Analysis of Scope, Coverage and Methodological Approaches for the Regional UNECE/FAO Work on Forest Resources Assessment in the Global FRA Context

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Note by the Author

This document was produced in the context of of a short term contract with UNECE Geneva. It was neither the intention of the study nor was it indeed possible to produce a comprehensive and in-depth analysis of each of the issues and aspects covered by the paper in the context of this assignment. Rather it should serve as a starting point for further discussion amongst a wider range of experts and for more detailed work on the range of topcis that are touched upon here.

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List of abbreviations

CBD	Convention on Biological Diversity
CEC	Cation Exchange Capacity
CIS	Commonwealth of Independent States
CO_2	Carbon dioxide
dbh	Diameter at breast height
EC	European Commission
ENFIN	European National Forst Inventory Network
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FAWS	Forests vailable for wood supply
FOWL	Forest and other wooded land
FRA	Forest Resources Assessment
GDP	Gross Domestic Product
GFIS	Global Forest Information Service
ha	Hectares
ICP Forests	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IPGRI	International Plant Genetic Resources Institute
IUCN	The World Conservation Union
JFSQ	Joint Forest Sector Questionnaire
MCPFE	Ministerial Conference on the Protection of Forests in Europe
NEFIS	Network for a European Forest Service
NFI	National forest inventory
NWFP	Non-wood forest product
NFIS	National Forest Information System
OWL	Other wooded land
pH	Logarithmic measure of hydrogen ion concentration
R&D	Research and Development
RFRA	Regional Forest Resources Assessment
roi	Return on Investment
SFM	Sustainable Forest Management
TBFRA	Temperate and Boreal Forest Resources Assessment
ToS	Team of Specialists
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
WFC	World Forestry Congress
yr	Year

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1 Background and objective

The Joint UNECE/FAO Working Party on Forest Economics and Statistics, at its twenty-fifth session held in Geneva from 24 to 26 February 2003, noted that the global FRA approaches aiming to include "information on all aspects of forest resources" make it necessary to review and adjust the regional UNECE/FAO work on Forest Resources Assessment". The Working Party stressed the necessity of maintaining a "strong regional activity in forest resource assessment to satisfy specific regional needs and to complement the emerging global FRA".

The Working Party stated that the secretariat should implement with help from the Regional FRA Team of Specialists "a comparison of the new global FRA scope and coverage with those of the TBFRA 2000, to help in determining the scope of the regional FRA activities". It was also noted "quality and coverage of the information available at the regional level should not be reduced compared with the level achieved". The FRA 2000 level had also defined the scope of reporting on pan-European (MCPFE) Criteria and Indicators for Sustainable Forest Management (SFM).

The UNECE Timber Committee at its session held in October 2003 noted that some countries "expressed their concern about the suggested scope and timetable of the global update, as well as the draft modifications to the FRA 2000 set of terms and definitions". They considered that the approach so far might "generate discrepancies between the global and regional FRA activities, including the reporting on MCPFE criteria and indicators".

The objective of the paper is to provide a detailed analysis of the scope, coverage and methodological approaches of the global FRA 2005 update, including the suggested national reporting tables, variables (reporting data items) and terms and definitions, compared to TBFRA, with the purpose to identify and formulate the scope, coverage and methodological approaches of the regional UNECE/FAO work on Forest Resources Assessment, specifically with regard to reporting on the newly approved set of MCPFE Criteria and Indicators (C&I) for SFM. The main target of the work is to elaborate proposals and the outline for the UNECE regional FRA work, including the preparation for the FRA reporting to MCPFE process. The analysis is also expected to contribute to a tentative evaluation for a possible harmonization (to a certain extent) of C&I reporting within MCPFE and Montreal processes, where the UNECE countries are involved. In particular, according to the Terms of References, the study should:

- provide the detailed comparison of the global FRA 2005, TBFRA, global FRA 2000 and previous and current sets of MCPFE C&I for SFM;
- suggest formats for reporting FRA-related information on SFM (or its components) to the MCPFE, based on the pan-European Criteria and Indicators for SFM, as well as a list of topics/themes, variables

(parameters), including the supporting terms and definitions, for reporting;

- analyse, and if useful, elaborate options for the involvement of UNECE/FAO in reporting on SFM (or SFM components) to global level policy processes, especially the UNFF, and to the global FRA process;
- analyse current situation of the distribution of work and the contribution of the UNECE/FAO to the work of FAO on the global FRA and suggest possible changes in the design and contribution of the UNECE/FAO to enhance comprehensiveness and efficiency of monitoring, assessment and reporting on SFM in the UNECE region;
- analyse similarities and differences between different sets of C&I for SFM in the UNECE region (namely, Montreal and MCPFE processes), and propose possible options for designs for the possible harmonisation (integration) of reporting formats.

The study is structured along these specific requests.

2 Analysis of Scope, Coverage and Methodical Approaches

2.1 Thematic elements / Criteria for SFM and coverage by relevant C&I Processes and FRAs

The following table (Table 1) compares the seven "thematic elements" for SFM acnowledged by the United Nations Forum on Forests at its 4th Session in May 2004 with the MCPFE and Montreal Process criteria as well as with the main sections (chapters) of the TBFRA 2000 report, the FRA 2005 update tables and the FRA 2000 tables.

Table 1: Comparison of scope of UNFF thematic elements, FRAs and Criteria of relevant C&I processes

UNFF	MCPFE Criteria	Montreal Process	TBFRA 2000	FRA 2005	FRA 2000
1. Extent of forest resources	Maintenance & appropriate enhancement of forest resources and their contri-bution to global carbon cycles	Maintenance of Productive Capacity of Forest Ecosystems	Area of forest and other wooded land: status and changes	Extent of Forest Resources	Forest area and area change
		Maintenance of Forest Contribution to Global Carbon Cycles	Wood supply and carbon sequestration: status and changes	Contribution to Global Carbon Cycle	Wood volume and woody biomass
					Forest plantations
					Trees outside the forest
2. Biological diversity	Maintenance, conservation & appropriate enhancement of biological diversity in forest ecosystems	Conservation of Biological Diversity	Biological diversity and environmental protection	Biodiversity Function	Forest area by ecological zone
					Forests in protected areas
					Endangered and endemic species
3. Forest health and productivity	Maintenance of forest ecosystem health and vitality	Maintenance of Forest Ecosystem Health and Vitality	Forest condition and damage to forest and other wooded land	Forest Health and Vitality	Forest fires
4. Productive functions of forest resources	Maintenance and encourage-ment of productive functions of forests (wood	Maintenance and Enhancement of Long Term Multiple Socio-Economic Benefits to	Ownership and management status of forest and other wooded land	Production Function	Status and trends in forest management
				Economic Function	Removals

	forests (wood and non-wood)	Benefits to Meet the Needs of Societies			Non-wood forest products
5. Protective functions of forest resources.	Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water)	Conservation and Maintenance of Soil and Water Resources	Protective and socio-economic functions	Protection Function	
6. Socio-economic functions.	Maintenance of other socio-economic functions and conditions	Maintenance and Enhancement of Long Term Multiple Socio-Economic Benefits to Meet the Needs of Societies		Social Function	
7. Legal, policy and institutional framework.		Legal, Institutional and Economic Framework for Forest Conservation and Sustainable Management			

The comparison between UNFF "thematic elements" of SFM and criteria shows that the MCPFE and Montreal Process criteria both cover the common thematic areas for SFM as adopted by UNFF quite well. The MCPFE lacks a criterion on the legal, policy and institutional framework. The Montreal Process (MP) puts more emphasis on the forest contribution to global carbon cycles (which is a separate criterion), and covers productive functions and socio-economic benefits in one criterion (which are two different areas in the UNFF list). Note that the "qualitative Indicators" of the MCPFE provide a comprehensive coverage of the legal, policy and institutional framework which might therefore justly be considered the functional equivalent of the seventh "common element".

The comparison between UNFF "thematic elements" and FRAs shows that the latter have increasingly reoriented towards comprehensive coverage of SFM, as defined by UNFF or C&I processes. This is visible in both changes in the structure of FRA 2000 and TBFRA 2000 compared to the follow-up surveys in 2005 for the global FRA and the update of regional FRA data for the MCPFE in 2003, which used the MCPFE criteria as general structuring framework.

However, so far FRAs have not covered aspcts related to the legal and institutional frameworks of SFM. The global FRA 2005 update currently under way has explicitly excluded this thematic element. Note also that this is primarily a comparison of scope and structure, as e. g. information from each of the 15 FAO 2005 update tables relates to and provides information for more than one "thematic element" of UNFF.

2.2 Indicators of MCPFE and MP and coverage of FRAs

The following table (Table 2) shows a comparison of the MCPFE indicators with different forest resource assessments as well as the Montreal Process indicators in terms of coverage. Note that wording of indicators or parameters are often not identical. MCPFE was selected as reference for indicators due to its recent indicator update and the close collaboration between MCPFE and UNECE in the most recent regional reporting in 2003. A comparison of RFRA 2003 and Montreal Process indicators can be found in chapter 7.1.

Table 2: Overview table of FRA coverage and regional C&I process indicators

MCPFE quantitative indicators	RFRA 2003 update	TBFRA 2000	FRA 2005 update	FRA 2000	Montreal Process
1.1 Forest area	x	x	x	x	x
1.2 Growing stock	x	x	x	x	x
1.3 Age structure and/or diameter distribution	x	x			x
1.4 Carbon stock	x		x	x	x
2.1 Deposition of air pollutants	x				x
2.2 Soil condition					x
2.3 Defoliation	x	x			
2.4 Forest damage	x	x	x	x (fires)	x
3.1 Increment and fellings	x	x			x
3.2 Roundwood	x	x (removals)	x (removal)	x (removal)	x (wood products)
3.3 Non-wood goods	x		x (removal)	x (removal)?	x
3.4 Services					
3.5 Forests under management plans	x (forest under mgmt)?			x (forest mgmt)?	
4.1 Tree species composition	x (forest type)	x (number)	x (species)		x (number)

4.2 Regeneration	x	x			
4.3 Naturalness	x	x	x (characteris-tics)	x (plantations)	x (plantations)
4.4 Introduced tree species		x (origin of planting material)			x (exotic species)
4.5 Deadwood		x (standing volume: dead trees)	x	x	
4.6 Genetic resources	x				x (diminished species)
4.7 Landscape pattern					x (fragmentation)
4.8 Threatened forest species	x	x	X (tree species)	x	X (forest dependent species)
4.9 Protected forests	x	x	x	x	x
5.1 Protective forests – soil, water and other ecosystem functions	x	x	x		x
5.2 Protective forests – infrastructure and managed natural resources	x		x		x
6.1 Forest holdings	x	x	x		
6.2 Contribution of forest sector to GDP	x				x
6.3 Net revenue					x (roi)
6.4 Expenditures for services					x
6.5 Forest sector workforce	x		x		x
6.6 Occupational safety and health					x
6.7 Wood consumption					x
6.8 Trade in wood					
6.9 Energy from wood resources					
6.10 Accessibility for recreation	x	x			x
6.11 Cultural and spiritual values					x
Number of aspects not covered by	**12**	**17**	**20**	**23**	

FRAs					

The scope of quantitative MCPFE indicators, and thus the scope of aspects that constitute SFM, has been considerably extended with the latest improvement and now cover a range of aspects that are not directly related to forest management, especially on socio-economic functions.

Table 2 above shows that no FRA so far undertaken by UNECE or FAO covers all aspects of the improved set of MCPFE quantitative indicators. Compared to the TBFRA 2000, the regional FRA 2003 update is, however, increasingly comprehensive. About 2/3 of all indicators were covered by the UNECE/FAO regional update in 2003. Likewise, a comparison of FRA 2000 with the FRA 2005 design shows that FRA 2005 will cover SFM, as defined through indicators, more comprehensively. Nevertheless, regional FRAs cover considerably more indicators than global FRAs.

A comparison between the 35 quantitative indicators of MCPFE with the related Montreal Process indicators reveals that the latter covers all except ten topical areas. However, the Montreal Process covers a range of areas and uses some concepts that have not found its way into the MCPFE set of quantitative indicators, including: - soil erosion, - forest degradation, - forest catchment areas, - water body quality, - recycling, - investment, - R&D, - wage rates.

A comparison of the indicators of the 7th "thematic element" of SFM, a criterion of the Montreal Process and covered by the MCPFE through the qualitative indicators and their coverage by FRAs shows the following: both the Montreal Process and the MCPFE indicators cover legal, institutional and economic aspects, the Montreal Process with 20 indicators, the MCPFE with 17 indicators. However, the two processes use somewhat different concepts. The Montreal Process speaks of "frameworks" while the MCPFE uses the "policy instrument" approach, and in addition covers informational instruments. The Montreal Process set of indicators also covers indicators related to the capacity to measure and monitor changes in the conservation and sustainable management of forests (which is lacking in the MCPFE set) as well as the capacity to conduct and apply research and development (which is partly covered in a quantitative indicator under criterion 6 of the MCPFE). In comparison, the MCPFE structures qualitative indicators into overall information on policies, instruments and institutions and more detailed information to specific policy areas within the six criteria. This element is not covered by any regional or global FRA undertaken so far.

Table 3: Comparison of the coverage of the 7th "thematic element" of SFM (legal, policy and institutional framework) through indicators and in FRAs

Montreal Process	a) the extent to which the legal framework (laws, regulations, guidelines) supports the conservation and sustainable management of forests (5 specific sub-indicators), b) the extent to which the institutional framework supports the

	conservation and sustainable management of forests (5 specific sub-indicators), c) the extent to which the economic framework (economic policies and measures) supports the conservation and sustainable management of forests (2 specific sub-indicators), d) capacity to measure and monitor changes in the conservation and sustainable management of forests (3 specific sub-indicators) e) the capacity to conduct and apply research and development aimed at improving forest management and delivery of forest goods and services (5 specific sub-indicators).
MCPFE	A. Overall policies, institutions and instruments for sustainable forest management (5 specific sub-indicators) B. Policies, institutions and instruments by policy area (12 specific sub-indicators related to the six criteria)
RFRA 2003 update	Not covered
TBFRA 2000	Not covered
FRA 2000	Not covered
FRA 2005 update	Not covered

The MCPFE has restructured the qualitative indicators in the course of its recent revision of indicators. However, no further discussion was held regarding data collection, assessment and reporting on the qualitative indicators, which remained completely unclear so far.

2.3 Classifications used by C&I processes and by FRAs

The following table compares classifications used for reporting on specific indicators on global level (FRA 2005 update) and on regional level (RFRA 2003 update/TBFRA 2000 and Montreal Process). These indicators/classifications comprise those where there is a potential or a need to proceed on harmonization on global level. For indicators/classifications used on regional, but not on global level there is a potential or a need to proceed on harmonization on regional level in addition to the work on global level (Table 4).

Table 4: Classifications addressed /used on global and regional levels

Thematic element	Indicator/Classification
1. Extent of forest resources	used on global and regional level
	- forest area
	- forest type
	- growing stock
	- carbon stock
	used on regional level only
	- Forest type
	- Age structure / diameter distribution

2. Biological diversity	used on global and regional level
	- biodiversity/tree species composition
	- protection classes
	- endangerment classes (not covered by Montreal Process)
	- naturalness or similar concepts
	used on regional level only
	- Introduced tree species
	- Genetic resources
3. Forest health & productivity	used on global and regional level
	- forest damage/disturbance
	used on regional level only
	- Deposition of air pollutants
4. Productive functions of forest resources.	used on global and regional level
	- round wood
	- non-wood goods
	used on regional level only
	- Increment and fellings
5. Protective functions of forest resources.	used on global and regional level
	- protective forests
	used on regional level only
	-
6. Socioeconomic functions and conditions	used on global and regional level
	- employment (not covered by RFRA 2003 update)
	used on regional level only
	- Contribution to forest sector GDP
	- Accessibility for recreation

The Table A in Annex I lists categories used for classifying data in each of these areas for TBFRA 2000, the MCPFE, FRA 2005 update and the Montreal Process. RFRA 2003 is not covered as data was usually classified as in MCPFE. The analysis shows that about 13 indicators are used on global and regional (Montreal Process and MCPFE) levels. A detailed comparison of classifications of data (Table A, Annex) shows that practically none of the classifications are identical, neither between the global and the regional levels nor between the regional level C&I processes. This is an indication for quite some work ahead.

The Table 5 lists categories used for classifying data in each of the areas in Table 4 related to the regional level for TBFRA 2000, the MCPFE and the Montreal Process.

Table 5: Detailed comparison of classifications for indicators relevant on regional level

Forest type[1]	
TBFRA 2000	- coniferous - broadleaved - mixed as well as: - even-aged, un even-aged;

[1] note: a similar concept, "ecological zone" is defined in FAO FRA Working Paper 56

	- high forest, coppice - forest, other wooded land
MCPFE	New forest type classification on-going, in the meantime use of TBFRA 2000 classification of forest types: - coniferous - broadleaved - mixed
Montreal Process	For the overview report: - Conifer, Broadleaf, Mixed, Palm/Bamboo In general - Natural forest area - Plantation - native (indigenous to the area) - exotic plantation
Age structure / diameter distribution	
TBFRA 2000	Age-class distribution of even-aged high forest available for wood supply: total of all species groups, predominantly coniferous, predominantly broadleaved, mixed
MCPFE	For even-aged stands by forest types and by availability for wood supply: For uneven-aged stands by forest types and by availability for wood supply
Montreal Process	Extent of area by forest type and by age class or successional stage
Introduced tree species	
TBFRA 2000	Origin of planting material used in the forest
MCPFE	Area of stands of forest dominated by introduced tree species and of which invasive* Area of stands of other wooded land dominated by introduced tree species and of which invasive*
Montreal Process	The area and growing stock of plantations of native and exotic species
Genetic resources	
TBFRA 2000	Origin of planting material used in the forest
MCPFE	Area managed for in situ gene conservation Area managed for ex situ gene conservation Area managed for seed production
Montreal Process	Number of forest dependent species that occupy a small portion of their former range Population levels of representative species from diverse habitats monitored across their range
Deposition of air pollutants	
TBFRA 2000	-
MCPFE	Deposition of N, S and base cations, each on forest land; Deposition of N, S and base cations, each on other wooded land
Montreal Process	Area and percent of forest land subjected to levels of specific air pollutants (e.g. sulfates, nitrate, ozone) or ultraviolet B that may cause negative impacts on the forest ecosystem Area and percent of forest land experiencing an accumulation of persistent toxic substances

Increment and fellings	
TBFRA 2000	Fellings and removals on forest available for wood supply: comparative data
MCPFE	Net annual increment of wood on forest available for wood supply Annual fellings of wood on forest available for wood supply
Montreal Process	Annual removal of wood products compared to the volume determined to be sustainable Annual removal of non-timber forest products (e.g. fur bearers, berries, mushrooms, game), compared to the level determined to be sustainable
Contribution to forest sector GDP	
TBFRA 2000	-
MCPFE	Contribution of ISIC/NACE 02.0 (Forestry, logging and related services) to GDP Contribution of ISIC/NACE 20 ff (Manufacture of wood and /articles in wood) to GDP Contribution of ISIC/NACE 21 ff (Manufacture of paper and paper products) to GDP
Montreal Process	Value of wood and non-wood products production as percentage of GDP
Accessibility for recreation	
TBFRA 2000	Area of forest and other wooded land where access to public is legally allowed and not allowed
MCPFE	Separate figures to be reported on: - Forest area where access is available to the public for recreational purposes. - Other wooded land where access is available to the public for recreational purposes. Intensity of use should be reported according to one or more of the following figures: · Area of forest with recreation as one of main management goals · Area of other wooded land with recreation as one of main management goals · Number of visits and visitors in forests · Number of visits and visitors in other wooded land · Number of recreation facilities in forests · Number of recreation facilities in other wooded land
Montreal Process	Area and percent of forest land managed for general recreation and tourism, in relation to the total area of forest land Number and type of facilities available for general recreation and tourism, in relation to population and forest area Number of visitor days attributed to recreation and tourism, in relation to population and forest area

The comparison of the different classifications used for the data under a similar indicator again shows quite large differences between TBFRA 2000, MCPFE and the Montreal Process.

2.4 Comparison of terms and definitions

The following reference documents were used for comparison:
- TBFRA 2000: "Terms and definitions as applied in the UNECE/FAO Temperate and Boreal Forest Resources Assessment 2000" (approx. 83 definitions)
- MCPFE: "Relevant Definitions used for the Improved pan-European indicators for Sustainable Forest Management" (approx. 130 definitions)
- FRA 2005 terms and definitions document (approx. 74 definitions)
- Montreal Process: "Criteria And Indicators For The Conservation And Sustainable Management Of Temperate And Boreal Forests Montréal Process Technical Notes - Glossary of Terms, November 12, 2000 (accepted by MP countries)"; "Proposed Definitions Of Selected Terms Related To The Montreal Process Criteria And Indicators Draft 3.0 September 25, 1996, Report Of The Technical Advisory Committee (working technical aid)"; "Summary of Portland Capacity Building Workshop, Montréal Process Capacity Building Workshop, August 2001, Portland, Oregon, USA". (approx. 49 definitions)

A list of TBFRA 2000 terms that are also defined in at least the FRA 2005 update, the MCPFE or the Montreal Process can be found in Annex I Table B. Of the 83 definitions contained in the TBFRA 2000 Terms and Definitions document, only about 50 % (i.e. 41 definitions) are also defined in at least one of the other relevant processes. Only four (!) definitions are explicitly specified in all of the processes. These are listed in Table 6 below.

Table 6: TBFRA 2000 terms also defined in the relevant global or regional processes

Selected TBFRA 2000 definitions	MCPFE	FRA 2005 update	Montreal Process
Forest	x	x	x (forest land)
Growing stock	x	x (and growing stock composition)	x
Plantation	x	x (productive, protective)	x (forest)
Protection	x	x (of soil and water)	x (forest areas with protection function)

In total, 23 terms are defined in both the TBFRA 2000 and the FRA 2005 update document. These are listed in Table 8. A total of 36 terms are defined both in the TBFRA 2000 and the MCPFE indicator terms and definitions document. Only seven (!) terms are covered by both the TBFRA and the Montreal Process terms and definitions documents. In addition to those in Table 6, these are:

- forest available for wood supply
- indigenous and tribal communities (indigenous communities in the Montreal process)
- IUCN potection categories

Table 7: TBFRA 2000 terms also defined in the relevant global or regional processes

Selected TBFRA 2000 definitions	FRA 2005 update
Above stump woody biomass	x (above ground biomass)
Annual fellings	x (fellings)
Annual removal	x (wood removal, wood fuel removal)
Endangered species	x (tree)
Forest	x
Growing stock	x (and growing stock composition)
Inland water	x (bodies)
Introduced tree species	x (introduced species)
IUCN protection categories	x
Land area	x
Natural regeneration	x
Natural regeneration enhanced by planting	x (assisted natural regeneration)
Other land	x
Other wooded land	x
Plantation	x (productive, protective)
Predominantly damaged by - fire - insects and disease - known local pollution sources - storm, wind, snow or other identifiable abiotic factors - wildlife and grazing	x (disturbance concept, different categories, see chapter 6)
Private ownership	x
Protection	x (of soil and water)
Public ownership	x
Semi-natural forest/OWL	x
Total area	x (area of a country)
Tree	x
Woody biomass	x (split into above, below and dead wood)

There are almost as many terms defined in documents of relevant processes that are lacking in the TBFRA 2000 Terms & Definitions document (91 terms, compared to 96 terms). A list of these terms and the related process where it is defined can be found in Annex I Table C. A total of 28 terms are defined only in the TBFRA 2000 Terms and Definitions document, but in no other document of the relevant processes. A list of these terms is in Annex I Table D.

The following table (Table 8) shows a comparison of key terms defined in all four relevant processes analysed here, as listed in table 6. Note that brackets in Table 6 identify in some cases which specific aspects are covered.

Table 8: Detailed comparison of terms and their definitions

Forest	
TBFRA 2000	Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ. May consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground; or of open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10 percent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10 percent or tree height of 51-17 are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention or natural causes but which are expected to revert to forest. Includes: Forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas within the forest; forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and a width of more than 20 m. Rubberwood plantations and cork oak stands are included. Excludes: Land predominantly used for agricultural practices.
MCPFE	As in TBFRA 2000
FRA 2005 update	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters in situ. Areas under reforestation that have not yet but are expected to reach a canopy cover of 10 percent and tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes that are expected to regenerate. Includes areas with bamboo and palms provided that height and canopy cover criteria are reached. Includes forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest. Includes windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m. Includes plantations primarily used for forestry or protection purposes, such as rubber-wood plantations and cork oak stands. Excludes tree stands in agricultural production systems, for example in fruit plantations and agroforestry systems. The term also excludes trees in urban parks and gardens.
Montreal	Land with existing forest (as in indicator l .l .a). In addition, some

Process	countries report "potential forest" and "non-forest" land as forest land but it is important that these elements be reported separately in order to prevent confusion in interpreting many indicators.
Growing stock	
TBFRA 2000	The living tree component of the standing volume
MCPFE	As in TBFRA 2000
FRA 2005 update	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm
Montreal Process	The living tree component of the standing volume. Standing volume is the volume above stump, of standing trees living or dead.
Plantation	
TBFRA 2000	Forest stands established by planting or/and seeding in the process of afforestation or reforestation. They are either: - of introduced species (all planted stands), or - intensively managed stands of indigenous species which meet all the following criteria: one or two species at plantation, even age class, regular spacing. Excludes: Stands which were established as plantations but which have been without intensive management for a significant period of time. These should be considered semi-natural.
MCPFE	As in TBFRA 2000
FRA 2005 update	Productive plantation: Forest/Other wooded land of introduced species, and in some cases native species, established through planting or seeding mainly for production of wood or non wood goods. Protective plantation: Forest / Other wooded land of native or introduced species, established through planting or seeding mainly for provision of services
Montreal Process	Plantation forest: Forest stands established by planting, or deliberately sowing seed. Additional considerations in classifying a stand as a plantation may include, but are not necessarily limited to purpose of the planting or seeding, site preparation, intensity of management. Forests that fall outside this classification are not necessarily natural forests.
Protection	
TBFRA 2000	The function of forest/other wooded land in providing protection of soil against erosion by water or wind, prevention of desertification, the reduction of risk of avalanches and rock or mud slides; and in conserving, protecting and regulating the quantity and quality of water supply, including the prevention of flooding. Includes: Protection against air and noise pollution.
MCPFE	As in TBFRA 2000
FRA 2005 update	Protection of soil and water Forest/Other wooded land (designated function)
Montreal Process	Forest areas that have a legal designation to be managed primarily for soil and water protection should be included. For example, areas within o Production forest; o Private land; o National parks (all or a portion of); with a primary function of soil and water protection. Montréal Process Technical Notes indicate that an area should only be included if it meets the intent of "primarily" soil and water protection

	(stream buffers, etc.). Voluntary protection areas i.e. those not legally gazetted for a protective function, will not be included in the Overview report, however, they may be included in the country report if relevant. If such areas are included, these should be reported separately. Forest land that has legal protection for a variety of reasons including soil and water protection (e.g., conservation, recreation) should not be included when reporting on indicator 4b. Nor should a percentage or portion of general protection areas, be included even where soil and water protection is one of the functions. "Primarily" implies that the most important function (dominant) of the forest area is to conserve soil and water values.

Note that some key terms are not defined in any of the key documents analysed here, e. g. “fragmentation” or “increment”.

2.5 Comparison of reporting formats, timing and methods

A comparison of data collection formats for reporting of TBFRA 2000 and RFRA 2003 update as well as FRA 2000 and FRA 2005 update shows that regional FRAs use almost double the number of reporting tables compared to global reporting tables (Table 9).

Table 9: Number of tables used for national reporting of data

TBFRA 2000	25 tables
RFRA 2003 update	29 tables
FRA 2000	15 tables (1 table: correspondents)
FRA 2005 update	15 tables

Table 10: Structure of data reporting tables

TBFRA 2000	- country
	- reference period
	- purpose
	- data table
	- consistency checks
	- data source and quality
	  - source
	  - adjustment; description of adjustment process and of deviations from TBFRA 2000 definition
	  - likely uncertainty range (absolute figure)
	- comments
	
	Table contents was not standardised for all tables to allow taking into account different requirements for different variables

RFRA update 2003	- data table (pre-filled) - reference period - comments

FRA 2005 update	- FRA 2005 terms and definitions
	- data sources
	  - references to sources of information
	  - quality (H/M/L)
	  - variable(s)
	  - year(s)
	  - additional comments
	- national classifications and related definitions
	- original data
	- analysis and processing of national data
	  - calibration
	  - estimation and forecasting
	- reclassification into FRA 2005 classes
	- data reporting table (1990, 2000, 2005)
	- comments to national reporting table
	
	repoting structure for each table is standardized, and identical for all tables

The comparison shows that both TBFRA 2000 and FRA 2005 have a quite detailed structure for reporting (Table 10). The FRA 2005 update is widely seen as constituting rather a new assessment, which is confirmed by comparing the structure of TBFRA 2000 and the relatively straightforward regional FRA update 2003.

Recent full FRAs put considerable emphasis on the documentation of original data sources and a transparent transformation of national data to international formats. The strong emphasis on the provision of the original data along with the documentation of original data sources is an accepted and welcome standard procedure for high quality reporting, and should be continued practice in future assessments. Similary important is a transparent transformation of national to international data formats, which can be achieved by documenting the transformation rules.

One issue where different approaches to national reporting are used concerns the extrapolation or interpolation of data to common dates by national correspondents. National reporting to the FRA 2005, and to some extent for the global FRA 2000, requires extra/interpolation to one common date, while TBFRA 2000 accepted historic data for a variety of dates. Both approaches have clear advantages and disadvantages. The most important argument for standard dates is the enhanced user friendliness and comparability of data. The most important for historic variation is data reliability: the avoidance of one potential source of error. There is no clearcut answer which option to prefer.

The FRA 2005 update, which requests data at different points in time (1990, 2000, 2005 (forecast) is taking the lead in attempting to deliver upon one of the key requests that FRAs have to fulfil in order to be useful for policy makers and many other users: identifying changes and trends over time. Here, the track record and ambition of UNECE/FAO led FRAs certainly has not been as bold. It seems to have put considerably more emphasis on building up high quality data bases rather than policy relevant information based on approximative data. In fact, building reliable and valid time series based on existing data has been one of the most difficult tasks in the context of making use of available international data. Experience has shown that efforts to produce time series have faced many serious obstacles to producing reliable information. However, based on the related work that has been undertaken by UNECE, the UNECE should consider further work in this direction. Policy makers justly call for policy-relevant information on trends. They prefer information that is about right over detailed and abundant data that is not policy relevant. UNECE/FAO is and will increasingly be called upon to put more emphasis on change and trend data in the future.

A further difference between UNECE/FAO and FAO 2005 update exists in the reporting designs. Unlike UNECE/FAO related regional reporting, the FRA 2005

update foresees both an international and individual national reports on FRA or the state of SFM.

A comparison of time lines for reporting on global and regional FRAs (Table 11) highlights the less than optimally distributed information needs or update routines of global and regional FRAs and the resulting busy schedule for regional FRAs and updates for the UNECE. However, given that the Montreal Process countries use a five-year cycle of reporting to the World Forest Congress (which is far from certain) and given that the MCPFE keeps a five-year cycle of organizing Ministerial Conferences, the regional FRA update for these two regions – as far as covered by the UNECE/FAO – would have data needs at similar points in time.

Table 11: Timing and periodicity of data needs and major reports based on FRA data (note that regional FRAs are either undertaken in the context of global FRAs or for the MCPFE)

	Regional FRAs	Global FRAs	MCPFE Reports	Montreal Process reports	UNFF
1997					
1998			3rd MCPFE report		
1999					
2000	TBFRA 2000	Global FRA			
2001					
2002					
2003	Regional FRA 2003 update for MCPFE		4th MCPFE	First Report at WFC	
2004					
2005	Regional FRA update for global FRA update	Global FRA 2005 update			Review of SFM
2006					
2007					
2008	Regional FRA update for MCPFE (?)		5th MCPFE (?)		
2009					
2010	Regional FRA	Global FRA 2010			

The third MCPFE report in 1998 was based on preliminary and largely non-verified results and data from the TBFRA 2000. The subsequent MCPFE report in 2003 was undertaken as a relatively efficient update of relevant data tables from the TBFRA 2000. While the future of reporting and the related required timing is open, it seems unavoidable to adjust at least reporting to the politically determined time table. This does, however, not mean that new data should be collected on all aspects for a respective report. Given that it is well

known which countries have new data available (which should be the case), it would be most efficient to update only the data of these countries, using the same routine as in the previous main FRA or FRA update. Thereby a new status of the situation could be presented while avoiding major work.

In terms of data collection from national correspondents existing information technology could be utilized that allow direct feeding of data to UNECE data bases and automatic consistency checks for the data supplied. Likewise, data retrieval interfaces, such as developed by different initiatives (Global Forest information Service (GFIS), Network for a European Forest Information Service (NEFIS), National Forest Information System (NFIS) Canada, etc.) could enhance the value of data pools for different user groups without major work needed by the data storing institution.

3 Conclusions and Recommendations from the Comparison

3.1 Thematic Elements of SFM / Criteria and future regional FRAs

Criteria are increasingly accepted on political level (UNFF 4). It will take quite major efforts to change them altogether or to change individual components. Criteria will most likely remain as they are regardless of FRA design beyond 2010. In terms of general structure of regional FRAs and related monitoring, assessment and reporting, SFM and the seven "thematic elements" or criteria will be the guiding framework for communication on forests and their utilization for the forseeable future.

However, there is a range of other international processes and arrangements that address forest issues on global level, such as CBD, UNFCCC, UNCCD, and which use forest related C&I systems, and assessments, e.g. the Millennium Development Goals and the Millennium Environmental Assessments. Most of the latter initiatives cover only basic forest data, which are often derived from global FRA. However, several of these use different conceptual approaches that are quite different from the seven "thematic elements" (see Rametsteiner and Wijewardana 2002 for a comparison of concepts and parameters/indicators used in other fora). Similarly, regional level institutions, such as the EU, use different structures and concepts in more overall reporting, such as in the EU Sustainable Development Indicator framework structure.

Not all topics related to forests are covered by indicators of SFM. There are a range of emerging "hot issues" that are not taken into account if FRAs focus on SFM as a framework for data collection and reporting. It seems, nevertheless, important to focus FRAs on a stable and long-term framework.

Recommendations:

1. Future UNECE/FAO regional FRAs should be consequently reoriented towards the "thematic elements" for SFM as the overall framework. Note that this reorientation could/should also be reflected in the title of the assessment (from Forest Resources to SFM Assessment).

2. Regarding the scope, UNECE/FAO FRA will continue to cover thematic elements / criteria 1-6, but it will have to decide whether and, if yes, how to cover the 7th "thematic element" / criterion / the MCPFE qualitative indicators (institutional and legal framework). Related to this question is how data collection, assessment and reporting should be organized in the context of FRA, including practical arrangements. A practical option is to leave this aspect out of the scope of the FRA. Data would be collected, e. g. for the MCPFE, through supplementary country reports.

3. UNECE/FAO should observe the development of new reporting frameworks based on different conceptual systems within the territorial coverage of the UNECE region in order to identify and communicate incompatibilities early. This is specifically important in relation to the various "sustainable development" indicator and reporting initiatives.

4. UNECE/FAO FRA might consider, in addition to indicators of SFM, to collect data on emerging or "hot topics". However, such topics should be restricted to very few, if any. There should be a realistic chance that national correspondents for the FRA are able to collect quantitative national data with comparatively little further efforts on these topics.

3.2 Indicators and future regional FRAs

The regional FRA 2003 update for the MCPFE Ministerial Conference in 2003 is a good example of client-oriented and –targeted service of the UNECE, and of the collaboration between a more technically oriented UN body and a more politically oriented policy making body. SFM, as defined through MCPFE indicators, however, cover aspects where data collection is undertaken by a variety of other institutions. It is therefore necessary to define the area of competency in terms of data collection, storage and reporting on SFM or parts thereof and to specify collaboration arrangements with other bodies involved in data collection, analysis, storage and reporting on SFM.

Recommendations:

5. UNECE/FAO should define, together with the MCPFE and the Montreal Process, the specific set of indicators on which they intend to collect data, also in partnership with other institutions.

6. UNECE/FAO should decide whether and how to be involved in data collection, storage, analysis and reporting on each of the indicators it decided not to collect data on.

7. UNECE/FAO should offer assistance on its specific field of expertise of international data collection to the review of indicators currently undertaken by the Montreal Process (similar to its assistance in the review and improvement of MCPFE indicators).

3.3 Classifications for reporting on indicators and future regional FRAs

The comparison of the different classifications used for the data under similar indicators used on global and regional levels (by Montreal Process and MCPFE countries) shows quite large differences in the way data is classified. Indicators

used on global and regional level should, as a priority, be attempted to be harmonized on global level. In case this is not deemed fruitful.

Recommendations:

8. UNECE/ FAO ToS on FRA should agree with MCPFE to get a mandate for or co-operate with the MCPFE on the maintenance and further development of the document "MCPFE Background Information for the Improved Indicators for Sustainable Forest Management", which contains data collection specifications related to MCPFE indicators.

9. UNECE/ FAO ToS on FRA should collaborate with MCPFE and Montreal Process to further develop categories and classifications in areas that allow reporting on global and regional levels; this could e.g. be done in the context of a FAO-led C&I meeting, through existing mechanisms and platforms, such as Kotka, C&I process experts meeting, the Advisory Group on global FRA. A further option is to set up a UNECE/FAO Working Group with a specific assignment and concrete limited time frame.

10. UNECE/ FAO ToS on FRA should collaborate with the Montreal Process to further develop harmonized categories and classifications in areas that allow reporting for the MCPFE and the Montreal Process;

3.4 Terms and definitions and future FRAs

A comparison of different terms and definitions documents issued for TBFRA 2000, FRA 2005 update, MCPFE and Montreal Process indicators shows that these cover quite different terms. No single document is comprehensive. There is a comparatively high degree of harmonization between TBFRA 2000 and MCPFE terms and definitions coverage, a medium degree of harmonization between TBFRA 2000 and FAO FRA 2005 update definitions and a low degree of harmonization between coverage of TBFRA 2000 and the Montreal Process terms.

Recommendations:

11. UNECE/ FAO FRA should assist FAO and other global bodies in their efforts to develop a widely agreed definitions document with key terms defined on a global level. The first list of terms for starting the discussion and to select terms to focus on is in Table 7 and Table 8. This process should furthermore build on the definitions document elaborated by FAO for FRA 2005, which needs wider discussion and agreement.

12. UNECE/ FAO FRA and MCPFE should agree on the process of developing a comprehensive terms and definitions document for the next regional FRA that is consistent with global level definitions.

13. UNECE/ FAO ToS on FRA should, based on a mandate or an agreement (see Recommendation No. 8), contribute to developing a comprehensive Terms & Definitions document for MCPFE reporting (presumably the next regional FRA update, based on FRA 2005 data), and enhance the number of compatible terms and definitions with the Montreal Process countries.

3.5 Reporting formats and timing for future FRAs

Full FRAs should and do put considerable emphasis on the documentation of original data sources and on a transparent transformation of national data to international formats. The work of national correspondents would be made easier if the design of FRA data reporting tables on global and regional levels would be as identical as possible, and remain identical over subsequent FRAs.

In terms of timing for FRAs, the current situation of different time lines for data collection for FRA and FRA updates on the one hand and the reporting needs from policy processes seem to prevail. However, routines could be improved to decouple data collection and reporting and to minimize the burden for national correspondents.

In the medium term IT-based solutions should be further developed that enable even less efforts for correspondents to deliver new data, and to generate data for specific needs by different constituencies, with considerably reduced work loads for the data storing institution.

Recommendations:

14. UNECE/ FAO should strive to develop standardised data collection formats over time and across different forest resources assessment. Given the largely similar formats for FAO global FRAs and TBFRA 2000, the experience with both formats should be shared between FAO and UNECE / FAO, and one common format be developed for future regional FRA-related work.

15. Updates of data, using pre-filled data tables, should be restricted to those aspects and those countries where changes have been made in either in the international data collection format or where new national data is available from a recently concluded inventory.

16. A decision is required as to whether to report figures adjusted to an agreed standard date or whether to report a variety of dates. In view of the fact that national historic data remains available, and statistical tools and technical systems are on a comparatively sophisticated level throughout the UNECE region a common standard date could be considered.

17. Information on changes over time in indicators is a crucially important task for FRAs, and will be increasingly so. A decision needs to be made on whether countries are requested to report national data for different points in time, and whether an analysis should be made on the related changes and trends that emerge, supplemented by explanatory text. While there is no question that this will be a key requirement over the medium term, it should be discussed in how far the next FRA can be used to explore the possibilities and limitations. The experiences of the FRA 2005 update provide a good first indication of the technical and practical issues involved.

18. For reporting requests on-line forms should be tested that would allow to not only show the specific past data per country for the respective correspondent but all previous notes and comments given. It would also allow to pre-form data consistency checks automatically and warn the correspondent if data are inconsistent. In order to develop most appropriate formats it would be useful to compare data computing structures and routines by countries.

19. UNECE/FAO should continue to be strongly engaged in leading and contributing to work undertaken in the context of streamlining reporting and customized data retrieval systems, including the development of ICT-based support tools that allow more automated forms of reporting and/or that link different data sets and improve user friendliness. The work undertaken by FAO in this area is a welcome development.

4 Formats for reporting FRA-related information on SFM to MCPFE

4.1 Readjustment and development work needed

Table 12 below shows which (improved) MCPFE indicators were not covered by the regional FRA update in 2003. These areas partly fall beyond the competency of UNECE/ FAO regional FRA. Other areas fall into the competency of UNECE/FAO regional FRA - in these UNECE is requested to review its existing FRA design. Note that considerable work and / or agreement is necessary for some of the MCPFE indicators, including on further specifications regarding reporting of "landscape level patterns" and possible reporting approaches to "energy from wood resources". In the draft reporting format developed in the course of this study those areas are included where UNECE/FAO RFRA competency was considered to be given.

Table 12: Improved MCPFE indicators not covered by regional FRA update 2003

MCPFE Indicator	UNECE RFRA competency	Type of data needed
Soil condition	no	?
introduced tree species	yes	introduced tree species and of which invasive
Dead wood	yes	dead standing trees (snags) and lying
Landscape level patterns	yes	Landscape-level spatial pattern of forest
Net revenue	no	-
Expenditures for services	?	Total expenditures for long-term sustainable services from forests
Wood consumption	yes	Consumption per head of wood and products derived from wood
Trade in wood	yes	Imports and exports of wood and products derived from wood
Energy from wood resources	partly	Wood used for energy taken directly from the forest and from trees outside the forest
Cultural and spiritual values	?	Number of sites within FOWL designated as having cultural or spiritual values

Note that individual countries and the MCPFE need to identify data providers as well as data collection, analysis and reporting procedures for each of the aspects listed in Table 12, whether it be collected through UNCECE/FAO or not. See also the next chapter on possible data collection arrangements.

The next table (Table 13) shows areas, which were covered by the regional FRA2003 update, but where changes in MCPFE indicator categories require re-visiting of the existing FRA design.

Table 13: MCPFE indicators covered by RFRA 2003, but where changes were made within the indicator (changes in classification, etc.)

Indicator	UNECE RFRA competency	Change
several indicators	Yes	Forest type definition
Carbon stock	Yes, partly	in soils
Forest Damage	Yes	Change to biotic, abiotic, human induced; Human induced: Damages by forest operations, Damages by human induced fire
Round wood	yes	Marketed round wood
NWGs	?	Marketed NWGs; confined to three most important (value) per country
Forests under mgmt plans	Yes	Mgmt plans or equivalent
Tree species composition	Yes	Number of tree species occurring
Regeneration	Yes	even-aged stands and uneven-aged stands
Genetic resources	Yes	Area managed for in situ gene conservation and area managed for seed production in addition to ex-situ
Threatened forest species	Yes, partly	In addition to endangered category: vulnerable, critically endangered, extinct in the wild
Ownership	Yes	In addition to public and private: others
Forest sector workforce	?	Sectors, gender, age group, education, job characteristics
Access for recreation	Yes, partly	Intensity of use: Area of FOWL with recreation as one of main management goals Number of visits and visitors Number of recreation facilities

In addition to these changes in quantitative indicators the MCPFE has developed a new set of qualitative indicators (see chapter 2.2). To date no discussion has been held as to how to cover monitoring, assessment and reporting on qualitative indicators. The build-up of a data base on qualitative indicators could be beneficial in terms of reducing the reporting burden of countries over the medium term as "only" changes need to be reported. However, this still leaves open as to how best standardize data collection, reporting formats, who should host the data pool, etc. In the short term it seems advisable to treat the issue of data collection for qualitative indicators separate from the main regional FRA. Covering this set of indicators would add a considerable workload on the shoulders of national correspondents, with unclear outcome. It seems more appropriate to set up a separate pilot data collection initiative, by MCPFE or UNECE/FAO together with MCPFE.

Recommendations:

1. Clarify competency of UNECE/FAO FRA in areas not yet covered by the RFRA 2003 (Table 13). It is important for the MCPFE and countries to identify data providers and alternative data collection, analysis and reporting procedures for each of the indicators in Table 13 that is not covered through the UNECE/FAO FRA. For each indicator in Table 14 a decision should be made concerning their coverage. More detailed suggestions are made in chapter 4.2

2. Clarify competency of UNECE/FAO FRA and clarify how to address changes made in the improved indicators as listed under "change" in Table 14. Again, it is necessary to identify data providers and alternative data collection, analysis and reporting procedures for each of the indicators in order to be able to cover all MCPFE indicators fully.

3. MCPFE and UNECE/FAO should decide whether or not to cover the set of qualitative indicators of MCPFE within the FRA reporting structure, or by other ways. It is recommended to exclude data collection on MCPFE qualitative indicators from the standard regional FRA for the MCPFE. It is also recommended to assist or collaborate with the MCPFE in setting up a pilot data collection initiative independently of FRA. Note that a large pool of information on national policy situations is available on the international levels, which should be adequately exploited before starting detailed national surveys.

4.2 Data collection: possible distribution of work and tentative timetable

Data collection by the UNECE for a report by the MCPFE on the status of forests / status of sustainable forest management in Europe at a not yet specified date, possibly in 2007 or 2008, can take two strategic approaches:

a) a separate data collection for the MCPFE conducted about one year before the Ministerial Conference (see possible time table in the next chapter)

b) a regional update of data from the data collected in the course of the global FRA 2005 update.

A comparison of data requests by FAO FRA 2005 update and the classifications needed for the MCPFE (see Table A in Annex I) and/or used in the RFRA 2003 update (see Table 16) shows that in several areas the elaboration of identical classifications – or at least harmonization between these classifications could be achieved in the run up to the global FRA 2010. Wherever such a harmonization is achieved, it seems useful to check whether the respective data from the most recent round of data collection (be it FRA 2005 update or

RFRA data collection for the MCPFE) can be taken as the most recent one, in order to be able to focus on data gaps and to reduce the reporting burden for national correspondents.

Some MCPFE indicators not yet covered by UNECE/ FAO regional FRA are to be covered in collaboration with other units within UNECE or with other data collection bodies (see Table 14). Steps are to be undertaken to establish clear lines of competency as to data collection, data storage and data handling for the report. For two indicators no international data providers were proposed by the MCPFE:

- expenditure for services
- cultural and spiritual values

Both areas need further development in order to design data collection protocols and to test them in practice. UNECE/FAO in collaboration with MCPFE or the MCPFE could undertake a pilot study on data collection, assessment and reporting on these two aspects (see chapter 4.1 and Recommendation 3 in this chapter). Further note that in a range of areas, most notably on "energy from wood resources" the existing institutions mentioned in Table 14 are so far not able to provide data as specified or needed by the MCPFE. Nonetheless, national data providers in quite a range of countries would be able to deliver such data.

Table 14: MCPFE indicators where UNECE/FAO is specified as international data provider together with others

MCPFE Indicator	International data provider
Carbon stock	• UNECE/FAO for carbon stock in woody biomass • ICP Forests for carbon stock in soils (Level I) • IPCC
Forest damage	• ICP Forests (Level I) • UNECE/FAO • DG Environment
Increment and fellings	• UNECE/FAO (for fellings) • Eurostat: JQ annual data (for removals)
Roundwood	• UNECE/FAO • Eurostat: JQ annual data
Non-wood goods	• UNECE/FAO • Eurostat: IEEAF
Tree species composition	• UNECE/FAO • ICP Forests (Level I)
Naturalness	• UNECE/FAO • EEA • Berne Convention data • Council of Europe: EMERALD data
Introduced tree species	• UNECE/FAO • ICP Forests
Threatened forest species	• IUCN (Red Lists) • UNECE/FAO • EEA
Expenditures for services	-

Wood consumption	• UNECE/FAO • Eurostat
Trade in wood	• UNECE/FAO • Eurostat
Energy from wood resources	• Eurostat: Energy Statistics • IEA (International Energy Agency) • UNECE/FAO
Cultural and spiritual values	-

Assuming that the next MCPFE report on the status of forests / the status on sustainable forest management in Europe is due to be presented at the 5th Ministerial Conference in Warsaw in late spring 2008, the time table for the MCPFE related data collection could be as follows:

Table 15: Possible timetable for the data collection for the MCPFE report in 2007/2008

Year	Tasks
2004	Elaboration and discussion of overall approach to reporting for MCPFE Preliminary discussion of reporting format, Identification of work to be undertaken during 2005/06 on data specifications, including definitions, classifications
2005	Elaboration of data specification (classifications, definitions) in key areas (see table 12 and 13); Elaboration of draft final data collection protocols and formats Testing of data collection formats in newly covered areas; co-ordination with FAO and consultations with Montreal Process countries Start of data collection after final review by ToS (if Ministerial Conference is in 2007, otherwise this can be done in 2006)
2006	data verification, data analysis, draft report, review of draft report (if Ministerial Conference is in 2007)
2007 or 2008	Final review of draft, layout, typesetting and printing of report; Presentation of report at 5th MCPFE Conference

5 Options for the involvement of UNECE/FAO in reporting on SFM on global level

UNECE/FAO undoubtedly plays a key role in monitoring, assessment and reporting on SFM in the region. When reviewing steps involved in monitoring, assessment and reporting on SFM on a more general level, it becomes quite clear that some areas have become standard routines and are standardised to a level that does not call for major changes or action. In fact, UNECE/FAO regional FRA has been successfully maintaining a high level of quality and involvement in almost all of the following main stages in MAR:

- Preparation of data collection: data collection formats, classifications, terms and definitions
- Data collection and data uploading
- Data analysis
- Reporting
- Review of data collection
- Data storage
- Data retrieval
- Data distribution

The focus of contributions of UNECE/FAO to global level reporting on SFM seems to be in three areas:

1. work towards standardization of data collection over time and the construction of time lines from existing data sets
2. work towards harmonization of data collection across regions and institutions (including FAO, UNFCCC, CBD, EU institutions...)
3. work towards better technical solutions for data retrieval systems for different user groups (such as GFIS, NEFIS, but also technical solutions for more narrowly defined user groups such as governments)

Given the technical and data expertise of UNECE, active involvement in the work in developing technical solutions for data storage and retrieval systems development and testing seems a reasonable goal.

The United Nations Forum on Forests, in its fourth session in May 2004, invited FAO and other CPF members, criteria and indicators processes, and other relevant organizations and instruments to cooperate in preparing a document that provides a global overview of progress toward sustainable forest management for the consideration of UNFF at its fifth session. UNECE is thus asked to assist in preparing such documents and/or submit related reports to the UNFF. Given the unclear future of the UNFF post-2005 no further steps seem to be called for at this point in time. While it is highly likely that UNFF will continue after 2005, the detailed mandate and modalities of operation are not clear to date.

The Collaborative Partnership on Forests (CPF) established a Task Force on Streamlining Forest-related Reporting in June 2002, consisting of members of

FAO, ITTO, UNEP-WCMC and secretariats of CBD, UNCCD, UNFCCC, and UNFF. The CPF task force was created to propose ways to reduce the forest-related reporting burden, for example, through reducing and streamlining reporting requests, synchronizing reporting cycles, harmonizing data collection methods and increasing data comparability and compatibility, and facilitating the accessibility and flows of existing information. It also seeks to guide ongoing international processes by sharing experiences and lessons learned on different reporting frameworks and by seeking possibilities for common approaches for data and information collection, storage and reporting by international organizations. In the longer term, CPF sees that the work could aim to contribute to better information management system(s), whereby data and information will be more easily accessible and widely available, and in which the information could eventually be inserted and updated by countries themselves (CPF 2004).

The CPF task force also seeks practical solutions to manage forest-related information and to make forest-related information and reports easily accessible by seeking ways to improve information storage and retrieval systems, which make data and information more easily accessible and by seeking possibilities for integrated or interlinked information management system(s) among CPF members. It has developed an internet portal that provides easy access to national reports submitted to major international processes dealing with forests and the corresponding reporting formats, with a view to facilitating reporting on forests to international agreements and fora, improving knowledge of work undertaken on forests, and to improving coordination. CPF members presented a proposal to develop a common information framework on national reporting to international bodies at the meeting of the "UNFF Ad Hoc Expert Group on Approaches and Mechanisms for Monitoring, Assessment and Reporting", held in Geneva in December 2003.

UNECE/FAO regional FRA is called upon to collaborate with members of the CPF Task Force to develop solutions and mechanisms that make best use of available information technology for the storage and user-friendly retrieval of data according to specifications by the user. Several such projects are on-going, including the “Global Forest Information Service” (GFIS), NEFIS and others.

6 Distribution of work between UNECE regional FRA and global FRA

The distribution of work between UNECE/FAO regional FRA and global FRA with UNECE has basically been confirmed by the parent bodies of UNECE and FAO. European countries have made it clear that they prefer, for the foreseeable future, FRA related data collection via UNECE.

Current timing between global FRAs of FAO and demands for regional intermediate updates for MCPFE is not optimal. IT based solutions would possibly reduce efforts needed with each update, both for UNECE staff and national correspondents.

Current coverage of regional, more specific and more comprehensive FRAs should have a globally harmonized core set of parameters and specifications. There is a lot of work in developing, testing and implementing monitoring, assessment and reporting related technical systems and routines as well as management systems for the preparation, data collection, data analysis. This document lists especially a range of tasks to standardize reporting routines and to harmonize reporting across institutions and regions. Both areas require considerable resources and quite some time. In both areas close collaboration between UNECE and FAO seems useful, given that global FAO FRA is willing to benefit from coordinated FRA-related developments in the UNECE region.

The need for a process of further refining and agreeing on common classifications, terms and definitions is also evident from this draft document. It is therefore advisable to jointly analyze the set of definitions proposed in this document, identifying those that are solidly established and those that are disputed and prioritize areas of work on harmonization.

A further area for work concerns the harmonization of data collection formats and the development of data collection protocols as well as protocols for the adjustment of national data to a common agreed set of definitions and to a common reference year.

Table 16 below shows FRA 2005 National Reporting Tables and categories and corresponding RFRA 2003 update categories. Coloured areas identify areas with major differences between FRA 2005 and RFRA 2003 update data classifications. The comparison shows that in key areas harmonization has been achieved to a large extent, both on the items and the classifications used. Not surprisingly, all topics covered by FRA 2005 have been covered by the RFRA 2003 update. Note that the FAO Tables that were derived from indicators common to most C&I processes.

Table 16: Comparison of FAO 2005 and RFRA 2003 update for MCPFE (coloured: areas with major differences in data classification)

FRA 2005 update Tables	FRA 2005 Categories	RFRA 2003 update categories
	Forest	Forest area
	Other wooded land	OWL area
	Other land	Other land
	... of which with tree cover	
	Inland water bodies	Inland water bodies
T1 Extent of FOWL	Private	Private
	Public	Public
	other	In addition: number of owners
T2 Ownership of FOWL	Production	-
	Protection of soil and water	Protective forest area and OWL MCPFE Class 3.1
	Conservation of biodiversity	Protected ive forest area and OWL MCPFE Classes 1.1-1.3, 2
	Social services	
	Multiple purposes	
	No or unknown function	
T3 Designated functions	Primary	Undisturbed by man
	Modified natural	-
	Semi-natural (ex. modified nat.)	Semi-natural
	Productive plantation	Plantations
	Protective plantation	Plantations
T4 Characteristics	Growing stock	Growing stock overbark
	Commercial growing stock	
		In addition: forest total stem volume
T5 Growing stock	above ground	Forest total woody biomass
	below ground	
	Dead wood	
T6 Biomass stock	carbon in above ground biomass	carbon stock of woody biomass
	carbon in below ground biomass	
	carbon in dead wood biomass	
	carbon in litter	
	carbon in soil	
T7 Carbon stock	By fire	Fires (primarily damaged by)
	By insects	Insects and diseases (primarily damaged by)
	By diseases	Insects and diseases (primarily damaged by)
	other	Storm, wind, snow or other identifiable abiotic factor (primarily damaged by) Wildlife and grazing (Primarily damaged by) Known local pollution source (Primarily damaged by) Total area with damage by a) known, b) unknown causes
T8 Disturbances	Number of native tree species	Forest-occurring tree species
T9 Diversity	Critically endangered tree species	Endangered forest-occurring tree species

	Endangered tree species	
	Vulnerable tree species	
		In addition: forest-occurring vascular plant species
	1-10 most common species	Mixed forest
T10 Growing stock composition	Industrial wood removal	Quantity of total wood produced
T11 Wood removal	Wood fuel removal	
	Industrial wood removal	Value of total wood produced
T12 Value of wood removal	Wood fuel removal	
	8 plant products/raw material	8 plant products/raw material
T13 NWFP removal	8 animal products/raw material	2 animal products/raw material
	8 plant products/raw material	8 plant products/raw material
T14 Value of NWFP removal	8 animal products/raw material	2 animal products/raw material
	Primary production of goods	Forestry (ISIC/NACE 02.0)
T15 Employment	Provision of services	
	Unspecified forestry activities	
		In addition: wood industries, pulp&paper

There is a range of important areas where FRA 2005 deviates considerably from the 2003 update outline. These are summarized in Table 17 below:

Table 17: In detail: Main differences between categories used in FRA 2005 update and RFRA 2003 update

FRA 2005 update	Change to RFRA 2003
Extent of FOWL	Additional category: Other land with tree cover
Designation	Additional categories: designation for - "production forests", - "social services", - "multiple purpose", - "no designated function"
Forest characteristics	Additional category: "modified natural" Split of plantation into "protective" and "productive"
Biomass stock	Additional categories: - below ground biomass - dead wood
Carbon stock	Additional categories for carbon below ground, dead wood, litter, soil
Disturbance	Different concept: "disturbance" instead of "damage"
Diversity	Additional categories: "critically endangered", "vulnerable"
Growing stock composition	Different concept: frequency of most common species
Wood removal	Additional category: "wood fuel"
Employment	Additional categories: "primary production of goods", "production of services", "unspecified forestry activities"

Further work undertaken on the harmonization of terms, definitions and classifications between the global and relevant regional levels should make use of existing mechanisms and platforms, such as those listed in Table 18.

Table 18: Existing global mechanisms and platforms that could be used for increased collaboration on the harmonization of terms, definitions and classifications.

Global	- Kotka meetings related to FRA (approx. every five years)
	- Network of National Correspondents for FRA
	- Advisory Group on FRA
	- Periodic meetings of experts or countries on C&I for SFM (e.g. ECCI 2004)
	- CPF Task Force on Forest Related Reporting

Recommendations:

1. UNECE/FAO regional FRA should work on harmonizing classifications for some key areas with those of FRA 2005 for some classes, such as biomass and carbon stork (i.e. harmonization to agreed UNFCCC reporting specifications), or include OL with tree cover.

2. UNECE/FAO FRA should collaborate with FAO and others to further develop categories and classifications in areas where a clear need for further development exists for both sides (e.g. employment categories, see also chapter 2.2.4)

3. The aim of UNECE/FAO FRA should be to develop a core harmonized set of parameters on which data is collected and compatible related classifications (and definitions, see next chapter) that fit both regional FRAs and FAO FRA 2010 (e.g. through lead development by UNECE ToS, preparation for next Kotka-type meeting, joint meeting, specific Working Group,..)

7 Options for harmonization and integration of MCPFE and Montreal Process reporting

7.1 Montreal Process Report 2003 indicators and corresponding MCPFE indicators

The best starting point for harmonization of data collection for reporting by the MCPFE and Montreal Process countries is the set of indicators used by countries of the Montreal Process in their joint 2003 report (Table 19). For these indicators the countries of the Montreal Process agreed on detailed specifications to follow for this overview report. Note, however, that the Montreal Process countries put emphasis on individual national reports.

Table 19: Comparison of indicators used for the First Forest Overview Report 2003 by the Montreal Process and related MCPFE indicators

Montreal Process First Forest Overview Report 2003 indicators	MCPFE Indicators
I 1.a: Extent of forest type relative to total forest area	I 1.1: Forest area (Area of forest, classified by forest type; · Area of other wooded land, classified by forest type · Area of other wooded land available for wood supply, classified by forest type)
I 2.a: Area of forestland and net area of forestland available for timber production	I 1.1: Area of forest available for wood supply, classified by forest type, Area of other wooded land available for wood supply, classified by forest type
I 3.a: Area and percent of forested area affected by process beyod historic variation	-
I 4.b: Percent of forest land managed primarily for protective functions	I 5.1 Protective forests – soil, water and other ecosystem functions (Area of forest and other wooded land designated to prevent soil erosion, to preserve water resources, or to maintain other forest ecosystem functions, part of MCPFE Class "Protective Functions") 5.2 Protective forests – infrastructure and managed natural resources (Area of forest and other wooded land designated to protect infrastructure and managed natural resources against natural hazards, part of MCPFE Class "Protective Functions")
I 5.a: Total forest ecosystem biomass and carbon	I 1.4 Carbon stock (Carbon stock of woody biomass and of soils on forest and other wooded land)
I 6.5.a: Direct and indirect employment in the forest sector and forest sector employment as a proportion of total	I 6.5 Forest sector workforce (Number of persons employed and labour input in the forest sector, classified by gender and

employment	age group, education and job characteristics)
I 7.4.b: Scope, frequency and statistical reliability of forest inventories, assessments, monitoring and other relevant information	-

The comparison shows quite some overlaps, but also considerable differences between the indicators of these two processes. This is confirmed by the more detailed comparisons made on the fit of the full list of indicators of the MCPFE to the Montreal Process indicators (Table 2), on the classifications used for key indicators on global and regional levels (Table 3 and Table A in Annex I) as well as on the similarities and differences of definition of terms used by different relevant processes.

7.2 Options for harmonizing and integration of MCPFE and Montreal Process Reporting

Before outlining options for harmonizing and integrating MCPFE and Montreal Process data collection on which these processes can base their subsequent reporting, it is important to keep a few points in mind:

- Not all Montreal Process countries are covered by the UNECE region
- Montreal Process countries include countries with very different status of FRA systems and, although all of the Montreal Process countries possess temperate forests, these are sometimes a minor percentage of total forests
- Montreal Process will review its indicators 2004-2005
- Montreal Process will start work on developing a refined set of indicators most likely 2005/6 and will most probably need until 2007 or later to agree on a new set
- MCPFE reports at MCPFE conferences, the next of which is scheduled for 2007 at the earliest
- Montreal Process reports at large international occasions, which could be the World Forestry Congress, UNFF or other global meetings, as appropriate

These points make it clear that any approach to harmonize data collection and integrate these into the UNECE data collection in the course of its regional FRAs, and the subsequent use of the data for reporting needs to take a view beyond 2008-2010. Nevertheless, it is important to continue and reinforce efforts towards this goal already now, in the review phase of the Montreal Process.

a) the Montreal Process review of indicators and the development of an improved set of indicators

The UNECE Team of Specialists on FRA, especially the members of the Team whose countries are members of the Montreal Process should offer their expertise to the Montreal Process work on reviewing indicators 2004-2005, and, as far as seen appropriate.

b) A stepwise streamlining of data collection protocols and timetables

The Montreal Process countries will start work on developing a refined set of indicators most likely 2005/6 and will most probably need until 2007 or later to agree on a new set. During this phase it might be appropriate to propose a joint workshop between the Montreal Process, MCPFE and the UNECE ToS on FRA with the aim to explore options for the harmonization and integration of data collection for the MCPFE and Montreal Process. This meeting could cover five main topics:

1. Increasing the number of harmonized indicators on which data is collected
2. increasing the number of indicators with harmonized classifications
3. increasing the number of harmonized definitions
4. harmonizing data reporting designs
5. harmonizing time tables for data collection

c) the JFSQ approach for long-term collaboration

One option to overcome differences between the MCPFE and Montreal Process data reporting needs and capabilities, yet to utilize synergies in data collection, is to use the approach taken by the organizations involved in the Joint Forest Sector Questionnaire (JFSQ). The basic principles and methods of cooperation in JFSQ include:

- That there be one national correspondent for forest sector statistics in each country and the national correspondent only complete one form (including the questionnaires of the four organizations).
- That each item of information be requested only once from each country.
- That JFSQ be accompanied by a terms and definitions document where all terms and definitions have been harmonized and are internally consistent.
- That the completed questionnaire be sent to one focal organization, which then provides the information required for the three other groups participating in the activity.
- That each organization focus on the data validation efforts in a limited number of countries, trusting their partners to work with other countries.
- That the information received through the joint questionnaire be distributed to all involved organizations.
- That information from JFSQ be shared between the organizations.

- That each organization continue to use the information it receives according to its own mandate, which remains completely unchanged by practical cooperation in data collection.

Annex I: Tables and comparisons

Table A: Detailed comparison of classifications for indicators relevant on global level

Forest area / land area	
TBFRA 2000	- Forest and OWL: comparative data - Forest and OWL by species groups - Forest and OWL by species groups: comparative data - FAWS by species groups and silvicultural categories - Forest not available for wood supply by species groups, silvicultural categories and reasons for non-availability
MCPFE	Area of forest, classified by forest type; Area of FAWS, classified by forest type Area of OWL, classified by forest type Area of OWL available for wood supply, classified by forest type
FRA 2005	Forest Other wooded land ... of which with tree cover (subcategory of TC) Other land Inland water bodies
Montreal Process	Extent of forests by forest type relative to total forest area Area of forest land and net area of forest land available for timber production
Growing stock	
TBFRA 2000	Growing stock Growing stock on forest by species groups Growing stock on forest available for wood supply: comparative data Changes over time in growing stock on forest and forest available for wood supply Changes over time in growing stock on forest available for wood supply by species group
MCPFE	Growing stock on forest / OWL land, classified by availability for wood supply and by forest type
FRA 2005	Growing stock, classified for forest and OWL Commercial growing stock, classified for forest and OWL
Montreal Process	Total growing stock of both merchantable and non-merchantable tree species on forest land available for timber production The area and growing stock of plantations of native and exotic species
Carbon stock	
TBFRA 2000	Above stump woody biomass
MCPFE	Carbon stock of woody biomass on forest land Carbon stock of woody biomass on other wooded land Carbon stock of soils on forest land Carbon stock of soils on other wooded land
FRA 2005	Carbon in above ground biomass Carbon in below ground biomass Carbon in dead wood Carbon in litter Carbon in soil
Montreal	Total forest ecosystem biomass and carbon pool, and if appropriate,

Process	by forest type, age class, and successional stages; Absorption and release of carbon: - standing biomass, - coarse woody debris, - peat and soil carbon Forest products
Endangerment classes	
TBFRA 2000	Total number and number of forest-occurring, of which endangered: Trees, vascular, ferns, mosses, lichens, mammals, birds, other vertebrates (fish, amphibians, reptiles), butterflies
MCPFE	birds/ mammals/ other vertebrates/ invertebrates/ vascular plants/. cryptogams and fungi in classes: - vulnerable - endangered - critically endangered - extinct in the wild
FRA 2005	number of critically endangered tree species number of endangered tree specs number of vulnerable tree specs
Montreal Process	The status: - threatened, - rare, - vulnerable, - endangered, or - extinct of forest dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment-(a).
Biodiversity/tree species composition	
TBFRA 2000	
MCPFE	number of tree species occurring and by forest type, separately for forest land and OWL
FRA 2005	number of native tree species additional table: Growing stock composition: 1-10 most common species
Montreal Process	The number of forest dependent species Number of forest dependent species that occupy a small portion of their former range Population levels of representative species from diverse habitats monitored across their range
Protection classes: biodiversity	
TBFRA 2000	Protection status: Forest and other wooded land in IUCN protection categories I to V1 and forest not available for wood production for conservation/protection reasons;
MCPFE	Area of forest land and area of other wooded land in classes: protected according to MCPFE Classes 1.1, 1.2, 1.3, 2 (biodiversity protection)
FRA 2005	Designation of forest and OWL to functions: - Conservation of biodiversity - Multiple purpose - No or unknown function
Montreal	Extent of area by forest type in protected area categories as defined by

Process	IUCN or other classification systems
Naturalness or similar concepts	
TBFRA 2000	- undisturbed by man, - semi-natural, - plantations, additional: Origin of planting material used in the forest
MCPFE	- undisturbed by man, - semi-natural, - plantations, by forest type, separately for forests and OWL additional: Area of stands of forest / OWL dominated by introduced tree species and of which invasive Landscape-level spatial pattern of forest cover
FRA 2005	Primary forest/OWL Modified natural foresVOWL Semi-natural forest/OWL Productive plantation Protective plantation
Montreal Process	The area and growing stock of plantations of native and exotic species; additional: Fraqmentation of forest types.
Damage/disturbance	
TBFRA 2000	Area of damage to forest and other wooded land The heaviest annual damage by known causes which occurred in most recent ten-year period Forest fires: number, total area, area of forest/OWL burned Separate figures for defoliation: Forest condition: percentage of all tree species showing defoliation of 25 % or more (classes 2, 3 and 4) Forest condition: percentage of coniferous species showing defoliation of 25 % or more (classes 2, 3 and 4) Forest condition: percentage of broadleaved species showing defoliation of 25 % or more (classes 2, 3 and 4)
MCPFE	Biotic: - Insects and diseases - Wildlife and grazing, Abiotic - Fire - Storm, wind, snow, drought, mudflow, avalanche and other identifiable abiotic factors Human induced - Damages by forest operations, - Damages by human induced fire Separate figures for forest, other wooded land and by forest type Separate figures for defoliation: Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes "moderate", "severe" and 'dead" Separate figures for air pollutant deposition: Deposition of air pollutants on forest and other wooded land, classified by N, S and base cations

FRA 2005	Disturbances, classified - by fire, classified for forest an OWL - by insects, classified for forest an OWL - by diseases, classified for forest an OWL - Other, classified for forest an OWL
Montreal Process	Area and percent of forest affected by processes or agents beyond the range of historic variation, e.g. by insects, disease, competition from exotic species, fire, storm, land clearance, permanent flooding, salinisation, and domestic animals Area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes (e.g. soil nutrient cycling, seed dispersion, pollination) and/or ecological continuity (monitoring of functionally important species such as fungi, arboreal epiphytes, nematodes, beetles, wasps, etc.) Separate indicators for soil and water issues
Round wood	
TBFRA 2000	Annual fellings overbark Annual fellings overbark on forest by species groups Annual removals overbark on forest Annual removals underbark, total Annual removals underbark on forest by species groups
MCPFE	value of marketed roundwood quantity of marketed roundwood
FRA 2005 update	industrial wood removal wood fuel industrial value of wood removal value of wood fuel
Montreal Process	Value and volume of wood and wood products production, including value added through downstream processing; Supply and consumption of wood and wood products, including consumption per capita;
Non-wood goods	
TBFRA 2000	-
MCPFE	value of marketed non-wood goods from forest and other wooded land quantity of marketed non-wood goods from forest and other wooded land
FRA 2005 update	NWG removal (quantity and value): Plant products/raw material: food, fodder, raw material for medicine and aromatic products/ colorants and dyes/ utensils, handicrafts & construction (3 cats); ornamental plants, exudates, other plant products; Animal products/raw material: 9. Living animals 10. Hides, skins and trophies 11. Wild honey and bee-wax 13. Raw material for medicine 14. Raw material for colorants 15. Other edible animal products 16. Other non-edible animal products
Montreal Process	Value and quantities of production of non-wood forest products Supply and consumption/use of non-wood products
Protection classes: protective forests	
TBFRA 2000	Areas where forest and other wooded land is managed primarily for soil protection; Changes over time in areas where forest and other wooded land is managed primarily for soil protection
MCPFE	The total area with main management objective "Protective Functions",

	according to MCPFE Class 3 divided into areas with: 1) management clearly directed to protect soil and its properties, or water quality and quantity or other forest ecosystem functions; and 2) management clearly directed to protect infrastructure and managed natural resources aqainst natural hazards (indicator 5.2) and reported
FRA 2005	Designation of forest and OWL to functions: - Protection of soil and water - Social services - Multiple purpose - No or unknown function
Montreal Process	Area and percent of forest land managed primarily for protective functions, e.g. watersheds, flood protection, avalanche protection, riparian zones Area and percent of forest land managed in relation to the total area of forest land to protect the range of cultural, social and spiritual needs and values
Employment	
TBFRA 2000	-
MCPFE	a) sectors: ISIC/NACE 02.0 (Forestry, logging and related services) ISIC/NACE 20 ff (Manufacture of wood and articles in wood) and ISIC/NACE 21 ff (Manufacture of paper and paper products) b) gender categories: male female c) age-group categories: <20 yr., 20-50 yr., >50 yr. d) educational categories: workers, technicians, managers / forest engineers e) job characteristics: salaried employees, contractors and contractor employees, forest owners
FRA 2005	Primary production of goods Provision of services Unspecified forestry activities
Montreal Process	Direct and indirect employment in the forest sector and forest sector employment as a proportion of total employment;

Table B: TBFRA 2000 terms explicitly defined in several other relevant processes

Selected TBFRA 2000 definitions	MCPFE	FRA 2005 update	Montreal Process
Above stump woody biomass	x	x (above ground biomass)	
Annual fellings	x	x (fellings)	
Annual removal	x	x (wood removal, wood fuel removal)	
Coppice sprouting	x (regeneration by)		
Damage to forest	x		
Defoliation classes	x		
Endangered species	x (endangered)	x (tree)	
Even-aged (hiqh forest)	x		
Forest	x	x	x (forest land)
Forest available for wood supply	x		x
Forest/OWL undisturbed by man	x		
Gross annual increment	x		
Growing stock	x	x (and growing stock composition)	x
Holding	x		
Inland water		x (bodies)	
Indigenous and tribal peoples			x (indigenous communities)
Introduced tree species	x	x (introduced species)	
Invasive species	x (invasive tree secies)		
IUCN protection categories		x	x
Land area		x	
Legal right of access	x		
Natural regeneration	x	x	
Natural regeneration enhanced by planting	x	x (assisted natural regeneration)	
Net annual increment	x		
Other land		x	
Other wooded land	x	x	
Plantation	x	x (productive, protective)	x (forest)

Predominantly damaged by - fire - insects and disease - known local pollution sources - storm, wind, snow or other identifiable abiotic factors - wildlife and grazing	x	x (disturbance concept, different categories, see separate chapter)	
Private ownership	x	x	
Protection	x	x (of soil and water)	x (forest areas with protection function)
Public ownership	x	x	
Reference period	x		
Regeneration	x		
Semi-natural forest/OWL	x	x	
Species occurring on forest / OWL	x (forest species)		
Standing volumee	x		
Stumps androots	x		
Total area	x	x (area of a country)	
Tree	x	x	
Un-even aged (high) forest	x		
Woody biomass	x	x (split into above, below and dead wood)	

Table C: Terms defined in other processes, but lacking definition in TBFRA 2000 document

	MCPFE	FRA 2005 update	Montreal Process
Abiotic	X		
Adaptive management approach			X
Afforestation	X		
Age class	X(and distribution)		X
Below ground biomass		X	
biodiversity	X (biological diversity)	X	X subdivided into ecosystem, species, genetic
Biotic	X		
Carbon stock	X	X (carbon in - above ground BM - below ground BM - dead wood - litter - soil	
Commercial growing stock		X	
Critically endangered	X	X (number of)	
Dead wood	X	X (biomass)	
Defoilationn classes	X		
Designated function		X different classes, see discussion below	
Diameter class	X		
Diameter distribution	X		
Diminished biological components			X
Disturbance			
Ecosystem	X (and forest ecosystem)		X
Ecosystem biomass			X
Education and educational categories - forest worker (skilled, unskilled) - forest technician - forest engineer - manaqer	X		
Employment		X	X (direct employment)
Erosion	X		
Eutrophication	X		
Exotic species			X
Exports	X		

Extinct in the wild	X		
Forest dependent human Communities			X
Forest management plans or equivalents	X		
Forestry	X		
Forest sector - manufacture of wood and articles in wood - manufacture of paper and paper products	X		
Forest services	X	X (provision of services)	
Forest types	X		X
Free on board			X
Genetic resources	X		
Gene conservation - ex situ conservation - in situ conservation	X		
Gross domestic product	X		
Gross capital formation - gross fixed capital formation	X		
Hazard	X		
Imports	X		
Indirect employment			X
Industrial wood removal		X	
Infrastructure	X		
Inland water bodies		X	
Intensive forest manaqement		X	
Job characteristics - contractor	X		
Litter		X	
Merchantable tree species			X
Monitoring			X
Modified natural forest / OWL		X	
Multiple purpose forest / OWL		X	
Native species		X	
Native tree species		X (number of)	
Net revenue	X		
Non-consumptive forest uses			X
Non-wood forest products	X	X	
Non-wood forest products removal		X	X (non-timber)
Occupational accident	X		

Occupational disease	X		
Other land with tree cover		X	
Primary forest/OWL		X	
Primary production of goods		X	
Production forest / OWL		X	
Productive plantation		X	
Range of historic variation			X
Recreation	X		
Recreational forest	X		
Representative species			X
Round wood	X	X	
Silvicultural activities		X	
Silviculture		X	
Seed collection stand	X		
Significant (soil erosion)			X
Soil and forest soil	X	X (mineral soil)	
Soil nutrification and acidity	X		
Species			X (flora and fauna)
Stand - even-aged stand - un even-aged stand	X		
Subsistence			X
Successional stage			X
Sustainable forest management	X		
Timber			X
Unspecified forestry activities		X	
Value of - industrial wood removal - NWFP - Wood removal - Wood fuel removal		X	
Visitor use days			x
Volume	X		
Vulnerable	X	X (number of tree species)	
Wood	X		
Wood consumption	X		
Wood resources	X		
Wood fuel	X	x	
Wood residues	X		

Table D: Definitions defined only in TBFRA 2000 terms and definitions document

Broadleaved, coniferous, coppice and coppice with standard
Domesticated introduced tree species
Endemic species
Forest fire
Forest industries (owned by)
Forest not available for woqd suppy
Forest/OWL with damagqfom unidentifiable causes
High forest
Indigenous tree species
Individuals (owned by)
Local provenance
Managed forest / OWL
Mixed forest / OWL
Natural colonization of non-forest land
Natural conversion of OWL to forest
Natural losses
Non-local provenance
Other private institutions (owned by) l Other public institutions (owned by)
Planting and seeding
Predominantly bamboos, palms, etc. I Predominantly broadleaved I Predominantly coniferous
Removals for commercial use
Rotation age
Shrubs and bushes
Species at risk
State ownership
Stumps and roots
Trees outside forest
Under regeneration