies links between the policy and the market scenarios.

European Forest Sector Outlook Study (EFSOS)

The European Forest Sector Outlook Studies (EFSOS) are the continuation of the European Timber Trends Studies dating back to the 1950s. These studies develop scenarios for changes in the forest and forest products sector over the next twenty years. The current programme consists of three primary studies on the outlook for forest resources, on forest products, and on the policy context. A large number of ancillary studies are also in progress or planned. The geographical scope has been broadened to include all European UNECE member states, which collectively have over 70% of the world's temperate and boreal forest. Products covered include all major wood end-products. The results of EFSOS are intended for government policy makers as well as analysts and researchers.

UNECE Timber Committee and FAO European Forestry Commission

Further information about forests and forest products, as well as information about the UNECE Timber Committee and the FAO European Forestry Commission is available on the website www.unece.org/trade/timber. Information about the UNECE may be found at www.unece.org and information about FAO may be found at www.fao.org.

UNECE/FAO Timber Branch
UN Economic Commission for Europe
Palais des Nations
CH-1211 Geneva 10, Switzerland
Fax: +41 22 917 0041
E-mail: info.timber@unece.org
http://www.unece.org/trade/timber