

Feasibility Study on means of combating forest dieback in the European Union

DG ENV, Study Contract No: 070102110004/2006/449050/MAR/B1

Technical Report – December 2007



Submitted by:



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Executive Summary

All Member States face economic and ecological losses due to forest damages. Thus, combating forest dieback is a contribution to human safety and well-being and the sustainable development of Europe.

Available EU programmes contribute to the prevention, mitigation and control of forest dieback. The most important EU instruments in the context of combating forest dieback are the Rural Development Regulation (Council Regulation (EC) No 1257/1999, replaced by the Council Regulation (EC) No 1698/2005) and the Forest Focus Regulation (Council Regulation (EC) No 2152/2003, expired in 2006). These instruments have provided sufficient and effective support to Member States to obtain valuable information and create good networks of expertise in the context of Sustainable Forest Management (SFM) and the objective of combating forest dieback.

Monitoring of forest condition such as conducted by the joint monitoring programme of ICP Forests/ Forest Focus or the European Forest Fire Information System (EFFIS) are indispensable tools to control and detect negative impacts of forest dieback in short and long term. Collected information provide the basis for developing and implementing adequate prevention and mitigation measures such as measures supported by the Rural Development Regulation but also other EU financial instruments.

Reviewing collected information of forest condition in the EU, it can be concluded that abiotic damages, caused by extreme weather events such as storms, drought and heat waves but also human induced damages such as forest fires, need special attention due to their catastrophic nature affecting not only forests but also human welfare and economy. In addition to abiotic damages several biotic damaging agents, namely insects, diseases and wildlife grazing can have considerable impact on forest health and vitality, although damages are often of minor effect on national economy.

Forest stability improving measures and restoration measures respective of various damaging causes are mainly supported by the Rural Development Regulation and the European Agricultural Fund for Rural Development (EAFRD). Fire prevention is subject of several EU funding schemes, but is still a problem since forestry measures are not necessarily linked and jointly coordinated to fire prevention measures even in fire-prone zones. In cases of emergencies, the mutual assistance between Member States and other participating countries is reinforced e.g. by the Civil Protection Mechanism or the European Solidarity Fund.

For contributing to the objective of preventing, mitigating and control of forest deterioration in the EU, the *Feasibility Study on means of combating forest dieback in the European Union* presents a) a review of the different factors affecting forest dieback in the EU and their related causes b) an evaluation of the coherence and effectiveness of relevant EU legislation and instruments to combat forest dieback in the EU and c) an examination of different options for establishing a specialised entity on forest protection, which would assist in coordinating ongoing and future efforts to combat forest dieback in the EU. Study objectives and outcomes were debated cautiously by making consultations with different national and EU experts and representatives from various disciplines including forest policy, monitoring and funding.

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List of Acronyms

AGFC	Advisory Group on Forestry and Cork
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
CITES	Convention on Trade in Endangered Species
CLRTAP	Convention on Long Range Transboundary Air Pollution
COM	Communication from the Commission
CSD	Commission on Sustainable Development
DG	Directorate General
DG AGRI	DG Agriculture and Rural Development
DG ENV	DG Environment
DG JRC	DG Joint Research Centre
DG SANCO	DG Health and Consumer Protection
EAFRD	European Agricultural Fund for Rural Development
EAGGF	Agricultural Guidance and Guarantee Fund
EC	European Commission
EEC	European Economic Community
EFDAC	European Forest Data Centre
EFFIS	European Forest Fire Information System
EFICP	European Forest Information and Communication Platform
EFSOS	European Forest Sector Outlook Study
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
COST	European Cooperation in the field of Scientific and Technical Research
COST E43	COST Action on Harmonisation of National Forest Inventories in Europe: Techniques for Common Reporting
FAO	Food and Agriculture Organisation of the United Nations
GAK Programme	Joint Task for the Improvement of Agricultural Structures and Coastal Protection
ICP Forests	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests
IFF	Intergovernmental Forum on Forests

IPF	Intergovernmental Panel on Forests
ISFG	Inter-Services Group on Forestry
ITTO	International Tropical Timber Organisation
JRC	Joint Research Centre
LIFE	Financial Instrument for the Environment
MCPFE	Ministerial Conference for the Protection of Forests in Europe
NFI	National Forest Inventories
NFP	National Forest Programme
SFC	Standing Forestry Committee
SFM	Sustainable Forest Management
UN	United Nations
UNECE	United Nations Economic Council of Europe
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
WSSD	World Summit on Sustainable Development

1 Introduction

Cooperation and support for sustainable forestry is part of the EU Forestry Strategy (1998) and the EU Forest Action Plan (2006), aimed at ensuring the protection and sustainable management and development of the EU's forests. The European Community and its Member States have made international commitments relating to the maintenance and protection of forests.

The latest report on Europe's forests issued by the 5th Ministerial Conference on the Protection of Forests in Europe (MCPFE) in November 2007 shows that forests in the EU are managed sustainably. Forest area is increasing, timber volumes have reached record heights, and timber utilisation is well below increment. Forests fulfil a wide variety of economic, environmental, protective and socio-economic functions. In wide parts of Europe, forests are the motor of rural development. At the national level EU Member States established institutional frameworks that foster sustainable management.

In order to meet the aim of managing forests sustainably the health and vitality of forests is of high relevance. Forest health and vitality serves as an indicator for negative environmental impacts, which can in turn affect human welfare and the quality of life. The EU Member States face economic and ecological losses due to forest damages. In recent years severe storms, fires, droughts, insect infestations and diseases have raised the attention of practitioners, research and policy makers alike. Thus actions towards combating forest dieback are seen as a contribution to both human safety and well-being and the sustainable development of Europe.¹

¹ MCPFE Warsaw Declaration, 2007: *Conditions of life on our planet are threatened and call for immediate action. The challenge for all governments and civil society is to protect and sustainably use the Earth's natural resources. European forests have a vital role to play, as they can improve and benefit the quality of life and in particular contribute to climate change mitigation, energy supply and water protection.*

Box 1: Definition of Forest Dieback.

“Forest dieback” is used in this report as an umbrella term, which incorporates agents of all kinds that negatively affect the health, vitality and biodiversity of forests. Damages can be caused by biotic and abiotic agents or their combination thus resulting in mortality, or a significant loss of vitality, productivity or value of trees and other components of the forest ecosystem (after UNECE, 2000). They can be of pure natural causes, be human induced or result from a combination of both.

In order to effectively combat forest dieback in the EU, the magnitude and causes of forest dieback need to be assessed, efficient and coherent measures and strategies developed and implemented at both the community and national levels.

The *Feasibility Study on means of combating forest dieback in the European Union* – hereinafter referred to as “feasibility study” in this report – was initiated by the European Parliament demanding the European Commission to develop a concrete proposal for preventing, mitigating and control forest dieback in the EU. The main objectives were to:

review the different factors affecting forest dieback in the EU and their related causes,
analyse and evaluate the effectiveness of available EU legislations and instruments to combat forest dieback in the EU and
examine possibilities for establishing a specialised entity for forest protection in the EU.

The primary task of the feasibility study was to analyse and evaluate the effectiveness of relevant EU legislations and instruments towards combating forest dieback in the EU. Most relevant EU instruments were analysed on how they address specific damaging agents and threats to forests in terms of prevention (targeted measures in threatened areas), mitigation (measures after damage occurrence in affected areas) and control (measures to monitor and manage total forest area).

Fig. 1: Components of a forest protection strategy.



Linkages between prevention, mitigation and control describe the mutual coherence of these three components (see Fig. 1). Prevention, mitigation and control are thus seen as essential for ensuring effective measures for tackling forest protection and should constitute the cornerstones of establishing a common strategy on combating forest dieback.

The outputs of the feasibility study include:

- a background report (Annex I)
- an evaluation report (Annex II)
- a workshop report (Annex III)

The **background report** describes the forest condition in the EU as well as relevant international, EU or national level initiatives and programmes, which directly address or contribute to the objective of combating forest dieback.

An **enquiry** was developed and circulated among the members of the Standing Forestry Committee (SFC) and the Advisory Group on Forestry and Cork (AGFC) in order to obtain objective and comprehensive national level input on a) the main damaging agents in forests and b) the policies and instruments that are applied to respond or to prevent forest dieback. An **evaluation report** of the enquiry summarises the 31 responses from 22 EU countries.

A **workshop** was conducted bringing together both national and international experts from various disciplines including forest condition monitoring, research, forest policy and subsidy

programmes and to provide a platform for presenting and reviewing the study outputs. Emphasis was put on the investigation of coherent approaches for the most effective application of EU instruments to prevent, mitigate and control forest dieback. In addition the experts were consulted to evaluate – based on their experience – the need as well as potential benefits and obstacles for establishing a specialised entity on forest protection within the EU.

This report provides a **summary** of the study outcomes with particular emphasis on **future prospects** to combat forest dieback within the EU.

2 Forest Condition in the EU

2.1 Introduction

Forests are negatively affected by various factors, which take effect on a wide range of temporal and spatial scales and induce direct or indirect pressures on forest ecosystem health and vitality. The term “disturbance” as used in this report is adapted from FAO (2006) and is understood as *‘an environmental fluctuation and destructive event that affect forest health and vitality as well as the dynamics of forest pattern changing structure and/or resources or physical environment at any given spatial or temporal scale’*.

Disturbances to forests can be caused by abiotic or biotic agents such as fires, storm, insect infestations and diseases. Depending on the extent of disturbances, the resulting damages to forest ecosystems can be substantive with severe, economic losses. Besides disturbances, pressures such as climatic change, air pollution, damage by wildlife or livestock impact on forest health and vitality. Disturbances and pressures, be they biotic, abiotic or human induced, can be interlinked. It is noted that disturbances are not by definition harmful or undesirable and have their place in the development cycle of natural forests. Natural disturbance features such as gap dynamics are applied in forest management to stimulate natural regeneration and natural selection or enhance biological diversity.

In order to prevent, mitigate and control the negative impacts of biotic, abiotic or human induced damages to forests in Europe, it is essential to have available sound, reliable, comparable and up-to-date information on the multiple causes of forest dieback. Only by this effective and efficient prevention and/or mitigation measures can be developed and implemented. In the EU the joint monitoring programme of UNECE ICP Forests/EC Forest Focus has successfully been implemented to collect harmonised information on certain elements of forest condition.

Besides ICP Forests/Forest Focus monitoring, national assessments provide additional information on forests. These are for example National Forest Inventories (NFI), which

traditionally focus on forest resources, or national forest soil surveys, which provide information on plant nutrition and deposition levels of pollutants. As each country or region has its historical development of forest management regimes and corresponding information needs covered by national forest monitoring systems, the national activities related to monitoring forest ecosystem health and vitality can be diverse. Between NFIs, substantial differences in sampling designs, assessment procedures, data sources and formats, systems of nomenclature (e.g. measurement rules and definitions), models (e.g. timber volume and carbon stocks), analysis techniques, spatial and temporal resolution, and reference points in time can be found and render the provision of harmonised information on EU level difficult (EC, 1997; Köhl et al, 1997; Päivinen and Köhl 2005). Inconsistency, non-comparability and/or non-availability of national data, make any interpretation of forest condition at the European level difficult. This again can hamper the development, the implementation but also the evaluation of the effectiveness of common measures for combating forest dieback.

The problem of between country comparability of forest related information and the need for harmonised information on the European level has initiated a series of efforts, including the study on the European Forest Information and Communication System (EFICS) (EU, 1995), the JRC – Nomenclature Study (Köhl and Päivinen et al., 1996), or the current COST Action E43 “Harmonisation of National Inventories in Europe: Techniques for Common Reporting”.² This COST Action addresses such inconsistencies and non-comparability issues of NFIs in European countries.

A logical next step is to harmonise national assessments and make their information comparable at the EU level. This is indispensable for combining nationally assessed information on the productivity, economy, and ecology of forests and their multiple functions with the already harmonised information of ICP Forests/ Forest Focus monitoring of forest condition. Such efforts will accommodate the demand for harmonised data by international programmes including the FAO Forest Resources Assessment, IPCC Greenhouse Gas Monitoring or the MCPFE.

The MCPFE recognised the importance of forest ecosystem health and vitality by dedicating one of its six criteria for Sustainable Forest Management (SFM) to this issue (MCPFE,

² <http://www.metla.fi/eu/cost/e43>

2002a). Under the MCPFE Criterion 2 ‘Maintenance of Forest Ecosystem Health and Vitality’, information on *deposition of air pollutants* (Indicator 2.1), *soil condition* (Indicator 2.2), *defoliation* (Indicator 2.3) and *forest damages* (Indicator 2.4) is requested (MCPFE, 2007). Indicators 2.1, 2.2 and 2.3 are well covered by ICP Forests/Forest Focus monitoring, making the Forest Focus database the main international data source for information on forest ecosystem health and vitality in Europe. Information on forest damages (Indicator 2.4) as requested by MCPFE reporting is to be given separately for biotic (insects and diseases; wildlife and grazing), abiotic (storms/wind/snow etc.; fire) and human induced factors (forest operations; other). For MCPFE’s report on ‘State of Europe’s Forests 2007’ information on forest fires were provided by the European Commission's European Forest Fire Information System (EFFIS), and a comprehensive description on status and trends of forest fires in the EU presented. Data on other types of forest damages were provided by countries and resulted in substantial inconsistencies in terms of data provision. This made the need for consistent data assessments and harmonised systems of nomenclature obvious in order to provide a reliable and comprehensive description of European forests health and vitality.

FAO’s ‘Forest Resource Assessment for 2005’ and the MCPFE report ‘State of Europe’s Forests 2007’ indicated that, in terms of area affected, fires, storms, and insects and diseases represent the most important causes of forest dieback in Europe. In addition the MCPFE report reveals considerable damage by wildlife and grazing (MCPFE, 2007).

In the scope of the feasibility study a survey was conducted in the EU Member States on the importance of damaging agents in EU27 forests. The results of the survey are presented in Table 1 and show that the importance of individual threats to forest ecosystem health and vitality varies within European regions.

Table 1 shows that insects, storm/windfall and browsing³ have been identified as the most important damaging agents for the entire EU. Damages caused by illegal logging, snow/avalanches, domestic animals and inappropriate management were ranked lowest. The ranking of the importance of individual damaging agents differs substantially between the individual European regions. Insects, storm/windfall, and fire were regarded as the most

³ According to the IUFRO Silva Term Database³ *browsing* is the feeding on buds, shoots and leaves of shrubs and trees by livestock or wildlife.

serious threats in Central Europe, Western Europe and Southern Europe respectively. This result indicates that specific instruments to combat forest dieback are of major relevance. Regional differences exist in relation to damage types and intensity, which thus reflect the importance for particular instruments to combat forest dieback.

Table 1: Ranking of importance of main threats to forests in EU Member States (Outcome of the Forest Dieback enquiry sent to the Members of Standing Forestry Committee (SFC) in June 2007; replies from 22 countries).

Damaging agent	EUROPE					
	Northern	Central	Western	Eastern	Southern	Total
Storm/ windfall	2.8	3.0	3.6	2.7	1.6	2.8
Snow/ avalanches	1.6	1.8	1.4	1.7	1.6	1.6
Drought	1.4	2.5	2.9	3.3	3.0	2.6
Insects	3.4	3.8	3.1	3.0	3.0	3.3
Diseases	3.2	2.5	2.4	2.7	2.2	2.6
Browsing	3.4	2.5	3.0	2.7	1.8	2.7
Domestic animals	1.0	2.3	1.3	1.7	2.4	1.7
Invasive species	1.2	1.8	2.6	2.0	1.4	1.8
Inappropriate management	1.2	2.0	2.0	1.3	3.0	1.7
Illegal logging	1.4	1.8	1.1	2.7	1.2	1.5
Pollution	1.2	2.0	2.4	2.3	1.8	2.0
Fire	1.8	3.0	2.0	2.3	3.4	2.5

Legend: 1= negligible; 2= occasionally a problem at local scale; 3= regularly a problem at local scale; 4= regularly a problem at local scale, but with a tendency of large scale distribution; 5 = serious problem at large scale

2.2 Forest dieback caused by storms

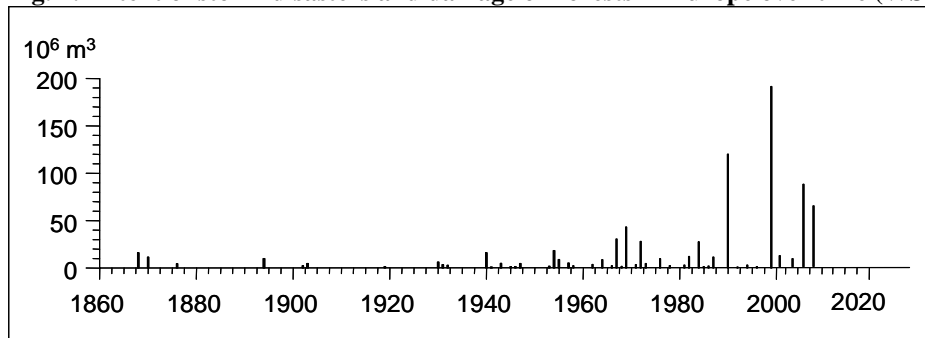
In natural forest ecosystems disturbances caused by storms are part of the development cycle. They can occur as catastrophic events but also allow for small scale gap dynamics thus modifying stand structure and micro-climate. Small scale disturbances that affect individual trees or groups of trees within a stand can result in an increased amount of dead wood and a diversification of stand structure and thus positively affect the diversity of fauna and flora in disturbed areas.

In natural forests storm damages can be regarded as a natural phenomenon that drives regeneration and adaptation processes. Small scale disturbances caused by storms can have positive effects on biological diversity, while damages to the forest owners stay within acceptable limits. In cases where storm events are of larger magnitude, as has been experienced in the recent past, they can pose considerable threats to managed forests. In extensive storm events the structure of forest stands can be seriously affected thus causing major disruptions to management goals and have major economic implications for forest

owners, wood processing industries and society. Storm damages can affect landscapes, the quality of wildlife habitats, disrupt timber markets and destroy the base of existence especially for private forest owners. In years succeeding storm events the likelihood of insect infestations increases. The impact of storm damages can be further amplified by poor species selection or monoculture plantations.

Most alarming is the fact that over the past decades the severity and frequency of forest damages caused by storms has increased. Especially in Central Europe, the areas affected by heavy storms extended beyond local scale. Considerable storm damages such as caused by Lothar 1999, Gudrun 2005 or Kyrill 2007 affected several countries displaying devastating effects to extensive areas of forest. The storm Lothar caused the highest damage ever reported in Europe, amounting to 175 Mio m³ of merchantable timber, which is almost equivalent to half of the annual wood production in Europe. In 2005 in Sweden, 75 million m³, equivalent to one year's cutting, were damaged by storms. The economic consequences of storm damages can be severe. They may force countries to timber market interventions and official limitations of regular timber harvests. After the recent storm Kyrill in 2007, the German Forestry Council estimated that 20 million m³ were windblown, which would cost the country's forestry industry about EUR 1 billion in lost revenue and damages.

Fig. 2: Extent of storm disasters and damage on forests in Europe over time (WSL/BUWAL, 2001).



The damage caused by storms has increased over the last 150 years, both in frequency and in magnitude (Fig. 2). According to Schelhaas et al. (2003) reports of storm damages are incomplete at the European scale. It is likely that the increase in the frequency of storm damage is due, in part, to the increasing number of reported events rather than a real increase in the number of events. The accuracy of reported damages caused by storms today is surely higher than in the past although it can be expected that catastrophic storm events, even if underreported, will have been documented to some extent.

Storms are regarded to become an increasing risk factor for forests within the EU. While in most cases they will extend on the local scale, future scenarios of climate change predict an alarming increase of disastrous storm events that affect large regions that extend across national borders. There are a number of EC funds/financial instruments available in support of storm damages for the prevention and mitigation of storm damages. Technical support is provided through the mobilisation of vital Civil Protection Mechanism assisting for the immediate needs of disaster-stricken countries (e.g. Sweden and Albania called upon the Mechanism for assistance in dealing with the consequences of a major storm and snowstorms respectively). Forest restoration measures after storm damages such as reforestation are supported by the Rural Development Regulation and the Solidarity Fund for important damages.

Preventive measures against storm damages require the conversion of non-site adapted and unstable forest stands in order to strengthen their storm resistance. Such undertakings are of long term nature and will show no immediate reduction of damages caused by storms. The EC may consider investigating if current available measures provide sufficient financial incentives for such measures in storm-prone areas. Severe storm events are often followed by a disruption of wood markets not only at the local scale. The availability of vast amounts of timber – mainly of lower valued timber assortments – affects both forest owners and timber industries. In order to mitigate such disruptions the EC may explore options for regulatory market interventions or support to compensation payment schemes. These instruments will have to fit into national measures and be consistent with the principle of subsidiarity.

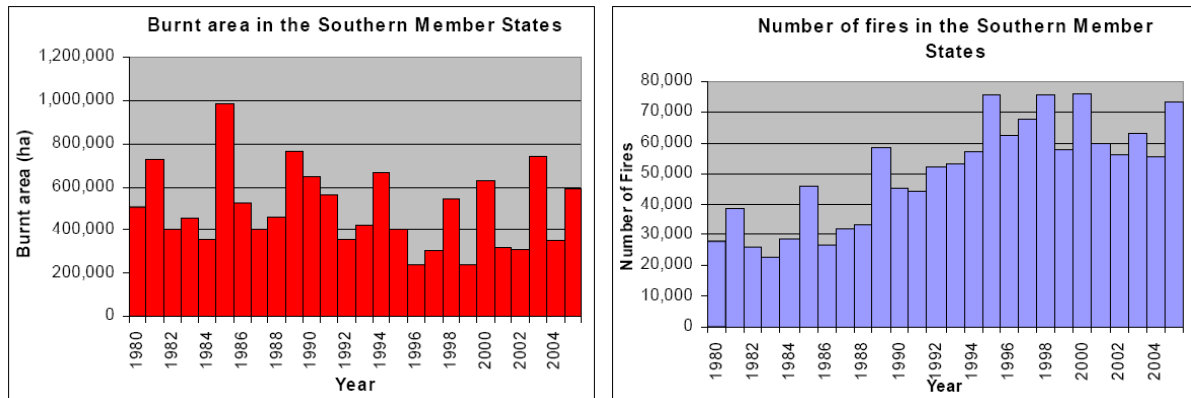
The major emphasis in terms of EC instruments will be on the mitigation of disastrous, large scale storm events. Prevention measures have to aim at increasing stand stability and the propagation of site adapted tree species. These measures are thus restricted to long term risk reduction.

2.3 Forest dieback caused by fire

Forest fires have been identified as the most important threat to forests in Southern Europe (Tab. 1). According to the European Forest Fire Information System (EFFIS), the number of forest fire incidents increased in recent years (see Fig. 3b), while the annual amount of burnt area alternates (see Fig. 3a). The improvement of tools and systems for monitoring and

recording forest fires have surely set the base for a more comprehensive capture of occurring fire incidents. This can account for a higher detection rate of the number and extent of fires than in the past.

Fig. 3: Burnt area (a) and number of fires (b) in the five Southern Member States (Portugal, Spain, France, Italy, Greece) for the last 26 years (EC-JRC, 2006).



In recent years the Mediterranean region has experienced a number of large scale disastrous forest fires (Portugal 2003: about 400 000 hectares of forests were burnt; Greece in 2007⁴: around 270 000 hectares of forests and other wooded land were destroyed (EC-JRC, 2007)). Such large scale fire events do not only cause ecological damages, but can have tremendous impacts on livelihoods, infrastructure and tourism, often resulting in both the loss of human lives and high economic damages. Regular fire protection means were unable to prevent these disastrous situations. Even regions with well prepared fire brigades, equipped with sophisticated ground and aerial equipments and a substantial number of fire fighters had to face extraordinarily difficult situations in fire prevention and fire fighting.

Causes of burnt areas of forests and other wooded land can be manifold: they may be related to changes in land use, climate, the expanding use of forests for recreation and reductions in forest fire service capacities. The increase of forest area and other wooded land in the Mediterranean countries, being partly a result of reforestation policies and partly due to spontaneous re-vegetation of abandoned land can add to the fire risk. A significant exodus from the rural areas in the last decades resulted in the abandonment of agricultural, stockbreeding and forestry activities in these areas. The abandonment of land and lack of

⁴ Greece is the country most severely affected by fires in 2007. The total burnt area mapped in Greece until the 31 August 2007 was 269 114 ha. From this area 30 132 ha were on NATURA 2000 sites, corresponding to 11.2% of the total area burnt (JRC EFFIS 2007).

management can lead to the build up of high fuel loads and/or dense shrubs lands thus becoming susceptible to fire. In such situation the burning capacity of the vegetation is considerably higher, which in turn greatly increases the risks of fires as well as their intensity.

Natural factors, such as droughts, winds as well as difficulties of access play a decisive part in the scale and spread of the fires, but they are mainly not initiating a fire. According to the European Forest Fire Information System (EFFIS), in average less than 10% of all fires are provoked by natural causes (e.g. lightening, heat). The vast majority of fires are caused as a result of human activity. Of these, 30% are of a criminal nature, or in pursuit of various interests such as urban development, game management, timber production and livestock farming. 50% are due to negligence, age-old rural practices such as burning the stubble and regenerating annual pastureland for livestock, day-trippers, recreational activities etc, while the causes of the remainder are unclear. The percentage of unknown or unclear causes has fallen in recent decades, primarily due to more thorough investigations (Council, 2004). As an example, in 2005 approximately 62 000 fires were recorded in Spain and Portugal, burning an area of almost 520 000 ha (EC-JRC, 2006; MIMAM, 2006; DGRF, 2006). Almost half of these fires were the result of intended (criminal) action, one third was caused by accidents and only 3% were of natural origin.

Following the above, forest fires are and will remain the most serious threat in the Mediterranean region but also continue to play a role for Central and Eastern countries of the EU. Many of the financial instruments of the Community address fire explicitly or as part of natural disasters. In terms of prevention the EU addresses a variation of targeted measures in support of preventing, mitigating or managing fire risk. Financial assistance is for example provided for measures such as the construction of forest roads, the establishment of water points, fire breaks, the reforestation of burnt areas and controlled burning.

The Civil Protection Mechanism and the European Union Solidarity Fund are available for mitigation measures. The Civil Protection Mechanism was called upon for assistance to the forest fires in France and Portugal in 2003 and 2004 in terms of fire fighting personnel and equipment.

The European Commission's Joint Research Centre (JRC) set up in 1999 a research group to work specifically on the development and implementation of advanced methods for the evaluation of forest fire risk and mapping of burnt areas at the European scale. In 2003-2006

the Forest Focus regulation provided support for monitoring forest fires and partly also for prevention measures. In particular, the European Forest Fire Information System (EFFIS) has shown to be a powerful monitoring tool addressing both pre-fire and post-fire conditions (see Box 2).

Box 2: The two basic functions of the European Forest Fire Information System (EFFIS).

On the *pre-fire phase*, EFFIS is focused both on the development of systems to provide forest fire risk forecast based on existing fire risk indices, and on the development of new integrated forest fire risk indicators (EFFIS – Risk Forecast). These indices permit the harmonised assessment of forest fire risk at the European scale. They may be used as tools for the assessment of risk situations in cases in which international cooperation in the field of civil protection is needed. On the *post-fire phase*, EFFIS is focused on the estimation of annual damage caused by forest fires in southern EU. All burned areas larger than 50 ha, which account for around 75 % of the total area burnt in southern Europe are mapped every year using satellite imagery (EFFIS – Damage Assessment). (see: <http://effis.jrc.it>)

EFFIS has become an efficient tool intensively used by the Member States. Planned activities such as the elaboration of a European fuel type and biomass map or the development methods for the estimation of forest fire emissions will further strengthen EFFIS monitoring capabilities.

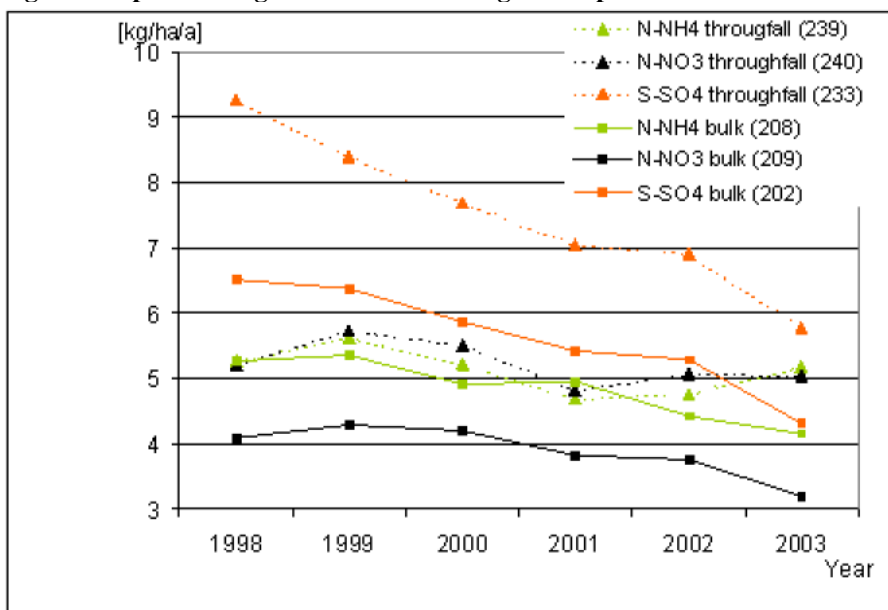
Ongoing research activities are investigating potentials for new fire management practices. They include techniques such as prescribed burning and suppression fire. The EC should follow up closely on such projects as their results may deliver valuable outputs to further enhance measures and instruments for the prevention, mitigation and control of forest fires.

2.4 Forest dieback caused by air pollution

In the 1980s forest decline caused by the deposition of transboundary air pollutants became a major threat to forest health and vitality in Europe. During the last two decades air quality has improved, which is an important success of Europe's clean air policy. According to the MCPFE report (2007) trees are still under stress, although air quality and deposition rates of air pollutants improved. The MCPFE report (MCPFE 2007) concludes that further reductions in emissions are needed to bring depositions below critical loads and to improve ecosystem health and vitality.

Despite the fact that air pollution and depositions, especially of sulphur, have been reduced in recent years (see Fig. 4), past depositions accumulated in soils may lead to higher levels of nitrogen, sulphate and soil acidity, which make forests more vulnerable to environmental stress and changing climatic conditions. Tree crown condition has stabilised but defoliation levels are still high in most regions, indicating that trees have a reduced potential to withstand adverse environmental impacts (ICP Forests, 2006).

Fig. 4: Temporal changes in bulk and throughfall deposition from 1998–2003 (ICP Forests, 2006).



Representatives of EU Member States indicated in the survey conducted in the scope of the feasibility study that forest damages caused by air pollution are considered of lower importance as compared to other threats. Due to the complex relationships, the direct impact of atmospheric pollution and its effects on forests are less visible than the effects of other damaging factors. Past depositions of pollutants accumulated in soils make forests more vulnerable to environmental stress and changing climatic conditions. Despite the improvements achieved by clean air policies, critical loads for acidity and nutrient nitrogen are still exceeded in large areas in Europe. 45% of the forests still suffer from nitrogen inputs that are above the critical loads (ICP Forests, 2006). High nitrogen deposition can affect the composition and structure of non-tree vegetation. These changes in turn induce effects on the fauna composition. It is also known that nitrogen deposition and increasing temperature can have a positive effect on tree growth. However, the relations between environmental factors,

deposition rates, vulnerability and effects on tree growth are complex and require further research (ICP Forests, 2004).

ICP Forests/Forest Focus established a harmonised monitoring scheme, jointly publishing annual reports of forest condition in Europe, and providing input to a set of international programmes and initiatives. Among those are the MCPFE reporting on Criteria and Indicators (C&I) for Sustainable Forest Management (SFM), for which ICP Forests/Forest Focus is a major international data provider, the UN Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC) for the estimation of greenhouse gas emissions, or the UN Convention on Long Range Transboundary Air Pollution (CLRTAP) (see also Chapter 3.2).

In addition to clean air policies the EC has limited options of support to prevent and mitigate air pollution effects on forests. One measure is the financial support for liming in forests to mitigate the effect of past depositions on soils and their effects on tree vitality. The current condition of European forests makes them vulnerable to changing environmental conditions. Current monitoring of forest condition provides information on status and trends of forest ecosystem health and vitality, serves as an early warning system to detect unpropitious developments, and contributes to the mutual understanding of complex cause-effect relationships; information that is indispensable for the evaluation of European's forests capacity to fulfil their multiple economic, ecologic and social functions and the development of measures to sustain their indispensable beneficial contribution to the quality of life.

2.5 Forest dieback caused by insects and diseases

Massive attacks of insects and phyto-pathogens (bacteria, viruses, fungi) may constitute major risk factors for the health and vitality of forest ecosystems. Large scale outbreaks can cause considerable economic loss to forest owners. These biotic damages may result in the deterioration of tree condition, not only in the year of occurrence, but also in later years. Insects and fungi often appear on trees weakened after drought, frost, hail, storm or forest fires and thus are part of the natural dynamics of forests, which in some cases may contribute to a serious destabilisation of the stands. Insect populations are likely to react to long-term environmental change processes such as those caused by climate change. Extreme weather conditions such as heavy storms and drought can elevate the risk of a mass propagation of e.g.

bark beetles. This was particularly observed in large parts of Europe as a result of the drought during the summer of 2003 (ICP Forests, 2004).

According to the MCPFE 2007, about 2.7% of the forest area in the MCPFE region (excluding the Russian Federation) was adversely affected by insects and diseases. In contrast to transboundary air pollution effects, insects and diseases generally have a punctual appearance in the form of outbreaks. However, there are also insects/diseases, which are of less destructive nature but chronic and ubiquitous, leading to a general loss of vitality and growth. Others can affect one or more tree species seriously, causing their rapid decline or preventing the tree species from recovery. An example is the Hoeny mushroom (*Armillaria ostoyae*) or the Dutch elm disease.

The EU contributes to the prevention and mitigation of damages caused by insects and diseases in supporting reforestation and restoration of forestry potential and the introduction of preventive actions by the means of the Rural Development Regulation (see Chapter 3.5). Improvements are seen in the collection of more representative data about the abundance and occurrence of negative impacts due to different insects and diseases in different regions. Insect damages have been given the highest ranking by the respondents to the feasibility study's survey. Assessments on the relative importance of the impacts of insects and diseases on forest health and vitality and therefore on forest economy should be developed further. Contribution by the EU to support monitoring activities is regarded as crucial.

2.6 Specific problems caused by invasive species

The globalisation process fosters the international trade and shipping of goods. It also contributes to introducing and spreading animal and plant species beyond their natural vegetation zone, area or region (MCPFE, 2003). An invasive introduced tree refers to an alien tree species whose introduction and spread threatens ecosystems, habitats or species with socio-cultural, economic and/or environmental harm, and or harm to human health (MCPFE 2002b).⁵

⁵ MCPFE 2002, definition of invasive alien species from UNEP/CBD/COP/6/18/Add.1/Rev.1; 2002. The word "tree" was added.

According to MCPFE (2007) in Europe excluding the Russian Federation, the area dominated by introduced tree species is around 4%. In many countries, introduced tree species are closely related to the establishment of plantations. Very few introduced tree species are invasive, and while significant in some countries, the total area of these introduced tree species is not increasing, but has remained stable during the period of 1990-2005 (MCPFE, 2007).

A number of introduced tree species, such as *Picea sitchensis*, *Pinus concorta*, *Pseudotsuga menziesii* and *Eucalyptus spp.*, make a significant contribution to wood supply in some countries. Their ecological characteristics, in particular competitiveness, may change the dynamics of forest ecosystems and influence sites, species composition, structure and functional diversity. Looking beyond tree species, the EEA (2007) reports that a large and increasing number of alien species have established in Europe. A list of 'worst invasive alien species' has been produced, which are known to endanger native biological diversity in Europe including those relevant to forests. Experience has shown that a relatively small amount of those species are a threat to forest ecosystems and its biodiversity and human interests.

Non-native plants that have been introduced for aesthetic or functional landscaping or as cover for game animals can become aggressive invaders that inhibit or prevent the natural regeneration of native species. Examples are *Rhododendron ponticum* (Belgium, Ireland, UK), *Prunus serotina* (Belgium, Germany, Netherlands) and *Robinia pseudoacacia* (France, Greece, Hungary). Major threats to European forests, however, arise from introduced pathogens, invertebrates and mammals. The Dutch elm disease and the white pine blister rust are examples of fungus diseases, which were accidentally introduced and have caused serious damage in several EU countries. The pine wood nematode for example caused serious damages in Portugal similar to the Asian long-horned beetle in Austria, Germany and France. Introduced mammals, especially herbivores, have had a major impact on the regeneration of Europe's forests. In 2000, a study was carried out in Great Britain, which estimated the total cost of grey squirrel damage to beech, sycamore and oak to £10 million for the British timber industry. As a result costly measures may arise to prevent the spread of invasive species in the EU.

A set of measures exists to prevent the spread of dangerous diseases such as stipulated by the Community plant health regime exists. The Council Directive 2000/29/EC lays out protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. The Commission Directive 2004/102/EC and the amended Council Directive 2005/15/EC introduced new requirements for the import of wood packaging material and for dunnage into the EU.

Alien invasive species currently being of lower importance for forest health and vitality may adapt to new conditions and cause considerable damages at local or regional scales in the future. The EC has in place directives, which incorporate protective measures linked to the import or introduction of harmful organisms and products. As this is an essential precaution in terms of prevention, additional activities are needed to mitigate damages caused by already introduced species. In particular research has to contribute to the knowledge on alien invasive species and to the development of operational measures to control and mitigate their adverse impacts.

2.7 Forest dieback caused by wildlife and livestock

According to MCPFE (2007) damages caused by wildlife in forests did exceed 5% in the Nordic/ Baltic region only. Overall, the quality and provision of the data was limited, making an estimate of wildlife damages for the MCPFE region difficult. As an indication roughly 3% of the forests (excluding the Russian Federation) are facing damages by wildlife. No information on livestock grazing is available.

There are differences in definitions of *browsing* and *grazing*. According to the IUFRO Silva Term Database⁶ *browsing* is the feeding on buds, shoots and leaves of shrubs and trees by livestock or wildlife. *Grazing* is the consumption of native forage from rangelands or pastures by livestock or wildlife.⁷ The differences in definitions and the limited possibility to separate damage by wildlife from damage by livestock add substantial uncertainty to reporting. Generally, the majority of damages are caused by wildlife, which can be regarded as a problem throughout Europe (predominately in Central and Northern Europe). Grazing by

⁶ <http://193.170.148.70/silvavoc/search.asp>

⁷ www.ifad.org/lrkm/glossary/g.htm

livestock may be a considerable problem at the regional level (predominantly in Southern and South-Eastern Europe).

The abundance of game populations is at high levels in numerous countries. This is due to many factors, including hunting practices and the absence of predators. As a consequence, extensive and costly measures have to be taken for the protection of regeneration and afforestation areas (MCPFE 2003). In the absence of protective measures tree species distribution of forests may develop towards species, which are less susceptible to browsing, i.e. coniferous species. The fact that grazing and browsing cause considerable damages to many forests in Europe is clearly reflected by the survey conducted in the scope of the feasibility study, where damage by wildlife was assigned the third highest rank among all damaging agents.

The Rural Development Regulation may provide support for protection measures linked to reforestation and afforestation activities. Mitigation of damages through the reduction of game populations and fencing are rather measures of local or regional concern where the EC has limited possibilities of engagement. In terms of control the EC could promote the effective monitoring of damages by wildlife and livestock and the improvement of data quality.

2.8 Direct human-induced damages

According to MCPFE (2007) direct human-induced damage factors include harvesting and forest operations damage, which may cause severe economic losses and decrease of the ecosystems' health and vitality (decrease in timber quality, rot, decay, destruction of natural regeneration, soil degradation). Human-induced damages by unidentifiable causes comprise damages from air pollution, traffic and cattle rearing, which may overlap with other damage types and thus be difficult to trace to a particular source.

Human-induced damages might play a significant role as most of the forests in the EU is managed and influenced by human activities (see also MCPFE 2007). Site preparations or forest roads can lead to increased soil erosion and/or imbalanced hydrology thus increasing forests vulnerability. Especially afforestation/regeneration measures can have negative impacts in cases where non-site adapted tree species or tree provenances are selected. The

selection of non-site adapted tree species or tree provenances can lead to unstable forests, which are prone to storms, fire and/or insects and diseases.

However, according to international reported data, human-induced damages are regarded as being of minor importance compared to other damages or damaging agents. MCPFE (2007) reported human induced damages on less than 1% of the forest area. Reliable data are either available only in parts or non-existent in most of the EU countries, thus making a meaningful evaluation of the importance of human induced damages questionable (UNECE, 2005).

2.9 Forest dieback caused by climate change

A study published by the EEA (2005) concluded that changing environmental conditions induced by climate change will increase the vulnerability of European forests and result in adaptation processes. Although forests have responded to climate change throughout their evolutionary history, a primary concern for forest ecosystems is the rapid rate of change. Climate change will have pronounced impacts on land use regimes, forest health and vitality, and the sustainable supply of goods and services for the population.

The increasing frequency and extent of climate related events (drought, heavy precipitation, changes in wind patterns) and associated disturbances (fires, storms, insect and diseases) have been affecting European forests at a more extensive scale in the recent past and will do so in the future. During the summer of 2003 and 2004 much of Europe was affected by extreme heat waves and drought. Drought as a stress factor has manifested itself in accelerated defoliation, decreased productivity and increased vulnerability against other damaging agents. In the Mediterranean region, prolonged droughts raise the danger of forest fires (see fire years of 2003, 2004 and 2007) and contribute to an acceleration of desertification.

The IPCC Fourth Assessment Report (AR4) was completed in 2007. The Synthesis Report provides an integrated view of climate change. A few of the main findings are listed to illustrate the impacts and effects of climate change:

- Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea
 - World temperatures could rise by between 1.1 and 6.4 °C during the 21st century
 - The probability that this is caused by natural climatic processes alone is less than 5%.
- Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.
- Global GHG emissions due to human activities have increased since pre-industrial times, with an increase of 70% between 1970 and 2004
 - Both past and future anthropogenic carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium.
- There is now higher confidence than in the 3rd Assessment Report in projected patterns of warming and other regional-scale features, including changes in wind patterns, precipitation and sea ice.
 - There is a confidence level >90% that there will be more frequent warm spells, heat waves and heavy rainfall.
 - There is a confidence level >66% that there will be an increase in droughts, tropical cyclones and extreme high tides.
- There is high agreement and much evidence that with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to increase over the next few decades.

Source: Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report:
<http://arch.rivm.nl/env/int/ipcc/pagesmedia/AR4SYRSPMapprv4.pdf>

Such climate change driven effects can only partially be mitigated by forest management. The threats are transboundary in nature, expose forests to increased risks, and can involve a cascade of negative effects, including land-use, timber markets as well as protective, ecological and socio-economic functions.

Future risks for forest ecosystem health and vitality caused by climate change are considered only to a minor extent in forest management programmes. Therefore, future instruments will need to embrace more strongly mitigation and control measures besides already existing prevention activities, like supporting site-adopted tree species and tree provenances for increasing stable forest stands. Control measures could include the further enhancement of EFFIS for monitoring, assessing and predicting capabilities for forest fires.

3 Instruments and programmes towards combating forest dieback in the EU

3.1 Introduction

The responsibility for forestry policy lies with the EU Member States. Within the EU many horizontal and issue-driven policy initiatives that directly or indirectly have impact on the forest sector are developed, which influence national forest policy and action and vice versa. Although the EU does not have competences in forestry policy – the Treaty establishing the European Community makes no provision for a specific common forestry policy – there have been several actions and instruments in place for which EU Member States are obliged to bring national forest policies in line with EU objectives, such as the Forest Focus Regulation requiring national monitoring reports, the Rural Development Regulation requiring national rural development plans or the Birds and Habitat Directives requiring reporting on designated NATURA 2000 sites.

Pursuant to the principle of subsidiarity and the concept of shared responsibility, the European Community contributes to the implementation of Sustainable Forest Management (SFM) and to the multifunctional role of forests (e.g. wood production, protection of biodiversity, protective functions of forest soils and water, socio-economic services) by the means of:

- non-binding **policy frameworks**, like EU Forest Strategy/ Forest Action Plan;
- binding **directives, regulations and decisions**, like the Birds Directive⁸ and Habitats Directive⁹, the Forest Focus Regulation¹⁰ or Rural Development Regulation¹¹ for which financial support is provided by various **funds and financial instruments**, like

⁸ Council Directive 79/409/EEC

⁹ Council Directive 92/43/EEC

¹⁰ Council Regulation (EC) No 2152/2003

¹¹ Council Regulation (EC) No 1257/1999, Council Regulation (EC) No 1698/2005

the European Agricultural Rural Development Fund EARDF¹², the Forest Focus scheme or the Financial Instrument for the Environment LIFE+¹³.

Analysing the role and effectiveness of a coordinated EU policy towards the specific objective of combating forest dieback in the EU requires reviewing a) the linkages of international processes like UNFF, UNFCCC, CBD or MCPFE to EU forest related forest policy and vice versa b) how EU forest related policy is structured and organised, describing what the major actors (policymakers, industry and NGOs) of EU forest related policy are and c) which EU instruments like regulations, directives and financial instruments are the most relevant towards the objective of combating forest dieback.

As forest policy is in the competence of the EU Member States, it also requires reviewing available major strategies and instruments at sub-national, national and international level for supporting and implementing different measures for combating forest dieback at sub-national, national or international level.

Within the EU Member States various national and regional forest protection strategies are developed and implemented. The complexity of various strategies is expressed by their explicit national and regional legal and policy actions, objectives, instruments, financial and administrative inputs, beneficiaries, outputs, implementation and effectiveness. Due to this complexity the study objective was to provide an overview on the different national forest protection strategies. To get some more detailed information, for three selected countries, namely Germany, Spain and Finland, case studies have been conducted and analysed. In addition an enquiry was developed and distributed to gather additional information on the different strategies and concepts of the EU27 (see Chapter 1 – Introduction).

Most of the detailed activities at different levels (national, EU and international) are described in the study Background report. Chapter 3 intends to provide a brief summary of ongoing actions and instruments in place, including conclusions and statements a) collected by the enquiry to EU Member States and b) made by the participants of the forest dieback workshop

¹² Council Regulation (EC) No 1257/1999 and 1698/2005

¹³ Council Regulation (EC) No 1614/2007

in Hamburg, September 2007. By this an evaluation of the feasibility but also of the complexity concerning combating forest dieback in the EU is made.

3.2 International processes and their linkage to EU policy

This chapter describes how international forest related processes affect EU forest related policy and vice versa. In the frame of international processes, individual EU Member States are responsible to implement adopted binding or non-binding commitments. The linkages and the effects of international processes are of relevance for the EU policy. The EU has the responsibility to facilitate common action towards adopted commitments.

The worldwide debate on conservation and sustainable management of all types of forests takes place in various processes and initiatives, which are jointly called “the international forest regime”. This includes global processes, like the UN Forum on Forests (UNFF), and regional processes, like the Ministerial Conference on the Protection of Forests in Europe (MCPFE). Other relevant elements of the international forest regime are conventions and protocols, such as the UN Framework Convention on Climate Change (UNFCCC) with its Kyoto Protocol, the UN Convention on Biological Diversity (CBD) and the UN Convention to Combat Desertification (CCD). Furthermore, it includes other intergovernmental treaties like the Convention on Trade in Endangered Species (CITES) or the Ramsar Convention on Wetlands.

The European Community participates together with EU Member States in these processes. The role of the European Community, in a) being responsible for implementing commitments of different processes or b) only advising the EU Member States in implementing the commitments, is different in most of the processes. Within the UNFF, for example, it is only the Member States which are responsible for implementing UNFF commitments. The European Community provides only guidance to the Member States, e.g. in the frame of UNFF negotiations. Preparations for the meetings and joint statements are discussed in relevant Council Groups, where the Commission assists the Presidency in its co-ordinating role, as well as ensuring that commitments are in line with Community legislation and policies. Instead in the frame the UNFCCC or regional processes like the MCPFE or the Ministerial Conference “Environment for Europe”, the European Community is a member and has its specific responsibility in implementing adopted declarations and resolutions.

At regional level the MCPFE is the platform for supporting and continuing the European dialogue on Sustainable Forest Management (SFM) and the protection of forest in Europe at ministerial level. Several of the MCPFE resolutions are particularly relevant concerning combating forest dieback in Europe (see Box 3).

Box 3: MCPFE resolutions which are of particular relevance for combating forest dieback in Europe.

- Resolution S1 (1990, Strassbourg): European Network of Permanent Sample Plots for Monitoring of Forest Ecosystems. The Resolution is based on the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests).
- Resolution S3 (1990, Strassbourg): Decentralised European Data Bank on Forest Fires
- Resolution H4 (1993, Helsinki): Strategies for a Process of Long-term Adaptation of Forests in Europe to Climate Change:
- Resolution L2 (1998, Lisbon): Pan-European Criteria, Indicators and Operational Level Guidelines for Sustainable Forest Management
- Resolution V4 (2003, Vienna): Conserving and Enhancing Forest Biological Diversity in Europe.
- Resolution V5 (2003, Vienna): Climate Change and Sustainable Forest Management in Europe

The MCPFE declarations and resolutions offer a good basis for a discussion on common approaches to forest policy. Support by the EU towards the process of MCPFE but also its implementation at national level should be granted in future. Support can be given for example by EU forest policy frameworks like the EU Forest Action Plan describing common objectives for a certain period of time, but also by the means of financial instruments supporting different measures at national and sub-national level. This is crucial for continuing the MCPFE process in future but also to strengthen joint cooperation between MCPFE and EU objectives.

The linkage between international forest related processes and EU forest related policy becomes evident in the EU Forestry Strategy and the more recent, EU Forest Action Plan. The Council Resolution of 15th December 1998 on a Forestry Strategy for the European Union established a framework for forest related actions in support of Sustainable Forest Management (SFM), based on the coordination of the forest policies of the Member States and Community policies and initiatives relevant to forests and forestry. It takes into account the commitments made by the EU and its Member States in the relevant international processes, in particular the UNCED in 1992 and its follow-up conferences and the MCPFE (Strasbourg 1990, Helsinki 1993, Lisbon 1998 and Vienna 2003). The Strategy emphasises the implementation of international commitments, principles and recommendations through national or sub-national forest programmes or equivalent instruments, and active participation in all forest-related international processes. It further stresses the need to improve coordination, communication and cooperation in all policy areas relevant to the forest sector.

In the Communication from the Commission to the Council and the European Parliament of 15th June 2006 on an EU Forest Action Plan (COM (2006) 302 final) some of the 18 listed Key Actions like Key action 6, 7 and especially 16 address how the EU Forest Action Plan relates to international processes and therefore supports the maintenance of forests health and vitality in Europe (see Box 4).

Box 4: Key actions of EU Forest Action Plan describing linkages between EU policy and international processes.

Key action 6: Facilitate EU compliance with the obligations on climate change mitigation of the UNFCCC and its Kyoto Protocol, and encourage adaptation to the effects of climate change.

Key action 7: Contribute towards achieving the revised Community biodiversity objectives for 2010 and beyond (COM(2006) 216 final). Proposals include considering forest biodiversity monitoring as a pilot exercise in the framework of the current work on EU biodiversity indicators (see initiative of Streamlining European 2010 Biodiversity Indicators process with the European Environment Agency (EEA) and UN Environment Programme (UNEP)). This action is specifically related to the process of and commitments to the CBD.

Key action 16: Strengthen the EU profile in international forest-related processes. A high degree of coordination is necessary both within the Commission and in the Member States

to ensure coherence in different forest-related international processes. Relevant Council Working Parties, especially the one on Forestry, have a key role to play in this regard....Although the Commission will no longer have a specific financing instrument for forests after 2006, there will be opportunities for financial support from 2007 onwards from the Environment and Natural Resources Thematic Programme, as well as in country or regional programmes. This will allow support for implementation of the commitments of Multilateral Environmental Agreements.

A relevant international convention related to the objective of combating forest dieback within the EU, is the UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP). The Convention has addressed some of the major environmental problems of the UNECE region through scientific collaboration and policy negotiation. In 1979 the Convention was signed by 34 Governments and the European Community (EC). Based on the UNECE CLRTAP the ICP Forests for forest condition monitoring in Europe was launched in 1985. Today both the ICP Forests and the EC are closely cooperating in coordinating the forest condition monitoring on the established monitoring system Level I and Level II of the ICP Forests. Financial support for EU Member States for conducting forest condition monitoring according to the CLRTAP was particularly provided by the EC Forest Focus Regulation (Council Regulation (EC) 2152/2003). Although the Forest Focus Regulation expired in 2006 (see below), the financial support was of importance for assessing core parameters of forest conditions, like deposition of air pollutants and defoliation, on a harmonised basis.

It can be concluded that during the past decades a lot of international processes related to forest condition, protection and Sustainable Forest Management (SFM), have been launched which again are of tremendous importance for supporting the development and implementation of EU forest related policy. The commitments made have been implemented in strategic and other documents at national and EU level. These documents oblige the EC and its members to continue with already started actions and develop new ones aimed at the protection and sustainable use of forest resources.

The EU has been instrumental to progress under international forest related processes. This requires being capable of cooperating and presenting constructive proposals for international

discussions and negotiations.¹⁴ The role of the EU European Community to influence, support and implement international commitments towards these actions as formulated by the UNFCCC, CBD and CCD is of high importance and needs to be strengthened in the future.

Joint coordination of various international processes combined in strategic documents of the EC, like the Forest Action Plan, are important steps for a holistic action at European level. By taking different objectives and requirements of international forest related processes into account, a common framework for forest protection and maintenance including the particular objective of combating forest dieback, should be formulated at EU level. The new Forest Action Plan established for the period of 2007 to 2013 could provide a good basis for such common framework in future.

3.3 EU forest related policy frameworks

Forests are a cross-cutting issue and dispersed in various direct or indirect forest related EU instruments. Direct forest related actions are based on the principles as laid down in the EU Forestry Strategy (1998) and the EU Forest Action Plan (2007-2013). With respect to forest damages, the EU Forest Strategy specifically emphasises the need to improve the protection of the Community's forests against atmospheric pollution and against fire. Important means of implementation of EU Forest Strategy and Forest Action Plan are the Rural Development Regulation (EC No 1698/2005), the new financial instrument LIFE+ (EC No 614/2007) and the 7th Research Framework Programme (Council Decision, 18 December 2006). Between 2003 and 2006 the Forest Focus Regulation (EC No 2152/2003) was of particular importance for supporting forest condition monitoring in the EU (see below).

Box 5: Forest Action Plan.

The **EU Forest Action Plan** focuses on four main objectives: (1) to improve long-term economic competitiveness; (2) to improve and protect the environment; (3) to contribute to the quality of life; and (4) to foster coordination and communication. Eighteen key actions are proposed by the Commission to be implemented jointly with the Member States during a period of five years (2007—2011).

¹⁴ Environment Programme for the Finnish EU Presidency Period (2006).

With the principles of the Forestry Strategy still being valid, it has been transformed into a dynamic process consisting of a set of key actions, which are laid out in the EU Forest Action Plan (2006). The Forest Action Plan is an expression of common intentions by EU Member States in trying to achieve a sustainable and competitive forestry sector. It aims to strike the right balance between the multiple functions of forests. Specifically relevant towards the objective of combating forest dieback is the **Key Action 9 “Enhance the protection of EU forests”**, which is described as follows:

Forest fires, biotic agents and atmospheric pollution have a sizeable influence on the ecological condition and productive capacity of forests in the EU. Global trade and climate change have increased the potential vectors for harmful organisms and invasive species. As protection of forests against biotic and abiotic agents is one of the main priorities of forest policy, it is essential to have up-to-date information about the state of forests in the EU.

The Commission will:

- work towards the further development of the European Forest Fire Information System;
- carry out a study, which will analyse the main factors influencing the evolution of forest condition in Europe (including forest fires), the efficiency of current Community instruments and measures for forest protection, and potential future options to improve the efficiency of the measures;¹⁵
- encourage Member States to form groupings to study particular regional problems with the condition of forests;
- support research on protection of forests and phytosanitary issues under the 7th Research Framework Programme.

In addition, with support from the EARDF and the Life+ instrument, the Member States may:

- develop national afforestation guidelines and promote afforestation for environmental and protective objectives;
- promote agroforestry systems;

¹⁵ This refers basically to the objectives of the “Forest Dieback” feasibility study.

- promote Natura 2000-forest measures;
- promote schemes for forest owners to engage in voluntary environmental commitments;
- promote investments, which enhance the ecological value of forests;
- support forest fire prevention measures;
- support restoration of forests damaged by natural disasters and fire;
- support studies on the causes of forest fires, awareness raising campaigns, training and demonstration projects;
- review and update broader protection strategies against biotic and abiotic agents, including studies on risk assessment in relation to harmful organisms and invasive species.

One of the objectives of the Forest Action is to improve and protect the environment by maintaining and appropriately enhancing biodiversity, carbon sequestration, integrity, health and resilience of forest ecosystems at multiple geographical scales (Forest Action Plan, Section 3.2). Further relevant Key Actions in that context and particular in the context of combating forest dieback are:

Key action 6: Facilitate EU compliance with the obligations on climate change mitigation of the UNFCCC and its Kyoto Protocol and encourage adaptation to the effects of climate change.

Key action 7: Contribute towards achieving the revised Community biodiversity objectives for 2010 and beyond.

Key action 8: Work towards a European Forest Monitoring System.

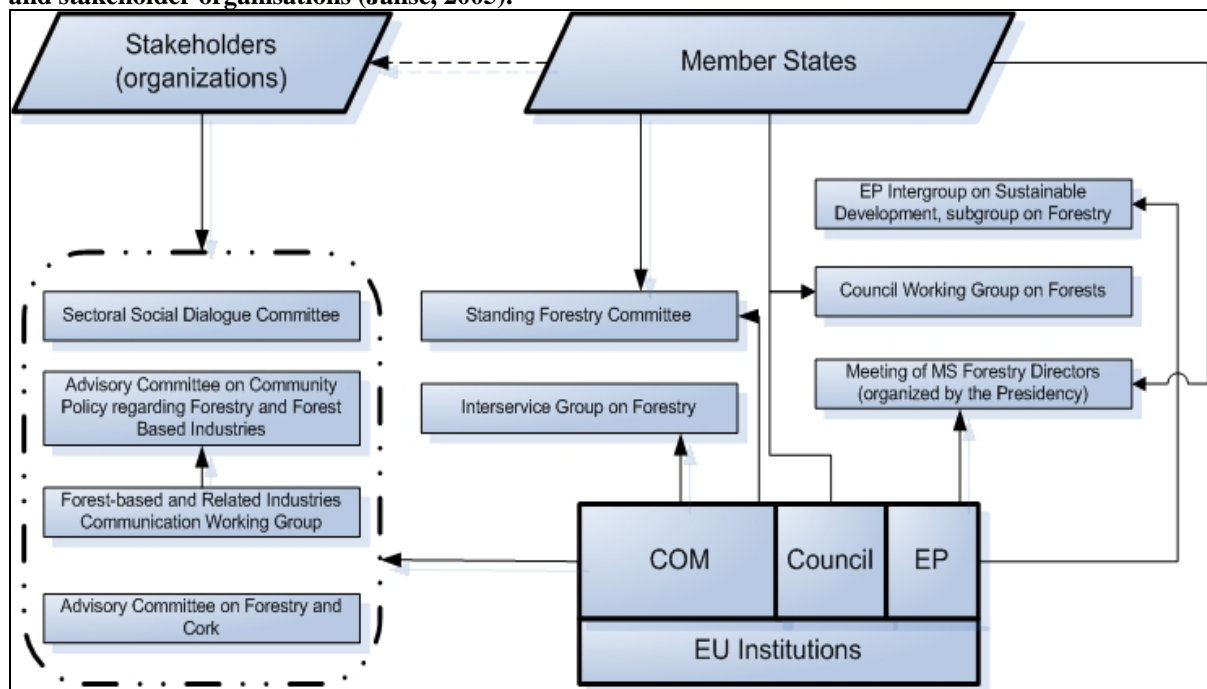
Key action 6 supports the international objective of reducing climate change and its short or long term impacts on forest and environment. This requires specific action and commitments in close linkage to ongoing international processes (see Chapter 3.1). The other two key actions are particularly relevant for supporting forest monitoring actions, which collected and evaluated information is fundamental for decision making on particular EU policy and measures.

It can be concluded that the issue of protecting EU forests and therefore, the objective of combating forest dieback is well covered within the EU Forest Action Plan and within the EU Forest Strategy. Future challenges are seen in developing the existing Forest Action Plan further beyond the period 2007-2011 towards new challenges and complex forest dieback causes such as climate change. Nevertheless, it is recommended to identify new forest protection measures, which could be applied at EU level, in particular prevention and mitigation measures against border-crossing damages.

3.4 Major actors within EU forest related policy

There are various disciplines and actors involved in various forest related policies. To formulate common strategies, e.g. for the objective of combating forest dieback, it is of particular importance to know how coordination and communication between the various policy formulation and implementation sectors and its institutions are organised.

Fig. 5: Communication structures between Commission, Council, European Parliament, Member States and stakeholder organisations (Janse, 2005).



The EU Member States and the Commission coordinate positions prior to major forest-related international meetings in the Council Working Group on Forests. The Working Group also deals with forest-relevant Commission policy and legislative initiatives, such as FLEGT. This

group had existed on an ad-hoc basis for a number of years, but in 2002 a decision was taken for it to become a permanent Working Group within the Council.

The Standing Forestry Committee (SFC) was established by the Council Decision 89/367/EEC in May 1989. The SFC which brings together representatives of the Member States and which is chaired by the Commission, has a three-fold role: a) acting as an advisory and management Committee for specific forestry measures; b) serving as an ad-hoc consultation forum that provides expertise in connection with the development of forest-related measures in the framework of various Community policies, such as those on rural development and the environment; c) providing a venue for exchange of information among Member States, and between Member States and the Commission.

The management function of the SFC concentrated in recent years particularly on the implementation of the Forest Focus Regulation, which was adopted in 2003 and expired in 2006. Cooperation and communication with stakeholders have taken place in the context of other committees. There has been a regular information exchange, cooperation and coordination with forestry interest groups and stakeholders through different committees, such as the Advisory Group on Forestry and Cork, the Advisory Committee on Community Policy Regarding Forestry and Forest-based Industries and the Forest-based and Related Industries Communication Working Group.

As there are many cross-sectional actors influencing EU forest related policy it is important that most relevant actors with the specific objective of combating forest dieback be taken into account when developing and implementing common strategies (see Chapter 4 – Future Prospects). To facilitate most benefits and synergies between existing programmes, it is important to consider different actors' opinions and statements which directly or indirectly influence EU forest related policy decisions.

As there is no common EU forest policy per se, joint communication and processing at EU level towards common forest strategies and policy are challenging. With respect to the specific objective of combating forest dieback and specifically due to the multiple facets of forest dieback and its different causes in different regions, it is crucial that cross-sectional sectors and its actors will be taken into account. A specialised entity on forest dieback within the EU could help facilitate joint communication and action (see Chapter 4).

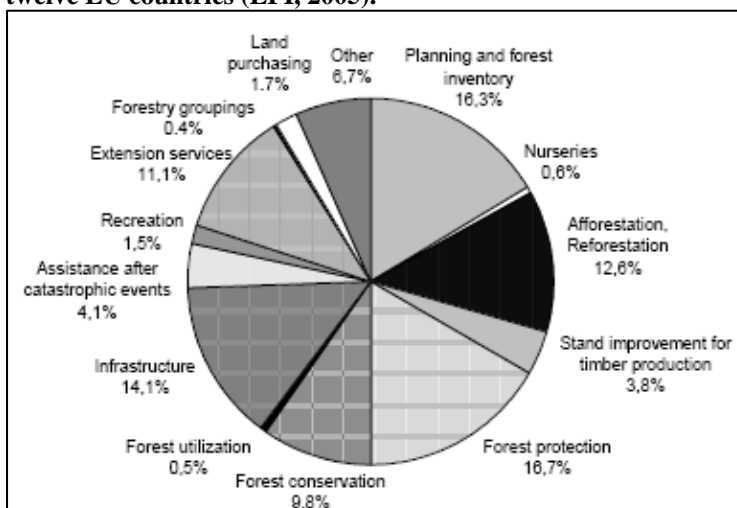
3.5 EU financial instruments and funds

Analysing the feasibility of combating forest dieback within the EU requires in particular reviewing available financial instruments and funds which the EU provides to support various actions and measures conducted at sub-national, national and EU level.

Forestry measures in Europe are financially supported by various national, EU but also international sources. A variety of EU funds and financial instruments address environmental and social dimensions of Sustainable Forest Management (SFM). Due to possible interlinks of programmes, overriding objectives such as regional development, weaknesses in monitoring processes at EU and national level, the implications of a single funding mechanism are difficult to track and summarise.

Despite all shortcomings in data availability and completeness, the EFFE¹⁶ study in 2005 revealed that about 35% of public funding for forestry support directly or indirectly forest protection activities. This includes financial support for several prevention measures like against fire, diseases, insects, floods, soil erosion, game, avalanches, snow, wind, air pollution but also mitigation measures like for assisting after catastrophic events, e.g. supporting restoration measures after storm damages.

Fig. 6: The aggregate distribution of public funding (1990-1999) by the types of activities supported in twelve EU countries (EFI, 2005).



¹⁶ Evaluation of Financing Forestry in Europe (EFI, 2005).

To assist in the goal of cohesion and sustainable development, the EU has created funds and financial instruments like **Structural Funds**. They are used to co-finance regional and sectoral operations in the Member States, which fall within the competence of the national governments. The funds are administered on the basis of programming documents, which the Member States negotiate with the Commission.

The Structural Funds combine all EU funds related to structural measures for regional development specifically supporting less developed regions. Measures in the forestry sector may be included if they contribute to the overall objectives of Structural Funds and Cohesion funds, in particular Objective 1: *...development and structural adjustment of regions whose development is lagging behind, i.e. whose average per capita GDP is less than 75% of the EU average.*¹⁷

For the period of 2007 – 2013, the Structural Funds consist of the European Agricultural Fund for Rural Development (EAFRD), the European Regional Development Fund (ERDF) and the European Social Fund (ESF). Of these, the EAFRD is the most relevant for supporting various forestry measures, including those addressing forest dieback and thus presented in more detail.

From the 1st of January 2007, the Council Regulation (EC) No 1698/2005 on support for Rural Development by the **European Agricultural Fund for Rural Development (EAFRD)** rules the new Rural Development Programme. The new fund replaces the former source of funding rural development, the **European Agricultural Guidance and Guarantee Fund (EAGGF)**. As no data are yet available for EAFRD Fig. 6 presents the funds utilised for afforestation and other forestry measures under EAGGF during the period 2000-2006.

In December 2005 the European Council agreed on a budget of about EUR 69.75 billion for the overall Rural Development fund for the period 2007-2013. At least EUR 33.01 billion will be shared between the twelve new Member States. The remaining EUR 36.74 billion will be divided up among the EU-25, with at least half (EUR 18.91 billion) being guaranteed for the EU-15.

¹⁷ Council Regulation (EC) No 1260/1999; Commission Regulation (EC) No 2355/2002.

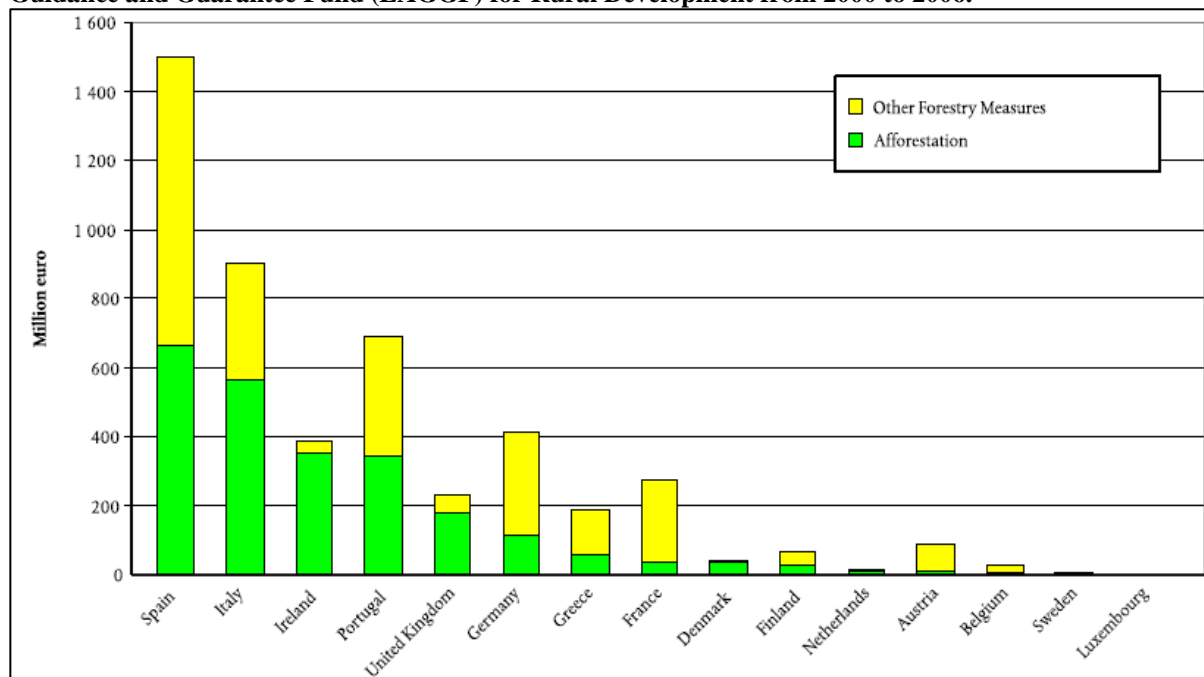
The current Rural Development policy is built around a competitiveness axis for agriculture, food and forestry, a land management-environment axis and a quality of life/diversification axis in rural areas. Forestry measures with respect to protection and rehabilitation are part of Axis 2: *Improving the environment and the countryside*. The Rural Development programmes, including the design of the suitable forestry measures, are drafted, implemented, and largely monitored at the national level.

Of particular importance for the objective of combating forest dieback is the support for restoring forestry potential in forests damaged by natural disasters and fire, and for introducing preventive actions in order to maintain the environmental and economical role of these forests [Code 226]. Within this particular measure many types of specific actions can be supported. Examples are: preventive investments reducing the consequences of forest fires (e.g. forest fire breaks, waterpoints, forest roads, preventive forestry), or investments to restore the forest in its state before the disaster.¹⁸ Other measures such as *first afforestation* [Code 221 and Code 223], *forest-environment payments* [Code 225] or payments for *Natura 2000* [Code 213 and 323] are rather of indirect relevance towards the objective of combating forest dieback.

Afforestation is an indispensable measure for maintaining forest resources. In terms of forest protection, afforestation can contribute to reducing the risk of soil erosion, avalanches, instable water households, storm effects etc., which again helps to protect and maintain forests at regional and local scale. When implementing afforestation measures it should be ensured that site-adapted tree species are selected; if not, forest damages caused by storms, fire and/or insects and diseases may increase.

¹⁸ Article 36 (b) (vi) of Reg. (EC) N° 1698/2005.

Fig. 7: Financial support for afforestation and other forestry measures by the European Agricultural Guidance and Guarantee Fund (EAGGF) for Rural Development from 2000 to 2006.



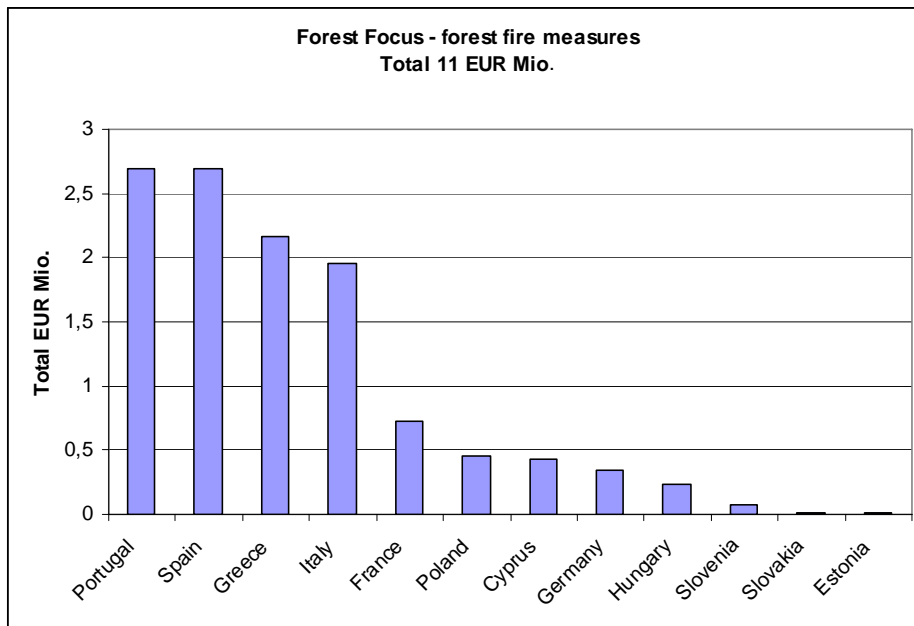
In addition to EU structural funds the Commission also provides financial instruments such as the **Financial Instrument for the Environment (LIFE)**. LIFE was established in 1992 (Council Regulation (EEC) No 1973/92). Member States submit proposals for action to the Commission, which assisted by a Committee, decides on the provision of grants. The general objective of LIFE is to contribute to the development and implementation of Community environmental policy and legislation by: a) financing priority environmental actions in the Community; b) providing technical assistance actions with third countries from the Mediterranean region or bordering the Baltic Sea. In exceptional circumstances, assistance may be provided for actions concerning regional or global environmental problems covered by international agreements.

During the third phase 2000-2004, LIFE (EC No 1655/2000) consisted of three thematic components, namely *LIFE nature*, *LIFE environment* and *LIFE third countries*. LIFE nature was especially relevant for supporting various forestry measures in the context of implementing the EU Directives on the conservation of wild birds, the conservation of natural habitats and the establishment of the Natura 2000 network. For the third phase, the total budget was EUR 640 Mio, where as 47% of it was allocated for *LIFE nature*. The third phase was extended until the end of 2006 (Regulation (EC) No 1682/2004).

The **Forest Focus Regulation** (Regulation (EC) No 2152/2003) for the period 2003-2006 funded a Community scheme for broad-based, harmonised and comprehensive, long-term monitoring of forest condition. It combines the elements of earlier EU Regulations on the protection of the Community's forests against atmospheric pollution (Council Regulation (EEC) No 3528/86) and on the protection of the Community's forests against fire (Council Regulation (EEC) No 2158/92) with wider environmental concerns. The Regulation expired at the end of 2006. For receiving support for forest condition monitoring on ICP Forests Level I and Level II plots, the Member States drew up national programmes, which were approved by the Commission. Eligible measures were co-financed at a rate of 50%, except special studies or demonstration projects, which were partly co-financed with 75%.

The budget for the implementation of Forest Focus for the period 2003-2006 was about EUR 65 Mio of which approximately EUR 11 Mio were used for fire prevention measures (see Fig. 8).

Fig. 8: Total allocation of resources to Forest Focus forest fire measures in 2003-2006 (JRC EFFIS Report 2006).



The new **LIFE+** programme (2007-2013) replaces former LIFE programmes and also the Forest Focus scheme (Regulation (EC) No 614/2007). The total budget is EUR 2.14 billion (2007-2013). The general objective of LIFE+ shall be to contribute to the development, implementation, monitoring, evaluation and communication of Community environment

policy and legislation as a contribution to promoting sustainable development in the EU.¹⁹ LIFE+ will support in particular the implementation of the 6th Environmental Action Programme, which aims at combating climate change, halting the decline in nature and biodiversity, improving environment, health and the quality of life, promoting the sustainable use and management of natural resources and wastes, and developing strategic approaches to policy development, implementation and information/awareness raising.

In principle the scope of the former Forest Focus Regulation is reflected in LIFE+. In contrast, LIFE+ does not provide an obligation for EU Member States to carry out regular monitoring on Level I and Level II. LIFE+ provides a co-financing mechanism for forest monitoring on a voluntary basis by the means of projects for which Member States can apply for funds. The first call for project proposals has been published on 4th October 2007 in the Official Journal of the EU (C232, p.10) and explicitly mentioning forest monitoring. Application for support will have to compete with other proposals from the environmental sector.

Within the multi-annual strategic programme of LIFE+ the **principal objective for “forests”** is defined as follows:

To provide, especially through an EU coordination network, a concise and comprehensive basis for policy relevant information on forests in relation to climate change (impact on forest ecosystems, mitigation, substitution effects), biodiversity (baseline information and protected forest areas), forest fires, forest conditions and the protective functions of forests (water, soil and infrastructure) as well as contributing to the protection of forests against fires.

Priority areas of action:

- promoting the collection, analysis and dissemination of policy-relevant information concerning forests and environmental interactions,
- promoting harmonisation and effectiveness of forest monitoring activities and data collection systems and making use of synergies by creating links between monitoring mechanisms established at sub-national, national, Community and global level,

¹⁹ Proposal concerning the Financial Instrument for the Environment (LIFE+) - COM(2004) 621.

- stimulating synergies between specific forest-related issues and environmental initiatives and legislation (e.g. Thematic Strategy for soil protection, Natura 2000, Directive 2000/60/EC),
- contributing to Sustainable Forest Management (SFM), in particular, by collecting data related to the improved pan-European Criteria and Indicators (C&I) for Sustainable Forest Management (SFM) as adopted by the MCPFE (2003),
- building capacities at national and Community level to allow for coordination and guidance on forest monitoring.

Since 2001, the **Community Civil Protection Mechanism** (Council Decision 2001/792) supports and facilitates the mobilisation of vital civil protection assistance for the immediate needs of disaster-stricken countries. Its contribution builds on lessons learned and experience gained from providing assistance in a broad range of previous disasters both inside and outside the EU. In the EU the Community Civil Protection Mechanism was applied for the floods in Central Europe (2002) and France (2003) and the forest fires in France and Portugal (2003, 2004). Most recently, Greece called upon the mechanism for assistance in dealing with the consequences of forest fires in 2007. The implementation period 2000-2004 was supported with EUR 7.5 Mio. The programme was extended until the end of 2006 allocating additional EUR 4.8 Mio.

The European financial instrument for high emergency aid is the **European Union Solidarity Fund (EUSF)**. It was created after the devastating floods in Central Europe in August 2002 (Council Regulation (EC) No 2012/2002). EUSF is designed to provide fast, effective and flexible emergency financial aid in case of natural disasters like large scale forest fires in the Mediterranean regions (such as in Portugal 2003 or Greece 2007). Measures included are e.g. providing temporary accommodation or the provisional repair of vital infrastructures permitting the resumption of everyday life.

Box 6: Responses to EU forest related policy frameworks and financial support mechanisms made a) by the EU Member States to the enquiry of the feasibility study and b) by the participants of the Forest Dieback Workshop (Hamburg, Sept. 2007).

General Statement

There is a consensus that available EU programmes contribute to the prevention, mitigation and control of forest dieback. It was widely acknowledged that the most important EU instruments in the context of combating forest dieback are the Rural Development Regulation and the EAGGF/EAFRD and the Forest Focus Regulation which expired in 2006. These instruments have provided sufficient and effective support to EU Member States to obtain valuable information and create good networks of expertise in the context of Sustainable Forest Management (SFM) and the objective of combating forest dieback. The EU Forest Strategy or Forestry Action Plan were mentioned to be less relevant for specifically assisting in combating forest dieback, although they were considered as important for drafting and/or developing further National Forest Programmes (NFP). Not considered yet as that relevant are financial instruments for providing support in cases of high emergency such as the Civil Protection Mechanism, which e.g. played a significant role in supporting immediate action for fire fighting in Greece in 2007.

Almost all countries see gaps and needs for improvement or assistance with current instruments.

At present there are many financial instruments that are coordinated by different authorities, which generally have no direct link to forest and the forestry sector. The separation of measures to address the prevention, mitigation and control of forest dieback in different financial instruments results in increased bureaucracy and intensifies coordination problems. Thus many Member States support the need for a more holistic program/regulation on prevention, mitigation and control of forest dieback allowing for better coordination of currently available or future instruments as the understanding of their potentials.

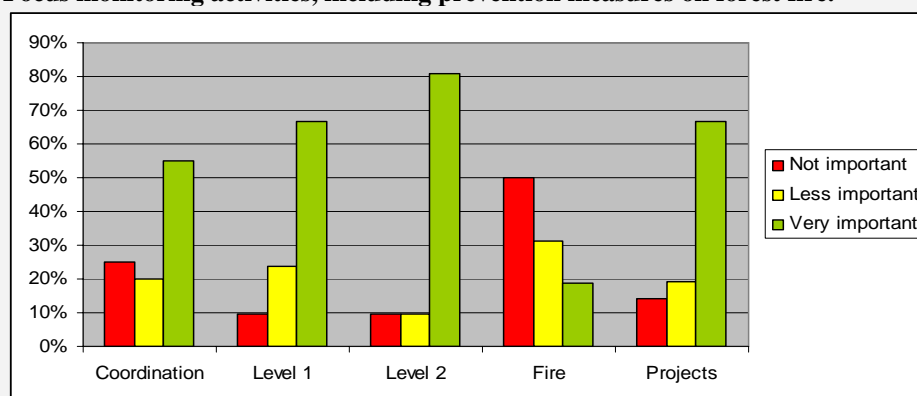
Study respondents called for better coordination and use of synergies between present instruments. A feasible approach towards addressing forest dieback more effectively was seen in e.g. awarding more explicitly a budget for forestry measures clearly directed to prevent, mitigate and control forest dieback under new EAFRD and LIFE+. By such an

approach the safeguarding of appropriate emphasis could be given to forest dieback.

Comments – Forest Focus and LIFE+

Based on the enquiry results LIFE+ was not considered to be sufficient with respect to maintaining national forest condition monitoring. A continuous co-financing for monitoring on Level I and Level II such as provided by the Forest Focus Regulation would have been favoured. Forest monitoring will continue to be required to fulfil various commitments to different international processes and EU forestry actions. Shortcomings in financial support for forest condition monitoring could lead to data inconsistency, poor data quality and gaps in data coverage if activities are not coordinated at the European level.

Fig. 9: Summary from the enquiry on the importance of Forest Focus for the implementation of Forest Focus monitoring activities, including prevention measures on forest fire.



The assistance of Forest Focus in collecting harmonised data either for national or international requirements is widely acknowledged. Collected information and available time series directly influences the development of forest protection measures at national level. In the case that co-financing for monitoring will not be assured, the respondents see a reduction of monitoring activities as highly likely in future. Reductions would affect in particular the intensive monitoring activities on Level II plots as they require high financial inputs.

Financial support for forest condition monitoring as available in the past was also seen to have shortcomings. In particular this corresponds to coordinated data processing and evaluation. Financial support is most likely to be available for the monitoring activities themselves, partly for data management, but hardly ever for thorough data processing, analysis and evaluation.

A clear need to improve coordination of monitoring activities and reporting at the EU level was expressed. Possible synergies between ICP Forests/Forest Focus (Level I and Level II) and National Forest Inventories should be promoted and used in future. Improvements are seen in enhancing the set of common parameters collected by a joint forest monitoring programme. Reliable and comparable data for a certain set of common indicators/parameters (e.g. MCPFE Criteria and Indicators (C&I)) is essential for supporting and reflecting on common policy decision making.

Comments – Rural Development (EAGGF/EAFRD)

Based on the results from the enquiry opportunities to incorporate more explicitly measures towards the prevention of forest dieback are seen in the Rural Development Programme. Attention should be given that there are no overlaps with other EU financial support schemes. Overlaps such as between different fire prevention measures as supported by Rural Development but also by Forest Focus/LIFE+ are rather seen as confusing than jointly beneficial.

For the new EAFRD 2007-2013, some respondents were concerned with a likely imbalance between financial attention for agriculture and forestry. This is of particular concern, where forestry has lower priority as compared to agriculture or environmental protection. In that context it has to be considered that forestry measures are subsumed under Axis 2 under the Rural Development Regulation, and therefore are part of the set of agriculture and forestry measures that have a direct impact on the protection of environment. Furthermore, it has to be considered that forestry measures might perhaps be rightly given lower priority in a specific regional Rural Development Programme in a region with small forest area.

Comments – Private Forest Sector

For private forest owners, the Rural Development Regulation especially, and the Forest Focus Regulation have offered important contributions to forest damage prevention, mitigation and control.

The information on support measures is not always very accessible. Though basically all information is available, the owner associations have fewer resources for experts on EU instruments than national governmental bodies have, and therefore need more assistance. In this respect it has to be considered that it is in the responsibility of the national authorities to

give assistance in disseminating information on Rural Development Programmes at the national level to all potential beneficiaries, including the private sector. At the European level the Confederation of European Forest Owners (CEPF), including its national member organisations, is responsible for a) increasing the awareness of private sector issues within the EU but also b) providing guidance to the private forest sector on EU forest related policy.

Another aspect regarding the efficiency of the EU support is that a lot of private owners are not organised, thus they have no access to support. The complexity and fragmentation of ownership rights lead to several problems in implementing EU actions. In the specific context of combating forest dieback it has to be considered that in many countries the large numbers of unregistered owners (small scale forest owners) may be responsible for a considerable amount of forest area and other wooded land in which problems occur, e.g. forest fires. Prevention measures, like fire and pest control or game management to be implemented on a larger scale within a common forest protection strategy, might fail at small scale level simply due to limitations enabling small scale forest owners to act. EU support in this case is rather limited. Possibilities for improvement are seen in the support of establishing and maintaining forest owner associations.

Comments – State Forest Sector

Financial support as provided by the Rural Development Funds is mainly available for private forest owners. Basically there are two measures, which are also applicable for state forests: a) restoring forestry potential and introducing prevention actions and b) support for non-productive investments. Other measures might be included as the eligibility rules are set at national and not at the EU level and each Rural Development Programme specifies them for the given state/region depending on the local factors.

In general the responsibility for assistance to beneficiaries is delegated to the authorities at the national level, who draft the programmes and implementation rules at the national level. New Member States and their state forest management organisations sometimes lack experience on EU financial instruments. In this case more guidance and coordination from the EU to the new Member States is required. If this is the case, it should be discussed to what extent guidance and coordination to beneficiaries might at present come from EU level.

The efficiency of forest protection measures depends on scale economy and full utilisation of available best-practices. State forest managers have good competence and networks for forest protection and therefore they should be considered as a crucial part of large scale preventive measures (see here also the opposite situation for small scale forest owners).

3.6 Activities at national/sub-national level

The EU Member States apply different approaches to address forest protection. Such differences are reflected within the national and sub-national policy, in the formulation of appropriate measures and instruments for combating, mitigating and preventing forest damages and in the targeted beneficiaries. To reflect this heterogeneity, three in-depth case studies and a questionnaire enquiry to the 27 EU Member States were conducted. The main outcomes are presented in the following paragraphs.

One general observation was that the EU Member States have no explicit national forest protection strategy. A national forest protection strategy for example could be expressed in a holistic framework covering the multiple facets of forest dieback, its different causes and its necessary measures of prevention, mitigation and control. Within a holistic forest protection strategy the linkage between prevention, mitigation and control (see Chapter 3.6) can be described. This would facilitate joint efforts considering various available instruments in one strategy towards combating forest dieback at sub-national, national and international level.

Although countries do not have explicit forest protection strategies this does not imply that forest dieback is not targeted, as for example in forest acts, National Forest Programmes (NFPs) or other instruments, but simply that there is no holistic strategy for addressing all aspects of forest damage under one national or sub-national strategy. Member States have an array of legislative frameworks, programmes, acts and instruments to combat forest dieback at national and sub-national level (see Box 7). They are applied in different ways, depending on the issue they target. They can be aimed directly towards forest damages in the form of prevention measures, like in the case of insect and disease infestations or fire and storm events, while others may mitigate forest damages indirectly. Examples are silvicultural and infrastructure measures and monitoring and evaluation activities. There also exist numerous non-forestry, programmes, acts and instruments which are outside the traditional domain of

forestry but can have profound impacts upon forests, their health and stability as e.g. in agriculture, rural development, air pollution, climate or energy resources. Tracking their relevance and effectiveness towards combating forest dieback is a complex task, which should be recognised.

Box 7: Most relevant legislations and programmes for combating forest dieback: Example Spain.

The Spanish Forest Act (BOE 2003) includes a chapter on forest protection where it addresses soil conservation, mitigation of erosion and desertification, restoration, forest fires (prevention, extinction and restoration) and forest health.

The Spanish Forest Strategy (MMA 1999) and the National Forest Plan (MMA 2002) are more explicitly specifying the objectives and measures towards prevention, mitigation and control.

There are also programmes which are designed to tackle the main threats to Spanish forests directly. Examples are: the “defence against forest fires” (MMA 2007a) and the “national plan of priority actions of forest-hydrology restoration, erosion control and defence against desertification” (MMA 2007b).

Document	Prevention	Mitigation	Control
Spanish Forest Act	indirect	indirect	Indirect
Spanish Forest Strategy	direct/indirect	direct/indirect	direct/indirect
National Forest Plan	direct/indirect	direct/indirect	direct/indirect
Program “defence against forest fires”	direct	direct	direct
National plan of priority actions of forest-hydrology restoration, erosion control and defence against desertification	direct	direct	direct

National Forest Programmes (NFPs) consist of participatory, holistic, intersectoral and iterative processes of policy planning, implementation, monitoring and evaluation at the national or sub-national level thus contributing and enhancing Sustainable Forest Management (SFM). It aims at strengthening consistency with and synergies between relevant initiatives and conventions in each country and lays out appropriate levels and requirements for co-operative efforts and activities. Forest health is usually indicated in NFPs although emphasis on forest condition and damaging agents can differ. The phase of development of NFPs differs between European countries. Partly they are in the process of formulation or in the implementation/evaluation phase (Table 2).

The relevance of NFPs as a policy framework for formulating but also implementing forestry and forest sector actions are different. Nevertheless NFPs can serve as a holistic framework to formulate common strategies towards combating forest dieback taking into account national and/or regional specifications and actions. Support by the EU to develop and implement NFPs is for example given by the EU Forest Action Plan. The objective of key action 15 is to “apply the open method of coordination to national forest programmes”, facilitating help to

EU Member States to progressively develop their own policies. Possibilities to strengthen the objective of combating forest dieback by formulating or strengthening this particular aspect within NFPs should be considered.

Table 2: Stages of the NFP of selected EU Member States (MCPFE, 2005).

	Austria	Czech Republic	Denmark	Finland	France	Germany	Hungary	Ireland	Italy	Lithuania	Luxembourg	Netherlands	Poland	Portugal	Spain	Sweden	UK
Formulation	X				X		X		X		X		X	X			
Implementation		X	X			X		X			X	X		X	X		X
Evaluation				X		X		X									

Most of the Member States regard EU programmes as important financial supplements for combating forest dieback in addition to their own instruments at national and sub-national level. The various financial instruments in the scope of involvement of national authorities' vice versa the role of the EU differ from Member State to Member State. For Member States with well established forest economy and own financial support mechanisms, EU financial instruments are regarded as additional support. Of particular importance are EU financial support mechanisms in those countries where national support mechanisms are either partly exist or are completely absent. Despite these differences, the most important programmes towards forestry in general but also towards the objective of combating forest dieback are the expired Forest Focus Regulation, the former and new Rural Development Regulation and the LIFE programmes (see also Chapter 3.2). Other EU funding programmes and instruments were seen to have less importance in terms of forest dieback (see also Box 6, p. 45-48).

In particular the role of Forest Focus was emphasised in the context of implementing monitoring activities. Within the feasibility study about half of the countries stated that Forest Focus had directly influenced the development of forest protection measures in their countries. The other half of the countries responded that Forest Focus did this indirectly. This accounted in particular to the collection of harmonised data both for national needs and reporting to international processes. The importance to link and jointly coordinate major forest assessments including e.g. National Forest Inventories and forest condition monitoring (ICP Forest: Level I / Level II assessments) were seen as a big challenge but also as a prerequisite in order to meet the information demands at present and be able to address new information needs both at national or at international level.

One observation worth mentioning in the context of monitoring is that for a majority of the EU Member States, instruments to monitor and evaluate damage types such as grazing and browsing, and drought are either less developed or not in place although noteworthy threats to Europe's forests exist. Possibilities of EU support actions, in helping Member States to develop appropriate monitoring and evaluation systems towards these two particular causes, need to be analysed (see also Chapter 2). Possibilities are specifically seen in further research programmes on e.g. monitoring, assessment and reporting of damages caused by grazing and browsing.

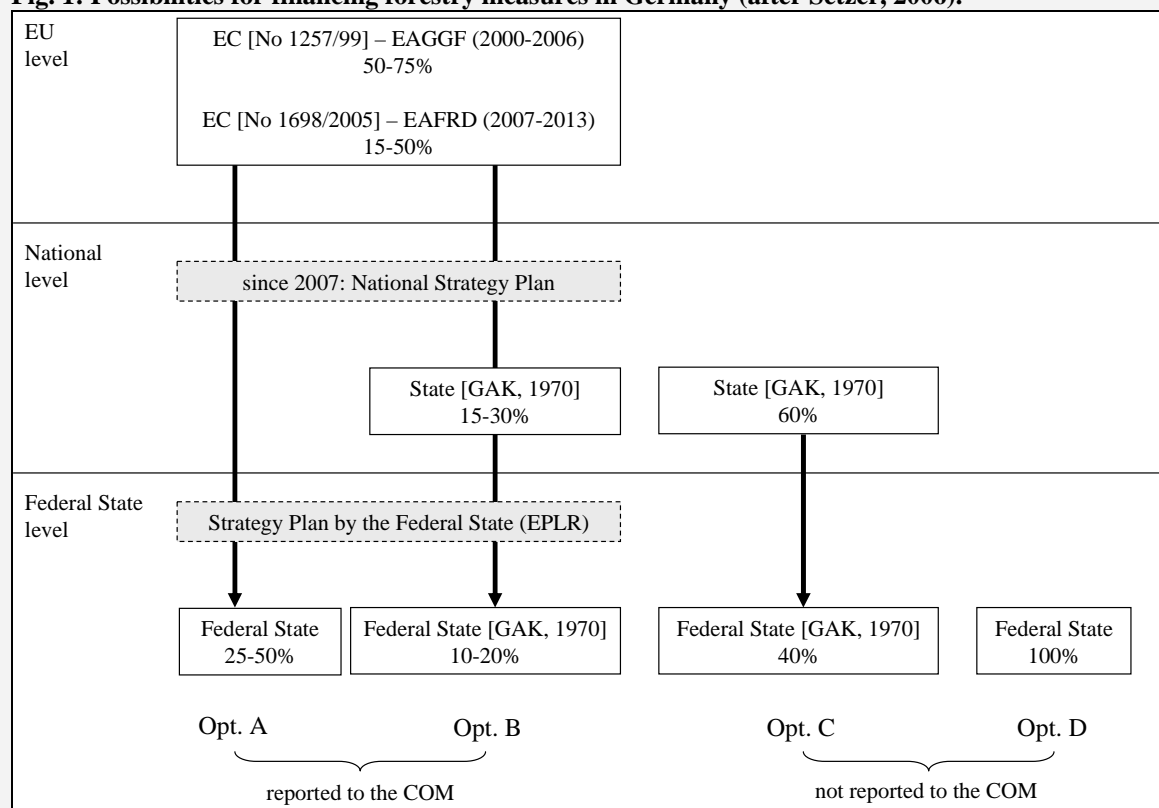
The second important financial instrument, the Rural Development Fund, was considered most relevant for forest improvement measures supporting either directly or indirectly forest damage prevention, mitigation and control. Some of the measures for which the Rural Development Fund was applied were afforestation and reforestation, understory planting, fire protection, sanitary measures and forest road construction. The effectiveness of measures towards combating forest dieback is hard to track at national level. This is either due to the complexity of different procedures financing forestry measures, which again limits transparent evaluations on the effectiveness (see case study example in Box 8), or due to contradicting effects between different measures. Afforestation and road construction for example may contribute to forest protection, or may do the opposite. Afforestation and reforestation in general helps maintain and enhance forest resources. Planting tree species not adapted to explicit forest sites can lead to forest damages like those caused by storms, insects and diseases. Networks of forest roads provide access to forest fires and therefore help forest fire fighting. In contradiction forest roads can lead to an increased fragmentation of forests, de-stabilising ecosystem functions and therefore leading to an increased vulnerability of forests.

Box 8: Financing of forestry measures under national rural development plans. Example Germany.

There are four different institutional options for financing forestry measures in Germany (Fig 9). Measures can either be directly co-financed by the Commission Fund EAFRD at the Federal State level (Opt. A) or jointly co-financed by the Commission, the State (through the: *Joint Task for the Improvement of Agricultural Structures and Coastal Protection* (GAK Programme)) and the Federal State (Opt. B). A third option is that measures are financed without any Commission contribution (Opt. C) which means that the costs are jointly covered by the national GAK Programme and individual Federal State programmes. The fourth option is that measures are only covered by the Federal State itself (Opt. D). For the first two options measures and budgets are reported to the Commission. In contrast no reporting is required for financing option C and D.

The complexity of financing forestry measures, demonstrated for the example of Germany, can thus limit transparent evaluations on the effectiveness and efficiency of measures and actions to combat forest dieback at sub-national, national and also at EU level.

Fig. 1: Possibilities for financing forestry measures in Germany (after Setzer, 2006).



To summarise, EU Member States are well aware that forests contribute to sustainable development by delivering a multitude of ecological, economic and socio-cultural services. The availability or development of instruments to prevent, combat and mitigate forest dieback is a prerequisite to guarantee these services. Another finding of the feasibility study is that in many countries specific national forest protection strategies do not exist but forest health and damages are addressed within various instruments. This may have influence on the implementation of actions to prevent, mitigate and control forest damages in a holistic view. National and sub-national efforts in combating forest dieback can vary significantly due to the

different importance of damaging agents e.g. fire, storms or diseases in different regions (see Chapter 2, Table 1).

Due to high diversity of procedures in different countries joint actions or cooperation between neighbouring countries for combating forest dieback at transnational scale, e.g. like mitigation after storm damages or damages by insects and diseases are difficult.

Within the feasibility study Member States expressed the need to be better informed about actions and programmes and the related financial instruments launched by the EC. Clear instructions on procedures for application and budget allocation for measures on prevention, mitigation, and control are requested.

3.7 Conclusion & Synthesis

The Treaty establishing the European Community makes no provision for a specific common forestry policy. However, the management, conservation and sustainable development of forests are vital concerns of existing common policies, like the Common Agricultural Policy, and the rural development, environment, trade, internal market, research, industry, development cooperation and energy policies.

The European Commission actively participates in the international forest regime and in the implementation of various commitments (see Chapter 3.2). The role of the EU to influence, support and implement international commitments as formulated by international processes such as the UNFCCC, CBD and CCD is of high importance and needs to be strengthened in future. Emphasis should be given on future challenging tasks, in particular combating the effects of climate change on forest health and vitality. This requires joint coordination but also continuation of common policy actions at European level. With respect to EU forestry related policy, actions are seen in improving forest condition monitoring, providing reliable, comparable and up-to-date information, which is essential for common decision making, e.g. developing and implementing effective prevention and mitigation measures.

The EU annually devotes considerable funds to the conservation and sustainable development of forests (see Chapter 3.5). The survey carried out in the scope of this study revealed that at the EU level there are efficient and well established measures in place to assist and support

EU Member States to combat forest dieback. Table 3 shows most relevant EU funds/financial instruments covering the three general forest protection strategy components, namely: *prevention, mitigation and control*.

Table 3: EU funds and their relevance for a protection strategy, described by the aspects *prevention, mitigation and control*.

Financial instrument	Prevention	Mitigation	Control	
			Monitoring	Management
Cohesion Fund		x (pollution)		
European Regional Development Fund	x (natural risks) x (fire) x (pollution)	x (natural risks) x (fire) x (pollution)		x (natural risks) x (fire) x (pollution)
European Social Fund				
European Union Solidarity Fund		x (fire) x (major disaster)		
Life	x (fire)		x (pollution) x (fire)	
Civil Protection mechanism	x (disasters)	x (fire) x (storms)		
Forest Focus 2003-2006	x (fire)		x (pollution) x (fire)	
Rural Development Regulation – Agri-Environmental Measures	x (natural hazards) x (fire)			
Rural Development Regulation – EAGGF	x (natural disasters) x (fire)	x (natural disasters) x (fire)		x (forest improvement) x (restoration)
Rural Development Regulation – EAFRD	x (natural disasters) x (fire)	x (natural disasters) x (fire)		x (forest improvement) x (restoration)

It can be concluded that several EU financial instruments and funds contribute directly or indirectly to the prevention, mitigation and control of forest dieback. The Rural Development Regulation and its funds can be regarded as most important in the context of combating forest dieback. Also regarded of high relevance was the support through the expired Forest Focus regulation. It supported the conduction of forest condition monitoring and protection activities of forests against fires during 2003-2006. In case of natural disasters, which include large scale forest fires, storms or floods, instruments such as the EU Solidarity Fund and the Civil Protection Mechanism are becoming increasingly relevant for the provision of fast, effective and flexible emergency financial aid. Other financial instruments can be regarded as of minor relevance towards the specific objective of directly combating forest dieback.

Means like Mid-Term Evaluations (MTE) are elaborated by EU Member States for assessing effectiveness of financial support provided by the EAGGF/EARDF. Despite these efforts the assessment of the effectiveness of individual measures towards a) one specific cause of forest dieback or b) a complex set of various causes, of different relevance in different regions is limited. This can be due to the complexity of different procedures for financing forestry measures (e.g. combining national support mechanisms with EU mechanisms) or due to contradicting effects between different measures (see Chapter 3.6). Another reason is that measures are not directly linked towards the objective of combating forest dieback with the exception of the EARDF measure *restoring forestry potential and introducing prevention actions* [Code 226]. Such indirect relevance and use of financial support for combating specific causes of forest dieback are hard to trace.

From the perspective of different causes of forest dieback (see Chapter 2) it can be concluded that not all damaging agents can equally be targeted by EU activities.

Fire is the most extensively covered damaging agent within EU funds/financial instruments. There are several measures supporting fire prevention, mitigation and control (see Table 3). In terms of prevention the EU addresses a variation of targeted forest fire measures. Forest Focus funds were available for monitoring forest fires and partly also for prevention measures. In particular, the European Forest Fire Information System (EFFIS) has shown to be an important monitoring tool addressing both pre-fire and post-fire conditions. Improvements are necessary in enhancing joint coordination and coherency between the varieties of existing fire prevention and restoration measures.

For **storms** there are also EC funds/financial instruments available, which are supporting the prevention and mitigation of storm damages, e.g. by supporting re-forestation measures. The major emphasis of EC instruments should be on the mitigation of disastrous, large scale storm events in future. Prevention measures have to aim at increasing stand stability and the propagation of site adapted tree species and are thus restricted to long term processes and risk reduction. To mitigate the excessive availability of timber after large scale storm events and the resulting changes of timber assortments, the EU may explore options for regulatory market mechanisms or support to compensate payment schemes.

The EU forest related policy has only limited possibilities of support in terms of prevention and mitigation measures when it comes to impacts of **air pollution** on forest health and vitality. Priorities are set on supporting forest condition monitoring and assessing different cause-effects between depositions of air pollutants and forest dieback. The importance of monitoring air pollution effects on forests as it is conducted under the UNECE ICP Forests scheme is widely recognised. It was financially supported by the EC Forest Focus regulation during 2003-2006. As the scope of the former Forest Focus Regulation is reflected in LIFE+, a co-financing mechanism for forest monitoring on a voluntary basis is provided in 2007-2013. A continuous financial support after 2013 should be assured to allow for the collection of data as it has been done under the Forest Focus scheme. This is especially important as such data is needed for various international reporting obligations and research activities beyond the forest sector.

Alien invasive species can cause considerable damages although often affecting forests more at regional or local scale. EC directives incorporate protective measures linked to the import or introduction of harmful organisms and products. As this may seem sufficient in terms of prevention, it may become necessary to look in more detail into the effectiveness of these measures. In this respect ongoing research activities will need to be closely monitored as they may yield substantial information and knowledge on alien invasive species. The provision of support for effective mitigation measures, which allow to control the spread of already established, persistent species should be of particular concern.

Game populations are at high levels in numerous countries causing damages, which can have considerable impacts on forest management unit level. Mitigation of damages through the reduction of game populations and fencing are rather measures of local or regional concern where the EC has limited possibilities of engagement. The Rural Development Regulation may provide support for protection measures linked to reforestation and afforestation activities. In terms of control the EC could promote effective monitoring of damages by wildlife and livestock and the improvement of data quality.

Climate change is widely regarded as the main driving force of different cause-effects on forest dieback already now and particularly in future. Changing environmental conditions induced by climate change will increase the vulnerability of European forests and result in adaptation processes. Climate change will have pronounced impacts on land use regimes,

forest health and vitality, and the sustainable supply of goods and services for the population. Challenges are seen in incorporating the different cause-effects of climate change on forest health and vitality into effective instruments and measures. Future instruments will need to embrace more strongly mitigation and control measures beside prevention activities.

In the course of forest monitoring activities huge amounts of data are being collected. In general, it can be concluded that although lots of data are collected by various monitoring initiatives like Level I, Level II and NFIs the current data availability for reporting on forest conditions and its various causes at sub-national, national and EU level is limited by data inconsistency, gaps and non-comparability. A continuous financial support for harmonised data collection assessing the different cause-effects of forest dieback is necessary for maintaining but also improving current forest monitoring systems. Based on evaluating sound and reliable information, appropriate policy mechanisms, e.g. towards prevention and mitigation of forest dieback, can be satisfactorily developed and implemented at different scales.

Having reviewed relevant EU financial instruments and the different measures, which are supported by these instruments (see Chapter 3.5), it was observed that there are partly overlaps between the objectives of different measures. Overlaps can be found in particular in forest fire prevention, mitigation and control measures, which are supported by various instruments with different backgrounds and objectives (see Table 3). Improved coordination and coherency between these measures is proposed.

The opportunities and priorities which lie within EC funds and financial instruments are substantial but need to be fully understood by potential recipients. The EC could, where necessary, pro-actively communicate such information to appropriate authorities at member state level. The variety of financial instruments, and their different application procedures, allocation options and reporting procedures can result in increased bureaucracy and coordination activities. Although several measures are already implemented, existing measures need to be further developed in order to increase synergy effects between individual instruments, to make them more transparent to a wide range of stakeholders and to improve communication between the different actors involved.

To effectively combat the various causes of forest dieback at different levels, improved coordination, communication and coherency of existing instruments is fundamental. Support for this could be provided by a specialised EU entity on forest protection.

4 Future Prospects – Options for a Forest Protection Entity

The feasibility study showed that as a consequence of the current state and the predicted development of environmental pressures (see Chapter 2), future activities at the EU level to combat forest dieback are urgently needed. In the following the objectives and alternative organisational options for future activities to combat forest dieback in the EU are presented. The recommendations are based on the assessment of past and current policy measures at national and EU level and on the current state and predicted future developments of forests and their disposition to forest dieback.

The survey carried out in the scope of the feasibility study showed that at the EU level efficient and well established measures to combat forest dieback have been implemented (see Table 3). Those measures have to be further developed in order to (a) increase synergy effects between individual instruments, (b) make the instruments more transparent to the entire range of potential stakeholders and beneficiaries, and (c) improve the communication between the different actors involved. A major challenge will be to incorporate future patterns of forest dieback, which are mainly driven by climate change, into existing, amended or new measures. As the future risks for forest ecosystem health and vitality evade forest management to a large extent, future instruments will need to address mitigation and control activities in particular beside prevention. Only the triad of prevention, mitigation and control will put the EU in a position to maintain and enhance the multiple, beneficial functions of forests and their contribution to the quality of life.

The efficiency of national and EU forest protection measures depends on purposeful programmes and instruments. In order to guarantee most effective and targeted actions for prevention, mitigation and control of forest dieback, improved coordination, communication and coherence between relevant programmes and available financial instruments for supporting forestry measures is of crucial importance. This will contribute to securing the proper financing for the most urgent issues and to improving the efficiency of the supported actions. A major issue is the coordination of forest protection measures under the Rural Development Regulation and monitoring activities, which were linked to the expired Forest

Focus regulation and are presently addressed in the financial instrument for the Environment LIFE+ (2007 to 2013).

The three major components of a forest protection strategy – **prevention, mitigation** and **control** – render a set of specific objectives necessary.

The outcomes of a survey conducted among EU Member States and personal communication with various stakeholders revealed a set of specific objectives, which were considered essential for strengthening current activities and allowing for preparation and implementation of supplementary measures at the EU level. The objectives are summarised below; the sequence of listing does not reflect a ranking of priorities.

Objectives

Communication and Coordination

The analysis of the enquiry circulated among EU Member States clearly showed that despite the satisfaction with the EU measures and financial instruments it was felt that in some cases there are difficulties in terms of transparency, regarding a) the applicability of measures, b) the options of financing and c) the evaluation of effectiveness). It was expressed that a simplification of EU measures and financial instruments would be most welcome.

The European Agricultural Fund for Rural Development (EAFRD), which provides financial support for implementing the new Rural Development Programme supports simplification and thus their understanding and effectiveness. The same general principle was applied by incorporating the expired Forest Focus regulation together with other instruments into LIFE+. LIFE+, which supports the implementation of the 6th Community Environment Action Programme consists of the three main components (1) nature and biodiversity, (2) environmental policy and governance, and (3) information and communication. Under the latter forests and forest monitoring are embedded. Besides the simplification and consolidation of its instruments the EC should consider engaging more pro-actively in support and technical guidance for Member States. Examples where support could be provided are linked to a) eligibility for funding, b) the selection of adequate financial instruments and c) their application procedures. Increased communication, coordination and a comprehensive understanding of the application options of EU financial instruments will support towards

tackling forest protection measures more effectively while respecting the principle of national/sub-national subsidiarity.

Furthermore the EC could commit to promoting (independent) assessments on the efficiency of its forest related financial instruments and measures at the EU level. Such assessments offer the potential to give insights into the performance of applied measures at Member State level, reveal success stories but also identify areas, where further guidance or development of instruments is required to mitigate the impacts of forest dieback. The EU Member States approached in the scope of the feasibility study, proposed to put in place clear guidelines and standardised procedures in order to facilitate such efficiency assessments.

As Member States have different levels of application and experience with EU instruments, it is important to support exchange of expertise and experience between Member States. This holds especially true for Member States facing similar impacts caused by forest disturbances and their associated damages.

Good cooperation and knowledge exchange already exists to some extent between individual countries. Examples are: a) programmes for knowledge-exchange and cooperation in preventing and mitigating forest fires in Mediterranean countries or b) the assistance of northern-countries to salvage logging after severe storms in central Europe. Generally, it can be concluded that knowledge transfer and cooperation between Member States needs to be promoted and strengthened. Such cooperation is especially important to protect against and/or mitigate large-scale damages on forests caused by fires, storms or insects and pests, which are often of trans-boundary nature. Facilitating the coordination of joint actions by means of applying or developing compatible prevention and mitigation measures will help to reduce the severity of various forest damages.

Monitoring, Assessment and Reporting

Monitoring is an indispensable source of information on current state and changes of forest ecosystems. Success in the conception, development, implementation, monitoring the further improvement of environmental policies and advancing the effectiveness of prevention, mitigation and control measures depends crucially on the availability of comprehensive and reliable data on the state of the environment, pressures, impacts and responses.

It can be concluded that the current monitoring, assessment and reporting of forest damages caused by storms, insects and diseases, damages by wildlife and livestock are less developed and harmonised as compared to those of forest fire and air pollutants effects. Activities are in general taken at national or regional level but not systematically synthesised at EU level although such dieback causes have been receiving increasing attention (see also Chapter 2).

Monitoring of forest condition under ICP Forests/ Forest Focus has mainly addressed forest decline caused by air pollutants and was found to fall short with relation to the identification of cause-effect relationships. This was mainly due to the fact that forest dieback is a result of complex, often site-specific interactions. Furthermore, the limited number of attributes assessed by the representative sampling Level I do not allow for causal inference and the identification of cause-effect relationships. The need to enhance the scope of parameters to be assessed is widely accepted, which will allow to further advance research and analysis on forest decline. This will also support the development and enhancement of prevention and mitigation measures. Forest condition monitoring can benefit from (a) integrating harmonised attributes into National Forest Inventory assessments with their extensive plot network or (b) by extending the harmonised assessments carried out on Level I and Level II plots. First approaches for enhanced assessments were tested for example in the EC BioSoil²⁰ (Level I) and ForestBiota²¹ (Level II) project. Generally, it can be concluded that data assessed need to be made available more easily to institutions and Commission services engaged in the monitoring of forest dieback and the identification of cause-effect relationships. For the coordination of monitoring activities related to forest health and vitality the proven cooperation between the Commission and UNECE ICP Forests should be maintained.

In terms of data management, including their storage, exchange and access the EC has a comprehensive set of information systems and databases in place. Examples are the European Forest Fire Information System (EFFIS), the Forest Focus database, or the Eurostat Forestry Database. Future prospects are seen in the development of the European Forest Data Centre (EFDAC), as a component of Shared Environment Information System (SEIS).²²

²⁰ <http://forest.jrc.it/activities/ForestFocus/biosoil.html>

²¹ <http://www.forestbiota.org/>

²² In 2005 the DG ENV, DG ESTAT, DG JRC, and EEA concluded to establish Environmental Data Centres as a joint system for the provision of data in some of the most important environmental fields, and agreed on principles for the sharing of responsibilities.

The European Forest Fire Information System (EFFIS) provides relevant information for the protection of forests against fires in Europe. It addresses pre-fire conditions i.e. forest fire risk forecasts and post-fire evaluation focused on the estimation of annual damage caused by forest fires. Plans to enhance the monitoring of forest fires in the forthcoming years are related to the post-fire phase including atmospheric emissions, vegetation regeneration, and post-fire risk analysis, thus giving more tools at hand for fire professionals and for the development of fire prevention and mitigation measures.

In recent years, there has been a growing concern among Member States that the reporting burden arising from international processes, initiatives and commitments has significantly increased. International commitments require a growing set of information to assess the current state and development of forest in terms of resources, their state of biodiversity and health, their role in the global carbon cycle, or their vulnerability to climatic change. The constantly increasing reporting obligations may thus affect the quality, completeness and timeliness of data and information submitted, rather detracting from than supporting the implementation of reporting commitments. In order to reduce the reporting burden of Member States provisions need to be taken to (a) provide assistance in meeting the requirements of various reporting obligations, (b) reduce reporting redundancies, and (c) guarantee that the submitted information is complete, reliable and comparable at all levels. It has been widely acknowledged that support is needed to adapt national monitoring, assessment and reporting procedures to given conventions, resolutions and directives.

Generally, it can be concluded that monitoring, assessment and reporting of various causes of forest dieback is fundamental for designing effective prevention and mitigation measures. Only by the means of reliable, harmonised and up-to-date information, timely response in affected regions as well as long term actions like implementing prevention measures can be assured. Collected and evaluated data provide the basis for policy and decision making. Therefore, it is important that a) financial and organisational support for monitoring, assessment and reporting activities will be assured but also b) existing monitoring, assessment and reporting mechanisms will be developed further and improved for being more efficient and capable towards future information requirements and related policy and decision making processes.

Strategic development and budget allocation

The evaluation of the performance and suitability of measures to prevent, mitigate and control forest dieback as well as recent knowledge on new patterns of forest dieback need to be utilised for the control and further strategic development of measures and instruments. Those evaluations should be used to provide the Commission with a feedback on the performance of measures taken and to identify issues that need special attention in the near future. Strategic documents and policy advice including the evaluation of ongoing measures and recommendations for future fields of activities need to be provided for the Commission. The strategic development of measures to combat forest dieback renders the joined efforts and expertise of representatives from research, monitoring and policy necessary. Of general concern the principle of subsidiary should be taken into account.

Member States expressed the need for well established structures and procedures of both financial instruments and actions to facilitate the identification of priorities. A forest protection entity could assist the EC in providing guidance to the Member States on budget allocation for prevention, mitigation and control measures for particular types of forest dieback caused by specific agents and/or affecting specific regions. Linkages to continuous monitoring, establishment of ad-hoc damage assessments and risk forecasting can assist in budget allocations. A positive example for this procedure is the European Forest Fire Information System hosted by the EC-JRC, streamlining and harmonising damage assessments and risk mapping for various causes (e.g. fire, storms, insects and diseases) could be promoted and utilised for the selection of priority actions and decisions about flexible budget allocations for supporting measures.

Coordination of actions in case of large scale, transboundary disasters

It is widely accepted that future forest dieback scenarios are likely to occur at various scales, ranging from several hectares to large regions covering several Member States. In case of large scale, transboundary disasters, activities for the assessment and the restoration of the given damages render the multi-national coordination necessary. This includes activities, which support the prevention of and preparation for crisis situations such as damage mitigation or provision of resources for crisis management as well as activities that need to be taken after catastrophic events (e.g. clearing of affected sites, reforestation, or market

interventions to stabilise timber prices). Those measures have to be compatible with national laws and the sovereignty rights of Member States.

Technical assistance in emergency cases

Especially in case of catastrophic events, the need for action can not be restricted to administrative or financial support. The Commission should facilitate the establishment of task forces that will provide technical and logistical assistance to Member States, e.g. equipment (airplanes) and technical staff for fire fighting or task forces for pest control. Those operations will be conducted only on request by Member States and have to be compatible with national laws and the sovereignty of Member States. The EU Solidarity Fund and especially the Civil Protection Mechanism could serve as examples.

Consulting by Experts

Future patterns of forest dieback will confront forest experts and national administrations with new problems, which are likely to be beyond the scope of expertise and experience available at the national level. While expertise for handling specific risks and adverse events may be available in some but not all Member States (e.g. forest fires), other threats may be new for Europe (e.g. damages caused by new invasive species). In order to implement efficient approaches to combat different aspects of forest dieback, the necessity to establish expert panels and make their expertise available to Member States was expressed. The Commission was identified as a coordinator and facilitator of expert panels and task forces that focus on specific aspects of forest dieback and are ready to consult Member States.

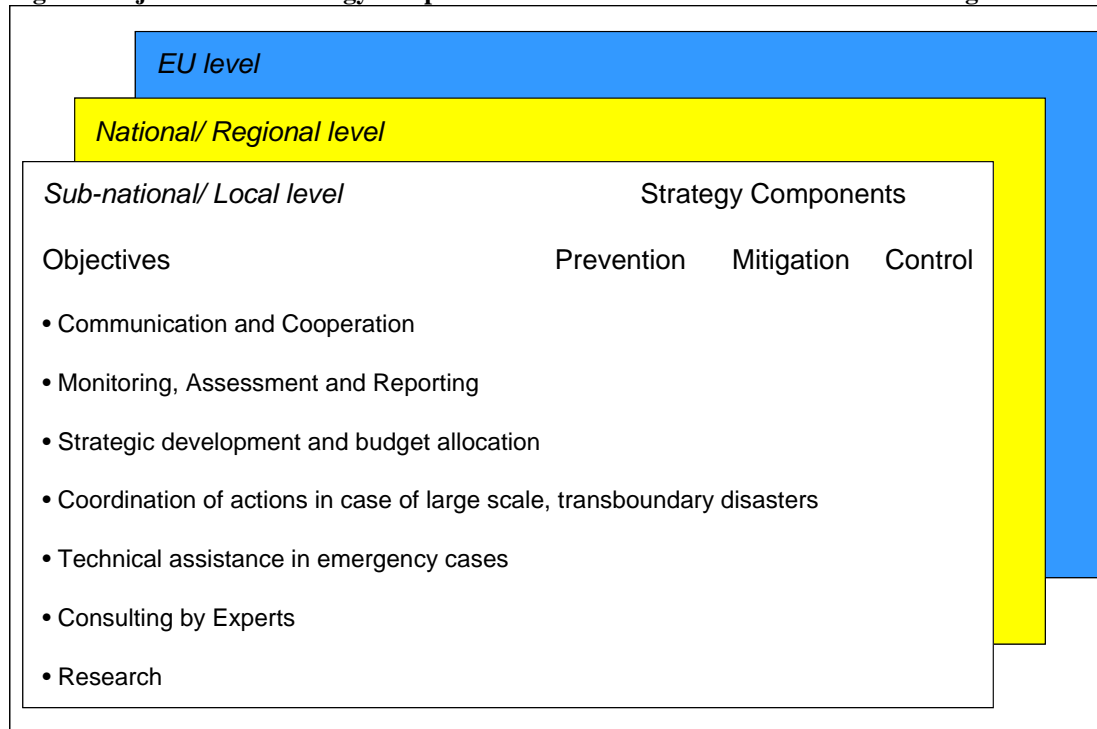
Research

The complexity of forest dieback, the existing knowledge gaps concerning driving agents and cause-effect relationships, and the uncertainty of predictions of future scenarios renders the involvement of science necessary. For each of the three major objectives – prevention, mitigation and control – applied research can provide significant contributions that allow for developing new, case-specific measures and increase their efficiency.

In addition, research activities are needed to screen and analyse already available information from surveys and scientific studies and provide synoptic analyses. For example, the data assessed by Forest Focus monitoring could be merged with data from National Forest Inventories, experimental studies and other auxiliary information (e.g. climate prognosis models, forest growth models) and provide information that allow to identify the likely range

of future scenarios and anticipate those for the development of prevention, mitigation and control measures. The EC in conjunction with the Member States will need to identify fields/topics where research is urgently needed and lobby for their inclusion into funding schemes such as the EU Framework Programmes or other relevant funding avenues.

Fig. 10: Objectives and strategy components at different level of action for combating forest dieback.



Conclusion

The tasks listed above can be applied for the entire EU or selected geographical regions, depending on specific patterns of forest dieback. Some adverse events will be restricted to the local level, while others may affect larger areas expanding across the borders of EU Member States. Beside task specific aspects the development and implementation of instruments for combating forest dieback need to take into account a geographical component (see Fig. 10). Of particular concern is to adhere to the principle of subsidiarity.

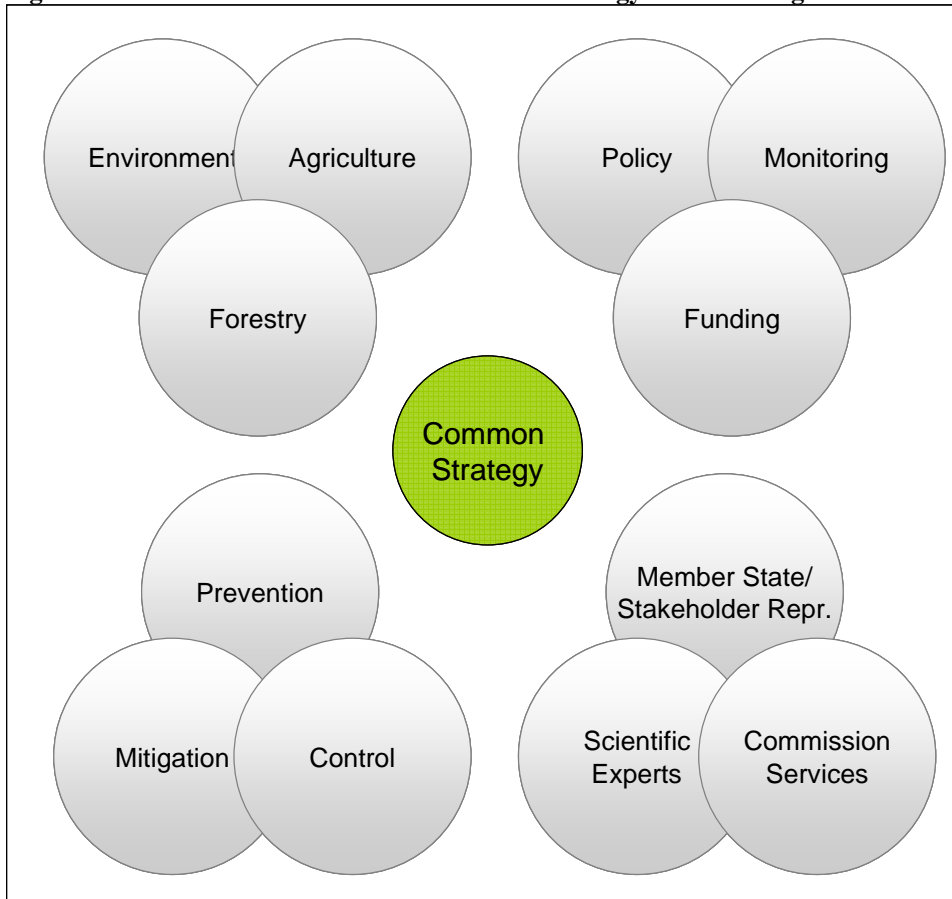
Taking into account the entire complexity of forest dieback and its linkages to other environmental, social and economic sectors, measures to combat forest dieback need to take into account (see Fig. 11):

- (1) coordination and cooperation between different sectors (e.g. environment, agriculture and forestry) and actors (Commission Services, Member States and scientific experts),
- (2) different forest protection strategy components, namely prevention, mitigation and control, and

- (3) different instruments or applications for implementation (e.g. policy, monitoring and funding).

To mitigate this complexity joint coordination and cooperation interfaces are to be supported. A continuous dialogue between all stakeholders and sectors involved, enforced by the European Parliament and the European Commission, is crucial for combating forest dieback either at sub-national, national or EU level. Several options exist to facilitate this dialogue and to establish a common organisational structure for combating forest dieback, ranging from expert panels and task forces on selected issues to a specialised entity on forest protection. In the following these options will be presented and evaluated.

Fig. 11: Cross-sectoral interfaces for a common strategy on combating forest dieback.



Organisational structure

To meet the objectives mentioned above a set of different organisational structures can be considered. The realisation of any of the alternative structures depends on a cascade of legal

constraints, the sovereignty of Member States and the willingness of different stakeholders to endorse responsibilities to a new organisational entity.

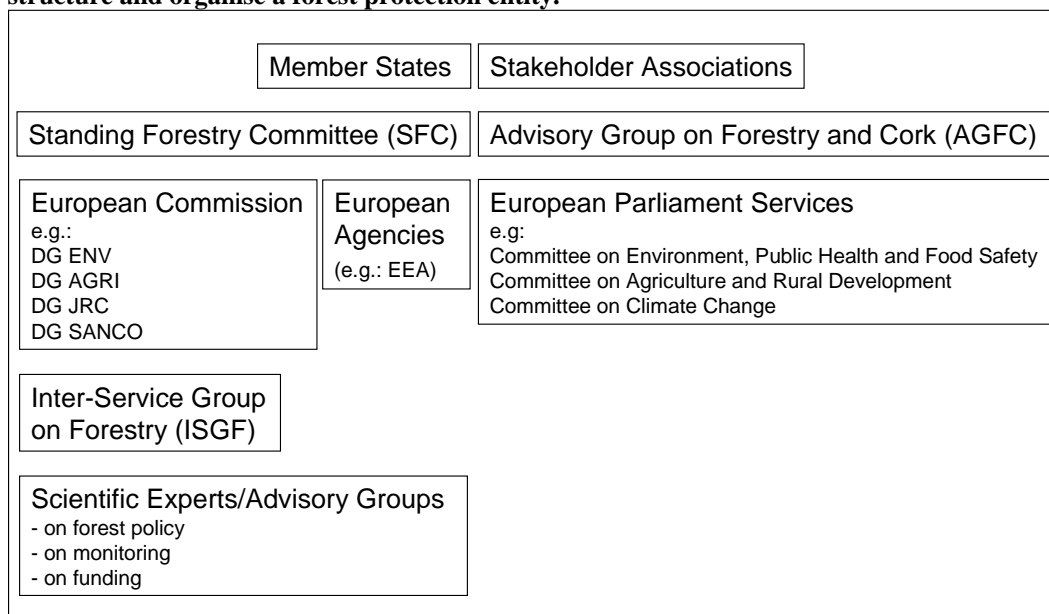
A multitude of options exists for the implementation of a forest protection entity at the EU level, which differ in the legal status and the mandate assigned to the entity. To facilitate the presentation of potential options three alternatives have been selected to stipulate discussions:

- Expert panels or advisory groups, including experts of forest related policy, monitoring and funding, which could be led by a joint coordination programme elaborated e.g. by DG ENV, DG AGRI, DG JRC and DG SANCO;
- Network of competence or virtual entity, consisting of different nodes of already established EC institutions (e.g. European Forest Data Centre, Eurostat, EEA, JRC) international programmes and centres (e.g. ICP Forests, UNECE, FAO, UN IPCC, IUFRO) and institutions and experts from Member States (e.g. forest research institutes).
- Specialised entity, implementing and coordinating on behalf of the European Commission a common strategy on combating forest dieback in the EU, with its own infrastructure and staff.

Expert panels or advisory groups are the most modest form of a structural organisation with limited obligations, while a specialised entity may represent an organisational structure with a far-reaching mandate, own staff and an own budget. A network of competence has an intermediate status and can facilitate the cooperation of already existing EC and non-EC organisations.

Without reference to the legal form of the different options already existing relevant bodies need to be involved in the discussion and selection of the final organisational form and its mandate. In Fig. 12 the most relevant bodies are listed that need to be consulted when discussing the different options on how to organise and assign mandates to a forest protection entity.

Fig. 12: Relevant bodies, which should be taken into account when discussing different options how to structure and organise a forest protection entity.



Depending on the organisational and legal form different objectives and tasks for a specialised entity can be defined. Table 4 presents the objectives described above and the potential of the three options to meet these objectives. One or several expert groups would be the most modest organisational format, which would mainly be dedicated to consulting. To a limited extent research activities could be assigned to expert groups.

A specialised entity could meet all objectives. Monitoring, assessment and reporting would need to be coordinated with already existing EC-institutions and their mandates, e.g. the EC-JRC. The specialised entity could have an own budget for research activities or assign mandates to external research institutions.

A virtual network of competence has an intermediate position and mandate. A couple of mandates and objectives could only be partially assigned to the virtual network.

Table 4: Objectives assigned to different options of organisational formats.

Options of Organisation Objectives	Expert group	Virtual network of competence	Specialised entity
Communication and Cooperation		(X)	X
Monitoring, Assessment and Reporting		X	(X)
Strategic development and budget allocation		(X)	X
Coordination of actions in case of large scale, transboundary disasters		(X)	X
Technical assistance in emergency cases		(X)	X
Consulting by experts	X	X	X
Research	(X)	X	(X)

The final decision about the selection of any option depends on the intention of the Member States and the availability of budgets. Forest dieback and the future challenges to forest ecosystems and the forest sector render joint efforts necessary. It is widely accepted that future challenges to European forests extend far beyond the complexity than only associated with air pollution effects on forest condition. It is beyond controversy that the multiple functions of forests need to be maintained. According to EEA's report on vulnerability and adaptation to climate change in Europe (EEA, 2006) the Mediterranean regions and continental Europe will experience decreases in yield due to more frequent droughts. In addition, increased risks of fire are likely in southern Europe like are storms in central Europe. The likely increase of risks to forest ecosystems renders joint activities necessary.

The need to implement a joint EU policy to combat forest dieback has been expressed unequivocally. The challenge remains how the political imperative to combat forest dieback can be implemented in EU policy instruments while respecting the principle of subsidiarity.

5 List of References

COM (2004) 621 final: Proposal for a Regulation of the European Parliament and of the Council concerning the Financial Instrument for the Environment (LIFE+)

COM (2006) 302 final: Communication from the Commission to the Council and the European Parliament of 15 June 2006 on an EU Forest Action Plan

Commission Regulation (EC) No 2355/2002 of 27 December 2002 amending Commission Regulation (EC) No 438/2001 laying down detailed rules for the implementation of Council Regulation (EC) No 1260/1999 as regards the management and control systems for assistance granted under the Structural Funds

Council 2004, Preventing Forest Fires – Report to Committee on the Environment, Agriculture and Local and Regional Affairs of the Council of Europe, see:
<http://assembly.coe.int/Main.asp?link=/Documents/WorkingDocs/Doc06/EDOC10962.htm>

Council Decision 89/367/EEC in May 1989 setting up a Standing Forestry Committee

Council Decision of 23 October 2001 establishing a Community mechanism to facilitate reinforced cooperation in civil protection assistance

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

Council Regulation (EC) No 1257/1999 of 17 May 1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations

Council Regulation (EC) No 1260/1999 of 21 June 1999 laying down general provisions on the Structural Funds

Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (EUSF)

Council Regulation (EEC) No 1973/92 of 21 May 1992 establishing a financial instrument for the environment (LIFE)

Council Regulation (EEC) No 2158/92 of 23 July 1992 on protection of the Community's forests against fire (OJ L217, 31. 7. 1992)

Council Regulation (EEC) No 3528/86 of 17 November 1986 on the protection of the Community's forests against atmospheric pollution

Council Resolution of 15th of December 1998 on a Forestry Strategy for the European Union (1999/C 56/01)

DGRF, 2006: Relatório sobre Incêndios Florestais (2005), Direcção Geral dos Recursos Florestais (DGRF), see: http://194.38.148.228/images/stories/dgrf_if_

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

EC-JRC, 2006: Forest Fires in Europe 2005, European Commission – Joint Research Centre, see: <http://effis.jrc.it/documents/2006/ForestFiresInEurope2005.pdf>. 53 p.

EC-JRC, 2007: The European Forest Fire Information System Newsletter, Issue 2007 (3). EC-Joint Research Centre, Institute for Environment and Sustainability, see: http://effis.jrc.it/documents/2007/EFFIS_Newsletter_3_2007_small.pdf. 22 p.

EEA, 2007: Halting the loss of biodiversity by 2010: Proposal for a first set of indicators to monitor progress in Europe, EEA Technical Report 11/2007

- EEA, 2005: Vulnerability and adaptation to climate change in Europe. European Environmental Agency, Technical Report 7/2005. 79 p.
- EFI, 2005: Evaluating Financing of Forestry in Europe, EFFE (QLK5-CT-2000-01228)
<http://www.efi.fi/projects/effe/>
- FAO, 2006: Global Forest Resources Assessment 2005, Progress towards sustainable forest management. FAO Forestry Paper 147EC, 1997: Study on European Forestry Information and Communication System – Reports on Forestry Inventory and Survey Systems – Volume 1, 2, Belgium 1997, 1328 p.
- ICP Forests, 2006: The condition of forests in Europe, 2006 Executive Report, Federal Research Centre for Forestry and Forest Products (BFH), United Nations Economic Commission for Europe, Geneva 2006, 33 p.
- ICP, Forests, 2004: The condition of forests in Europe 2004, Executive Report, Federal Research Centre for Forestry and Forest Products (BFH), United Nations Economic Commission for Europe, Geneva 2004, 52 p.
- Janse, G., 2005: European-Cooperation and Networking in Forest Communication, European Forest Institute, EFI Technical Report 20
- Köhl, M., Päivinen, R., 1996: Definition of a System of Nomenclature for Mapping European Forests and for Compiling a Pan-European Forest Information System, Ispra, Joint Research Center, Joensuu, European Forest Institute, Birmensdorf, WSL, EUR 16416 EN, 238 p.
- Köhl, M., Päivinen, R., Traub, B., Miina, S., 1997: Comparative Study, in: Study on European Forestry Information and Communication System: Report on Forest Inventory and Survey Systems, European Commission, Luxembourg: 1267-1322.
- MCPFE, 2002a: Improved Pan-European Indicators for Sustainable Forest Management, Vienna, 6 p.

- MCPFE, 2002b: Relevant Definitions used for the Improved Pan-European Indicators for Sustainable Forest Management, MCPFE Expert Level Meeting, Vienna, MCPFE Liaison Unit. October 2002.
- MCPFE, 2003, State of Europe's forests 2003, The MCPFE Report on Sustainable Forest Management in Europe, 114 p.
- MCPFE, 2005: National Forest Programmes in Europe, Steps taken by the MCPFE towards the development, dissemination and implementation of the concept of National Forest Programmes in Europe, Warsaw 2005
- MCPFE, 2007: State of Europe's Forests 2007, The MCPFE report on sustainable forest management in Europe, Jointly prepared by the MCPFE Liaison Unit Warsaw, UNECE and FAO, Warsaw 2007, 263 p.
- MIMAM, 2006: Los incendios forestales en España durante el año 2005, Ministerio del Medio Ambiente, http://www.mma.es/secciones/biodiversidad/defensa_incendios/estadisticas_incendios/pdf/incendios_forestales_2005.pdf
- Official Journal of the European Union, 2007/C 232/05 ISSN 1725-2423, Volume 50
- Päivinen, R., Köhl, M. (Editors), 2005: European Forest Information and Communication System (EFICS), EFI Technical Report No. 17, European Forest Institute, Joensuu, Finland, 199 p.
- Regulation (EC) No 1655/2000 of the European Parliament and of the Council of 17 July 2000 concerning the Financial Instrument for the Environment (LIFE)
- Regulation (EC) No 1682/2004 of the European Parliament and of the Council of 15 September 2004 amending Regulation (EC) No 1655/2000 concerning the Financial Instrument for the Environment (LIFE)
- Regulation (EC) No 2152/2003 of the European Parliament and of the Council of 17 November 2003 concerning monitoring of forests and environmental interactions in the Community (Forest Focus)

Regulation (EC) No 614/2007 of the European Parliament and of the Council of 23 May 2007 concerning the Financial Instrument for the Environment (LIFE+)

Schelhaas, M.J., Nabuurs, G.J., Schuck, A., 2003: Natural disturbances in the European forests in the 19th and 20th centuries, *Global Change Biology*, 9 (11), p. 1620-1633

Setzer, F., 2006: Zur institutionellen und finanziellen Umsetzung der forstlichen Förderung in Deutschland, *Forst u. Holz*, 61, Nr.2, p.43-46

UNECE/FAO 2005. European Forest Sector Outlook Study – Main Report. Geneva Timber and Forest Study Paper 20. ECE/TIM/SP/20. Geneva 2005. 234 p.

UNECE/FAO, 2000: Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand (TBFRA 2000), Main report, UNECE/FAO Contribution to the Global Forest Resources Assessment 2000, United Nations, New York and Geneva 2000, 445p.

WSL/BUWAL, 2001: Lothar - Der Orkan 1999, Ereignisanalyse, Birmensdorf, Bern; Eidg. Forschungsanstalt WSL, Bundesamt für Umwelt, Wald und Landschaft BUWAL (eds), 365 p.