Policy Foundations Review for Geographically Explicit Information Needs on Forests

Jo Van Brusselen and Andreas Schuck

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Publisher: European Forest Institute
Torikatu 34, FIN-80100 Joensuu Finland
Tel. + 358 13 252 020
Fax. + 358 13 124 393
Email. Publications@efi.fi
http://www.efi.fi

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Foreword

Global Monitoring for Environmental and Security (GMES) is a joint initiative of the European Space Agency (ESA) and European Commission (EC), providing a response to the constantly growing needs for global information to support Europe's policies in the areas of Environment and Security. The main goal of both ESA and the EC for the GMES programme is to establish a European capacity for the provision of operational information services for global monitoring of environment and security. This further supports the European Commission's INSPIRE initiative for harmonizing and development of the infrastructure for spatial information in Europe.

The GMES Service Element (GSE) is part of the ESA Earthwatch Programme. GSE aims to delivers policy-relevant services to end-users, primarily (but not exclusively) from Earth Observation sources. The objective is to integrate existing and novel data sources, both data collected on the ground as well as air and space borne remote sensing data. GSE is an important element of GMES, as it will enable end-users to become key players in the move from present generation Earth Observation satellites to future European systems that will deliver vital information on global environment and security.

Stage 1 of the GSE Programme (2003-2004) - the consolidation stage - focused on consolidating, aggregating and improving existing pre-cursor services in order to make them sustainable within a reasonable timeframe. In Stage 2 (2005-2008) emphasis will be put on increasing the delivery of services and the benefits for users, establishing a durable service-provision network, and demonstrating progress towards long-term sustainability of the services.

The GMES identified the need for dedicated forest monitoring as one of the thematic priorities. ESA contracted an international Consortium led by GAF-AG (Germany) to consolidate the GMES Service Element for Forest Monitoring (GSE FM). GSE FM now unites European know-how and technology through an open partnership consortium structure with operational forest monitoring services which will gradually be made available world-wide.

The document concerns an update of the Policy Foundations Review that the European Forest Institute delivered during Stage 1. The Policy Foundations Review presents an analysis of the forest and environmental policy framework, in support of the policy-driven and user-relevant development of the GSE Forest Monitoring services.

October 2005, Frascati, Italy

Mark Doherty,
EO Programmes Directorate
European Space Agency

October 2005, München, Germany

Thomas Häusler
Project Manager GSE Forest Monitoring
GAF-AG

Executive summary

A policy foundations review has been conducted by the European Forest Institute as part of the public policy analysis and strategic planning for the GMES Service Element (GSE) Forest Monitoring. Major global and European environmental policies and instruments have been studied for information requirements on forests, with a possible role for Earth Observation. The findings will allow the GSE Forest Monitoring project to take into consideration immediate policy requirements when developing its Earth Observation services.

The policy processes under review in this document are: the United Nations Environmental Conferences, the United Nations Framework Convention on Climate Change and its Kyoto Protocol, the United Nations Convention on Biological Diversity, the United Nations Convention to Combat Desertification, the United Nations Forum on Forests, Criteria and Indicator processes and the Ministerial Conference on the Protection of Forests in Europe, the Council of Europe Landscape Convention, the European Union Forest Focus Regulation, National Forest Programmes, and the issues illegal logging and forest certification.

The Framework Convention on Climate Change and the Forest Focus Regulation concern climate change and atmospheric pollution. The ultimate objective of the Framework Convention on Climate Change is the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol aims to contribute to this objective by promoting the reduction of emissions of carbon dioxide by sources and the removal from the atmosphere and the durable storage of carbon in sinks. To this end, considerable attention is given to the role of forests. The Forest Focus Regulation is a policy instrument to continue and reinforce the monitoring of atmospheric pollution and their effect on forests and to monitor and enhance the prevention of forest fires at the European level. In the near future it will additionally integrate the monitoring of issues like biodiversity and carbon sequestration.

Desertification, addressed by the Convention to Combat Desertification, is also related to climate and climate change but in most cases it is related to unsustainable land use, whether it is through deforestation or through improper agricultural practices.

The remaining policy processes relate to biodiversity and sustainable forest management. The main objective of the Convention on Biological Diversity is the protection of biological diversity, among which forest (biological) diversity has its place. The United Nations Forum on Forests and the Ministerial Conference on the Protection of Forests in Europe have among their main objectives the preservation of sustainably managed forests. The Landscape convention aims at preserving all types of landscapes. National forest programmes are holistic processes that address forestry issues defined by stakeholders, national and international policy processes. The G8 special Action Programme on Forests addressed combating illegal logging and forest law enforcement, governance and trade, with the main aim to stimulate sustainable use of forest resources. Forest certification is a market-based initiative to guarantee consumers through third party audit and certification that wood products originate from sustainably managed forests.

While these policies differ in their main objectives, they often require identical or similar information. The identification of these information needs will allow to react in a coordinated way, thus taking into account different requirements simultaneously, based on a harmonised assessment methodology.

The most stringent and specific information requirements result from the Framework Convention on Climate Change and the Kyoto Protocol. The Kyoto Protocol will be the only process, upon ratification, with such criticality of information that non-information can result e.g. to legal procedures with (direct or indirect) financial implications. This is one reason why it has been pre-defined as the most important target policy of GSE Forest Monitoring. For other policy areas, absence of detailed information would not have such severe consequences. However that lack could lead to less efficient and effective governing from regional to national level, with undesired effects at the forest management level.

The information needs identified from the policy review can be separated into three main categories, being: “Area”, “Biomass” and “Disturbances”. The most important variables are derived from the Kyoto Protocol and relate to the surface and biomass contained on areas of afforestation, deforestation and reforestation. The most important disturbance variables are derived from the Forest Focus Regulation and are related to defoliation of the forest canopy and to forest fires.

Stakeholders may already have monitoring schemes in place or they may be under preparation. The quality of in-situ observations and estimations could be largely improved when combining these information sources with the wall-to-wall mapping power of Earth Observation infrastructure.

The identified needs from the Policy Foundations Review will be presented to stakeholders. They will be asked to acknowledge and prioritise those needs. The stakeholders’ input is seen as essential in particular towards the compliance with standards that are specific to a country or region under consideration.

Table of Contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

AAU	Assigned Amount Units
Ac	Accession
AE	CDM Applicant Entity (part of CDM project cycle)
AIJ	Activities Implemented Jointly
Ap	Approval
AP panel	CDM panel for the accreditation of operational entities
AR	Afforestation, Reforestation
ARD	Afforestation, Reforestation and Deforestation
At	Acceptance
BEAR	Biodiversity Evaluation Tools for European Forests
Bio-IMPS	Biodiversity Implementation Indicators
Bio-TEN	Top 10 National Biodiversity Indicators
C&I	Criteria and Indicators
C&I for SFM	Criteria and Indicators for Sustainable Forest Management
C.I.	Confidence interval
CAFE	Clean air for Europe
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CEC	Commission of the European Communities
CER	Certified Emission Reduction
CH_4	Methane
CHM	Clearinghouse Mechanism
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Conservation of Migratory Species of Wild Animals
CO_2	Carbondioxide

CO_2-e	CO_2 emissions
CO_2-r	CO_2 reductions
COP	Conference of the Parties
COP/MOP	Conference of the Parties serving as the Meeting of the Parties
COP/MOP-x/y	Conference of the Parties at its xth session serving as the Meeting of the Parties at its yth session
COP-x	Conference of the Parties at its xth session
COST E19	European Cooperation in the Field of Scientific and Technical Research; E19 – National Forest Programmes in a European Context
CPF	Collaborative Partnership on Forests
CSD	Commission on Sustainable Development
CSD	Commission on Sustainable Development
DG	Directorate General
DG AGRI	Directorate General of Agriculture of the Commission of the European Communities
DG ENV	Directorate General of Environment of the Commission of the European Communities
DNA	Designated National Authority (part of CDM project cycle)
DOE	Designated Operational Entity (part of CDM project cycle)
EAGGF	European Agricultural Guidance and Guarantee Fund
EAP	Environmental Action Programme
EB	Executive Board of the CDM
ECE	United Nations Economic Commission for Europe
ECOSOC	Economic and Social Committee of the United Nations
ECOSOC	UN Economic and Social Council
EEA	European Environment Agency
EEC	European Economic Union
EfE	Environment for Europe
EFICN	European Forestry Information and Communication Network
EFICS	European Forestry Information and Communication System

EIF	Entry Into Force
EO	Earth Observation
Eq.	Equivalent
ERU	Emission Reduction Units
EU	European Union
EU15	The European Union of the 15 Member States: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, Sweden and The United Kingdom of Great Britain and Northern Ireland
EUFORGEN	European Forest Genetic Resource Programme to implement MCPFE resolution S2 on the conservation of forest genetic resources
EUNIS	European Nature Information System
FAO	Food and Agriculture Organisation of the United Nations
FLEG(T)	Forest Law Enforcement, Governance (and Trade)
FSC	Forest Stewardship Council
G8	The G8 (Group of 8) is an informal group of eight countries: Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States. Each year, G8 Leaders and representatives from the European Union meet to discuss broad economic and foreign policies.
GEF	Global Environment Facility
Gg	Giga-gram = 1000 tons = 10^9 grams
GHGI	Greenhouse Gas Inventory
GMES	Global Monitoring for Environment and Security
GPG	Good Practice Guidance
GSE	GMES Service Element
ICP-Forests	International Cooperative Programme on assessment and monitoring of air-pollution effects on forests operating under UNECE
IFF	Intergovernmental Forum on Forests
ILO	International Labour Organisation
IPCC	Intergovernmental Panel on Climate Change
IPF	Intergovernmental Panel of Forests

IUCN	The World Conservation Union (previously International Union for Conservation of nature and Natural resources)
IUFRO	International Union of Forest Research Organizations
IWG-BioMIN	International Working Group on Biodiversity Monitoring and Indicators
KP	Kyoto Protocol
LUCF	Land-Use Change and Forestry
LULUCF	Land Use, Land-Use Change and Forestry
M&P	Modalities and Procedures of the CDM
MCPFE	Ministerial Conference on the Protection of Forests in Europe
Meth panel	CDM methodological panel – To develop recommendations to the Board on guidelines for methodologies for baselines and monitoring plans
MOP	Meeting of the Parties
N_2O	Dinitrogen monoxide
NFP	National Forest Programme
NGO	Non-governmental organisation
NMVOC	Non-Methane Volatile Organic Compounds
OECD	Organisation for Economic Cooperation and Development
PACD	Plan of Action to Combat Desertification
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
PEFC	Pan European Forest Certification
PEOLG	Pan European Operational Level Guidelines for SFM
PP	CDM Project Participant (part of CDM project cycle)
R	Ratification
RMU	Removal Unit
SBSTA	UNFCCC Subsidiary Body for Scientific and Technological Advice
SBSTTA	CBD Subsidiary Body on Scientific, Technical and Technological Advice
SCBD	Secretariat of the Convention on Biological Diversity
SFM	Sustainable Forest Management
Sig	Signatory

SO_x	Sulphuric oxide
SSC panel	Small Scale CDM panel - To recommend simplified modalities and procedures for small-scale CDM project activities to the Board
TBFRA	Temperate and Boreal Forest Resources Assessment
TESEO	Treaty Enforcement Services using Earth Observation
UN	United Nations
UN ECE	United Nations Economic Commission for Europe
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCOD	United Nations Conference on Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
URF	Uniform Reporting Format
WCMC	World Conservation Monitoring Centre
WMO	World Meteorological Organisation
WSSD	World Summit on Sustainable Development
x/CMP.y	UNFCCC decision x (to be) adopted at the COP/MOP at session y
x/CP.y	UNFCCC decision number x taken at the COP during session y

Policy Foundations Review

1. Introduction

The policy foundations review identifies policy areas that could support a portfolio with reference to Forest Monitoring services within the priority theme "Land Cover Change in Europe". In the following chapters, a brief first description is given of relevant policy processes and activities and the information requirements they pose to the policy makers in order to fulfil reporting obligations and to forest managers that need information for the practical implementation into their daily business.

The increased attention towards environmental policy in the last decades has altered countries' and regions' reporting requirements on forests and forestry. The United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, 1992) was a milestone amongst the United Nations Environmental Conferences. UNCED agreed on principles for sustainable development and it lead to conventions like the United Nations Framework Convention on Climate Change, the United Nations Convention on Biological Diversity and the United Nations Convention to Combat Desertification. The UNCED principles and conventions have given effect to many subsequent regional, national and sub-national policy processes.

International organisations like the Food and Agricultural Organisation of the United Nations and the International Tropical Timber Organisation need specific information for their operations from Member States.

The policy that has been investigated for needs for geographically referenced information, can be seen as dealing with two major topics. These are related to "atmospheric pollution and climate change" and "biological diversity and sustainable forest management":

Atmospheric pollution and climate change:

The United Nations Framework Convention on Climate Change and its Kyoto Protocol present a global tool with legal backing for combating the adverse effects of emissions of greenhouse gasses.

The Council Regulation concerning monitoring of forests and environmental interactions in the European Community (Forest Focus) will build further on European Union initiatives for monitoring and mitigating atmospheric pollution and forest fires.

Biodiversity and sustainable forest management:

The Convention on Biological Diversity aims at protecting the world's biodiversity. In its process it presents a holistic strategy to achieving this objective.

The Convention to Combat Desertification focuses on the prevention, rehabilitation and reclamation of areas threatened by desertification. Climate change can put extra pressure on areas' vulnerability to desertification, but the threat comes from the largest part from unsustainable land practices like deforestation and improper agricultural practice.

The United Nations Forum on Forests finds its roots and builds further on the 270 proposals for action that were drawn up by the preceding Intergovernmental Panel on Forests and its successor the Intergovernmental Forum on Forests in the follow-up process of UNCED. The Forum puts strong attention to encouraging countries in designing and implementing National Forest Programmes.

Worldwide, numerous activities have been set up to define criteria and indicators for sustainable forest management. At the European level the Ministerial Conference on the Protection of Forests in Europe proposes a list of criteria and indicators that allow monitoring the state of the forests in Europe. The Ministerial Conference on the Protection of Forests in Europe supports the implementation of National Forest Programmes at the European level.

National Forest Programmes present a holistic approach to the management of forests, from the national/regional to the local level. Although these programmes are influenced and partly steered by diverse international treaties, they are situated between the needs of providing information for reporting obligations and demanding information necessary for immediate practical implementation. This includes active management of the forest resource.

Combating illegal logging and forest law enforcement, governance and trade were addressed by the G8 special Action Programme on Forests, with the main aim to stimulate sustainable use of forest resources.

Forest certification is a market-based initiative to guarantee consumers through third party audit and certification that wood products originate from sustainably managed forests, thus enabling implementation of the sustainability principles agreed in policy.

Definitions and methodologies

The various reporting formats often require the same information twice and thus causing duplication of efforts, due to overlap in the information needs. However, in many cases the information for an item is specified in slightly differing definitions. This causes not only needless duplication of effort in reporting but also leads to additional methodological problems in the event that a national inventorying system is not designed to perform under such required flexibility.

Asked by the United Nations Forum on Forests, the Food and Agricultural Organisation of the United Nations has set up a process for streamlining of definitions and of the reporting itself in order to facilitate the reporting and to ultimately decrease the burden on the governmental stakeholders. This point of convergence of definitions is however not yet in immediate reach. Earth Observation tools should in their design consider the inclusion of sufficient flexibility in order that the system can provide information according to different if not all existing definitions. Furthermore, the required information is not always readily available. Different data acquisition methodologies can lead to a reduced comparability of data.

The identification of unique, similar or identical information needs across the policy spectrum will allow reacting on the demand in a coordinated way thus taking into account possibly different requirements towards the information simultaneously. This will allow also preventing duplication of efforts, with a positive influence on the cost-effectiveness of both the development and of the application of information tools based on the unique input from Earth Observation.

2. United Nations Conferences on the Environment

2.1. General Policy Outline

2.1.1. General Scope and Objectives of the Policy

In the end of the 1960s and 1970s, the effects of environmental degradation through e.g. water and air pollution become more and more visible and lead to public concern. IN response, the United Nations Conference on Human Environment (Stockholm, 1972) was the first of its kind in a series of UN conferences during the last three decades, which brought Member States together to discuss and tackle current environmental problems.

In 1987 the World Commission on Environment and Development (WCED) published a report promoting the principle of sustainable development. Taking into account economic, social and environmental aspects of sustainable development, the report laid the foundations for the United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, 1992), the "Earth Summit".

UNCED resulted in the adoption of three non-binding instruments: the Rio Declaration, the Forest Principles and the Agenda 21, a plan for achieving sustainable development in the 21st century, the latter of which Chapter 11 is especially of importance to forestry.

The Rio Declaration on Environment and Development (Annex I to the UNCED proceedings) explains in 27 Principles that good governance of the Earth's environment has to go hand in hand with sustainable economic and social development. It introduces environmental impact assessment, as a national instrument, to be undertaken for proposed activities that are likely to have a significant adverse impact on the environment. Further it calls for transboundary cooperation in urgent environmental matters.

The Chapter 11 of Agenda 21 (Annex II to the UNCED proceedings) focuses on combating deforestation in 4 programme areas, being:

- Sustaining the multiple roles and functions of all types of forests, forest lands and woodlands

- Enhancing the protection, sustainable management and conservation of all forests, and the greening of degraded areas, through forest rehabilitation, afforestation, reforestation and other rehabilitative means

- Promoting efficient utilizations and assessment to recover the full valuation of the goods and services provided by forests, forest lands and woodlands

- Establishing and/or strengthening capacities for the planning, assessment and systematic observations of forests and related programmes, projects and activities, including commercial trade and processes. The concerned programme activities foresee the need and include provision for human resource development in terms of specialization (e.g. the use of remote-sensing, mapping and statistical modelling), training, technology transfer, fellowships and field demonstrations.

The Forest Principles (Annex III to the UNCED proceedings) are a non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests, both natural and planted, in all geographical regions and climatic zones.

Further of particular interest to this report are Chapter 12 "Managing fragile ecosystems: combating desertification and drought" and Chapter 15 "Conservation of biological diversity". Chapter 40 "Information for decision-making" includes a recommendation that countries and international organizations should make use of new techniques of data collection, including satellite-based remote sensing.

UNCED opened the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity for signature, and it called on the UN General Assembly to establish an Intergovernmental Negotiating Committee to prepare a Convention to Combat Desertification, particularly in Africa, which was adopted in 1994.

UNCED has effectively determined the environmental policy agenda for the decades beyond 1992. In the United Nations Millennium Declaration and in its "Millennium Development Goals" (New York, 2000), and in the Declaration of the World Summit on Sustainable Development (WSSD, Johannesburg, 2002), UN Member States reaffirmed their commitment for the full implementation of the principles of sustainable development including those set out in Agenda 21. They resolve to intensify their collective efforts for the management, conservation and sustainable development of all types of forests. 'To ensure environmental sustainability' and 'to reverse the loss of environmental resources' are some of the eight Millennium Development Goals that UN Member States have set as target to be reached by 2015. This includes the target to integrate the principles of sustainable development into country policies and programmes and to reverse the loss of environmental resources (UN, 2000).

The United Nations Commission on Sustainable Development (CSD) was created in December 1992 to ensure effective follow-up of UNCED; and to monitor and report on implementation of the Earth Summit agreements at the local, national, regional and international levels. The CSD is a functional commission of the UN Economic and Social Council (ECOSOC) (CSD, 2003-1). The Division for Sustainable Development serves as the substantive secretariat responsible for servicing the Commission on Sustainable Development; for follow-up of the implementation of Agenda 21 as well as the Plan of Implementation (POI) of the World Summit on Sustainable Development (CSD, 2003-2).

2.1.2. Status of Participation/Ratification and Implementation

United Nations environmental conferences are organised under the authority of the UN General Assembly. UNCED was attended by 178 States, more than 50 intergovernmental organizations and several hundreds of non-governmental organizations. The European Union also attended the Conference and is party to its subsequent the treaties as an economic integration organisation.

2.1.3. Policy Timeline and Agenda

The work of the Commission on Sustainable Development is organised according seven two-year cycles, until 2017, with each cycle focusing on selected thematic clusters of issues.

Besides the cluster-specific concerns, means of implementation should be addressed in every cycle as well as linkages to other cross-cutting issues, like: protecting and managing the natural resource base of economic and social development, sustainable development for Africa, and the institutional framework for sustainable development (CSD, 2003-3).

Especially three clusters relate to topics of high relevance for GSE Forest Monitoring: forests and land cover, biodiversity and climate change (UN, 2003a). Climate change is one of the themes of the cycle 2006-2007. Agriculture, rural development, land, drought, desertification and Africa are the themes for the cycle 2008/2009. Forests,biodiversity, biotechnology, mountains and tourism are of specific concern in the cycle 2012/2013.

The secretariats of the UNCCD and CBD with the cooperation of the UNFCCC secretariat have held a workshop in Viterbo, Italy from 5 to 7 April 2004 on "Forests and Forest Ecosystems: Promoting Synergy in the Implementation of the three Rio Conventions."

2.1.4. Access to Information

Principle 10 of the Rio Declaration states that at the national level, each individual should have appropriate access to information concerning the environment that is held by public authorities (UN, 1992). This concept has been further developed with the Aarhus Convention on Access to Information, Public Participation in Decision–Making and Access to Justice in Environmental Matters (Aarhus, 1998) (UNECE, 1998). The Aarhus Convention requests each party to ensure that public authorities, in response to a request for environmental information, make such information available to the public, within the framework of national legislation.

2.2. Relations to or Inter-linkages between Policies

UNCED was the first occasion where global consensus was reached on linkages between environmental protection and socio-economic development, shaping the concept of global sustainable development. It was the seedbed for globally important conventions like the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on Biological Diversity (UNCBD) and the United Nations Convention to Combat Desertification (UNCCD).

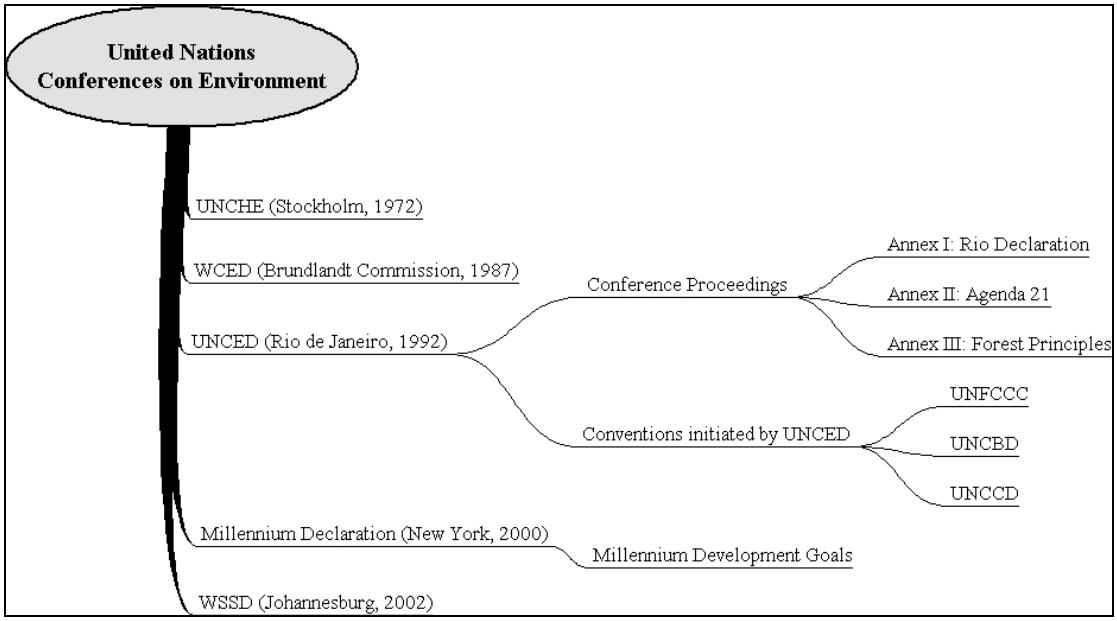

Figure 1. United Nations Conferences on Environment and derived processes

2.3. Terms and Definitions

The WCED defined sustainable development as: "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This early definition, although further developed for specific domains, still is the basis for all work on issues related to sustainability.

2.4. Reporting Requirements and Information Needs with EO Potential

In the UNCED proceedings report under Chapter 40 'Information for decision making', there is a call for the improvement of data collection and use (UN, 2000). It is stated that "Countries and, upon request, international organizations should carry out inventories of environmental, resource and developmental data, based on national/global priorities for the management of sustainable development. They should determine the gaps and organize activities to fill those gaps. Within the organs and organizations of the United Nations system and relevant international organizations, data-collection activities, including those of Earthwatch (…), need to be strengthened, especially in the areas of (…) land resources (including forests and rangelands), desertification, other habitats, soil degradation and biodiversity. Countries and international organizations should make use of new techniques of data collection, including satellite-based remote sensing." (UN, 1992).

Further there is a call for the 'improvement of methods of data assessment and analysis', which should happen through: "the development by relevant international organizations of practical recommendations for coordinated, harmonized collection and assessment of data at the national and international levels. National and international data and information centers should set up continuous and accurate data-collection systems and make use of geographic information systems, expert systems, models and a variety of other techniques for the assessment and analysis of data. These steps will be particularly relevant, as large quantities of data from satellite sources will need to be processed in the future. Developed countries and

international organizations, as well as the private sector, should cooperate, in particular with developing countries, upon request, to facilitate their acquiring these technologies and this know-how." (UN, 1992).

Amongst the indicators used to assess progress on the achievement of the target 'to reverse the loss of environmental resources' under the Millennium Goals, the following are of special interest to land use and forest monitoring (UN, 2003b):

- Proportion of land area covered by forest (provided through FAO)

- Ratio of area protected to maintain biological diversity to surface area (provided through UNEP-IUCN)

Summary:

- UNCED (1992) was the first occasion for global consensus on linkages between environmental protection and socio-economic development, shaping the concept of global sustainable development.
- UNCED was the seedbed for globally important conventions like the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on Biological Diversity (UNCBD) and the United Nations Convention to Combat Desertification (UNCCD).
- UNCED resulted in the adoption of three non-binding instruments: the Rio Declaration, the Forest Principles and the Agenda 21, a plan for achieving sustainable development in the 21st century.
- Satellite-based remote sensing is promoted for data collection.
- Decisions taken at UNCED have been reaffirmed at the Millennium Summit (2000) and the WSSD (2002).

3. United Nations Framework Convention on Climate Change and Kyoto Protocol

3.1. General Policy Outline

3.1.1. General Scope and Objectives of the Policy

The ultimate objective of the *United Nations Framework Convention on Climate Change (UNFCCC)* is the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (man-made) interference with the climate system, in order to promote sustainable development.

The Kyoto Protocol (KP) to the United Nations Framework Convention on Climate Change (UNFCCC, 1997) targets the international community closer to achieving the ultimate goal of the convention. The protocol contains emissions targets for the countries as listed in the UNFCCC Annex I, with a view to reducing their overall emissions of such gases by at least 5 % below 1990 levels in the first commitment period 2008 to 2012. These countries are OECD member countries, including countries in transition to a free-market economy.

To reach the Kyoto targets Parties are allowed besides reducing their emissions, to account also for enhancing removals by sinks (Art.3.3, 3.4 KP), and to use the Kyoto mechanism (Art.6(JI), 12(CDM), 17(Emission Trading), provided that *inter alia* scientifically sound data are reported in accordance with the relevant provisions of the Marrakesh Accords.

All signatory parties to the UNFCCC meet during the Conference of Parties (COP). The COP is the decision taking body that is responsible for the follow-up of the UNFCCC. After ratification of the Kyoto Protocol, the COP will also serve as the Meeting of Parties (MOP) and will keep the implementation of the Protocol under regular review. The Marrakech Accords (COP-7, UNFCCC, 2001a), the Delhi Declaration (COP-8, UNFCCC, 2002a) and the Milano Decisions (COP-9) present the latest steps of the COPs to prepare the Kyoto Protocol for operationality. They contain draft decisions for adoption upon the first Meeting of the Parties to the Protocol upon its entry into force. They are especially important for the definition of accepted land use, land-use change and forestry (LULUCF) activities and for the outlining of methodological issues for the reporting thereon.

On scientific matters, the COP is assisted by the UNFCCC Subsidiary Body for Scientific and Technologic Advice (SBSTA) and by the Intergovernmental Panel on Climate Change (IPCC). The SBSTA assists e.g. in analyzing the yearly greenhouse gas (GHG) inventories. The IPCC provides e.g. support on methodological reporting issues.

The relation between the convention, the protocol and the organizational framework for its implementation is shown in Figure 2.

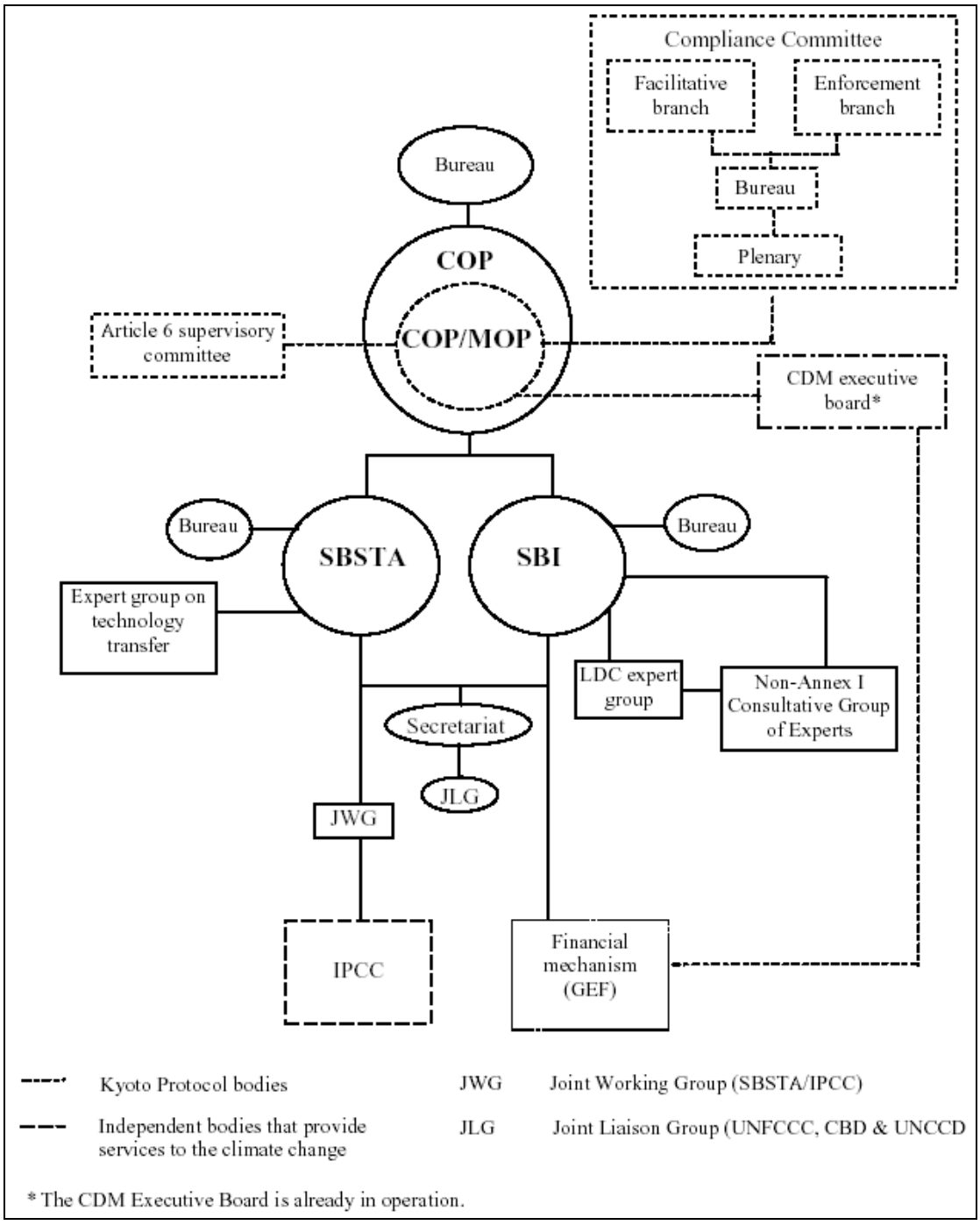

Figure 2 Institutions of the Convention and future institutions of the Protocol, including those established by the Marrakech Accords (UNFCCC, 2002c).

3.1.2. Status of Participation/Ratification and Implementation

Two years after its adoption at the Earth Summit in Rio 1992, the treaty took effect on 21 March 1994 (UNFCCC, 1994). A total of 187 countries and the European Economic Community have committed themselves to implementing the decisions outlined by the convention.

The protocol was adopted at the third Conference of Parties to the UNFCCC in Kyoto, Japan, on 11 December 1997. As is stated in its Article 25, the protocol shall enter into force on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55 per cent of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession. On 29 April 2005, a total of 150 countries have done so, including 34 Annex I countries (UNFCCC, 2003a). The latter account for a total of 61.6 % of total 1990 emissions of Annex I countries. The European Union has approved the Kyoto Protocol on May 31st, 2002. On the same day, all 15 European Union Member States have implicitly but also effectively committed themselves to the Kyoto Protocol. The Kyoto Protocol entered into force on 16 February 2005. This became possible upon the ratification of the Kyoto Protocol by the Russian Federation on 18 November 2004. Country-by-country ratification status is in Annex A.

Parties to the protocol will have to provide data compiled following scientifically sound methodology. A lack of such information may result into serious consequences to a Party, possibly leading to a direct or indirect monetary punishment.

3.1.3. Policy Timeline and Agenda

Timeline of the policy process

Generally, the Conference of the Parties holds its plenary sessions annually. The SBSTA meets up to 2 times per year. Short-term information on SBSTA and COP meetings is given below. Up-to-date calendar information is available from the UNFCCC web site: http://unfccc.int/meetings/unfccc_calendar/items/2655.php

Information on the historical and mid-term future agenda of the UNFCCC is illustrated in Figure 3.

Canada will host the first meeting of the Parties to the Kyoto Protocol in Montreal in conjunction with the eleventh session of the Conference of the Parties to the Climate Change Convention. The meeting will convene 28 November to 9 December 2005.

A decision on the application of biome-specific forest definitions for the second and subsequent commitment periods will be considered at a future SBSTA session. It noted that a decision on this subject is not needed at this stage and decided to consider the matter at an undated future session.

Timeline of information needs

The convention requires the parties to send greenhouse gas (GHG) inventories by 15 April every year since 1996. The inventory must include data for the base year and for all years up to the last but one prior to submission.

The Parties to the Kyoto Protocol should make demonstrable progress in achieving their commitments under this Protocol by **2005** (KP Article 3.2).

Parties have been requested to report a fourth national communication to the UNFCCC by 1 January 2006 (Decision 4/CP.8).

No later than one year prior to the start of the first commitment period, Parties must have a national system in place for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol (KP Article 5). These national inventory systems have to ensure that areas of land subject to LULUCF activities under Article 3.3 and 3.4 are identifiable. Information on these areas has to be included by each Annex I Party in their national inventories (UNFCCC, 2001a).

The first quantified emission limitation and reduction commitment period starts January 1st, 2008 and ends December 31st, 2012.

3.1.4. Access to Information

Education, training, public awareness, public participation and public access to information are seen as key mechanisms for gaining public support for measures to combat climate change. All parties shall facilitate public access to information on, climate change (UNFCCC, 1997; UNFCCC, 2002a).

National communications and national greenhouse gas inventories are generally made publicly available in electronic format through the UNFCCC website. Parties are however allowed to submit parts of the detail in their national greenhouse gas inventory as confidential information (UNFCCC, 2002a).

The operational rules of the mechanisms (JI; CDM) are based on openness and transparency. All non-confidential information is to be made publicly accessible, also through the Internet, while the proceedings of the CDM Executive Board and the Article 6 Supervisory Committee will be open to observers.

The CDM EB will develop and maintain a publicly available database of CDM project activities containing information on registered project design documents, comments received, verification reports, its decisions as well as information on all issued certified emission reduction units (CERs);

Designated Operational Entitities shall make information obtained from CDM project participants publicly available, as required by the Executive Board. Information obtained from CDM project participants marked as proprietary or confidential shall not be disclosed without the written consent of the provider of the information, except as required by national law. Information used to determine additionality, to describe the baseline methodology and its application, and to support an environmental impact assessment, shall not be considered as proprietary or confidential.

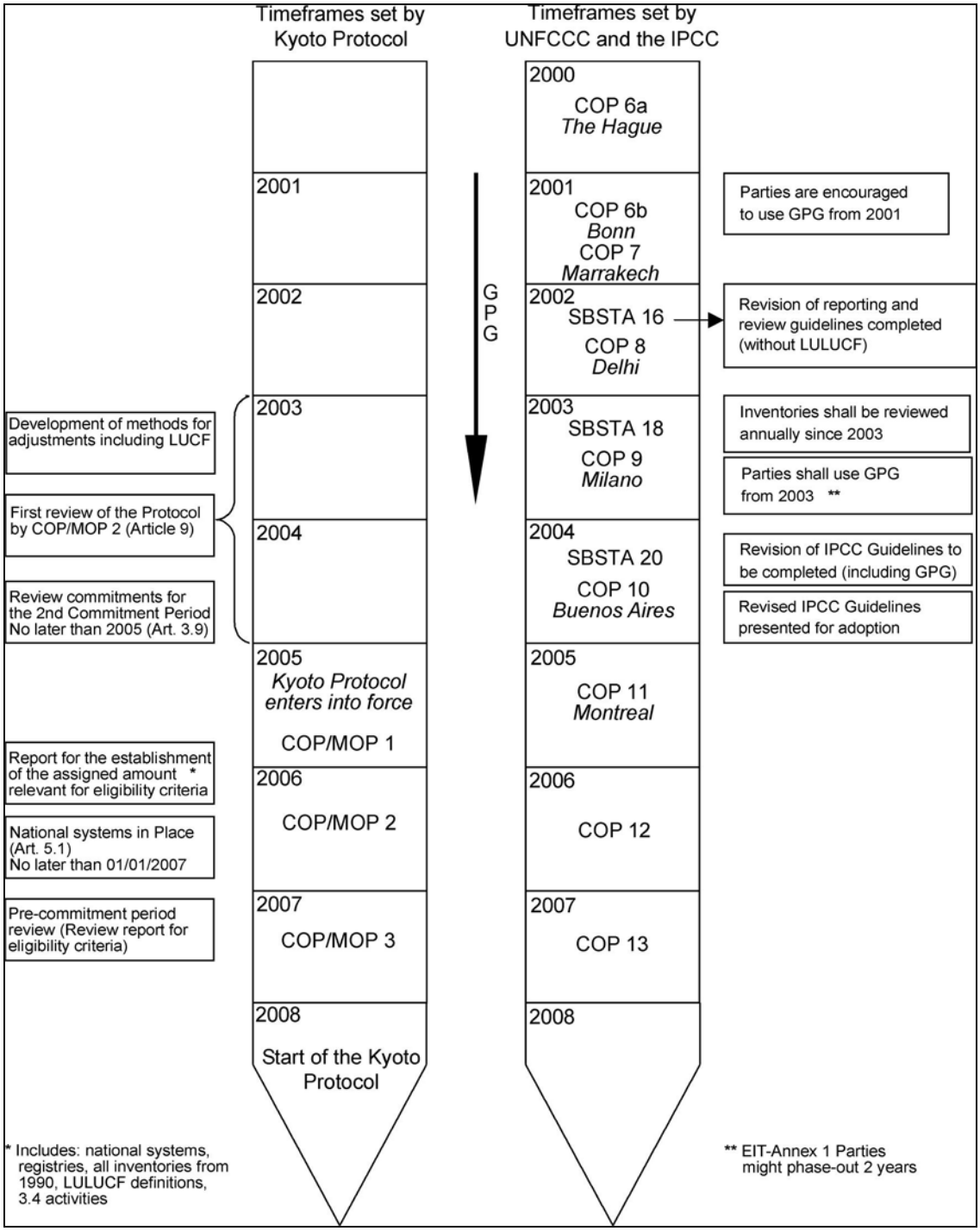

Figure 3 Policy timeline and agenda (after UNFCCC, 2001b)

3.2. Relations to or Inter-linkages between Policies

Cooperation between the UNFCCC and the Convention on Biological Diversity (CBD) has been intensified. This is in the aim to prevent that activities mitigating climate change would adversely affect the biological diversity of ecosystems in which they take place. Scientific understanding of biological diversity and the goods and services it provides could help decision-makers in identifying some priorities for adaptation measures. Furthermore, scientific understanding of the vulnerability of ecosystems and species could help decision makers in identifying fragile ecosystems referred to in article 4, paragraph 8, of the climate

change convention (CBD, 2002a). The CBD Ad Hoc Technical Expert Group on Biodiversity and Climate Change has published a report on the interlinkages between biological diversity and climate change and advice on the integration of biodiversity considerations into the implementation of the United Nations Framework Convention on Climate Change and its Kyoto Protocol. In the European Union, its Biodiversity Strategy has stipulations aiming to limit damage to ecosystems from afforestation schemes (Chaytor, 2002).

There is also a link between the UNFCCC and the United Nations Convention to Combat Desertification (UNCCD). Forests play an acknowledged role in the Kyoto Protocol in mitigating activities to combat climate change. Forests are also one of the main tools that allow to sustainably combat desertification.

Combining efforts would stimulate the protection of forests under threat of desertification and the afforestation of areas where this would put desertification to a hold or push it even back. Desertification occurs both in developed (Annex I) as in developing (non-Annex I) countries.

3.3. Forest Related Aspects of the Policy and Definitions

Forest ecosystems and forestry as regulatory instruments play an important role under the UNFCCC and KP. Their function in the global carbon cycle processes is being acknowledged as forests may present a significant sink for the removal of carbon dioxide from the atmosphere. Modalities for carbon accounting were explicitly initiated in the Kyoto Protocol, where afforestation, reforestation and deforestation; and land management including forest management were introduced as accountable activities to be reported by Annex I Parties. Further it enhanced the sharing of burden among Annex I parties by Joint Implementation; or between an Annex I party and a non-Annex I party under the so-called Clean Development Mechanism. These mechanisms are further discussed.

Afforestation, Reforestation and Deforestation

Under KP Article 3.3, Annex I Parties have to account emissions from deforestation activities and emission reductions for afforestation and reforestation projects that occurred since 1 January 1990. The net carbon change from these activities can only be accounted for the results occurring during the first commitment period itself, i.e. from 1 January 2008 until 31 December 2012. The accounting of an ARD activity begins with the onset of the activity or the beginning of the commitment period, whichever comes later.

Forest Management

Under KP Article 3.4, Annex I Parties may choose to include forest management in their carbon accounting system for the first commitment period among any or all of other human-induced land management activities such as revegetation, cropland management, and grazing land management. Double counting with ARD activities should be excluded. The accounting of a forest management activity begins with the onset of the activity or the beginning of the commitment period, whichever comes later. The activity should have occurred since 1990.

There is however a limit to the extent that forest management can affect the assigned amount of a Party, indicated in Table 1 (Appendix to the Annex of Draft decision -/CMP.1, UNFCCC, 2001a).

In case ARD activities (under KP Article 3.3) result in a net source of CO_2, then forest management activity can allow offsetting these emissions. When the removals by sinks in the managed forest since 1990 are equal to, or larger than the ARD emissions, then no more than 9 megatons of carbon times five can be accounted for during the first 5-year commitment period.

Joint Implementation

For the purpose of meeting its commitments under KP Article 3, KP Article 6 allows any Party included in Annex I to transfer to or acquire from any other such Party emission reduction units (ERU) resulting from projects aimed at reducing anthropogenic emissions or enhancing anthropogenic removals of greenhouse gases in any sector of the economy. This is generally referred to as Joint Implementation (JI) The issuance of ERUs in emissions trading, results in the cancellation of either assigned amount units (AAU) or removal units (RMU), in order that no overall impact on a Party's assigned amount is felt (KP Article 3.10 and 3.11). Activities implemented jointly in the LUCF sector are those as valid under KP Articles 3.3 and 3.4 and can be of the type: afforestation, reforestation, forest preservation, agroforestry, silviculture (forest management), fire management, sustainable harvesting, reduced impact logging, manufacture of durable wood products, and other (UNFCCC, 2002a). The "other" category is to allow for addition of new activities in the light of results of methodological work on LULUCF. For activities other then forest management activities, there is no limitation to the extent that carbon can be claimed for. Credits from forest management activities are capped asTable 1 indicates. Projects starting as of the year 2000 may be eligible for JI accounting. The accounting of ERUs can then however only start from the year 2008 (UNFCCC, 2001a; 16/CP.7 -/CMP/1). The baseline for JI projects has to represent the scenario that would reasonably represent the anthropogenic GHG emissions and removals that would occur in the absence of the project. A baseline has to be established on a project-specific basis and/or using a multi-project emission factor (UNFCCC, 2001a, 17/CP.7.app.A).

For activities implemented jointly (AIJ) under the pilot phase, there exists a uniform reporting format (URF) for the transfer of information to the UNFCCC. Such reporting has to occur on a project-per-project basis.

For the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in Table 1, times five (UNFCCC, 2001a, 11/CP.7).

Table 1. Limitation to carbon credits from forest management under KP Articles 3.4 and 6 (UNFCCC, 2001a; UNFCCC, 2003c); Total GHG emissions excluding LULUCF for the year 2000 if not otherwise indicated (1: 1990; 2: 1995; 3: 1998; 4: 1999 – UNFCCC, 2003b)

Country	Maximum accountable carbon sink from forest management (Mt C/yr)	Total GHG emissions excl. LULUCF (Mt C eq./yr)	Carbon credits per eq. carbon emissions excl. LULUCF (%)
Australia	0	149.38	0.0%
Austria	0.63	27.01	2.3%
Belarus	-	-	-
Belgium	0.03	47.34	0.1%
Bulgaria	0.37	26.19[4]	1.4%
Canada	12	225.30	5.3%
Croatia	0.265	6.77[2]	3.9%
Czech Republic	0.32	46.62	0.7%
Denmark	0.05	21.46	0.2%
Estonia	0.1	8.65	1.2%
Finland	0.16	26.45	0.6%
France	0.88	187.53	0.5%
Germany	1.24	309.53	0.4%
Greece	0.09	39.05	0.2%
Hungary	0.29	27.35	1.1%
Iceland	0	0.97	0.0%
Ireland	0.05	20.59	0.2%
Italy	0.18	174.15	0.1%
Japan	13	424.48	3.1%
Latvia	0.34	4.79	7.1%
Liechtenstein	0.01	0.07[4]	15.1%
Lithuania	0.28	9.81[3]	2.9%
Luxembourg	0.01	1.93	0.5%
Monaco	0	0.04[4]	0.0%
Netherlands	0.01	66.90	0.0%
New Zealand	0.2	30.94	0.6%
Norway	0.4	22.88	1.7%
Poland	0.82	132.60	0.6%
Portugal	0.22	27.75	0.8%
Romania	1.1	82.57[1]	1.3%
Russian Federation	33	887.12[2]	3.7%
Slovakia	0.5	15.88	3.1%
Slovenia	0.36	6.62	5.4%
Spain	0.67	128.66	0.5%
Sweden	0.58	29.89	1.9%
Switzerland	0.5	16.81	3.0%
Ukraine	1.11	159.37[3]	0.7%
United Kingdom	0.37	199.08	0.2%

Procedures for the periodic calculation of the reductions of anthropogenic emissions by sources and/or enhancements of anthropogenic removals by sinks by a proposed Article 6 project and for leakage effects, if any, have to be included in a monitoring plan as part of a "Project Design Document".

Leakage is defined as the net change of anthropogenic emissions by sources and/or removals by sinks of greenhouse gases which occurs outside the project boundary, and that is measurable and attributable to the project (UNFCCC, 2001a, 16/CP.7).

Clean Development Mechanism

Parties to the protocol not included in Annex I are not bound by emission limitations. However, they can benefit from Afforestation and Reforestation project activities that result in certified emission reductions (CER) (KP Article 12). Upon the acquisition of CERs in emissions trading, these are to be accounted as additions to the assigned amount as referred to in KP Article 3.12. However, for the first commitment period, the total of additions to a Party's assigned amount resulting from eligible land use, land-use change and forestry project activities under this article is not allowed to exceed one per cent of base year emissions of the Party times five (UNFCCC, 2001a).

By supporting such "Clean Development Mechanism" or CDM-projects, Annex I countries can budget the certified emission reduction for compliance with part of their commitments under Article 3. The eligibility of land use, land-use change and forestry project activities under Article 12 is limited to afforestation and reforestation during the first commitment period. Carbon accounting methodology of such projects will have to take into account the issues of non-permanence, additionality, leakage, uncertainties and socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems. This also implies the necessity of the determination of project boundaries including accounting for all greenhouse gases that should be included as a part of the baseline, and monitoring. The SBSTA is developing definitions and modalities on these issues. Description of formulae used to calculate and to project leakage should be included in a so-called "Project Design Document" (UNFCCC, 2001a, 17/CP.7).

CDM projects must have the approval of all Parties involved and this may be gained from designated national authorities (to be set up by each Annex I and non-Annex I Party). The CDM eight-step project cycle is illustrated in Figure 4. Monitoring methodology of CDM project results has to be formally accepted by the CDM Executive Board (EB). "If a designated operational entity (which is responsible for validating/registering a project design and for verifying/certifying monitoring results) determines that the project activity intends to use a new baseline or monitoring methodology it shall forward the proposed methodology to the EB for review." Once the methodology has been approved, it enters in a list of accepted methodologies from which project initiators can choose their preferred monitoring methodology. In case an approved methodology has to be revised upon request of the COP/MOP, no CDM project activity may apply the methodology. The project participants have to revise the methodology when they would be required to do so. (UNFCCC, 2001a)

Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism have been incorporated into the guidelines for preparing the annual greenhouse gas inventory. (13/CP.10) Simplified modalities and procedures for small-scale afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol and measures to facilitate their implementation. (14/CP.10)

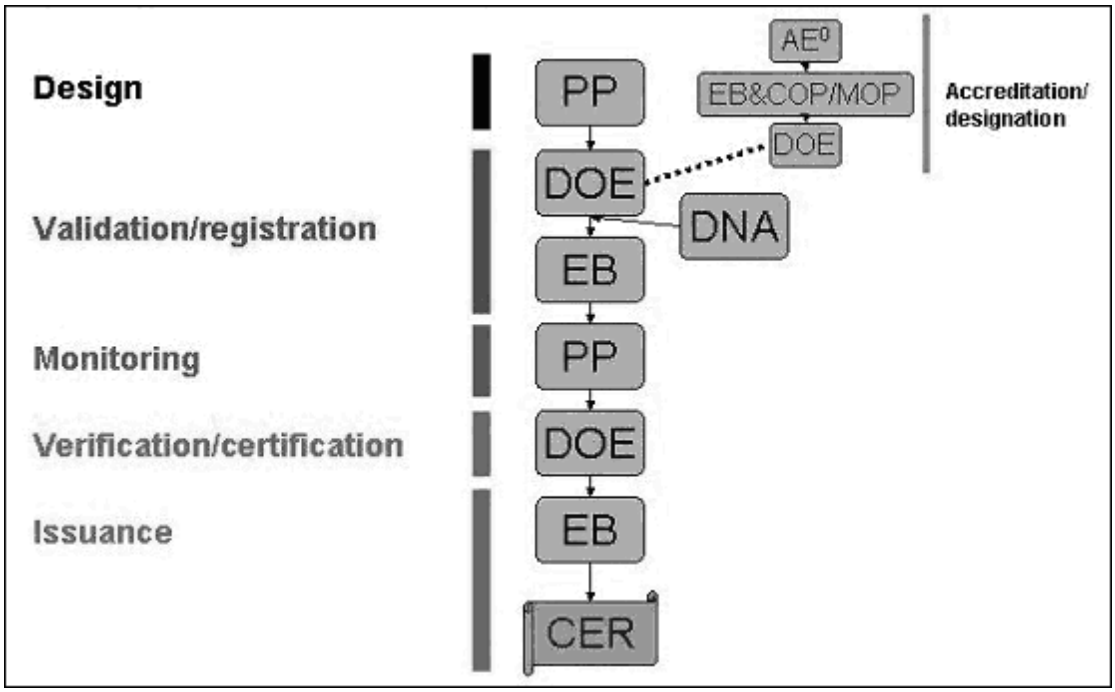

Figure 4 Clean Development Mechanism project activity cycle (PP = project participants; AE = an applicant entity; EB = executive board of the CDM; DOE = designated operational entity; DNA = designated national authority for the CDM; CER = certified emission reduction (UNFCCC, 2002b).

Terms and definitions

Definitions for "forest" and for the activities "afforestation", "reforestation", "deforestation", "revegetation" and "forest management" have been adopted at COP-7 for the purpose of implementing KP Articles 3.3 and 3.4. More detail on definitional aspects is stated below. The definitions of forest, reforestation and afforestation will also apply to CDM projects for the first commitment period (UNFCCC, 2003d).

For the first commitment period, the COP proposes the following definition of "*forest"*: "Forest is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 meters at maturity in situ. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 meters are included under forest, as are areas normally forming part of the forest area, which are temporarily unstocked as a result of human intervention such as harvesting or natural causes and which are expected to revert to forest." (UNFCCC, 2001a, 11/CP.7) Countries have to include information on the selection of parameters for defining "Forest" under the Kyoto Protocol in their yearly reports (15/CP.10).

The Kyoto Protocol specifies that it is important to systematically compile information on the area where eligible forestry activities take place, in order to spatially quantify changes in land cover (KP Articles 5 and 10), and to estimate the biomass stocks and changes therein (KP Articles 3 and 12). The definition of forest implies the specification of the (boundary of the) areas where these activities can be accounted for.

For the purpose of KP Articles 3.3 and 3.4, Parties have to determine the area of all ARD activities using the same spatial assessment unit, but not larger than 1 hectare (UNFCCC,

2001a, 11/CP.7). In the case the definition of forest, including the minimal area unit, would differ from that used in historical reporting to other international processes, as e.g. the Forest Resource Assessment by the FAO, such has to be explained to why and how such values were chosen (FAO, 2002).

The SBSTA was asked by the COP at its seventh session to look into the possible application of biome-specific forest definitions for the second and subsequent commitment periods. By the time of COP 10, the SBSTA will recommend a decision for adoption on the use of such definitions (UNFCCC, 2001a, 11/CP.7). The definition of biome could consider the categories: tropical (rain forest; moist deciduous forest; dry forest; shrubland; desert; mountain systems); subtropical (humid forest, dry forest, steppe, desert, mountain systems); temperate (oceanic forest, continental forest, steppe, desert, mountain systems); boreal (coniferous forest, tundra woodland, mountain systems); polar. However, it is under discussion whether Parties can use their own (national) system of ecological zoning; whether a new global zoning system should be developed that would take carbon dynamics into account from the beginning or whether currently existing regional/global systems should be applied (FAO, 2002).

"Afforestation" is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources (UNFCCC, 2001a, 11/CP.7).

"Reforestation" is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989 (UNFCCC, 2001a, 11/CP.7).

"*Deforestation"* is the direct human-induced conversion of forested land to non-forested land (UNFCCC, 2001a, 11/CP.7).

Definitions for direct human-induced "*forest degradation*" and "*devegetation*" of vegetation types other than forest are being developed by the IPCC. These definitions will be submitted for consideration and possible adoption to the Conference of the Parties at its ninth session (UNFCCC, 2001a, 11/CP.7).

"*Forest management*" is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner (UNFCCC, 2001a, 11/CP.7).

"*Revegetation*" is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation applicable to KP Articles 3.3 and 3.4 (UNFCCC, 2001a, 11/CP.7).

3.4. Reporting Requirements and Information Needs with EO Potential

Parties to the Convention yearly communicate an inventory of national greenhouse gas emissions by sources and of removals by sinks through a national communication to the UNFCCC. National reporting requirements for developed countries (national communications of annex I Parties) are more detailed than guidelines for developing countries (national communications of non-annex I Parties).

In national communications forest related information is reported under each chapter, such as national circumstances, national inventory of emissions and removals by sinks, policies and measures, impacts, adaptation and vulnerability. At COP-8 the Parties have been requested to submit a fourth national communication by 1 January 2006 (UNFCCC, 2002a). The national greenhouse gas inventory is prepared following the revised 1996 IPCC guidelines for national greenhouse gas inventories. The guidelines suggest a default method for estimating emissions and removals of greenhouse gases for five sectors of human activities that influence sources and sinks of greenhouse gases: energy, industrial processes, agriculture, land-use change and forestry and waste. Table 2 to Table 7 present extracts for forestry data requirements of the common reporting format for the land use, land-use change and forestry categories for annual GHG reporting under the Convention (UNFCCC, 2003e).

The Kyoto Protocol requires its Annex I Parties to establish a national system for the estimation of anthropogenic emissions by sources and removals by sinks. These must be based on the above-mentioned IPCC guidelines (KP Article 5). The methodology can be revised for the purposes of ascertaining compliance with commitments under KP Article 3, based on advice based on the work of the IPCC and advice provided by the Subsidiary Body for Scientific and Technological Advice. This in effect makes the reporting requirements coming from the Kyoto Protocol much stricter and more demanding than those from the UNFCCC. Furthermore, non-delivery of information could be regarded as non-compliance, what could lead to a legal procedure with possible direct and/or indirect financial implications.

Table 2. Sectoral report for land use, land-use change and forestry (Table 5, UNFCCC, 2003e)

Greenhouse gas source and sink categories	**CO_2-e (Gg)** [1]	**CO_2-r (Gg)**	**CH_4 (Gg)**	**N_2O (Gg)**	**CO (Gg)**	**NO_x (Gg)**
5. Total land-use categories						
5.A. Forest land						
5.A.1. Forest remaining forest land						
5.A.2. Land converted to forest land						
5.B. Cropland						
5.B.1. Cropland remaining cropland						
5.B.2. Land converted to cropland						
5.C. Grassland						
5.C.1. Grassland remaining grassland						
5.C.2. Land converted to grassland						
5.D. Wetlands						
5.D.1. Wetlands remaining wetlands						
5.D.2. Land converted to wetlands						
5.E. Settlements						
5.E.1. Settlements remaining settlements						
5.E.2. Land converted to settlements						
5.F. Other land						
5.F.1. Other land remaining other land						
5.F.2. Land converted to other land						
5.G. Other (please specify)						
Harvested wood products [2]						

[1] CO2 emissions from liming and biomass burning are included in this column.
[2] Non-obligatory item

Table 3. Sectoral report for land use, land-use change and forestry – sheet for Forest land (Tables 5.A-F, UNFCCC, 2003e)

Land Use Change for reporting year		Activity data	Implied emission factors					Emissions/Removals				
5. Total land-use categories	Sub-division [1]	Total area (kha)	Carbon stock changes in living biomass per area			Net carbon stock change in dead organic matter per area	Net carbon stock change in soils per area	Carbon stock change in living biomass			Net carbon stock change in dead organic matter	Net carbon stock change in soils
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			Mg C / ha					Gg C / ha				
5.A. Forest land												
5.A.1. Forest remaining forest land												
5.B.2.a. Forest converted to cropland												
5.C.2.a. Forest converted to grassland												
5.D.2.a. Forest converted to wetlands												
5.E.2.a. Forest converted to settlements												
5.F.2.a. Forest converted to other land												

[1] Land categories may be further divided according to climate zones, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

Table 4. Reporting of direct N2O emissions from N fertilization on forest land (Table 5 (I), UNFCCC, 2003e)

Land use and land use change for reporting year	Activity data	Implied emission factors	Emissions
Land use category	Total amount of fertilizer applied	N2O-N emissions per unit of fertilizer	N_2O
	(Gg N/yr)	(kg N_2O-N/kg N)	(Gg)
Total for all land use categories			
5.A Forest land			
5.A.1. Forest land remaining forest land			
5.A.2. Land converted to forest land			

Table 5. Reporting of N_2O emissions from drainage of soils on forest land (Table 5 (II), UNFCCC, 2003e)

Land use and land use change for reporting year		Activity data	Implied emission factors	Emissions
Land use category	Sub-division [1]	Area of drained soils	N_2O-N per area drained	N_2O
		(kha)	(kg N_2O-N / ha	(Gg)
Total all land-use categories				
5.A. Forest land				
Organic soil				
Mineral soil				

[1] A Party should report further disaggregations of drained soils corresponding to the methods used. Tier 1 disaggregates soils into "nutrient rich" and "nutrient poor" areas, whereas higher-tier methods can further disaggregate into different peatland types, soil fertility or tree species.

Table 6. Reporting of N_2O emissions from disturbance associated with forest land conversion to cropland (Table (III), 2003e)

Land use and land use change for reporting year	Activity data	Implied emission factors	Emissions
Land use category	Land area converted	N_2O-N emissions per area converted	N_2O
	(kha)	(kg N_2O-N/ha)	(Gg)
Total all land-use categories			
5.B.2.1 Forest land converted to cropland			
Organic soils			
Mineral soils			

Table 7. Reporting of biomass burning on forest land (Table (V), UNFCCC, 2003e)

Land use and land use change for reporting year	Activity data			Implied emission factor			Emission		
	Description	Unit	Values	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Land use category		Ha or kg dm		Mg / activity data unit			Gg		
Total for land use categories									
5.A. Forest land									
5.A.1. Forest land remaining forest land									
Controlled burning									
Wildfires									
5.A.2. Land converted to forest land									
Controlled burning									
Wildfires									

The IPCC was invited by COP-7 to elaborate methods to estimate, measure, monitor, and report changes in carbon stocks and anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from land use, land-use change and forestry under Article 3.3, 3.4, 6 and 12, further referred to as LULUCF GPG (UNFCCC, 2001a, 11/CP.7). The LULUCF GPG also focuses on uncertainty management relating to the measurement, estimation, assessment of uncertainties, monitoring and reporting of net carbon stock changes, removals of anthropogenic greenhouse gas by sinks and emissions by sources. The carbon stock changes that have to be accounted for should be of anthropogenic nature, which should be discriminated from indirect human-induced, natural changes and effects due to past practices in forests, and the effects should be additional to the baseline situation (UNFCCC, 2001a, 11/CP.7).

"Guidelines for the Preparation of information required under Article 7 of the Kyoto Protocol" were adopted at COP-7. The Parties are thereby requested to report on "The geographical location of the boundaries of the areas that encompass (UNFCCC, 2001a, 22/CP.7):

i. Units of land subject to activities under article 3, paragraph 3;

ii. Units of land subject to activities under Article 3, paragraph 3, which would otherwise be included in land subject to elected activities under article 3, paragraph 4, with reference to paragraph 8 of the annex to decision -/CMP.1 (Land use, land-use change and forestry); and

iii. Land subject to elected activities under Article 3, paragraph 4."

The IPCC LULUCF GPG suggests using one of two methods for monitoring the eligible activities within these boundaries (IPCC, 2003):

1. "The first reporting method entails representing a broad geographic area that includes multiple land units subject to the activities by using legal, administrative, or ecosystem boundaries or grids on images produced by remote sensing techniques."

2. "The second reporting method is based on the spatially explicit and complete geographical identification of all units of land subject to Article 3.3 activities and all lands subject to Article 3.4 activities."; also referred to as "wall-to-wall" area coverage.

Following the adoption of the LULUCF GPG, the tables of the common reporting format for reporting on LULUCF will be revised in a new document containing updated guidelines to facilitate the preparation and reporting of annual greenhouse gas inventories for LULUCF by Annex I Parties (UNFCCC, 2003e).

The requirements to forestry information from the Kyoto Protocol, the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and from the IPCC Good Practice Guidance on LULUCF activities are shown in Table 8. The reporting requirements develop from rather generic in the KP itself to specific in the LULUCF GPG.

A study performed for ESA by a consortium lead by VTT Information Technology, "Treaty Enforcement Services using Earth Observation - Theme Carbon" (TESEO Carbon; ESA/ESRIN contract no. 15557/01/I-LG) investigated UNFCCC and Kyoto Protocol

documents and surveyed in 2001 national and international stakeholders for related information needs and requirements towards EO.

The investigation and the user survey within TESEO Carbon indicated a lot of critical weight for monitoring the following variables:

- Area of forest;
- Area of afforestation, reforestation and deforestation;
- Above-ground vegetation biomass and changes therein;
- Land use for different land classes for the base year

This result was supported also by the key user segment profiling done for GSE Forest Monitoring, which also identified a high need for information on forest fires. A general observation from both exercises indicated that the respondents preferred approaches, which combine EO and ground inventory data or modelling data (Häme et al., 2002; GSE-FM, 2003).

Summary: UNFCCC, Kyoto Protocol

- The UNFCCC and its Kyoto Protocol pose stringent information requirements to their Parties.
- Non-delivery of information could be regarded as non-compliance, what could lead to a legal procedure with possible (direct and/or indirect) financial implications.
- The need for geo-referenced information, combined with the definition of forest, gives an opportunity for the use of EO. It may be effective to complement and / or validate existing information with EO-data as EO is a tool to retrieve data for a full inventory of land under eligible activities at high spatial resolution, with relatively high accuracy and applicable over large areas according a homogenous methodology. The Marrakech Accords however allow basing the reporting of activities based on sampling estimations within the defined geographical boundaries that a Party has chosen to apply the accounting of such activities.
- The most important variables that information is required on, are related to Afforestation, Reforestation and Deforestation activities (and the biomass thereupon); and management activities that affect the biomass stocks (forest management, fire management, etc.).

Table 8. Information needs on forests and forestry and their relevance to the UNFCCC and Kyoto Protocol; Accuracy requirement: Where there is sufficient information to define the underlying probability distribution for conventional statistical analysis, a 95 per cent confidence interval should be calculated as a definition of the range (IPCC). (*1): One of top-four variables with high priority for Kyoto reporting in the ESA TESEO Carbon project.

Variable	Relevance to the Kyoto Protocol	Notes	Literature reference
Area per land-use category for base year (*1)	KP Art. 3.3, 3.4, 3.7, 6	The base year is generally 1990, except for the following countries (base year indicated between brackets): Bulgaria (1989); Hungary (average of the years 1985 to 1987); Poland (1988); Romania (1989); Slovenia (1986).	Kyoto Protocol
Area of human-induced land use change	KP Art. 3.3, 3.4, 3.7, 6	First quantified emission limitation and reduction commitment period, from 2008 to 2012	Kyoto Protocol
Area of Afforestation, Reforestation and Deforestation (Kha) (*1)	KP Art. 3.3, 6, 12	Taking into account the definitions for ARD activities. KP Art. 12 considers afforested and reforested areas.	Kyoto Protocol
Above-ground vegetation biomass and changes therein (*1)	KP Art. 3, 6, 12	Also for biomass stocks, the eligible carbon stock changes must be changes compared to the base year (Art 3) or in case of Art 6 and 12 compared to the base line.	Kyoto Protocol
Above- and below-ground biomass, litter, dead wood and soil organic carbon	KP Art. 3, 6, 12	A Party may choose not to account for a given pool in a commitment period, if transparent and verifiable information is provided that the pool is not a source. Also for biomass stocks, the eligible carbon stock changes must be changes compared to the base year (Art 3.3, 3.4) or in case of Art 6 and 12 compared to the base line of the project.	FCCC/CP/2001/5/Add. 2
Area of forest (*1) /Biomass Stocks (Kha)	IPCC methodology	Changes in Forest and Other Woody Biomass Stocks	IPCC Revised 1996 Guidelines
For dispersed (non-forest) trees (e.g., urban, village and farm trees): the number of trees (in 1000s of trees)	IPCC methodology	Changes in Forest and Other Woody Biomass Stocks	IPCC Revised 1996 Guidelines
Area Converted Annually (Kha)	IPCC methodology	CO_2 Emissions from forest and grassland conversion	IPCC Revised 1996 Guidelines

Variable	Relevance to the Kyoto Protocol	Notes	Literature reference
Biomass Before Conversion in tonnes of dry matter per hectare (t dm/ha)	IPCC methodology	CO_2 Emissions from Forest and Grassland Conversion	IPCC Revised 1996 Guidelines
Biomass After Conversion in tonnes of dry matter per hectare (t dm/ha)	IPCC methodology	CO_2 Emissions from Forest and Grassland Conversion	IPCC Revised 1996 Guidelines
Fraction of Biomass Burned On Site by forest/grassland type Fraction left to decay. Fraction which oxidises during burning	IPCC methodology	CO_2 Emissions from Forest and Grassland Conversion	IPCC Revised 1996 Guidelines
Total Area Abandoned and Regrowing land by type for the last twenty years (in Kha)	IPCC methodology	Abandonment of Managed Lands: - For areas abandoned for the last 20 years - For areas abandoned for more than 20 years	IPCC Revised 1996 Guidelines
Annual aboveground biomass growth	IPCC methodology	Abandonment of Managed Lands: - For areas abandoned for the last 20 years - For areas abandoned for more than 20 years	IPCC Revised 1996 Guidelines
Afforestation and reforestation area size (and its geographical location)	GPG on LULUCF	Geographical location and boundaries of an activity will have to be specified if a Party chooses to base its reporting on spatially explicit and complete geographical identification of all units of lands subject to KP Articles 3.3 and/or 3.4 ;	IPCC, 2003
Area per land-use class category: forest (sub-categories); cropland; grass-land; wetlands; settlements; other land; other	GPG on LULUCF		IPCC, 2003

Variable	Relevance to the Kyoto Protocol	Notes	Literature reference
Changes of area from one land class to another for the land classes (forest (sub-categories); cropland; grass-land; wetlands; settlements; other land; other)	GPG on LULUCF		IPCC, 2003
Afforestation and refores-tation carbon stock change	GPG on LULUCF		IPCC, 2003
Deforestation area	GPG on LULUCF	Deforested areas compared to the base year; Areas deforested after the base year, until the end of the first Commitment Period.	IPCC, 2003
Deforestation carbon stock change	GPG on LULUCF		IPCC, 2003
Forest management area	GPG on LULUCF		IPCC, 2003
Forest management carbon stock change in each year of the Commitment Period	GPG on LULUCF	Geographical location and boundaries of an activity will have to be specified if a Party chooses to base its reporting on spatially explicit and complete geographical identification of all units of lands subject to KP Article 3.3;	IPCC, 2003
Spatially explicit reference map of the land use on December 31, 1989.	GPG on LULUCF		IPCC, 2003
Area of harvested forest	GPG on LULUCF		IPCC, 2003
Area of regenerated forest	GPG on LULUCF	The same variable also with reference to the area of harvested forest in the base year	IPCC, 2003
Forest area annually affected by disturbances	GPG on LULUCF		IPCC, 2003
1990 forest/non-forest base map	GPG on LULUCF		IPCC, 2003
Area of drained forest land	GPG on LULUCF	On organic soils; On mineral soils; A Party should report further disaggregations of drained soils corresponding to the methods used. Tier 1 disaggregates soils into "nutrient rich" and "nutrient poor" areas, whereas higher-tier methods can further disaggregate into different peatland types, soil fertility or tree species.	IPCC, 2003

Variable	Relevance to the Kyoto Protocol	Notes	Literature reference
Forest area converted to cropland	GPG on LULUCF	On organic soils; On mineral soils	IPCC, 2003
Area of controlled burning and of wildfires	GPG on LULUCF	On forest land remaining forest land and on land converted to forest land	IPCC, 2003
Area of forest converted	GPG on LULUCF	To cropland; To grassland; To wetlands; To settlements; To other land	

4. United Nations Convention on Biological Diversity

4.1. General Policy Outline

4.1.1. General Scope and Objectives of the Policy

Species and ecosystems face more and more serious threats due to population growth, consumer revolution, climate change among other actors. At the Earth Summit (UNCED) in Rio de Janeiro in 1992, countries agreed on a strategy for sustainable development. One of the key agreements was the United Nations Convention on Biological Diversity (CBD, 1992). The convention offers a global strategy for protecting and maintaining resources for the future. The philosophy of sustainable development, the ecosystem approach and the emphasis on building partnerships are helpful to shape global action on biodiversity (CBD, 2002c).

The Convention's main objectives are (CBD, 2002a) the promotion and enhancement of:

- Conservation, sustainable use and benefit sharing;
- Institutional and socio-economic enabling environment;
- Knowledge, assessment and monitoring

At the 6th Conference of the Parties to the Convention on Biological Diversity (The Hague 7 - 19 April 2002), a Strategic Plan was adopted to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level. The target has been endorsed at the Fifth 'Environment for Europe' Ministerial Conference, at European level, and with the 6th Environmental Action Programme (2001) also at the European Union level.

4.1.2. Status of Participation/Ratification and Implementation

The Convention aims for the global level. By the year 2003, the Convention counts 187 parties. The European Community and its 15 Member States have ratified the Convention (CBD, 2003). Country-by-country status is given in Annex A.

4.1.3. Policy Timeline and Agenda

The Conference of the Parties (COP) meets every other two years. The seventh COP was held in Kuala Lumpur, Malaysia, from 9-20 February 2004.

An assessment of the implementation of the expanded programme of work on forest biological diversity should be reported through a thematic report which parties were invited to submit to COP-7 in 2004 and through the third national report (in 2005) for discussion at COP-8 in Brazil in 2006 (FAO, 2003a).

4.1.4. Access to Information

CBD Article 17 on Exchange of Information stipulates that the Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs

of developing countries. Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information.

4.2. Relations to or Inter-linkages between Policies

In implementing its work programme, the Convention interacts with the Collaborative Partnership on Forests (CPF) established under the United Nations Forum on Forests in 2001.

CBD has signed Memoranda of Cooperation with the Bureau of the "Convention on Wetlands of International Importance Especially as Waterfowl Habitat" (Ramsar Convention - 1971), the Secretariat of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES - 1975) and the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS - 1979) (UNEP, 1996). These and other linkages are presented in Figure 5.

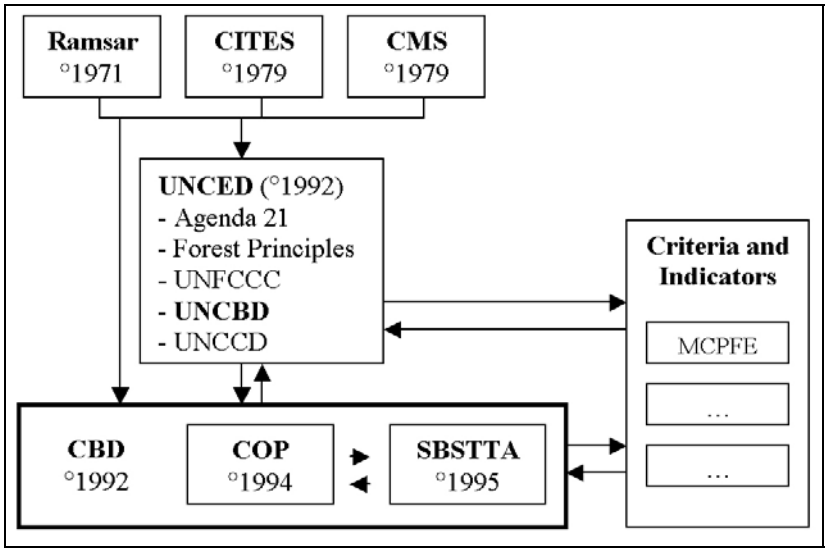

Figure 5 Interlinkages between the Convention on Biological Diversity and other policies

The CBD Conference of the Parties has called for strengthened collaboration with the UNFCCC on issues such as the impact of climate change on forest biodiversity; incentive measures; and the integration of biodiversity considerations in the implementation of the Kyoto Protocol (CBD, 2003). Some crosscutting issue between the CBD and UNFCCC are presented in Table 9.

Table 9. Climate Change and Biodiversity - Overview of the interlinkages between biological diversity and climate change (CBD, 2002d)

Likely impact on biodiversity	Afforestation, reforestation and deforestation (ARD) activities (Art 3.3)	Additional activities (Art 3.4)
Strongly positive	Avoiding deforestation of natural forests	
Positive	Reforestation with native trees Afforestation with native trees on degraded land	Forest management (reduced-impact logging, extended rotation) Revegetation (establishment of native vegetation, natural regeneration, agroforestry) Reduced tillage agriculture Reduced grazing (reductions in overgrazing)
Net neutral or uncertain	Reforestation (other) Afforestation (other)	Forest management (other) Crop management Revegetation (other)
Negative	Afforestation on other native ecosystems (eg: natural grassland or savannah) Conversion of natural forests to plantations	Drainage of wetlands Fertilization of nutrient limited natural ecosystems Irrigation of water limited natural ecosystems

4.3. Forest Related Aspects of the Policy and Definitions

The sixth session of the Conference of the Parties adopted the expanded programme of work on forest biological diversity. The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) developed the programme of work for implementation by countries according to their national priorities and needs.

The work programme provides (CBD, 2002c):

- Holistic and inter-sectoral ecosystem approaches that integrate the conservation and sustainable use of biological diversity, considering social, cultural and economic situations;
- Comprehensive analysis of influence of forest-management practices on biological diversity;
- Minimize or mitigate negative influences on biological diversity

Terms and definitions

The CBD ad-hoc technical expert group on forest biological diversity considers the FAO definition for forest, as applied in its Forest Resource Assessment of the year 2000, as the basic one. The expert group however acknowledges that many other useful forest definitions have been published and applied. This is a reflection of the diversity of forests and forest ecosystems in the world and of the diversity of human approaches to forests. (CBD, 2002b)

4.4. Reporting Requirements and Information Needs with EO Potential

Each contracting party has to report the measures that have been taken to implement the objectives of CBD. These reports are prepared by parties through a consultative process involving relevant stakeholders, and/or by drawing upon information developed through other consultative processes. The parties can also prepare and submit thematic reports on one or more specific items for in-depth consideration at the COP ordinary meetings (FAO, 2003a). Several Parties submitted a special thematic report on forests and biodiversity.

The convention is currently assisting the countries to design national-level monitoring programmes and indicators, taking into account the on-going work and initiatives on indicators. Indicators are necessary to the development of measures designed to achieve the aims of the convention ensuring conservation of biological diversity, sustainable use of biological resources and equitable sharing of the benefits of genetic resources. Specification to the required quality of the information is that the indicators should be reliable. (CBD, 2002c) More detailed information needs related to forest biodiversity are derived from the process of the Ministerial Conference on the Protection of Forests in Europe (See 8).

The CBD requires information on ecosystems and habitats, species and communities and described genomes and genes of social, scientific or economic importance. The need for information could be clarified as information on ecosystems, species, scenes and sites (WCMC, 2000).

The mission to significantly reduce the current rate of biodiversity loss by 2010 needs monitoring for assessing progress as compared to baseline inventories along the framework of CBD criteria and indicators.

Summary: CBD

- The Convention on Biological Diversity aims at protecting the world's biodiversity. It presents a holistic strategy to achieving this objective.
- The Parties to the Convention report on a voluntary basis. There is a system of annual progress reports, possibly complemented with special thematic reports.
- The Convention supports the development of Criteria and Indicators for monitoring the status of biological diversity and reviewing progress towards significantly reducing the rate of biodiversity loss by 2010.

Table 10. CBD Reporting requirements and information needs with EO potential; No information is available neither on geographical reporting unit, spatial resolution, temporal nor accuracy requirement.

Variable	Reference
Information on ecosystems	WCMC, 2000
Information on habitat types	WCMC, 2000
Information on protection status	WCMC, 2000
Range and distribution of species	WCMC, 2000
Information on population	WCMC, 2000
Information on habitat requirements/availability	WCMC, 2000
Information on in-situ and management activities	WCMC, 2000
Information on in-situ conservation and management activities	WCMC, 2000
Information on threats (direct, habitat destruction, indirect, etc.)	WCMC, 2000
Information on sustainable use	WCMC, 2000
Information on site details	WCMC, 2000
Information on geographic location	WCMC, 2000
Wetland loss (incl. forest wetland)	EC, 1998
Fragmentation of forests	EC, 1998
Fragmentation of landscapes	EC, 1998
Protected area loss	EC, 1998
Occurrence of illegal logging	CBD, 2002b

5. United Nations Conference to Combat Desertification

5.1. General Policy Outline

5.1.1. General Scope and Objectives of the Policy

Desertification is a worldwide problem, directly affecting over 250 million people. A third of the Earth's land surface, or over 4 billion hectares, is threatened by desertification. In addition, the livelihoods of some 1.2 billion people who depend on land for most of their needs and usually the world's poorest in over 110 countries are threatened. (UNCCD, 2003a). While water shortages and desertification affect all dryland areas, developing countries are particularly vulnerable to the economic and social costs associated with the decline of agricultural and natural ecosystem productivity (Goodrich, 2000).

In 1977, the United Nations Conference on Desertification (UNCOD) adopted a Plan of Action to Combat Desertification (PACD). Despite the effort the United Nations Environment Programme (UNEP) had to conclude in 1991 that the problem of land degradation in arid, semi-arid and dry sub-humid areas had intensified.

As a result, desertification was still a major concern for the United Nations Conference on Environment and Development (UNCED). The Conference called on the United Nations General Assembly to establish an Intergovernmental Negotiating Committee to prepare, by June 1994, a Convention to Combat Desertification, particularly in Africa. This resulted in the "United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa" (UNCCD).

5.1.2. Status of Participation/Ratification and Implementation

The United Nations Convention to Combat Desertification (UNCCD) was adopted in June 1994. During the time it was open for signature, from October 1994 to October 1995, it received 115 signatures. The UNCCD entered into force on 26 December 1996, 90 days after the fiftieth instrument of Ratification or Accession was deposited. For a party acceding the Convention after this date the Convention enters into force 90 days after this party has deposited its instrument of Ratification, Accession or Acceptance. To date, 190 countries have ratified, acceded or accepted the UNCCD. Non-signatory States have the option of acceding to the Convention at any time (UNCCD, 2003b).

Among European countries, 44 countries are Parties to the Convention and 22 countries are affected by desertification, land degradation and drought. Of the affected countries, seven have already finalized their National Action Programmes, which are long-term policy guidelines that constitute the backbone of the Convention (UNCCD, 2003c).

In support of the implementation of the convention to combat desertification in the Mediterranean, a Desertification Information System (DISMED) has been established between 11 countries in the Mediterranean basin. The information service is accessible via the following website: http://dismed.eionet.eu.int/

Worldwide country-by-country ratification status is presented in Annex A.

5.1.3. Policy Timeline and Agenda

Non-affected countries will report to every session (odd years starting in 2003) and affected countries to every other session, alternating between African countries and countries in other regions.

The sixth session of the Conference of the Parties (COP) of the United Nations Convention to Combat Desertification was held in Cuba, from 25 August to 5 September 2003.

The seventh session of the COP is scheduled to convene from 17-28 October 2005, in Nairobi, Kenia, to consider, inter alia: the programme and budget for 2006-2007; reviews of the implementation of the Convention.

The UNCCD secretariat publishes information about its work plan on its website: http://www.unccd.int/secretariat/secretariat.php

5.2. Relations to or Inter-linkages between Policies

Drought and deforestation are two of the major causes of desertification in Europe. Forest fires and droughts contribute to erosion, land degradation and eventually desertification (UNCCD, 2003c). The issue of deforestation links to the afforestation, reforestation and deforestation (ARD) accounting for the Kyoto Protocol. Land degradation resulting in the eventual loss of biodiversity links to the Convention on Biological Diversity. The connection between forest fires and desertification in the South of Europe links with the Forest Focus regulation, which aims for one part at preventing and monitoring forest fires.

Also security issues are on the agenda. Environmental changes, such as desertification, put pressure on social, economic, political and demographic dynamics, triggering insecurity. This concern was echoed at a NATO workshop on Security issues related to desertification in the Mediterranean region, in Valencia, Spain, on 2-5 December 2003 (UNCCD, 2003d).

5.3. Terms and Definitions

The UNCCD convention text outlines the following land-related definitions (UNCCD, 1994):

Desertification means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities;

Combating desertification includes activities which are part of the integrated development of land in arid, semi-arid and dry sub-humid areas for sustainable development which are aimed at:

- Prevention and/or reduction of land degradation;
- Rehabilitation of partly degraded land; and
- Reclamation of desertified land

Land means the terrestrial bio-productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system.

Land degradation means reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or

range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as:

- Soil erosion caused by wind and/or water;
- Deterioration of the physical, chemical and biological or economic properties of soil; and
- Long-term loss of natural vegetation

5.4. Reporting Requirements and Information Needs with EO Potential

The information needs with EO potential are related especially to the identification of areas vulnerable to desertification. Generally such areas can be labeled by a high land degradation risk and by gradual or abrupt vegetation cover change.

TESEO Desertification, a project that studied EO information needs emerging from the UNCCD concluded that from a technical point of view, the end-user requirements are closely related to the variables and indicators of desertification and droughts. A number of identified EO products, which could assist in combating desertification, are related to forest monitoring. TESEO Desertification stated however that there was a lack of a common set of indicators for desertification monitoring and drought early warning open to EO. Subdivided in three categories, these are the following (TESEO Desertification, 2002):

1. Physical
    - Land cover, use/change
    - Eroded land
2. Biological
    - Vegetation cover
    - Vegetation indices (e.g. NDVI, …)
    - Vegetation biomass
    - Forest burnt area
3. Episodic
    - Bush and forest fire
    - Forest clear cut

Summary:

- The United Nations Convention to Combat Desertification aims at protecting globally about 4 billion hectares of land that are vulnerable to desertification;
- The convention entered into force in 1996 and has been ratified by 190 countries;
- There are monitoring requirements towards land cover, vegetation indices and forest burnt area;
- The information needs with EO potential are related especially to the identification of areas vulnerable to desertification; the needs can be categorised into physical, biological and episodic variables.

6. United Nations Forum on Forests

6.1. General Policy Outline

6.1.1. General Scope and Objectives of the Policy

The Economic and Social Council (ECOSOC) of the United Nations established the United Nations Forum on Forests (UNFF) as a subsidiary body in the year 2000. Its main objective is to promote the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment hereto as part of a new international arrangement on forests, to carry on the work building on the Rio Declaration, the Forest Principles, Chapter 11 of Agenda 21 and the outcome of the IPF/IFF processes (UNFF, 2003). The UNFF is part of a broader process of the UNCED follow-up, supported by the Commission on Sustainable Development.

The Intergovernmental Panel on Forests (IPF, 1995-1997), and the Intergovernmental Forum on Forests (IFF, 1997-2000) were the main intergovernmental fora for international forest policy development in the UNCED aftermath. Both were under the auspices of the United Nations Commission on Sustainable Development.

IPF and IFF examined a wide range of forest-related topics over a five-year period. The most important document of the intergovernmental discussion contains 270 proposals for action towards sustainable forest management and referred to as the IPF/IFF Proposals for Action.

Established in the October 2000 the UNFF further feeds into broader global environment and development processes with documents at the level of ministerial declarations. The UNFF is guided by a Bureau and serviced by a secretariat that also serves as a secretariat for the Collaborative Partnership on Forests (CPF). The CPF is a high-level, informal Interagency Task Force on Forest, which currently comprised of 13 international organisation members[1]. The CPF has two main objectives: 1) to support the work of the UNFF and its member countries and 2) to foster increased cooperation and coordination on forests (UNFF, 2003).

6.1.2. Status of Participation/Ratification and Implementation

The UNFF is composed of all Member States of the United Nations and specialized agencies and meets in annual sessions.

Although the IPF/IFF proposals for action are not legally binding, participants of these processes are under a political commitment to implement the agreed proposals for action and each country is expected to conduct a systematic national assessment of the IPF/IFF proposals for action and to plan for their implementation.

[1] The CPF members are Secretariat of the Convention on Biological Diversity (CBD), Secretariat of the Convention to Combat Desertification (UNCCD), Centre for International Forestry Research (CIFOR), Food and Agriculture Organization of the United Nations (FAO), Secretariat of the Global Environmental Facility (GEF), International Tropical Timber Organization (ITTO), Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Department for Economic and Social Affairs (DESA), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), World Agroforestry Centre (ICRAF), World Bank, World Conservation Union (IUCN) (UNFF, 2003)

6.1.3. Policy Timeline and Agenda

The fifth session of the UNFF was held at the United Nations, New York, United States of America in May 2005. Information on the baseline of discussions at the fifth session is available from: http://www.un.org/esa/forests/reports-unff5baseline.html

The sixth session of the UNFF will be held at the United Nations, New York from 13 to 24 February 2006.

The UNFF publishes an exhaustive agenda of worldwide events related to forestry: http://www.un.org/esa/forests/calendar.html

6.2. Relations to or Inter-linkages between Policies

There are collaborative initiatives for inter-linkage between the Convention on Biological Diversity (CBD) and the UNFF. The proposals are in the fields of: protected forest areas; further development and integration of the concepts of ecosystem approach and sustainable forest management; cross-sectoral impacts on forest biological diversity; and facilitating integration at the national level, especially National Forest Programmes and National Biodiversity Strategic Action Plans (CBD, 2002b).

The UNFF supports the establishment of monitoring programmes based on criteria and indicators. This provided important back-support for the development of the Criteria and Indicators programme of the Ministerial Conference on the Protection of Forests in Europe (MCPFE) and other C&I processes (See also chapters 0 and 8). The MCPFE has produced the 'MCPFE and the IPF/IFF Proposals for Action' (MCPFE Paper 1, MCPFE, 2001) describing and analysing linkages between the MCPFE Work Programme and the proposals for action agreed upon by the Intergovernmental Panel on Forests (IPF) and its successor, the Intergovernmental Forum on Forests (IFF).

6.3. Terms and Definitions

International organizations and multilateral institutions and instruments are asked to undertake efforts to achieve a common international understanding on concepts, essential terms and definitions used in developing criteria and indicators for sustainable forest management (UNFF, 2002a).

6.4. Reporting Requirements and Information Needs with EO Potential

The IPF/IFF/UNFF processes stress the importance of monitoring, assessment and reporting on forest ecosystems as this would allow follow-up on progress towards the objectives of the policy.

The processes support the development and implementation of regional and national criteria and indicators for sustainable forest management as a basis for reporting on sustainable forest management and encouraged their use in reporting internationally. There is however no detail on the specification or requirements to those indicators.

Information would be needed on deforestation and forest preservation, forest degradation, forest health and forest productivity, forest conservation and protection of unique types of forests and fragile ecosystems

It is mentioned that many developing countries do not currently have the capacity to use criteria and indicators as a tool for monitoring and reporting, although they recognise their importance in promoting sustainable forest management. In some of the international processes, work is under way to develop a common reporting format; to use internationally accepted terms, concepts and definitions; and to report on progress towards sustainable forest management by individual countries and/or regionally, by the process (UNFF, 2002b). This stresses the importance of the transfer of knowledge and technology between developed and developing countries.

Regarding the assessment, monitoring and rehabilitation of forest cover in environmentally critical areas, countries and relevant international organisations and major groups are encouraged to cooperate and coordinate activities concerning forests and trees in environmentally critical areas, and to contribute to more systematic collection, analysis and dissemination of information (UNFF, 2002b).

Summary: IPF/IFF/UNFF

- The UNFF is an international forum for the enhancement of the discussion on sustainable forest management and the protection of the forest resource, with a floor for all stakeholders. It continues the work of the IPF and IFF and follows the implementation up of 270 proposals for action that were laid down by the latter two processes.
- This is a consultative process, with voluntary contributions thus without legal consequence for e.g. not submitting required information. The UNFF supports the establishment of monitoring systems. It stresses the need for transfer of knowledge and technology to developing nations for capacity building. The legal parties in the process are committed to the cause and many subsequent processes have more specific requirements for information.
- Special explicit mentioning of support is given to the development and implementation of Criteria and Indicators on Sustainable Forest Management.

7. Criteria and Indicators for Sustainable Forest Management

During the recent past, the perspective on forests has evolved from management largely for sustained yield of wood to environmentally sustainable forest management (Commission on Sustainable Development, 1996). In general terms, Sustainable Forest Management (SFM) deals with the administrative, economic, social, legal, technical and scientific aspects of the conservation and sustainable use of forests within the framework of technically sound and politically accepted national land-use plans. It implies various degrees of human intervention, ranging from action aimed at safeguarding and maintaining the structure and function of forest ecosystems, to favouring socially or economically valuable species or groups of species for the improved production of goods and environmental services. In operational terms, SFM includes the formulation and implementation of forest management plans, which help to control and regulate harvesting of specified goods, combined with silvicultural and protective measures applied in varying intensity to sustain or to enhance the social, ecological and economic value of subsequent generations of the managed forests.

After the United Nations Conference on Environment and Development (UNCED) in 1992, the interest in criteria and indicators (C&I) as a tool to cost-effectively describe, monitor, evaluate and report of progress towards the sustainability of forest management increased rapidly all over the world (Eoronheimo, 2002). Criteria define essential elements against which sustainability of forest management is judged, with due consideration paid to the environmental, economic and socio-cultural roles of forests and forest ecosystems. Each criterion is defined by indicators, which are monitored periodically. Indicators can be based on in-situ measured or remotely sensed variables but they can also cover e.g. monitoring of progress in political processes. Changes in the indicators between periods indicate whether a country is moving towards or away from sustainability (FAO, 2001b).

A number of international initiatives have emerged with the goal of identifying criteria and define indicators corresponding to various criterions. The initiatives are listed below:

- International Tropical Timber Organization (ITTO) criteria for sustainable tropical forest management
- Ministerial Conference on the Protection of Forests in Europe - MCPFE Process (Pan-European Process) (See also Chapter 8)
- The Montreal Process (Santiago Declaration)
- The Tarapoto Process on the Amazon forest's Sustainability Criteria and Indicators
- Criteria and Indicators for Sustainable Forest Management in Sub-Saharan Dry-zone Africa
- Criteria and Indicators for Sustainable Forest Management in the Near East
- The Central American Process of Lepaterique
- Initiatives of the African Timber Organization (ATO) on Criteria and Indicators for Sustainable Forest Management
- Dry Asia Initiative

Currently over 100 countries are involved in developing national-level C&I. The criteria in all of the initiatives include the following elements, although in some cases using different approaches/indicators to assess them (Granholm et al., 1996):

- Area of forest resources;
- Biodiversity;
- Health and vitality;
- Productive functions;
- Protective and environmental functions;
- Development and social needs;
- Legal policy and institutional framework

8. Ministerial Conference on the Protection of Forests in Europe

8.1. General Policy Outline

8.1.1. General Scope and Objectives of the Policy

The pan-European Forest Process "Ministerial Conference on the Protection of Forest in Europe" (MCPFE) was set up in 1990 for a better understanding of the ways and means for protection and sustainable management of forests (SFM) at a pan-European level. The MCPFE is a high-level political initiative for cooperation. The process has strengthened political and scientific discussion while also co-operation on forest-related issues. The implementation of the decisions adopted in the Conferences concerns to the signatory states (European Community included) in the pan-European area.

The MCPFE has a facilitating role in the implementation of global commitments on the management, conservation and sustainable development of forests at a European-wide scale. MCPFE also contributes to the development of forest-related commitments at a global level. National and sub-national forest programmes are used as a means for effective intersectoral coordination, reflecting a balanced decision making process (MCPFE, 2003a).

Relevant documents of the MCPFE process are the Resolutions of the different Conferences - Strasbourg (1990), Helsinki (1993), Lisbon (1998) and in Vienna (2003). Main output of the Conferences to date has been the establishment of European networks (e.g. on forest monitoring, genetic resources, research, etc.), guidelines for the sustainable management of European forests and the conservation of their biodiversity and as set of pan-European C&I for SFM.

The pan-European criteria and indicators for sustainable forest management (C&I for SFM) are seen as a basis for the development of national indicators (MCPFE, 2003b).

Table 11. Areas of work and corresponding elements of the MCPFE Work Programme (MCPFE, 2003c)

Dialogue with Society	Socio-Economic Issues	Biodiversity and Conservation	Planning, Monitoring, Evaluation and Reporting
Public Relations	Rural Development	Biological and Landscape Diversity	National Forest Programmes
Public Participation	Goods and Services	Forests and Climate Change	Criteria and Indicators for SFM
Education	Training, Education and Gender Issues	Management of Mountain Forests	
	Countries in Transition		

8.1.2. Status of Participation/Ratification and Implementation

The MCPFE is a dynamic process based on a chain of conferences at ministerial level and follow-up mechanisms. The implementation of the decisions adopted by the Conferences concern the signatory states (including the European Community) in the pan-European area. This regional platform on European forest issues brings together governments of 45 European

countries and the European Community[2] and allows other countries[3] and international organisations[4] to participate as observers. Environmental and social NGOs, research institutions and forest owners' associations participate as stakeholders therein.

At the conferences the ministers responsible for forests deal with aspects of highest political interest and concern. Between two Ministerial Conferences, the decisions passed by the ministers are further specified and put into action at expert meetings within the framework of a follow-up process. In addition, issues of immediate interest are taken up and further developed on a flexible basis. The signatory states and the European Community are responsible for implementing the MCPFE decisions at European, national and sub-national levels.

The Liaison Unit is the service-oriented secretariat of the MCPFE, located in the city where the next conference will convene, now being Warsaw. It is responsible for the co-ordination of the MCPFE Work Programme's implementation, the organisation and carrying out of all international meetings of the MCPFE, the preparation of reports, papers and all other information on the work of the MCPFE.

8.1.3. Policy Timeline and Agenda

Timeline of the policy process

Four conferences have already taken place and are considered as milestones of European forest policies:

- 1990 First Ministerial Conference in Strasbourg
- 1993 Second Ministerial Conference in Helsinki
- 1998 Third Ministerial Conference in Lisbon
- 2003 Fourth Ministerial Conference in Vienna
- 2008 Fifth Ministerial Conference in Warsaw

After the first Ministerial Conference on Protection of Forests in Europe, meetings were held regularly among participants and observers to put the different resolutions into action. For up-to-date information on MCPFE meetings, see http://www.mcpfe.org.

Timeline of information needs

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[2] European participant countries: Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Community, Finland, France, Georgia, Germany, Greece, Holy See, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia and Montenegro, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and United Kingdom.

[3] Observer countries: Australia, Brazil, Cameroon, Canada, Chile, China, Ghana, India, Japan, Korea (Republic), Malaysia, New Zealand and USA.

[4] Observer organisations: CEI Bois, CEPF, CEPI, COPA, Council of Europe, EFI, ELO, ENFE, EOMF, FAO, FECOF, Greenpeace European Unit, Greenpeace International, IFBWW, IIASA, ILO, IPGRI, ITTO, IUCN, IUFRO, Montreal Process, UEF, UNDP, UNECE, UNEP, UNFF, UNU, USSE and WWF International.

Reports should be prepared and published at a frequency that balances the ability to measure meaningful change, build capacity, respond to domestic audiences and maintain momentum and international visibility.

The MCPFE Reporting should be undertaken on a regular basis at 5-6 year intervals, taking into account the schedule of relevant international events (e.g. political Conferences, World Forestry Congress) and timeframes for related forest reporting (e.g. UNECE/FAO Temperate and Boreal Forest Resource Assessment (TBFRA) of which the next edition is expected for 2005) (MPCI, 2001).

8.2. Relations to or Inter-linkages between Policies

The MCPFE has been contributing to the implementation of the forest-related decisions and agreements of the United Nations Conference on Environment and Development (UNCED) and its follow-up process within IPF/IFF (Intergovernmental Panel on Forests/Intergovernmental Forum on Forests). It has also close ties to the United Nations Conventions, namely United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (CCD) and CBD. As contribution to the implementation of the CBD, the MCPFE co-operates with the Ministerial Process "Environment for Europe" and its Pan-European Biological and Landscape Diversity Strategy (PEBLDS). PEBLDS is lead by the Council of Europe and was endorsed by 54 countries in 1995 at the 3rd 'Environment for Europe' (EfE) Conference. The Strategy provided the basis for development of a European Biodiversity Monitoring and Indicator Framework (EBMI-F). This aims to support a sustainable development by creating synergies in monitoring and developing biodiversity indicators. The objective is thus to promote cooperation towards a consistent reporting on Europe's biodiversity, using the objectives of the CBD as guidance (EEA, 2003). The year 2010 as target to halt the degradation of the region's biological and landscape diversity was endorsed as part of the 'Kyiv Resolution on Biodiversity' at the 5th Ministerial Conference 'Environment for Europe' in Kyiv, May 2003.

The MCPFE has close working relations to the European Environment Agency's[5] (EEA) strategy for reporting on environmental trends. EEA is currently developing a core set of environmental indicators for major sectors (energy, agriculture, forestry, tourism etc.) and issues such as biodiversity, water, terrestrial environment, air and climate change (Delbaere, B. 2002). EEA puts an important role to the development of a core set of indicators as key information provider on environmental issues at the European level. It intends to use the MCPFE biodiversity indicators in its core set. Furthermore, the CBD Work Programme on forests stresses the need for forest classification. The MCPFE was supported on the issue of forest types schemes through European Nature Information System (EUNIS) and the EU-Concerted action FAIR CT 97-3575 under 4th EU Commission Framework Programme "Indicators for monitoring and evaluation of forest biodiversity in Europe (BEAR)" (Larsson, 2001). Interlinkages between the MCPFE and other policy processes are illustrated in Figure 6.

[5] The Agency both gathers and distributes its data and information through the European environment information and observation network (EIONET), which brings together over 300 environment bodies, agencies, public and private research centres and centres of expertise across Europe. The EEA is responsible for coordinating the EIONET.

8.3. Terms and Definitions

Terms and definitions used, are in compliance with the terminology of the UN-ECE/FAO Temperate and Boreal Forest Resource Assessment (TBFRA2000). In addition, as outcome of the implementation of the joint "Work-Programme on the Conservation and Enhancement of Biological and Landscape Diversity in Forest Ecosystems 1997-2000" of the MCPFE and EfE, a MCPFE Classification of Protected and Protective Forests and Other Wooded Land in Europe was established based on the Common Database on Designated Areas (CDDA) and The World Conservation Union (IUCN) Categories (MCPFE, 2001).

8.4. Reporting Requirements and Information Needs with EO Potential

All European countries and the European Community share the Pan-European C&I for SFM as common basis for both data collection and reporting on SFM at the pan-European level and for the development of respective national indicators. These C&I have been adopted at high political level as a monitoring and reporting framework and therefore represent key references for the scientific and technical work undertaken with regard to SFM (Wildburger, C., 2000).

Data collection on the Pan-European C&I is mainly based on national-level data collection systems and has been carried out through the Temperate and Boreal Forest Resource Assessment (TBFRA 2000, UNECE/FAO, 2000) based on harmonised definitions. Data has further been obtained through ICP Forests/European Union Scheme on the Protection of Forests against Atmospheric Pollution. Additional new datasets have been added on protected forest areas by the secretariat of the Ministerial Conference on the Protection of Forests in Europe, and on forest genetic issues by the European Forest Genetics Network – EUFORGEN.

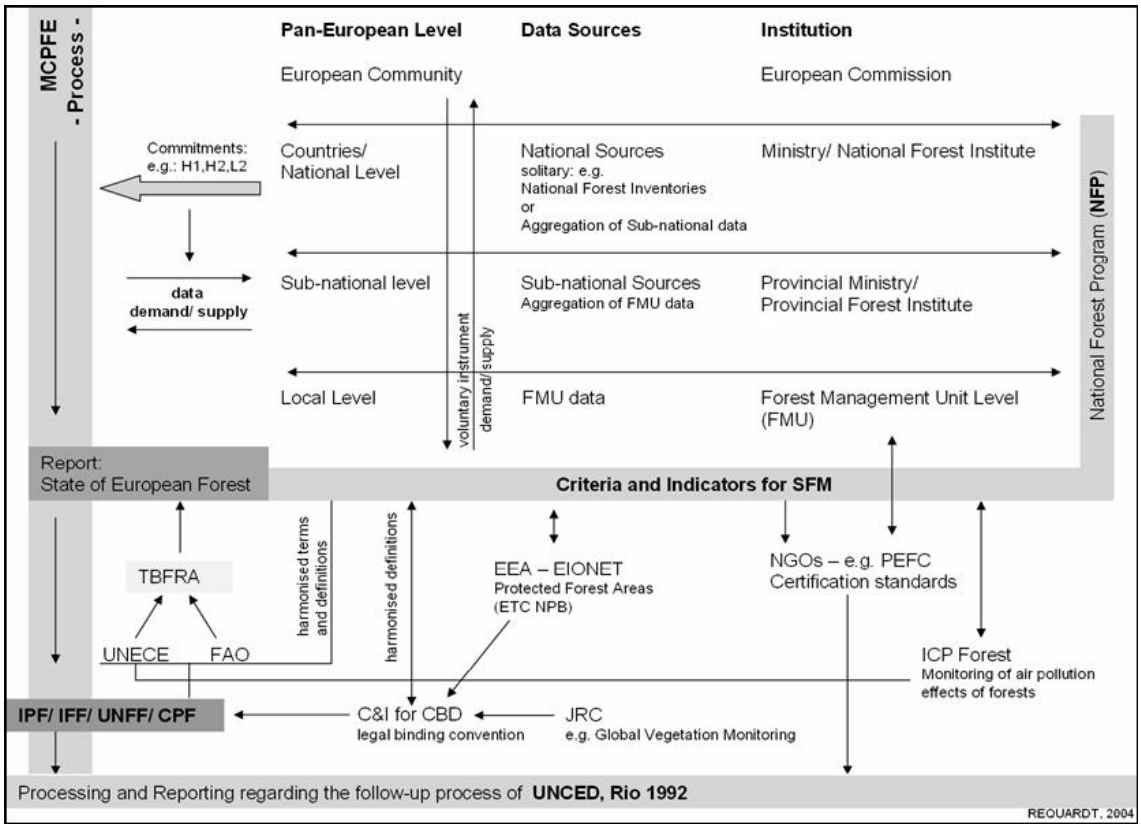

Figure 6 Linkages between MCPFE and other processes (Requardt, 2004)

Relevant forest-related indicators where data input from earth observation sources could be useful, are listed in Table 11. The major information needs concern especially aspects of forest area, volume/biomass, spatial patterns and fragmentation.

Summary: The MCPFE process and needs for earth observation

- The MCPFE is a high-level political initiative for cooperation.
- The signatory states and the European Community are responsible for implementing the MCPFE decisions at European, national and sub-national levels.
- Criteria and indicators have been adopted as a monitoring and reporting framework and therefore represent key references for the scientific and technical work undertaken with regard to sustainable forest management.
- Main indicators allowing EO applications are besides others (see Table 6): forest/other wooded land area and changes within; woody biomass and volume; biotic and abiotic damages; landscape-level spatial pattern of forest cover and defoliation.
- Major data source for the indicators is the harmonised TBFRA 2000 data set and its follow-up process. Further EEA and ICP Forest are of high importance as data suppliers.

Table 12. Information needs on forests and forestry with relevance to the MCPFE and earth observation (MCPFE, 2002); No reference was found to the level of required accuracy. Generally, best available information is used for the indicator reporting.

Variable	Geographical Reporting Unit	Reference	Current data source
1.1. Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area	Country-level	MCPFE	TBFRA2000
1.2. Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply	Country-level	MCPFE	TBFRA2000
1.4. Carbon stock of woody biomass and of soils on forest and other wooded land	Country-level	MCPFE	TBFRA2000
2.3. Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes "moderate", "severe" and "dead"	Country-level	MCPFE	TBFRA2000 (Defoliation ≥ 25%) / ICP (member countries)
2.4. Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced) and by forest type	Country-level	MCPFE	TBFRA2000
3.5. Proportion of forest and other wooded land under a management plan or equivalent	Country-level	MCPFE	-
4.1. Area of forest and other wooded land, classified by number of tree species occurring and by forest type	Country-level	MCPFE	-
4.2. Area of regeneration within even-aged stands and uneven-aged stands, classified by regeneration type	Country-level	MCPFE	TBFRA2000
4.4. Area of forest and other wooded land dominated by introduced tree species	Country-level	MCPFE	TBFRA2000
4.7 Landscape-level spatial pattern of forest cover	Country-level	MCPFE	-
Further indicators related to the MCPFE process with relevance to earth observation			
71. Urban forest index	Municipalities	EEA core set	Konijnendijk, C.C. 2001
74. Urban forest increase	Municipalities	EEA core set	COST Action E12 "Urban Forests and Trees"
25. Wind and snow break*	All-levels	EEA core set	-
27. Forest fragmentation by internal roads*	Landscape level	EEA core set	-
Changes in forest area	All-levels	EEA core set	Rois et al., 2002
Changes in growing stock	All-levels	EEA core set	Rois et al., 2002

* Suggested by the BEAR project.

9. Council of Europe Landscape Convention

9.1. General Policy Outline

9.1.1. General Scope and Objectives of the Policy

The aims of the Council of Europe Landscape Convention are to promote landscape protection, management and planning, and to organise European co-operation on landscape issues (Art. 3). This Convention applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas. It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes, but does not deal with historic monuments (unlike the UNESCO convention, see 9.2). Its main objective is to introduce protection, management and planning rules for all landscape based on a set of principles. The convention refers to international agreed principles concerning environmental impact assessment as a tool to assess the overall impact of an intervention on the landscape.

9.1.2. Status of Participation/Ratification and Implementation

Since its adoption in Florence, Italy, on 20 October 2000, a total number of 28 states have signed the convention, of which 11 have ratified it. The convention has entered into force on the first of March 2004. Any states that have not yet ratified the convention or that will accede it at later date will see it enter into force three months upon doing so. Country-by-country status is presented in Annex A.

9.1.3. Policy Timeline and Agenda

The Landscape Convention has entered into force on the first of March 2004.

9.2. Relations to or Inter-linkages between Policies

The European Landscape Convention is seen as being complementary to existing international legal instruments, such as the following Council of Europe conventions (CoE, 2000):

a. The Unesco Convention concerning the Protection of the World Cultural and Natural Heritage, (Paris, 16 November 1972);

b. The Council of Europe Convention on the Conservation of European Wildlife and Natural Habitats, (Bern, 19 September 1979);

c. The Council of Europe Convention for the Protection of the Architectural Heritage of Europe, (Granada, 3 October 1985);

d. The Council of Europe Convention for the Protection of the Archaeological Heritage (revised) (Valletta, 16 January 1992).

The Landscape Convention will further reinforce the effective implementation of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS). PEBLDS establishes an

international framework for co-operation for consolidating and extending existing schemes and programmes in the conservation field. Endorsed at the third Pan-European Conference of Ministers of Environment "Environment for Europe" (EfE), held in Sofia in October 1995, it concerns 54 countries of the United Nations economic commission for Europe. In the same context there is a link to the MCPFE element “Biological and Landscape Diversity” in the area of work “Biodiversity and Conservation” (See 8.1) (UNEP, 2001). In practical terms this leads e.g. e.g. to afforestation measures that not negatively affect ecologically interesting or noteworthy sites, habitats and ecosystems landscapes (Chaytor, 2002).

The European Union has established the NATURA 2000 Network of sites, designated based on species and habitats related to the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (i.e. the Habitats Directive), and the Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (i.e. the Birds Directive).

The EMERALD network, which is also related to the CoE Bern Convention on the protection of habitats. It will complement Natura2000 in non-EU countries, on the European Landscape Convention (adopted 2000) and on the pan-European biological and landscape strategy (PEBLDS).

9.3. Terms and Definitions

“Landscape” means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors;

"Landscape management" is any measure introduced, in accordance with the principle of sustainable development, to steer changes brought about by economic, social or environmental necessity. Such measures may be concerned with organisation of the landscape or its components. They will ensure a regular upkeep of the landscape and that the landscape evolves harmoniously and in a way that meets economic and social needs. The management approach must be a dynamic one and seek to improve landscape quality on the basis of the population's expectations.

"Landscape planning" is the formal process of study, design and construction by which new landscapes are created to meet the aspirations of the people concerned. It involves framing proper planning projects, more particularly in those most affected by change and badly damaged areas (for example suburbs, peri-urban and industrial areas, coastal areas). The purpose of such planning projects is to radically reshape the damaged landscapes.

“Landscape management” means action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonise changes which are brought about by social, economic and environmental processes;

“Landscape protection" consists of measures to preserve the present character and quality of a landscape which is greatly valued on account of its distinctive natural or cultural configuration. Such protection must be active and involve upkeep measures to preserve significant features of a landscape;

"Landscape quality objective" means, for a specific landscape, the formulation by the competent public authorities of the aspirations of the public with regard to the landscape features of their surroundings;

9.4. Reporting Requirements and Information Needs with EO Potential

The Committee of Ministers recommended the identification of landscapes of European interest. The body supervising the implementation of the convention will supposedly coordinate this work. A representative of the Council of Europe presented the Landscape Convention at the 3rd GMES Forum and expressed interest in the application of earth observation data for monitoring the implementation of the convention (Dejeant-Pons, 2003). Although, no specific guidance was given on the parameters to be monitored. More practical definition of information needs may come from the CBD, MCPFE and PEBLDS, e.g. the CBD indicator "fragmentation of landscapes" (see Table 10) and the MCPFE indicator "landscape-level spatial pattern of forest cover" (see Table **12**).

The COST Action E25 'Ecosystem and Landscape' could potentially contribute in the future to specification of information needs based on its investigation of the forest ecosystem processes at the landscape scale.

The Pan European Forum for Countryside and Landscape Monitoring (ECOLAND) aims to develop an integrated approach to landscape and vegetation monitoring. ECOLAND is a working group which is incorporated into the framework of the International Association for Landscape Ecology. The overall objective of ECOLAND is to create a structure for the production of an integrated assessment of change in habitats and biodiversity and the associated causes and impacts on the European landscape.

ECOLAND identified that monitoring methodology should establish links between ground truth information, remote sensing (e.g. CORINE) and aerial photography information to improve objectivity in field recording (e.g. % coverage of trees); to identify basic units; to enable time-series to be produced; to enable generalisation to larger areas (extrapolation) and integration between species data from ground truth survey and the extensive coverage from remote sensing images. (landscape-ecology.org, 2005 and landscape-europe.org, 2005)

Landscape integrated assessment are needed to bridge the methodological gap between the different levels across European regions and which at the same time is flexible enough to allow region-specific applications. (landscape-europe, 2005)

Summary:

- The aim of the Council of Europe Landscape Convention is to promote landscape protection, management and planning.
- Landscape related information needs are identified through the Convention on Biological Diversity, the Pan-European Biological and Landscape Diversity Strategy and the Ministerial Conference on the Protection of Forests in Europe.

10. Council Regulation (EC) No 2152/2003 Concerning Monitoring of Forests and Environmental Interactions in the European Community (Forest Focus)

10.1. General Policy Outline

10.1.1. General Scope and Objectives of the Policy

In 1986, the Directorate General for Agriculture of the European Union launched its first action to monitor forest ecosystems' health. Since, the established monitoring activity has and continues to collect valuable data on forest condition, in respect to atmospheric pollution and other human and natural induced stresses. Since 1992, another action was providing valuable information on forest fires, their monitoring being extremely important for the Mediterranean members of the Union. These measures have resulted in the collection of data on a common grid for the Union.

In the end of 2003, the European Parliament and Council adopted the regulation (EC) No 2152/2003 concerning monitoring of forests and environmental interactions in the Community, generally referred to as "Forest Focus" (CEC, 2003a).

The purpose of the regulation is the establishment of a new Community scheme on monitoring of forests and environmental interactions to protect the Community's forests. Such Community-wide action will allow for the collection of harmonised data and the provision of policy relevant information at Community level. This will help the evaluation of ongoing Community measures on effects of atmospheric pollution and forest fires and the promotion the conservation and sustainable management of forest ecosystems. Besides the reiteration of monitoring activities of forest condition and forest fires, Forest Focus envisages developing new activities to assess the impact of climate change on forest ecosystems and to complement EU policies on bio-diversity, carbon sequestration and soil protection (DG ENV, 2003).

The scheme should encourage the exchange of information on forest ecosystems conditions in the Community and enable the implementation and evaluation of Community's measures taken to protect and develop and manage forests in the Community in a sustainable way.

10.1.2. Status of Participation/Ratification and Implementation

The scheme is open to the Member Countries of the European Union (EU) as well as to the EU Candidate Countries of Central and Eastern Europe. The scheme is open to Cyprus, Malta and Turkey on the basis of bilateral agreements to be concluded with these countries, and to other European countries at their own expense.

10.1.3. Policy Timeline and Agenda

Timeline of the policy process

The scheme applies from 1 January 2003 to 31 December 2006 and run for a total of 4 years. The scheme entered into force 11 December 2003.

Member States will be requested to setup multi-annual monitoring programmes suggested for periods of 2 years). Member states will have to submit annual reports (each year no later than 31 December) on the implementation of the monitoring program and their monitoring activity, with (geo-referenced) data gathered under the scheme and a report on them.

31 June 2006, the European Commission assisted by the EEA will submit a report on the implementation of the scheme to the European Parliament and the Council, reviewing the effectiveness of the scheme in order to provide a basis for any decisions on the continuation of the Forest Focus activities after 2006 – to which end the Commission is invited to present a proposal.

A new single financial instrument targeting the environment, named LIFE+ will come in place in 2007. LIFE+ should closely support the priorities of the 6th Environment Action Programme (2002-2012) which are to combat climate change, to halt the decline in bio-diversity, to minimise negative environmental effects on human health, and to deal with natural resources and waste in sustainable ways. (CEC, 2004)

LIFE+ has been designed to contribute to the development, implementation, monitoring, evaluation and communication of EU environment policy.

LIFE + will have two strands:

- One strand "Implementation and Governance" (covering between 75 and 80% of funds) will particularly concern the development and demonstration of innovative policy approaches; the consolidation of knowledge of, on the one hand, environmental policies and law and, on the other, the state of the environment and elements which impact on it; the implementation of Community environment policy at local and regional level; the broadening of stakeholder involvement;

- One strand "Information and Communication" (covering between 20 and 25% of funds) will concern the dissemination of information and raising public awareness as well as supporting accompanying measures.

The scope of the current Forest Focus regulation will be reflected in the LIFE+ programmes and the activities will be covered by both strands of LIFE+.

Timeline of information needs

A report on the results gained from the monitoring of forest ecosystems conditions has to be submitted to the Commission by 31 December 2005. For forest fires there is an annual reporting scheme to be submitted each year by 31 December.

10.1.4. Access to information

Forest Focus specifies "data should be disseminated taking into account the UN/ECE 1998 Convention on access to information, public participation in decision-making and access to justice in environmental matters (Aarhus Convention) and relevant European Community provisions on access to environmental information".

Data governed by the International Co-operative Programme on the Evaluation and Monitoring of Air Pollution Effects on Forests (ICP Forests, see 10.3) are available to third parties for further evaluation and analysis. The submission of data is possible after formal request with the ICP Forests Coordinating Centre in Hamburg.

Several services of the European Commission, including the Joint Research Centre, are working to establish the so-called European Forest Fires Information System (EFFIS), which will store the existing information on forest fires at the European level, and will incorporate on-line derived information on fire risk and fire damage assessment retrieved through the use of advanced methods. The EFFIS is being developed as a dynamic system to incorporate information on forest fires as it becomes available. It is intended as a web interface system in which users can retrieve information for any area of interest in Europe. Two subsystems of EFFIS are already developed, and are being tested by operational forest fire services: the first one is referred to as the European Forest Fire Risk Forecasting System (EFFRFS); a second module is referred to as the European Forest Fire Damage Assessment System (EFFDAS).

The Forest Focus data platform is currently being established for the EU's Joint Research Centre, Institute for Environment and Sustainability under the action - Information and monitoring of the forest environment, INFOREST (FP6 - WP2005 - Action n°2141).

10.2. Relations to or Inter-linkages between Policies

The EU and its Member States are committed to the sustainable management and protection of forests as according all relevant international and pan-European processes related to forests such as in particular the Forest Principles agreed at the 1992 UN Conference for Environment and Development (UNCED) in Rio de Janeiro and the subsequent work deriving from its follow-up.

The European Union and its Member States are committed to promote sustainable development in all policies and actions. The setting up of Forest Focus follows the sixth Environmental Action Programme (EAP) of the European Community, which identified the need for monitoring the multiple roles of forests in line with recommendations adopted by the CBD, UNFCCC conventions and MCPFE**,** the UNFF and other fora.

One of the objectives of Forest Focus is to fulfil obligations that already have been taken up by the European Union (e.g. Convention on Long-range Transboundary Air Pollution, Convention on Biodiversity), to support pan-European and international discussions (e.g. Ministerial Conference on the Protection of Forests in Europe - Strasbourg, Helsinki and Lisbon) and to respond to requirements that will evolve in the future (EU Soil Strategy, Clean air for Europe – CAFE, etc). The various monitoring elements proposed are all related to key priorities in the 6th Environmental Action Programme and the Sustainable Development Strategy, i.e. pollution, climate change, biodiversity, natural resources and soils (CEC, 2002).

A Community scheme on monitoring of forests and environmental interactions will contribute to meeting the needs for information to identify the nature of risks and uncertainties, so as to provide a basis for solutions and further policy decisions, for e.g. Environmental legislation and policies at European Union level, such as the Clean Air for Europe Programme, the 2000/60/EC Water Framework Directive, the 79/409/EEC Directive on the conservation of wild birds and the 92/43/EEC Directive on the conservation of natural habitats and of wild flora and fauna, as well as the recent EU Thematic Strategy for Soil Protection.

The monitoring activity under Forest Focus could assist substantially the monitoring requirements deriving from European Climate Change Programme, the EU Biodiversity Strategy and corresponding Biodiversity Action Plans, the Soil Strategy and the forthcoming scheduled work on the Soil Monitoring Directive and could contribute to Global Monitoring of Environment and Security (GMES) activities.

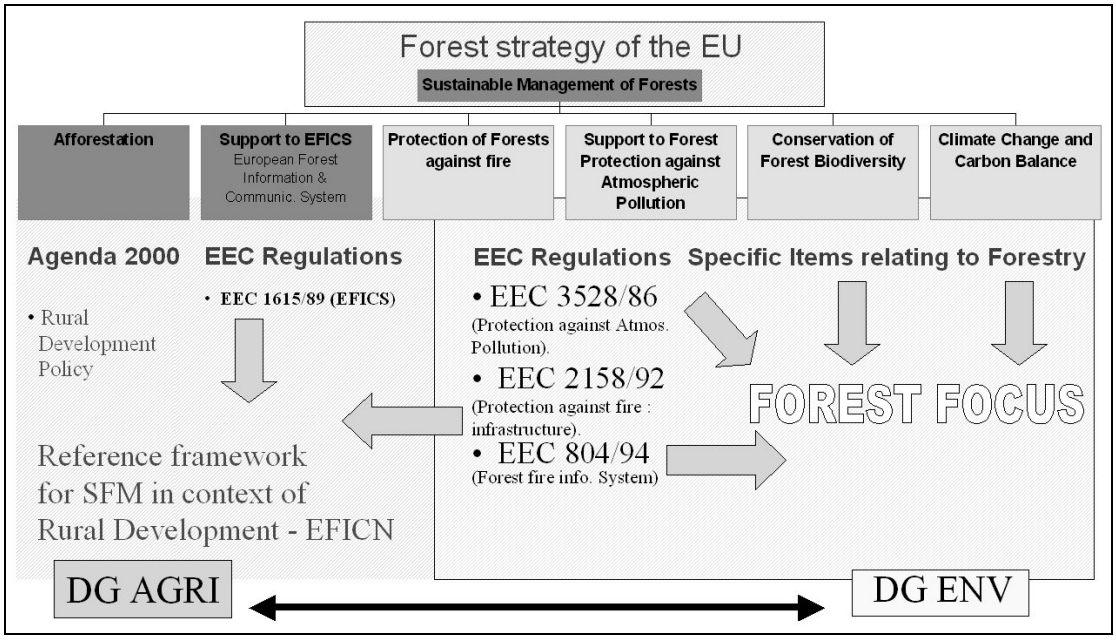

Figure 7 The position of Forest Focus in the Forest strategy policy framework of the European Union (Folving, 2003)

10.3. Forest Related Aspects of the Policy and Definitions

Forest Focus is a regulation specifically aimed at the protection and preservation of the forests in Europe and thereby aims at enhancing the sustainable management of the forests in Europe.

The scheme will be built on the achievements of two Council regulations for monitoring the impacts of atmospheric pollution (Council regulation (EEC) 3528/86) and of fires (Council regulation (EEC) 2158/92) on forest ecosystems.

A Community scheme to protect forests against atmospheric pollution was established by Council regulation (EEC) 3528/86 in order to provide increased protection for forests in the Community and thereby contribute in particular to safeguarding the productive potential of

agriculture. The Community action (EEC) 3528/86 on the protection of the Community's forests against atmospheric pollution was implemented in close co-operation with the International Co-operative Programme on the Evaluation and Monitoring of Air Pollution Effects on Forests (ICP Forests) under the UN-ECE Convention on Long-range Trans-boundary Air Pollution (Geneva, 1979), to which the European Community is a signatory party.

Council regulation (EEC) 2158/92 set up an action framework mainly for the prevention of forest fires. Various measures were co-financed under this regulation, such as the creation or improvement of existing prevention systems and, in particular, the establishment of protection infrastructure (forest paths, tracks, hydrants, firebreaks, etc.), as well as the creation or improvement of systems to monitor forests or identify the causes of forest fires and determine the means for combating them. This regulation introduced systematic collection of a set of data on each fire occurring, for all areas at risk of fire in the Member States participating in the system. The forest-fire information system now covers six Member States of the Union with fire-risk areas: Germany, Portugal, Spain, France, Italy and Greece. The system is an operational tool for monitoring and assessing the measures taken by the Member States and the Commission for fire prevention. The system will be also covered by the proposed framework regulation.

Terms and definitions

The Regulation contains definitions for forest, other wooded land, other land, forest fire and geo-referenced. Shortened versions of the definitions are given below:

“Forest” has in mature state a crown cover of at least 10 %, trees of height minimum 5 m, and an area of at least 0.5 ha with a width of at least 20 m;

“Other wooded land” has a crown cover of 5-10 % of trees not able to reach 5 m at maturity in situ and shrub or bush cover in both cases always on areas of at least 0.5 ha of at least 20 m wide. Such definition leaves in some countries areas out of scope that by the national definition of forest would be recognised as forest.

‘Other land’ means land not classified as forest or other wooded land.

‘Forest fire’ means fire affecting forest and other wooded land. The definition of ‘forest fire’ excludes: prescribed or controlled burning, usually with the aim of reducing or eliminating the quantity of accumulated fuel on the ground;

‘Geo-referenced’ means a reference to a specific geographic area within which data or other information is gathered. The area referred to may be larger than the area or point

from which the data/information is gathered, for example in order to ensure anonymity as regards the source of gathered data/information.

10.4. Reporting Requirements and Information Needs with EO Potential

The monitoring activities to be carried out by the Member States, in particular the collection of data as well as studies; experiments and demonstration projects shall be implemented under multi-annual national programmes (2-year period). The enhanced monitoring regulation is

related to the overall package of environmental action areas and will follow a scientific based approach. To achieve these objectives the Commission shall establish a Scientific Co-ordination Body, which may be within the Joint Research Centre of the European Commission. It shall in particular organise the collection and assessment of data and shall develop a Community data platform.

The Commission may need additional assistance from contracted decentralised thematic centers and may in addition consult and contract experts and research institutes for carrying out specific tasks. The EEA shall assist the Commission in its reporting activity. In this context co-operation with pan-European and international bodies, in particular with ICP Forests in the common field of monitoring air pollution, is needed to ensure a coherent approach to monitoring.

The Member States shall each designate one National Focal Centre to ensure efficient and clear communication structures. The data gathered under Forest Focus shall be submitted by the National Focal Centers to the Commission.

Among the objectives of Forest Focus is to provide:

- Information on the spatial and temporal variation in forest ecosystem condition, in relation to anthropogenic as well as natural stress factors, for the different eco-regions of the European Union.

- Information on forest fires and causes of forest fires in the Union and develop models for forest fire prediction and prevention based on the condition of the forest ecosystem.

Furthermore, it is among the objectives to assess the requirements for and develop the monitoring of soils, carbon sequestration, climate change effects and biodiversity, as well as protective functions of forests (Art. 1.1.b).

A breakdown of different information required for the implementation of the proposed actions is presented in Table 13.

Summary: Forest Focus

- Forest Focus is the European Union action on monitoring and prevention of atmospheric forest pollution and forest fires.
- Forest Focus builds on existing monitoring schemes and infrastructure, namely ICP Forests and a forest-fire information system. There may be the need to complement and/or validate the ICP Forest information with earth observation information. Additional input may also be required if the forest fire information system should include e.g. a risk assessment and early warning system, or a real-time observatory for emergency help purposes.
- Monitoring of biodiversity, carbon fluxes and social functions of the forest may be included following the outcome of pilot projects
- The responsibility for the monitoring within the Forest Focus frame lies with the EU Member States.
- The Regulation has been adopted in November 2003, de facto instating it retroactive to the beginning of that year.

Table 13. Information needs and requirements for Forest Focus (based on Folving, 2003 and CEC, 2002); Standard requirements to accuracy are not specified, but best practice applies.

Variable	Geographical Reporting Unit	Temporal requirement	Reference	Current data source
Soil inventory	Administrative boundaries	10 year	Folving, 2003	ICP
Increment	Administrative boundaries	5 year	Folving, 2003	ICP, Eurostat
Crown condition	Administrative boundaries	1 year	Folving, 2003	ICP
Deposition	Administrative boundaries	Continuous	Folving, 2003	ICP
Vegetation	Administrative boundaries	5 year	Folving, 2003	ICP
Foliage	Administrative boundaries	2 year	Folving, 2003	ICP
Anthropogenic and natural stress factors per eco-region	Administrative boundaries	?	CEC, 2002	-
Forest fire maps	Administrative boundaries	Continuous	CEC, 2002	Forest-fire information system, JRC
Forest fire risk maps	Administrative boundaries	Continuous	CEC, 2002	Forest-fire information system, JRC

11. National Forest Programmes

11.1. General Policy Outline

11.1.1. General Scope and Objectives of the Policy

The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, in 1992, can be seen as the major initiator for National Forest Programmes (NFPs) at the global level. The outcomes of the UNCED, the Agenda 21 and the Forest Principles set up a framework for the discussion on the management, conservation and sustainable development of forests in particular the world forest resources (FAO, 2003b). Agenda 21 in its Chapter 11, suggested countries to prepare and implement national forestry programmes so that the principles and recommendations of UNCED would turn into actions. Also the conventions on biodiversity, climate change and desertification implied the need for NFPs in the light of sustainable development in forestry activities and in forestry planning in a synthetising way in order to reach this multitude of objectives consistently in a holistic, comprehensive and multi-sectoral manner (FAO, 2003b). The post-UNCED intergovernmental negotiations on forests – conducted under the IPF, followed by the IFF developed the idea of a National Forest Programme (NFP) to serve as a frame for the sustainable management, development and conservation of forest resources in the world (Liss, 1999). The general concept of NFP was developed by IFP.

The aim of a NFP is to promote the conservation and sustainable use of forest resources and to manage, protect and restore forest resources in order to make them available for future generations. NFPs serve as tools for planning, implementing and monitoring forestry and forestry-related activities. They are participatory processes. From planning to implementation (including evaluation), these promote and assist the participation of different stakeholders from various levels (local, regional, national and international). The stakeholders can be e.g. national and local governmental agencies, other institutions, non-governmental organisation, industry, community-based organisations and non-profit civil society actors.

All stakeholders, from both the public and the private sector, should commit themselves into implementing the measures that were mutually agreed during the planning phase. They should be willing to dedicate their efforts and resources for the successful implementation of the programme (FAO, 2003b). Stakeholder participation can be found in almost every country in the development of the NFP (UNFF, 2002b). In some countries the process is still dominated by the national forest administrations and the responsible ministries. The involvement of non-governmental organisations may however have an impact on the rapid progress of the process. (FAO, 2003b)

ccording to FAO (2003) the main objectives of NFPs are:

- Introducing inter-sectoral planning approaches involving all relevant partners to resolve conflicts and generate effective policies and programmes to address problems;
- Raising awareness and mobilising commitments at all levels in order to address the issues related to sustainable forestry development;
- Increasing efficiency and effectiveness of public and private actions for sustainable forestry development;
- To foster local, national, regional and international partnerships;
- Mobilising and organising national and international resources and catalyse action to implement programmes/plans in a coordinated manner; and
- Planning and implementing in how forests and the forestry sector could contribute to national and global initiatives.

11.1.2. Status of Participation/Ratification and Implementation

An NFP is a national initiative. Each country has full leadership and responsibility and the sovereign right to use their forest resources in accordance with their own environmental policies and development needs (FAO, 2003b). So does each country have the right to define its own NFP, although the various demands put to national and regional governments from international commitments will lead to streamlining and governance of policy and information demands to a certain degree.

In many countries, central government institutions may with the participation of all stakeholders best lead strategic planning; the operational planning will be carried out at the regional and local levels. Implementation of the NFP may thus be left mostly to the private sector, community-based organizations and NGOs. In most countries the process is still slow and the implementation is fragmentary (FAO, 2003b).

The essential political commitment to enforce the programme through ratification lacks in some countries. Reasons for this according to Zimmerman and Mauderli (2001) can be:

- NFPs are only exceptionally legally binding;
- Many countries seem to lack financial support for establishment of NFPs;
- Concrete objectives and long-term commitments are exceptional cases;
- Controlling-instruments like evaluation and monitoring are weakly institutionalised

So far six EU member countries have presented their policy and objectives in an NFP document. They are namely Denmark, Finland, Germany, Spain and the United Kingdom (Yudego, 2002).

11.1.3. Policy Agenda and Timeline

The state of planning, implementing and monitoring of the NFPs differ between countries. In many transition countries NFPs cannot be implemented because of a lack of technical and financial resources (FAO, 2003b). Other countries, like the Netherlands, do not see the necessity of an NFP because of their low forest cover (Zimmerman and Mauderli, 2001).

The low number of existing of only 6 NFPs shows that policy makers need support in NFPs' development and implementation. A cooperative project COST E19 (European Cooperation in the field of Scientific and Technical research) was launched to provide European policy makers with improved means for formulating and implementing NFPs. 20 European countries are participating in COST E19. Outcomes can be expected during the year 2003 (COST E19, 1999).

At this stage, the requirements towards information are visible only through demands arising from international and national forestry processes that are not yet explicitly within NFP requirements. More information on this issue may result from work implemented under the analysis of the global user base.

11.2. Relations to or Inter-linkages between Policies

National Forest Programmes are linked to the principles of Agenda 21 (Chapter 11) and to the global forest principles of the IPF. The IPF encouraged countries to use criteria and indicators for sustainable forest management in formulating, implementing, monitoring and evaluating NFPs (UNFF, 2002b). The United Nations Forum on Forests (UNFF) has national forest programmes as one of the common items for each of its sessions. The UNFF urges to approach the management of the forest resource in a holistic way, and to develop, implement, monitor and evaluate national forest programmes.

At the European level, the Ministerial Conference on the Protection of Forests in Europe (MCPFE) has put strong support in achieving common European principles on national forest programmes. The 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 like e.g. 2080/92 on the afforestation of agricultural lands, also links to NFP (CEC, 1999). It states that support in rural areas for

sustainable forest management, maintenance and improvement of forest resources and extension of woodland areas can only be done in according national or subnational forest programmes or equivalent instruments.

11.3. Reporting Requirements and Information Needs with EO Potential

Since NFPs are only being developed in a small number of EU countries so far there are not many requests for EO Information explicitly within the NFP. Due to the nature of NFPs (NFPs are a national initiative) it can be expected that EO information needs will vary. The Pan-European C&I and operational level guidelines for SFM can be considered guiding principles (see Table 3, Chapter 1.3.5)

The need for information could be clarified as information on forest resources and their contribution to global carbon cycles, forest ecosystem health and vitality, productive functions of forest, biological diversity in forest ecosystems, protective functions in forest management and on soil erosion and water conservation in forests. The main contribution to the information needs from the NFPs may be from monitoring requirements for the purpose of practical forest management at the local level and from the monitoring for the validation of the effectiveness of financial instruments in forest policy. This issue will be resolved under the analysis of the global user base.

Summary: National Forest Programmes

- National Forest Programmes are being initiated in many countries globally. They should ultimately present an integrated policy approach for achieving sustainable development of the forest resource. They are built on commitment to international agreements in combination with stakeholder dialogue.
- The information needs are on two levels: the first related to the needs for aggregated information for reporting in policy processes; First level information needs are based on policy processes as elsewhere described in this document.
- The second addressing information necessary/useful for practical implementation in forest management at the local level; Second level information needs may differ from case to case and need to be resolved through stakeholder dialogue.

12. Illegal Logging

12.1. General Policy Outline

12.1.1. General Scope and Objectives of the Policy

Illegal logging takes place when timber is harvested in violation of national laws (CEC, 2003b). This can be understood as logging done with the infringement of criminal law (timber robbery) or of administrative law (harvest regulation) (Bouriaud et al., 2003). In an extended interpretation, illegal logging could include also the clearing of land with the purpose of illegally assigning another land use to the area (illegal land occupation; illegal cultivation) (IFF, 1999). The issue is very sensitive as it can be linked to political decision-making through bribery and corruption (CEC, 2003b). Some form of protection was already provided for the protection of the trade in endangered tree species with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, ¤ 1975). CITES can however not prevent the logging of endangered trees for local use and the problem of illegal logging goes beyond the logging of rare and/or valuable species.

Forests are central to growth in many developing countries through trade and industrial development. According the World Bank, illegal logging and mismanagement of the forest resources has cost governments revenues that exceed World Bank lending to these countries. Illegal logging results in additional losses of at least US$10 billion to $15 billion per year of forest resources from public lands alone (World Bank, 2003).

In 1998, the G8 countries have committed themselves to promoting actions against illegal logging and the use of illegally harvested timber with the G8 Action Programme on Forests.

In the intergovernmental arena, the ministerial declaration from the Forest Law Enforcement and Governance East Asia Ministerial Conference held in Bali, Indonesia in September 2001 represented a major advance in rallying commitment and support for actions to combat illegal logging. Its Ministerial Declaration emphasized the need for effective cooperation at the sub-national, national, regional and international levels. It was the first high-level political statement of its kind on illegal logging and associated trade, and corruption *(G8, 2003).*

At the World Summit on Sustainable Development (Johannesburg, 2002), countries committed themselves to crack down on illegal logging that contributes to deforestation and to 'take immediate action on domestic forest law enforcement and illegal international trade in forest products, including in forest biological resources, with the support of the international community, and provide human and institutional capacity building related to the enforcement of national legislation in those areas.' *(UN, 2003; RIIA, 2002).*

In addition to the formal outcomes, the Summit saw the announcement of a wide range of informal outcomes, or partnerships for implementation, bringing together governments, intergovernmental organisations and non-governmental actors such as businesses, NGOs and community groups. A number of secondary outcomes of the WSSD relevant to illegal logging, include the Asia Forest Partnership - which includes developing log tracking and verification systems, measures to eliminate the export and import of illegally harvested timber, and data sharing and information exchange on illegal logging and the trade in illegal timber - and the Congo Basin Initiative *(RIIA, 2002).*

The final report on the G8 Action Programme was submitted to the G8 Foreign Ministers' Meeting in June 2003 and was discussed at the G8 Leaders' Meeting, the Kananaskis Summit. The environment ministers stated that cooperation with developing countries will be continued to help them fight illegal logging (G8, 2003).

The European Union addresses illegal logging in a proposal for a EU Action Plan on forest law enforcement, governance and trade (FLEGT) (CEC, 2003b). The proposal could ultimately lead to the development of a regulation to tackle FLEGT issues (CEC, 2003c).

12.1.2. Status of Participation/Ratification and Implementation

Illegal logging is high on the agenda. Illegal logging can be a problem in both developed and developing countries. Developed countries have expressed willingness to support the developing countries in combating illegal logging by enhancing technical cooperation on this issue.

12.1.3. Policy Timeline and Agenda

Timeline of the policy process

The next G8 Summit will be held in the USA (Sea Island, Georgia), June 8-10, 2004.

The European Commission is in the process of reviewing options for, and to consider the internal and external impact of the measures indicated in the FLEGT Action Plan, including the development of a Regulation and to present its findings to the European Council by mid-2004 (CEC, 2003b, CEC, 2003c).

The government of the Russian Federation has committed itself to hold a first Ministerial Conference on Europe and North Asia Forest Law Enforcement and Governance (ENA-FLEG). The event will take place in Moscow towards end 2005.

Timeline of information needs

Information needs are highest in those countries where illegal logging is recognised by the authorities to be a significant problem and where there is political willingness to act against it. As illegal logging can occur year-round, monitoring would need to happen on regular intervals.

12.2. Relations to or Inter-linkages between Policies

The G-8 Action Programme on Forests motivated a partnership on forest law enforcement for East Asia between the World Bank, the UK and the US, which led to the FLEG East Asia Ministerial Conference in September 2001 (IISD, 2003).

The Asia Forest Partnership (AFP) was proposed collaboratively by the governments of Japan and Indonesia and was launched at the World Summit on Sustainable Development (2002), and through ITTO. Like the "Asia Ministerial Conference" there was also the "Ministerial Conference on Forest Law Enforcement and Governance in Africa", held in 2001.

The Ministerial Conference on the Protection of Forests in Europe also addresses the issues of illegal logging and associated trade (MCPFE, 2003).

The European Commission addresses this issue as one of its priorities in the follow-up to the 2002 World Summit on Sustainable Development (WSSD). Furthermore, the issue of illegal logging has links to the Convention on International Trade in Endangered Species (CITES) concerning the trade of endangered timber species. Also the OECD Convention on Bribery and Corruption is relevant, since illegal logging operations are virtually synonymous with bribery and corruption. *(CEC, 2003b)*

Illegal logging forms a threat to sustainable management and biological diversity of the forest resource (Bouriaud et al., 2003). The violation of harvesting regulations often leads to non-sustainable forest practices (unsustainable cuttings, logging of immature stands and trees, logging in areas reserved for nature protection, etc.). Hence illegal logging conflicts heavily with the aims of National Forest Programmes, the Convention on Biological Diversity.

12.3. Forest Related Aspects of the Policy, Terms and Definitions

From the legal perspective, illegal logging can be understood as logging done with the infringement of criminal law (timber robbery) or of administrative law (e.g. breaching of legally binding forest management and harvesting regulations). The rules of logging as part of forest management activities are settled by basic forest laws (Forest Acts, Forest Codes) and detailed at the stand level by regulations for forest management (Bouriaud et al., 2003).

12.4. Reporting Requirements and Information Needs with EO Potential

Besides the development of market-based instruments and methods for identification and verification of legal compliance through timber tracking; and the promotion of work on labeling and certification of the origin of forest products, G8 countries support activities like (G8, 2002):

- Development of independent monitoring and verification processes to track forest crimes;

- Strengthening the capacity of government organizations and agencies to manage forests and control logging;

- Provision of monitoring services to enable decision-makers and civil society to monitor concession policies;

Technologies such as remote sensing and aerial photography also have an important role to play in ensuring transparency. The Joint Research Centre of the European Commission (JRC) has been mentioned to provide expertise to support the evolving FLEGT programme in this field *(CEC, 2003b).*

The UNECE and FAO Joint Session “Forest Law Enforcement and Governance: a Significant Problem in the UNECE Region?” (Geneva, Switzerland, 5 - 9 October 2004) identified that major factors limiting illegal logging include: properly carried out forest inventories, the use

of remote sensing, an effective forest administration and enforced legislation, transparency and public awareness (UNECE/FAO, 2004).

The integration of remote sensing and ground-based monitoring of forests is being implemented in Congo Basin, Amazon Basin and Central America (Bush, 2003).

Summary:

- Illegal logging can be understood as logging done with the infringement of criminal or of administrative law.
- The G8 countries and the European Union actively support Forest Law Enforcement Governance and Trade processes in both developed as well as developing countries. The Asia Forest Partnership and the Congo Basin Initiative reflect this for example.
- Monitoring of illegal logging can be pursued both by monitoring forests as through log labeling systems.

13. Certification and Sustainable Forest Management

13.1. General Policy Outline

13.1.1. General Scope and Objectives of the Policy

Forest certification was introduced in 1993 as a market-based response to address public concerns related to deforestation in the tropics. Soon many different certification schemes appeared and forest certification is now a worldwide phenomenon. The objective of forest certification is to inform the consumers of wood products that the products originate from forests that are used and managed in a sustainable way. This is verified in an audit by a third independent party and is measured against a set of indicators for a number of criteria, which are specific to a certification scheme. Finally the certification labels are issued for forests that meet the conditions (Parviainen, 2002).

Contrary to the concept of sustainable forest management, which aims are clearly supported and implemented by governments world-wide since UNCED, forest certification is much less taken aboard of policy and legal frameworks.

In an expert survey, Rametsteiner (2001) found that a majority of respondents from both governmental and non-governmental representatives (total of 55%) preferred voluntary agreements over legally binding forms of establishing frameworks for certification. The establishment of minimum requirements on a national level through legislation was viewed as the least preferred option. Similarly negative was the answer to a EU Directive.

However, essential roles for governments are e.g. ensuring compatibility with laws and international obligations. Governments may also need to exert a guiding function for market transparency and market efficiency concerning both setting standards for forest management and roles in setting up and running private certification systems in order to prevent negative impacts towards quality standards in a competitive certifying market (Rametsteiner, 2001). Certification and independent public oversight could be used concurrently to maximize the

public trust in the practice of sound forest management. As the first is structured to gain access to markets for its product, while the second is to steward a public resource (Cafferata et al., 2003). The European Commission has taken a more active role on these issues with the adoption of a proposal for a council regulation concerning the establishment of a voluntary FLEGT licensing scheme for imports of timber into the European Community (CEC, 2005).

Carbon credit certification of carbon sequestration for Kyoto Protocol carbon accounting could possibly be included into the targets of sustainable forest management of forest certification schemes. In such case, governmental review of certification schemes may become unavoidable, firstly because the carbon credits should not be gained through projects that would work against the objectives of the cross-sectoral issues of international conventions inter-linked with the UNFCCC and Kyoto Protocol, and secondly because carbon credits are valuta that, as all valuta, should be monitored by official authorities.

13.1.2. Status of Participation/Ratification and Implementation

Non-governmental organisations and processes generally lead certification processes. As public authorities together represent the single largest forest owner in most countries, they are important stakeholders in the certification process. The largest public forest areas have in Europe been certified with the Pan European Forest Certification scheme (PEFC).

Some governmental bodies have been instrumental in establishing the Forest Stewardship Council (FSC), a non-governmental international independent certification label, including Austria, the Netherlands and Mexico. In some other countries, governments have played a stronger role in supporting the creation of non-governmental national certification programmes, e.g. Brazil, Canada, Finland, Indonesia, Malaysia, Norway and Sweden. Establishing a new governmental forest certification programme is usually not pursued, given the presence of private initiatives. The exception is Russia, where a mandatory forest certification system is being established, which should help the government to control the conduct of private companies in the exploitation of state forest resources (Rametsteiner, 2001; Thang, 2003).

In autumn 2002, there were 32 national, regional or global certification systems in use in Europe. They covered a total of over 61 million hectares of forests in Europe, i.e. 45% of the total forest area in the countries involved in certification. Most important are the Forest Stewardship Council (FSC) and the Pan-European Forest Certification (PEFC).

The FSC follows ten general principles, which are not directly linked to the international conventions or agreements of sustainable forest management. Most FSC certified forests are owned by forest industry companies, associations or states.

The PEFC system is based on the internationally agreed requirements of sustainable forest management, which are in the case of Europe the criteria developed by the Ministerial Conference on the Protection of Forests in Europe.

Certification schemes endorsed by PEFC are 13 and endorsed by FSC 17. In Europe the FSC scheme covers about 24 million hectares of forest. The European PEFC scheme covers 52 million ha of forest in 13 countries. Certification information is presented per country in Table 14.

Table 14. Forest certification in Europe. Coverage by the two largest certification schemes: Forest Stewardship Council (FSC) and Pan-European Forest Certification (PEFC); as (FSC, 2004; PEFC, 2004)

Country	Forest (1000 ha)	PEFC (%)	FSC (%)
Austria	3,840	100%	0%
Belgium	646	25%	0%
Belarus	7,865	0%	1%
Croatia	1,775	100%	0%
Czech Republic	2,630	73%	0%
Denmark	445	2%	0%
Estonia	2,016	0%	53%
Finland	21,883	100%	0%
France	15,156	20%	0%
Germany	10,740	63%	4%
Hungary	1,811	0%	10%
Ireland	591	0%	74%
Italy	9,857	0%	0%
Latvia	2,884	1%	58%
Lithuania	1,978	0%	19%
Netherlands	339	0%	37%
Norway	8,710	100%	0%
Poland	8,942	0%	69%
Romania	6,301	0%	1%
Slovakia	2,016	0%	2%
Spain	13,509	1%	0%
Sweden	27,264	17%	36%
Switzerland	1,173	21%	18%
UK	2,469	1%	47%
Total	**154,840**	**34%**	**15%**

13.1.3. Policy Timeline and Agenda

There is no information available about specific high profile events concerning the certification topic.

13.2. Relations to or Inter-linkages between Policies

There is a close connection between the criteria and indicators for sustainable forest management and forest certification. The primary differences rest in the degree to which the procedures are binding and the thresholds of the criteria and indicators (Parviainen et al., 2003). Some further major differences between criteria and indicators (C&I) for sustainable forest management (SFM) and forest certification are presented in Table 15.

Criteria and indicators are incorporated in the resolutions of intergovernmental processes, which the signatory countries are committed to respect. In intergovernmental agreements, goals are laid down for the criteria and indicators, with which sustainability can be measured and controlled. Certification, on the other hand, represents voluntary activity between market actors through performance standards setting minimum requirements for the attributes to be evaluated (Parviainen et al., 2003).

Table 15. Major differences between criteria and indicators (C&I) for sustainable forest management (SFM) and forest certification (Parviainen et al., 2003).

C&I for SFM	Forest certification
Mainly national level	Sub-national level
Descriptive approach	Prescriptive (standards / requirements)
Mainly used for information sharing	Used for establishing proof of sustainable or good forest management
Used by governments and policy makers	Used by market players

The development of the criteria and indicators into practical tools and guidelines for the monitoring of sustainability takes place within national applications, which may also contain minimum requirements for their implementation as adjusted to local conditions. Certification represents a continuation of this work, and is one way to put into practice the basic requirements that were determined jointly (Parviainen et al., 2003).

The Pan-European Forest Certification (PEFC) Initiative uses the Criteria and Indicators (Helsinki process) as well as the Pan European Operational Level Guidelines for Sustainable Forest Management (PEOLG) of the Ministerial Conference on the Protection of Forests in Europe as agreed in Lisbon 1998. The 10 FSC Principles and Criteria for sustainable forest management, on the other hand, are not immediately based on existing international criteria and indicator sets agreed by conventions or resolutions (Parviainen et al., 2003).

The PEFC states that international conventions relevant to forest management and ratified by the country will be respected in the legislative framework. Such conventions include, amongst others, e.g., Convention on Biological Diversity and its Biosafety Protocol, Carbon sinks matters related to the Framework Convention on Climate Change and its Kyoto Protocol, the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The requirements agreed upon in the conventions, even if they are not ratified by the country, will be respected in the certification criteria to the degree that they are covered in PEOLG or other reference basis approved by the PEFC Council (PEFC, 2003). This is illustrated in Figure 8.

There is increased attention towards crosscutting issues related to SFM, protection of biological diversity on the one hand and carbon crediting on the other hand. Basically it comes to the fact that measures and actions for these issues should not be counterproductive and should optimally take into account the objectives of all related policy. Whereas the procedures for the auditing of carbon crediting are designed by governmental process, taking into account the principles of sustainable forest management set by both governmental and non-governmental actors in SFM, it is not prevented that non-governmental SFM crediting bodies make the carbon monitoring/crediting procedures stricter so that they would better fit under their respective schemes.

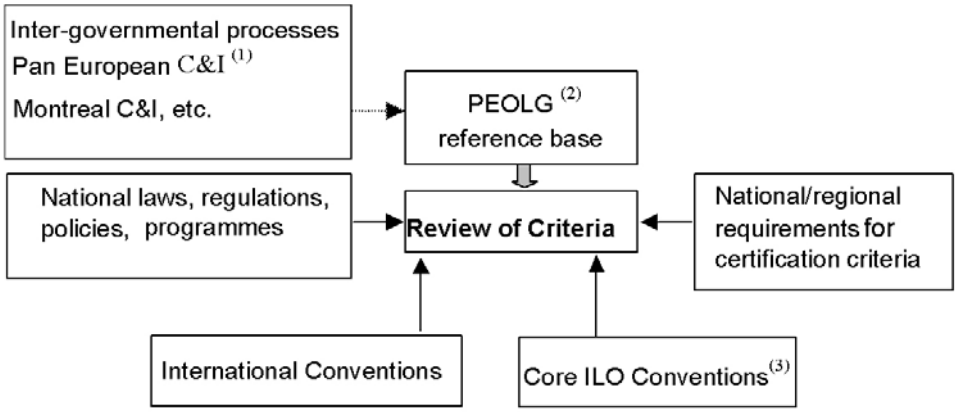

Figure 8. Basis for forest certification criteria in the PEFC process (PEFC, 2003); (1) C&I: Criteria and Indicators; (2) PEOLG: Pan European Operational Level Guidelines for SFM; (3) ILO: International Labour Organisations

13.3. Terms and Definitions

The PEFC defines forest certification as follows: An assessment from an independent, qualified and accredited expert who verifies that the quality of the forest management practices comply with a series of collectively agreed performance standards for sustainable forest management (PEFC, 2003).

13.4. Reporting Requirements and Information Needs with EO Potential

The information necessary to base the decision of whether or not to certify a forest area are based locally, on the level of the forest manager. The areas that information is needed for may range from a few hectares to several thousands of hectares. The international/regional sets of criteria and indicators share a number of common elements with the information needs for forest certification. E.g. aspects to be covered in certification that follow the Pan-European criteria agreed at the Lisbon Ministerial Conference on the Protection of Forests in Europe, are presented in the following list. Information needs with EO potential are indicated for each aspect (Parviainen et al., 2003; AENOR, 2001):

(1) Extent of forest resources

- Forest area and structure

(2) Forest health and vitality

- Percentage of forest cover affected by biotic damage and the cause
- State of regeneration of areas affected by disasters: percentage of wooded forest area regenerated of that affected by disasters during the past 10 years.

(3) Productive functions of forests

- Volume of stocks and growth rate
- Removals of wood growth or the removal of wood biological production ratio of the main productive elements

- State and density of routes according to type and intensity of use and the terrain, taking into account regional forestry guidelines
- Carbon stocks

(4) Biological diversity

- Area of forest habitats in the management unit
- Conservation of protected areas
- Identification and mapping of areas of singular habitats and ecotones, and the state of conservation of those ecotones considered significant
- Number, size, distribution and the condition of dead trees per area in forest ecosystems

(5) Protective functions of forest

- Absence of evidence of erosion due to forest management

(6) Socio-economic benefits and needs

(7) Legal, policy and institutional framework

Summary:

- Forest certification is a market-based response to address public concerns that the wood products they buy originate from sustainably managed forests and that they do not originate from protected areas or from illegal logging.
- Forest certification thus enables practical implementation of sustainability principles as agreed within policy measures. However not all certification schemes strictly follow policy guidance.
- The Forest Stewardship Council – FSC – provides the largest certification scheme globally; the Pan-European Forest Certification scheme is the largest in Europe.
- The information needs are based locally and the areas that information is needed for may range from a few hectares to several thousands of hectares.
- The information needs are related to the extent of the forest resources; forest health and vitality; productive functions of the forest; biological diversity; and protective functions of the forest.

14. Summary Conclusions

Environmental Policy and Forestry

For the last three decades, the increased attention for the environment has been reflected by an abundance of political initiatives. This came to a height with the United Nations Conference on the Environment and Development, held in Rio de Janeiro in 1992. The conference concluded with global consensus on urgent environmental matters like sustainable development, climate change, biodiversity and desertification. The convention initiated three important conventions of global importance: the Framework Convention on Climate Change, the Convention on Biological Diversity and the Convention to Combat Desertification.

The ultimate objective of the United Nations Framework Convention on Climate Change is the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol aims to contribute to this objective by promoting the removal of carbon dioxide from the atmosphere and the durable storage of carbon in sinks – to which end considerable attention and importance is given to the role of forests. The main objective of the UNCBD is the protection of biological diversity, including forest (biological) diversity. The UNCCD aims at preventing and combating desertification on vulnerable and affected areas.

The United Nations Forum on Forests (UNFF) follows the implementation up of the forest related issues from the Conference on the Environment and Development and brought forward in the proposals for action from the Intergovernmental Panel on Forests and the subsequent Intergovernmental Forum on Forests. The UNFF promotes the preservation of sustainably managed forests and stresses the importance of the implementation of national forest programmes to address the social, economic and environmental demands put on the forests with an integrated approach. One of the aims of UNFF is to explore the feasibility for setting a convention dedicated to all types of forests.

Attention was given also to European policy processes, the pan-European area being a major target area for deployment of GSE Forest Monitoring services element. The Ministerial Conference on the Protection of Forests in Europe has similar objective as the Forum on Forests at the Pan-European level. The Ministerial Conference on the Protection of Forests in Europe puts considerable effort on reaching consensus for monitoring sustainable forest management with a common set of criteria and indicators. Information of the European Landscape Convention are not resolved yet, although it is expected that they will rest on existing criteria and indicators developed by the Ministerial Conference on the Protection of Forests in Europe and the Pan-European Biodiversity and Landscape Strategy.

Forest Focus is an integrative policy instrument at European Union level to continue and reinforce the monitoring of atmospheric pollution and their effect on forests and to monitor and enhance the prevention of forest fires. The responsibility for implementation of the regulation lies with the European Union Member States. Monitoring of effects of air pollution on forests and forest fires is put most focus to. In 2006 decision will be taken on how to uniformly monitor biodiversity and carbon across the European Union.

In the optimal case forest policy tools are part of integrated national forest programmes. National forest programmes are holistic processes that take into account differing needs of national/regional stakeholder groups and complementary requirements from international

processes, with an optimal coordination of monitoring, information, processing and reporting between national organisations involved.

The G8 special Action Programme on Forests addressed combating illegal logging and forest law enforcement, governance and trade, with the main aim to stimulate sustainable use of forest resources. While most attention is given to trade regulating mechanisms, attention is also given to the monitoring of forest resources.

Information Needs

The policy foundations review highlighted similar or identical cross-policy information needs. These are presented in Table 16. Where overlaps are identified, duplication of efforts can be avoided. This will allow GSE Forest Monitoring to react on the information demand in a coordinated way, thus taking into account different requirements simultaneously.

Policy processes have different objectives; e.g. mitigation of dangerous anthropogenic effects on the atmosphere like the United Nations Framework Convention on Climate Change and Kyoto Protocol or towards the promotion of sustainable forest management or protecting biodiversity as stressed by the United Nations Convention on Biological Diversity, the Ministerial Conference on the Protection of Forests in Europe and the United Nations Forum on Forests. Closer cooperation between different processes such as e.g. the Kyoto Protocol, the Convention on Biodiversity and the Ministerial Conference on the Protection of Forests in Europe are presently ongoing. Consequently tools and services of the GSE Forest Monitoring Service Element should target to serve simultaneously different reporting obligations with its products.

The results from the policy review should thus give input to the GSE Forest Monitoring service portfolio. The major global policies and instruments have been studied with regard to information requirements on forests. Important information needs and needs for capacity building have been identified for developing countries.

The most stringent and specific information requirements result from the UNFCCC and KP. It will be the only process, upon ratification, with such criticality of information that non-information can result e.g. by non-compliance with direct and/or indirect financial implications. This is one reason why the KP has been pre-defined as the most important target policy of the GSE Forest Monitoring services element. For other policy areas, absence of detailed information would not have such severe consequences as resulting from the KP. However, a lack of high-quality information could lead to less efficient and effective governing from regional to national level; with comparably negative effects on forest management at the (local) practical forest management level.

Three major categories of information needs on forests resulting from the policy review are derived from Table 16. These are: (1) “area” (surface area and specification of location and boundaries of an area and changes per land cover class); (2) “biomass” (biomass as such, volume, changes of biomass and volume, growth and increment); and (3) “disturbances” (biotical damage, abiotic damage and forest fires in particular).

The most important variables are set by the Kyoto Protocol and relate to the surface and biomass contained on areas of afforestation, deforestation and reforestation. The Good Practice Guidance on Land Use, Land-Use Change and Monitoring poses stringent monitoring requirements to the developed countries that ratified the Kyoto Protocol and to

projects in developing countries for the Clean Development Mechanism. The most important disturbance variables are derived from Forest Focus and are related to defoliation of the forest canopy and to forest fires. The major categories can be broken down to more specific requirements depending on the policy (see reporting requirements per individual policy and the summary in Table 16).

A stakeholder survey and information needs analysis done for GSE Forest Monitoring identified four important variables that relate to the categories area and biomass:

- Area of forest;
- Area of afforestation, reforestation and deforestation;
- Aboveground vegetation biomass and changes therein;
- Land use and land-use change for and between different land classes

These variables are highly relevant to the GSE Forest Monitoring Service Portfolio and the information needs are supported across the whole forest policy spectrum.

The Kyoto Protocol requires information on the area of forest. Temporal reporting requirements and spatial resolution requirements are stricter for the Kyoto Protocol than for other processes. The Ministerial Conference on the Protection of Forests in Europe (MCPFE) lists forest area per forest type as an indicator for sustainable forest management. The Kyoto Protocol does not explicitly require such extra detail, but stratification of the forest area could help to improve the accuracy of remote sensing results. The MCPFE indicator process relies mainly on harmonised data collected within the Regional Forest Resource Assessment activities of the UNECE/FAO Timber Committee (UNECE/FAO, 2000). On a global scale this is implemented by the Food an Agriculture Organisation of the United Nations (FAO, 2001) The most recent data collection for UNECE region was completed in 2000, the so called Temperate and Boreal Forest Resources Assessment 2000 (TBFRA 2000). The MCPFE report "State of Europe's Forests 2003" contains land cover data tables along the Criteria and Indicators of the Ministerial Conference of the Protection of Forests in Europe based on updated datasets according to the same definitions as applied in TBFRA 2000. An update of the Global Forest Resources Assessment will be published at the end of 2005. Additional new datasets have been added on protected forest areas by the secretariat of the Ministerial Conference on the Protection of Forests in Europe, and on forest genetic issues by the European Forest Genetics Network – EUFORGEN.

Monitoring afforestation, reforestation and deforestation for the Kyoto Protocol reporting is of major importance for carbon accounting. This information resolves under the required monitoring of land use and land-use change for and between different land classes. A GSE Forest Monitoring service tool for ARD could serve not only KP reporting requirements but also give input to for example the analysis of forest fragmentation (indicator under the Convention on Biological Diversity, the United Nations Forum on Forests and the Ministerial Conference on the Protection of Forests in Europe) and urban forests (indicator for the United Nations Forum on Forests and the Ministerial Conference on the Protection of Forests in Europe).

National forest assessments collect data following national forest definitions. Data then need be converted to match with the single definition of forest in the international assessment. Not

all assessments however allow statistically sound conversion of the data. One data table ('Changes over time in area of forest and other wooded land') is seen as one of the most important items needed by policy makers and managers. For some of the reporting countries such data is proving difficult to provide. The situation is seen to improve 1) if key definitions of forest and other wooded land remain unchanged between one assessment and 2) new technologies, notably remote sensing, could contribute thus allowing to significantly improving data quality both in spatial and temporal terms (UNECE/FAO, 2000).

When looking at the issue of resolution requirements the KP, through its definition of forest, sets high standards. Developed countries (Annex I countries to the UNFCCC) may opt for high resolution mapping of their whole territory (a so-called wall-to-wall inventory). EO would in such case be the only tool that would allow yearly reporting. Developing countries (non-Annex I countries to the UNFCCC) do not they have such stringent requirements as the developed nations. Therefore, products with a lower resolution (e.g. 1km x 1km) may be sufficient. However stricter requirements are bound to the reporting on projects in developing countries under the KP's Clean Development Mechanism. This requires non-Annex I countries to monitor CDM afforestation and reforestation projects. The geographical reporting unit is then the single area of a CDM project with the start of the project determining the base year.

Policy has acknowledged already at the UNCED Conference that Earth Observation (EO) should be used in data collection. It allows cost-effective and efficient collection of large amounts of data at high detail and accuracy. Earth Observation further allows for applying an assessment methodology homogeneously to large areas. It is now to both the EO and forestry sector to cooperate in combining in-situ and ex-situ data in order to develop highly accurate, flexible and timely products and services.

Continuous consultation of policy forums, stakeholder groups and actual end-users of GSE Forest Monitoring will allow to further prioritise information needs and accelerate the continuous development of the existing GSE Forest Monitoring services.

Table 16. Overview of information needs derived from international environmental policy. More detail on information needs of a specific policy is specified in the policy-relevant chapter.

Variable	FCCC and KP	CBD	CCD	UNFF	MCPFE	LC	Forest Focus	Illegal logging	Certifi-cation
AREA									
Area of forest	XXX	X	XX	X	X	X	X	X	X
Area per land-use class category: forest (subcategories); cropland; grassland; wetlands; settlements; other land; other	XXX								
Changes of area between land-use class categories: forest (subcategories); cropland; grassland; wetlands; settlements; other land; other	XXX								
Area of forest and other wooded land dominated by introduced tree species				X	XX				
Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area				X	XX				
Area of forest/non-forest base map for the base year	XXX								
base Land-use reference map for December 31, in the year prior to the base year.	XXX								
(human induced) afforestation, reforestation and deforestation area size (and its geographical location)	XXX								
Area of clearcut forest	XX		XX					XX	X
Area of harvested forest	XX							X	X
Area of eroded land			XX						X
(Proportion of) Forest and other wooded land under a management plan or equivalent	XXX			X	X				
Geographical boundaries of areas of land subject to the afforestation and reforestation, deforestation, forest management for identification purposes.	XXX							XX	X
Geographical boundaries of protected areas, habitats, ecotones, singular habitats		X			X				X

Variable	FCCC and KP	CBD	CCD	UNFF	MCPFE	LC	Forest Focus	Illegal logging	Certifi-cation
Information on geographic location	XXX	X					XXX	XX	
Information on protected area loss	X	X			X			X	X
Area of regeneration within even-aged stands and uneven-aged stands, classified by regeneration type				X	XX				
Landscape-level spatial pattern of forest cover				X	X	X			
Area of forest and other wooded land, classified by number of tree species occurring and by forest type	XX			X	XX				
Urban forest increase				X	X				
Urban forest index				X	X				
Total Area Abandoned and Regrowing land by type for the last twenty years (in Kha)	XX								
BIOMASS									
Biomass Stocks in Forests	XXX			X	XX				
Above-ground vegetation biomass and changes therein	XXX		XX	X	XX				
Below-ground biomass	XX			X	XX				
Fraction of biomass left to decay (Dead wood)					XX				X
Fraction of biomass which oxidises during burning									
Fraction of Biomass Burned On Site by forest/grassland type	XXX				XX				
Carbon stock change from Afforestation, reforestation and deforestation / Growth rate	XXX								
Forest management carbon stock change (in each year of the Commitment Period)	XXX			X	XX		XXX	X	X
Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply	X			X	XX				
Growing stock harvested / wood removal					XX				X
DISTURBANCES									
Wind and snow break*	X			X	X				
Foliage; Defoliation of main tree species on forest (and other wooded land)				X	XX		XXX		X
Deposition							X		

Variable	FCCC and KP	CBD	CCD	UNFF	MCPFE	LC	Forest Focus	Illegal logging	Certifi-cation
Area affected by forest fire	XX		XX				XX	X	X
Forest fire risk areas							XX		
Fragmentation of forests		X		X	X				
Fragmentation of landscapes		X			X				
Anthropogenic and natural stress factors per eco-region							X		
Damage on forest and other wooded land, classified by primary damaging agent (abiotic, biotic and human induced) and by forest type	X			X	X				X
Forest area annually affected by disturbances	XX								
Information on threats (direct, habitat destruction, indirect, etc.)		X							
Information on ecosystems		X							
MISCELLANEOUS									
Dispersed (non-forest) trees (e.g., urban, village and farm trees): the number of trees (in 1000s of trees)	XX								
Information on site details		X				X			
Information on sustainable use of forests		X							X
Soil inventory	XX						X		
Vegetation cover			XX				X		
Illegal logging		XX						XX	
Information on range and distribution		X							
Information on habitat types		X							
Information on in-situ conservation and management activities		X							
Road density per road category								X	X

XXX : Variables with high relevance to Earth Observation and with high need and applicable over large areas.

XXX : Variables belonging to the previous category, which were selected as top-four in the ESA TESEO Carbon project (Häme et al., 2002). These variables were identified from literature review and stakeholder consultation as having most important information needs for Kyoto reporting towards Earth Observation.

XX : Variables that have an expressed need for information, with relevance to Earth Observation

X : Variables considered less important, or less relevant to Earth Observation.

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Appendix A: Policy Implementation Status

Legend:

Policy

(UNFCCC): United Nations Framework Convention on Climate Change; (KP): Kyoto Protocol; (UNCBD): United Nations Convention on Biological Diversity; (UNCCD): United nations Convention to Combat Desertification and Draught; (CoELC): Council of Europe Landscape Convention; (MCPFE): Ministerial Conference on the Protection of Forests in Europe.

Policy status

(EIF): Entry Into Force; (R): Ratification; (At) Acceptance; (Ap): Approval; (Ac): Accession; (S): Signatory; *: UNFCCC Annex I country, % of share of 1990 baseline CO_2 emissions; The KP has entered into force for alll countries that ratified, accepted , approved or acceded the protocol

COUNTRY	UNFCCC		KP			UNCBD		UNCCD	CoE LC		MCPFE
Afghanistan	18/12/2002	EIF				19/09/2002	R	26/12/1996	nl		nl
Albania	01/01/1995	EIF	01/04/05	Ac		05/01/1994	Ac	26/07/2000			Participant
Algeria	21/03/1994	EIF	16/02/05	Ac		14/08/1995	R	26/12/1996	nl		nl
American Samoa								nl	nl		nl
Andorra								13/10/2002			Participant
Angola	15/08/2000	EIF				01/04/1998	R	28/09/1997	nl		nl
Antigua and Barbuda	21/03/1994	EIF	03/11/98	R		09/03/1993	R	06/09/1997	nl		nl
Argentina	09/06/1994	EIF	28/09/01	R		22/11/1994	R	06/04/1997	nl		nl
Armenia	21/03/1994	EIF	25/04/03	Ac		14/05/1993	At	30/09/1997	14/05/2003	S	nl
Australia *	21/03/1994	EIF	29/04/98	S		18/06/1993	R	13/08/2000	nl		Observer country
Austria *	29/05/1994	EIF	31/05/02	R	0.4%	18/08/1994	R	31/08/1997			Participant
Azerbaijan	14/08/1995	EIF	28/09/00	Ac		03/08/2000	Ap	08/11/1998	22/10/2003	S	----
Bahamas	27/06/1994	EIF	09/04/99	Ac		02/09/1993	R	08/02/2001	nl		nl
Bahrain	28/03/1995	EIF				30/08/1996	R	12/10/1997	nl		nl
Bangladesh	14/07/1994	EIF	22/10/01	Ac		03/05/1994	R	26/12/1996	nl		nl
Barbados	21/06/1994	EIF	07/08/00	Ac		10/12/1993	R	12/08/1997	nl		nl
Belarus	09/08/2000	EIF				08/09/1993	R	27/11/2001	nl		Participant
Belgium *	15/04/1996	EIF	31/05/02	R	0.8%	22/11/1996	R	28/09/1997	20/10/2000	S	Participant
Belize	29/01/1995	EIF	26/09/03	Ac		30/12/1993	R	21/10/1998	nl		nl
Benin	28/09/1994	EIF	25/02/02	Ac		30/06/1994	R	26/12/1996	nl		nl
Bermuda								nl	nl		nl
Bhutan	23/11/1995	EIF	26/08/02	Ac		25/08/1995	R	18/11/2003	nl		nl
Bolivia	01/01/1995	EIF	30/11/99	R		03/10/1994	R	26/12/1996	nl		nl
Bosnia and Herzegovina	06/12/2000	EIF				26/08/2002	Ac	24/11/2002			Participant
Botswana	27/04/1994	EIF	08/08/03	Ac		12/10/1995	R	26/12/1996	nl		nl
Brazil	29/05/1994	EIF	23/08/02	R		28/02/1994	R	23/09/1997	nl		nl
British Virgin Islands								nl	nl		nl
Brunei Darussalam								04/03/2003	nl		nl
Bulgaria *	10/08/1995	EIF	15/08/02	R	0.6%	17/04/1996	R	22/05/2001	20/10/2000	S	Participant
Burkina Faso	21/03/1994	EIF	31/03/05	Ac		02/09/1993	R	26/12/1996	nl		nl
Burundi	07/04/1997	EIF	18/10/01	Ac		15/04/1997	R	06/04/1997	nl		nl
Cambodia	17/03/1996	EIF	22/08/02	Ac		09/02/1995	Ac	16/11/1997	nl		nl

			KP								
Cameroon	17/01/1995	EIF	28/08/02	Ac		19/10/1994	R	27/08/1997	nl		nl
Canada *	21/03/1994	EIF	17/12/02	R	3.3%	04/12/1992	R	26/12/1996	nl		Observer country
Cape Verde	27/06/1995	EIF				29/03/1995	R	26/12/1996	nl		nl
Cayman Islands								nl	nl		nl
Central African Republic	08/06/1995	EIF				15/03/1995	R	26/12/1996	nl		nl
Chad	05/09/1994	EIF				07/06/1994	R	26/12/1996	nl		nl
Chile	22/03/1995	EIF	26/08/02	R		09/09/1994	R	09/03/1998	nl		nl
China	21/03/1994	EIF	30/08/02	Ap		05/01/1993	R	19/05/1997	nl		nl
Colombia	20/06/1995	EIF	30/11/01	Ac		28/11/1994	R	06/09/1999	nl		nl
Comoros	29/01/1995	EIF				29/09/1994	R	02/07/1998	nl		nl
Congo	11/01/1997	EIF				01/08/1996	R	11/10/1999	nl		nl
Cook Islands	21/03/1994	EIF	27/08/01	R		20/04/1993	R	19/11/1998	nl		nl
Costa Rica	24/11/1994	EIF	09/08/02	R		26/08/1994	R	08/04/1998	nl		nl
Cote d'Ivoire	27/02/1995	EIF				29/11/1994	R	02/06/1997	nl		nl
Croatia *	07/07/1996	EIF	11/03/99	S		07/10/1996	R	04/01/2001	01/03/2004	EIF	Participant
Cuba	05/04/1994	EIF	30/04/02	R		08/03/1994	R	11/06/1997	nl		nl
Cyprus	13/01/1998	EIF	16/07/99	Ac		10/07/1996	R	27/06/2000	21/11/2001	S	Participant
Czech Republic *	21/03/1994	EIF	15/11/01	Ap	1.2%	03/12/1993	Ap	24/04/2000	28/11/2002	S	Participant
Dem. People's Rep. of Kore	05/03/1995	EIF	23/03/05	Ac		26/10/1994	Ap	nl	nl		nl
Dem. Rep. of the Congo	09/04/1995	EIF	27/04/05	Ac		03/12/1994	R	11/12/1997	nl		nl
Denmark *	21/03/1994	EIF	31/05/02	R1	0.4%	21/12/1993	R	26/12/1996	01/03/2004	EIF	Participant
Djibouti	25/11/1995	EIF	12/03/02	Ac		01/09/1994	R	10/09/1997	nl		nl
Dominica	21/03/1994	EIF	25/01/05	Ac		06/04/1994	R	08/03/1998	nl		nl
Dominican Republic	05/01/1999	EIF	12/02/02	Ac		25/11/1996	R	24/09/1997	nl		nl
East Timor								18/11/2003	nl		nl
Ecuador	21/03/1994	EIF	13/01/00	R		23/02/1993	R	26/12/1996	nl		nl
Egypt	05/03/1995	EIF	12/01/05	R		02/06/1994	R	26/12/1996	nl		nl
El Salvador	03/03/1996	EIF	30/11/98	R		08/09/1994	R	25/09/1997	nl		nl
Equatorial Guinea	14/11/2000	EIF	16/08/00	Ac		06/12/1994	Ac	25/09/1997	nl		nl
Eritrea	23/07/1995	EIF				21/03/1996	Ac	26/12/1996	nl		nl
Estonia *	25/10/1994	EIF	14/10/02	R	0.3%	27/07/1994	R	nl			Participant
Ethiopia	04/07/1994	EIF	14/04/05	Ac		05/04/1994	R	25/09/1997	nl		nl
Falkland Islands								nl	nl		nl
Fiji	21/03/1994	EIF	17/09/98	R		25/02/1993	R	24/11/1998	nl		nl
Fiand *	01/08/1994	EIF	31/05/02	R	0.4%	27/07/1994	At	26/12/1996	20/10/2000	S	Participant
France *	23/06/1994	EIF	31/05/02	Ap	2.7%	01/07/1994	R	10/09/1997	20/10/2000	S	Participant
French Guiana								nl	nl		nl
French Polynesia								nl	nl		nl
Gabon	21/04/1998	EIF				14/03/1997	R	26/12/1996	nl		nl
Gambia	08/09/1994	EIF	01/06/01	Ac		10/06/1994	R	26/12/1996	nl		nl
Gaza Strip								nl	nl		nl
Georgia	27/10/1994	EIF	16/06/99	Ac		02/06/1994	Ac	21/10/1999			Participant
Germany *	21/03/1994	EIF	31/05/02	R	7.4%	21/12/1993	R	26/12/1996			Participant
Ghana	05/12/1995	EIF	30/05/03	Ac		29/08/1994	R	27/03/1997	nl		nl
Greece *	02/11/1994	EIF	31/05/02	R	0.6%	04/08/1994	R	03/08/1997	13/12/2000	S	Participant
Greeand								nl	nl		nl

			KP								
Grenada	09/11/1994	EIF	06/08/02	Ac		11/08/1994	R	26/08/1997	nl		nl
Guadeloupe								nl	nl		nl
Guam								nl	nl		nl
Guatemala	14/03/1996	EIF	05/10/99	R		10/07/1995	R	09/12/1998	nl		nl
Guinea	21/03/1994	EIF	07/09/00	Ac		07/05/1993	R	21/09/1997	nl		nl
Guinea-Bissau	25/01/1996	EIF				27/10/1995	R	26/12/1996	nl		nl
Guyana	27/11/1994	EIF	05/08/03	Ac		29/08/1994	R	24/09/1997	nl		nl
Haiti	24/12/1996	EIF				25/09/1996	R	26/12/1996	nl		nl
Holy See								nl	nl		nl
Honduras	17/01/1996	EIF	19/07/00	R		31/07/1995	R	23/09/1997	nl		nl
Hungary *	25/05/1994	EIF	21/08/02	Ac	0.5%	24/02/1994	R	11/10/1999			Participant
Iceland *	21/03/1994	EIF	23/05/02	Ac	0.0%	12/09/1994	R	03/09/1997			Participant
India	21/03/1994	EIF	26/08/02	Ac		18/02/1994	R	17/03/1997	nl		nl
Indonesia	21/11/1994	EIF	03/12/04	R		23/08/1994	R	28/11/1998	nl		nl
Iran (Islamic Rep. of)	16/10/1996	EIF				06/08/1996	R	28/07/1997	nl		nl
Iraq								nl	nl		nl
Ireland *	19/07/1994	EIF	31/05/02	R	0.2%	22/03/1996	R	29/10/1997	01/03/2004	EIF	Participant
Israel	02/09/1996	EIF	15/03/04	R		07/08/1995	R	26/12/1996	nl		----
Italy *	14/07/1994	EIF	31/05/02	R	3.1%	15/04/1994	R	21/09/1997	20/10/2000	S	Participant
Jamaica	06/04/1995	EIF	28/06/99	Ac		06/01/1995	R	10/03/1998	nl		nl
Japan *	21/03/1994	EIF	04/06/02	At	8.5%	28/05/1993	At	10/12/1998	nl		Observer country
Jordan	21/03/1994	EIF	17/01/03	Ac		12/11/1993	R	19/01/1997	nl		nl
Kazakhstan	15/08/1995	EIF	12/03/99	S		06/09/1994	R	07/10/1997	nl		nl
Kenya	28/11/1994	EIF	25/02/05	Ac		26/07/1994	R	22/09/1997	nl		nl
Kiribati	08/05/1995	EIF	07/09/00	Ac		16/08/1994	Ac	07/12/1998	nl		nl
Kuwait	28/03/1995	EIF	11/03/05	Ac		02/08/2002	R	25/09/1997	nl		nl
Kyrgyzstan	23/08/2000	EIF	13/05/03	Ac		06/08/1996	Ac	18/12/1997	nl		nl
Lao People's Dem. Rep.	04/04/1995	EIF	06/02/03	Ac		20/09/1996	Ac	26/12/1996	nl		nl
Latvia *	21/06/1995	EIF	05/07/02	R	0.2%	14/12/1995	R	19/01/2003			Participant
Lebanon	15/03/1995	EIF				15/12/1994	R	26/12/1996	nl		nl
Lesotho	08/05/1995	EIF	06/09/00	Ac		10/01/1995	R	26/12/1996	nl		nl
Liberia	04/02/2003	EIF	05/11/02	Ac		08/11/2000	R	01/07/1998	nl		nl
Libyan Arab Jamahiriya	12/09/1999	EIF				12/07/2001	R	26/12/1996	nl		nl
Liechtenstein *	20/09/1994	EIF	03/12/04	R		19/11/1997	R	28/03/2000			Participant
Lithuania *	22/06/1995	EIF	03/01/03	R		01/02/1996	R	23/10/2003	01/03/2004	EIF	Participant
Luxembourg *	07/08/1994	EIF	31/05/02	R	0.1%	09/05/1994	R	05/05/1997	20/10/2000	S	Participant
Madagascar	31/08/1999	EIF	24/09/03	Ac		04/03/1996	R	23/09/1997	nl		nl
Malawi	20/07/1994	EIF	26/10/01	Ac		02/02/1994	R	26/12/1996	nl		nl
Malaysia	11/10/1994	EIF	04/09/02	R		24/06/1994	R	23/09/1997	nl		nl
Maldives	21/03/1994	EIF	30/12/98	R		09/11/1992	R	02/12/2002	nl		nl
Mali	28/03/1995	EIF	28/03/02	R		29/03/1995	R	26/12/1996	nl		nl
Malta	15/06/1994	EIF	11/11/01	R		29/12/2000	R	30/04/1998	20/10/2000	S	Participant
Marshall Islands	21/03/1994	EIF	11/08/03	R		08/10/1992	R	31/08/1998	nl		nl
Martinique								nl	nl		nl
Mauritania	20/04/1994	EIF				16/08/1996	R	26/12/1996	nl		nl
Mauritius	21/03/1994	EIF	09/05/01	Ac		04/09/1992	R	26/12/1996	nl		nl
Mexico	21/03/1994	EIF	07/09/00	R		11/03/1993	R	26/12/1996	nl		nl
Micronesia	21/03/1994	EIF	21/06/99	R		20/06/1994	R	26/12/1996	nl		nl
Monaco *	21/03/1994	EIF	29/04/98	S		20/11/1992	R	03/06/1999	nl		Participant
Mongolia	21/03/1994	EIF	15/12/99	Ac		30/09/1993	R	26/12/1996	nl		nl

			KP								
Montserrat								nl	nl		nl
Morocco	27/03/1996	EIF	25/01/02	Ac		21/08/1995	R	05/02/1997	nl		nl
Mozambique	23/11/1995	EIF	18/01/05	Ac		25/08/1995	R	11/06/1997	nl		nl
Myanmar	23/02/1995	EIF	13/08/03	Ac		25/11/1994	R	02/04/1997	nl		nl
Namibia	14/08/1995	EIF	04/09/03	Ac		16/05/1997	R	14/08/1997	nl		nl
Nauru	21/03/1994	EIF	16/08/01	R		11/11/1993	R	21/12/1998	nl		nl
Nepal	31/07/1994	EIF				23/11/1993	R	13/01/1997	nl		nl
Netherlands *	21/03/1994	EIF	31/05/02	At2	1.2%	12/07/1994	At	26/12/1996			Participant
Netherlands Antilles								nl	nl		nl
New Caledonia								nl	nl		nl
New Zealand *	21/03/1994	EIF	19/12/02	R3	0.2%	16/09/1993	R	06/12/2000	nl		Observer country
Nicaragua	29/01/1996	EIF	18/11/99	R		20/11/1995	R	18/05/1998	nl		nl
Niger	23/10/1995	EIF	30/09/04	R		25/07/1995	R	26/12/1996	nl		nl
Nigeria	27/11/1994	EIF	10/12/04	Ac		29/08/1994	R	06/10/1997	nl		nl
Niue	28/05/1996	EIF	06/05/99	R		28/02/1996	Ac	10/11/1998	nl		nl
Northern Mariana Isl.								nl	nl		nl
Norway *	21/03/1994	EIF	30/05/02	R	0.3%	09/07/1993	R	26/12/1996	01/03/2004	EIF	Participant
Oman	09/05/1995	EIF	19/01/05	Ac		08/02/1995	R	26/12/1996	nl		nl
Pakistan	30/08/1994	EIF	11/01/05	Ac		26/07/1994	R	25/05/1997	nl		nl
Palau	09/03/2000	EIF	10/12/99	Ac		06/01/1999	Ac	13/09/1999	nl		nl
Panama	21/08/1995	EIF	05/03/99	R		17/01/1995	R	26/12/1996	nl		nl
Papua New Guinea	21/03/1994	EIF	28/03/02	R		16/03/1993	R	06/03/2001	nl		nl
Paraguay	25/05/1994	EIF	27/8/99	R		24/02/1994	R	15/04/1997	nl		nl
Peru	21/03/1994	EIF	12/09/02	R		07/06/1993	R	26/12/1996	nl		nl
Philippines	31/10/1994	EIF	20/11/03	R		08/10/1993	R	10/05/2000	nl		nl
Poland *	26/10/1994	EIF	13/12/02	R	3,0%	18/01/1996	R	12/02/2002	21/12/2001	S	Participant
Portugal *	21/03/1994	EIF	31/05/02	Ap	0.3%	21/12/1993	R	26/12/1996	20/10/2000	S	Participant
Puerto Rico								nl	nl		nl
Qatar	17/07/1996	EIF	11/01/05	Ac		21/08/1996	R	14/12/1999	nl		nl
Republic of Korea	21/03/1994	EIF	08/11/02	R		03/10/1994	R	15/11/1999	nl		nl
Republic of Moldova	07/09/1995	EIF	22/04/03	Ac		20/10/1995	R	08/06/1999	01/03/2004	EIF	Participant
Réunion								nl	nl		nl
Romania *	06/09/1994	EIF	19/03/01	R	1.2%	17/08/1994	R	17/11/1998	01/03/2004	EIF	Participant
Russian Federation*	28/03/1995	EIF	18/11/04	R	17.4%	05/04/1995	R	27/08/2003	nl		Participant
Rwanda	16/11/1998	EIF	22/07/04	Ac		29/05/1996	R	20/01/1999	nl		nl
Saint Helena								nl	nl		nl
Saint Kitts and Nevis	21/03/1994	EIF				07/01/1993	R	28/09/1997	nl		nl
Saint Lucia	21/03/1994	EIF	20/08/03	R		28/07/1993	R	30/09/1997	nl		nl
Saint Pierre & Miquelon								nl	nl		nl
Saint Vincent and the Grenadines	02/03/1997	EIF	31/12/04	R		03/06/1996	Ac	14/06/1998	nl		nl
Samoa	27/02/1995	EIF	27/11/00	R		09/02/1994	R	19/11/1998	nl		nl
San Marino	26/01/1995	EIF				28/10/1994	R	21/10/1999	01/03/2004	EIF	nl
Sao Tome and Principe	28/12/1999	EIF				29/09/1999	R	06/10/1998	nl		nl
Saudi Arabia	28/03/1995	EIF	31/01/05	Ac		03/10/2001	Ac	23/09/1997	nl		nl
Senegal	15/01/1995	EIF	20/07/01	Ac		17/10/1994	R	26/12/1996	nl		nl
Serbia and Montenegro (Former	10/06/2001	EIF				01/03/2002	R	nl			Participant

			KP								
Yugoslavia, Fed. Rep. of)											
Seychelles	21/03/1994	EIF	22/07/02	R		22/09/1992	R	24/09/1997	nl		nl
Sierra Leone	20/09/1995	EIF				12/12/1994	Ac	24/12/1997	nl		nl
Singapore	27/08/1997	EIF				21/12/1995	R	25/07/1999	nl		nl
Slovak Republic *	23/11/1994	EIF	31/05/02	R	0.4%	25/08/1994	Ap	07/04/2002			Participant
Slovenia *	29/02/1996	EIF	02/08/02	R		09/07/1996	R	26/09/2001	01/03/2004	EIF	Participant
Solomon Islands	28/03/1995	EIF	13/03/03	R		03/10/1995	R	15/07/1999	nl		nl
Somalia								22/10/2002	nl		nl
South Africa	27/11/1997	EIF	31/07/02	Ac		02/11/1995	R	29/12/1997	nl		nl
Spain *	21/03/1994	EIF	31/05/02	R	1.9%	21/12/1993	R	26/12/1996	20/10/2000	S	Participant
Sri Lanka	21/03/1994	EIF	03/09/02	Ac		23/03/1994	R	09/03/1999	nl		nl
Sudan	21/03/1994	EIF	02/11/04	Ac		30/10/1995	R	26/12/1996	nl		nl
Suriname	12/01/1998	EIF				12/01/1996	R	30/08/2000	nl		nl
Swaziland	05/01/1997	EIF				09/11/1994	R	05/01/1997	nl		nl
Sweden *	21/03/1994	EIF	31/05/02	R	0.4%	16/12/1993	R	26/12/1996	22/02/2001	S	Participant
Switzerland *	21/03/1994	EIF	09/07/03	R	0.3%%	21/11/1994	R	26/12/1996	20/10/2000	S	Participant
Syrian Arab Republic	03/04/1996	EIF				04/01/1996	R	08/09/1997	nl		nl
Tajikistan*	07/04/1998	EIF				29/10/1997	Ac	14/10/1997	nl		nl
Thailand	28/03/1995	EIF	28/08/02	R		29/01/2004	R	05/07/2001	nl		nl
The FYR of Macedonia	28/04/1998	EIF	18/11/04	Ac		02/12/1997	Ac	04/06/2002	01/03/2004	EIF	----
Togo	06/06/1995	EIF	02/07/04	Ac		04/10/1995	At	26/12/1996	nl		nl
Tonga	18/10/1998	EIF				19/05/1998	Ac	24/12/1998	nl		nl
Trinidad and Tobago	22/09/1994	EIF	28/01/99	R		01/08/1996	R	06/09/2000	nl		nl
Tunisia	21/03/1994	EIF	22/01/03	Ac		15/07/1993	R	26/12/1996	nl		nl
Turkey						14/02/1997	R	29/06/1998	01/03/2004	EIF	Participant
Turkmenistan	03/09/1995	EIF	11/01/99	R		18/09/1996	Ac	26/12/1996	nl		nl
Tuvalu	21/03/1994	EIF	16/11/98	R		20/12/2002	R	13/12/1998	nl		nl
Uganda	21/03/1994	EIF	25/03/02	Ac		08/09/1993	R	23/09/1997	nl		nl
Ukraine *	11/08/1997	EIF	12/04/04	R		07/02/1995	R	25/11/2002			Participant
United Arab Emirates	28/03/1996	EIF	26/01/05	Ac		10/02/2000	R	19/01/1999	nl		nl
United Kingdom	21/03/1994	EIF	31/05/02	R	4.3%	03/06/1994	R	16/01/1997			Participant
United Rep. of Tanzania	16/07/1996	EIF	26/08/02	Ac		08/03/1996	R	17/09/1997	nl		nl
United States of America	21/03/1994	EIF	12/11/98	S		04/06/1993	S	15/02/2001	nl		Observer country
Uruguay	16/11/1994	EIF	05/02/01	R		05/11/1993	R	18/05/1999	nl		nl
US Virgin Islands								nl	nl		nl
Uzbekistan	21/03/1994	EIF	12/10/99	R		19/07/1995	Ac	26/12/1996	nl		----
Vanuatu	21/03/1994	EIF	17/07/01	Ac		25/03/1993	R	08/11/1999	nl		nl
Venezuela	28/03/1995	EIF	18/02/05	Ac		13/09/1994	R	27/09/1998	nl		nl
Viet Nam	14/02/1995	EIF	25/09/02	R		16/11/1994	R	23/11/1998	nl		nl
West Bank								nl	nl		nl
Western Sahara								nl	nl		nl
Yemen	21/05/1996	EIF	15/09/04	Ac		21/02/1996	R	14/04/1997	nl		nl
Zambia	21/03/1994	EIF	05/08/98	S				26/12/1996	nl		nl
Zimbabwe	21/03/1994	EIF						22/12/1997	nl		nl
	21/03/1994	EIF	31/05/02	Ap		21/12/1993	Ap	24/06/1998	nl		Participant

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