PROCEEDINGS

Workshop on pan-European recommendations for afforestation and reforestation in the context of UNFCCC

Implementation of Vienna Resolution V5 (Climate change and sustainable forest management in Europe)

Dates: **October 24-26, 2006**

Place and venue: **Vilnius, Lithuania, Reval Hotel Lietuva**

Warsaw, 2006

CONTENTS

Workshop on pan-European recommendations for afforestation and reforestation in the context of UNFCCC

Workshop basis and goals

Workshop basis: The need for reduction of carbon dioxide emissions was highlighted in the United Nations Framework Convention on Climate Change (UNFCCC, 1992). The Kyoto Protocol and Marrakech Accord to the UNFCCC list carbon sequestration through afforestation and reforestation activities among the possible ways for offsetting CO_2 emissions. In its Vienna Resolution 5, the MCPFE aims to enhance the contribution of forests to reducing net greenhouse-gas emissions and to encourage SFM practices in carbon sequestration measures. One of the actions planned in line with implementation of the Vienna Resolution 5 is elaboration of pan-European recommendations for afforestation and reforestation in the context of UNFCCC. The MCPFE Expert Level Meeting on 5-6 September, 2005, endorsed the IUCN publication on "Afforestation and reforestation for climate change mitigation: potentials for pan-European action" (Warsaw, July 2004) as a building block for preparing these recommendations. The workshop is also organized in the context of implementation of the Framework for Cooperation between MCPFE and Environment for Europe/PEBLDS process.

Aims of the workshop:

a) to provide the latest knowledge on ecological, social, and economic aspects of and policy settings for afforestation and reforestation in Europe, including climate change and biodiversity issues;
b) to review and discuss a proposal for pan-European Recommendations for afforestation and reforestation in the context of UNFCCC

Working modalities: plenary sessions and working group discussions (24-25.10), excursion focusing on afforestation areas and related topics (26.10).

Organisers: MCPFE Liaison Unit Warsaw; PEBLDS Joint Secretariat, Ministry of Environment of the Republic of Lithuania

Target group: experts designated by the MCPFE and PEBLDS member countries as well as observer countries and organizations.

Participants: 49 participants representing 15 countries and 11 observer organizations.

Workshop Outcome: workshop participants have discussed the proposed Draft Recommendations on Pan-European Guidelines for Afforestation and Reforestation in the Context of Climate Change Mitigation. Experts in the working groups on general, ecological, and socio-economic issues have provided their expertise to review and improve the draft. The resulted recommendations are now expected to be presented to the MCPFE and PEBLDS decision-making bodies for further consideration.

Web page: http://www.mcpfe.org/documents/minutes/06/unf/

Revised Recommendations as an Outcome of Working Group meetings

Draft Recommendations

on Pan-European Guidelines for Afforestation and Reforestation in the Context of Climate Change Mitigation

Vilnius Draft

Introduction

Afforestation and reforestation[1] activities in the framework of climate mitigation processes require an enabling framework at the national, regional[2] and international levels, i.e. effective institutions, policies and legislation.

The specific pan-European policy recommendations set out below aim to provide guidelines for implementing economically viable, environmentally sound and socially equitable afforestation and reforestation activities and projects and strengthen **synergies** in implementing the UNFF, UNFCCC, CBD, UNCCD, and other relevant forest-related **international commitments**. Furthermore, they address **specific pan-European issues** in balancing afforestation needs and the conservation of sites of high ecological and cultural value and offer respective guidance to policymakers.

This set of pan-European guidelines on afforestation and reforestation is also a contribution to further **deliberations** in the **UNFCCC** in reviewing modalities and procedures for afforestation and reforestation activities under the CDM. The efforts made so far based on the work of A/R working group and the Executive Board of the CDM of the Kyoto Protocol should be acknowledged. There is a need to clearly ensure that the project design document (PDD)[3] reflects the procedures and modalities for CDM A/R project activities in particular those related to environmental and socio-economic aspects.

The cooperation of pan-European countries with other countries on carbon sequestration under the CDM entails the need to consider socio-economic and environmental impacts of afforestation and reforestation. In this context, the pan-European guidelines could be used, if appropriate, when **assessing CDM-projects[4].**

[1] Afforestation and reforestation are defined by the UNFCCC as direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources. *Afforestation* can take place on land that has not been covered by forest for at least 50 years. *Reforestation* can occur on land that was historically forested, but was subject to another land use. (For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989). (Source: FCCC/CP/2001/13/Add.1, decision 11/CP7).

[2] Regional in this case means more than one country, for example, pan-European.

[3] Appendix B to the annex to decision 5/CMP.1 and Appendix A to the annex to decision 6/CMP.1 of the Kyoto Protocol (FCCC/KP/CMP/2005/8/Add.1).

[4] CDM projects need approval of all involved parties through their designated national authorities.

General Guidelines

1. Ensure that all afforestation and reforestation measures for increasing carbon sequestration and biomass/energy production are in line with SFM[5] and take into account environmental, social and economic aspects in a balanced way.
2. Use the Pan-European Criteria and Indicators for Sustainable Forest Management as an overall framework for establishing and managing afforestation and reforestation as well as the Pan-European Operational Level Guidelines for SFM as a framework to promote the sustainable management of afforestation and reforestation at the management unit level.
3. Ensure that an afforested landscape possesses the necessary goods and services to fulfil biodiversity and sustainable livelihood objectives to increase the permanence of the project's emission reductions.
4. Promote the consideration of these afforestation and reforestation guidelines in national policies, legislation and programmes related to forestry (e.g. National Forest Programmes), biodiversity (e.g. National Biodiversity Strategies and Action Plans), land use and management, integrated water management and agriculture.
5. Use afforestation and reforestation as a cross-cutting platform on carbon sinks at the national level to promote synergies among relevant national and regional programmes related to international commitments under UNFF, UNCCD, UNFCCC, and CBD.
6. Establish or improve the lines of communication and information sharing between relevant authorities involved in afforestation and reforestation activities to ensure a better cooperation among them.
7. Assess environmental and socio-economic impacts of afforestation and reforestation activities.
8. Encourage research on afforestation and reforestation in the context of climate change mitigation.

Ecological Guidelines[6]

9. While developing policies and planning procedures for afforestation and reforestation activities take measures to avoid negative impacts to areas of high ecological values, high soil carbon stock, or traditional land use, emphasising good practices and methods for site selection.

10. Increase carbon sequestration through other alternative measures in SFM in those cases where afforestation and reforestation may negatively impact on the environment.

11. Promote afforestation and reforestation with native tree species or provenances of tree species that are well adapted to site conditions now and in the future.

12. Develop research on the use of well-adapted species and provenances with regard to climate change.

13. Use only those non-native tree species[7], provenances or varieties, whose impacts on the ecosystem and on the genetic integrity of native tree species and local provenances have been evaluated, and if negative impacts can be avoided or minimised[8]. Take measures to avoid the use of invasive alien species[9].

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[5] It is understood by the MCPFE and the PEBLDS processes that SFM, as defined and further developed by the MCPFE, is consistent with the application of the Ecosystem Approach to forest ecosystems in the pan-European region (Source: MCPFE/PEBLDS 2006, Joint position of the MCPFE and the EfE/PEBLDS on the Pan-European understanding of the linkage between the ecosystem approach and sustainable forest management).

[6] Genetically modified trees were not referenced because they are not in use in the Pan-European region and the guidance at the global level is forthcoming from CBD. So far, the CBD recommends Parties to take a precautionary approach to genetically modified trees in decision VIII/19.

[7] CBD uses the following definition of native species: A native species is one which naturally exists at a given location or in a particular ecosystem, i.e. it has not been moved there by humans (CBD Technical Series No. 7). The term native species is synonymous with indigenous species (FRA 2005).

[8] MCPFE Resolution H1 under General guidelines for the sustainable management of forests in Europe (point 9) states that "Native species and local provenances should be preferred where appropriate. The use of species, provenances, varieties or ecotypes outside their natural range should be discouraged where their introduction would endanger important/valuable indigenous ecosystems, flora and fauna… Whenever introduced species are used to replace local

14. Promote species composition and structural diversity in line with the natural diversity of the specific habitats in afforestation and reforestation and promote the development of natural dynamics of forest ecosystems, as long as it does not cause considerable damage to forest ecosystems (i.e. forest fires).

15. Promote afforestation and reforestation activities that contribute to the improvement and restoration of ecological connectivity and ecological corridors, as appropriate[10].

16. Limit the use of fertilizers and pesticides/herbicides to those areas and conditions in which it is necessary to ensure the establishment and maintenance of forests.

17. Ensure the maintenance and protection of all ground and surface water resources in terms of quantity and quality in all afforestation and reforestation activities.

18. Raise public awareness on environmental issues related to afforestation and reforestation in particular in the context of climate change mitigation.

Socio-economic Guidelines

19. Ensure appropriate legislation, so that afforestation and reforestation for carbon sequestration do not overwhelm existing safeguards for SFM and respect priorities for income generation, rural livelihood and poverty alleviation.
20. Secure land tenure rights and clarify access rights as well as responsibility for management of resources in assessing afforestation and reforestation projects.
21. Develop and enhance incentives for afforestation and reforestation for the private sector and ensure that they are in line with SFM.
22. Encourage incentives for afforestation and reforestation to be in line with other policies, *inter alia* rural development, energy, environmental, climate change policies.
23. Promote the establishment of criteria for environmentally sound, economically viable and socially equitable afforestation and reforestation projects to be used by project developers and implementers in their project design and by investment funds to evaluate these projects.
24. Ensure decisions regarding land use and implementation of afforestation and reforestation projects are taken in consultation with local communities.
25. Take into account all landscape values, including maintenance of cultural landscape, cultural heritage sites and sacred cultural sites, in the elaboration of policies and planning procedures for afforestation and reforestation activities.
26. Assess and take into account present and future risk factors, including storms, pests, diseases, fires and animal browsing, affecting the economic viability and permanence of carbon stocks of afforestation and reforestation projects.
27. Contribute to wood and biomass/energy markets through afforestation and reforestation activities with a view to increasing social and economic benefits to rural communities.
28. Increase public awareness of the potential social and economic benefits of afforestation and reforestation activities.

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ecosystems, sufficient action should be taken at the same time to conserve native flora and fauna.". The Pan-European operational level guidelines for sustainable forest management under criterion 4 (point 4.2b) include the following: "For reforestation and afforestation, origins of native species and local provenances that are well adapted to site conditions should be preferred, where appropriate."

[9] Alien species is a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce. Invasive alien species is an alien species whose introduction and/or spread threaten biological diversity (annex to CBD Decision VI/23).

[10] Ecological corridor is defined as a thin strip of vegetation used by wildlife and potentially allowing movement of biotic factors between two areas (EEA glossary). IUCN defines connectivity as a term describing the existence of functional continuity although there is no structural continuity.

29. Promote inter-disciplinary research on social and economic aspects in order to enhance future decision-making on afforestation and reforestation activities.
30. Build capacity and expertise at all levels in order to support and promote afforestation and reforestation activities.

Background Document

for the
Draft Recommendations for Afforestation and Reforestation in the Context of Climate Change Mitigation

Introduction

Afforestation and reforestation activities enjoy a prominent place on the policy agenda as potential measures for carbon sequestration as well as biomass production in order to mitigate climate change. In addition, a decrease in agricultural viability and the objective to increase forest cover also trigger afforestation of former agricultural land in certain areas in Europe. The establishment of such forested areas in the framework of the United Nations Framework Convention on Climate Change (UNFCCC) may have an impact on other environmental, economic and social services. Comprehensive approaches to afforestation and reforestation consider carbon sequestration, biodiversity conservation, soil protection as well as sustainable provision of raw material for forest industries and other goods and services in a balanced way.

In this context, European countries recognized the importance of promoting Sustainable Forest Management (SFM) in the context of UNFCCC in their Ministerial Conference on the Protection of Forests in Europe (MCPFE) commitments and clearly linking their implementation activities to the pan-European concept of SFM, as laid down in the "General Guidelines for the Sustainable Management of Forests in Europe" and the "Pan-European Criteria and Indicators for SFM".

Consequently, the MCPFE countries committed themselves to promote SFM in the context of the UNFCCC process in the **Vienna Declaration** in 2003**.** They specifically addressed guidance on afforestation and reforestation in respective commitments in **Vienna Resolutions V4** and **V5**[11]. Furthermore, the **MCPFE-Environment for Europe/Pan-European Biological and Landscape Diversity Strategy (EfE/PEBLDS) Framework for Cooperation**, also endorsed at the Vienna Conference, identifies the elaboration of recommendations for afforestation in the context of the UNFCCC process as priority issue. This Framework for Cooperation was also adopted by the 5th Ministerial Conference **Environment for Europe** in Kyiv in 2003 in its Kyiv Resolution on Biodiversity.

Corresponding to these commitments, the current **MCPFE Work Programme**, adopted in autumn 2003, identifies two actions which aim at encouraging SFM practices in carbon sequestration measures, in particular taking into account the conservation of biological diversity:

- As a first step, a **proposal** for guidance on afforestation and reforestation in the context of UNFCCC should be elaborated.
- Secondly, a **workshop** should develop draft European recommendations for afforestation and reforestation in the context of UNFCCC to be submitted to the decision-making bodies of MCPFE and PEBLDS.

The **PEBLDS rolling work programme** also addresses the implementation of this co-operative work in the same way.

In implementing the first action, IUCN[12] as a leading actor submitted a **publication** on "Afforestation and Reforestation for Climate Change Mitigation: Potentials for Pan-European Action" to the MCPFE Expert Level Meeting (ELM). The paper offers an overview on the issue and, most importantly, provides policy recommendations as a contribution for further discussions. The ELM in September 2005 decided to take these recommendations as **basis** for further discussions at this **workshop**. This background document builds upon the IUCN proposal and takes into account recent developments and specific considerations raised in the MCPFE and PEBLDS processes.

The **goal** of this **workshop** is to reflect on the proposed recommendations, discuss issues arising and to give recommendations on **pan-European guidelines for afforestation and reforestation in the context of UNFCCC** to be submitted to the MCPFE ELM and the PEBLDS Council.

[11] See chapter 2
[12] IUCN – The World Conservation Union

2 International Policy Framework

Global Processes

In the context of climate change mitigation policies forests are approached as sinks and afforestation and reforestation are used as tools for sequestering carbon to reduce greenhouse gas concentrations in the atmosphere. By signing the **United Nations Framework Convention on Climate Change** (UNFCCC), industrialised European countries (listed in Annex I to the Convention[13]) committed themselves to reduce carbon dioxide emissions. As outlined in the **Kyoto Protocol** and the **Marrakech Accords** to the UNFCCC, these countries may partly offset their domestic carbon dioxide emissions by sequestering carbon in *land-use, land-use change and forestry activities (LULUCF)*, *inter alia*, through afforestation and reforestation[14]. Developing countries are eligible to implement afforestation and reforestation projects.

During the first commitment period (2008 – 2012) all Annex I countries having ratified the Kyoto Protocol are obliged to report their accounted greenhouse gas (GHG) removals resulting from afforestation and reforestation after 1990. The net result of removals may be used to fulfil the national targets.

In this context three Kyoto mechanisms were defined:

- Through the *Joint Implementation* mechanism an Annex I Country may implement a respective project in the territory of another Annex I Party.
- *Emission trading* provides for Annex I Parties to acquire specific units from other Annex I countries. A surplus in reductions/removals of GHG could be traded.
- To foster co-operation on afforestation and reforestation between industrialised and developing countries, the Kyoto Protocol established the *Clean Development Mechanism (CDM)*.The CDM provides a platform for industrialised countries to initiate afforestation and reforestation projects in developing countries and to acquire respective carbon credits.

The Climate Convention defines *forest management* as "a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner". In general, Parties to the UNFCCC are guided by the principle that land-use activities should contribute to biodiversity conservation and the sustainable use of natural resources. However, so far the Convention does not refer to a commonly agreed detailed concept of sustainable forest management as a basis for its forest related decisions and activities.

The Conference of the Parties to the UNFCCC adopted good practice guidance for LULUCF activities as well as *modalities and procedures for afforestation and reforestation* activities under the CDM and further modified them in 2005[15]. Though it was agreed that socio-economic and environmental impacts should be taken into account in CDM projects, these modalities and procedures do not yet provide specific guidelines for afforestation and reforestation covering the relevant economic, environmental and social issues[16].

Definition of afforestation and reforestation[17]

Afforestation and reforestation are defined by the UNFCCC as direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed

[13] *Australia*, Austria, Belarus, Belgium, Bulgaria, *Canada*, Croatia, Czech Republic, Denmark, Estonia, European Economic Community, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, *Japan*, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, *New Zealand*, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, *United States of America* – Non-European countries in *Italics*

[14] Article 3.3 of the Kyoto Protocol defines, *inter alia*, forestry activities, limited to afforestation, reforestation and deforestation since 1990 as measures to be accounted for in greenhouse gas (GHG) balances of the Parties.

[15] Documents FCCC/CP/2004/10/Add.2 and FCCC/KP/CMP/2005/8/Add.1

[16] The guidance provided in the UNFCCC focuses on methodology related to carbon sequestration. At the moment there are 2 afforestation projects (respectively their methodologies) approved in the framework of the CDM. Most recently the forest related discussion in the UNFCCC focuses on deforestation in developing countries causing emissions.

[17] In its Global Forest Resource Assessment FAO uses the following definitions:
Afforestation: Establishment of forest plantations on land that, until then, was not classified as forest. Implies a transformation from non-forest to forest.
Reforestation: Establishment of forest plantations on temporarily unstocked lands that are considered as forest.

sources. *Afforestation* can take place on land that has not been covered by forest for at least 50 years. *Reforestation* can occur on land that was historically forested, but was subject to another land use. (For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989).

(Source: FCCC/CP/2001/13/Add.1, decision 11/CP7)

The **Convention on Biological Diversity** (CBD) addresses the potential impact of afforestation and reforestation on forest biological diversity (decision V/4) and other ecosystems. It urges Parties to the UNFCCC to ensure that activities targeted to carbon sequestration are in accordance with the conservation and sustainable use of biological diversity. In addition, it promotes the creation of synergies in implementing both conventions, the CBD and the UNFCCC. Furthermore, the report of a *CBD Ad-hoc Technical Expert Group on Biodiversity and Climate Change* provides advice on the integration of biodiversity considerations into the implementation of the UNFCCC.

Recently, the 8th Meeting of the Conference of the Parties to the CBD reaffirmed the need to promote *synergies* among *activities for biodiversity conservation, climate change mitigation and combating land degradation* in decision VIII/30. Countries are, *inter alia*, encouraged to integrate biodiversity considerations into national policies, programmes and plans in response to climate change, to develop respective regional co-operations and to address research gaps. However, no common guidelines have yet been discussed that would specifically address afforestation and reforestation for carbon sequestration.

The **United Nations Convention to Combat Desertification** (UNCCD) addresses the sustainable management of natural resources and the sustainable development of livelihood in countries experiencing desertification, land degradation and drought in arid, semi-arid and dry sub-humid areas, including in European region through its regional implementation Annex IV for Northern Mediterranean and V for Central and Eastern Europe. The National, Sub regional and Regional Action Programmes under UNCCD aim at an integrated approach of the management and development of land with majors multi-stakeholders involvement, in which natural and planted forests make a significant contribution to conservation of soil, to rehabilitation of degraded land and to combating desertification.

The Sixth Session of the **United Nations Forum on Forests** (UNFF) agreed on four shared Global Objectives on Forests, which were approved by ECOSOC[18]. Global objective 1 refers to afforestation and reforestation as measures in SFM to reverse the worldwide loss of forest cover.

Most recently **FAO[19]** developed a draft of a *Planted Forest Code*, which will be brought to the 18th meeting of the Commission on Forestry (COFO) for consideration. The Code aims at describing a guiding framework of principles for planted forests development. It should help to ensure that cultural, social, environmental and economic dimensions were considered in a balanced manner.

Regional Processes

Afforestation and reforestation are addressed at pan-European level in the context of SFM. The **MCPFE** refers to afforestation and reforestation issues in various commitments. Adopted in 1993, the *"General Guidelines for the Sustainable Management of Forests in Europe"* already state that afforestation should be conducted in a manner that does not negatively affect ecologically interesting or noteworthy sites and landscapes. The resolution underlines that afforestation needs to be well-suited to local conditions and capable of tolerating climatic and other stresses, *inter alia*, potential climate change. The *"Pan-European Criteria, Indicators and Operational Level Guidelines for Sustainable Forest Management"* adopted in 1998, provide the basis for development of environmentally sound carbon sequestration, balancing efforts on carbon sequestration with the need to conserve biological diversity and providing a tool to implement SFM at field level. They promote reforestation and afforestation with native species and local provenances that are well adapted to site conditions.

To meet further concerns regarding afforestation and reforestation in the context of climate change, the following already cited decisions have been taken in the MCPFE:
In *Resolution V5* the countries committed themselves to contribute to the implementation of the UNFCCC and the Kyoto Protocol, among others, by including guidance on afforestation and reforestation into national forest programmes or plans, which takes due regard of environmental (in particular biodiversity), economic and

[18] Economic and Social Council of the United Nations
[19] Food and Agriculture Organization of the United Nations

social values and aims at mitigating the potential negative effects of large scale afforestation. Furthermore, the elaboration of recommendations for afforestation in the context of UNFCC, taking account of biodiversity interests, is defined as priority theme for co-operation between MCPFE and PEBLDS in Annex II to *Resolution V4*.

MCPFE commitments related to afforestation and carbon sequestration:

- *Resolution S2 – Conservation of Forest Genetic Resources* addresses the need for conserving genetic diversity to have sufficient diversity in the choice of afforestation material.
- *Resolution S5 – Expansion of the EUROSILVA Network of Research on Tree Physiology* emphasises the importance of carbon sequestration research.
- *Resolution H1 – General Guidelines for the Sustainable Management of Forests in Europe* defines how afforestation should be conducted in the frame of SFM.
- *Resolution H4 – Strategies for a Process of Long-Term Adaptation of Forests in Europe to Climate Change* refers to the potential of forests for carbon sequestration and the need for related research.
- *Resolution L2 – Pan-European Criteria, Indicators and Operational Level Guidelines for SFM* defines Criterion 1 as "Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles" and Criterion 4 as "Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems". The operational level guidelines promote afforestation and reforestation with native species and local provenances.
- *Vienna Living Forest Summit Declaration:* Countries commit themselves to promote the concept of SFM in relation to UNFCCC and its Kyoto Protocol.
- *Resolution V4 – Conserving and Enhancing Forest Biological Diversity in Europe* promotes the restoration of forest biological diversity in forests established on former forestlands or other landscapes as well as the enhancement of incentives to promote natural regeneration and regeneration with native tree species and provenances.
- *MCPFE/EfE PEBLDS Framework for Co-operation* identifies the elaboration of recommendations for afforestation as a priority issue.
- *Resolution V5 – Climate Change and SFM in Europe:* Countries commit themselves to include guidance on afforestation and reforestation into national forest programmes taking into account economic, social and environmental values, in particular biodiversity.

In addition to the MCPFE process, the **Pan-European Biological and Landscape Diversity Strategy** (PEBLDS) identifies the harmonisation of afforestation policies with nature conservation and landscape policies as priority for action. As mentioned above the respective *Work Programmes* of MCPFE and PEBLDS tackle afforestation and reforestation issues and aim at a joint pan-European approach to afforestation and reforestation in the context of climate change mitigation.

The **European Community**'s (EC) afforestation activities were mainly developed in the framework of the Common Agricultural Policies. The *Rural Development Regulation* contains forestry measures, including afforestation of agricultural land. Afforestation of agricultural land is supported, provided that such planting is adapted to local conditions and is compatible with the environment. These European Union (EU) policies focus mainly on expanding woodlands in agricultural areas. Their implementation has been approached differently by the EU Member States, partly raising concerns that large tracts of marginal land may be turned into forests negatively impacting native biodiversity. However, the *Biodiversity Strategy and the Action Plan for the Conservation of Natural Resources* define the objective to ensure the conservation and sustainable use of biodiversity in the implementation of the Rural Development Regulation. The latest biodiversity-related *Communication of the European Commission* confirms that goal and emphasizes the need to prevent, minimise and offset any potential damages to biodiversity arising from climate change adaptation and mitigation measures[20].

[20] COM(2006) 216 Halting the Loss of Biodiversity by 2010 – and Beyond

EC's regulations and policies on afforestation and carbon sequestration:

- *Rural Development Regulation* (1698/2005, 1257/1999[21]) and related regulations focus especially on the restructuring and competitiveness of agriculture and, in addition, regard afforestation as means to increase supplies for certain forestry products and as important for soil use and the environment.
- *Forest Focus Regulation* (2152/2003) addresses the monitoring of biodiversity and carbon sequestration.
- *Forest Strategy* (COM/1998/649) proposes to contribute to carbon storage through afforestation of agricultural land with species adapted to local conditions, preferably native species or local provenances.
- *Biodiversity Strategy* (COM/1998/0042) includes the objective to promote carbon sequestration and to ensure that afforestation does not negatively affect ecologically interesting or noteworthy sites and ecosystems.
- *Biodiversity Action Plan for the Conservation of Natural Resources* (COM/2001/0162) includes the Action to ensure that conservation and sustainable use of biodiversity is being promoted by the Rural Development Regulation.
- *Biodiversity Communication* (COM(2006) 216) emphasizes the need to prevent, minimise and offset any potential damages to biodiversity arising from climate change adaptation and mitigation measures.
- *EU Forest Action Plan (COM/2006/302/F) adopted by the Commission 15/06/2006:* Key actions aim at facilitating co-ordinated EU-response to the UNFCCC provisions related to afforestation and reforestation, developing national afforestation guidelines and promoting afforestation for environmental and protective objectives.

Recently an *EU Forest Action Plan* has been developed. It defines facilitating EU-compliance with the obligations of the UNFCCC as key action, referring particularly also to a co-ordinated response to the provisions on afforestation and reforestation (Article 3.3 of the Kyoto Protocol). In the context of forest protection the Action Plan proposes afforestation for environmental and protective objectives and the development of national afforestation guidelines. In addition, it promotes the use of forest biomass for energy generation, *inter alia*, to support climate change mitigation. The Forest Action Plan is expected to be adopted by the European Council in fall 2006.

3 Economic, ecological and social considerations

In general, the conversion of non-forested land to forest land is usually associated with benefits in **carbon sequestration** as forests accumulate carbon in the biomass. Furthermore, afforestation aiming at the **production of renewable energy** derived from woody biomass will contribute to the reduction of GHG emissions through substituting fossil fuels. Nevertheless, the carbon balance of afforestation may vary considerably according to a wide range of factors, which have to be considered.

The focus on carbon sequestration or biomass production (especially valuing these functions over other ecosystem services activities) in afforestation and reforestation may conflict with a balanced approach to SFM and sustainable development and may cause **negative impacts** on the environment and people's livelihoods. Certain afforestation activities may be effective in storing carbon or contributing to the reduction of GHG emissions, but might not comply with the principles of sustainable management of natural resources.

The Kyoto Protocol and the Marrakech Accords refer to the importance of ensuring that climate change mitigation activities contribute to the objectives of the CBD, but they do not explicitly exclude practices negatively impacting on ecosystem integrity and the provision of goods and services as well as practises leading to loss of native biodiversity, e.g. plantations of fast growing non-native trees and afforestation of native non-forest habitats that threaten natural biodiversity and may reduce ecosystem services. Since the adoption of the Kyoto Protocol in 1997, the **environmental, economic and social implications of afforestation and reforestation** in climate change mitigation have been widely discussed.

A respective discussion on European activities should take into account the following issues:

[21] Regulation (EC) No 1257/1999 should be repealed from 1 January 2007 with the exception of certain provisions concerning less favoured areas which should be repealed at a later date.

Ecological issues

- *Ecosystem and landscape diversity, native non-forest habitats, monocultures*

There is the threat that the emerging market for carbon sequestration and biomass could encourage afforestation and reforestation based on large scale forestry schemes, which focus on simple forest types and land with good growth rates. While planting trees on formerly forested land can enhance biodiversity and environmental services, especially when native species are used, planting trees on natural non-forest ecosystems is likely to lead to loss of native flora and fauna and associated ecosystem services. In addition, the establishment of single species plantations may decrease biological diversity and landscape diversity and degrade soils. Furthermore, support for afforestation can cause the loss of non-forest habitats based on traditional land uses with high ecological value, if the incentives for afforestation are higher than for the traditional use or conservation measures.

- *Native biodiversity, exotic/invasive alien species, genetically modified organisms*

The focus on carbon sequestration or biomass production might trigger an increased use of exotic or genetically modified species to improve growth rates. If severe degradation hampers the regeneration of native species, the establishment of non-invasive exotic species as a nurse crop may be useful in restoration of natural forest ecosystems in order to assist in the recovery of key primary processes such as nutrient cycling. Nevertheless, using alien invasive species for forest establishment will adversely affect environmental services and create negative side effects. In addition, the use of genetically modified species entails risks of genetic pollution and other negative environmental impacts[22]. Genetic diversity is seen as an important factor for adapting to climate change.

- *Use of pesticides, herbicides and fertilisers, degradation of sites*

The application of chemicals in controlling pest populations in order to retain biomass for carbon sequestration is likely to pollute air, soil and groundwater and may affect populations of non-target species negatively. The use of fertilisers to increase forest growth rates and hasten the accumulation of woody biomass may cause eutrophication leading to a loss of local biodiversity. Fertilisers may also contribute to greenhouse gas emissions through enhancing nitrogen oxide emissions and decreasing methane oxidation. Harvesting techniques that extract all above ground biomass of trees for energy production might seriously diminish the nutrient flow causing a degradation of sites.

Socio-economic issues

- *Provision of goods and services, relation between livelihoods and afforestation activities, generation of income*

Afforestation and reforestation may change landscapes and may have an impact on the provision of landscape-related goods and services. The supply with goods and services benefiting people and societies and the conservation of traditional cultural landscapes as well as landscape ecology need to be taken into account in respective activities. If afforestation is to contribute to socio-economic sustainability, the relation between livelihoods, the generation of income and forest activities need to be evaluated, too.

- *land tenure, traditional management/knowledge, existing land-use practices, rights of indigenous people*

Clarity of land tenure is fundamentally important for an effective sustainable management of afforestation and reforestation. The legal basis has to provide for clear, formal and long term recognition of rights and responsibilities. Insecure rights and related land tenure may cause unsustainable activities, overexploitation etc. In this context traditional management as well as traditional knowledge, existing land-use practices and indigenous peoples rights, may play an important role to be considered and recognized.

- *sustainable development and permanence of carbon sequestration, illegal harvesting*

Afforestation and reforestation projects also could bear risks for sustainable development in general, especially in developing countries[23]. The land use change for development may become highly constrained if

[22] The CBD recommends Parties to take a precautionary approach to genetically modified trees in decision VIII/19.
[23] Several project reports and case studies (see e.g. the IUCN publication in the Annex) point at this issue.

large tracts of land are locked up in contracts for carbon sequestration. If an afforestation or reforestation project is perceived as being an impediment to local livelihoods, it may create an incentive for illegal harvesting or clearing, also threatening the permanence of carbon sequestration.

In general, projects in the framework of the UNFCCC, notably also in the CDM, should ensure social, economic and environmental improvements, should contribute to sustainable development through enhancing the productivity and resilience of existing land-use practices and should provide for generation of additional income.

Background Information on afforestation and reforestation in Europe*

1. World forest area change

Total world forest area in 2005 is estimated to be around 4 billion hectares, equivalent to 30% of the total land area (FAO, 2006). Europe (excluding Russia) has 192.6 million hectares of forest area, which represents 33.7% of its land area. Forest area of the European part of Russian Federation is 149 million hectares (total forest area in Russia is 808.8 million hectares or 47.9% of its land area).

World deforestation rate in the period of 2000-2005 was reported (FAO, 2006) to be some 13 million hectares per year, mainly due to conversion of forests to agricultural land. However, forest planting, landscape restoration and natural forest expansion have significantly reduced the net loss of forest area, with the net global change in forest area estimated as -7.3 million hectares per year, which has reduced compare to the previous period of 1990-2000 from -8.9 million hectares per year.

In the Caribbean, Europe, North America, Oceania, Western and Central Asia, a majority of countries reported no major changes in forest area during the last five years, while Africa and South America suffered the largest net loss of forests from 2000 to 2005. The positive change rate for Asia in the period 2000-2005 is mainly due to recent, large-scale afforestation programmes in China (Table 1).

Region	1990-2000		2000-2005	
	1000 ha	%	1000 ha	%
Africa	-4 375	-0.64	-4 040	-0.62
Asia	-792	-0.14	1 003	0.18
Europe	877	0.09	661	0.07
North and Central America	-328	-0.05	-333	-0.05
Oceania	-448	-0.21	-356	-0.17
South America	-3 802	-0.44	-4 251	-0.50
World	**-8868**	**-0.22**	**-7316**	**-0.18**

Table 1. Annual changes in forest area 1990-2005 (FAO, 2006)

Forest areas in Europe in 2000-2005 continued to expand, although at a slower rate than in the 1990s. Other FRA 2005 findings showed that the status of forest resources in Europe was essentially stable, with the exception of several severe storms of 1999, which affected forest health and vitality. The focus of forest management in Europe shifted away from productive functions towards conservation of biological diversity, protection and multiple use, and the area of forest under private ownership increased.

2. Deforestation and afforestation in Europe

2.1 Historical changes in European forest area

Historical changes in European forest cover are closely linked to climatic fluctuations and developments in human history. The last major change related to climate occurred after the retreating of ice sheet, which around 21,000 years ago (18,000 14C years ago) was covering about one third of continental Europe with tundra and grasslands occupying most of the rest of European territory (Adams, 1997). With establishment of warmer and moister conditions around 11,500 years ago, forests spread throughout most of European lands.

* Background information on afforestation and reforestation in Europe is a compilation of statistics from FAO, UNECE, EC and UNFCCC, which has been prepared for the purposes of the workshop by Lei Chen (University of Tuscia (Italy), Leonardo trainee at MCPFE LUW), Olga Zyrina and Roman Michalak (MCPFE LUW).

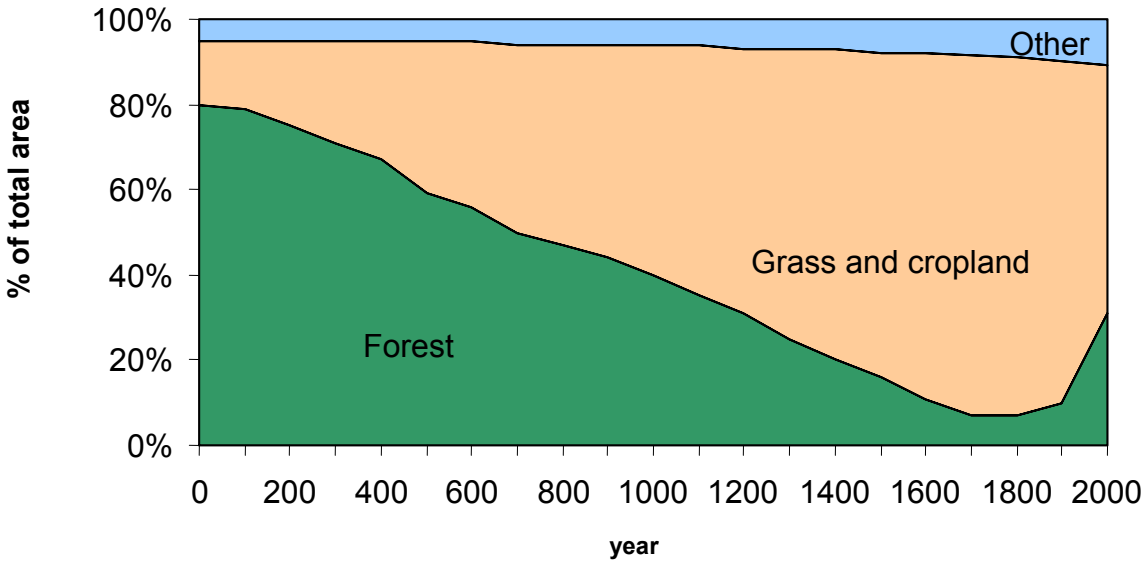


Fig. 1 Indicative figure displaying historical changes in land use in Europe, the presented values should not be taken as absolute (IPCC, 2001)

In Europe, human communities started to develop farming around 9,000 years ago (in Greece, 7,000 BC). In history, it is the period of Neolithic Revolution, the transition from hunting and gathering to agriculture. To clear the land for crops and to create openings for game species, the prehistoric humans used fire. With growth of human settlements came other factors affecting the environment, such as cattle grazing, use of wood for construction, housekeeping activities, and later shipbuilding and industry. The food supply to cities was coming from agricultural lands around them. From the 11th century, the population of Europe started to increase more rapidly and at the same time to extend into new territories in the north and east with more forests being cut and marshes developed to provide for such needed agricultural land. Last two centuries can be characterized from one side by major industrial developments in all parts of Europe, but also by conservation movement and gradual restoration of European forest cover through various afforestation projects in the second half of 20th century. Through their long history, European forests, which at some point of time occupied 80-90% of the continent, have been reduced to less than half of the area they occupied before (Fig.1), with only 2-3% of that being natural forests in Western Europe and 5-10% in European Russia.

2.2 European forests in the XX century

After the World War II major afforestation efforts were made in many European countries to compensate for earlier deforestation and to achieve timber self-sufficiency.
The growth of forest area has slowed down notably since the beginning of 1970s in all sub-regions, with the exception of the Western Europe (Fig.2). Loss of forest in urbanized areas and the extension of human settlements contributed to a lower growth of forest cover. Nowadays, forest cover development is likely to be driven by the demand for social and environmental benefits from forestry, as well as promoting changes from agricultural land use towards forestry (attempting to reduce the burden of agricultural subsidies in the European Union) (Gold, 2003).

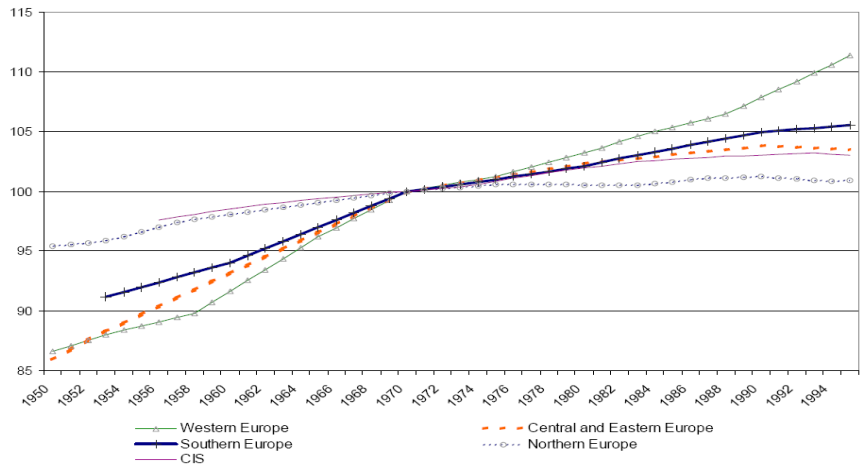


Fig.2 Development of forest by area in Europe by regions (1970=100%), *UNECE/FAO*

2.3 European forest area change from 1990 to 2006

The data reported by FRA2005 show that the five of the ten world countries with the largest net gain per year in the period 2000-2005 are European countries (Table 2). During this period, these five countries contributed 81% of the total Europe annual change (Fig. 3).

Country	Annual change (1000 ha/year)
China	4058
Spain	296
Viet Nam	241
United States	159
Italy	106
Chile	57
Cuba	56
Bulgaria	50
France	41
Portugal	40
Total	**5104**

Table 2. Ten world countries with largest annual net gain in forest area 2000-2005 (FAO, 2006)

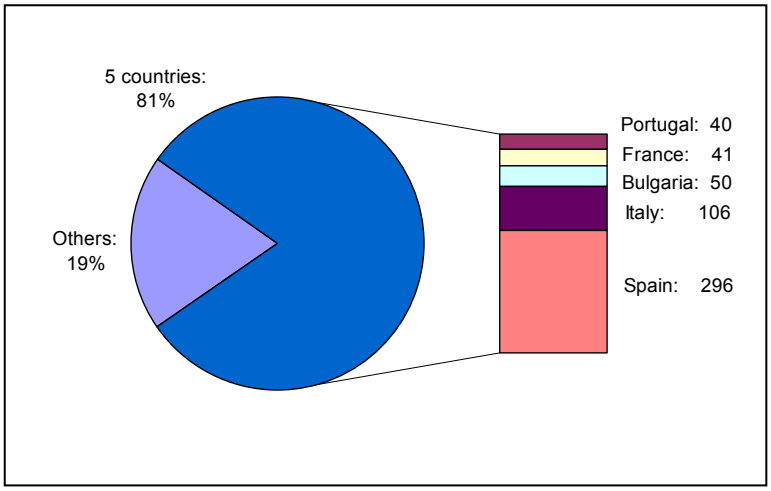


Fig.3 Five European countries with highest annual net gain, (FAO, 2006)

For the MCPFE countries, the annual change rate during the periods of 1990-2000 and 2000-2005 is presented in the Table 3. During the last fifteen years, the forest area in most of MCPFE countries continued to increase, but generally at a smaller rate during the period of 2000-2005.

MCPFE COUNTRY*	Annual change rate			
	1990-2000		2000-2005	
	1000 ha/year	%[a]	1000 ha/year	%[a]
Albania	-2	-0.3	5	0.6
Andorra	0	0	0	0
Austria	6	0.2	5	0.1
Belarus	47	0.6	9	0.1
Belgium	-1	-0.1	0	0
Bosnia and Herzegovina	-2	-0.1	0	0

Bulgaria	5	0.1	50	1.4
Croatia	1	0.1	1	0.1
Czech Republic	1	n.s.	2	0.1
Denmark	4	0.9	3	0.6
Estonia	8	0.4	8	0.4
Finland	28	0.1	5	n.s.
France	81	0.5	41	0.3
Georgia	n.s.	n.s.	n.s.	n.s.
Germany	34	0.3	0	0
Greece	30	0.9	30	0.8
Hungary	11	0.6	14	0.7
Iceland	1	4.3	2	3.9
Ireland	17	3.3	12	1.9
Italy	106	1.2	106	1.1
Latvia	11	0.4	11	0.4
Liechtenstein	n.s.	0.6	0	0
Lithuania	8	0.4	16	0.8
Luxembourg	n.s.	0.1	0	0
Malta	0	0	0	0
Moldova	1	0.2	1	0.2
Monaco	0	0	0	0
Netherlands	2	0.4	1	0.3
Norway	17	0.2	17	0.2
Poland	18	0.2	27	0.3
Portugal	48	1.5	40	1.1
Romania	0	n.s.	1	n.s.
Russia	32	n.s.	-96	n.s.
Serbia and Montenegro	9	0.3	9	0.3
Slovak Republic	n.s.	n.s.	2	0.1
Slovenia	5	0.4	5	0.4
Spain	296	2	296	1.7
Sweden	11	n.s.	11	n.s.
Switzerland	4	0.4	4	0.4
Turkey	37	0.4	25	0.2
Ukraine	24	0.3	13	0.1
United Kingdom	18	0.7	10	0.4
Total	**916**	**0.09**	**686**	**0.07**
Total excl. Russian Fed.	**844**	**0.44**	**782**	**0.38**

Table 3. Annual changes in forest area for MCPFE countries 1990-2005 (FAO, 2006)
* In addition to European countries of FRA 2005, MCPFE country list also includes Turkey and Georgia
[a] Rate of gain or loss in percent of the remaining forest area each year within the given period.
n.s. – not significant, indicating a very small value

The negative change in forest area reported for Russia (-96 thousand hectares per year during the period of 200-2005) was explained by correction of inexact data and more precise definitions used. With the large extend of Russian forests, the introduced corrections gave such a significant change, which mostly relates to the Asian part of Russia.

3. EU afforestation programs

In 1992 measures accompanying the common agricultural policy (CAP) reform were adopted to benefit the environment, early retirement and forestry. As part of one of the main areas of the reform, temporary set-aside or reallocating farmland to afforestation or non-food production was implemented under the Council Regulation (EEC) No 2080/92 of 30 June 1992 – a Community aid scheme for forestry measures in

agriculture. The aid was part-financed by the Guarantee Section of the European Agricultural Guidance and Guarantee Fund (EAGGF) to promote afforestation as an alternative use of agricultural land and the development of forestry activities on farms.
One million hectares of agricultural land were afforested between 1994 and 1999 owing to the Regulation 2080/92 (EU15). 95% of the areas planted are to be found in five countries: Spain, Portugal, Ireland, United Kingdom, and Italy (Fig.4).

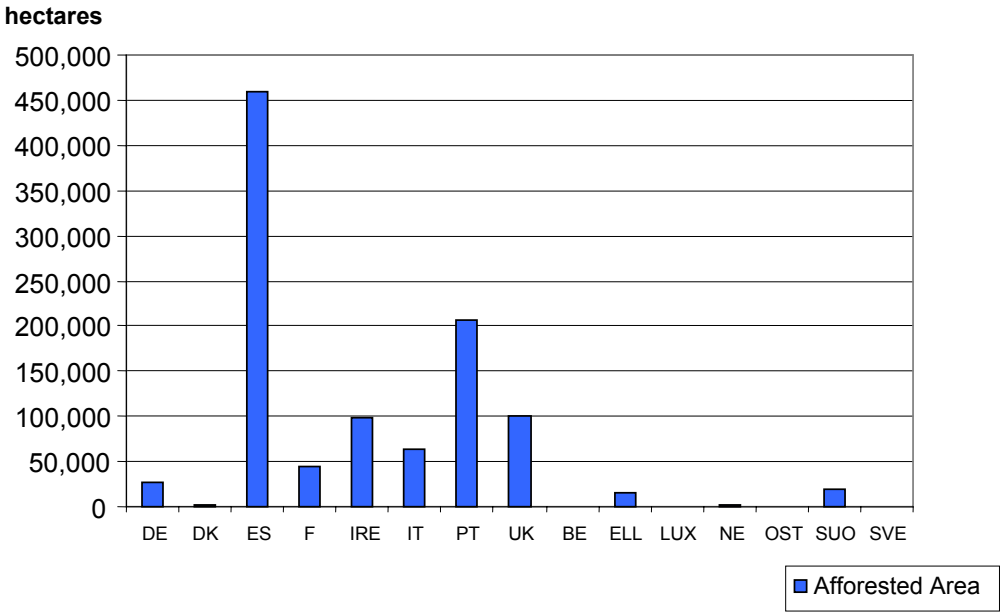


Fig.4 Distribution of the areas financed by Regulation 2080 by country over the period 1994-1999 (Picard, 2001)
Scale: 15 countries of the European Union

If afforested under the Regulation 2080 lands are assigned to specific biogeographical area, the Mediterranean area, covering the regions of Spain, Portugal and Italy, represents almost 60% of the total area planted (Fig.5).

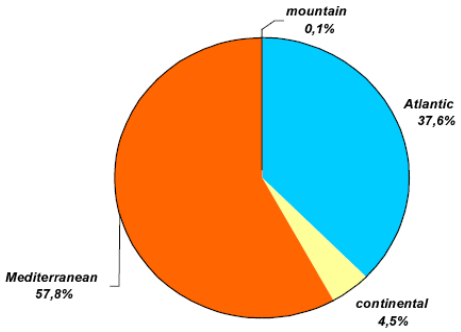


Fig.5 Distribution of afforested lands under Regulation 2080 by biogeographically area (Picard, 2001)

Comparing the annual afforestation rate due to the EU programme of the period 1994-1999 with the annual change in forest area of the period 1990-2000 reported for FRA2005, it can be noticed that the annual change rates have similar pattern. For some countries such as France, Ireland, and UK, annual afforested area supported by EU programme in the period 1994-1999 was higher than 10-year annual change reported by FRA. For Spain, Italy, and Germany, the major part of the annual change in forest area could be attributed to the nationally funded afforestation activities (Fig.6).

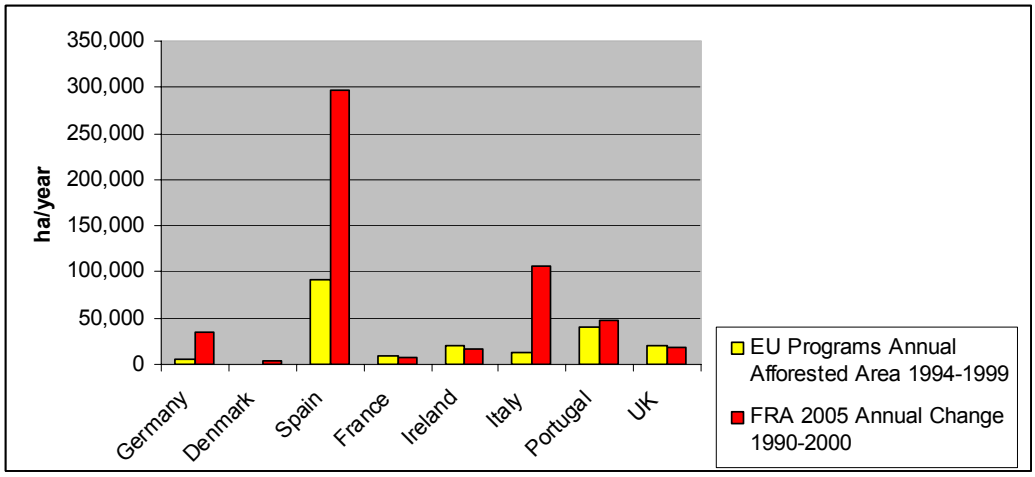
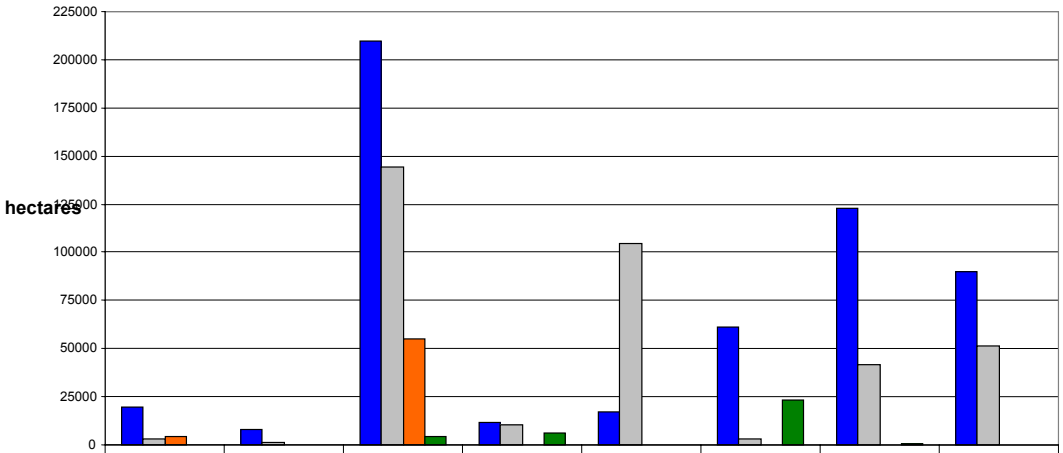


Fig.6 Comparison of EU programme annual afforested area and FRA2005 annual change in forest area.

3.1 Qualitative features of EU afforestation programmes

The broadleaved species represented 57% of the planted area, with cork oak and the evergreen oak stands occupying a dominating position, which is the reverse of the planting trends in previous decades; conifers represented 32% and fast-growing species 4%; the mixed stands (7%) in certain countries and regions also considerably enhanced the resource created (Fig.7). (Picard, 2001)



	Germany	Denmark	Spain	France	Ireland	Italy	Portugal	UK
Braodleaved	19677	7905	209661	11674	17058	61217	123077	89868
Conifers	2982	1288	143992	10151	104783	3132	41717	51210
Mixed broadeleaved/coniferous	4386	0	54769	0	0	0	0	0
Fast-growing species	0	0	4382	5850	0	23513	316	0

Fig.7 Distribution by species used for afforestation of the planted areas (Regul. 2080/92) (Picard, 2001)
Scale: 8 EU countries which represent 96% of the area afforested by Regulation 2080.

Under EU programs, half of the reviewed countries have used similar species distribution for afforestation to their current forests (Fig.8). Different situation was observed in Germany, Denmark, Spain, and UK, where more broadleaves were planted, but existing forests are dominated by conifers. This can possibly be explained by conifer-dominated afforestation trend in the first half of the 20th century and change to more natural forests in the second half of the century.

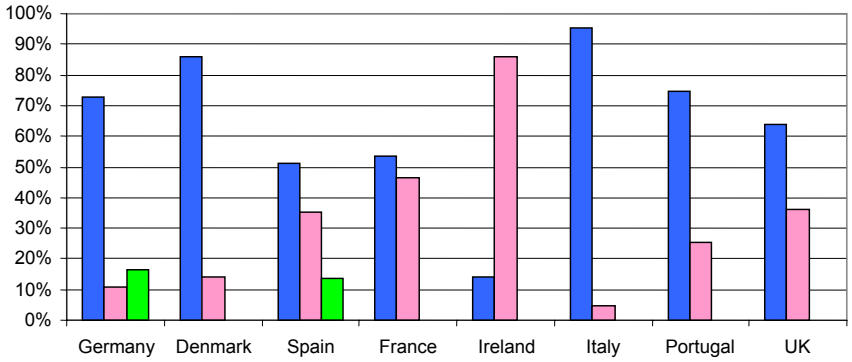


Fig. 8a. Distribution by species of the EU afforestation programmes (Picard, 2001)

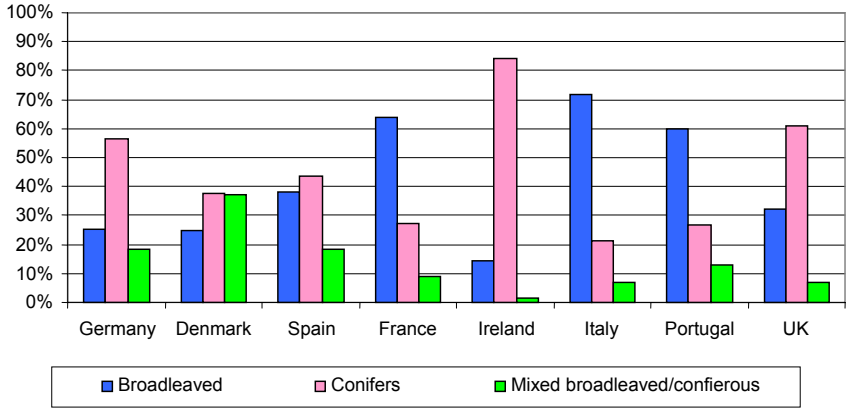


Fig. 8b. Distribution by species of the total forest area (UNECE/FAO, 2000)

For example, in Germany, located in the temperate zone, originally deciduous trees covered about two thirds of the area, however during the last centuries, softwood species were extended to areas where they do not represent part of the natural communities, which caused problems such as severe wind throws and spread of fungi and insects. In the 1990s, the afforestation projects had the emphasis on planting of near-natural deciduous and mixed-species forests (UNFCCC, 1997).

Britain was already largely deforested by 1100 AD and by 1900 woodland only covered around 5% of the land area (Pryor, 2000). Afforestation in the second half of the 1990s has increased the forest cover to 10% by planting mostly non-native conifers. Breakdown of current afforestation by grant type shows that 60% of the area planted is with native species (mostly broadleaves) and 40% with coniferous.

In Spain, the Council Regulation (EEC) No 2080/92 contributed to restoration of many degraded areas and provided valid options to farmers for their abandoned land. Under the Spanish Programme, species were planted for long-term timber production (native pines, cedar spruce, fir, etc.) as well as for restoring or creating permanent forest stands (fir, white poplar, beech, elm, green oak, cork oak, etc.). In certain areas, the planting was done with native tree or shrub species in view of their specific timber quality or species being endemic or endangered (araar, certain junipers, cherry, chestnut, walnut, etc.) (Barbero, 2000).

4. Europe future forest development

Forests cover more than a third of the land area in Europe and have been expanding during the last century. This trend is likely to continue for the future. The total forest area in Europe is expected to increase by around five percent between 2000 and 2020 (UNECE, 2005). This will take place due to government programmes aiming to increase long-term timber supply, to increase the level of non-wood goods and services, and to provide alternatives for agricultural use of land. A mixture of afforestation and natural processes will occur both on former agricultural land as well as along the tree margin in mountain and boreal areas. The increase in Western Europe is expected to be higher than the European average, due to policies in agriculture, rural development and land-use shifting slightly in favour of forestry.

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List of Annexes:

Annex I. Extent of forest land 2005 (FAO, 2006).

Annex II. Afforestation and reforestation activities in countries (contributions from Russia and Bulgaria).

Annex I. Extent of forest land 2005 (FAO, 2006).

Country	Forest, th.ha	Forest, %	Inland water, th.ha	Total area, th.ha
Albania	794	29,0	135	2875
Andorra	16	35,6	0	45
Austria	3862	46,7	113	8386
Belarus	7894	38,0	12	20760
Belgium	667	22,0	25	3053
Bosnia and Herzegovina	2185	43,1	47	5120
Bulgaria	3625	32,8	36	11099
Channel Islands	1	4,1	n.s.	19
Croatia	2135	38,2	62	5654
Czech Republic	2648	34,3	159	7887
Denmark	500	11,8	66	4309
Estonia	2284	53,9	284	4523
Faeroe Islands	n.s.	0,1	0	140
Finland	22500	73,9	3367	33814
France	15554	28,3	140	55150
Germany	11076	31,7	808	35703
Gibraltar	0	0	0	1
Greece	3752	29,1	306	13196
Holy See	0	0	0	n.s.
Hungary	1976	21,5	92	9303
Iceland	46	0,5	275	10300
Ireland	669	9,7	138	7027
Isle of Man	3	5,3		57
Italy	9979	33,9	723	30134
Latvia	2941	47,4	255	6460
Liechtenstein	7	43,8	0	16
Lithuania	2099	33,5	262	6530
Luxembourg	87	33,6	0	259
Malta	n.s.	1,1	0	32
Monaco	0	0	0	n.s.
Netherlands	365	10,8	765	4153
Norway	9387	30,7	1751	32376
Poland	9192	30,0	640	31269
Portugal	3783	41,3	48	9198
Republic of Moldova	329	10,0	96	3384
Romania	6370	27,7	852	23839
Russia	808790	47,9	18690	1707540
San Marino	n.s.	1,6	0	6
Serbia and Montenegro	2694	26,4	17	10217
Slovak Republic	1929	40,1	93	4901
Slovenia	1264	62,8	13	2027
Spain	17915	35,9	655	50599
Sweden	27528	66,9	3834	44996
Switzerland	1221	30,9	174	4129
The FYR Macedonia	906	35,8	40	2571
Ukraine	9575	16,5	2435	60370
United Kingdom	2845	11,8	203	24291
Total Europe	1001393	44,3	37611	2297718

Annex II. Afforestation and reforestation activities in countries (contributions from Russia, Bulgaria, and Italy)

II.1. Russia.

1. Area of afforestation:

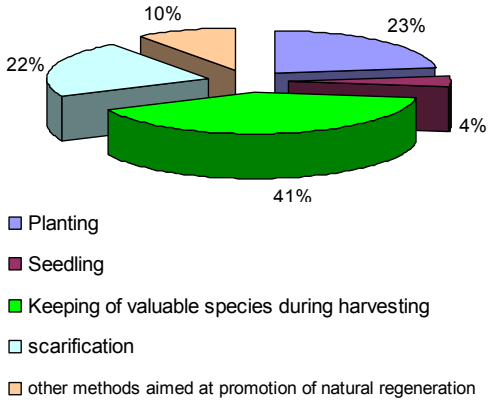
Area of afforestation, thousand ha

Index	1995	2000	2001	2002	2003	2004	2005
Area of afforestation (total in Russia)	1453,8	972,9	959,9	886,8	834,1	796,7	812,3
- including area of afforestation by Federal Agency of Forestry	1362,6	913,5	899,4	825,6	769,4	733,8	757,9
- including area reforested through planting and sowing	366,9	263,3	264,859	254,3	233,1	230,4	187,1
- included area reforested through planting and sowing by Federal Agency of Forestry	331,7	236,2	237,6	226,6	205,8	203,1	163,8

Annually in Russia reforestation works are embrace area of 800-880 thousand ha, included:

- establishment of forest cultures (planting and seedling) – 180-250 thousand ha,
- promotion of natural regeneration (keeping of valuable tree species felling operations, scarification of soil – 570-630 thousand ha.

Methods of reforestation works (% of area):



2. Main objectives

The major principles of forest management are defined in the Forest Code of the Russian Federation (1997), new edition of Forest Code (2006) and in the number of other legal documents. Presently, these principles are designed to “provide inexhaustible and sustainable forest use, regeneration, forest protection and conservation of the forests”. Rules of afforestation are defined by the following legislative documents approved by the orders of Federal Agency of Forestry of Russia: “Basic regulation of afforestation and forest cultivation in Forest Fund of Russian Federation” (1993), regional instructions on afforestation and forest cultivation and others.

According to new Forest Code “Reforestation and afforestation is carried out in the order established by authorized federal executive power” (regional level).

3. Species planted

Total area of planted forests in Russia on 01.01.2005 - 17,3 mill. ha.

Tree species composition of planted forests: Pine (mainly - Pinus silvestris) – 39%, spruce (Picea sp.) – 41 %, Siberian stone pine (Pinus sibirica) – 9 %, Larch (Larix sp.) – 3 %, oak (Quercus sp.) – 3 %, Birch (Betula sp.) – 1 %, others – 4% of area of planted forests.

4. Relevant institutions

There are 5 selection-seed-farming centers, 34 seed-farming industrial stations, 28 specialized seed-farming enterprises in Russia. The most part of afforestation and reforestation works is carried out by FMUs (leshos).

5. Main policy instrument used:

Mainly legislative documents approved by the orders of Federal Agency of Forestry of Russia

6. Afforestation in the National Forest Programme
There are no National Forest Programme of Russia, however there is Indicative Plan.

II.2. Bulgaria

1. Area of afforestation – ha

2000	2001	2002	2003	2004	2005
6313.3	5031.2	7133.8	8377.0	7532.3	5397.3

2. Main objectives
- multifunctional forest management and sustainable development of economically forest sector;
- supporting the constantly forest cover of 30 % in the country;
- conservation of biodiversity etc.

3. Species planted

	2000		2005
Conifers	21.83 %	Pines, spruce, cedar	24.71 %
Broadleaves	55.47 %	Beech, oak, poplar	63.96 %
mixed	22.7 %		11.33 %

4. Relevant institutions

State Forest Services, State Hunting Stations, Regional Forestry boards, National Forestry board

5. Main policy instruments used

Mainly financial and economical instruments for afforestation are used in Bulgaria.

6. Planned afforestation

The planning of afforestation is done according to forest management plan for 10-year period. In this plan together with other indexes are shown the area for afforestation and tree species which will be used. The annual rate of afforestation in Bulgaria is 12 000 ha.

II.3. Italy.

In Italy the matter of afforestation/reforestation policies for climate change mitigation is mainly under the responsibility of the Ministry of Environment. Within the Regional Rural Development Programmes in the period (2000-2004), about 35.979 ha (former crop-land) have been afforested as shown in the following table:

Conifers	Broadleaves Long rotation	Broadleaved Short rotations	Mixed
11.079 ha	11.353 ha	7.471 ha	6.076 ha

The plantations to be carried out in the next future to retain climate change will probably be of the same kind of the ones recently established.

The results of the thematic study on plantations (Angelo Mariano, 2005) carried out by the FAO provide information afforestation methods adopted in Italy.

Top 10 species planted	%	Predominant Rotation Length years		Harvest Vol. Yield m^3/ha	
		Min	Max	Min	Max
1) Hybrid Poplars	57	10.3	11.2	170	220
2) *Eucalyptus* genus	16	8	15	100	300
3) *Juglans regia* L.	10	35	80		
4) *Prunus avium* L.	3	40	80		

5) *Pinus radiata* D. Don	4	20	40		
6) Pseudotsuga menziesii	2	30	70	500	1200
7) Other conifers	8				

Table 1. Productive Plantation Forests. Species composition (%), Mean Annual Increment (m^3/ha/year), Rotation Length (years), Harvest volume yield (m^3/ha) and age class distribution (%).

Apart from poplar stands, detailed information on Italian forest plantations is not available. Thus for the compilation of this report not only heterogeneous documents and sources have been used, but also expert estimations have been made in order to assess some parameters.

The most important source for area extent is the ongoing National Forest Inventory (NFI), which provides some provisional results on the most common plantations. It must be said that the relatively small surface devoted to less common species, together with the sampling rate adopted by the NFI, could lead to a potential underestimation of productive plantations. Moreover, being only the two first inventory phases (consisting in photo-interpretation and ground checks to distinguish forest resources from other-land) completed, information on sylvicultural characteristics (structure, age, composition, etc.) is not yet available. The reference year of NFI findings is 2002, when the most of the used ortho-photos were taken. As the situation of planted forest in the last 3 years can be considered stable, the same share of area among species found by the NFI has been applied to the FRA 2005 total extent of productive plantations.

Some details on the different plantations listed in table 1 are given below.
1. Besides the NFI, the area devoted to poplar cultivation is also clearly defined by the fifth 2001 Agricultural census carried out by the National Statistical Institute (ISTAT). Main results are available at the following internet site.

Sylvicultural details regarding poplar stands (increment, rotation length, ecc.) have been provided by the Poplar Research Institute based in Casale Monferrato, whose site is: http://www.populus.it/

At present, the Populus x Euroamericana clone “I 214” represents about the 80% of the hybrid Poplars grown in Italy. Among the various clones admitted for cultivation the most common are the ones named: “Boccalari, San Martino, Neva and A4A”, which represent about the 15% of the extent of the poplar plantations (about 83.000 ha). The most important sites for poplar cultivation are the plains of northern Italy and especially the Po Valley.

2. As regards Eucalyptus plantations, the findings of the NFI strongly differ from what reported in the most updated article published in 1987 by Luigi Boggia (Cellulosa e Carta, n. 5 pgs. 11/17). According to this author, in the late eighties, the area of pure Eucalyptus stands was about 46.000 ha, while at present it results almost halved. Hopefully such discrepancy will be cleared up when the NFI is completed. Other data on Eucalyptus is either retrieved from literature (CSAF, 1990 - *Principali latifoglie da legno.* Edizioni RESS-ENCC, Roma) or assessed by experts. Anyway information on such plantations is quite poor due to the great variability of ecological conditions and to the fact that many of them, mainly established in the sixties and seventies in southern and insular Italy, have been neglected during the last decades not having met the expected productive results. Also for this reason, the sylvicultural characteristics (especially distribution of age class) must be considered just as an indication and refer only to Eucalyptus coppices.
Most spread species in Italy are: *E. camaldulensis* Dehn., *E. occidentalis* Endl., *E. x trabutii* Vilmorin, *E. globules* Labill, *E. botryoides* Sm., *E. viminalis* Labill., *E. gomphocephala* A. D.C., *E. globules* Labill..

3. Looking at the preliminary results of the NFI a tentative estimate of the area extent of broadleaves plantations for high valuable timber production has been made. Walnut (*Juglans regia* L.) and wild cherry (*Prunus avium* L.) are the two most common species, which have been more and more encouraged in the last years in set-aside or abandoned agricultural land. Due to the fact that these plantations are averagely too young and often made by different species (mixed stands), reliable information on sylvicultural parameters is not available, even if some provisional results can be found in scientific literature (http://www.sisef.it/forest@/pdf/Di_Vaio_291.pdf). Rotation lengths and distribution in age class must be considered as a tentative expert estimate. The area share of walnut and cherry is also based on an expert estimation and could include other minor species belonging to genus such as *Alnus*, *Fraxinus, Quercus* and *Robinia* which can be found in pure (usually not exceeding 1 or 2 ha of size) or mixed stands where the two main high valuable broadleaves are predominant.

4. According to the ongoing NFI, the area of *Pinus radiata* D. Don plantations has severely decreased in the last 20 years. In 1981 Eccher (Atti 1° Cong. Naz. “Il legno nelle attività economiche del Pese”. Sez. III, 65-69, Roma.) reported that such species was covering about 25.000 ha located in central and southern Italy, while

the present area is about 5.800 ha. Sylvicultural and productive characteristics retrieved from literature (CSAF, 1992 - *Conifere.* Edizioni RESS-ENCC, Roma; Eccher A., Ferrara A., 1983 – Pino insigne*. Prime tavole di cubatura.* Cellulosa e Carta, n. 2 pgs. 16/34).

5. Even if in 1981 the area of Douglas fir in Italy was estimated at the beginning of the eighties as about 10.000 ha (AA.VV. 1982. *Le specie forestali esdotiche nella selvicoltura italiana*. Annali dell'Istituto Sperimentale per la Selvicoltura, XII-XIII: 330:491) L, the number of ha recognised so far as productive plantations by the NFI is around 3.000. Sylvicultural details in the table have been retrieved from the mentioned article.

In Italy several introduced and native conifers are used in productive plantations, due to the fragmentation and complexity of the existing stands, often mixed, a breakdown for botanical species of these planted forest is impossible. Thus the mention "Other conifers" refers to an aggregated class and therefore the sylvicultural aspects cannot be detailed. Most common species in this group are, in alphabetic order: *Abies alba* Mill., *Cedrus atlantica* (Endl.) Carr., *Cupressus sempervirens* L., *Picea abies* (L.) Karst., *Pinus canariensis* Smith, *P. halepensis* Mill., *P. nigra* Arnold ssp. *laricio* (poiret) Maire, *P. pinaster* Aiton., *P. pinea* L., *P. strobes* L..

Workshop Agenda

Workshop on pan-European recommendations for afforestation and reforestation in the context of UNFCCC

24 October, 2006 (Tuesday)

9:00 – 9:30 Registration

Session I Chair: Mr. Piotr Borkowski (MCPFE LUW), Ms. Ivonne Higuero (PEBLDS)

9:30 – 9:40 Welcome by the Government of Lithuania
Dr. Aidas Pivoriūnas (Ministry of Environment, Lithuania)

9:40 – 9:50 Opening remarks
Mr. Piotr Borkowski (MCPFE LUW), Ms. Ivonne Higuero (PEBLDS)

9:50 – 10:10 Presentation of the workshop programme, adoption of the agenda
Chair

10:10 – 10:30 Ms. Jenny Wong (UNFCCC)
Afforestation and reforestation in the context of UNFCCC

10:30 – 10:50 Ms. Ivonne Higuero (on behalf of CBD)
Biodiversity aspects and afforestation practices

10:50 – 11:10 Ms. Elysabeth David (UNCCD)
Re-/Afforestation in the context of UNCCD to combat land degradation and desertification

11:10 – 11:40 Coffee break

11:40 – 12:00 Mr. Joost Van de Velde EU (DG Environment)
Afforestation and reforestation within EU policy

12:00 – 12:20 Dr. Roman Michalak (MCPFE LUW)
MCPFE resolutions on afforestation and reforestation

Expert view
12:20 – 12:40 Ecological aspects
Dr. Jarkko Koskela (IPGRI)
Afforestation and reforestation with regards to forest genetic resources

12:40 – 13:00 Ms. Giuliana Zanchi (EFI)
Quantitative overview and analysis of afforestation in Europe

13:00 – 14:30 Lunch break

14:30 – 16:20 Session I (cont.)

14:30 – 14:45 Country experience – Lithuania, Ms. Laura Kasnauskaite
14:45 – 15:00 Country experience – Norway, Mr. Petter Nilsen

15:00 – 15:20 Mr. Christoph Wildburger (Consultant)
Presentation of the background paper, review of proposal for pan-European recommendations for afforestation and reforestation in the context of UNFCCC

15:20 – 15:35 Introduction to Working Groups (Mr. Christoph Wildburger)

15:35 – 16:10 Coffee break

(Big meeting room divided into 2 parts during coffee time)

Session II Working Groups

16:10 – 18:10 Working Group discussions

20:00 Reception by Lithuanian Government

25 October, 2006 (Wednesday)

Session II Working Groups (cont.)

9:00 – 11:00 Working Group discussions (continued)

11:00 – 11:30 Coffee break

11:30 – 13:00 Working Group wrap-up, preparation of outcome

13:00 – 14:30 Lunch

Session III Plenary Discussion
Chair: Ms. Ivonne Higuero (PEBLDS), Mr. Piotr Borkowski (MCPFE LUW)

14:30 – 15:00 Presentation of the outcome of the working groups

15:00 – 16:30 Conclusions and recommendations

16:30 – 17:00 Closure of the meeting – MCPFE, PEBLDS, Government of Lithuania

18:30 Excursion to the Old part of Vilnius

26 October, 2006 (Thursday)

8:00 – Departure for the excursion to the Dubrava experimental and training forest enterprise (Kaunas reg.) from the main entrance of the Hotel

11.00 – 11.40 – presentation of the Dubrava experimental and training forest enterprise, coffee break

11.40 – 13.00 – excursion to experimental plantations and stands

13.00 – 14.00 – Lunch

14.00 – 19.00 – excursion to the conservation area, Trakai castle

19.00 – Departure back to Vilnius; Dinner by the road

21.00 – Arrival to Hotel

Terms of Reference for Working Groups

Workshop on pan-European recommendations for afforestation and reforestation
in the context of UNFCCC

Tasks of Working Groups:

- To review the recommendations and background paper and to propose improvements where appropriate

Questions:

- Are there any issues which are not covered?
- Are there any specific aspects missing in guidelines?
- Are there guidelines or parts of guidelines, which are not relevant and should be excluded?

Working Group Topics and Moderators

Working Group 1 – General Guidelines (WG 1) – Dr. Sallie Bailey (UK)
Working Group 2 – Ecological Guidelines (WG 2) – Dr. Jarkko Koskela (IPGRI)
Working Group 3 – Socio-Economic Guidelines (WG 3) – Ms. Natalie Hufnagl (CEPF)

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WG 1 – General Guidelines

1. Jovica Ristovski
2. Dragan Serafimovski
3. Sallie Bailey
4. Arto Koistinen
5. Ciprian Pahontu
6. Csaba Mozes
7. Lasma Abolina
8. Thomas Schneider
9. Elysabeth David
10. Anna Zornaczuk
11. Petter Nilsen
12. Bjorn Merkell
13. Zbignev Glazko
14. Piotr Borkowski
15. Ivonne Higuero

WG 2 – Ecological Guidelines

1. Dolores Belorechka
2. Neli Mihaylova
3. Robert Jandl
4. Jarkko Koskela
5. Jaap Paasman
6. Manfred Klein
7. Remigijus Zalkauskas
8. Giuliana Zanchi
9. Wlodzimierz Adamczyk
10. Petras Kurlavicius
11. Oscar Barreiro
12. Almir Karacic
13. Joost Van de Velde
14. Olivier Bouyer
15. Malgorzara Buszko-Briggs

WG 3 – Socio-Economic Guidelines

1. Natalie Hufnagl
2. Jenny Wong
3. Olga Zyrina
4. Roman Michalak
5. Ghazal Badiozamani
6. Maksimilijan Mohoric
7. Donatas Vaikasas
8. Kestutis Cesnavicius
9. Evaldas Survila
10. Laura Kasnauskaite
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Presentation Abstracts

Afforestation and Reforestation under the UNFCCC

Jenny L P Wong
Adaptation, Technology and Science
UNFCCC Secretariat

Commitments of all Parties to the UNFCCC under Article 4 are reflected in the Paragraph 1(d): "Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases, not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems".

Reporting of the Land Use, Land-use Change and Forestry (LULUCF) sector under the UNFCCC consists of GHG inventories, including the LULUCF sector, which is reported annually since 1997. Parties report on 6 broad categories of land – Forest land, Cropland, Grassland, Wetlands, Settlements and Other land. Inventory covers GHG emissions and removals from managed lands only. Countries use their own definitions of these categories. Annex I Parties use the tables of the Common Reporting Format for reporting the LULUCF sector (decision 14/CP.11) for their inventory submissions. Annex I Parties should use the IPCC GPG for LULUCF for preparing inventories under UNFCCC, in 2005 and beyond.

The reporting of the Forest Land category includes all land with woody vegetation consistent with thresholds used to define forest. Parties provide national definitions of forest and sub-categories. Sub-division by activity, management regime, climatic zone and ecosystem type. Forest land is divided into 2 sub-category: Forest land remaining Forest land and Land converted to forest land. Estimation of changes in carbon stock is done from 5 carbon pools – aboveground biomass, belowground biomass, dead wood, litter and soil organic matter. Non-CO_2 gases (N_2O, CH_4) are reported for forest fertilization, forest fires and drainage of forest soils. CO_2 emissions from liming on forest land are also reported.

Reporting of the Forest Land category also includes land converted to forest land, such as conversion of managed land to forest by afforestation and reforestation, either by natural and artificial regeneration (including plantations). It involves a change in land use. Converted areas must correspond to definition of forest adopted by the country. Land converted to forest land are followed in conversion status for 20 years (IPCC default value).

Reporting LULUCF activities under the Kyoto Protocol, such as reporting of emissions and removals of CO_2 and other GHG results from the Article 3.3 activities – Afforestation, Reforestation and Deforestation and Article 3.4 activities – Forest management, Cropland management, Grazing land management and Revegetation. Definitions of these activities comes from the annex to decision 16/CMP.1. Information reported is supplementary to that reported under the Convention. Parties are supposed to report annually during the commitment period, but annual reporting does not imply need for annual measurements.

As part of the Marrakesh Accords, a set of rules for LULUCF activities were agreed upon (decision 16/CMP.1), including a set of principles to govern LULUCF activities; for example, treatment of these activities based on sound science; contribution of implementation of LULUCF activities to the conservation of biodiversity and sustainable use of natural resources. Accounting should exclude removals resulting from: (i) elevated carbon dioxide concentrations above their pre-industrial level; (ii) indirect nitrogen deposition; and (iii) the dynamic effects of age structure resulting from activities and practices before the reference year.

Decision 15/CP.10 adopted a set of CRF tables for reporting of LULUCF activities under Articles 3.3 and 3.4. Parties may submit on voluntary basis this supplementary information next year (15 April 2007). Based on experiences of use, these CRF tables may be modified/ up-dated at SBSTA 27 (Dec 2007). Parties should report on C stock changes in AGB, BGB, litter, dead wood and soils (ARD) for all Article 3.3 activities and each of the elected Article 3.4 activity; N_2O emissions from N fertilization (A/R, FM), drainage of organic/ mineral soils (FM), disturbance associated with land-use conversion to cropland; C emissions from lime application (all 3.3 and elected 3.4 activities); and GHG emissions from biomass burning.

Each Annex I Party shall submit to the secretariat, prior to 1 January 2007, a report (initial report) for establishing its assigned amount. This report should contain several information related to LULUCF activities, amongst other information. LULUCF projects under Article 6 (Joint Implementation) shall conform to definitions, accounting rules, modalities and guidelines under Articles 3.3 and 3.4 of the Kyoto Protocol.

Interlinkages between Climate Change and Biodiversity

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The SBSTTA provided advice to the Conference of the Parties to the CBD through an assessment of the interlinkages between biodiversity and climate change prepared by an ad hoc technical expert group in 2003.The report concludes that there are significant opportunities for mitigating climate change, and for adapting to climate change while enhancing the conservation of biodiversity. In Decision VII/15, the COP invites Parties, other Governments, international organizations and other bodies to make use of the report in order to promote synergies at the national level between the UNFCCC and its Kyoto Protocol and the CBD, when implementing climate-change activities and their relation to the conservation and sustainable use of biodiversity. The COP also invites the COP of the UNFCCC and the UNCCD to collaborate with the CBD, through the joint liaison group as appropriate, in the development of advice or guidance to Parties in implementing activities that are mutually supportive of the objectives of the three conventions at the local, sub-national, and national levels; and to involve biodiversity experts in relevant activities of the UNFCCC, including methodological issues.

There are significant opportunities for mitigating climate change, and for adapting to climate change, while enhancing the conservation of biodiversity. Mitigation involves reducing the greenhouse gas emissions from energy and biological sources or enhancing the sinks of greenhouse gases. Adaptation is comprised of activities that reduce a system's (human and natural) vulnerability to climate change. Carbon mitigation and adaptation options that take into account environmental (including biodiversity), social and economic considerations, offer the greatest potential for positive synergistic impacts.

Afforestation and reforestation can have positive, neutral, or negative impacts on biodiversity depending on the ecosystem being replaced, management options applied, and the spatial and temporal scales. The value of a planted forest to biodiversity will depend to a large degree on what was previously on the site and also on the landscape context in which it occurs. The reforestation of degraded lands will often produce the greatest benefits to biodiversity but can also provide the greatest challenges to forest management. Afforestation and reforestation activities that pay attention to species selection and site location, can promote the return, survival, and expansion of native plant and animal populations. In contrast, clearing native forests and replacing them with a monoculture forest of exotics would clearly have a negative effect on biodiversity. Afforestation of other natural grasslands and other native habitat types would also entail significant loss of biodiversity.

Short rotation plantations will not sequester and maintain carbon as much as long rotation plantations in which vegetation and soil carbon is allowed to accumulate. Loss of soil carbon occurs for several years following harvesting and replanting due to the exposure of soil, increased leaching and runoff and reduced inputs from litter. Short rotation forests, with their simpler structure, foster lower species richness than longer-lived forests. However, products from short rotation plantations may alleviate the pressure to harvest or deforest longer-lived or primary forests.

Plantations of native tree species will support more biodiversity than exotic species and plantations of mixed tree species will usually support more biodiversity than monocultures. Plantations of exotic species support only some of the local biodiversity but may contribute to biodiversity conservation if appropriately situated in the landscape. Planting of invasive exotic species, however, could have major and widespread negative consequences for biodiversity. Tree plantations may be designed to allow for the colonization and establishment of diverse under-storey plant communities by providing shade and by ameliorating microclimates. Involvement of local and indigenous communities in the design and the benefits to be achieved from a plantation may contribute to local support for a project and hence contribute to its longevity. Plantations may contribute to the dispersal capability of some species among habitat patches on a formerly fragmented landscape. Even plantations of a single species can confer some benefits to local biodiversity, especially if they incorporate features such as allowing canopy gaps, retaining some dead wood components, and providing landscape connectivity.

Revegetation activities that increase plant cover on eroded, severely degraded, or otherwise disturbed lands have a high potential to increase C sequestration and enhance biodiversity. Sequestration rates will depend on various factors. Soils of eroded or degraded sites generally have low carbon levels and therefore a high potential to accumulate carbon; however, revegetation of these types of such sites will pose technical challenges. An important consideration is to match the plant species to the site conditions and to consider which key ecological functions need to be restored. Biodiversity can be improved if revegetation aids

recruitment of native species over time or if it prevents further degradation and protects neighboring ecosystems. In certain instances, where native species may now be impossible to grow on some degraded sites, the use of exotic species and fertilizers may provide the best (and only) opportunity for reestablishing vegetation. However, care should be exercised to avoid situations where exotics that have invasive characteristics end up colonizing neighboring native habitats.

Bio-energy plantations provide the potential to substitute fossil fuel energy with biomass fuels but may have adverse impacts on biodiversity if they replace ecosystems with higher biodiversity. However, bio-energy plantations on degraded lands or abandoned agricultural sites could benefit biodiversity.

Case studies provided to the CBD Secretariat confirm that there is scope for afforestation, reforestation, improved forest management and avoided deforestation activities to be harmonized with biodiversity conservation benefits. [Note: improved forest management and avoided deforestation are not eligible under the CDM.] Improved conservation of biodiversity can occur through reforestation, afforestation, avoided deforestation and improved forest management. These projects included specific design features to optimize conservation benefits, including the use of native species for planting, reduced impact logging to ensure minimal disturbance; and establishment of biological corridors. Nevertheless, there is room for improvement in existing projects to further explore synergies between climate mitigation activities and biodiversity conservation.

Afforestation and reforestation in the context of land degradation/desertification in Europe

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Resulting from the 1992 United Nations Conference on Environment and Development (UNCED) the United Nations Convention to Combat Desertification (UNCCD) is the centerpiece of the international community's efforts to combat desertification and land degradation. Adopted in 1994, the Convention entered into force on 26 December 1996, and currently has 191 Parties.

The UNCCD recognizes the physical, biological, chemical and socio-economic aspects of desertification by calling for "long-term integrated strategies that focus simultaneously, in affected areas, on improved productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources" [24]. Furthermore the Convention acknowledges the importance of redirecting technology transfer so that it is demand-driven, as well as the involvement of local communities in combating desertification and land degradation (bottom-up approach).

The core instruments of the UNCCD process are the development of national, subregional and regional action programmes (NAPs/ SRAPs and RAPs respectively) by national governments, in cooperation with donors, local communities and Non governmental Organizations, with the objective of implementing activities which are part of the integrated development of land in arid, semi-arid and dry sub-humid areas for sustainable development which are aimed at prevention and/or reduction of land degradation; rehabilitation of partly degraded land; and reclamation of desertified land[25].

The implementation of the UNCCD in Europe involved developed non-affected countries, developed affected countries, affected countries with an economy in transition, and non-affected countries with an economy in transition; in addition, some countries are candidates to the European Union (EU). European affected countries are under the UNCCD regional implementation annexes for the Northern Mediterranean (Annex IV) or for the Central and Eastern Europe (Annex V). Several South Eastern Europe countries are under both annexes. UNCCD Annex IV includes the following countries: Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Italy, Malta, Monaco, Portugal, Slovenia, Spain, and Turkey. UNCCD Annex V includes: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Latvia, Lithuania, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia, The Former Yugoslav Republic of Macedonia and Ukraine. Only three European countries are still non-Parties: Estonia, Montenegro and Serbia.

Forest are instrumental in mitigating climate change and promoting biodiversity, globally and in dry lands, as well as in forestalling desertification, both directly through their effect on soil and water, and indirectly through

[24] UNCCD, Article 2, Paragraphe 2.
[25] UNCCD, Article 1 (b).

their role in climate and biodiversity. The UNCCD decision 8/COP.4, under the topic specific thematic and sectorial areas, called for actions at all levels, including launching afforestation and reforestation programmes. In addition, the third session of the Committee for the Review of the Implementation of the Convention (CRIC) highlighted[26] that in the context of sustainable forest, reforestation and afforestation are important elements for combating desertification.

Several affected European country Parties reported on various afforestation and reforestation activities that they are undertaking at national level in the framework of their NAPs (such as Albania in 2000, Cyprus in 2000, Greece in 2002, Italy in 2006, Republic of Moldova in 2006, Turkey in 2006). All these national reports can be found on the UNCCD website <www.unccd.int> under "reports".

A regional meeting for the Northern Mediterranean region held in Bonn, Germany, in 2004, identified reforestation, afforestation and tree planting in affected areas, as well as soil conservation strategies and planning, as two of the eight priority areas adopted for scientific cooperation. In this context Turkey is planning to organize regional training on reforestation, afforestation and tree planting in affected areas. A regional meeting for Central and Eastern Europe held in Minsk, Belarus, in 2003, decided that reforestation, afforestation and tree planting are important areas for scientific cooperation and capacity-building. As a consequence, the Forest Research and Management Institute in Romania offered to be a host institution for a regional thematic network on afforestation in temperate zones affected by drought.

The Rio Conventions share a common concern for many environmental and sustainable development issues. They also contain a number of crosscutting issues in terms of standard obligations, implementation measures and needs for capacity-building. In recognition of the strong potential for synergy in the development and implementation of activities under the Rio Conventions, a Joint Liaison Group (JLG) between the Convention on Biodiversity, the United Nations Framework Convention on Climate Change (UNFCCC) and UNCCD Secretariats was established in 2001 with aim enhancing coordination between the secretariats and exploring options for future cooperation, such as a joint work plan. Results of this workshop should be brought to the attention of the JLG. In addition, as the UNCCD COPs have repeatedly called for closer collaboration among other conventions and bodies, the UNCCD secretariat organized a workshop in Viterbo, Italy, in March 2004 on identifying synergies through forest and forest ecosystems (see <www.unccd.int>).

Land degradation and desertification generally induce a loss of topsoil, in quantity and/or in quality, which has extreme consequences on the vegetation, the biodiversity, the landscape and the climate. Decision makers do not consider these increasing changes as occurring in the "skin of the earth" because these changes are invisible for them. Soil degradation is being called "a silent disaster of the world". Afforestation and reforestation activities are seen as having positive anti-desertification and anti-land degradation effects at local level. They maintain soil fertility, improve the physical properties of the soil, reduce the erosive action of wind and rain, decrease the evapotranspiration and increase the biological productivity of soil. At global level, there is a complex interaction between the soil and climate change due to soil's role in carbon sequestration and its impact on the variation of biomass. In return, consequences of climate change affect soil properties and performance.

A better knowledge of some local socio-economic data, of the needs of local populations and of the conditions of local access to markets could contribute to federate the local stakeholders around afforestation and reforestation projects to achieve the objectives of the three conventions. An integrated territorial platform of management of natural resources would also benefit from the decentralization of accountability and decision-making on natural resources, the upgrading of skills of stakeholders, the setting-up of mechanisms to facilitate access to financial resources, the setting-up of incentives and systems of compensation in rural areas, and the introduction of remunerative prices for products.

The formulation and management of integrated local area development programmes on afforestation needs to take into account soil conservation issues, in particular the soil potential. In addition, in the several European countries, which are considered as affected under UNCCD and which are not included in Annex I of UNFCCC, afforestation projects to combat land degradation and desertification should already be designed to be eligible for the Clean Development Mechanism.

Finally, on the issue of afforestation and reforestation, it is important to galvanize the focal points of the three Rio Conventions to build concrete synergetic actions on information received from each of the Conventions and to ensure a coherence between their respective reporting processes on this topic.

[26] Document ICCD/CRIC(3)/ 9 Paragraphe 53.

Looking back on EU "Forestry Measures" : the role of afforestation

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"Forestry Measures" are possibilities for the co-financing by the Community Budget of certain actions taken by the Member States. They are NOT directly managed from Brussels.

Four different phases can be distinguished :

- Before 1992, EU forestry measures where relatively small in scale and budgetary impact, concentrated on specific regional problems and mostly linked to the Common Agricultural Policy.

- From 1992-1999, the EU co-funded a large afforestation Programme, intended to offer farmers and alternative use for agricultural land set aside by the 1992 CAP reforms. A total of about 1 million ha was planted under this programme.

- Under the Rural Development Scheme that came with Agenda 2000 (2000-2006) , forestry measures were diversified to cover, in addition to afforestation, also investments in economic forestry activities and in ecological forest functions.

- The Rural Development scheme under Agenda 2007 (2007-2013) continues the trend towards diversification of forestry measures. It foresees support for investment in forest based enterprises, while also offering the possibility to support a wide array of ecologically oriented forestry measures.

Afforestation of agricultural land
This measure follows the scheme established in 1992 by Council Regulation (EEC)
N° 2080/1992 as an accompanying measure of the CAP reform. This Regulation introduced a system of EU aid for forestry measures in the context of the CAP, with 4 main objectives:

- To accompany the changes to be introduced under market organisation rules;
- To contribute towards an eventual improvement in forest resources;
- To contribute towards forms of countryside management more compatible with environmental balance;
- To combat the greenhouse effect and absorb carbon dioxide.

In the context of Regulation N° 2080/92, about one million hectares of agricultural land were afforested in the EU Member States during the period 1994 - 1999. In qualitative terms, the broadleaved species represented 56.8% of the planted area, particularly cork oak and evergreen oak stands. Conifers represented 32.1% of the area, while about 4% of the total area was planted with fast growing tree species.

The Commission presented an evaluation report of this Regulation in 2001 (AGRI/2001/33002-00-00-EN). The report analyses the economic, social and environmental impact of the measures in the EU. In terms of economic and social aspects, the report indicates that all countries benefited from the favourable effects of diversification of agricultural activities and the development of activities connected with afforestation. It is estimated that 150.000 full-time equivalent jobs were temporarily created owing to afforestation operations. The frequent planting of mixed stands in certain countries and autochthonous tree species contributed, for example in Germany, Finland and Austria in particular, to a greater diversity, and in Spain and Portugal they enabled the specific interventions connected with fire protection to be developed as well as the improvement of cork oak stands.

Under the current Rural Development Regulation (2000-2006) , afforestation is supported by the Community Budget in 13 of the EU-15 Member States (all except Finland and Sweden). The information provided by the EU-15 Member States shows that countries are placing greater emphasis on the use of native broadleaf tree species. For instance, Denmark indicates that afforestation with indigenous broadleaf tree species represents 94% of the total area planted. In Germany, 96% of planted forests are mixed broadleaf stands; France indicates a rate of 70% of broadleaf tree species and UK of about 77% in the new plantations. Concerning afforestation strategies, seven countries indicate that they are established at national level, while in the rest specific strategies are established at regional level.

It is expected that afforestation will occupy an important position in the Rural Development Plans that will be presented by the 8 new continental Member States, as these countries will have important areas available due

to the restructuring of their agricultural sectors following EU accession in 2004. In the ex-EU15 , a further diversification of forestry measures will be possible.

Forestry measures and rural development

The EU's rural development policy, both under Agenda 2000 and Agenda 2007, seeks to establish a coherent and sustainable framework for the future of the rural areas based on the following main principles:

- The multifunctionality of agriculture and forestry, i.e. its varied role over and above the production of foodstuffs and raw materials. This implies the recognition and encouragement of the range of services provided by farmers and foresters;
- A multisectoral and integrated approach to the rural economy in order to diversify activities, create new sources of income and employment, and protect the rural heritage;
- Subsidiarity for Member States to draw up their rural development programmes.

The core instruments to achieve these objectives are Regulations No 1257/1999 and 1648/2005 - the Rural Development Regulations.

Financial impact during 2000-2006

A total amount of 4.8 billion EURO has been allocated from the Community Budget to forestry measures in the EU-15 Member States under the EAGGF budget for the period 2000 – 2006. This amount represents approximately 10% of the total budget allocated to rural development over that period (Leader+ excluded). Portugal (19.3%), Spain (17.5%), Ireland (14.9%), UK (14.6%), Denmark (12.4%) and Italy (12%) are the countries with the highest proportion of the budget allocated to forestry measures within their rural development programmes.

The table below provides a breakdown of the EU forestry spending between Member States :

Country	**EAGGF budget for rural development (EURO)**	**EAGGF budget for forestry measures (EURO)**			**% of total RD budget**
		Afforestation	**Other forestry measures**	**Total**	
Austria	3 249 445 471	8 080 000	78 619 783	86 699 783	2.6%
Belgium	401 767 048	6 153 000	18 068 182	24 221 182	6.0%
Denmark	336 420 000	35 330 000	6 600 000	41 930 000	12.4%
Finland	2 393 294 000	23 330 000	40 731 000	64 061 000	2.6%
France	5 762 531 788	37 605 789	238 268 240	275 874 029	4.7%
Germany	8 661 786 733	110 012 000	299 378 594	409 390 594	4.7%
Greece	3 253 700 000	57 800 000	129 966 503	187 766 503	5.7%
Ireland	2 558 291 000	350 800 000	31 500 000	382 300 000	14.9%
Italy	7 493 685 000	560 123 000	341 189 000	901 312 000	12.0%
Luxembourg	91 000 000	14 000	1 101 250	1 115 250	1.2%
the Netherlands	427 000 000	12 210 000	5 450 000	17 660 000	4.1%
Portugal	3 552 483 178	345 864 791	341 115 503	686 980 294	19.3%
Spain	8 515 946 848	663 539 423	832 792 843	1 496 332 266	17.5%
Sweden	1 232 268 999		3 620 999	3 620 999	0.3%
United Kingdom	1 555 509 000	175 910 000	51 452 000	227 362 000	14.6%
Total	**49 485 129 064**	**2 386 772 003**	**2 419 853 896**	**4 806 625 899**	**9.7%**

MCPFE resolutions on afforestation and reforestation

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The MCPFE is a high level political initiative that has developed as a dynamic process towards the protection and sustainable management of forests. This political commitment involves 45 European countries, European Community and cooperates with other countries, as well as international organizations that participate as observers.

Since 1990, four Ministerial Conferences on the Protection of Forests in Europe have taken place. These are regarded as milestones in the development of international forest policy:

- 1990 – First Ministerial Conference in Strasbourg
- 1993 – Second Ministerial Conference in Helsinki
- 1998 – Third Ministerial Conference in Lisbon
- 2003 – Fourth Ministerial Conference in Vienna

Besides conferences, representatives of MCPFE signatory parties, are meeting at expert level meetings (ELM), round table meetings, ad hoc working groups, workshops, and seminars.

The signatory states and the European Community are responsible for implementing the MCPFE decisions at regional, national and sub-national levels. Based on voluntary commitments, which constitute a common framework, governments all over Europe have taken initiatives to ensure and improve the sustainable management and protection of forests.

Afforestation and reforestation are regarded as one of the important topics throughout the whole history of MCPFE. At the First Ministerial Conference in Strasbourg (1990), the Resolution S2 highlighted that conservation of forest genetic resources addresses the need for conserving genetic diversity to have sufficient diversity in the choice of afforestation material.

In Helsinki (1993), the General Guidelines for the Sustainable Management of Forests in Europe defined how afforestation should be conducted in the frame of SFM.

Lisbon Resolution L2 (1998) on the Pan-European Criteria and Indicators for SFM outlined the following Criteria: C1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles; C2: Maintenance of Forest Ecosystem Health and Vitality; C3: Maintenance and Encourage-ment of Productive Functions of Forests; C4: Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems; C 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management; C 6: Maintenance of other socio-economic functions and conditions.

In the Pan-European Operational Level Guidelines for SFM (Lisbon, 1998), within the Guidelines for Forest Management Planning (1.1a) it is stated that forest management planning should aim to maintain or increase forest and other wooded area, and enhance the quality of the economic, ecological, cultural and social values of forest resources, including soil and water. While the guideline 1.2 c indicates that conversion of abandoned agricultural and treeless land into forest land should be taken into consideration, whenever it can add economic, ecological, social and/or cultural value.

Forest management planning should aim to maintain and increase the health and vitality of forest ecosystems and to rehabilitate degraded forest ecosystems, whenever this is possible by silvicultural means (2.1). Adequate genetic, species and structural diversity should be encouraged and/or maintained to enhance stability, vitality and resistance capacity of the forests to adverse environmental factors and strengthen natural regulation mechanisms (2.2a). Appropriate forest management practices such as reforestation and afforestation with tree species and provenances that are suited to the site conditions or the use of tending, harvesting and transport techniques that minimise tree and/or soil damages should be applied (2.2b).

Forest management planning should aim to maintain, conserve and enhance biodiversity on ecosystem, species and genetic level and, where appropriate, diversity at landscape level (4.1a). For reforestation and afforestation, origins of native species and local provenances that are well adapted to site conditions should be preferred, where appropriate. Only those introduced species, provenances or varieties should be used whose impacts on the ecosystem and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimized (4.2b).

The Guideline 4.2 underlines that Forest management practices should, where appropriate, promote a diversity of both horizontal and vertical structures such as uneven-aged stands and the diversity of species such as mixed stands. Where appropriate, the practices should also aim to maintain and restore landscape diversity. Infrastructure should be planned and constructed in a way that minimises damage to ecosystems, especially to rare, sensitive or representative ecosystems and genetic reserves, and that takes threatened or other key species - in particular their migration patterns - into consideration. Special key biotopes in the forest such as water sources, wetlands, rocky outcrops and ravines should be protected or, where appropriate, restored when damaged by forest practices.

Forest management planning should aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanche (5.1). Forest management planning should aim to respect the multiple functions of forests to society, have due regard to the role of forestry in rural development, and especially consider new opportunities for employment in connection with the socio-economic functions of forests (6.1).

The last MCPFE conference took place in Vienna in 2003. Also here, the resolutions were highly relevant to afforestation and reforestation practices. The Resolution V4 on Conserving and Enhancing Forest Biological Diversity in Europe promoted the restoration of forest biological diversity in forests established on former forestlands or other landscapes as well as the enhancement of incentives to promote natural regeneration and regeneration with native tree species and provenances.

In the Resolution V5 on Climate change and SFM in Europe, countries commited themselves to include guidance on afforestation and reforestation into national forest programmes taking into account economic, social and environmental values, in particular biodiversity. PEBLDS/MCPFE Framework for Co-operation identified the elaboration of recommendations for afforestation as priority issue.

MCPFE resolutions are also highly relevant to the issue of climate change stressing *inter alia* capability of tree species to tolerate climatic and other stresses (H1); supporting appropriate measures for the mitigation of climate change (H4); contributing to the implementation of the UNFCCC and the Kyoto Protocol by maintaining the carbon stock and enhancing carbon sequestration of forests in Europe; and also contribution to the on-going work under the UNFCCC on the elaboration of methods to estimate, measure, monitor and report changes in carbon stocks in forest ecosystems and forest products (V5).

Forest genetic resources in afforestation and reforestation for climate change mitigation in Europe

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Forest trees have the highest levels of genetic variation of all living organisms and therefore they are thought to have high level of adaptive potential to changes of the environment, including climate change. However, forest trees have long life cycles and the predicted climate change is expected to take place rapidly, i.e. within the existing tree generation. Forest tree species are forced to 1) cope with the changes, 2) adapt to new conditions, or 3) migrate to new sites and more favourable climatic conditions. Trees can cope with rapid changes of the environment through physiological adaptation (acclimatization) during which individual trees adjust photosynthetic production, for example. Evolutionary adaptation takes place when tree populations adjust their genetic structures through natural evolution and other evolutionary processes.

Results of field trials show a remarkable range of adaptive potentials in forest trees even to dramatic changes in temperature and moisture conditions. It is unlikely that the widely-occurring tree species will face extinction at species level due to climate change. However, there are genetically set limits to adaptation and some tree populations are seriously threatened by climate change at xeric limits, particularly in the Mediterranean region and continental Europe. Local extinctions of tree populations may also occur as a result of lack of reproduction, especially in the case of scattered and/or rare trees species.

Most climate-based models predict a dramatic shift in the range of forest tree species in Europe but they assume that the climate envelopes of the species will not change. However, this assumption is unlikely to be valid as the climate envelopes will probably change due to evolutionary processes. The climate envelope of a species refers to the range of climatic variation within which the species can persist, provided its non-climatic environmental requirements are met. In most parts of Europe, fragmented and intensively managed landscapes expose considerable obstacles to spontaneous migration of forest tree species. Human

interventions, such as well-documented transfer of forest reproductive material, based on scientific knowledge, may thus be necessary to enhance adaptation of tree species to climate change.

Use of suitable, high-quality forest reproductive material should be encouraged in afforestation and reforestation. While natural regeneration is considered the most reliable method to maintain genetic diversity and ensure that trees are well-adapted to local conditions, it is not always possible to apply for afforestation and reforestation efforts. The genetic material that will be used for artificial regeneration in a given site should to be adapted to the conditions of the site, including climatic conditions. The material should also have enough genetic diversity for further adaptation and against pests and diseases. It should be kept in mind that a local provenance is not always the most suitable in terms of growth or adaptation to specific site conditions.

There is a need to develop pan-European guidelines for the transfer and use of forest reproductive material considering the implications of climate change for sustainable forest management. The European Council Directive on the marketing of forest reproductive material (1999/105/EC) sets the requirements on how forest reproductive material moving in the trade in the European Union should be documented. It also gives general guidance for the use of the material but it does not include any climate change considerations. The Directive has been incorporated into national legislation in all 25 EU Member States and candidate Member States are in the process of adopting the Directive in their legislation as well.

It is widely agreed that preference should be given to native tree species in afforestation and reforestation, but the use of exotic species should not be banned in Europe. Not all exotic tree species are invasive and many of them have been used successfully in Europe for a long period of time in forestry and environmental protection. Genetic modification can improve resistance of trees against pests and diseases or enhance wood properties but it has limited usefulness to accelerate adaptation of forest trees to climate change. Genetically modified trees are not being used in forestry in Europe but research efforts are underway to assess their environmental impacts. The Directive on forest reproductive material (1999/105/EC) and the Directive on the deliberate release into the environment of genetically modified organisms (2001/18/EC) set rather strict conditions and requirements for the use of genetically modified trees. Instead of genetically modified trees, the use of natural genetic diversity in afforestation and reforestation should be encouraged as it provides flexibility for forest management. Increasing use of genetic diversity is a highly recommendable risk-reducing strategy considering the implications of climate change.

On 15-16 March 2006, IPGRI and IUFRO organized a workshop on climate change and forest genetic diversity as part of the MCPFE Work Programme to implement Vienna Resolution 5. Based on the outcomes of the workshop, the use of forest genetic diversity in particular should be reflected in the recommendations for afforestation and reforestation to be adopted by the MCPFE Process in the context of climate change mitigation. The workshop recommended that the importance of forest genetic diversity in mitigating the impacts of climate change and the management of this diversity should be better incorporated into National Forest Programmes and other relevant policies, programmes and strategies. Furthermore, the workshop concluded that tree breeding and transfer of suitable forest reproductive material on the basis of scientific knowledge can accelerate adaptation of forest trees to climate change. Detailed information on the outcomes of the workshop is available at www.euforgen.org.

Quantitative overview and analysis of afforestation in Europe

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The conversion of land to forest land is recognized as an eligible measure to achieve goals promoted by recent environmental policies as mitigation of climate change and biodiversity protection and enhancement. In this context the general increase of forest area occurring in Europe could play an important role. Within the MEACAP project, aiming at the analysis of current CAP and the identification of the most desirable changes to comply with Kyoto Protocol and the Biodiversity Convention, an analysis of available data sources on forest area change was developed in order to define actual trends and to understand possible future trends on the expansion of European forests. The data were integrated with figures obtained by a questionnaire submitted to national entities. Information was also gathered on the proportion of forest area change due to natural processes or afforestation (in this context defined as planting of trees). Several limitations on data sources could be detected: different reference periods and different definitions (e.g. forest or afforestation) are provided so it is not always easy to compare the figures; the data can be the result of interpolation or extrapolation between subsequent national forest inventories; some data sources give just partial information about a region or a single afforestation policy; separation between natural forest expansion or afforestation is

often not provided. A general increase of forest area, broken down by region, is reported for all Europe. The most significant development was observed after the Second World War until the 1970s when substantial economic and land-use changes occurred. However, the forest area is still increasing even if at a slower rate. The proportion of forest area change due to natural succession and afforestation varies from country to country. In general, afforestation substantially contributes to forest area change in the North of Europe and in some East-European countries. For the future several countries are planning to implement further afforestation, natural expansion will occur in marginal areas especially in the Mediterranean area and a high potential for forest expansion is forecasted for the 10 accession countries.

Afforestation and reforestation in Lithuania

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Forest land area amounts to 2,218,800 ha in Lithuania covering 32,5 % of the country's territory. Since 1 January 2001, the forestland area has increased by 100,600 ha, which comprised 4,7 % of the total forest cover. The forestland increased due to natural forest expansion on abandoned agricultural land as well as afforestation of state owned and private land.

State Forest Enterprises, managing state forests, from 2000 until 2006 planted more than 1000 ha each year, since 2007 it is foreseen to plant 3000 ha of new forests annually on state owned land. Until 2005 only up to 100 ha of private land were afforested but since afforestation scheme under RDP have been launched the amounts of afforested land greatly increased, 840 ha of forests were planted in 2005, in 2006 – 2141 ha. In total afforestation efforts in Lithuania resulted in 3,4 thousand ha of new forests in 2006.

National Forestry Policy as well as in 2002 adopted Afforestation Programme sets the objective to increase forest cover of Lithuania by 3 % during the next 20 years taking into regard the environmental, landscape formation, protection of the cultural heritage, social and other factors.

For reaching the target over 100 thousand ha of agricultural land or other land should be afforested by 2020. While carrying out forest resource assessment around 5 thousand ha of new forests are inventoried annually due to naturally regenerated forests on abandoned land. Additionally to that approx. 6-7 thousand of forests should be afforestated each year. According to the Afforestation Programme during period 2007-2020 around 4000 ha of new forests on private land and 3000 ha on state land should be planted annually.

Priority areas for afforestation and areas, which have to be excluded from afforestation activities due to their importance for biological diversity or due to status of protected habitats, are designated in the Regional Forest Distribution and Land-use Planning Schemes, which are about to be finalised. While carrying out the selection of land to be afforested, the priority is given to areas such as abandoned agricultural land, areas less favourable for agriculture, marginal agricultural land within or close to forests, as well as land of special significance for environment, eg. protection zones of water courses, landscape with recreational values, areas sensitive to erosion, areas close to urban territories.

Progress of afforestation during coming years very much depends on how soon will be completed Land reform, which creates difficulties in selecting state land suitable for afforestation, as well as on activeness and interest of private owners in using EU support for afforestation. So far direct payments for agricultural land in less favored areas received by farmers were higher than compensation for lost income therefore it was not always tempting farmers to choose afforestation instead of traditional agricultural activities. Another reason why afforestation was not carried out at expected levels was difference between EU and national goals. EU financial support during period 2004-2006 was aimed at reducing area of agricultural land, and therefore afforestation of abandoned land could not be financed meanwhile national rural development policy stipulates, that agricultural land of high productivity should be sustained for farming and less favored and abandoned land areas are to be afforested. Changes in RDP for coming period 2007-2013 will allow to increase afforestation significantly as afforestation of abandoned land will be supported as well as support will be available to public bodies.

Afforestation and reforestation activities in Norway
Aspects on C sequestration and biodiversity

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Afforestation and reforestation as defined in the context of the Kyoto protocol is for Norwegian conditions almost the same. Afforestation programs started in the 1920's in Norway, but was launched in a systematic campaign in the early 1950's. The top was reached in the early 1960's with approximately 14.000 ha annually, and up to now some 165.000 ha have been afforested.

The effort was put in planting areas in Western and Northern Norway with high productive conifer tree species, Picea sitchensis, Picea x lutzii and Picea abies, but also other conifers were tried. Former gras- and heath land was converted into conifer plantations and also low productive birch and pine forests was harvested and replanted with spruce.

Due to several reasons (aesthetics, economy, subsidies, biodiversity) the present level of afforestation is very low and has been estimated to some 1000 ha annually. In comparison the forest areas that are replanted and natural regenerated in the whole country after harvest is some 15.000 – 20.000 ha depending on year.

Large areas in the coastal region and in the timberline areas are subjected to natural afforestation. This is caused mainly by a large scale change in land use, particularly due to a reduction in summer farming and grassing in the mountain region, decreased grassing activity in the agricultural areas and also a reduced pressure on firewood harvesting and a change in the agricultural intensity. This natural afforestation represents a large scale potential for increased C sequestration. However, several other aspects must be considered, as a potential reduction in biodiversity, reduced aesthetical values of the culture landscape and reduced value for leisure activities. At present there are subsidies given for farmers to increase the animal grassing in these areas, in order to maintain the open landscape picture.

In the present situation efforts have been put on research on alien tree species and their potential for spreading and their aggressiveness and competition to other species. The use of aliens has been reduced the last decades. However, within the Christmas tree and greenery production system the share is quite high.

The biodiversity strategy in Norwegian forestry is based upon a system for registration of environmental values that is "mandatory" in the sense that subsidies for forest survey depends on inclusion of the registration system. Some 50% of productive forest areas are so far covered by environmental registrations. Forest management is influenced by the outcome of registrations and is evaluated on a municipality and landscape level. In the bottom of the management recommendations are the standards of the Norwegian system called "Living forest". These standards have regulations for tree species, regeneration, clear-cutting sizes etc. and also a ban to afforest the heathland areas in the coastal zone. "Living forest" together with ISO 14001 is one system of forest certification in Norway.

To measure the changes and monitor the environmental values, the National Forest Inventory has adapted this registration system and the whole country will be covered in 2007 within the existing grid system.

The forestry act in Norway is based upon the principle of "freedom under responsibility". Some absolute regulations are given within the act and its regulations. However, most intensives for management changes are given through use of subsidies, recommendation and education, especially through the forest extension service.

At present it is a high activity towards more use of bio energy from forests and subsidies on establishment of small and medium scale combustion plants are well developed. Within important sectors of society plans are made for increased C sequestration and mitigation and adaptation to climate change effects (e.g. transport, industry, agriculture).