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PROCEEDINGS

Expert Meeting on Harmonizing forest-related definitions for use by various stakeholders

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FOREWORD

For a long time, nations have recognized the important roles of their forests as a vital economic, environmental, social and cultural asset. In passing laws governing their protection and use and in taking stock periodically of this national resource, countries have created forest-related definitions to match their traditions, national circumstances and information needs.

Since UNCED at the latest, also the world community has formally recognized forests as a global asset. Forests play crucial roles in many international conventions and processes, stirring a growing demand for more, better and comprehensive information about their state, the changes they undergo and the functions they perform. At this global scale, forest-related definitions again form the basis for negotiating and implementing international conventions and collecting reliable information. Definitions will continue to be crucial issues in ongoing negotiations and in future international arrangements and processes involving forests.

Given these varying origins, contexts and purposes, it is not surprising that forest-related definitions diverge within and between nations and between international conventions. While there may be very good reasons for this, definitions should not diverge unnecessarily, thereby increasing costs of assessments and the burden of reporting. Moreover, differing definitions of the same term can create misunderstandings, undue delays and lingering ambiguities.

FAO has since long made an effort to meet the growing need for information about the world's forests, most recently in the context of the Global Forest Resources Assessment 2000. In the process of aggregating country-specific information, it had to deal with diverging forest-related definitions and their harmonization. However, the Global Forest Resources Assessment 2000, which applies consistent definitions to forests and forest change processes worldwide, demonstrates that harmonization can be both successful and immensely useful.

Harmonization, not standardization was the approach chosen. Harmonization works bottom-up, incorporating existing definitions into a framework, so that they are easier to recognize, compare, adjust or even convert. Harmonization does not judge chosen definitions; it has no intent to interfere with the political dialogue. It aims to facilitate such processes by pointing out the meaning of the various definitions, clarifying differences and relations and easing informed choices.

With this experience, FAO has joined IPCC, CIFOR and IUFRO in organizing an Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders, covered in the present report. This is a beginning. Participants have realized that they have barely scratched the surface. Sometimes to their surprise, they have also recognized that follow-up is necessary, and that achieving harmonization of forest-related definitions is feasible. FAO and its partner organizations are grateful for the experts' contributions and their continuing commitment.



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ACRONYMS AND ABBREVIATIONS

a	acre
AHTEG	Ad Hoc Technical Expert Group on Forest Biological Diversity
ARD	afforestation, reforestation, deforestation
C	carbon
C&I	Criteria and Indicators
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CIFOR	Centre for International Forestry Research
CO ₂	carbon dioxide
COFO	Committee on Forestry
COP	Conference of the Parties
CPF	Collaborative Partnership on Forests
CSCE	Commission on Security and Cooperation in Europe
DG	Directorate General
ECE	Economic Commission for Europe
FAO	Food and Agriculture Organization of the United Nations
FRA	Forest Resources Assessment
ha	hectare
IFF	Intergovernmental Forum on Forests
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IPF	Intergovernmental Panel on Forests
ITTA	International Timber Trade Agreement
ITTC	International Tropical Timber Council
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
IUFRO	International Union of Forestry Research Organizations
km ²	square kilometre
LCSS	Land Cover Classification System
LULUCF	land use, land-use change and forestry
KP	Kyoto Protocol
m	metre
NTFP	non-timber forest products
SADC	Southern African Development Community
SBSTA	Subsidiary Body for Scientific and Technical Advice
SBSTTA	Subsidiary Body for Scientific, Technical and Technological Advice
SFM	sustainable forest management
TBFRA	Temperate and Boreal Forest Resources Assessment
US	United States

UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
USDA	United States Department of Agriculture
USFS	United States Forest Service
WB	World Bank
WCMC	World Conservation Monitoring Centre
WFC	World Forestry Congress
WWF	World Wildlife Fund

I. INTRODUCTION

The Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders was jointly organized by the Food and Agriculture Organization of the United Nations (FAO) and the Intergovernmental Panel on Climate Change (IPCC), in collaboration with the Centre for International Forestry Research (CIFOR) and the International Union of Forest Research Organizations (IUFRO), at FAO Headquarters, in Rome, from 23 to 25 January 2002.

The objective of the meeting was to start a process to review, improve, where feasible, and interrelate forest-related definitions, in particular *biome-specific forest definitions*, and definitions for the terms *forest degradation* and *devegetation*.

The meeting was not intended to question decisions taken by Parties to the Conventions, neither did it intend to interfere with ongoing processes. The purpose of this meeting and its follow-up process was rather to look at the subject matter from a purely technical point of view and to complement work done by other bodies and processes.

Much global or regional information on forest resources is derived from national data. FAO has, therefore, developed forest-related definitions for national inputs to globally aggregated forest assessments and outlook studies. The Parties to the United Nations Framework Convention on Climate Change (UNFCCC) have developed forest-related definitions for use in climate change issues involving land use, land-use change and forestry. Other organizations have developed such definitions for other purposes, such as assessing forest resources or monitoring biological diversity in forests. There is a need to improve the compatibility and consistency of definitions in order to permit comparability and thus improve the quality and usefulness of forest information; increase the synergy among conventions and international processes; and use more effectively the scarce available resources for assessment, monitoring, reporting and verification.

There is a need for globally and regionally aggregated information on forest resources and forest ecosystems to:

- Define the concept of, and monitor progress toward, sustainable forest management;
- Assess the role of forests in climate change;
- Assess the attributes of forest ecosystems and their changes which affect biological diversity, conservation and other functions;
- Analyse the social, economic and other environmental roles of forests.

The information required differs between users but, with consistent, comparable or even convertible definitions, it could be possible to exchange it.

Harmonized forest-related definitions might further help to reduce the reporting burden on countries, thus reducing costs and, in some cases, also improving the quality of the information. Ambiguities and misunderstandings could be avoided.

It is thus expected that the harmonization of definitions will prove to be of great importance to the forestry and agriculture sectors, as well as to the implementation of the UNFCCC, the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD). The need for harmonization was elaborated by the Resumed Sixth Session of the Conference of Parties to the UNFCCC (Bonn, 16-27 June 2001), the Twentieth Session of the FAO Council (Rome, 19-23 June 2001), the FAO Committee on Forestry at its fifteenth session (Rome, 12-16 March 2001), the

FAO Committee on Agriculture at its sixteenth session (Rome, 26-30 March 2001) and the first session of the United Nations Forum on Forests (New York, 11-12 June 2001).

A Discussion Paper was prepared and shared with the participants before the meeting (its final version is included as Annex I).

The Meeting agenda is shown as Annex II.

The participants (Annex III) included a total of 52 experts, resource persons and observers invited by the Director-General of FAO. They were selected on the basis of their specialized knowledge and familiarity with the ongoing work on forest-related definitions in various international fora, including UNFCCC, CBD, UNCCD and UNFF. Participants served in their personal capacity and not as representatives of their governments or organizations. In addition, resource persons from each of the co-sponsoring and collaborating agencies attended the meeting.

II. OPENING CEREMONY

The meeting was opened by Mr M. Hosny El-Lakany, Assistant Director-General of the FAO Forestry Department; Mr Ian Noble, of IPCC; Ms R. Prüller, of IUFRO; and Mr Ken MacDicken, Assistant Director-General of CIFOR.

Messages were received from the Secretariats of the CBD and the UNFCCC, represented by Mr J. Plesnik, Chairman of the Subsidiary Body on Scientific, Technological and Technical Advice to the CBD; and by Mr Dennis Tirpak, Coordinator Science and Technology, respectively.

III. ORGANIZATION OF THE WORK

The meeting was chaired by Mr Wulf Killmann, Director of the FAO Forest Products Division, and moderated by Mr Markku Simula, Indufor. Part of the meeting was conducted in the form of group sessions. Each of the five groups dealt with different issues: The first group, focusing on the issues related to afforestation, reforestation and deforestation, was chaired by Mr Jean-Paul Lanly, and its rapporteur was Mr Robert Scholes. The second group dealt with forest degradation, revegetation and devegetation; it was chaired by Mr Ian Noble, with Mr Masahiro Amano acting as rapporteur. The third group worked on tropical biome-related forest definitions, with Ms Thelma Krug as Chairperson and Mr Ken MacDicken as rapporteur. The fourth group worked on temperate and subtropical biome-related forest definitions, with Mr Gyde Lund III as Chairman and Mr Jürgen Pretzsch as rapporteur. The fifth group dealt with boreal biome-related forest definitions, with Mr Anatoly Shvidenko as Chairman and Mr Brian Haddon as rapporteur.

Of the four plenary sessions, the first one focused on the concepts and information requirements of the relevant international conventions and fora. The second session was aimed at identifying forest-related terms for which definitions are still needed. The third session explored biome-specific definitions; and the fourth session identified ways and means on how the process of harmonizing forest-related definitions could be continued.

The presentations made in the workshop are reproduced in Annex IV and the reports of group work in Annex V.

IV. CONCLUSIONS

1. Need for Harmonization and Reporting Requirements

Forest-related definitions are used internationally or are being developed under various international conventions and fora. These encompass, *inter alia*, UNFCCC, CBD, UNCCD, UNFF and various other bodies to which countries have reporting obligations, including FAO and International Tropical Timber Organization (ITTO). Different reporting requirements represent a considerable burden for the countries, and particularly developing countries have difficulties to meet them. Differing definitions aggravate this burden.

Various conventions and stakeholders have their own objectives and therefore different information needs. For example, the definitions agreed upon after extensive negotiation for Articles 3.3 and 3.4 of the Kyoto Protocol (KP) are highly context-specific and, to a large extent, related to the role of forests in climate change and, particularly, to carbon accounting, reporting and verification. Thus clear definitions were required for terms such as 'forest', 'afforestation', 'reforestation', 'deforestation' and 'forest management' to specify the land areas and activities affecting carbon accounting.

The CBD has not included the term 'forest' in its Art. 2 (use of terms). The Ad Hoc Technical Expert Group on Forest Biological Diversity (AHTEG) considers the FAO (FAO 2000) definition of 'forest' useful, but notes that many other useful definitions also exist. The fact that 'forest' has been defined in many ways is in itself an indication of the diversity of forests and forest ecosystems in the world and of the diversity of human approaches to manage and conserve them.

According to AHTEG, a forest is a land area of more than 0.5 ha, with a tree canopy cover of more than 10 percent, which is not primarily under agricultural or other land use. In the case of young forests, or regions where tree growth is climatically suppressed, the trees should be capable of reaching a height of 5 m *in situ* and of meeting the canopy cover requirement. The CBD treats forests as a functional ecosystem unit which should be conserved, used sustainably, and the benefits derived from it should be shared equitably. In this sense, CBD's view of forests is function and ecosystem oriented.

The UNCCD views forest and wooded land as a land component within the integrated management of natural resources. Forest definitions should help to understand better causes, factors, state and impact of land cover degradation and the effectiveness of remedial measures, which are taken at various levels, to combat desertification.

The objectives of the UNFF's programme of work related to Monitoring, Assessment and Reporting include

- (a) enhance common understanding of concepts, terms and definitions;
- (b) streamlining of reporting requirements; and
- (c) reducing reporting burden on countries and providing meaningful, reliable and cost-effective information on forests.

The reporting needs under the UNFF focus on progress in the implementation of the IPF/IFF Proposals for Action, progress towards sustainable management of all types of forests, and the review of the effectiveness of the UNFF process.

FAO has a fundamental long-established task to compile and produce global baseline statistics on the forest sector, including forest resources assessments. Global assessments are made in participation with countries, applying harmonized terms and definitions. The Global Forest Resources Assessment 2000 (FRA 2000) was published in 2001 and was the first to have consistent definitions of forest and forest-change processes, applied by all countries. Agreement on terminology illustrates the commitment of participating countries to achieve comparable global information.

Countries will continue to develop and use their own definitions for their forests. These can be made compatible and consistent – also over time – with the international definitions. The experience with FRA 2000, where national classifications and definitions were mapped into globally homogenous classes for all countries, shows that harmonized definitions are feasible.

ITTO recognizes the need for harmonization of definitions in the following three areas:

- (a) for the criteria and indicator processes;
- (b) for country reporting on progress towards sustainable forest management, taking into account the reporting requirements of different organizations; and
- (c) for the ongoing development of guidelines for the restoration of degraded high forests, the management of secondary forests and the rehabilitation of degraded forest lands in tropical regions, especially as regards the definitions of degradation, restoration, rehabilitation and with regard to different forest types such as primary forest, modified forest, disturbed forest, degraded forest and secondary forest.

Coordination between the various international bodies in developing definitions and reporting requirements has been inadequate. This has resulted in inconsistent and sometimes conflicting definitions. The FRA definitions are not fully consistent with other international processes. Varying interpretations of 'reforestation' in the Kyoto Protocol have burdened negotiations about the role of forest carbon sinks. Conflicts also arise because of differing views of forests and forest management between geographic regions, or because various interest groups focus on alternative functions of forests.

The Meeting concluded that there is a need to harmonize definitions which could help reduce the burden of reporting on countries and even improve the quality of information.

2. Desirable Characteristics of Forest-related Definitions

To be useful, internationally applicable forest-related definitions should be:

- clear, concise, objective and unambiguous in the context used;
- information-rich (predictive, useful and effective for the intended use) and not driven by exceptions;
- practical and easily applicable in all countries so that data collection, meaningful reporting and verification are possible and cost-efficient;
- easily adaptable to national systems;
- consistent over time and harmonized over space (and international process);
- seamless with related non-forest definitions to allow their consistent use in various international fora;
- constructed or harmonized in such a way that the current reporting requirements from countries are reduced.

The purpose of harmonizing-forest related definitions would be to reduce the costs of data collection, reporting and verification; avoid ambiguities and misunderstandings; and improve functional coordination between international conventions and other arrangements.

As a general rule, existing definitions should be adopted. Whenever necessary, they should be adapted, improved and related to each other.

3. State and Change Processes

The forest-related definitions dealt with in detail at the Meeting formed part of an overall classification of land (state) and of change processes occurring within and between land classes. There is a fundamental necessity to consider the complete set of generic land classes that include all lands. Such a generic classification would provide a consistent framework for developing and applying more specific definitions under various conventions and for various uses of information, while providing a common baseline for general land classes.

These classes may be based on land cover, land use, their combination, or additional attributes and functions. The relevant terms related to forest state include forest, non-forest, other wooded land and trees outside of forests. Terms related to change over time include afforestation, reforestation, natural expansion of forest, revegetation, deforestation, devegetation, natural regeneration of forests, forest improvement and forest degradation. Further, the terms related to the agent or mode of change (such as natural events, directly or indirectly human-induced activities, as well as forest management) also need to be addressed.

One approach in setting up a framework for forest-related definitions could be to create a system of entities with continuously varying attributes (e.g., crown cover, height, naturalness, etc.), from which any number of objective-oriented classifications can be derived and adapted for application within a specific context. Such a system could also encompass change processes and the various functions affected by them (climate change mitigation, maintenance of biological diversity, provision of wood and non-wood products, soil and water conservation and other services). Each function to be considered could be characterized by using appropriate criteria, indicators, reference points or proxies, if indicators cannot be measured directly. Developing definitions for forest functions is a particular challenge, as functions are not necessarily related to a specified area.

Reference points may be needed for such concepts as “sustainably managed forests” or “healthy forests”. The former may be derived from the Criteria and Indicators for sustainable forest management that have been developed under various international and regional processes.

4. Forest as a Land-Use Class

Although land cover is an important feature in defining land classes and changes between them, the Meeting recognized that forest definitions should distinguish tree-covered land that is primarily used for agriculture or urban environments. In this context, it was noted that the FAO-UNEP Land Cover Classification System (LCCS) is a comprehensive methodology for description, characterization, classification and comparison of most land cover anywhere in the world at any scale and at different levels of detail. It is a useful tool to allow rational use and easy exchange of land cover information between different countries, institutions and end users. Land-cover classes rely on the combination of a set of independent diagnostic attributes allowing the user to define a wide variety of different land-cover features within a standardized but flexible framework.

The Meeting discussed the following classes related to the state of the land: forest, other wooded land and other land, including trees outside forest. The following change processes between these land classes were discussed: deforestation, afforestation, natural expansion of forests, reforestation, natural regeneration, forest degradation, forest improvement, devegetation and revegetation.

There is a need to adapt threshold values for forest definitions to improve their relevance and applicability in different local conditions or forest types. There is also a need to develop guidance for countries on how to select those threshold values to ensure comparability and consistency, if the definitions themselves cannot be harmonized. Threshold values are particularly important for forest area and carbon accounting, and they should consider the resilience of the forest under different situations and for different functions.

5. Comparative Framework

A comparative framework for harmonizing forest-related definitions could be a matrix where the definitions of a number of concepts and terms can be listed, described, compared and related to different uses (international conventions, FRA, etc.) and stakeholders.

The IPCC Special Report on Land Use, Land-Use Change and Forestry provides a useful starting point, and some of its elements were further elaborated upon by the Expert Meeting. It was also suggested that a set of functions should be developed to relate and, if possible, convert definitions.

The Meeting identified a number of core terms for which internationally used definitions are already

largely compatible. They could, however, be improved to make them more consistent and directly comparable. These core terms include, *inter alia*, forest, forest land (as land use), land-use change and degradation.

6. Definitions of Forest, Afforestation, Reforestation and Deforestation

Definition of forest is fundamental to how afforestation, reforestation and deforestation are defined by various parties. FRA 2000 and the Marrakech Accord of the UNFCCC (COP-7) have slightly different interpretations of what is forest even though they share common elements (a threshold value for tree cover, tree height and minimum area of land). However, there are key differences:

- 1) The FAO definition sets a single threshold for canopy cover (10%), height (5 m) and minimum area (0.5 ha), whereas the KP definition provides for a range in these values within which a country may choose an appropriate threshold to suit to its own circumstances. However, Parties are required to justify in their reporting that such values are consistent with the information that has been reported historically to FAO or other international bodies and, if they differ, to explain why and how such values were chosen.
- 2) The FAO definition specifically excludes orchards, agroforestry and urban forests, whereas these are not explicitly excluded in the forest definition of the Marrakech Accord. However, the latter definition assigns any system of practices on land on which agricultural crops are grown to the activity "cropland management". If trees form part of such a system, they are thus excluded from forest.

Afforestation, as applied by FRA 2000, is the conversion of non-forest into forest as the result of direct human action through planting or seeding. Afforestation explicitly excludes natural expansion of forest to non-forest land, whereas deforestation does not distinguish natural loss of forest from that caused by human action. Therefore, the FRA definition of afforestation is not truly symmetric with that of deforestation. Taken together, afforestation and natural expansion of forests represent all changes from non-forest to forest according to the FRA definition.

For Article 3.3 of the Kyoto Protocol, afforestation is defined in the Marrakech Accord as "the conversion of land that has not been forested for at least 50 years to forested land through planting, seeding and/or human-induced promotion of natural seed sources". The term 'forested land' is not defined, and it is unclear whether young forests which are not yet firmly established are included or not. Similarly, the expression "promotion of natural seed sources" would exclude other forms of regeneration, such as vegetative propagation, which may not have been the intent of the negotiators. FRA does not make any qualification regarding the means of afforestation (through seeds or vegetative propagation).

Both definitions of afforestation are compatible in the sense that they require human action and crossing of the forest/non-forest threshold. They differ in that the Kyoto Protocol requires that the land has not been forested within the previous 50 years, whereas the FRA definition does not. The FRA thresholds are fixed, whereas the Kyoto Protocol allows them to be chosen by the Annex I countries from within a range.

The treatment of young forests is compatible in the two cases. However, the KP definition explicitly includes young forests, whereas FRA 2000 considers as afforested only young forest stands that have been successfully established, but may not yet have crossed the applicable thresholds.

The FRA definition of **reforestation** implies active establishment (through seeding or planting) of forest on land previously forested but temporarily below the forest threshold due to harvesting or disturbances. Natural regeneration on forest lands is defined and accounted separately. Lands undergoing reforestation or natural regeneration (according to FRA) continue to be forest throughout. Neither of these transition processes involves a change in land-use class.

The KP definition (Article 3.3) defines reforestation as conversion of land that was forested but had been converted to non-forested land. For the first commitment period, reforestation is restricted to land that did not contain forest on 31 December 1989. The definition uses three undefined terms: non-forested land, forested land and land that did not contain forests. Reforestation, as defined by the Kyoto Protocol, is accounted as afforestation under FRA 2000 since the land was not previously forested. The current definitions of reforestation by FRA and the KP are therefore incompatible from a land-use point of view.

The terms afforestation and reforestation have not yet been defined under Article 12 of the KP referring to the Clean Development Mechanism (CDM). If different thresholds are used from those under Article 3.3, this could have major implications for land area reported as afforested or deforested. The requirement of meeting sustainable development objectives is also likely to introduce additional conditions. The KP may exclude credits for afforestation and reforestation activities that do not meet sustainable development objectives, as defined by the Party.

The Kyoto Protocol defines **deforestation** as "direct human-induced conversion of forested land to non-forested land". Parties must report how they differentiate deforestation from harvesting or natural disturbance that is followed by re-establishment of a forest. In FRA, deforestation is "the conversion of forest to another land-use class or the long-term reduction of the tree cover below the minimum 10 percent threshold". Both definitions refer to non-temporary (long-term or permanent) change from forest to non-forest. The definitions differ in the sense that deforestation under FRA can also be a change in land use/forest use to other use, and it includes both human-induced and natural causes.

Both definitions leave the time period for a "temporary" unstocked state undefined. Another source of inconsistency is that the KP definition of deforestation excludes natural permanent forest loss. This could be significant due to landslides, flooding, volcanic eruptions or other natural disasters, and even climate change.

It is important to note that, in a given country, minimum areas defined for forest (and non-forest), afforestation and deforestation should be consistent and preferably equal. If a forest patch falls below the minimum area chosen, it needs to be reported as deforested. The minimum area requirement is also important as it influences possibilities and costs of monitoring by remote sensing.

7. Definitions of Forest Degradation

Forest degradation is a change process which FAO defines as "changes within the forest which negatively affect the structure or function of the stand and site, and thereby lower the capacity to supply products and/or services". The CBD defines a degraded forest as a state which delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. Such a forest may have lost its structure, species composition or productivity normally associated with the natural forest type expected at that site. ITTO (in preparation) applies the state concept to degradation referring to all those forests or forest lands that have been altered beyond the normal effects of natural processes through human activities or natural disasters, such as fire, landslides, etc.

All these existing definitions of degradation are largely compatible, and a generic common definition could be developed without greatly disrupting the existing use of the term. However, the available definitions may be inadequate because they do not take into account the relative levels of resilience in different forest types. Neither are structural changes related to biological diversity considered. Natural forest and plantations might require differentiated criteria. Indicators would be needed for resilience of forest types and such changed structures of forest which indicate degradation. It was noted that degradation is not always human-induced, as it can also take place for natural reasons (e.g., nutrient leaching).

Forest improvement describes the reverse process of forest degradation. Other terms for this purpose may, however, be preferred, such as aggradation.

The various definitions of degradation (and improvement) leave several open issues related to the reference point (initial state, definition of the appropriate set of goods and services, time frame of the change, etc.). Further considerations include whether the process is human-induced or natural, and whether it should cover both discrete events and slow, chronic degradation.

A core definition of forest degradation should preferably provide

- the reference point;
- an agreed set of variables; and
- indicators (and their proxies if necessary) to measure the change of a forest (ecosystem).

A negative change in any indicator (beyond a certain threshold value) would represent an element of degradation. Both process and state definitions may be applied. A generic, composite index for degradation, based on a weighted combination of indicators and/or their changes over time, could be a template for international application.

Weighting would be justified, as various negative changes would not have an equal impact on forest functions. Additional elements could be added or singled out, depending on the particular interests related to the forest (e.g., carbon density even though it may already form part of the composite index). The use of proxies (e.g., crown cover percentage) will continue, but more work is needed in validating their appropriateness and translating them into relevant information on the specific aspects of degradation.

There is a need to review all existing definitions and seek for stakeholder views on the generic definition of forest degradation and its application. Any composite measures or additional sustainability or context-specific measures should be checked in practice to ensure that they can be assessed at reasonable cost and used for national reporting. In addition, such measures should not lead to pervert situations where e.g. unsustainably managed forests exhibit increased carbon density.

8. Biome-specific Definitions

Due to the difficulties of applying global definitions to the highly variable biophysical and socio-economic conditions prevailing in the world's forests, COP-7 of the UNFCCC has asked its Subsidiary Body for Scientific and Technical Advice (SBSTA) to explore the possible application of biome-specific definitions that could capture important aspects which are not identified when using globally applicable definitions. Were a biome-based approach adopted, the participants of the Meeting felt that 'biomes' should be defined 'bottom-up' (i.e., as a specified set of vegetation types) rather than on a climatic basis.

The Meeting also concluded that biomes are probably less useful as a basis for different definitional thresholds than forest or vegetation types. The concept of biocentric biome is not necessarily compatible with the actual land use and the way forests are managed and utilized. As many countries include several biomes, using biome-specific definitions would increase, rather than decrease, the reporting burden. Socio-economic parameters and land-use systems cross-cut the limits of biomes, which is another complicating factor. A tiered approach, based on a common definition of forest at the top level (e.g., an ecosystem-based definition) and biome or forest type-specific definitions at the next level, could address the problem. Another option is classification of forest categories according to the degree of anthropogenic influence (protected natural forest, managed natural forest, plantation, agroforestry, etc.).

COP-7 left open the possibility of applying biome-specific forest definitions for the second and subsequent commitment periods. However, a choice may have to be made earlier, when applicable definitions are agreed upon in the context of the CDM (Art. 12).

9. Other Initiatives

The Meeting took note of the following related activities:

- SBSTA of the UNFCCC is to consider applying biome-specific forest definitions;
- SBSTA of the UNFCCC must also develop forest-related definitions for the CDM (Article 12 of the KP);
- PCC has been requested to develop definitions for degradation and devegetation;
- ITTO is working on defining degraded and secondary forests;
- The World Conservation Union (IUCN), the World Wildlife Fund (WWF) and CIFOR are developing a typology of plantations;
- IUFRO is working on terminology;
- UNEP and IUFRO are working on how low-forest cover should be defined.

V RECOMMENDATIONS

1. Definitions

1.1 The current definitions related to the Kyoto Protocol and the FRA are largely compatible with each other in spite of some inconsistencies. In order to improve the comparability between the two sets of definitions, the Meeting recommended the following:

- Parties to the Protocol may wish to consider, in the second or subsequent commitment period, dropping the requirement for a 50-year non-unforest condition for afforestation. This would eliminate the need for a separate definition of reforestation and bring the KP afforestation figures into closer agreement with the FRA results;
- FAO should take action to ensure that all the relevant bodies are aware of the final version of forest-related definitions of FRA 2000;
- FAO may wish to consider expanding the FRA definition of afforestation (i) to include assisted regeneration not involving direct seeding or planting, and (ii) to differentiate direct human-induced deforestation and permanent forest loss due to other causes. This would make the FRA data compatible with the needs of the Kyoto Protocol.

1.2 In deciding about adopting the AHTEG definition of forests, the CBD may wish to verify that it is using the FRA 2000 definitions of afforestation and reforestation correctly.

2 Follow-up Action

The Expert Meeting made the following recommendations for follow-up action:

- i) The process of harmonizing forest-related definitions should be continued and urgently completed under the umbrella of the Collaborative Partnership on Forests (CPF), with FAO acting as the Secretariat, in cooperation with IPCC, IUFRO, CIFOR and the Secretariats of the CBD and UNFCCC.
- ii) Other stakeholders should be invited to participate in the process, including those who have not yet been part of the process (e.g., International Labor Organization).
- iii) The results of the Meeting (the Meeting Report and the Discussion Paper) should be conveyed by FAO to the interested parties, including the international and regional C&I processes. In particular the following meetings should be informed: COP-6 of CBD, IPCC meetings on Good Practice Guidance and the Kotka IV meeting on FRA.
- iv) A Task Force of knowledgeable experts should be formed without delay to plan and implement identified follow-up work.
- v) FAO, in cooperation with the Task Force, should prepare a comprehensive analytical framework, including compilation and analysis of similarities and differences between different definitions and their relationships, in order to facilitate the follow-up process.

- vi) The draft report on the framework should be submitted to the participants of the Meeting and other experts for review and comment. Based on the comments received, the final version would be prepared.
- vii) A second Expert Meeting should be arranged, preferably in June 2002. The Meeting should review the report on the framework and decide on further action that may be required to harmonize forest-related definitions

ANNEX I

DISCUSSION PAPER



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EXPERT MEETING ON HARMONIZING FOREST-RELATED DEFINITIONS FOR USE BY VARIOUS STAKEHOLDERS

Rome, 23-25 January 2002

FOREST-RELATED DEFINITIONS – ISSUES AND DEVELOPMENT NEEDS

Discussion Paper

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**Helsinki, Finland
January 31, 2002**

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1. INTRODUCTION

Definitions are artificial constructs, which help us understand events and phenomena around us, and see how they change over time. Forest-related definitions enable us to classify and structure information regarding forest land use and vegetation so that discussion becomes focused and communication can be based on shared notions.

The range of forest-related definitions is wide, reflecting the variety of conditions where forests grow and are managed. There are dozens of definitions even for the most basic terms, such as “forest”, “tree”, etc. Definitions developed locally usually capture well the specific characteristics of the ecological environment, in which they apply. Administrative and legal frameworks at national and local levels also set their mark on the definitions used in national contexts.

However, while the abundance of definitions is usually not an issue at national level, it often leads to confusion in the international context. Different interpretations of the same definition effectively hinder communication and make it difficult to reach common understanding among the multitude of partners involved at a global level. Negotiations carried out in international fora have often been hindered because of misunderstandings due to lack of adequate definitions. Occasionally, it has become necessary to re-open negotiations on issues that have already been agreed upon because the agreement was based on different interpretations of the same definition.

There is also a need to provide comparable data that can be used both at national and global levels. Governments often need information from global assessments to complement national data or for benchmarking and other comparisons. Governments wish to evaluate the efficiency and impacts of their policies, and international comparisons provide a convenient yardstick. Protection of forest resources has become a global concern, and the international community is providing substantial resources to thwart negative trends and encourage sustainable forest management. Comparable data are necessary to establish the need for action, to allocate resources to priority areas and issues, and to assess the effectiveness of various forest-related activities.

Another impetus for further development of definitions comes from the evolution of forest-related concepts. Traditional definitions tend to be related to timber production, which was considered the primary function of forestry. While timber production remains one of the key elements of forestry, other outputs, forest-based services as well as ecological and social aspects have substantially gained in importance. The definitions need to be adjusted and expanded to duly reflect changes in valuing forests. This also implies that definitions cannot be static, but they need to follow the development of international processes.

Definitions have several specific applications both at international and national levels. The scope and extent of obligations derived from international agreements depends crucially on definitions. This was well illustrated by the debate regarding definitions underpinning the accounting procedures for carbon sequestration (see section 5.5). Definitions also constitute a basis for monitoring and reporting on developments in the forest sector. For international statistics, agreed definitions constitute the foundation of data collection and processing. The implications of monitoring instruments such as Criteria and Indicators (C&I) for Sustainable Forest Management (SFM) are crucially dependent on the definitions they apply. There is also an increased use of

economic and other policy instruments to guide developments in the forest sector. Payment of incentives, for example, is usually conditional on performance, and definitions determine the scope of activities to be evaluated and the threshold levels to be reached.

The significance of definitions is illustrated by the fact that all key international agreements include definitions to support the agreement text. For instance, the Convention on Biological Diversity (CBD), adopted in 1992, provides an extensive list of biodiversity-related definitions to enable an unambiguous interpretation of the agreement (Annex 1). Complementary definitions have been suggested by the Ad Hoc Technical Expert Group on Biological Diversity under the same Convention (Annex 2). Similarly, the United Nations Convention on Combating Desertification (CCD) adopted in 1994 defines the key concepts used in the agreement (Annex 3). The International Timber Trade Agreement (ITTA) adopted in 1983 and renegotiated in 1994, lists definitions regarding timber trade (Annex 4). Definitions for sustainable forest management have been put forward as guiding principles for action under various regional initiatives, inter alia, by the Ministerial Conference on Protection of European Forests (1994), the CSCE Seminar and the “Montreal Process” (1993) and the International Tropical Timber Council (ITTC) (1991) (Annex 5). The UN Framework Convention on Climate Change (FCCC) has elaborated forest-related definitions for monitoring and reporting on carbon sinks and to support the implementation of the Kyoto Protocol (Annex 6).

Forestry definitions have been identified at various sessions of Conference of Parties (COP) of the FCCC as a key requirement for the design of projects related to the flexible mechanisms of the Kyoto Protocol. One of the main processes to develop and refine forest-related definitions is the FAO Forest Resources Assessment which has been under implementation since the first assessment carried out more than 50 years ago in 1947 (Annex 7).

The need for further work in this field, particularly with regard to possible harmonization of forest-related definitions, has been recently elaborated upon by several forums and bodies:

- Resumed Sixth Session of the Conference of Parties to the FCCC (Bonn, 16-27 June 2001)
- The first session of the United Nations Forum on Forests (UNFF) (New York, June 11-22, 2001)
- The Twentieth Session of the FAO Council (Rome, 19-23 June 2001)
- The FAO Committee on Agriculture at its Sixteenth Session (Rome, 26–30 March 2001)
- The FAO Committee on Forests at its Fifteenth Session (Rome, 12–16 March 2001)

2. OBJECTIVE

The objective of this report is to highlight the main issues regarding the development of forest-related definitions in order to facilitate discussions at an Expert Meeting on Forest-related Definitions on January 23-25, 2002 in Rome, to be hosted by FAO, the Intergovernmental Panel on Climate Change (IPCC), the Centre for International Forestry Research (CIFOR) and the International Union of Forestry Research Organizations (IUFRO).

It is expected that proposals resulting from the meeting and any follow-up process will be submitted to the IPCC, the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the FCCC, the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA)

of the CBD and the Committee on Science and Technology of the UN Convention on Combating Desertification (CCD), as well as to the Member Countries of the UNFF for their consideration.

3. PRIOR ACTIVITIES

This report expands on the discussion initiated in 1987 in Kotka, Finland under the “Ad Hoc FAO/ECE/Finnida Meeting of Experts on Forest Resource Assessment” (Proceedings ... 1987). The meeting was one of the first major attempts to harmonize approaches to forest resource assessment at the global level. Definitions, which underpin any resource assessment, featured prominently on the meeting agenda. Two follow-up meetings were held in the same location: “FAO/ECE Meeting of Experts on Global Forest Resources Assessment” in 1993 (Proceedings ... 1993) and “Expert Consultation on Global Forest Resources Assessment 2000” in 1996 (Proceedings ... 1996). This “Kotka process” has played a key role by providing a global framework for the development of definitions. Further discussions on definitions relevant to forest resource assessment have been conducted under the Inter-governmental Panel on Forests (IPF 1997).

This report also draws on the work of the IPCC, especially the discussion on forest-related definitions published in the Panel’s report “Land Use, Land-use Change, and Forestry” (IPCC 2000). The relevant documentation produced by the SBSTA under the FCCC has also been reviewed when preparing this report (FCCC 2000a, 2000b, 2001). The definitions developed by the Ad Hoc Technical Expert Group on Forest Biological Diversity under the CBD were taken note of and incorporated in the report as relevant (UNEP/CBD/SBSTTA 2001). The work carried out by the Committee on Science and Technology under the Conference of the Parties of the CCD to develop benchmarks and indicators for desertification, was also reviewed (CCD 1998). The definitions provided in the World Bank Forest Policy (World Bank 1991) have been noted, but they have not been used as a reference since they are likely to be updated in the near future as part of the on-going Forest Policy Review process.

4. FOREST CHANGE PROCESSES

Managing changes in forests is a key area of interest for forest-related policies and strategies, and definitions typically serve to assess the extent and pace of such changes. The basic forest change processes include (i) change from an area classified as “forest” to “non-forest” or vice versa, and (ii) internal changes within the area classified as “forest”.

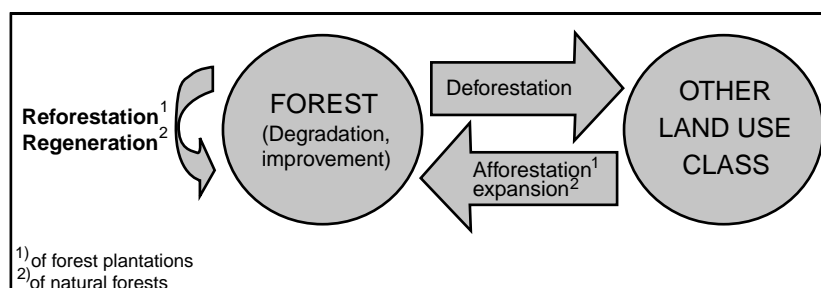
FAO (2000a) classifies land into three main categories based on forest cover and land use:

- Forest
- Other wooded land
- Other land (where trees outside of forests occur)

Based on this classification, FAO has defined forest changes by seven terms which are mutually exclusive and, as a whole, cover all possible changes. The seven identified change processes can be grouped into land use changes (deforestation, afforestation, expansion of natural forests) and internal changes (reforestation, regeneration of natural forests, degradation, improvement) within forest and other wooded land (Figure 1). These definitions are consistent and based on

a sound internal logic. They are also highly relevant to forest management at field level, as they conform to the established practices.

Figure 1 Forest Change Processes



Source: FAO 2000b

However, the use of definitions based on land use implies that it is necessary to distinguish between agriculture and forestry. This is often difficult, since there are many forms of land use where forestry and agriculture are combined. Of these, FAO classifies shifting cultivation, agroforestry and grazing in non-forest categories. However, the current definitions are still rather general, and boundaries are often difficult to determine. Land uses such as grazing in forested areas, cultivation of crops under trees, etc. are clearly in a “grey” zone.

Further, while the above terminology is logical and comprehensive in its own right, it is not necessarily suitable in situations where definitions are used of specific purposes. This problem has emerged in particular in conjunction with carbon accounting, where the information needs are different from those of forest management. Another difficulty relates to the operationalization of terms such as forest degradation and improvement. These issues will be discussed in the following chapters.

5. AFFORESTATION, DEFORESTATION AND REFORESTATION

5.1 Overview of Approaches

The definition of “forest” is the benchmark for any assessment regarding forest change. As suggested earlier, the definitions vary greatly from country to country. Lund (2001) identified 250 national 90 definitions for forest, differing in terms of minimum threshold values assigned to parameters such as the minimum area, tree height or canopy cover. Annex 8 contains a table which Lund (2001) has compiled on the criteria for defining forest land in various countries and Table 1 contains the criteria applied by various international bodies.

Global definitions have been formulated under the FCCC and by FAO (Box 1). The FCCC adopted in its COP-6 in Marrakech in October 2001 its forest-related definitions to provide a basis for implementing Articles 3.3 and 3.4 of the Kyoto Protocol (FCCC 2001)¹. The set of definitions put forward by FAO have been developed in conjunction with the FRA process (FAO 2000b) and under other international processes such as the IPF (1997).

¹ Draft decision/CMP.1 Annex A. Definitions. In the text we call these the “FCCC definitions”.

Table 1 Threshold Values Used for Defining Forest Land by International Bodies

Countries Strip width (m)	Definition type Notes	Area (ha)	Crown cover (%)	Tree height (m)
Dry-zone African countries (FAO)	Cover	10		
European Community European Community -	Cover 0.5	10-20		
DGXIII	Cover	10		
North Africa	Cover	10	5	
SADC	Cover	70		Excludes planted forests
FCCC	Use 0.5-1	10-20	2-5	
UNESCO	Cover	40	5	
United Nations – FAO Land Use	Use			Excludes woodland or forest used only for recreation purposes. Stands of permanent crops such as rubber-fruit trees- nut trees- are classed as permanent crops under agricultural land
United Nations - LCCS	Cover		3	
United Nations -	Use 0.5	10	5 20	
FRA 2000				
World Bank	Cover	10		
WCMC	Cover	30		

Source: Lund 1999, FCCC 2001, World Bank 1993.

A workable definition of forest or forestland could have quantifiable thresholds for minimum area, minimum percent crown cover, minimum tree height and minimum strip width.

The results of comparative analysis mean that national data from nearly every country had to be adjusted for input to FRA 2000. The FRA country data have been presented as being harmonized when actually they may not have been. The ability of a country to adjust to the international standards depends on the information that is in the national database and the relation of national thresholds to the international thresholds. Countries whose thresholds are more restrictive (higher) than the international standards, probably do not have the data on hand as those lands beyond the national thresholds probably were not inventoried. Countries that have more liberal thresholds can adjust to the international standards only if the threshold data (stand area, crown cover, tree height, strip width) were recorded and available in the national database. Tree height has the greatest likelihood of having been recovered. Consequently, international reports, which compare national forest areas and deforestation rates, have to be considered as best approximations and not accurate. Due to the difference in national definitions for forest land, there will always be difficulties to adjust national data to a global standard (Lund, pers. comm.). This is illustrated by Table 2.

Box 1 Global Definitions of Forest

Framework Convention for Climate Change (FCCC 2001)

“Forest” is a minimum area of land of 0.05 hectares with tree crown cover (or equivalent stocking level” of more than 10-30 percent with trees with the potential to reach a minimum height of 2-5 meters *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 percent or tree height of 2-5 meters are included under forest, as are areas normally forming part of the forest areas which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forests.

FAO Forest Resource Assessment (FAO 2000b)

Forests are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 percent, which are not primarily under agricultural or urban land use.

Explanatory note:

Forests are 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 which have yet to reach a crown density of 10 percent or tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, that are expected to regenerate. The term specifically includes: forest nurseries and seed orchards that constitute an integral part of the forest; 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; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry purposes, including rubberwood plantations and cork oak stands. The term specifically excludes trees planted primarily for agricultural production, for example in fruit plantations and agroforestry systems.

Table 2 Summary of National Definitions of Forest and Forest Land

Of the total of 130 countries analyzed, the definitions were based as follows:

- 51 national definitions are based on land use
- 16 use the 10 % canopy cover
- 7 use the 0.5 ha minimum area
- 11 use the 5 m tree height
- 5 use the 20 m strip width

The 130 countries met the criteria applied by FRA 2000 as follows:

- 64 nations met one
- 16 nations met two
- 3 nations met three
- 1 nation met four
- No nation met all

Source: Lund, pers. comm., based on Lund, 2001

The FCCC definition of forest is closely related to definitions of afforestation, reforestation and deforestation (so-called ARD activities). The discussion on deforestation was sparked by the need to develop modalities for carbon monitoring related to emissions from land-use change. The Kyoto Protocol identifies them as eligible activities under Article 3.3., and they constitute a basis for carbon monitoring. The FAO definitions were initially intended for use in forest inventories and practical forest management, but they have recently been revised to better observe the requirements of carbon monitoring and other broader roles of forests. The

wordings in the FCCC and FAO definitions differ slightly (Box 2), and there is also a difference in logic.

Box 2 Definitions of Deforestation, Afforestation and Reforestation

Framework Convention for Climate Change (FCCC 2001)

Deforestation. The direct human-induced conversion of forested land to non-forested land

Afforestation. The direct human-induced conversion of land that has not been forested for a period of at least 50 years to forest land through planting, seeding and/or the human-induced promotion of natural seed sources

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

Food and Agriculture Organization of the United Nations (FAO 2000a)

Deforestation is the conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10 percent threshold (see definition of forest and the following explanatory note).

Explanatory note: Deforestation implies the long-term or permanent loss of forest cover and implies transformation into another land use. Such a loss can only be caused and maintained by a continued human-induced or natural perturbation. Deforestation includes areas of forest converted to agriculture, pasture, water reservoirs and urban areas. The term specifically excludes areas where the trees have been removed as a result of harvesting or logging, and where the forest is expected to regenerate naturally or with the aid of silvicultural measures. Unless logging is followed by the clearing of the remaining logged-over forest for the introduction of alternative land uses, or the maintenance of the clearings through continued disturbance, forests commonly regenerate, although often to a different, secondary condition. In areas of shifting agriculture, forest, forest fallow and agricultural lands appear in a dynamic pattern where deforestation and the return of forest occur frequently in small patches. To simplify reporting of such areas, the net change over a larger area is typically used. Deforestation also includes areas where, for example, the impact of disturbance, overutilization or changing environmental conditions affects the forest to an extent that it cannot sustain a tree cover above the 10 percent threshold.

Afforestation is the establishment of forest plantations on land that, until then, was not classified as forest. Implies a transformation from non-forest to forest.

In addition, *Natural expansion of forest* is expansion of forests through natural succession on land that, until then, was under another land use (e.g. forest succession on land previously used for agriculture). Implies a transformation from non-forest to forest.

Taken together, afforestation and natural expansion of forest account for all transformation from non-forest to forest.

Reforestation is the establishment of forest plantations on temporarily unstocked lands that are considered as forest.

In addition, *Natural regeneration on forest lands* is the natural succession of forest on temporarily unstocked lands that are considered as forest.

There are a number of alternative approaches to definitions of forest and ARD activities. One approach involves the concept of land-use change. Deforestation can be defined as the conversion of forest land to non-forest land. 'Reforestation' and 'afforestation' can be defined as the conversion of non-forested lands to forests with the only difference between the two definitions being the length of time during which the land was without forest. Another interpretation of reforestation is that land use does not change, because the reforested area was only temporarily unstocked.

Alternatively, the definitions could be based on the threshold level of canopy cover or carbon density. Afforestation and reforestation could be defined in terms of an increase in canopy cover or carbon density. This approach would not involve the concept of land-use change.

The FCCC and FAO definitions appear to be a combination of the two, both changes in land use and in forest cover are observed. Regarding forest cover, both the FAO and FCCC definitions set minimum thresholds for minimum area, tree height and canopy cover. However, the FCCC thresholds are adjustable to the standard practice in the signatory countries, while the FAO thresholds apply universally. In addition, the FCCC definitions require that changes are “human induced”, which is a special condition derived from the Kyoto Protocol, and applicable to all the FCCC definitions.

The FAO and FCCC definitions share also a highly similar approach to land uses. According to both definitions, temporary lack of forest cover does not automatically disqualify an area as forest. Instead, young stands not yet meeting the minimum thresholds as well as areas temporarily falling below these thresholds are still considered forests. The temporary fall may result from harvesting or natural causes such as fire, insect damage, etc. In addition, the FAO definition of forest specifically mentions that other predominant land uses should not be present in an area considered as forest.

Inclusion of the land use aspect in definitions has been deemed necessary to reflect the logic of practical forest management. In particular, lack of forest cover should not be interpreted as ‘deforestation’, if it is due to harvesting, which is part of routine forest management and will be followed by regeneration. Similarly, ‘deforestation’ does not occur, if removal of the forest cover has been caused by natural damage, and it is likely to be restored in the short term. In both cases, the area is considered to remain forest, and forestry continues to be the land use throughout the regeneration period.

Reference to land use in the FCCC definition was motivated by the logic of carbon accounting. From this standpoint deforestation and reforestation are symmetrical changes in opposite directions. Were regeneration after temporary lack of forest cover considered reforestation and credited under the Kyoto Protocol, then the opposite, temporary removal of forest cover due to harvesting, natural damage or other reasons, would have to be debited and considered deforestation. However, the signatory countries did not consider this definition for deforestation acceptable. To eliminate the asymmetry in accounting that this would give rise to, the FCCC definition of reforestation was adjusted accordingly. This is the reason for the difference between the FAO and FCCC definitions of afforestation and reforestation (see below).

5.2 Deforestation

In the FCCC definition, ‘deforestation’ occurs when “forested land is converted to non-forested land” (see Box 1). Change may occur in land cover or land use. Conversion means that stand parameters go below one or several of the thresholds set for forest, and this situation is expected to prevail for the long term. If not, the area would remain forest.

In the FAO definition deforestation results from a change in land use or a prolonged (i.e., more than “temporary”) lack of forest cover. This is essentially the same as the FCCC definition,

except that the latter does not explicitly refer to prolonged lack of forest cover as a condition triggering deforestation. However, this is implied through the FCCC definition of forest, which states that a prolonged lack of forest cover means that an area has become non-forest, i.e., deforestation has occurred.

Annex 9 provides a summary on how countries have defined deforestation.

5.3 Reforestation

The FAO definition of reforestation refers to active re-establishment of the forest cover in a situation, where the canopy cover has temporarily fallen below the 10 percent threshold either due to human activities or for natural causes. The concept “temporary” is central in the definition, and is defaulted at ten years. The result of reforestation is, by FAO definitions, a forest plantation.

On the other hand, reforestation in the FCCC terminology is a conversion of originally forested, but then non-forested land back to forested land. Change in land use is essential in the FCCC definition, and it makes it fundamentally different from the FAO definition. For FCCC, regeneration after a temporary lack of forest cover does not qualify as reforestation, since it does not involve a change of land use. In other words, the land must have been ‘deforested’, i.e., lacking forest cover longer than temporarily, before it can be ‘reforested’. In addition, it has been decided for technical reasons that for the first commitment period of the Kyoto Protocol (2008-2012), ‘reforestation’ can take place only on lands that were without forest cover on 31 December 1989.

Reforestation always can take place either through human-induced measures (planting, direct seeding, etc.). FAO defines a complementary or naturally. In the latter case the term “natural regeneration” for re-establishment of forests without, or with only indirect, human measures applies which can be aided or unaided.

Annex 10 summarizes how various countries have defined reforestation in their own conditions.

5.4 Afforestation

The FAO definition of afforestation is a subset of the logical reverse of their definition of deforestation. The active conversion from other land uses into forest or increasing the canopy cover above the 10% threshold qualify as afforestation. By definition, the afforested land will always be classified as a forest plantation. FAO also defines a complementary term “natural expansion of forest” to cover all cases of conversion from non-forest to forest. In the latter case, it should be noted that in order to be termed afforestation, the canopy cover of the forest must have been under the 10% threshold on a “long-term” basis (i.e., more than temporarily). If not, the change would be termed reforestation (cf. above).

For the FCCC, afforestation involves a conversion of non-forested to forested land. An additional condition is that the land must have been non-forested for at least a period of 50 years. In practice, though, the difference between afforestation and reforestation will have little

meaning from accounting standpoint. Therefore, both FCCC definitions, the one for afforestation and the other for reforestation, are essentially the same as the FAO definition for afforestation. The specification regarding human intervention in the FCCC term is deliberate, since the Kyoto Protocol requires that all changes to be credited have to be “human-induced”. It should be noted that the FAO and FCCC definitions for afforestation involve human intervention on the site. This excludes natural expansion of forest area.

Annex 11 lists how various countries have defined afforestation in their national data.

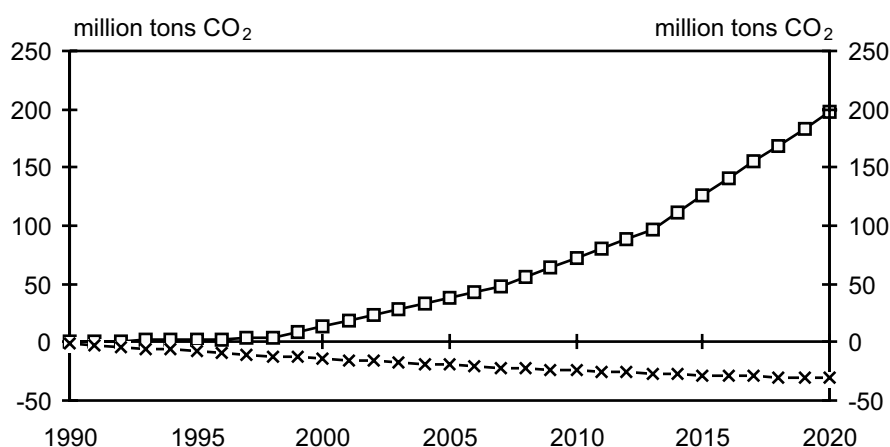
5.5 Comparability of Definitions

The differences between the FAO and FCCC definitions are attributable to differences in their use. The FAO definitions are meant to guide forest management, and their logic corresponds well with that of field practice. On the other hand, the logic behind the FCCC definitions is based on the needs of carbon accounting and additionality.

Another difference is that the FCCC requires all changes to be “human induced”. This follows from the special character of the Kyoto Protocol which credit the signatory countries only, if they have actively contributed to meeting their commitments. Naturally occurring development, such as natural expansion of forest or unassisted natural regeneration, are not credited. The FCCC definitions do not cover all forest change processes, but this is unavoidable given the context of the Kyoto Protocol. References to specific time frames in the FCCC definitions are, of course, applicable only to carbon accounting.

Harmonization of the definitions is not an aim in itself, and it should not be attempted when the differences in approach cannot be reconciled. Regarding carbon sequestration, the choice of definitions would have significant impact on the assessment results, as illustrated by Figure 2 presenting two scenarios on carbon sequestration in Finland. Assessment based on FAO definitions indicates that the Finnish forests constitute a substantial carbon sink. On the other hand, applying the IPCC definitions (which are close to those adopted by FCCC), the forests would be a source of carbon emissions.

Figure 2 Cumulative Impact of ARD Activities on Carbon Balance in 1990-2020 Based on Two Methods of Calculation - Case of Finland



Source: Sievänen (2000)

The difference between the two approaches is so large that harmonization may not be achieved without distorting the logic behind either set of definitions. This suggests that —different functions simply require different definitions, and that various sets can and should exist in parallel. However, in order to keep data collection and processing manageable, the number of alternative definitions should be minimized. This may be achieved by converging definitions, or by ensuring that the definitions are comparable. In the latter case the definitions would remain different, but they would be able to benefit from the same basic data.

Regarding carbon monitoring a significant portion of the necessary data can, in principle, be extracted from the data structure under the FRA. The extent of reforestation and deforestation at a national level according to the FCCC definitions could be derived from the FRA data with some adjustments.

The most difficult hurdle to making the FCCC and FAO definitions comparable is the FCCC requirement that all changes must be “human induced”. This is often difficult to assess without information at the site level. Of the seven change process defined by FAO, only afforestation and reforestation are entirely “human-induced”. The rest may be triggered either by humans or by natural causes² (Table 3).

Table 3 Human Activities as Triggering Factor of Forest Change

Change Process	“Human-inducedness”	Remarks
Deforestation	Often	Large-scale natural damage such as fire in extreme climatic conditions may sometimes cause long-term loss of forest cover
Afforestation	Always	By definition a “human-induced” activity
Natural expansion of forests	Seldom	May, however, be “human-induced”, if e.g. a land area is deliberately left undeveloped in order to allow natural expansion of forest
Reforestation	Always	By definition a “human-induced” activity
Natural regeneration	Sometimes	Natural regeneration after final felling may be assisted by human intervention
Degradation	Often	Large-scale natural damage may cause degradation
Improvement	Sometimes	Management interventions typically influence natural development in order to accelerate forest growth, water catchment or other functions

Another issue is the scale of activities under the Kyoto Protocol. The minimum size of forest under the FCCC definition is 0.05 ha, which may be too small to be detected with the current methods used by the FRA. The minimum size of forest in the definition applied by the FRA is 0.5 ha, which was mainly set based on technical considerations associated with remote sensing. Patches below this limit cannot be discerned clearly in satellite imagery, and the FRA may not be able to capture all activities which would qualify under the Kyoto Protocol. However, even if it proves difficult to provide direct data inputs through the FRA, the FAO

² As the world’s forests have hundreds of millions of dwellers, there is also the philosophical issue whether their activities, often as an essential part of relatively stable ecosystems, should be considered ‘human induced’ in this context.

should, at a minimum, continue to promote the adoption of global and comparable definitions for national forest inventories. Increased compatibility between global and national definitions would be a major step forward, since country-level data will continue to be the main source of information for any global monitoring system.

6. FOREST MANAGEMENT UNDER THE KYOTO PROTOCOL

Apart from activities under Article 3.3 of the Kyoto Protocol (afforestation, reforestation and deforestation), the Parties to Annex I may choose to claim credit for activities included under Article 3.4. of the Kyoto Protocol. These include revegetation, forest management, cropland management and grazing land management. Forest management is directly linked with forestry, whereas the link between forestry and revegetation (under the FCCC definition) is indirect.

6.1 Revegetation and Devegetation

The FCCC definition of revegetation is presented in Box 3. The term devegetation is referred to in FCCC documentation (FCCC 2001, Chapter K para 3(c)), but it still lacks definition. However, it may be taken as the logical reverse of revegetation and, therefore, the definition will most likely bear resemblance to that of revegetation.

Box 3 Definition of Revegetation

Framework Convention for Climate Change (FCCC 2001)

Revegetation is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definition of afforestation and reforestation contained here (reference to FCCC definitions).

In general terms, revegetation refers to human activity to increase both vegetative cover and soil organic matter (i.e., carbon stock) on a given site. This can be accomplished through a variety of means including: seeding or planting of trees, shrubs, legumes, and grasses. Revegetation does not usually lead to commercial forestry but can increase the value of the land for grazing or recreation. Revegetation has significant ancillary benefits in terms of erosion control, favorable impact on the hydrological characteristics of the site, and potential increases in biodiversity (FCCC 2000b).

Revegetation efforts commonly involve input of nutrients through the application of organic or inorganic fertilizers. Revegetation stimulates natural successional processes and is more commonly undertaken on sites where natural vegetation succession is slow due to land degradation associated with past land uses and/or climatic conditions. Revegetation generally leads to a significant increase in soil carbon stocks. This carbon stock is relatively permanent (FCCC 2000b).

Countries engaged in activities that may qualify under Article 3.4. include Iceland and Australia. The Government of Iceland has proposed growing of lupines, planting of grass and associated fertilization as eligible activities (FCCC 2000b). The Australian Government

lists the establishment of widely spaced trees, trees in windbreaks and shelterbelts, trees in alley planting, salt bush, tea tree and oil mallee as potential activities to be included under revegetation (FCCC 2000c).

The main concern regarding the definition of revegetation is that it is still rather broad. The scope of activities is limited to those that do not “meet definitions of afforestation or reforestation”, but this still leaves considerable room for interpretation. Defining revegetation and defining threshold values that are practical to use will be a particular challenge given the wide range of different types of vegetation that may be revegetated (or revegetated). The definition of revegetation (and revegetation once it is available) would benefit from accompanying, technical guidance enabling an unambiguous identification of activities to be considered. One particular problem is that, while many of the activities proposed under revegetation contribute to the objective of the FCCC (removal of carbon dioxide from the atmosphere), the permanence of their impact is often unclear. The need to develop adequate inventory methods for revegetation and revegetation was also signaled by the FCCC COP-7 (FCCC 2001, Chapter K para 3 (c)).

The definitions of revegetation and revegetation are of particular interest for countries where climatic conditions are unfavorable for forest vegetation to grow. This applies for developing countries where desertification is a problem. Through revegetation activities they may effectively participate in the implementation of the Kyoto Protocol through the Clean Development Mechanism, which concerns projects implemented jointly by Annex I countries (industrialized countries) and developing countries. As the proposals put forward by the Australian Government indicate that various measures to halt desertification and even recover already desertified areas would probably qualify under the current definitions.

6.2 **Forest Management**

Two definitions of forest management are presented in Box 4 in Box 4, one by the FCCC and the other by the UNCED “Forest Principles” (see also Annex 5). Both of them are broad statements attempting to capture the wide spectrum of issues related to what constitutes forest management. In the former case, sustainability qualification is added.

Box 4 Definitions of Forest Management

Framework Convention for Climate Change (FCCC 2001)

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

“Forest Principles” (UN 1992, paragraph 2 (b))

Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products. Appropriate measures should be taken to protect forests against harmful effects of pollution, including air-borne pollution, fires, pests and diseases, in order to maintain their full multiple value.

Paragraph 2(b), Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests

Sustainable forest management is the over-arching concept of forestry but in operational terms, it cannot be defined without political decision-making related to specific local conditions. Therefore, the scope of this report is limited to discussing the silvicultural aspects of forest management which are relevant to the Kyoto Protocol. While the definition of SFM is one of the key issues in the current debate, it is more suitable to be addressed in other fora. The Expert Meeting, which this paper is intended to provide inputs for, has a more technical orientation, and is not attempted to tackle the political dimensions of SFM.

Forest management under Article 3.4 of the Kyoto Protocol includes all forest management activities apart from afforestation, reforestation, deforestation, which are eligible activities under Article 3.3. The specific interventions to be considered under Article 3.4. have not been identified, but, in principle, all forest management activities that are likely to alter carbon stocks are likely to be taken into account. As an example, Box 5 provides an indicative list of forest management activities and their importance in specific country conditions depend on types of forest vegetation to be managed climatic and physical conditions, and objectives set for forest management.

Box 5 Examples of Forest Management Activities Influencing Carbon Sinks and Emissions

Intervention
<ul style="list-style-type: none"> • Prescribed burning • Forest fire prevention and control • Acceleration of forest regeneration <ul style="list-style-type: none"> - soil preparation - seeding - planting, enrichment planting - weeding • Tending of young stands (brashing) • Thinning intensity and timing • Fertilization • Pest management • Selection of rotation age or harvesting cycle in polycyclic forest management • Leaving of retention trees and management of decaying wood • Drainage • Protection of fragile areas • Choice of harvesting technology <ul style="list-style-type: none"> - reduced impact logging • Collection of harvesting waste

The issue regarding the definition of “forest management” under Article 3.4. is mainly related to accounting methods. The choice was to adopt either a “broad” or a “narrow” definition. In this context, the term “broad” denotes a definition of forest management that includes all practices that might be applied to an area over a specified time period. In this case accounting methods will focus on establishing the net effect of all the applied practices. The term “narrow” denotes a definition that is based on estimating the impact of individual practices, such as tending of young stands or fertilization, for example.

The FCCC has decided to apply a "broad" definition, i.e., adopt a land-based accounting system, where the changes in a given land area are monitored. This approach enables the use of statistical sampling methods to estimate the net effect of altered carbon emission or sink processes. In this case, monitoring of larger areas becomes cost-effective because the number of samples does not scale up proportionately with the increasing area. The drawback of using individual practices as the basis for reporting was that associated rates of reduced emissions or increased sinks should have been obtained through model estimates or research plots which are not available for all forest types and conditions.

Another definitional issue related to forest management is to decide whether to include the end use of harvested wood products in the scope of forest management and accounting procedures. Wood products are important for two reasons. First, they store carbon during their life span. Second, greater utilization of wood allows reduced use of fossil fuels. Wood can replace fossil fuels in energy production or replace energy-intensive products such as steel, aluminium, plasterboard, and bricks. Were wood products included in the scope of "forest management", the impact on carbon accounting would be significant as several studies have shown (e.g., Apps et al. 1997, Brown et al. 1998, Ford-Robertson 1999, Nabuurs & Sikkema 1998, Winjum et al. 1998).

7. FOREST DEGRADATION AND IMPROVEMENT

7.1 Definitions

It has often been suggested that forest degradation is a more extensive and severe problem than deforestation. However, compared to deforestation, it is an ambiguous concept, and there are considerable difficulties to develop operational definitions for it. This has hindered efforts to assess its status and significance, which has also made it difficult to target corrective action and determine appropriate resource allocations for reducing or alleviating forest degradation. A few of the available definitions of forest degradation and forest improvement – the reverse of forest degradation – are presented in Box 6.

The FAO definitions are based on changes in canopy cover or stocking within a forest. It is also mentioned that forest degradation takes places above the 10 percent threshold for canopy cover. If the 10 percent threshold is crossed, the change is termed deforestation (cf. section 5.2). On a more general level, degradation or improvement refer to long-term reduction or increase of the overall potential supply of benefits from the forest, which includes wood, biodiversity and any other product or service.

While the FAO definition tries to capture the essence of the degradation process, the UNEP/CBD/SBSTTA (2001) definition defines an outcome. The indicative definition proposed by the ad hoc Technical Expert Group under UNEP/CBD/SBSTTA also refers to reduced supply of goods and services as an indicator of forest degradation. In addition, it implies that the "natural" state of forest represents a reference point against which "degradation" can be measured. It is not clear whether a narrow concept of degradation is implied (e.g., eucalyptus plantation would increase wood supply but could be degradation in an ecological context). Another difficulty arises from the fact that the state of forest can be

better than the “natural” reference point if all the economic, social and ecological functions are accounted for (e.g., planted forest on degraded marginal land) (Holmgren, pers. comm.). The FAO definition, on the other hand, does not refer to a reference point, but terms any shift in stocking level or canopy cover as degradation or improvement depending on the direction of the movement.

Canopy cover and stocking level were apparently selected as indicators because they can be measured with conventional techniques and because it may be assumed that these parameters are in strong correlation with the forest’s potential to supply various benefits. Feasibility is an important argument given that the FAO definition is mainly used by the FRA but the correlation between the chosen parameters and benefit supply is obviously less clear.

Box 6 Definition of Forest Degradation and Improvement

Degradation

Food and Agriculture Organization of the United Nations (FAO 2000b)

Forest degradation is a reduction of the canopy cover or stocking within the forest.

Explanatory note

For the purpose of having a harmonized set of forest and forest change definitions, that also is measurable with conventional techniques, forest degradation is assumed to be indicated by the reduction of canopy cover and/or stocking of the forest through logging, fire, windfelling or other events, provided that the canopy cover stays above 10 percent (cf. definition of forest). In a more general sense, forest degradation is the long-term reduction of the overall potential supply of benefits from the forest, which includes wood, biodiversity and any other product or service.

Ad Hoc Technical Expert Group on Forest Biological Diversity under CBD (UNEP/CBD/SBSTTA 2001)

A degraded forest is a secondary forest that has lost, through human activities, the structure, function, species composition or productivity normally associated with a natural forest type expected on that site. Hence, a degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. Biological diversity of degraded forests includes many non-tree components, which may dominate in the undercanopy vegetation. (Proposed definition).

Improvement

Forest improvement is the increase of the canopy cover or stocking (FAO 2001) within a forest.

Explanatory note

For the purpose of having a harmonized set of forest and forest change definitions, that also is measurable with conventional techniques, forest improvement is assumed to be indicated by the increase of canopy cover and/or stocking of the forest through growth. In a more general sense (cf. forest degradation) forest improvement is the long-term increase of the overall potential supply of benefits from the forest, which includes wood, biodiversity and any other product or service.

Degradation usually implies a loss of productivity. Operations such as thinning and salvage logging, while reducing the canopy cover, may not reduce the productivity of the land. In fact it may increase it. Thus over story reduction alone may not be regarded as degraded forest (Lund 2001).

The UNEP/CBD/SBSTTA definition is specific as to the characteristics and components of degraded forest. Features such as the structure, function, species composition and productivity

associated with a natural forest type on the site in question are referred to. The UNEP/CBD/SBSTTA definition enables more accurate assessments, but remote sensing can be made use of only to a limited extent, which is bound drive up the cost. Another issue is that degraded planted forests fall outside the UNEP/CBD/SBSTTA definition.

Lund (2001) has compiled various national definitions of forest degradation.

7.2 Operationality vs. Relevance

The FAO definition of degradation was designed to be operationally used in large-scale assessments. The key question is whether changes in canopy cover or stocking are adequate proxies for the various aspects of forest degradation or improvement. Changes in the scope of definitions would have an impact on accuracy of information and cost of data collection. Any broadening of the definitions would increase costs, because measurements would become more complex and data would have to be collected at site level.

The correlation between the chosen parameters and the supply of benefits can be expected to be rather strong in the case of wood production potential. It may hold particularly well in tropical natural forests, where forest management typically consists of selective cuttings and production is optimized at high levels of stocking and canopy cover. If harvesting is sustainable, removals can be small in which case the impact on stocking level and canopy cover is modest. Sustainable harvesting should not be associated with degradation. On the other hand, removal of large timber volumes is often unsustainable and it would appropriately be interpreted as degradation. In selective cuttings, the harvesting intensity, the species removed and the applied technology are key decision parameters which define whether the outcome is 'degradation' or sustainable.

In temperate and boreal zones, where forests develop through succession, the correlation is less clear. For instance, stocking levels in forests close to their climax are high, but growth rates are low. In young forests with low stocking level, the growth rates and timber yields are usually higher. Reduction of high stocking levels in old-growth forests would in fact increase wood production. Coexistence of forest patches in early and late stages of succession complicates the interpretation further.

An important issue is to determine an appropriate spatial scale for assessments. For instance, should the change in stocking levels be determined for individual forest management units (FMU)³, groups of small holdings, or at a landscape, ecosystem, administrative district, national or some other level. From the operational standpoint, the FMU is an important concept and its operations should be assessed as a whole. If assessment is made only in harvested areas of an FMU, temporal observations would record reduction in stocking levels or canopy cover which could be interpreted as degradation even though they are part of the silvicultural system applied in a way which ensures sustainable harvesting levels in the FMU as a whole. On the other hand, if the area for which the assessment is made is too large, it would be difficult to separate the changes in stocking levels or canopy cover from their "normal" variation.

³ There are alternative interpretations for how a forest management unit is defined (cf. e.g., ISO 1998).

The correlation between biodiversity and canopy cover/stocking levels may in many cases be theoretically strong as these two variables capture several key elements of forest habitats which are essential for the maintenance of biological diversity. The correlation is probably highest in natural tropical forests, where high stocking levels are associated with undisturbed forests and natural biodiversity of the site. In temperate and boreal zones, a theoretical correlation exists, but the relationship is more complex due to forest succession. In the undisturbed forests of temperate and boreal zones, mature stands with high stocking levels and full canopy cover are accompanied by stands in early stages of succession, where the stocking levels are lower and canopy cover incomplete. Each of these stages of succession is associated with specific characteristics of biodiversity. In order to have an adequate structure of forests to maintain the various components of biodiversity, stands with low stocking levels should also be present to a sufficient extent. This implies that the highest stocking level would not represent an optimum for biodiversity maintenance which should be derived through a model involving multiple variables.

In practice, biodiversity is strongly influenced by forest management in many ways and the correlation with stocking level and canopy cover is weaker than in a theoretical, “undisturbed” situation. Factors such as degree of fragmentation, species composition, proportion of decaying wood (especially in temperate and boreal zones), etc., in managed stands affect biodiversity irrespective of the level of stocking or canopy cover. Forest improvement measures, such as protection of key biotopes establishment of biological corridors, etc., can enhance the level biodiversity even if stocking levels or canopy cover remain low.

Stocking level and canopy cover are often correlated with the availability of non-wood forest products and generation of environmental services such as soil and water conservation and carbon storage. The relationship is likely to hold best in natural tropical forests. The supply of non-wood forest products as a whole is probably higher, the closer the forest is to an undisturbed state but, in the same way as in case of timber, the output of individual non-wood products can be often enhanced through management measures. Similarly, well-stocked forests with high canopy cover provide effective soil protection, and they are also the largest carbon stores. In temperate and boreal forests, the correlation is, again, less clear. In particular, the availability of some non-wood forest products (e.g. some mushrooms and berries) may be high at low levels of canopy cover and stocking.

However, the importance of these issues should not be exaggerated in the context of the FRA. Misinterpretations will undoubtedly occur, but they tend to concentrate on exceptional and marginal circumstances. The validity of the chosen indicators can be considered reasonably strong in typical prevailing situations, and broad development trends can probably be discerned with sufficient accuracy. The priority area for indicator improvement is probably the interpretation of changes in temperate and boreal forests.

For other purposes, however, the FRA definition may not be sufficiently accurate. FMU-level criteria and indicators for sustainable forest management and various incentive mechanisms, which entail assessments at the field level, need more detailed indicators than can be developed based on the FRA definition.

7.3 Degradation of Carbon Stock

The COP-7 of the FCCC signaled the need to develop suitable definitions of degradation for the purposes of the Kyoto Protocol. Degradation has emerged (see e.g., CNE 2000, Friends of the Earth 2000) on the FCCC discussion agenda because there is a due concern that an accounting system based on ARD activities may not adequately reflect the changes in carbon stock. For instance, if canopy cover is reduced from 70 percent to 35 percent, the loss of carbon stock would be significant, but it would not appear in carbon accounting, since no 'deforestation' occurs according to current definitions. For deforestation to happen, the canopy cover should be reduced below threshold (10-30 percent as indicated in Box 1).

Provided that the countries participating in the Kyoto Protocol implementation choose to account for activities under Article 3.4., the problem would be largely eliminated. Article 3.4. makes a provision for countries to include forest management under eligible activities for the accounted impact on carbon stock. In this case stock reductions, even if the thresholds set for deforestation are not crossed, would enter carbon accounts. However, the countries are free to choose, whether they account for forest management activities under Article 3.4., and several countries may opt not to use this alternative.

Another concern is that the current framework could encourage countries to clear natural forests and replace them with fast-growing plantations (Friends of the Earth 2000). The reason is that plantations earn them credits much faster than natural forests, especially those consisting of mature stands. It is feared that this will pose serious problems for biological diversity, since the types of forest that yield maximum sequestration value are not optimal for biodiversity.

In order to address this problem, carbon released from cutting of natural forest is accounted as emission according to the FCCC rules. It has also been proposed that a definition of forest degradation relevant to carbon accounting should be formulated and applied under the Kyoto Protocol. It has also been proposed that such definitions should be biome-based. As they are able to better capture the natural variation in ecological conditions than definitions that are uniformly applied at a global level (FCCC 2001, CNE 2000, Friends of the Earth 2000, Greenpeace 2001)⁴.

7.4 Reduction of Biodiversity

7.4.1 Biodiversity

The correlation between biodiversity reduction and changes in canopy cover and stocking levels is probably the most difficult issue related to the FAO definition of forest degradation. Unfortunately, there is no agreed or easily measurable alternative to account for changes in biodiversity at various levels. The following definitions of biodiversity have been proposed (Box 7)

⁴ See further discussion in Chapter 9.

Box 7 Definitions of Biological Diversity

Convention on Biological Diversity, 1992 (www.biodiv.org/convention/articles)

Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Ad hoc Technical Expert Group on Forest Biological Diversity under CDB (UNEP/CBD/SBSTTA 2001 (para 7 Box 1))

Forest biological diversity means the variability among forest living organisms and the ecological processes of which they are part; this includes diversity in forests within species, between species and of ecosystems and landscapes. (Proposed definition)

7.4.2 Authenticity

Using the natural variation as the starting point for benchmarking in any forest influenced by human activity, “authenticity” and “naturalness” have been put forward as possible indirect indicators. There is no formal definition on these concepts as yet, but the purpose is to measure how closely an existing forest mirrors natural ecosystems and ecosystem functions. In ecological terms, “naturalness” may be a way of defining optimal conditions for the conservation of biodiversity. Dudley and Elliot (1997) have suggested five main components of authenticity:

- *natural composition* of trees and other flora and fauna
- *natural spatial variation* of trees with respect to age, size variety, spacing and presence of dead or decaying timber
- *continuity of forest* (i.e., the length of time forest has existed on the site)
- *integration of forest into the broader landscape* (under natural conditions some forest types will not contain continuous tree cover. There will be a mosaic of covered and open areas as a result of natural disturbances such as storms, fires and treefalls).
- *management practices which mimic natural ecological processes* (These vary from region to region. For instance, fire is very important in boreal forests, but much less common naturally in tropical moist forests).

The proposal gives an idea on the type of elements that may be relevant to include in definitions on what is considered a natural forest type expected on a particular site or area. The proposed list of components would, however, need further elaboration with regard to possible indicators. In addition, heterogeneity is not restricted to regional differences as the natural ecological processes can vary even from habitat to habitat within the same forest.

Another issue is how to consider such forests where the activities of indigenous people are an essential element to maintain the “authenticity” of these forests which may have been created over a period of hundreds or thousands of years. Among the myths to be dispelled soonest are those related to the belief that nature is static and that lack of human intervention or management will ensure a *status quo*— in ecosystems; that the present state of diversity is the ideal one; and that human action can only diminish, never help, maintain, or enhance, genetic diversity (Eriksson et al. 1993; Palmberg-Lerche 1993).

7.4.3 Identification of Key Elements

An alternative approach to operationalizing the definition of biodiversity is to focus on its key components. This view was adopted by the CBD which proposed that monitoring should focus on the key elements of biological diversity. The CBD also includes an indicative list of such components covering ecosystems and habitats, species and communities, and described genomes and genes with high biodiversity value (Box 8).

An obvious benefit of this approach is that it reduces the area to be monitored to sites which qualify for the listed criteria. Identification of priority components of biodiversity in local conditions poses a challenge and the status of maintenance of dominant species and ecosystems remains to be addressed by other means. For this purpose, stocking level and canopy cover could offer a useful initial tool.

Box 8 Monitoring of Biodiversity in the Convention on Biological Diversity

Convention on Biological Diversity, Article 7, 1992 (www.biodiv.org/convention/articles)

- (a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I;
- (b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use;

Annex I. Identification and Monitoring

1. Ecosystems and habitats: containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance; or, which are representative, unique or associated with key evolutionary or other biological processes;
2. Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and
3. Described genomes and genes of social, scientific or economic importance.

7.4.4 Measurement Options

7.4.4.1 Human Disturbance

The proposed list of components regarding authenticity (cf. section 7.4.2) suggests that there is limited scope to improve accuracy using conventional techniques of measurement. The FRA does not include indicators that are directly associated with authenticity, but there is a related indicator assessing the state of disturbance in natural forests. The relevant definitions applied in the FRA are presented in Box 9.

Box 9 Definitions of Degree of Human Disturbance or Modification

FAO, 1998

Natural forest undisturbed by man. Forest which shows natural forest dynamics such as natural species composition, occurrence of dead wood, natural age structure and natural regeneration processes, the area of which is large enough to maintain its natural characteristics and where there has been no known human intervention or where the last significant human intervention was long enough ago to have allowed the natural species composition and processes to have become re-established.

Natural forest disturbed by man. Includes (i) logged over forests associated with various intensity of logging, (ii) various forms of secondary forest, resulting from logging or abandoned cultivation.

Semi-natural forest. Managed forests modified by man through silviculture and assisted regeneration.

“Natural forest undisturbed by man” as defined by FAO constitutes the benchmark to which authenticity can be compared. The other two FAO definitions refer to situations, where human intervention has changed the undisturbed status. The wording is slightly ambiguous, but “natural forest disturbed by man” can be interpreted as one which has been logged over, but where subsequent development is not guided by forest management. This leaves a caveat for managed “semi-natural forest”, typical in many countries where forestry is based on natural forests.

The FRA indicators make it possible to distinguish, *in senso stricto*, between authentic and non-authentic forests. The respective assessment can be made rather reliably using conventional measurement techniques such as remote sensing. However, the dichotomy is discreet – authentic or not – and it does not enable an assessment of the degree of authenticity in managed or disturbed forests.

Additional indicators would be needed to make a more nuanced assessment possible. Of the ones proposed by Dudley and Elliott (1997), the only indicator which may be detectable with remote sensing techniques is “integration into the broader landscape”, which is based on size and variation of forest patches.

7.4.4.2 Fragmentation

The concept of forest fragmentation’ has been introduced as a possible measure for forest degradation or impact of human influence. However, the approach lacks an agreed theoretical foundation. For instance, there is no commonly agreed definition of forest fragmentation (Tyrrell 2001). In general terms it may be described in the following manner (Box 10).

Box 10 Definition of Forest Fragmentation

UNEP/CBD/SBSTTA 2001

Forest fragmentation refers to any process that results in the conversion of formerly continuous forest into patches of forest separated by non-forested lands.

A variety of indicators have been used in the past to assess fragmentation, such as

- (i) changes over time in edge to interior ratio
- (ii) parcel size
- (iii) proximity to development
- (iv) percentage of forest cover, etc.

For any one of the indicators, the apparent degree of fragmentation is highly dependent upon the definition of forest, the scale at which forests are mapped, and the scale at which fragmentation is measured. For example, if the scale is such that individual classes within a forest area cannot be distinguished, then the given area would not appear to be fragmented being completely covered by forests (of any type). If, however, the same area was mapped at a finer scale which recognized, say, age class differences within the forest, then the forest (of each age class) would appear to be fragmented.

For the other suggested components of authenticity, the assessment would have to be made at site level. In a few countries with developed information systems, part of the necessary information could perhaps be extracted from existing databases. However, a significant increase in monitoring costs would be unavoidable in most cases. Whether to include such indicators in the FRA would require exploration of the country situations to establish whether the approach is technically feasible and if so, weighing of costs and benefits should be made.

7.4.4.3 Key Biodiversity Components

The approach, where the focus is on monitoring of the key components of forest biodiversity, is not easy to implement either. In particular, keeping track of changes in the variation of species and communities is difficult and costly, not to speak of genomes and genes, which can perhaps be monitored only at a local level. Valuable ecosystems and habitats are usually larger in size, and monitoring them may be more feasible, especially if they can be distinguished by particular types of vegetation or other forest characteristics that can be detected on a larger scale.

In particular, this approach may be more suitable for temperate or boreal forests than for tropical forests. While the monitoring of biodiversity components such as small-sized key habitats has proven costly, much of the threatened biodiversity is concentrated in the so-called old growth forests (Lund 2001). They usually display characteristics, which may lend themselves more easily to monitoring. Some of The available international definitions of old-growth forests are presented in the (Box 11) various definitions of “old-growth forest” includes not only the age of the trees, but also the overall state and composition of a forest. Factors that most definitions have in common include (i) trees at or beyond biological maturity, (ii) living and dead trees, (iii) trees of various sizes, (iv) characteristic vertical structure, and (v) little or no evidence of human disturbance..

Lund (2001) has compiled a total of 74 definitions of old-growth forests. Most definitions of old growth forests suggest they are mature forests that are losing productivity. In a sense, old growth forests are “degraded” forests. They are also managed forest in the sense that a decision may have been made to spare the trees.

While direct measurement of these various characteristics is difficult, they can be expected to be in strong correlation with very high stocking levels. This is an indicator, which could be detected through remote sensing and some ground truthing. In addition, the cost of field level information could remain reasonable, because the geographic area, where ground truthing is needed, would be limited. This indicator could be cost-effective for monitoring of some key aspects of “authenticity”.

Box 11 Definition of Old-growth Forest

UNEP/CBD/SBSTTA 2001

An old growth forest is a primary or a secondary forest which has achieved an age at which structures and species normally associated with old primary forests of that type have sufficiently accumulated to act as a forest ecosystem distinct from any younger age class.

7.5 Broad vs. Narrow Definitions

The broad definition of forest degradation included both in the FAO and UNEP/CBD/SBSTTA definitions - long-term reduction of supply of benefits - is a well-founded but rather general statement. Forests produce a multitude of various goods and services, and many of these are produced simultaneously. The problem arises from the fact that production objectives are mutually dependent - sometimes even conflicting. Tradeoffs are, therefore, unavoidable. In order to assess degradation based on the proposed broad definitions, one would have to be able to judge which tradeoffs are acceptable.

For instance, can a reduction in the yield of one product be compensated with an increase of another? To give an example, if natural forests are replaced with forest plantations, timber production increases, but the “supply” of biodiversity, non-wood forest products and some environmental services will diminish. This also raises the question what the reference point would be, and what degree of deviation would be acceptable. Were the comparison made against undisturbed forests and no deviation tolerated, most managed forests would probably display various degrees of “degradation”.

Decision on tradeoffs involves value-based judgements which should be politically agreed. Such processes are difficult to implement and get easily bogged down due to conflicts. For the time being, it is probably more feasible to continue technical work on definitions with a more limited scope and specific purpose. In other words, the definitions of forest degradation will be more operational, if they refer to supply of a specific good or service, not the overall supply. The issues related to tradeoffs should be highlighted, but the judgement of their acceptability would have to be made by those using the information.

8. LAND USE VS. LAND FUNCTIONS

Most global definitions of forest are based on land use. Several definitions of land use exist but most of them imply that classification is based on the type of management activities and

⁵ See also IUFRO 6.03.02 Discussion List on Old Growth Forest in 1997 ([http://iufro.boku.ac.at/Division 6, 6.03.02, Electronic Discussion groups, Archives](http://iufro.boku.ac.at/Division_6,6.03.02,Electronic_Discussion_groups,Archives))

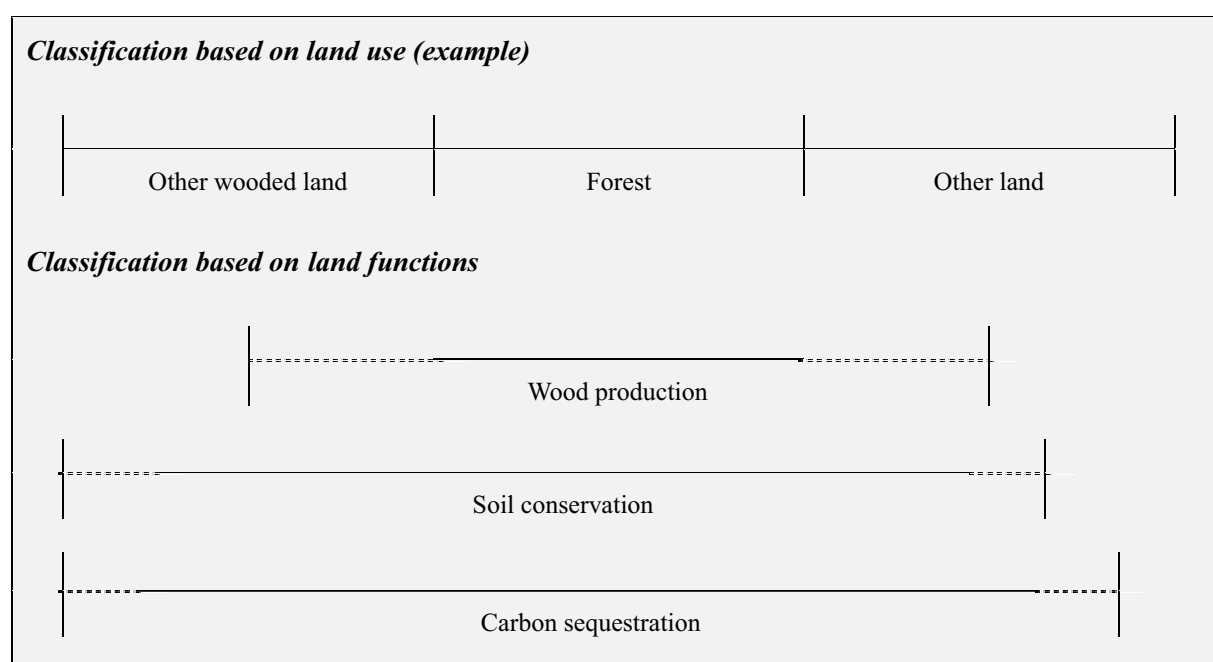
their purpose in a given land area. For instance, the FAO definition of forest specifically mentions that rubberwood plantations for timber and cork oak plantations are included but stands of trees established primarily for agricultural purposes are not⁶. However, it may often be more relevant to ask what general functions the existing vegetation fulfils regardless of its eventual association with forestry or other land uses.

The problem is not so much the definition of forest (or agriculture or any other land use) than the way in which the definition guides management activities, data collection, etc. Using the primary management objectives of a tree stand (e.g. forestry, agriculture) as an element to define forest, may be useful and necessary for such purposes as determining boundaries between administrative responsibilities. From the standpoint of large-scale forest inventories such as the FRA, it may also be technically convenient to draw a line between forestry and other land uses.

On the other hand, for decision-makers, the key issue may not be the existence or disappearance of forest *per se*, but the sustainability and function of the land use, be it forestry, agriculture, their combination or something else. If trees and shrubs in agricultural areas are ignored, the actual status of environmental - and even production - functions of the land may not be fully captured. Trees, shrubs, and other woody vegetation outside forest areas serve many of the same functions as forests do, including erosion control, carbon sequestration, providing habitats, food production, etc.

The key issue is that while many management functions, inventories, etc. are delineated based on land use, the functions that are of interest do not follow the boundaries of land use, as illustrated in Figure 3.

Figure 3 Comparison of Forest Classification Options



⁶ Rubber plantations for tapping would fall under the latter category in spite of the fact that trees would be used as fuelwood or industrial timber when tapping is discontinued due to the old age of the tree.

The available information on land functions is at best fragmentary. However, the main reason is not the definitions, but the traditional administrative boundaries between sectors. A number of global assessments and conventions require very similar data such as the Forest Resources Assessment, the World Agricultural Census but the international conventions tend to be more specific in their articulations. Each requires data on land cover and most on forests, yet the information is largely collected under separate processes (Lund and Boley 1995). Lund and Iremonger (1998) suggest that the international community should develop joint assessment objectives by consolidating the Forest Resources Assessment, the World Agricultural Census and the reports required by the CCD, CBD and FCCC into one consolidated effort and data base. Inventory designers should take more holistic views of *all* resources and potential products to provide more complete data sets to establish baselines for monitoring the environment. Traditional, single-function inventories should give way to integrated and multiple resource data collection schemes in an effort to reduce costs and to get more information about the complete ecosystems that people manage. This does not necessarily involve changes in definitions, but adoption of a broader perspective in the design of forest resource assessments would be required.

9. BIOME-BASED DEFINITIONS

9.1 Justification

The idea of developing biome-based definitions has been put forward in a number of fora. The decisions of the FCCC COP-7 included a recommendation to explore their applicability. The Ad hoc Expert Group on Forest Biodiversity under the CBD recommended to review and adopt standard forest definitions to be used in global reporting on the state of forest types (UNEP/CBD/SBSTTA 2001, para 6, 59 (c), 79 (a)). The Committee on Science and Technology under the CCD referred to the need to maintain comparability between the highly variable regions affected by desertification (CCD 1998 para 5 (k)).

The interest in biome-based definitions partly stems from the controversy regarding global definitions. On one hand, it is claimed that they enable unambiguous objective measurements and comparisons suitable for various reporting purposes at the international level. On the other hand, global definitions are considered overly rigid and ignoring the natural variation in biophysical conditions⁷. The threshold for canopy cover is a case in point.

Both FAO and the World Bank include the extent of canopy cover in their definition for forests, and both have 10 percent canopy cover as the cut-off point. Excluding the FRA 2000, the previous Forest Resource Assessments used two different thresholds, 10 percent for the developing countries, and 20 percent for developed countries. The distinction was based on respective differences in forest inventory practices. The issue was discussed in the Intergovernmental Panel on Forests (IPF 1997, para 53), which considered that the approach did not have an adequate scientific foundation. The experts under the IPF reached a consensus to switch to a uniform global standard in order to facilitate international comparisons (FAO 2000a, 2).

⁷ Variation in socio-economic conditions is also important as these conditions determine how forests are used or influenced by human activity.

However, the chosen 10 percent threshold has been challenged. On one hand, it has been considered too generous a limit. In many climate zones such a forest would not necessarily be able to sustain itself or at least it would be severely degraded. On the other hand, in dry zones a forest reaching the 10 percent threshold may be a fully viable ecosystem (CSE 2000).

In the biome-based approach the threshold values could vary depending on the natural characteristics of each biome. For example, tropical rain forests would be treated differently from sub-tropical dry forests (e.g., a higher threshold value for canopy cover in the former and a lower one in the latter type of forest). This could allow, e.g., deforestation to be captured more realistically across diverse forest ecosystems and ensure consistency among countries. The status of biodiversity, non-wood forest products and forest-based services could also be assessed more accurately, if the parameters affecting them could be adjusted at the biome level. Not least, a biome-based approach would enable adjustment of data collection methods according to availability and ease of collection, and analysis could be more relevant to specific conditions of the biome than using globally applicable notions.

9.2 CLASSIFICATION OF BIOMES

Several, slightly different definitions of biome have been proposed (Box 12). However, the basis for biome-based definitions, i.e. an agreed classification of biomes, is currently lacking. Forest biomes include tropical, temperate and boreal forests, where trees that form a close, or partially closed, canopy are the dominant vegetation types. However, these are still rather broad categories, and for practical purposes they are often sub-divided further into forest types or by ecological zones. Most existing forest classifications are based on this level of hierarchy.

Box 12 Definition of Biome and Forest Ecosystem

The Concise Oxford Dictionary of Ecology, 1994

Biome is a biological subdivision that reflects the ecological and physiognomic character of the vegetation. Biomes are the largest geographical biotic communities that it is convenient to recognize. They broadly correspond with climatic regions, although other environmental controls are sometimes important. They are the equivalent to the concept of major plant formations in plant ecology, but are defined in terms of all living organisms and of their interaction with the environment (and not only with the dominant vegetation type). Typically, distinctive biomes are recognized for all the major climatic regions of the world, emphasizing the adaptation of living organisms to their environment.

UNEP/CBD/SBSTTA, 2001

Forest biome:

A biome is the broadest forest classification. This reflects the ecological and physiognomic characteristics of the vegetation and broadly corresponds to climatic regions of the Earth.

Forest type:

Within biomes, a forest type is a group of forested areas or stands of generally similar composition that can be readily differentiated from other such groups by their tree species composition, height, and/or crown closure.

Forest ecosystem:

A forest ecosystem is a dynamic complex of plant, animal, and micro-organism communities, and their abiotic environment interacting as a functional unit, where the presence of trees is essential.— Humans, with their cultural, economic, and environmental needs are an integral part of many forest ecosystems.

One of the existing global forest classification systems has been developed by FAO based on the Köppen system (FAO 2001). Slightly modifying this scheme, FAO identified 20 global ecological zones, ranging from evergreen tropical rain forest to boreal tundra. Of them, the following 13 zones have forest cover.

- tropical rain forest
- tropical moist deciduous
- tropical dry
- tropical mountain
- subtropical humid forest
- subtropical dry forest
- subtropical mountain
- temperate oceanic forest
- temperate continental forest
- temperate mountain
- boreal coniferous forest
- boreal tundra woodland
- boreal mountain

To be practical, a global, biome-based classification should not be overly complex, and the number of classes should be limited. For instance, the FCCC definitions were developed with industrialized countries in mind as they originally referred to the implementation of the Kyoto Protocol commitments. Forests in these countries are found mainly in temperate and boreal zones, and the current thresholds may be appropriate for both zones. On the other hand, tropical and subtropical forests as well as dry zone forests would need separate definitions under any biome-based system. Planted forest and agroforestry systems may also merit specific definitions. In practice, the development of biome-based definitions usually entails an adjustment of various threshold values such as minimum canopy cover.

9.3 System of Biome-based Definitions

A relatively simple but consistent system of biome-based definitions could produce comparable data at higher level for global monitoring purposes while it could produce useful, decision-oriented information at a more detailed level (biome). At the same time, data collection and analysis could be kept manageable and make it easier to align the national classifications with the global standard. However, the higher the number of biome classes, the more difficult to maintain comparability between classes. For objectivity, the threshold values set for, e.g., “degradation”, should preferably reflect the same relative level of “degradation” irrespective of biome.

The FCCC definitions are moving into the direction of “biome-based” definitions, as the countries are allowed to choose threshold values within certain limits (see Box 1). However, as there is no guidance on how to set these values, it is doubtful, whether the definitions used will prove to be comparable. Rather than using their specific ecological conditions as a starting point, the countries may adopt a “strict” or “lax” policy of setting threshold values, depending on other interests they may have in this regard.

Applying biome-based definitions would be a complementary approach to the current methodology of applying uniform global standards. The FRA assessments will have to continue based on the current globally applicable definitions in order not to disrupt continuity of monitoring. A biome-based approach will only add a new dimension to the current analysis. This would, however, lead to a situation, where the forest area and other indicators would be different depending on the subject of discussion and reporting. Figure 4 is an attempt to illustrate this in the tropical biome.

Figure 4 Example of Biome-based Definition of Forest

Other wooded land (less canopy cover than forests or vegetation < 5 meters height)	Forest (< 10% canopy cover and no other dominating land use)	Other land (any other land including agricultural land, includes trees outside of forests)
	Forest in the tropical biome	

Source: Holmgren pers. comm.

The FAO/FRA divides land into three general classes based on canopy coverage and land use. A biome-based definition in the tropical zone could set a higher threshold of canopy cover, or include agricultural areas with tree cover. In areas where soil conservation is the main concern (e.g. in dry areas exposed to desertification), it might be warranted e.g. to lower the threshold for tree height.

In order to avoid confusion and duplication, it would be necessary to relate the biome-based classifications to global classifications. This is feasible, as similar exercise has been already carried out in conjunction with the FRA when national forest classifications were aligned with the global one. If change processes or more sub-classes are adjusted to be biome-specific, the same principle applies, but the analysis becomes more complex. This increases the need for data collection and processing, and the cost would have to be weighed against the value of additional information (Holmgren, pers. comm.).

10. CONCLUSION AND SUGGESTED FOLLOW-UP ACTION

Global definitions are developed under several constraints. To enable comparisons over time, compatibility with past definitions must be maintained. This is particularly important to enable continued use of comprehensive forest-related databases such as the one developed under the FRA by FAO. The feasibility of data collection is another pivotal consideration when developing global definitions. To this end, the definitions should, inter alia, be such that they enable substantial use of remote sensing. Further, a degree of compatibility with national definitions must be maintained. National authorities, who have an important role in providing basic data, are often unwilling to embark on a costly change of nationally applied definitions or readjustment of data if the current results are adequate for their own purposes.

Further work on definitions is likely to be conducted on two fronts:

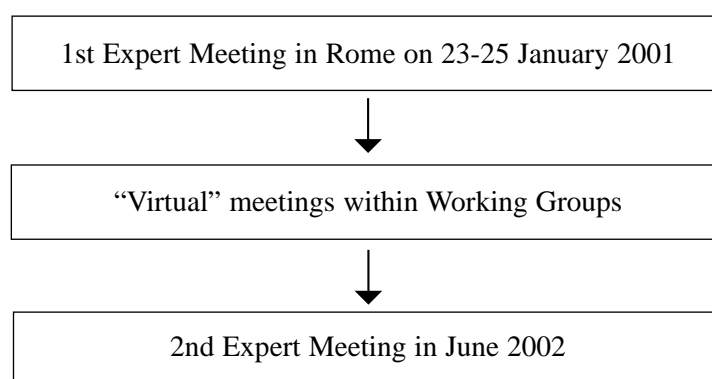
- (1) Definitions used for specific purposes, such as the FRA, carbon monitoring or specific biomes, will be adjusted to make them internally consistent and able to capture the essential features of the phenomena they are aimed to describe.
- (2) An effort will be made to ensure consistency and compatibility between global definitions as well as between global and national definitions. This would facilitate exchange of information and reduce its cost, as compatible data can easily be shared.

However, the emergence of parallel definitions is unavoidable, simply because they serve for different purposes. Harmonization may not be feasible or even desirable, as all needs cannot be accommodated in one definition. Instead, it is usually much more feasible to make the various definitions comparable, i.e. structure them so that data collected based on a set of definitions can be easily processed to serve various purposes. This would require much less dramatic changes in data structures, collection methods, etc., than full harmonization and be more acceptable to those producing the data at different levels in order to compile information for the monitoring of various indicators which have been agreed upon at an international level. Increasing comparability and synchronization of definitions would, therefore, be a highly cost-efficient strategy.

The procedure for further work must involve a broad-based participatory effort. It is necessary to ensure that the process will involve both highly qualified technical experts as well as representatives from various stakeholder groups. The outputs should be produced through a structured process within a realistic but fixed timeframe. To this end, it is suggested that the planned Expert Meeting on Forest-related Definitions to be arranged in Rome on 23-25 January, 2002 will be followed by two additional stages (Figure 5):

- (i) moderation of “virtual conferences” through e-mail communication to deal with specific issues, and
- (ii) a second expert meeting, where definitions and modes of their application will be finalized and agreed upon.

Figure 5 Proposed Follow-up Process



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Annex 1

Convention on Biological Diversity

Article 2

Use of Terms

For the purposes of this Convention:

“Biological diversity” means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

“Biological resources” includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

“Biotechnology” means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

“Country of origin of genetic resources” means the country which possesses those genetic resources in in-situ conditions.

“Country providing genetic resources” means the country supplying genetic resources collected from in-situ sources, including populations of both wild and domesticated species, or taken from ex-situ sources, which may or may not have originated in that country.

“Domesticated or cultivated species” means species in which the evolutionary process has been influenced by humans to meet their needs.

“Ecosystem” means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

“Ex-situ conservation” means the conservation of components of biological diversity outside their natural habitats.

“Genetic material” means any material of plant, animal, microbial or other origin containing functional units of heredity.

“Genetic resources” means genetic material of actual or potential value.

“Habitat” means the place or type of site where an organism or population naturally occurs.

“In-situ conditions” means conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

“In-situ conservation” means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

“Protected area” means a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.

“Sustainable use” means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

“Technology” includes biotechnology.

Annex 2

Definitions agreed and used by the Ad Hoc Technical Expert Group on Forest Biological Diversity, convened by the Secretariat of the CBD to prepare a report for SBSTTA-7 (November 2001)

A. Definitions

Forest:

The Forest AHTEG considers the FAO (FAO 2000) definition of a forest as a useful definition, but acknowledge that many other useful definitions of 'forest' exist in published form. The fact that 'forest' has been defined in many ways is a reflection of the diversity of forests and forest ecosystems in the world and of the diversity of human approaches to forests.

In this document, a forest is a land area of more than 0.5 ha, with a tree canopy cover of more than 10%, which is not primarily under agricultural or other land use. In the case of young forests, or regions where tree growth is climatically suppressed, the trees should be capable of reaching a height of 5 m *in situ*, and of meeting the canopy cover requirement.

Forest biome:

A biome is the broadest forest classification. This reflects the ecological and physiognomic characteristics of the vegetation and broadly corresponds to climatic regions of the Earth. In this document, three biomes are referred to as: boreal, temperate, and tropical forest biomes.

Forest type:

Within biomes, a forest type is a group of forested areas or stands of generally similar composition that can be readily differentiated from other such groups by their tree species composition, height, and/or crown closure. In this document, several forest types are referred to within each biome.

Forest ecosystem:

A forest ecosystem is a dynamic complex of plant, animal, and micro-organism communities, and their abiotic environment interacting as a functional unit, where the presence of trees is essential. Humans, with their cultural, economic, and environmental needs are an integral part of many forest ecosystems.

Forest biological diversity

Forest biological diversity means the variability among forest living organisms and the ecological processes of which they are part; this includes diversity living in forests within species, between species, and of ecosystems.

Primary forest:

A primary forest is a forest that has never been directly disturbed by humans and has developed following natural disturbance and under natural processes, regardless of its age. 'Direct human disturbance' means the intentional clearing of forest by any means (including fire) to manage or alter the forest for human use. We also include, as primary, forests that are used inconsequentially by indigenous and local communities living traditional lifestyles.

*Secondary forest:*¹

A secondary forest is a forest that has been directly disturbed by humans and has recovered naturally or artificially. Not all secondary forests provide the same value to sustaining biological diversity, or goods and services, as a primary forest may have done in the same location

¹ Locally in Malaysia, secondary forests refer to highly degraded forests; this is not the intent of the term in this document

Old growth forest:

An old growth forest is a primary or a secondary forest which has achieved an age at which structures and species normally associated with old primary forests of that type have sufficiently accumulated to act as a forest ecosystem distinct from any younger age class.

Plantation forest:

Plantation forest is an intensive short-rotation tree crop, established by planting or direct seeding, managed for the primary purpose of providing wood. A plantation forest may be on afforested land or a secondary forest. Areas are often planted with a single species and treated with various tools and techniques, such as herbicides, fertilizers, and silvicultural measures, such as thinning, with an objective to maximize rates of tree growth. Other plant species common in natural and semi-natural forests may be actively suppressed in order to maximize the yield. Further, structures which accumulate over time in more natural stands, such as dead trees, lianas, and fallen logs, are rare or absent in a plantation forest. A gradient exists among plantation forests from monocultures to trees planted in otherwise naturally-regenerating mixed species stands. This gradient is also likely reflective of capability of the plantation forest to maintain local biological diversity.

Degraded forest:

A degraded forest is a secondary forest which has permanently lost, or is unlikely to regain, the structure, function, species composition, or productivity normally associated with a natural forest type expected on that site. Hence, a degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity.

Agro-forest:

An agro-forest is a complex of tree areas within an area that is broadly characterised as agricultural or as an agro-ecosystem.

Reforestation:

Reforestation is the re-growth of forests after a temporary (<10 years.) condition with less than 10% canopy cover due to human-induced or natural perturbations (FAO 2000).

Afforestation;

Afforestation is the conversion from other land uses into forest, or the increase of canopy cover to the 10% defined threshold for forest (FAO 2000).

Forest fragmentation:

Forest fragmentation refers to any process that results in the conversion of formerly continuous forest into patches of forest separated by non-forested lands.

Forest species:

A forest species is a species that is dependent on a forest for part or all of its day to day living requirements, or for its reproductive requirements. Therefore, an animal species may be considered a forest species even if it does not live most of its life in a forest.

Native species:

A native species is a species known to have existed at a given location, or in a particular ecosystem, prior to the influence of humans.

Forest habitat loss:

Habitat loss refers to the permanent conversion of former habitat for a given forest species, into non-habitat that is forested or otherwise but where the native species in question species can no longer exist.

Endemic species

An endemic species is a native species restricted to a particular geographic region owing to factors such as isolation, or response to soil or climatic conditions

Alien species

An alien species is a species or a sub-species or lower taxon introduced outside of its normal past and present distribution; the definition includes, any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce (GISP 2001).

Alien invasive species

An alien invasive species means an alien species which becomes established, in natural or semi-natural ecosystems or habitat. It is an agent of change, and threatens native biological diversity” (IUCN 2000).

Annex 3

Convention to combat desertification

Article 1

Use of Terms

For the purposes of this Convention:

- (a) “desertification” means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities;
- (b) “combating desertification” includes activities which are part of the integrated development of land in arid, semi-arid and dry sub-humid areas for sustainable development which are aimed at:
 - (i) prevention and/or reduction of land degradation;
 - (ii) rehabilitation of partly degraded land; and
 - (iii) reclamation of desertified lands
- (c) “drought” means the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems;
- (d) “mitigating the effects of drought” means activities related to the prediction of drought and intended to reduce the vulnerability of society and natural systems to drought as it relates to combating desertification;
- (e) “land” means the terrestrial bio-productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system;
- (f) “land degradation” means reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as:
 - (i) soil erosion caused by wind and/or water;
 - (ii) deterioration of the physical, chemical and biological or economic properties of soil; and
 - (iii) long-term loss of natural vegetation
- (g) “arid, semi-arid and dry sub-humid areas” means areas, other than polar and sub-polar regions, in which the ratio of annual precipitation to potential evapotranspiration falls within the range from 0.05 to 0.65;
- (h) “affected areas” means arid, semi-arid and/or dry sub-humid areas affected or threatened by desertification;
- (i) “affected countries” means countries whose lands include, in whole or in part, affected areas;

Annex 4

International Timber Trade Agreement, 1994

Article 2

Definitions

For the purposes of this Agreement:

- (1) “Tropical timber” means non-coniferous tropical wood for industrial uses, which grows or is produced in the countries situated between the Tropic of Cancer and the Tropic of Capricorn. The term covers logs, sawnwood, veneer sheets and plywood. Plywood which includes in some measure conifers of tropical origin shall also be covered by this definition;
- (2) “Further processing” means the transformation of logs into primary wood products, semi-finished and finished products made wholly or almost wholly of tropical timber;
- (3) “Member” means a Government or an intergovernmental organization referred to in article 5 which has consented to be bound by this Agreement whether it is in force provisionally or definitively;
- (4) “Producing member” means any country with tropical forest resources and/or a net exporter of tropical timber in volume terms which is listed in annex A and which becomes a party to this Agreement, or any country with tropical forest resources and/or a net exporter of tropical timber in volume terms which is not so listed and which becomes a party to this Agreement and which the Council, with the consent of that country, declares to be a producing member;
- (5) “Consuming member” means any country listed in annex B which becomes a party to this Agreement, or any country not so listed which becomes a party to this Agreement and which the Council, with the consent of that country, declares to be a consuming member;

Annex 5

Definitions of sustainable Forest Management

Ministerial Conference on the Protection of European Forests and the “Helsinki Process”, 1993

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

International Tropical Timber Organization (ITTO), 1991

Sustainable forest management is the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.

For the national level, a forest policy aiming at sustainability is a policy that guarantees the sustainability of all ecological forest types of a country in a balanced way and divided over a reasonably sized permanent forest estate. For the forest management unit level, management of a certain forest is considered to be sustainable when it guarantees the continuity of all recognised principal functions of a particular forest without undue effects on the other functions.

CSCE Seminar and the “Montreal Process”, 1993

Sustainable forest management is a term used to describe the complementary goals of maintaining and enhancing the health of our forest ecosystems, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations.

Annex 6

UNITED NATIONS CONVENTION ON CLIMATE CHANGE, Conference of the Parties, 7th session, Marrakesh, Morocco, 29 October-9 November 2001

Definitions, Modalities, Rules and Guidelines Relating to Land use, Land-use Change and Forestry Activities Under the Kyoto Protocol

A. Definitions

1. For land use, land-use change and forestry activities under Articles'¹ 3.3 and 3.4, the following definitions shall apply:
 - (a) "Forest" is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 metres at maturity in situ. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest;
 - (b) "Afforestation" is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources;
 - (c) "Reforestation" is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989;
 - (d) "Deforestation" is the direct human-induced conversion of forested land to non-forested land;
 - (e) "Revegetation" is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation contained here;
 - (f) "Forest management" is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner;
 - (g) "Cropland management" is the system of practices on land on which agricultural crops are grown and on land that is set aside or temporarily not being used for crop production;
 - (h) "Grazing land management" is the system of practices on land used for livestock production aimed at manipulating the amount and type of vegetation and livestock produced.

¹ "Article" in this annex refers to an Article of the Kyoto Protocol, unless otherwise specified.

Annex 7

Definitions of Forest and Forest Change, Forest Resource Assessment 2000, Fao

Forest

Forests are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 percent, which are not primarily under agricultural or urban land use.

Explanatory note

Forests are 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 which have yet to reach a crown density of 10 percent or tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, that are expected to regenerate. The term specifically includes: forest nurseries and seed orchards that constitute an integral part of the forest; 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; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry purposes, including rubberwood plantations and cork oak stands. The term specifically excludes trees planted primarily for agricultural production, for example in fruit plantations and agroforestry systems.

Other wooded land

Other Wooded Land is land with a canopy cover of 5-10 percent of trees able to reach a height of 5 m *in situ*; or a canopy cover of more than 10 percent when smaller trees, shrubs and bushes are included.

Other land

Other land is, for the purpose of forestry, any land not classified as forest or other wooded land as defined above. Includes agricultural land, meadows and pastures, built-on areas, barren land, etc.

Inland water

Area occupied by major rivers, lakes and reservoirs.

Trees outside forests

Trees outside forests are trees and tree environments on land not defined as forest or other wooded land.

Explanatory note

Trees outside forests (ToF) include: (a) groups of trees covering an area of less than 0.5 ha, including lines and shelterbelts along infrastructure features and agricultural fields; (b) scattered trees in agricultural landscapes; (c) tree plantations mainly for other purposes than wood, such as fruit orchards and palm plantations; and (d) trees in parks and gardens and around buildings. ToF are not assigned an area in the overall land use classification, but occurs inside Other wooded land and Other land. Although the definition of ToF is based on the trees, the concept includes also the site and other vegetation at the location.

Deforestation

Deforestation is the conversion of forest to another land use *or* the long-term reduction of tree canopy cover below the 10% threshold.

Explanatory note

Deforestation implies the long-term or permanent loss of forest cover. Such a loss can only be caused and maintained through a continued man-induced or natural perturbation. Deforestation includes, for example, areas of forest converted to agriculture (including agroforestry), pasture, water reservoirs and urban areas. The term specifically excludes areas where the trees have been removed, due, for example, to harvesting or logging, and where the forest is expected to regenerate naturally or with the aid of silvicultural measures within the long-term. Unless followed by clearing of the remaining logged-over forest for the introduction of alternative landuses, and the maintenance of the clearings through continued disturbance, forests commonly regenerate, although often to a different, secondary condition. In areas of shifting agriculture, forest, forest fallow and agricultural lands appear in a dynamic pattern where deforestation and the return of forest occur frequently in small patches. To simplify reporting of such areas, the net change over a larger area is typically used. Deforestation also includes areas where overutilization or changing environmental conditions, influence the forest to an extent that it cannot (currently) sustain a tree cover above the 10% threshold, for example burnt-over areas where severe ground conditions or recurring fires for the long-term prevents the return of forest formations, or areas that after clearcutting cannot regenerate because of frost, competing vegetation, or other natural conditions. The concept “long-term” is central in this definition and is defined as ten years. Local climatological conditions, land use contexts or the purpose of the analysis may however justify that a longer time frame is used.

Afforestation

Afforestation is the conversion from other land uses into forest, *or* the increase of the canopy cover to above the 10% threshold.

Explanatory note

Afforestation is the reverse of deforestation and includes areas that are actively converted from other land uses into forest through silvicultural measures. Afforestation also includes natural transitions into forest, for example on abandoned agricultural land or in burnt-over areas that have not been classified as forest during the barren period. As for deforestation, the conversion should be long-term, that is areas where the transition into forest is expected to last less than ten years, for example due to recurring fires, should not be classified as afforestation areas. The concept “longterm” is central in this definition and is defined as ten years. Local climatological conditions, land use contexts or the purpose of the analysis may however justify that a longer time frame is used.

Reforestation

Reforestation is the re-establishment of forest formations after a temporary condition with less than 10% canopy cover due to human-induced or natural perturbations.

Explanatory note

The definition of forest clearly states that forests under regeneration are considered as forests even if the canopy cover is temporarily below 10 per cent. Many forest management regimes include clearcutting followed by regeneration, and several natural processes, notably forest fires and windfalls, may lead to a temporary situation with less than 10 percent canopy cover. In these cases, the area is considered as forest, provided that the re-establishment (i.e. reforestation) to above 10 percent canopy

cover takes place within the relatively near future. As for deforestation, the time frame is central. The concept “temporary” is central in this definition and is defined as less than ten years. Local climatological or land use contexts, or the purpose of the analysis, may however justify that a longer time frame is used.

Forest degradation

Forest degradation is a reduction of the canopy cover or stocking within a forest.

Explanatory note

For the purpose of having a harmonized set of forest and forest change definitions, that also is measurable with conventional techniques, forest degradation is assumed to be indicated by the reduction of canopy cover and/or stocking of the forest through logging, fire, windfelling or other events, provided that the canopy cover stays above 10% (cf. definition of forest). In a more general sense, forest degradation is the long-term reduction of the overall potential supply of benefits from the forest, which includes wood, biodiversity and any other product or service.

Forest improvement

Forest improvement is the increase of the canopy cover or stocking within a forest.

Explanatory note

For the purpose of having a harmonized set of forest and forest change definitions, that also is measurable with conventional techniques, forest improvement is assumed to be indicated by the increase of canopy cover and/or stocking of the forest through growth. In a more general sense (cf. forest degradation) forest improvement is the long-term increase of the overall potential supply of benefits from the forest, which includes wood, biodiversity and any other product or service.

Annex 8

National Criteria Used for defining Forestland

Note: Some data are extracted from the UN-ECE/FAO Forest Resource Assessment 2000 definitions in addition to those found in Lund (2001). Blanks mean no threshold values were stipulated or found.

Countries	Definition type	Area (ha)	Crown cover (%)	Tree height (m)	Strip width (m)	Notes
National						
Afghanistan	Cover		20			
Albania	Cover	0.1	20			
Algeria	Unknown					
Angola	Unknown					
Antigua & Barbuda	None					
Argentina	Use					
Armenia	Cover					
Aruba	Cover					
Australia	Use		30	5		
Austria	Use	0.1	30		10	
Azerbaijan	Unknown					
Bahamas	Unknown					
Bangladesh	Declared					"Tree" includes palms- bamboos-stumps-brush-wood and canes
Barbados	None					
Belarus	Use					
Belgium Flemish	Use	0.05	20		25	
Belgium Walloon	Use	0.01	10	5	9	
Belize	Unknown					"Tree" includes shrubs- bushes- palms- bamboos-creepers- canes- stumps- seedlings- saplings and coppice shoots
Benin	Cover					
Bhutan	Declared					
Bolivia	Use					
Bosnia and Herzegovina	Unknown					
Botswana	Declared					"Tree" includes palms- shrubs- bushes-climbers- seedlings- saplings and regrowth of all ages and of all kinds-and any part thereof.
Brazil	None					Reportedly has no national or legal definition
British Virgin Islands	Unknown					
Brunei Darussalam	Unknown					
Bulgaria	Admin	0.1		3	10	
Burkina Faso	Use					
Burundi	Use					
Cambodia	Cover		30	5		
Cameroon	Cover					

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Countries	Definition type	Area (ha)	Crown cover (%)	Tree height (m)	Strip width (m)	Notes
Canada	Use					
Cape Verde	Use					
Cayman Islands	Unknown					
Central African Republic	Declared					
Chad	Unknown					
Chile	Cover	5	10			Excludes degraded areas- and areas used for agriculture- fruit trees and intense grazing
China	Cover		20			
Colombia	None					Reportedly has no national or legal definition
Comoros	Use					
Congo (Zaire)	Unknown					
Congo- Republic of	Cover					
Costa Rica	Cover	2	70			Includes lands with more than 70 trees per ha and with dbh 15 cm.
Côte d'Ivoire	Cover					
Croatia	Cover					
Cuba	Use			5		
Cyprus	Use					
Czech Republic	Use	0.01			20	
Denmark	Use	0.5	30-50	6	20-30	
Djibouti	Unknown					
Dominica	Declared					
Dominican Republic	Unknown					
Ecuador	Unknown					
Egypt	Unknown					
El Salvador	Unknown					
Equatorial Guinea	Unknown					
Eritrea	Cover		10			
Estonia	Use	0.5	30	1.3		
Ethiopia	Cover		68	7		
Fiji	Cover	4	15			Includes shrubs and bushes of kinds- seedlings-saplings all and re-shoots of all ages- climbers and creepers and any part of the tree.
Finland	Potential	0.25				Excludes land capable of producing less than 1m3 and ha stemwood
France	Cover	0.25	10	8	15	
French Guyana	Unknown					
French Polynesia	Unknown					
Gabon	Declared					
Gambia	Cover		10	3		
Georgia	Cover					

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Countries	Definitione type	Area (ha)	Crown cover (%)	Tree height (m)	Strip width (m)	Notes
Germany	Use	0.1	50		10	
Ghana	Cover					
Greece	Use	0.5	10		30	
Greenland (Denmark)	Unknown					
Grenada	Use					"Tree" includes palms- bamboos- stumps- brushwood and canes.
Guadeloupe	Unknown					
Guam	Unknown					
Guatemala	Cover	2				
Guinea	Unknown					
Guinea Bissau	Unknown					
Guyana	Declared					
Haiti	Declared					
Honduras	Cover					
Hungary	Use	0.15	30			
Iceland	Use	0.25				
India	Cover		10			
Indonesia	Use					
Iran	Cover		1			
Iraq	Unknown					
Ireland	Use	0.5	20		40	Excludes areas producing less than 4m ³ /ha/yr "Forest" usually interpreted as woodland. "Tree" includes shrubs.
Isle of Man	None					
Israel	Cover		10	4		
Italy	Use	0.2	20		20	
Jamaica	Cover	4	75	5		Excludes tree crops
Japan	Use	0.3	30	5		
Jordan	Unknown					
Kazakhstan	Unknown					
Kenya	Cover		40	2		
Korea- Dem.People's						
Rep.	Unknown					
Korea- Republic of	Use					Excludes orchards
Kuwait	Unknown					
Kyrgyzstan	Use		20	2	25	
Laos	Declared					
Latvia	Use					
Lebanon	None					
Lesotho	Use					Tree includes any seedlings- sapling- transplant or coppice shoot of any age.
Liberia	Unknown					
Libya Arab Jamahiriyy	Unknown					
Liechtenstein	Cover		20		25-50	
Lithuania	Cover		20		10	Includes trees with a minimum dbh 14cm or greater.

Annex 8

Countries	Definition type	Area (ha)	Crown cover (%)	Tree height (m)	Strip width (m)	Notes
Luxembourg	Use	0.5	10	5		
Macedonia	Unknown					
Madagascar	Use					
Malawi	Cover		80			
Malaysia	Cover		10	5		
Mali	Use					
Malta	Unknown					
Martinique	Unknown					
Mauritania	Cover					
Mauritius	Use					
Mexico	Use	0.15	10	3		
Moldova- Republic of	Unknown					
Monaco	None					
Mongolia	Unknown					
Montserrat	Declared					
Morocco	Cover	3	30	7		
Mozambique	Cover		25	7		
Myanmar	Declared					"Tree" includes root- stump- stem- branch-bush- creeper- bamboo- cane- orchid and seedling.
Namibia	Cover		20	5		
Nepal	Cover					
Netherlands	Use	0.5	20	6	30	
New Caledonia	Unknown					
New Zealand	Use	5	20	6		"Tree" includes not only timber trees-but also all other kinds of trees- shrubs- and bushes- seedlings- saplings-cuttings- suckers- and shoots of every description
Nicaragua	Cover		25			
Niger	Use					
Nigeria	Unknown					
Northern Mariana Islands	Cover	0.01				
Norway	Potential	0.1				Includes land with an average potential production equal to or higher than 1 m3 (including bark) per ha and year
Oman	Unknown					
Pakistan	Use					"Tree" includes palms- bamboos- stumps- brush-wood and canes.
Palestine	Unknown					
Panama	Cover		45			
Papua New Guinea	Cover	100	10	5		
Paraguay	Potential					
Peru	Cover					

Annex 8

Countries	Definitione type	Area (ha)	Crown cover (%)	Tree height (m)	Strip width (m)	Notes
Philippines	Topography				20	Generally excludes areas with slopes < 18%
Poland	Use	0.1				
Portugal	Use	0.2	10-15	1.5	15	
Puerto Rico	Declared					
Reunion	Unknown					
Romania	Use	0.25		7		
Russian Federation	Cover		30			
Rwanda	Unknown					
Saint Lucia	Use					
Saudi Arabia	Unknown					
Senegal	Unknown					
Seychelles	International			10		Reportedly has no national or legal definition but uses international conventions. Which conventions were not specified. Shrubs > 10 m. "Tree" includes any woody vegetation.
Sierra Leone	Declared					
Singapore	Unknown					
Slovakia	Use					
Slovenia	Cover					Excludes individual trees- riverine and windbelt trees- plantations- etc.
Solomon Islands	Unknown					Excludes agricultural lands. Tree includes any root- stump- stem-branch- brushwood- ung(?) tree or sapling.
Somalia	Cover		20	5		
South Africa	Cover		75	3		
Spain	Use	0.2	5-10		20	Excludes lands capable of producing less than 1 m ³ /ha/yr
Sri Lanka	Unknown					
St. Kitts & Nevis	Unknown					
St. Helena	Unknown					
St. Vincent &						
Grenadine	Unknown					
Sudan	Cover		40	10		
Suriname	Unknown					
Swaziland	Unknown					"Tree" means the whole or any part of any tree as ordinarily understood or of shrub- bush- seedling- transplant-sapling- reshoot- underbrush or regrowth.
Sweden	Potential	0.25	20	5		Excludes land capable of producing less than 1m ³ /ha/yr
Switzerland	Cover		20-100	3	25-50	
Syrian Arab Rep.	Unknown					
Taiwan (R.O.C.)	Use		0.5	10	50	Trees include bamboo. Min. d.b.h. for tree is 10 cm

Annex 8

Countries	Definition type	Area (ha)	Crown cover (%)	Tree height (m)	Strip width (m)	Notes
Tajikistan Tanzania	Cover Cover		60	8		“Tree” includes palms- bamboos- canes-shrubs- bushes - plants- poles- climbers-seedlings- saplings and regrowth thereof- all ages and all kinds and part.
Thailand	Use					
Togo Tonga	Use Declared					Tree includes palms- shrubs- bushes- climbers-seedlings- saplings- and re-shoots of all ages and of all kinds- and any part thereof.
Trinidad & Tobago	Cover					“Tree” includes bamboo- palms and brushwood found growing on state lands
Tunisia	Cover					
Turkey	Use	3	10	8		
Turkmenistan	Unknown					
Uganda	Declared					“Tree” includes palms- bamboo- canes shrubs bushes- climbers- seedlings- and re-growth of all ages and of all kinds- and any part thereof.
Ukraine	Cover		60			
United Arab Emirates	Unknown					
United Kingdom	Use	0.25-1	20	20-50		
United States	Use	0.4	10	4	36	
Uruguay	Cover	0.25				
Uzbekistan	Unknown					
Vanuatu	Cover			10		Crowns touching or overlapping
Venezuela	Use			5		
Viet Nam	Use		30			Includes bamboo
Western Sahara	Unknown					
Western Samoa	Unknown					
Yemen	Cover	3	10	5		
Yugoslavia	Use					
Zambia	Declared					
Zimbabwe	Cover		80	15		“Tree” includes bushes- climbers- coppice-palms- reshoots- saplings- seedlings and shrubs of all ages and of all kinds and nay part thereof.

Source: Lund, 2001

Annex 9

National Definitions of Deforestation by type

Note: Where there is more than one entry per row, there was more than one definition found for that country.

Deforestation defined as	A change in land cover	A change in land use	A change in land cover and use
Austria			Yes
Bolivia	Yes		
Bulgaria	Yes		
Canada	Yes		Yes
Cyprus			Yes
Fiji	Yes		
France	Yes		
Ghana	Yes		
India			Yes
Italy		Yes	
Lithuania			Yes
Malaysia		Yes	
Morocco	Yes		
Nepal	Yes		
Northern Mariana Is.	Yes		
Pakistan			Yes
Papua New Guinea			Yes
Romania	Yes		
Saint Lucia.	Yes		
Taiwan (R.O.C.)	Yes		
Uganda	Yes		
Venezuela	Yes		
Yemen	Yes		
United Nations	Yes	Yes	

Source: Lund, 2001

Annex 10

National Definitions of Reforestation by type

Note: Where there is more than one entry per row there was more than one definition found for that country.

Reforestation defined as	A restoration of land cover	A restoration of land cover and use
Austria	Yes	
Bolivia		Yes
Brazil	Yes	
Bulgaria	Yes	
Canada	Yes	
Chile	Yes	
Colombia	Yes	
Cuba	Yes	
Cyprus	Yes	
Denmark	Yes	
Fiji	Yes	
India		Yes
Italy	Yes	
Kyrgyzstan	Yes	
Latvia		Yes
Lithuania	Yes	
Malaysia	Yes	
Morocco	Yes	
Nicaragua	Yes	
Northern Mariana Is.	Yes	
Pakistan	Yes	
Paraguay	Yes	
Romania	Yes	
Russia	Yes	
Saint Lucia	Yes	
Taiwan (R.O.C.)	Yes	
Thailand		Yes
Ukraine		Yes
United Kingdom	Yes	
USA	Yes	
Venezuela	Yes	
Yemen	Yes	
United Nations	Yes	

Source: Lund 2001

Annex 11

National Definitions of Reforestation by type

Note: Where there is more than one entry per row, there was more than one definition found for that country.

Afforestation defined as	Establishing a new land cover	Establishing a new land cover and use
Australia	Yes	
Austria		Yes
Bolivia	Yes	
Bulgaria	Yes	
Canada		Yes
Colombia	Yes	
Cote d'Ivoire	Yes	
Cuba	Yes	
Cyprus	Yes	
Denmark		Yes
Fiji	Yes	
France	Yes	
Ghana	Yes	
Hungary	Yes	
India	Yes	
Isle of Man	Yes	
Italy		Yes
Kyrgyzstan	Yes	
Latvia	Yes	
Lithuania	Yes	
Malaysia	Yes	
Morocco	Yes	
New Zealand	Yes	
Northern Mariana Is.	Yes	
Pakistan	Yes	
Papua New Guinea	Yes	
Paraguay	Yes	
Romania	Yes	
Saint Lucia.	Yes	
Taiwan (R.O.C.)	Yes	
UK	Yes	
Ukraine	Yes	
USA		Yes
Venezuela	Yes	
Yemen	Yes	
United Nations	Yes	Yes

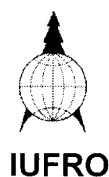
Source: Lund, 2001

ANNEX II

MEETING AGENDA



in collaboration with
and



EXPERT MEETING ON HARMONIZING FOREST-RELATED DEFINITIONS FOR USE BY VARIOUS STAKEHOLDERS

Rome, 23–25 January 2002

PROVISIONAL AGENDA

Wednesday, 23 January 2001

08.00 – 09.00	Registration of participants	
09.00 – 09.30	Welcome messages by: FAO IPCC IUFRO CIFOR	H. El-Lakany I. Noble R. Prüller K. MacDicken
09.30 – 09.45	Messages from Conventions CBD UNCCD UNFCCC	J. Plesnik NN D. Tirpak
09.45 – 10.15	Presentation of participants	
10.15 – 10.45	Coffee break	
10.45 – 11.00	Objectives of workshop, technical issues, logistics	W. Killmann
11.00 – 11.15	Stocktaking and orientation: From where do we start?	M. Simula
11.15 – 11.30	Concepts and information requirements under CBD	P. Kenmore
11.30 – 11.45	Concepts and information requirements under UNFCCC	C. Forner
11.45 – 12.00	Concepts and information requirements under UNCCD	E.H. Sène
12.00 – 13.30	Lunch	
13.30 – 13.40	Concepts and information requirements under UNFF	T. Vähänen

13.40 – 13.50	Concepts and information requirements under ITTO	E. Müller
13.50 – 14.15	Concepts and information requirements under FAO	A. di Gregorio/ P. Holmgren
14.15 – 14.30	Identification of forest terms which need definition	M. Simula
14.30 – 15.00	Plenary discussion, establishment of working groups	
15.00 - 15.30	Coffee break	
15.30 – 18.15	Group work on scope of the process towards a common understanding of forest-related definitions	
18.30 – 20.30	Reception hosted by Assistant Director-General, Forestry Department, and Assistant Director-General, Sustainable Development Department	H. El-Lakany/ J.P. Ekebil

Thursday, 24 January 2002

08.30 - 09.45	Reports of group work to the plenary	
09.45 – 10.00	Biome-specific forest definitions: Introduction and overview	M. Simula
10.00 – 10.30	Plenary discussion – Tasks of working groups	
10.30 – 11.00	Coffee break	
11.00 – 12.00	Work in groups: Group 1 – Afforestation, reforestation and deforestation Group 2 – Forest degradation, devegetation, revegetation Group 3 – Biome-specific forest definitions (tropical) Group 4 – Biome-specific forest definitions (subtropical/temperate) Group 5 – Biome-specific forest definitions (boreal)	
12.00 – 13.30	Lunch	
13.30 – 14.00	Continuation of work in groups	
14.00 – 14.30	Review of progress in group work	
14.30 – 16.00	Work in groups	
16.00 – 16.30	Coffee break	
16.30 – 18.00	Group work reports to the plenary	

Friday, 25 January

08.30 – 09.00	Brief presentation on terminology management	S. Katz/ R. Prüller
09.00 - 10.00	Plenary discussion on open issues - Tasks of working groups	
10.00 – 10.30	Coffee break	
11.00 – 12.00	Group work on follow-up process	
12.00 – 13.30	Lunch	
13.30 – 14.00	Continuation of group work on follow-up process	
14.00 – 15.30	Presentation of group work results and discussion in the plenary	
15.30 – 16.00	Coffee	
16.00 – 17.00	Continuation of discussion, concluding remarks and closing of the Expert Meeting	

ANNEX III

LIST OF PARTICIPANTS

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(Rome, 23-25 January 2002)

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ANNEX IV PRESENTATIONS

The Marrakech Accords Delivering a ratifiable Kyoto Protocol



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Features of the agreed system

- Quantitative targets for reducing emissions;
- Guidelines for reviewing and reporting information on emissions;
- Agreement on LULUCF rules for the first commitment period;
- A set of rules for the use of the mechanisms (JI, EI and CDM);
- Procedures and mechanisms for facilitating compliance;
- A funding scheme for developing countries
- Assistance for Parties with economies in transition;
- Commitments to minimise the effects of response measures

Elements of the Agreement

- Agreement on principles as a guide for LULUCF (i.e. no crediting of windfall or natural effects and a credible and transparent accounting system).
- Activities that can contribute to meeting the Protocol targets are: cropland management, grazing land management, revegetation and forest management, as follows:
 - Grazing land management, agricultural management and revegetation will be accounted on a net-net basis
 - Each Party may account for credits from forest management activities to compensate for a debit under Article 3.3, up to a limit of 9 MtC/yr
 - Each Party may also account for credits from forest management activities during the first commitment period up to the caps agreed for individual Parties

Elements of the Agreement

- An Annex I Party may account for credits from LULUCF CDM projects up to 1% of its base year emissions for each year of the first commitment period.
- Further work to be developed by SBSTA on:
 - biome specific definitions (possible second commitment period issue)
 - modalities for including afforestation and reforestation under the CDM.
- A request to the IPCC to develop Good Practice Guidance for the LULUCF sector, as well as definitions for forest degradation and devegetation of other vegetation types

LULUCF in numbers

	MT C/y	Compared to baseyear emissions of AI Parties	Compared to effort
Cropland management, grazing land management and revegetation (estimated)	13 – 33	0.7 % - 1.7%	3.47 % - 8.8%
Forest management activities (assuming caps are fully used)	69.9	3.7%	18.7%
LULUCF CDM projects (assuming caps are fully used)	18.75	1%	5%
Total annual LULUCF credits for Annex I Parties (excluding the USA)	115.9 – 135.9	3.5 % - 4.1%	30.9 % - 36.3%




FAO - IPCC - CIFOR - IUFRO

**Expert Meeting on
Harmonizing Forest -
Related Definitions for Use
by various Stakeholders**

Rome, 23 - 25 January 2002
Background & Objectives


FOREST biodiversity
Climate Change
MANAGEMENT




Previous Work

- IUFRO working Group on terminology
- Kotka process (FRA)
- IPCC -LULUCF report
- UNFCCC -COP 6 decisions
- EFI work for EUROSTAT
- USDA


FOREST biodiversity
Climate Change
MANAGEMENT




Forest- related Definitions in Use



- Different definitions /terms
- Objective - oriented
- More objectives - less precise
- Continuity
- Congruency
- Reporting by countries



Recommendations



- UNFF
- SBSTA UNFCCC , Bonn: Biome
- SBSTA UNFCCC , Marrakech
- SBSTTA CBD, Montreal
- FAO -COAG, COFO, COUNCIL



Objectives

FOREST biodiversity
Climate Change
MANAGEMENT


- develop a Definition - Framework;
- accommodate use of forest-related terms in forest management, biological diversity and climate change contexts, as well as corresponding reporting requirements;
- harmonize or relate a number of agreed definitions to each other.




Outset

FOREST biodiversity
Climate Change
MANAGEMENT

- Build on previous work
- Technical discussions



Working Process



- Plenary & Group work
- Scope of definitions to be discussed
- Clustering
- Biome - specific forest definitions
- Virtual process
- Submission to International Bodies



**EXPERT MEETING ON HARMONIZING FOREST -RELATED DEFINITIONS
FOR USE BY VARIOUS STAKEHOLDERS
Rome, 23 -25 January 2002**

Stock Taking and Orientation: From Where Do We Start?

Dr. Markku Simula
Indufor Oy

**Töölönkatu 11 A, FIN -00100 Helsinki, Finland
www.indufor.fi**

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Definitions

- **Artificial constructs in order to understand events and phenomena, and change over time**

Forest-related Definitions

- **Help clarify and structure information on forest land use and vegetation: definitions have to be clear, concise and objective (Lund, 2000)**

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Roaming Around

**The world of forest -related definitions is like
the “garden of bifurcating paths”**

– (Jose Luis Borges)

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Compounding Problem

Already in the past, the problem of definitions was difficult enough even though it concerned only foresters. The problem has now become much more serious

- **more objectives with more stakeholders involved**
- **due to many legal instruments (mainly MEAs)**

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Starting Point

There is confusion, inconsistency and lack of precision

BUT

there are also good workable definitions

which offer a useful starting point.

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Need for Clarity

There are different uses and users for definitions.

It will be impossible to cast all into the same straitjacket

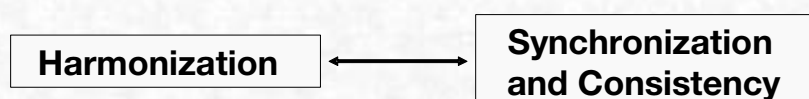
BUT

we must always have clarity what we are talking about.

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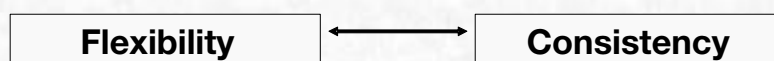
Alternative Strategies



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Tradeoff



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How to create consistency

- 1. Clarity of objectives**
- 2. Toolbox**
 - concepts and terms
 - definitions
 - “conversion factors” – relationships
- 3. Meaningful application (capacity building)**

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Sources of Confusion (1)

Functions

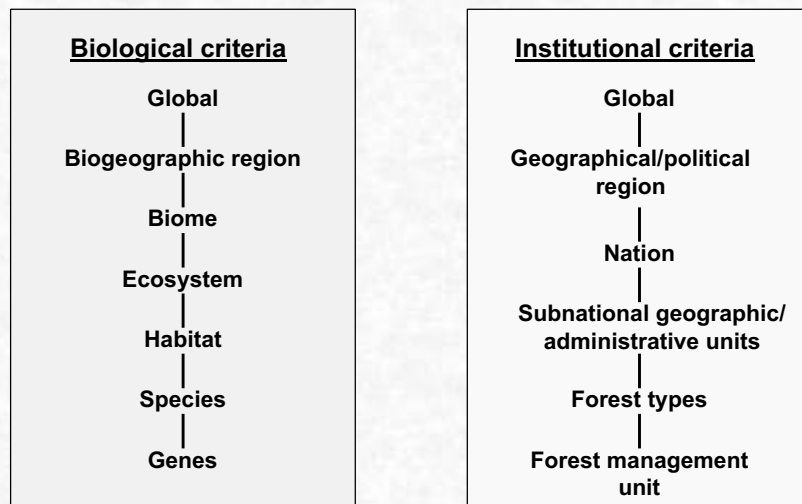
**Definitionally , weak fit between environmental
functions and the well -established
production -based approach**

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Sources of Confusion (2)

Levels of application



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Sources of Confusion (3)

Diversity

Global definitions do not work well in local situations and data are not always available

⇒ **Options for countries:**

- (a) manipulate**
- (b) estimate**
- (c) no action/response**

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Countries' Views

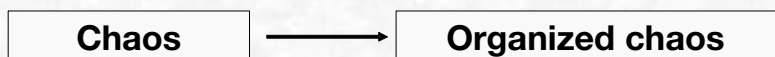
- Definitions should be meaningful and useful for planning and monitoring of efficiency and impacts
- Data should be available
- Cost of reporting should be reasonable
 - ⇒ Minimization of additional burden of international -level monitoring

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Main Objective of the Meeting

Moderator's Interpretation



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Specific Objectives of the Meeting

- 1. Identification of terms to be tackled**
- 2. Clarity about how to proceed in addressing the harmonization issue**
- 3. Agreement on the process towards consistency**
- 4. First steps to improve definitions**

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Agenda

- 1. Clarification of concepts and information requirements from the viewpoint of major conventions and fora**
- 2. Identification of the scope of the process**
- 3. Biome-specific definitions**
- 4. Follow-up process**

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Forest definitions in the context of the UNFCCC



Claudio Forner
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UNFCCC
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Contents

- Introduction
- Background for definitions
- The need for a forest definition
- Current definitions
 - Activities
 - Implications
- Future work on definitions

Introduction: Forests in the UNFCCC

Kyoto Protocol
Articles 3.3 and 3.4

BAPA

IPCC SR on
LULUCF

Bonn Agreement

Marrakech accords



Background for definitions

Paragraph 3 of decision 9/CP.4 requires SBSTA to draft a decision on definitions on activities related to Activities under Article 3.3 for adoption by the COP.

Paragraph 4 of the same decision refers to activities under Article 3.4

Background for definitions

Definitions for articles 3.3 and 3.4 were completed by SBSTA XIV. They were adopted by COP 7 in Marrakech, Paragraph 1 of the Annex to decision 11/CP.7.

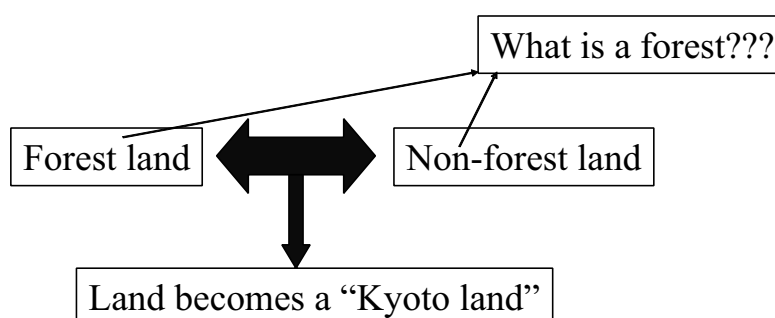
Forest related definitions included:

- Forest
- Afforestation and reforestation
- Deforestation
- Forest management
- Revegetation

The need for a forest definition

Article 3.3 of the Kyoto Protocol states that the net changes in GHG ... and removals by sinks resulting from ... afforestation, reforestation and deforestation... shall be used to meet commitments

Afforestation and reforestation require the definition of a forest.
Land use change is thought of as:



Current definitions: activities

crediting	debiting	Land type
Aforestation, reforestation	Deforestation	Forests
Forest management	Forest Degradation*	Forests
Revegetation	Devegetation*	non forests

The definition of “Forest”

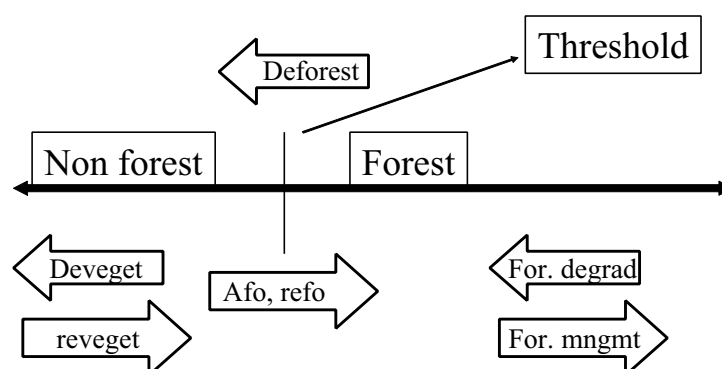
- A forest definition should serve the purposes of carbon accounting.
- Current definition is based on FAO
- It includes three thresholds (crown cover, area and tree height), to be selected by each party before the CP.

Defining the activities

- ARD activities are defined from a LUC perspective
- Activities must be human induced (component of additionality)
- Activities must have started since 1990

Implications

The definition of a forest plays its central role in defining lands that are to be considered for carbon accounting.



Implications

- There might be conflicts with national definitions and inventories of forests.
- The “since 1990” and “human induced” requirements of the definitions reduce the amount of accounted forests.
- Defining a threshold could have consequences on the credited carbon entering the system (e.g. forest management vs. reforestation and afforestation).
- Given the accorded rules, once a land is identified and accounted, it will have to remain accounted for all CPs

Future work on definitions

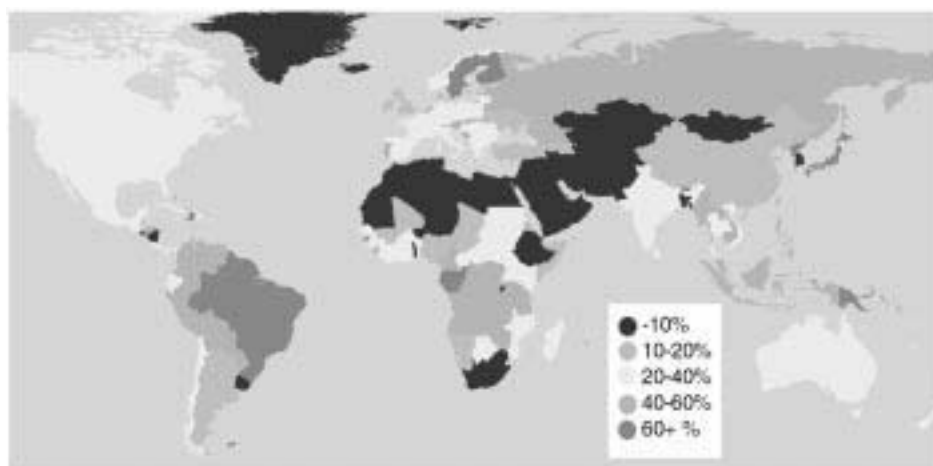
Task	To be adopted by:	Body in charge
Forest Biome specific definitions	COP X	SBSTA
Afforestation and reforestation under the CDM	COP IX	SBSTA
Degradation of forests and devegetation of other vegetation types	COP IX	IPCC

CONCEPTS & DEFINITIONS

SPECIAL NEEDS WITHIN THE IMPLEMENTATION OF THE UN CCD

FORESTCOVER & DESERTIFICATION

% OF COUNTRY UNDER FOREST



UNCCD - Desertification and Forest definitions

There is no UNCCD definition of forest but ... :

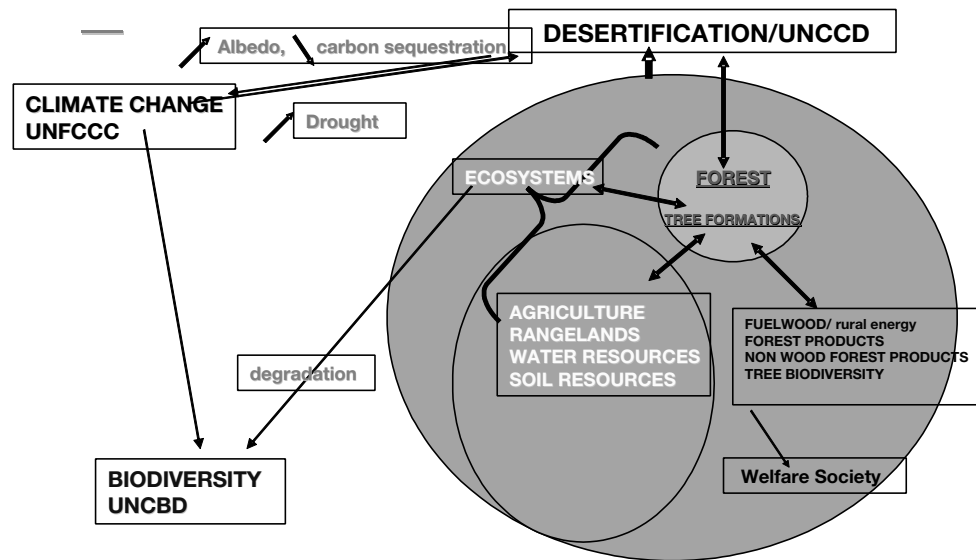
- Desertification is defined as a reduction or loss in drylands (=arid, semi arid and drysubhumid areas), of the biological and economic productivity and complexity of land;
- Forest is mentioned as one of the land component , as well are woodlands, croplands, irrigated lands, range and pastures.
- Drylands are areas which P/EPT is between 0.05 and 0.65 or which LGP is ranging approximately from 2 to 6 months
- *Desertification affects 36 M Km², 1/6 of the human population, 100 countries and costs 42 B Usd /year ;*
- Their specific problems are addressed in 5 annexes to the Convention.

UNCCD - Desertification and Forest definitions

From the UNCCD point of view, forest definitions should help better study and understand:

- Causes, State and Impact of the degradation of forest and remedial measures to rehabilitate dry forests and tree formations; often mentioned of interest / UNCCD are:
 - the resilience and equilibrium of main ecosystems/ watersheds;
 - the long term loss of natural vegetation
 - the fuelwood depletion
 - the reduction of agriculture productivity (role of tree in protecting agriculture and soils)
 - the decrease of valuable non wood forest products for the rural economy
 - the global warming (less carbon sequestration, more albedo)
 - the loss of biodiversity (tree species but also animal species through the destruction of forest related habitats)
- all levels of desertification : from local to global;
- various angles to combat desertification: investment projects, technical activities , research programmes, policy measures...

UNCCD - Desertification and Forest definitions



POTENTIAL NEEDS: BIOME-WISE GENERAL

- **Deciduous forests;**
- **Thickets;**
- **Open Woodlands;**
- **Savanna Woodlands;**
- **Tree Savanna**
- **Shrub savanna**
- **Steppes**

SPECIAL NEEDS: ECOGEOGRAPHIC ZONES: EXAMPLE OF ANNEX 1

- **Sudanian & Sahelian domains;**
- **the Zambezian domain**
- **the Madagascar and West Indian Ocean complex ...Etc;**
- **North African Mediterranean formations.**

SPECIAL NEEDS: THE PROCESSES

- **Degradation processes: negative modification of plant cover**
 - **deforestation;**
 - **devegetation**
 - **degradation of the parkland tree cover**
- **Improvement processes**
 - **Afforestation**
 - **Reforestation**
 - **Revegetation ...various forms, with increasing human inputs.**

OVERALL NEEDS OF THE CCD

- **THEY ARE REAL;**
- **THE PROBLEMS AND ISSUES INVOLVED ARE MANY;**
- **MORE AWARENESS WILL GENERATE & DIVERSIFY NEEDS.**

CONCEPTS and INFORMATION REQUIREMENTS under UNFF

FAO, Forests and Forestry

Intergovernmental forest fora

UNCED, Rio de Janeiro, 1992....

- **Intergovernmental Panel on Forests (IPF), 1995-97**
- **Intergovernmental Forum on Forests (IFF), 1997-2000**
- **United Nations Forum on Forests (UNFF), 2000-2005**

FAO, Forests and Forestry

UNFF

Intergovernmental body:

- **Facilitates implementation of proposals for action agreed by IPF/IFF**
- **Supported by Collaborative Partnership on Forests (CPF)**



FAO, Forests and Forestry

WHY definitions on UNFF agenda?

- **Part of one of the main functions of the UNFF: monitoring, assessment and reporting**
- **IPF/IFF dealt with concepts terms and terminology**
- **Wide collaboration is needed to advance the work**



FAO, Forests and Forestry

Definitions at UNFF

- UNFF does not debate on technical definitions

BUT

- Supports and facilitates the work (through policy dialogue)
- UNFF 2 (March 2002, Costa Rica)
- UNFF 4 (2004, Geneva)

FAO, Forests and Forestry

Information requirements under UNFF

- Progress in implementation of the IPF/IFF proposals for action
- Progress towards sustainable management of all types of forests (C&I)
- Review of the effectiveness of the UNFF process

=> UNFF 2...

FAO, Forests and Forestry

Among UNFF objectives

related to monitoring, assessment and reporting

**Common understanding on concepts,
terms and definitions**

(ii) Streamlining of reporting requirements

=>

**(iii) Reduce reporting burden on countries
and provide meaningful, reliable and cost-
effective information on forests**



FAO, Forests and Forestry

Harmonizing.



Forest-related definitions

Concepts and Information Requirements under FAO:

- **Land Cover Classification System (LCCS);**
- **Global Forest Resources Assessments.**



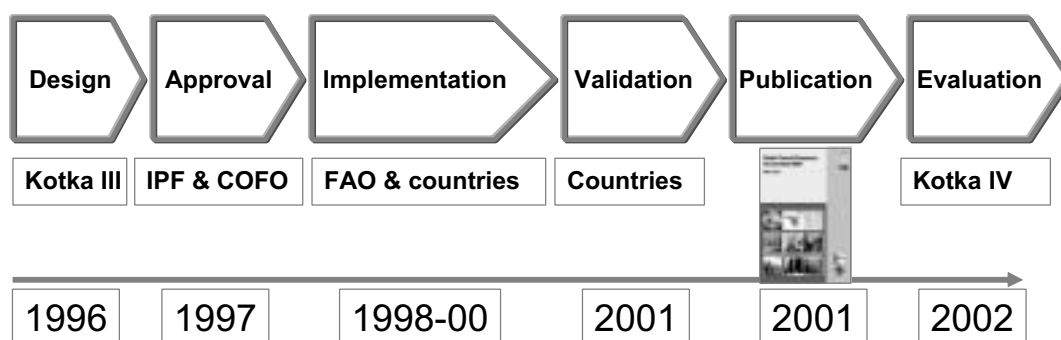
Forest-related definitions

Global Forest Resources Assessments



Global Assessment Process

FRA 2000 Timeline:

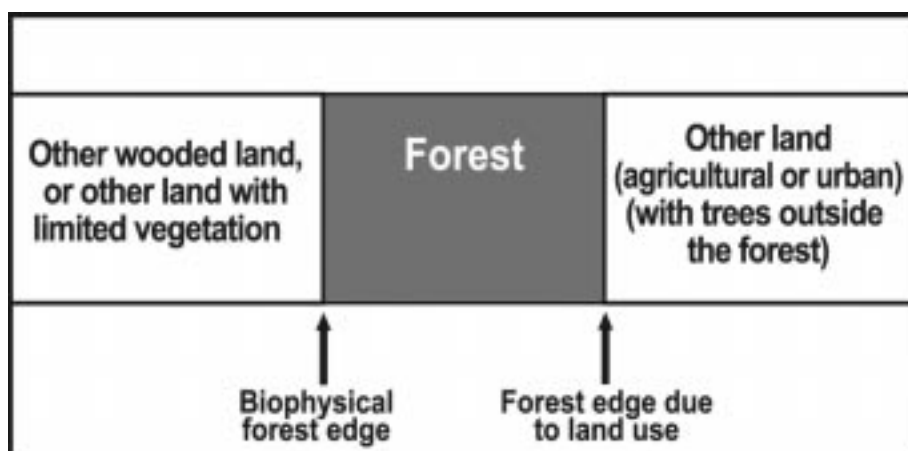


FRA 2000 “Forest”

- Kotka III agreed on variables and definitions;
- Common definition of Forest:
 - 10% crown coverage
 - over 5m potential tree height
 - over 0.5 ha in size
 - primary use = forestry
- Approved and used by all countries in FRA 2000;
- Also: Trees outside the forests.



FRA 2000 “Forest”



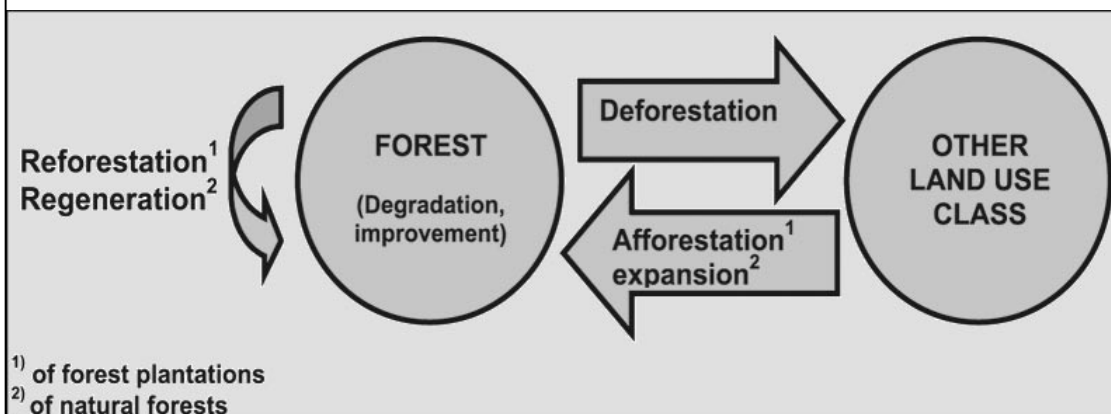
FRA 2000: Forest area change

- From Kotka III:
- Distinctions between:
 - Afforestation <-> Natural extension;
 - Land use change <-> Long-term degradation
- Reforestation not an area change.



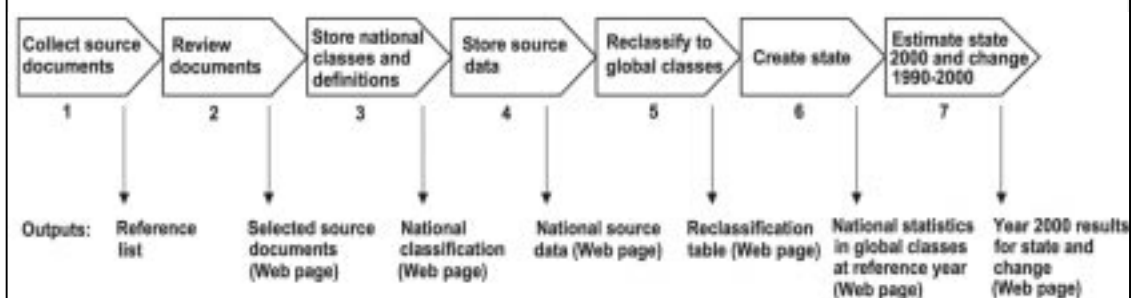
FRA 2000: Forest area change

- Clarifications made in FRA 2000 reporting:



FRA 2000: Documentation

• Transparency and Traceability:



Web page example

Forestry

Reclassification of national forest categories

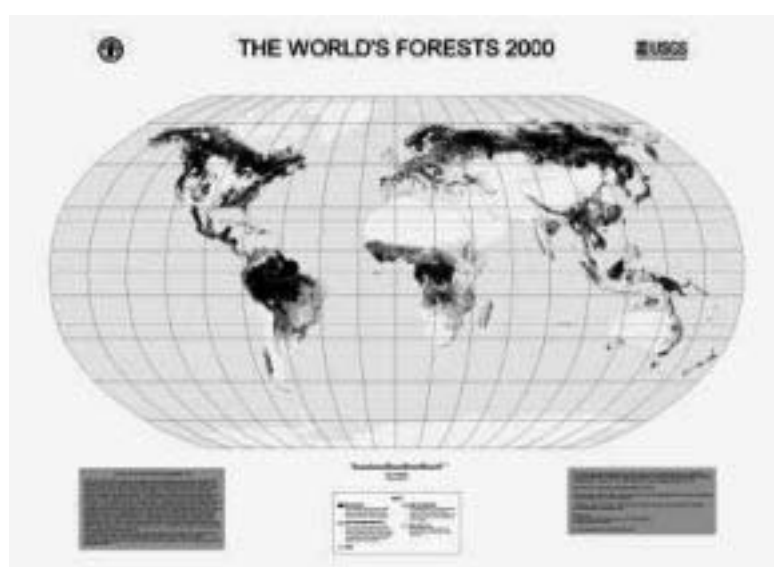
The table(s) below shows how the reported national categories of forest and other land uses are reclassified into the global classification system used by FAO. Hereafter, one national class fits within one global class, but one national class can fit into several global classes. The reclassification is done for each reported geographical unit.

References: Soket M., Muñoz A., Tapado R., Castella J. A., Barrios, 1995. Methodology and results of the Forestry Vegetation Mapping at 1:250 000 - FAGUAFEM, MAG/SO/013

For-Global	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
Global	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
Closed Forest (M1)	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%
Medium Closed Forest (M2)	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%
Open Forest (M3)	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%
Closed Low Land Forests (L1)	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%
Medium Closed Low Land Forests (L2)	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%	Closed Forest 100%
Open Low Land Forests (L3)	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%	Open Forest 100%
Thickets (T)	Closed Forest 2%	Open Forest 2%	Closed Forest 2%	Open Forest 2%	Closed Forest 2%	Open Forest 2%	Closed Forest 2%	Open Forest 2%	Closed Forest 2%	Open Forest 2%	Closed Forest 2%

Conclusions

- **Global FRA is an established and participatory process, involving all countries;**
- **The process includes definition aspects;**
- **A main purpose with global FRA's is to support policy development related to land use and the environmental functions of forests;**
- **Forest is regarded as a land use class;**
- **Accounting for forest and tree resources (and their changes) on all land may be an important future direction.**





EXPERT MEETING ON HARMONIZING FOREST -RELATED DEFINITIONS
FOR USE BY VARIOUS STAKEHOLDERS
Rome, 23 –25 January 2002

Identification of Forest Terms Which Need Definition

Dr. Markku Simula
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Tentative Elements of Definition Framework

- Objectives
- Needs and requirements of users
- Key terms and concepts
- Hierarchical structures
- Additional tools: linkages, “conversion factors, proxies, etc.

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Uses of International -level Definitions

- 1. Comparisons, benchmarking**
- 2. Reporting on obligations (FCCC, CBD, IPF/IFF, etc.)**
- 3. Implementing MEAs**
- 4. Making use of international instruments**
 - CDM, JI, ET, financing, certification, etc.**

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Information Needs

- 1. Analysis of land -use changes, differentiation and environmental status**
- 2. Monitoring of production potential**
- 2. Quality of management (SFM)**
- 3. Carbon accounting**
- 4. Monitoring of forest biodiversity**
- 5. Desertification: monitoring of soil and water**
- 6. Monitoring of implementation and impacts of policies (incl. Proposals for Action (UNFF))**

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Possible Clustering of Terms

1. **Carbon accounting**
2. **Type of forest (management)**
3. **Quality of forest**
4. **Type and quality of forest management**
5. **Other terms**

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Cluster (1): Carbon Accounting

- | | |
|---|---|
| ■ Afforestation | ■ Land cover |
| ■ Reforestation
– forestation
– regrowth | ■ Land use
– forestry |
| ■ Deforestation | ■ Forest
– forest land
– wood land |
| ■ Degradation | ■ Stand |
| ■ Devegetation /
revegetation | ■ Stocking |
| | ■ Tree |

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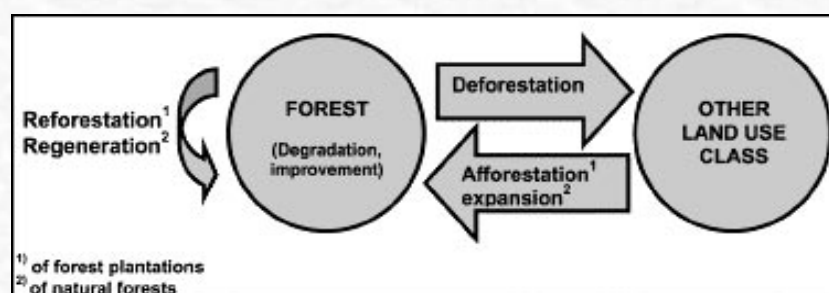
Examples of Forest Land Definition Criteria

	Definition type	Area	Crown cover %	Tree height m	Strip width m
FCCC	Use	0.5-1.0	10-20	2-5	
FAO-FRA	Use	0.5	10	5	20
WCMC	Cover		30		
UNESCO	Cover		40	5	
EU	Cover	0.5	10-20		
USA	Use	0.4	10	4	36
Russia	Cover		30		

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Forest Change Processes



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Elements of ARD Definitions

- Symmetry principle
- Land-use change
- Threshold level of canopy cover
- Human inducedness
- Temporary/permanent change

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Comparison of ARD Definitions

	FCCC	FAO
Forest	Min. 0.05 ha > Crown cover > 10-30% Tree height > 2-5 m	Min. 0.5 ha Crown cover > 10% Tree height > 5 m
Afforestation	Human-induced conversion of land not forested > 50 years	Other land use conversion into forest or increase of canopy cover > 10%
Reforestation	Human-induced conversion of non-forested land	Re-establishment of forest formation after temporary < 10% (human-induced or natural)
Deforestation	Human-induced From forested land	Conversion (incl. canopy < 10%) from forest Permanent loss for human- induced or natural perturbation

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Problem Areas in ARD Definitions

- **Young stands below threshold**
- **Data availability and classification**
- **Human inducedness**
- **Scale**

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Land Management

- **Revegetation and devegetation**
- **Forest management activities**
 - **eligible activities**
 - **broad vs. narrow: activity -based definition or land -based**
 - **end use of harvested wood products**

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Cluster (2): Type of forest (management)

- **Natural**
- **Plantation**
 - man -made
- **Secondary**
 - logged over
- **Semi-natural**

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Cluster (3): Quality of Forest

- | | |
|--|---|
| ■ Ancient <ul style="list-style-type: none">– antique | ■ Native <ul style="list-style-type: none">– indigenous |
| ■ Anthropogenic <ul style="list-style-type: none">– human disturbed– human induced | ■ Old <ul style="list-style-type: none">– mature |
| ■ Authentic <ul style="list-style-type: none">– naturalness | ■ Old-growth |
| ■ Climax | ■ Original |
| ■ Degraded | ■ Primeval <ul style="list-style-type: none">– virgin– pristine |
| ■ Fragmented | ■ Primary |
| ■ Frontier | ■ Productive / non-productive |
| ■ Low forest cover | |

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Forest Degradation

- **FAO:**
 - **Indicators:**
 - » change in canopy cover
 - » stocking density
 - **Benchmarking with**
 - » previous state
 - » natural state
- **CBD:**
 - **Secondary forest**
 - **BD loss through human activities**
 - **Benchmarking with natural forest type**

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Degradation: Operationality and Relevance

- **Adequacy of canopy cover and stocking density**
 - correlation with production potential
 - potential correlation with biodiversity
- **Appropriate spatial scale of assessments**
- **Carbon accounting**
 - inadequacy of canopy cover

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Fragmentation

- **Forest fragmentation** refers to any process that results in the conversion of formerly continuous forest into patches of forest separated by non-forested lands.
 - (i) Changes over time in the edge-to-interior ratio
 - (ii) Patch size
 - (iii) Proximity to development
 - (iv) Percentage of forest cover, etc.

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Degree of Human Disturbance

- **Natural forest undisturbed by man**
 - Forest which shows natural forest dynamics such as natural species composition, occurrence of dead wood, natural age structure and natural regeneration processes, the area of which is large enough to maintain its natural characteristics and where there has been no known human intervention or where the last significant human intervention was long enough ago to have allowed the natural species composition and processes to have become reestablished.
- **Natural forest disturbed by man**
 - Includes (i) logged over forests associated with various intensity of logging, (ii) various forms of secondary forest, resulting from logging or abandoned cultivation.
- **Semi-natural forest**
 - Managed forests modified by man through silviculture and assisted regeneration.

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Naturalness/Authenticity

- **Natural composition** of trees and other flora and fauna
- **Natural spatial variation** of trees with respect to age, size variety, spacing and presence of dead or decaying timber
- **Continuity of forest** (i.e., the length of time forest has existed on the site)
- **Integration of forest into the broader landscape** (under natural conditions some forest types will not contain continuous tree cover).
- **Management practices which mimic natural ecological processes** (These vary from region to region).

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Cluster (4): Type and Quality of Forest Management

Sustainable/unsustainable forest management

Integrated resource management/multiple-use forest management

Agroforestry and related terms

Urban forestry

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Cluster (5): Other Terms on the Status of Forest and Forest Land

Desertification

Forest health and related terms

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Clustering and Levels of Application

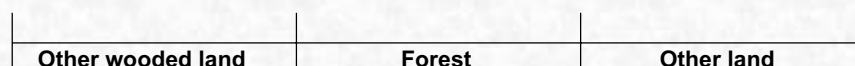
	Level of application					
	Global	Regional	Biome	National	Ecosystem	FMU
Carbon accounting	X	X	X	X		X
Biodiversity	X		X	X	X	X
Desertification	X			X	X	
Productive functions	X	X		X		X

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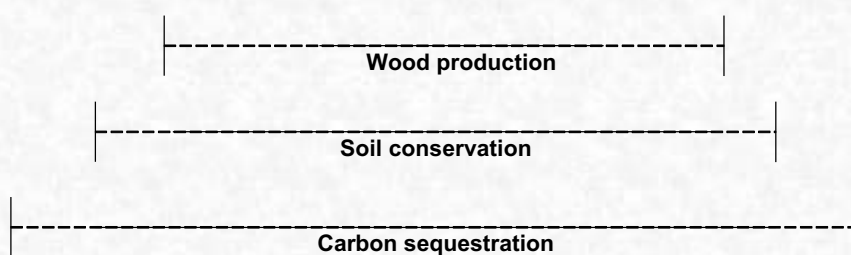


Comparison of Forest Classification Options

Classification based on land use (example)



Classification based on land functions



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Group Work Tasks

1. What are possible elements for framework for forest -related definitions
2. Identify key concepts and terms to be addressed. Consider need and possibility for harmonization or synchronization.
3. Usefulness of possible clustering and prioritization

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EXPERT MEETING ON HARMONIZING FOREST -RELATED DEFINITIONS
FOR USE BY VARIOUS STAKEHOLDERS
Rome, 23 –25 January 2002

Biome -specific Forest Definitions: Introduction and Overview

Dr. Markku Simula
Indufor Oy

Töölönkatu 11 A, FIN -00100 Helsinki, Finland
www.indufor.fi

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Proposals towards Biome-based Definitions

- **FCCC COP7 recommended to explore applicability**
- **CBD/SBSTTA recommended to review and adopt standard definitions to be used in global reporting on the state of forest types (2001)**
- **CCD/CST: need to maintain comparability between highly variable regions affected by desertification (1998)**

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Why Interest in Biome Specificity

- While global definitions may enable unambiguous objective measurements and comparisons, they are controversial. They ignore variation in biophysical and socio-economic conditions and are overly rigid.

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Application Experience: Canopy Cover Threshold

- Early FRAs used 10% for developing countries and 20% for developed countries (difference in forest inventory practices).
- IPF decided to apply a uniform global standard to allow international comparisons: 10%
- In dryland conditions this could be feasible but in many climate zones such a forest will not sustain itself.

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Potential Benefits of Biome Definitions

- **Incorporation of natural characteristics of each biome; relative abundancies and scarcities**
- **Change processes (e.g., deforestation) could be captured more realistically**
- **Status of biodiversity, non -wood forest products and forest -based services more accurately assessed**
- **Data collection adjusted to availability, and analysis more relevant to specific conditions**

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Role of Biome -based Definitions

- **Biome-based definitions are complementary to global ones but there is a need for**
 - **consistency**
 - **comparability**

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Definitions Related to Biome

- **A biome is the broadest forest classification. This reflects the ecological and physiognomic characteristics of the vegetation and broadly corresponds to climatic regions of the Earth.**
- **Within biomes, a forest type is a group of forested areas or stands of generally similar composition that can be readily differentiated from such groups by their tree species composition, height, and/or crown cover closure**

(UNEP/CBD/SBSTTA)

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Main Biomes

(Köppen System)

1. Tropical
2. Subtropical
3. Temperate
4. Boreal

FAO identified 20 global ecological zones, 13 with forest cover

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Biomes: Tentative List (1)

- 1.1 Tropical rainforest**
- 1.2 Tropical moist deciduous forest**
- 1.3 Tropical dry**
- 1.4 Tropical mountain forest**
- 2.1 Subtropical humid forest**
- 2.2 Subtropical dry forest**
- 2.3 Subtropical mountain forest**

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Biomes: Tentative List (2)

- 3.1 Temperate oceanic forest**
- 3.2 Temperate continental forest**
- 3.3 Temperate mountain forest**
- 4.1 Boreal coniferous forest**
- 4.2 Boreal tundra woodland**
- 4.3 Boreal mountain**

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Example of Biome -based Definition of Forest

Other wooded land (less canopy cover than forests or vegetation < 5 meters height)	Forest (> 10% canopy cover and no other dominating land use)	Other land (any other land including agricultural land, includes trees outside of forests)
	Forest in a tropical biome	

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Biome-based Classification: Elements

- Simple but consistent, not overly complex
- Limited number of classes; the higher the number, the more difficult to maintain comparability (forest types)
- Differentiated thresholds (canopy cover, stocking density, tree height, strip width, etc.)
- Threshold values could be chosen within specified limits but guidance would be necessary to avoid bias
- Differentiated definitions for planted forests, agroforestry , etc.

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Practical Aspects

- **Comparability and data collection at global level: clearly defined relations (FRA as proven experience)**
- **Threshold values to reflect relative similarities within global ranges; guidance lacking**
- **Decision-oriented at biome level**
- **Data availability**
- **Marginal costs vs. additional benefit**

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Areas of Further Work

1. **Objectives and uses of biome -based definitions**
 - broader uses (e.g., FRA)
 - specific uses (e.g., carbon accounting)
 - national interests
2. **Identification of biomass and types of forest for international -level use**
3. **Framework for**
 - identification
 - setting thresholds
4. **Consistency and compatibility between biome-level and global**
5. **Data: structuring of data collection, methods processing, reporting, analysis and manipulation**

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Terminology Management at FAO

(an Information Management Perspective)

Steve Katz
Chief, WAICENT/FAOINFO
F.A.O. of the U.N.

Expert Meeting on Harmonizing Forest-Related Definitions
Rome, Italy - 25 January 2002

From a global perspective

Harmonized Definitions and Terminology are vital:

- To communicate and understand effectively
- To achieve international understanding and agreements
- To compare and consolidate across national boundaries
- For scientific discovery
- For effective business processes
- For language management
- For effective information resource description and discovery

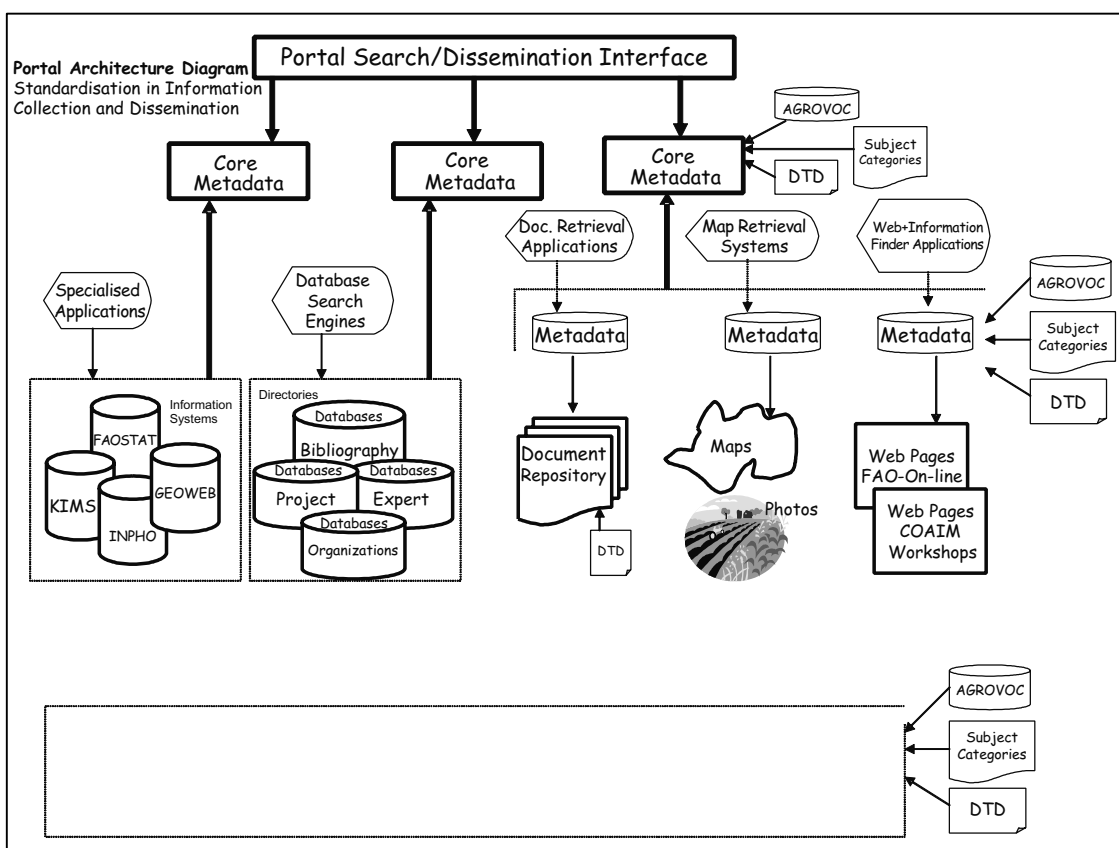
Terminology Management at FAO



WAICENT

- FAO's Strategic Program on Information Management and Dissemination (Key to implement component "E" of the Strategic Framework)
- Based on a Philosophy of Decentralization
- Sound Principles of Information Management
- Cooperation with Internal/External Stakeholders
- Primary Manifestation is WWW.FAO.ORG (20 million hits/month, 800,000 sessions/month)
- Outreach and Capacity Building Component
- Intergovernmental Process (COAIM)
- WAICENT made simple...

Terminology Management at FAO



The Information Access Problem

- Quantity of Internet information is spiraling out of control
- Standard search engines provide too many and non-relevant answers
- Only a small percentage of sites are Indexed
- Decentralization : Information is vastly dispersed around the World

The inevitable and obvious consequence:

- It is very difficult to find information on the Internet

Terminology Management at FAO

What to do? (Standards & Intl. Cooperation)

- Establish, adopt, and promote metadata and content management standards for web publishing
- Harmonize definitions, terminology, concepts, and relationships for more effective and contextual information retrieval
- Adopt existing open and International syntax and grammar standards (e.g. DC, XML, RDF(S))
- Partnership, partnership, partnership

Terminology Management at FAO

Evolution of Content Management

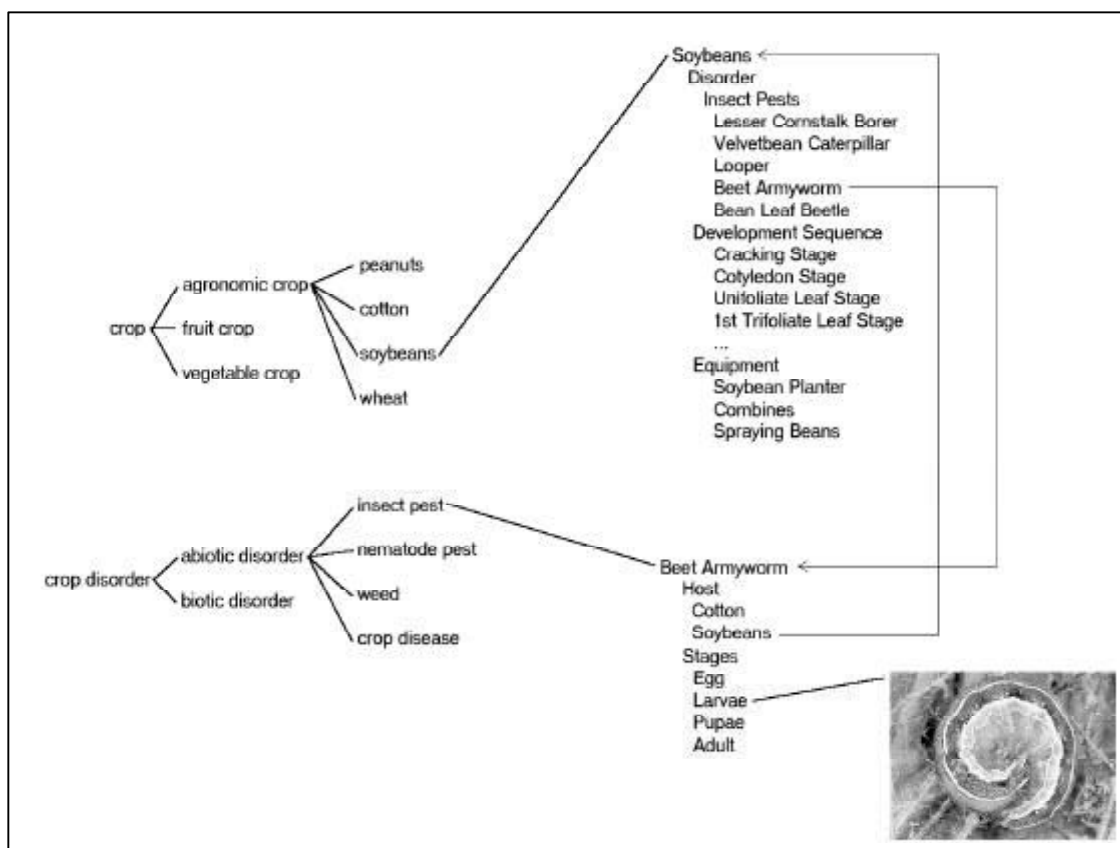
Pre-Web	Web	Semantic Web
Human indexing and document annotating	Machine indexing and document annotating	
Card and computer catalogues	Web catalogues on the templates of traditional catalogs	Machine readable metadata (RDF)
Human reading, checking and ordering	Full Text Search engines (Statistical text analysis)	Full Text Search engines (Semantic text analysis)
Libraries & Doc Centres	Implicit knowledge based web portals	Formal Knowledge based web portals
	Text Mining by Robots	
Thesauri, Classification Schemes, Glossaries, Keyword Lists,	Ontologies	

Terminology Management at FAO

What is an Ontology ?

- Webster Dictionary : a branch of metaphysics concerned with the nature and relations of being
- An ontology is a formal knowledge organization/ representation system:
- It contains concepts
- Information about these concepts (i.e. Formal Definitions)
- Relations between these concepts
- Instances of information associated with these concepts and relations

Terminology Management at FAO



Agricultural Ontology Service

- A normative framework managing ontologies in the Agricultural Domain;
- A vocabulary registry including our multilingual agricultural thesaurus AGROVOC, other specialized vocabularies in the subject area of agriculture, forestry, fishery and nutrition and possibly thesauri from other broader subject areas that overlap (example: Envoc)
- Define for each term its own concept namespace
- Define some properties formally for each term (RT, BT, NT, Usage, Scope, etc.)
- Relate a term to one or more other terms from the same or another thesaurus or controlled vocabulary
- Integrate general purpose classifications schemes (e.g. Dewey) or specific ones as the one for AGRIS/CARIS

Terminology Management at FAO

Agricultural Ontology Service

Records found: 5

1. xxxxxxxxxxxx
2. xxxxxxxxxxxx
3. xxxxxxxxxxxx
4. xxxxxxxxxxxx
5. xxxxxxxxxxxx

You may also be interested in...

[Biotopes](#)
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☒ Forestry

- ☒ Forest engineering
- ☒ Forest injuries and protection
- ☒ Forestry - General aspects
- ☒ Forestry production
- ☒ Processing of forest products

What would you like to view?

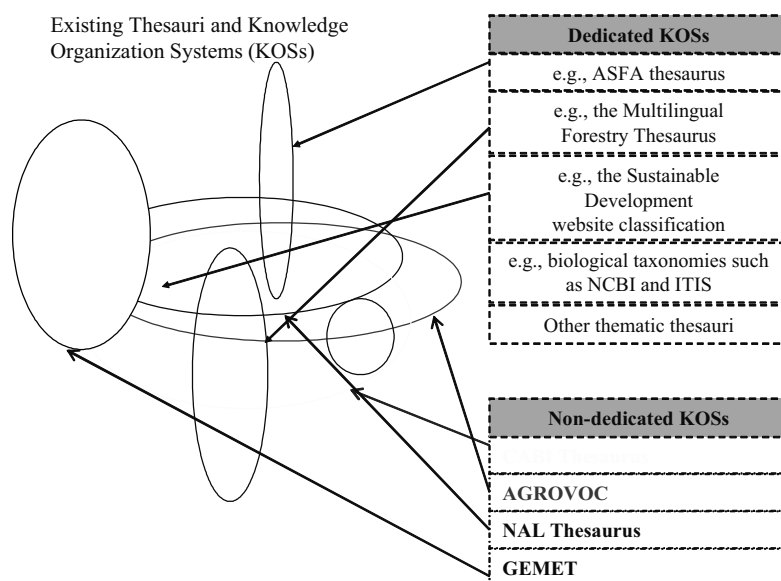
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You can further limit by:

Geographic area Africa ▼
 Type of resource Web page ▼

Terminology Management at FAO

Agricultural Ontology Service



Terminology Management at FAO

Agricultural Ontology Service

- The ultimate goal will be to provide a platform for multilingual interoperability between the authoritative controlled vocabularies within the agricultural community and with other related sectors
- A tool for facilitating information resource discovery on the internet and other digital media

Terminology Management at FAO

Agricultural Ontology Service

Concept note has been circulated

Participation in the first workshop:

- FAO (Food and Agriculture Organization)
- CABI (CAB International)
- Various FAO groups (Fishery, Forestry, Nutrition)
- University of Florida (Agricultural Department)
- National Agriculture Research Center (Japan)
- Participants from the OntoWeb Initiative
- GTZ
- And many others...

Terminology Management at FAO

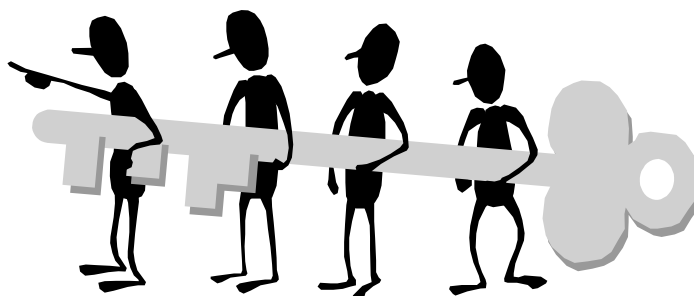
Agricultural Ontology Service

- A Launch Group has been established
- The Launch Group will develop a full project proposal
- The next Launch Group meeting is being hosted by CABI and is happening today!!
- In the meanwhile, further thesaurus development, mapping and linkages will take place

Terminology Management at FAO

“Information is only power if
you can find it!”

THANK YOU !!!!!



Terminology Management at FAO



Terminology Management

Renate Prüller

Coordinator SilvaVoc

Project on multilingual forest terminology

IUFRO Secretariat Vienna

Terminology - Concepts

Terminology

“... structured set of concepts and terms used to represent them in a specific subject field” (Wright & Budin, 1997)

“... make aware of difficulties in technical communication”

Terminology - Concepts

Concept

*“...cognitive (knowledge related)
representation of objects and facts”*

Term

*“... their linguistic expression or
linguistic label”*

Problems

**variety of
definitions**

**concepts change
with time**

**English
lingua franca ?**

**new terms -
neologisms**

... good terminologies reveal differences ...

Users - clients

- **Forest Scientists**
- **International Processes**
- **Decision-makers, politicians**
- **Students in forestry and related subjects**
- **Translators, Interpreters**
- **Information managers**

Tasks SilvaVoc

- **follow IUFRO's tradition**
- **information platform**
- **cooperation with forestry experts**
- **subject specific glossaries**
- **make results available on the Internet**
- **assistance in terminology work**

IUFRO	International Union of Forestry Research Organizations			
	SilvaVoc			
About SilvaVoc	English	Français	Español	Deutsch
Bibliography	SilvaVoc			
Database SilvaTerm	<p>The acronym is a composition of silva = forest, and voc = vocabulary.</p>			
Abbreviations	<p>http://iufro.boku.ac.at/iufro/silvavoc/</p>			
IUFRO In-house	Questionnaire			
Related Projects	<p>Contact person: Renate PRÜLLER IUFRO Secretariat Seckendorff-Gudent-Weg 8 A-1131 Vienna Austria</p>			
Archives				

International Bibliography of Dictionaries, Glossaries and Terminological Publications in Forestry and Related Sciences	
<p>SilvaVoc</p> <p>Readers' Guide Acknowledgments</p> <p>0 Forests, Forestry and the Utilization of Forest Products</p> <p>1 Factors of the Environment, Biology (incl. genetics, biodiversity, soil)</p> <p>2 Silviculture (incl. agroforestry)</p> <p>3 Work Science, Harvesting of Wood, Logging and Transport, Forest Engineering (incl. avalanche control)</p> <p>4 Forest Injuries and Protection (incl. forest health, forest fire)</p> <p>5 Forest Mensuration (incl. forest inventory)</p>	<p>4 FOREST INJURIES AND PROTECTION Dommages causés aux forêts et protection Daños en los Montes y Protección contra ellos Forstschäden und Forstschutz</p> <p>4.1 en(a/a) fr(a/a) BOUSQUET, Y <i>Beetles of Canada and Alaska</i>. Agriculture and Agri-Food Canada, Canada 1996 http://sis.agr.gc.ca/bird/beetles/english/html/home_e.html</p> <p>4.2 en(d,a) BRIGHT, D.E. <i>The Metallic Wood-Boring Beetles of Canada and Alaska. Coleoptera: Buprestidae. (The Insects and Arachids of Canada. Part 15).</i> Ottawa, Canada: Agriculture Canada, 1987. 335 p., 190x230 mm. ISBN 0-660-12517-X. \$: 14.90 -/17.40 -</p> <p>4.3 en(d,a) fr(d,a) CANADA. <i>Forest Fires Terminology. Section 3.</i> National Forestry Database Program. Canadian Council of Forest Ministers http://www.nrcan.gc.ca/cfs/poj/iesb/nfdp/cp95/text_e/sect33e.htm</p>



SilvaTerm Datenbank

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SilvaTerm

ist die forstliche Terminologiedatenbank, die bei IUFROs Terminologieprojekt SilvaVoc im Aufbau begriffen ist. Terminologie ist lebendiges Expertenwissen, daher handelt es sich nicht um eine statische Datenbank, sondern um einen **kontinuierlichen Prozess der Veränderung und Verbesserung**.

Die Datenbank baut sich gegenwärtig hauptsächlich aus Fachausdrücken und ihren Entsprechungen aus einem dreisprachigen Wörterbuch von T.B. Yerke, USA auf. Dieser Grundstock wird nun mit Definitionen und zusätzlichen Termini durch die Zusammenarbeit mit den IUFRO Arbeitsgruppen verbessert und ist in den nachstehenden Sprachen abrufbar:

**Englisch,
Französisch,
Spanisch,
Deutsch,
Italienisch,
Portugiesisch,
Ungarisch,
und Japanisch** (in Romanji Zeichen, Kanji Schriftzeichen suchen Sie in der Parallel-Datenbank in Japan unter <http://f9010.ffpri-109.affrc.go.jp/forterm/>)



SilvaTerm Database

[Back to Searchform](#) | [Search help](#) | [Input Form](#) | [SilvaVoc](#)

Search for terms in one language

Search for:	<input type="text" value="afforestation"/>		
Language:	<div>(please choose) ▼</div>		
<input type="button" value="Search"/> <input type="button" value="Delete values"/>			

Search for terms and equivalent terms

Search for:	<input type="text"/>		
Source Language	<div>(please choose) ▼</div>	Target Language	<div>(please choose) ▼</div>
<input type="button" value="Search"/> <input type="button" value="Delete values"/>			

 <div style="text-align: right;"> SilvaTerm Database </div>	
Back to Searchform Search help Input Form SilvaVoc	
English Term:	afforestation
Short Form:	
Synonym(s):	
Definition:	The establishment of a forest, stand or tree crop on an area not previously forested, or on land from which forest cover has very long been absent.
Cross Reference:	
Note:	If on land from which trees have recently been removed it is termed reforestation.
Source:	*FR
Hyperlink:	http://F010.fpri-109.affrc.go.jp/forterm/http://home.att.net/~gklun/DEFpaper.html
IUFRO Unit:	40407 SilvaPlan
Subject Field:	silviculture

Equivalent terms in other languages:

sp:	forestación
fr:	reboisement
pt:	reflorestamento
It:	rimboschimento
sh:	upandajimuti
jp:	zourin

Input Form

SilvaVoc is grateful for your help in improving the SilvaTerm database. If you click on the 'send form' button at the end of the form, your data will be submitted automatically via e-mail to the SilvaVoc Coordinator. Thank you. You may also use this form to send us comments on your experience with SilvaTerm.

TERM	<input type="text"/>
Language	<input type="text" value="Choose language"/>
Abbreviated form (Term resulting from the omission of any part of a term while designating the same concept. Types of abbreviated forms can include: short form, abbreviation, acronym, etc.)	<input type="text"/>
Synonym (Term that represents the same concept as the main entry term)	<input type="text"/>
DEFINITION (Statement that describes a concept and permits its differentiation from other concepts within a system of concepts)	<input type="text"/>

Person submitting this entry

Given Name	<input type="text"/>
Surname	<input type="text"/>
Email address	<input type="text"/>
Country	<input type="text"/>
IUFRO Unit	<input type="text"/>

Term database - how to present concepts with more than one definition ?

- Reference definition - parallel presentation of other definitions
- Harmonised definition - link to information on other definitions in use
- Other solutions ? - presentation of all referenced definitions

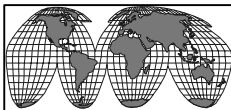
Homepage	Background	User's guide	English	References	
biological diversity			Français	Index	
			Deutsch		
			Español	alphabetical	systematic
<p>Reference Definitions:</p> <p>The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.</p> <p>Source: The Convention on Biological Diversity, Article 2, UNCED 1992</p>			<ul style="list-style-type: none"> • adaptability • biological diversity <ul style="list-style-type: none"> ◦ agrobiodiversity ◦ forest biological diversity • biotechnology <ul style="list-style-type: none"> ◦ genetic engineering ◦ genetic resources • conservation <ul style="list-style-type: none"> ◦ in situ conservation ◦ ex situ conservation ◦ genetic conservation • evolution/evolutionary processes • gene flow • genetic variation • genetic diversity • genetic resources <ul style="list-style-type: none"> ◦ value of genetic resources ◦ management of genetic resources • genera • genotype • gene pool • germplasm 		
<p>Other definitions:</p> <p>biological diversity or biodiversity is the total variability within all the living organisms and the ecological complexes they inhabit. Biodiversity has three levels - ecosystem, species and genetic diversity - reflected in the number of different species, the different combination of species and the different combinations of genes within each species. 5-10 million species are estimated to exist, and many of them have millions of</p>					



LCCS

LAND COVER CLASSIFICATION SYSTEM

GENERAL BACKGROUND



Land cover classification system



WHAT IS IT?

LCCS is

- a comprehensive methodology
- for description, characterization, classification and comparison
- of most land cover,
- anywhere in the world,
- at any scale and
- at different levels of detail.



**LCCS is a new world wide “language”
to allow a rational use and an easy
exchange of land cover information
between different countries, institutions,
and end users.**



New approach for land cover classification

Basic principle

A land cover class is defined by the combination of a set of independent diagnostic attributes, the so-called *classifiers* .

(trees, shrubs, herbaceous, closed, open, sparse, broadleaf, needleleaf etc.)

Gives possibility to define a wide variety of different land cover features



Land cover classification system



Major advantages of the method: Flexibility & Standardization

- **LCSS gives the possibility to define a large number of land cover features (appr.100.000)**
- **despite the large number all the classes have a very distinctive and unambiguous meaning**
- **LCSS creates an absolute level of standardization between the different uses**



Land cover classification system



Major possible applications:

- **all the land cover/natural resources mapping activities at any scale in any part of the world**
- **bridging system between land cover maps that use local or not standardized legends**
- **possible link between small scale global mapping activities and detailed large scale national mapping programs**
- **bridging system to link natural resources statistical census with mapping programs at national or regional level**



Background:

- LCCS is the result of many years of efforts of FAO and UNEP to harmonize data collection and management and to take a step towards an internationally agreed reference base for land cover (and land use);
- The initial concept of LCCS was discussed and endorsed by an international working group (60 experts) in Senegal (1996);
- Applied in Africover project, including 10 countries (8.5 Mkm²) at 1:200.000 scale;
- LCCS software is available from FAO (see report).



• While in full development (1997-1999) the system links with other international ongoing initiatives:

FDGC (U.S. Federal Geographic Data Committee)

ECWG (U.S. Vegetation Subcommittee and Earth Cover Working Group)

USDA Forest Service

IGBP (International Geosphere-Biosphere Programme)

LUCC (Land Use and Land Cover Change)

South African National Land Cover Database Project

ANNEX V

TASKS AND RESULTS OF WORKING GROUPS

Tasks for Working Group Sessions

Task 1: First group work session THE SCOPE OF DEFINITION PROCESS

All the five groups will address all these three questions.

1. What are possible elements for an adequate framework for forest-related definitions. These may cover such items as
 - objectives
 - needs, requirements and constraints of different users
 - key terms and concepts
 - hierarchical structures
 - classifications
 - linkages
 - “conversion factors” and proxies
2. Identify key concepts and terms which should be addressed in such an international level framework for forest-related definitions. Consider in particular terms which can or need to be harmonized or synchronized.
3. Is it possible or useful to cluster these concepts and terms, and if so, how could such clustering look like. How could the key concepts and terms be prioritized.

Task 2: Second group work session ON BIOME-SPECIFIC DEFINITIONS

Groups 1 (ARD) and 2 (FDRD)

1. Review the current definitions (ARD/FDRD) in view of harmonizing them or improving their comparability, and propose how they could be improved and related to each other.
2. Should there be biome-specific definitions for ARD/FDRD terms and how they could be differentiated.

Groups 3 (TROPICAL), 4 (TEMPERATE/SUBTROPICAL) and 5 (BOREAL)

1. Which priority terms and concepts should be defined at a biome level and why.
2. For which biomes should specific definitions be developed.
3. Develop proposals for how such definitions could be constructed (principles, indicators, other elements of characterization, etc.)

Task 3: Third group work session ON FOLLOW-UP ACTION

All the groups address the same questions.

1. What would be the objective and scope of the follow-up process towards harmonizing the current forest-related definitions.
2. What would be the next steps to be taken, e.g.,
 - finalization and communication of the results of this Expert Meeting
 - preparatory action to be taken to clarify the definitional framework and other open issues
 - future meetings in this and other fora (virtual and real)
 - consultation with, and participation of stakeholders, including identification of relevant interested parties
 - consideration of the results of other processes
 - integration of the results into other processes
3. Proposals for the responsibilities of the main tasks
4. Time-schedule of the first steps to be taken

Reports from Working Groups

Group 1: Afforestation, Deforestation and Reforestation, Task 1

Working group 23 Jan 2002 16:30 - 18:30

Lanly, Cruz Choque, Daamen, Holmgren, Keenan, Pande, Persson, Pipatti, Robledo, Schoene, Acholes

Q1: Elements of a framework

- Forest definitions need to be seamless with non-forest definitions
- Do not be driven by exceptions, try to be guided by the central concept
- Some international definitions cannot be tampered with: based in political and legal considerations

Q1: continued National vs international

- It is unavoidable that there will continue to be national concepts. The goal is to develop an international system in parallel.
 - For example, in India the legal delineation of *forest land* is the basis of definition
- Efficiency in linking national systems to the global systems is important

Q1: The context of definitions

- Definitions of A,R&D are highly use-specific.
 - The current ones are strongly based on UNFCCC/ KP considerations
 - The ARD definitions for CBD etc may be quite different

An organising framework

- Create an n-dimension array to order the large number of existing terms
- Dimensions of the definition-space
 - use
 - functions
 - management
 - physical structure (cover/trees)

Q2: key concepts (cont)

- Issues easy to quantify:
 - Geographic (Area)
 - Period (duration, time, start, end)
- Less easy to quantify:
 - Actors (natural process, management)
 - Functions
- It may be more important to harmonise over time than over space: consistency in trends rather than between nations

Issues relating to function

- Definitions relate to the functions of a forest
 - but can function always be related to an area?
 - area and what is on it are measurable, function and use less so
 - in many places there are multiple functions in one area
- Does function = use?
 - To foresters it may, but to ecologists it doesn't

The attributes of appropriately used definitions

- Essential features
 - unambiguous in the context
 - information-rich (predictive, useful, does the job it was intended for)
- Desirable features
 - practical, easily implemented in all countries
 - as simple as possible
 - easily translatable to national systems

Q1: a conceptual approach

- Create a system of continuously varying underlying attributes, from which any number of purpose-based classifications can be erected
 - cover and height are examples
 - 'naturalness' is another example

Q2: Key concepts and terms

- State concepts
 - Forest, non-forest, other wooded land
 - tree, cover, height,
- Transfer concepts
 - afforestation, deforestation, reforestation, forest degradation, (improvement?), devegetation, revegetation
 - human-induced
- Other
 - biome, forest management, land use

Comments on meeting structure

- Proposed structure is not ideal
- All groups should have an opportunity to discuss the global picture as well as their specific mandates

Group 1: ARD Task 2

24 January 2002 11:30-19:00

Lanly, Aldrich, Cruz Choque, Daamen, Holmgren, Keenan, Pande, Persson, Pipatti, Robledo, Schoene, Scholes

Biome definition considerations

- Biomes should be defined 'bottom up' (ie as a certain set of vegetation types) rather than on a climatic basis
- Many countries will include several biomes
 - using biome-specific definitions will increase reporting burden rather than decrease it

Why use biomes?

- The reason for investigating biome-specific definitions is their suggested potential within KP context to capture important changes which otherwise would be missed
 - eg in tropical areas, a 10 percent threshold may have missed most of the loss of carbon

- This may or may not be true; there may also be other ways of achieving the same end.
- Tiered approach, with a shared, simple, definition of forests at the top level, and then biome- or type-specific definitions at the next level may solve problems
- Biome-based concepts may advance UNFCCC and CBD, but it will also not solve all problems in all cases - for instance, biomes are not very relevant to social/use issues

Current definitions of ARD

Term	UNFCCC KP 3.3	UNFCCC KP 12 (CDM)	CBD	FAO/FRA
Afforestation	Defined:	Not yet defined	uses FAO 2000	Defined
Reforestation	Defined	Not yet defined	uses FAO 2000	Defined
Deforestation	Defined:	Not applicable	not defined, defines forest habitat loss	Defined

Afforestation in FAO/FRA 2000

- As applied by the FRA 2000, the conversion from other land use classes into forest, or the increase of the canopy cover to above the 10 percent threshold, can occur by two processes:
 - **Afforestation**, which requires direct human action. This is consistent with general forestry usage, where the word afforestation implies *planting or seeding* (ie an active human involvement) of the propagules. It currently does not clearly include less direct, but nevertheless deliberate, actions, such as assisted natural regeneration, but it is recommended by the ARD group that it should
 - **Natural expansion** of forest, which does not result from direct human propagation, but may result from actions such as protection of the land
- Note that FRA afforestation is not truly symmetric with FRA deforestation, since deforestation does not distinguish natural loss of forest area from human action. Natural loss may involve only small areas and unusual cases (natural fires, climatic fluctuations, volcanic eruptions)

Afforestation in Kyoto Protocol Art 3.3

- In KP 3.3, read with the Marrakesh Accord, afforestation is ‘the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding , and/or the human-induced promotion of natural seed sources’
 - is forested land the same as forest? The language was deliberate, but the logic is unclear. Was it to allow for young forests not yet above cover threshold?
 - the phrase ‘natural seed sources’ excludes other forms of regeneration such as vegetative propagation; this was probably not the intent and may not be interpreted literally

Afforestation Kyoto 3.3 vs FRA 2000

- The core definitions are fundamentally compatible;
 - both require direct human action and the anticipated or realised crossing of the forest/non forest threshold
- The exceptions are:
 - KP has the added provision that the land may not have been forested within the previous 50 years. FRA does not specify a period; the key issue is that there was previously a different land use class.
 - In FRA, the thresholds are 10 percent cover and 5m height; in KP it is chosen by the Annex 1 country in the range 10 to 30 percent and 2-5m height
 - KP may apply sustainability exclusions
 - KP afforestation includes human-induced promotion of natural seed sources, but FRA afforestation does not
- Assuming accurate reporting, FRA afforestation will generally, but not always, be a larger area than KP afforestation

Young forests

- Compatible in practice between KP 3.3 and FRA 2000
 - KP uses the phrase 'forested land' rather than forest (perhaps with the intent that the forest threshold does not have to have been reached at the time of reporting, but can reasonably be expected to be reached within a short period). The KP forest definition explicitly includes young forests.
 - FRA 2000 includes as afforestation forest plantations successfully established, but not yet across the forest threshold.

Afforestation in Kyoto Protocol Art 12

- In CDM, forest terms have not yet been defined. It is possible (but unlikely?) that a different range of thresholds could be adopted for article 12 than for article 3.3. This would have major impacts on area of land categorised as afforestation and deforestation
- CDM has a requirement to be consistent with sustainable development. It is likely to apply additional conditions, such as that it may not have adverse impacts on indicators of sustainability. The host nation defines sustainability.

Reforestation and natural regeneration in FRA 2000

- In general forestry and FRA usage reforestation is the active establishment, (through seeding or planting, of forest on land previously forested, but temporarily below the forest threshold, as a result of harvesting or natural disturbances.
- Natural regeneration on forest lands is defined and accounted separately, and is similar in concept but does not involve seeding or planting

- Lands undergoing reforestation or natural regeneration continue to be forest throughout; therefore neither are land use class transfer processes

Reforestation in Kyoto Protocol 3.3

- ‘Reforestation is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989’
 - ie, Reforestation in KP3.3 occurs on is the conversion of land that contained forests sometime between 1940 and 1990
 - This definition mixes three terms: non-forested land; forested land and lands that did not contain forests. These terms are not explicitly defined.
 - Reforestation under KP is afforestation under FRA 2000 since the land was previously under non-forest use
- See recommendation under afforestation section to eliminate the reforestation definition in second commitment period.

Deforestation

- KP definition: **Deforestation is direct human-induced conversion of forested land to non-forested land** (12 words, with supporting detail in Forest definition 129 words)
- FRA: **The conversion of forest to another land use or the long-term reduction of the tree cover below the minimum 10 percent threshold.** (24 words, plus 202 word explanation, plus 179 word forest definition)

Comparison of KP and FRA

- **Agreement:**
 - non-temporary change from forest to non-forest
- **Differences:**
 - FRA can also be a change in land use from forest use to other use
 - FRA includes both human induced and natural perturbation
 - KP does not exclude orchards, agroforestry, urban forests

How long is temporary?

- Unspecified in either KP or FRA
- Does it depend on intent?
- Does it depend on the inventory period?
 - Within the period
- Is it necessary?
 - A survey repeated every decade could just depend on a change in cover

Human-induced

- FRA does not distinguish between direct human-induced loss of forest and loss for any other reason. KP *only* includes direct human induced loss of cover.
- Non direct human-induced forest loss is possible, and may be significant.
 - Climate change, fire regime change, flooding
- Danger of asymmetry in the FRA definition could be fixed

Minimum area considerations

- Consistency is essential between minimum area for forest, afforestation and deforestation in a given country
 - If, as a result of deforestation, a patch falls below the minimum area chosen, it needs to be reported as completely deforested.
- Note that FRA minimum area (0.5 ha) is 9 high-resolution remote sensing pixels, while smallest KP minimum area is just 1.

Group 1: ARD, Task 3: Recommendations

- Future users should not lightly adopt new definitions without first seeing whether existing definitions would suffice
- CBD should check that it is indeed quoting and using the FRA 2000 definitions of afforestation and reforestation correctly
- FAO should consider expanding its definition of afforestation to include assisted regeneration not involving direct seeding or planting, and to differentiate direct human-induced deforestation and forest area loss through any other causes
- UNFCCC should consider, in the second or subsequent commitment period, dropping the 50-year period previously unforested requirement on afforestation. This would eliminate the need for a separate definition of reforestation and bring KP afforestation numbers into closer agreement with FRA afforestation numbers.

25 Jan 2002: way forward

- Harmonisation: 2 possibilities in theory
 - Q one reference definition,
 - (too late, not mandated)
 - R a harmonised set
 - an inventory (thesaurus) of definitions
 - (already have this mostly in place: IUFRO, FAO, Lund) , then
 - analysis
 - convergence where feasible
 - unnecessary incompatibilities removed
 - links, similarities and differences made clear
 - recognising that some are legally binding

Strategy: getting ahead of the game

- *Anticipate* the need for definitions, review options and suggest compatible/suitable definitions
 - eg biodiversity, IPCC, CDM, KP second commitment period
- *Participate* in processes developing definitions
 - identify existing or planned processes,
 - raise awareness in them of existing definitions,
 - provide outputs from this process,
 - provide technical expertise
- Raise awareness at *national level* on the benefits of consistency and coordination in definitions
- Conduct and/or promote pilot projects and capacity building dealing with definitions
 - test requirements for reporting under the trial definitions

Concrete actions

- Get Jan 2002 **meeting report** out asap
- Proactively **communicate** findings to stakeholders
 - SBSTA, IPCC, ITTO, UNFF, etc (as listed in invitation letter)
 - implement things that can be done immediately
- **Conceptual framework**
 - urgent need
 - promising start and interesting ideas
 - process is still in development - give it more time to mature before finalising it
- Small working group? Commissioned concept notes?

Schedule

- Workshop on cooperation between conventions and international bodies (soon)
- UNFF Collaborative Partnership on Forests 3-14 March 2002 Costa Rica
- UNFCCC workshop on definitions for CDM April 2002, Bonn (?)
- CBD CoP April 2002
- IPCC (series of meetings on LULUCF: Good Practice etc)
- FAO Regional Forestry Commissions meetings (ongoing)
- FRA Kotka IV July 2002 Finland
- IPCC Expert Meeting on definitions and inventory methods for degradation and deforestation July, Finland
- COFO March 2003
- UNFCCC CoP 9 Dec 2003

Responsibilities

- Meeting report and dissemination: FAO
 - small group to edit and synthesise
 - include Simula background paper

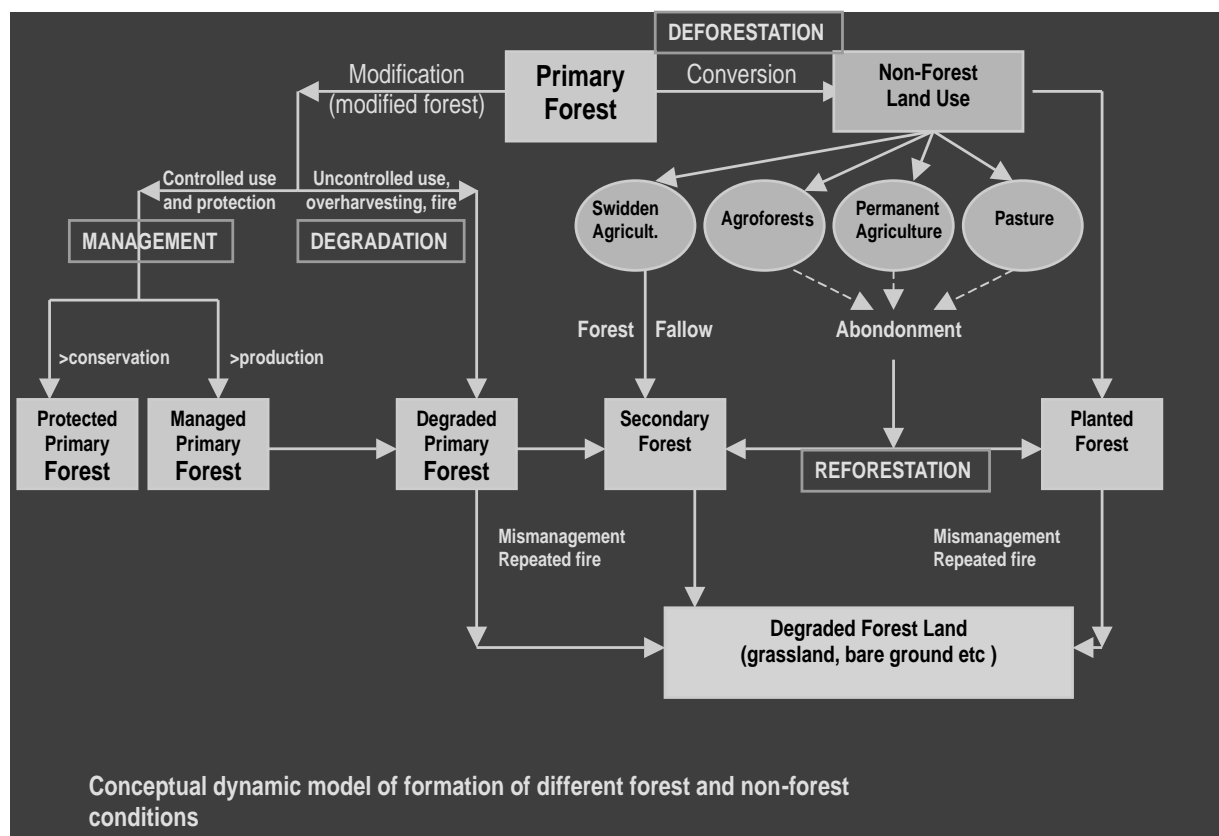
- Ongoing harmonisation process:
 - CPF umbrella,
 - FAO driver,
 - involve all stakeholders (IPCC, CBD etc)
 - technical inputs *inter alia* from IUFRO and FAO

Group 2: Degradation & revegetation, Task 2 & 3

<ul style="list-style-type: none"> • Noble • Amano • Goldberg • George • Forner • Barton • Gounandakoye 	<ul style="list-style-type: none"> • Masripatin • Chatterji • Blaser • Reichert • Sène • Mackensen • And others
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Degradation

- Clarify concepts
- Look at existing definitions
- Identify core components and ideas in those definitions
- Create a generic template
- Check against a number of cases



Degradation

- In a general sense, forest degradation is the long-term reduction of the overall potential supply of benefits from the forest, which include wood, biodiversity and any other product or service. [FAO - process]
- A degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. It has lost the structure function, species composition or productivity normally associated with the natural forest type expected at that site. [CBD - state]
- All those forests or forest lands that have been altered beyond the normal effects of natural processes through human activities or natural disasters, as fire, landslide etc. [ITTO in prep - state]
- In a general sense, forest degradation is the long-term reduction of the **overall potential supply of benefits from the forest**, which include wood, biodiversity and any other product or service. [FAO - process]
- A degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. It has lost the structure function, species composition or productivity **normally associated with the natural forest type** expected at that site. [CBD - state]
- All those forests or forest lands that have been altered beyond the **normal effects of natural processes** through human activities or natural disasters, as fire, landslide etc. [ITTO in prep - state]

Reference point

- *Move from status quo?*
 - overall potential supply of benefits from the forest
- “Natural forest”
 - normally associated with the natural forest type
 - normal effects of natural processes
- Who determines the appropriate set of goods and services?
- Over what time frame should the change be assessed?
- Event driven versus slow, chronic degradation.
- Attribution – “natural” versus human

Core definition

- Define the reference point
- Define an agreed set of important variables (axes)
- Define metrics that measure the change of a forest (ecosystem) away from the reference point

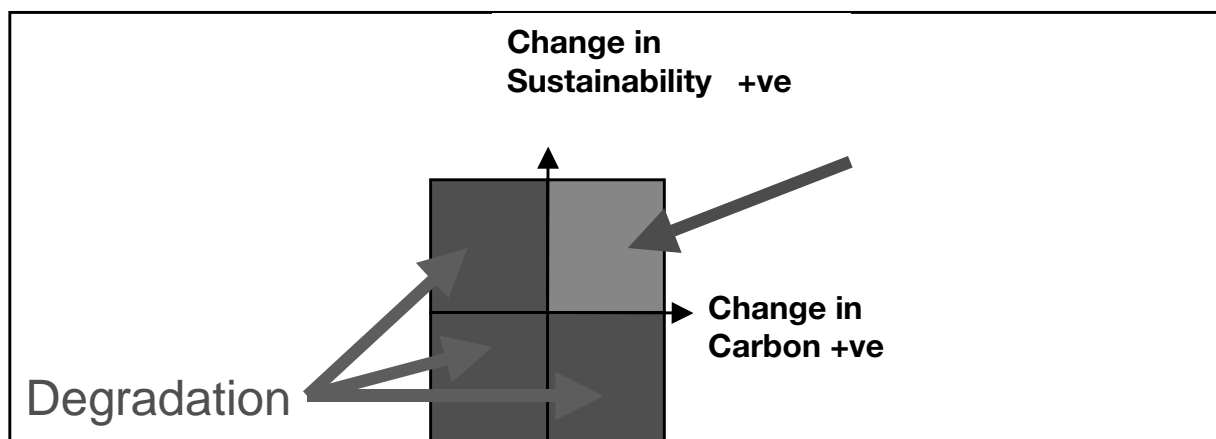
- Seek proxies for these metrics if necessary
- A negative change in any metric represents degradation
- Process or state definitions (state requires threshold value and that will probably have to be assessed by forest type)

BUT - What might constitute an agreed set of axes/metrics?

- Eventually agreed that a composite metric representing sustainability would be a core axis in any international negotiation
- Then other metric(s) added to represent the particular interests of the particular use

Example – UNFCCC

- Core elements — “Forest degradation is the *long-term* reduction of either the sustainability of a forest or in the carbon density (measured as carbon mass per unit area).”



Assessing sustainability

- For forests, there are certification processes in place and these are the obvious starting point

Reality check !

- UNFCCC
 - This would require a party to map the sustainability and current carbon density of all of its managed forests, and to ...
 - Potentially accept a penalty for forests where either criterion was not met.

- BUT !!!
 - What to do with “unsustainably” managed forests in which carbon density is increasing?
 - Definitions will need to be “tuned” to their context

Revegetation & devegetation

- Should any definition apply only to non-forest situations?
- Or, should they be sufficiently generic to cover all ecosystems?
- Which conventions etc needed such definitions and how would they use them (UNFCCC very specific)
- Problems defining devegetation to include slow soil carbon loss without the loss of vegetation cover
- Sustainability certification not as well developed outside forest ecosystems

Tentative conclusions

- The existing major definitions of degradation (and its opposite) are already essentially compatible
- A generic definition could be developed without greatly disrupting existing use
- The use of proxies (eg % cover) will continue, but more work is needed in validating their appropriateness and translating them into information about the key item of interest.
- Eg Translating % cover to tC/ha
- This will have to be forest type specific

Remaining tasks

- Harmonise with the work on the definitions on forests etc
- Widen search for existing definitions and stakeholder views
- Look more at the context in which the terms revegetation and devegetation will be used

Group 3: Tropical Biome Forest Definitions, Task 1

Group: T. Krug, K. Mac Dicken, O. Syphan, W.M. Razali, E. Trines, S. Kainja, O. Shakacite, S. Rietbergen, H.F. Maître, E. Müller, A. Di Gregorio, F. Castaneda, J. Tschirley

Group process

- Identified terms defined in: FCCC, CBD, CCD, ITTA, UNFF, FRA and those that are used across agreements/processes
- Pondered elements of framework
- Discussed key concepts/elements

Terms used in selected agreements or processes

- FCCC
 - Forest, deforestation, afforestation, reforestation, degradation, revegetation, forest management, cropland management, grazing land management
- CBD
 - Primary forest, secondary forest, biological diversity, forest biome, reforestation, plantations, afforestation, forest degradation
- CCD
 - Land, land degradation

Terms defined by agreement/process

- ITTA
 - Forest management, forest degradation
- UNFF
 - Sustainable forest management, criteria and indicators
- FRA
 - Forest, deforestation, afforestation, reforestation, forest degradation

Terms used by agreement

TERMS	FCCC	CBD	CCD	ITTA	UNFF	FRA
Afforestation	X	X				X
Reforestation	X					X
Forest	X	X				X
- Primary		X		X		
- Secondary		X		X		
Degradation	X	X	X (land)	X		X
Forest management	X			X	X	

Key concepts: Why harmonize?

- Assumption: Purpose is to harmonize, not necessarily unify definitions
- Harmonizing needs be done for one of two reasons:
 - Reduce cost/effort associated with data collection, analysis and reporting – unifying reporting requirements
 - Improve functional links between binding international agreements related to forests
- There may be room to unify *components* of definitions across agreements

Key concepts: Most urgent need

- Climate change related definitions
- For climate change convention
 - Most definitions in place
 - Second commitment period still open
 - CDM-related definitions critical
- Biome-specific definitions to be considered for future commitment periods (those beginning 2013)

Key concepts: Constraints to bridging the definitional divide

- Can be grouped by definitional basis:
 - Function: e.g., ecosystem service or socio-economic objective
 - Biophysical parameters: e.g., height, crown cover, area
- More thought needs to be given to how to harmonize across these two broad classes of definitions

Definitions may have mixture of each definitional class

- CCD and FRA: biophysical and functional
- CBD: functional
- FCCC: essentially biophysical, except CDM which also has a functional component
- ITTA: production functions

An example: Degradation

- Harmonization needed to allow the monitoring of changes in forest quality, test compliance with conventions, and hold parties responsible
- Substantial overlap between degradation (process) and degraded forests (state)
- Major differences in definition across agreements (e.g., capacity to regenerate)

Clustering may be useful...

- For example, clusters might include:
 - Terms related to loss of forest function
- Degraded forest
- Degradation
 - Terms relevant to restoration of forest production/function/quality
- Restoration
- Rehabilitation
- Regeneration

Group 3: Tropical Biomes, Task 2

Group process

- Discussed biome definitions and relative value of these compared to forest type definitions
- Tested differences in suitability of definitions for key terms across FRA four tropical forest types:
 - Tropical rainforest, tropical moist, tropical dry and tropical shrub lands
- Considered definitional weaknesses and proposals for future actions

Priority terms

- Biome, forest type
- Forest, deforestation, reforestation
- Degradation

Which problems do we solve by moving to a biome classification?

- Not many
- Added clarity comes only at the forest type level or below
- Group focused on forest type implications of definitions

Climate change definitions in tropical context

- For Kyoto Protocol, forest, forest degradation, deforestation definitions relate to developed country forests only – and thus do not relate to tropics (with a few exceptions such as northern Queensland)
- Key tropical definitions are those related to CDM uses of afforestation/reforestation and possibly biodiversity

Thresholds for forest x tropical forest type for the CBD

	Cover <10%	Tree height <5m
Rainforest	No – standard should be higher	No
Moist	No – possibly	No
Dry	Maybe -	Maybe
Shrub land	Probably	Probably

Thresholds for reforestation x tropical forest type for the CBD

	Conversion from <10% cover to 10% or more
Rainforest	Yes – should be higher
Moist	Yes – should be higher
Dry	Maybe
Shrub land	No

Terms for which definitions may not differ across forest type

- Degradation:
 - no difference across forest types using *existing* definitions
 - Existing definitions may be inadequate because they do not take into account the relative levels of resilience in different forest types
 - Structural changes as they relate to functional biodiversity are not considered

Do we need to nest forest mgmt. under forest type definitions?

- Is the definition needed for forest the same for plantations and natural forest?
 - Probably not!
- What about the process of degradation?
 - Also probably not – natural forest degradation and plantation degradation will use different criteria
- Is the definition of degradation the same for bioenergy plantations and long-rotation timber?
 - Again, probably not.
- So it seems we need to include forest management

Are we moving toward integrated, multipurpose inventory systems?

- If we need to reduce costs, we need to find greater efficiency
- Integration of data collection and reporting could provide such efficiency gains
- Systems could be designed to integrate sampling for all reporting requirements:
 - Timber/NTFP/soils
 - carbon stocks
 - selected biodiversity
 - socio-economic variables

Information needs...and initial proposal

- Specific information needs include:
 - Indicators of resilience by forest type
 - Structural change thresholds to indicate degradation
- Proposal elements
 - Use forest type definitions based on ecology and/or silvics
 - Natural vs. planted, possibly management within these sub-classes

Group 3: Tropical Biomes, Task 3

Objective and scope of follow-up process

- Find ways to improve efficiency of data collection, analysis and reporting
- Identify in detail the scope for harmonization of forestry-related definitions among conventions (CBD, CCD, FCCC)
- Elaborate implications of thresholds

Next steps?

- Inform other bodies working on harmonization/coordination (such as the convention liaison group) of progress and plans
- Virtual meeting has major limitations of access (particularly for developing countries) and communications effectiveness

Next steps...

- Identify small number of key questions for consideration
- Use a consultant and small task force to do follow-up and basic preparation for next meeting
- Invite an open review of draft document prior to next meeting

Proposed responsibilities

- Communicate outcomes of this meeting (FAO)
- Constitute Task Force that includes expert knowledge of each convention (joint FAO/IPCC/CIFOR/IUFRO)
- Identify main issues for further consideration, prepare draft paper (Task Force/consultant(s))
- Provide draft paper to participants of second expert meeting (FAO and co-sponsors)
- Second meeting (FAO and co-sponsors)

Time schedule for next steps

- First meeting report: Monday morning at 0800 GMT (Markku)
- Just kidding – report to reach participants by mid-February (Markku)
- Task force constituted: mid-February
- Participant response to first meeting report: end February
- Task Force (+ consultant?) prepares document for next meeting: end of April/beginning May
- Task force document distributed prior to next meeting: third week of May
- Next meeting: second half of June

Group 4: Temperate/ Suptropical Biomes, Task 1

Group: G. Lund III, J. Pretzsch, J.A. Prado, C. Schneider, R. Birdsey, N. Hamza, G. S. Mugnozza, J. Blaser, T. Rollinson, T. Hiraishi, R. Gommès, G. Bondaruk, J. Plesnik.

Temperate/Subtropical Biome Forest definitions

- Core information on land cover; is it biome specific ?
 - crown cover yes (could be 10 percent, 20 percent)
 - trees yes (but not clear)
 - stripwidth no
 - area no
 - (leaf area) ?
 - (biomass) ?
 - Land use no (but long discussion)

Observation: Biocentric biome concept is overlapped by actual land use (anthropocentric)

- For example in the temperate European forest zone hardly any original forest exists.
- Socio-economic parameters and land use systems which are far from nature play an important role in both “biomes”.
- An integration between both concepts seems to be necessary in future.

Forest types with necessity for further definition

- Temperate forest
 - arid forest (China)
 - saline forest
 - high altitude forest
 - low forest cover areas
- Subtropical forest
 - maquis
 - cloud forest
 - arid zone forest
 - low forest cover areas

Land use types

- Ordination by increasing anthropocentric influence
 - protected natural forest
 - managed natural forest (sustainable management ?)
 - plantation (see group 1 & 2)
 - agroforestry (much discussion, concept not clear)
 - agriculture & grazing (limitation towards forestry not always clear, fruit trees, palms etc.)
 - urban forestry (how to include ?)

Some results

- the biome concept does not bring enough drivers for a better classification
- overlapping of anthropocentric issues is difficult to deal with
- additional information on special types of forests is necessary for further discussion (saline, dry temperate, agroforestry etc.)

Lessons learnt

- a land use related focus requires further systematic comparative review of definitions from different stakeholders and in different contexts (conventions etc.)

Group 4: Task 2

Scope of the process...

- Objectives
 - reporting processes have to be deliverable to the public and to politicians in a consistent and understandable form.
 - interests of different stakeholders have to be integrated
 - the definition process has to be open for the integration new appearing stakeholders (p.e. social dimension)
 - agreement on forest-related definitions underlines the paradigmatic shift, towards more integration of forestry in other disciplines and sectors.

Scope of the process...

- Further objectives
 - reduction of transaction costs by a unified, simple reporting system, which is relevant for different stakeholders and required by information demanders
 - reduce information burden towards necessary common core elements (core/key indicators)

Procedure

- Two possible approaches are identified:
 - **inductive approach** which is based on one definitorial framework (p. e. FRA) , enlarging it in a step by step approach with the integration of other conventions/processes needs and requirements. Advantage: historical genesis of definition evolution as well as the meaning/philosophy of processes is taken in account.
 - **deductive approach**, all conventions and processes are compared in relation to forest related definitions in one step. Advantage: no preference is given to one “starting point definition”
- The group agreed on the deductive approach

Specific procedural proposal

- matrices with conventions and processes on the horizontal level (including related stakeholders) and definitory terms on the vertical level.
- differentiate the matrices in two steps:
 - **land cover**, which is related to biophysical descriptions (more static) and
 - **land use**, which includes the interpretation of change (more complex and dynamic)
- Look for common definitions and identify inconsistencies
- concentrate on inconsistencies between key indicators, which are relevant for different conventions/processes
- integrate more elements, which might not be well placed in the two steps (p.e. biodiversity aspects)
- Feed back between the steps is important (question of land use change may require change in definition of land cover)

Group 4: Task 3

Follow up

- Objectives to follow
 - provide support to forestry related processes by harmonization of forest related definitions
 - choosing land cover system (LCCS)
 - recognize the biogenic and anthropogenic overlap in land use
 - considering the above:
 - systematic review of the definitions (the proposed matrices)

Systematic approach

- Identify inconsistencies
- identify gaps
- core requirements
- (use available information sources p.e. silva voc)

Scope

- Forest related conventions and processes
- set priorities by proximate commitments (next meetings)
- identify other stakeholders (for example ILO)

Next steps

- Communicate
 - progress report from this meeting
 - establish matrices of conventions and processes for each definition
 - list of potential stakeholders, particularly data providers
 - Recommend that convention and processes SBSTA include coordinating data requirements on their agendas (e.g. New York next week)
- ask FAO to be secretary of definition process
- hire consultant to prepare matrices
- obtain commitment from working group to review and comment
- consultant organizes feed back
- form small working groups for specific aspects (on email base)
- new state of the art report by consultant
- second meeting
- time schedule: soon

Group 5: Boreal Biome Forest Definitions, Task 1

Group: A.Shvidenko (Chair), B.Haddon (Rapporteur), R.Prüller, K.Prins, M. Aldrich, C.Schmullius, J.Jakobson, D.Goldberg

- The group started with a discussion of possible strategies of harmonizing forest-related definitions. Two basic options were considered. The first is to use principles of a facet classification, i.e., to consider the needs of different users (international conventions) independently, and try to formulate the requirements of users in a non-contradictive way that could result in internationally accepted harmonized (unified) definitions. The second is to apply a hierarchical approach united by a general idea, if the latter would be able to satisfy the major requirements of users and would be flexible enough taking into account major goals of the process of harmonization. Both of these approaches have advantages and shortcomings. Finally, the group came to the conclusion that the Sustainable Forest Management Paradigm (SFMP) is relevant to be considered as an overall and adequate basis for harmonizing forest-related definitions due to the following reasons: (1) the SFMP is an internationally well known, developed and accepted political and negotiation process; and (2) the SFMP is professionally realized by sets of criteria and indicators. The criteria of the SFMP (1) are very similar in all national and international lists and for all forests biomes of the planet, (2) cover requirements of major (probably all) groups of stakeholders, and (3) are expressed by professionally solid indicators, which generates a direct linkage to forest-related definitions.
- Using the SFMP as an adequate framework for harmonizing forest-related definitions provides explicitly defined objectives [which are close to those indicated in the background paper]: harmonized definitions should promote in the most effective way (1) maintenance and increase the extent, productivity, vitality and sanitary state of forests; (2) preservation of biodiversity at all levels; (3) maintenance and improvement of the biospheric role of forests, in particular, the impact of forests on the global carbon budget, as well as on the budgets of other greenhouse gases; (4) increase the protective role of forests in all ramifications; (5) prevent the deterioration and degradation of natural landscapes; and (6) satisfy the economic, social, cultural and spiritual requirements of human society to forests.
- Discussing the concepts and framework of the harmonization, the following ideas were expressed. It is necessary to aim at developing a unified set of “core definitions”, which would cover major terms [forest land, (closed) forest, open woodland, ARD, degradation, etc.] and could be used at the global level. The group considered the process of harmonization as a long-term activity, as a process of mutual education, which would promote the improvements of definitions at the national level, as well as definitions formulated in different international processes and conventions.
- It was pointed out, that the process of harmonization of forest-related definitions could be of limited significance if major forest hierarchical classifications [e.g., forest types, major forest land-cover categories, etc.] and accounting for schemes [e.g., the full carbon budget] are not included in the process. Such an approach would eliminate evident difficulties of

the process of harmonization and significantly promote the process of reporting at the global level. In particular, some “biome-generated” problems could be solved at this stage.

- An opinion was expressed that compatibility of harmonized definitions with the requirements of current information technologies [e.g., geographical information systems, remotely sensed data] should be taken into account. The process of harmonization should support the developments of global databases, which would serve as a basis for a continuous process of improving of mutual understanding at the global level.
- Discussing the major general terms [forest, open woodlands, ARD, etc.], the group came to the conclusion that FAO (FRA-2000) definitions are most relevant to be used as the basis for the process of harmonization of forest related definitions. For instance, the FRA-2000 definition of forests is acceptable for the boreal zone, although some biome-related clarifications should be done [at the second level of the hierarchical classification of the cluster “forest” (or “forest land”)]. However, the group identified that the definition of “degradation” considered in the background paper is ambiguous, because it does not contain some crucial thresholds: duration of the process (phenomenon) and change (decrease) a value which would be used for identifying degradation.
- Considering the interests of the different stakeholders, it was pointed out that the process of harmonization of forest-related definitions should be considered in the most common way, for instance, based on a land-cover approach. This means that the forest should be considered as a land (cover) class among other land classes, which would provide a complete coverage of land. There are a number of reasons for this: (1) forest management is coming to a landscape-ecosystem basis, (2) the full greenhouse gases budget could be reliably estimated only using a landscape-ecosystem approach, etc.

Group 5: Boreal Forest Biome, Task 2

Do we need biome-based definitions?

- We need biome-independent terms and definitions at the global level - so called “core” terms.
- This does not preclude biome-specific complementary clarification consistent with global definitions.
- *Which priority terms and concepts should be defined at a biome level and why?*
- Tested “core” terms for applicability to the boreal biome.
- Forest and ARD
 - FAO definitions are acceptable, but thresholds may need to be revised for boreal biome (e.g., tree height, % crown cover)
- Revegetation/devegetation
 - (relevance to forest-related definitions?)

Which priority terms and concepts should be defined at a biome level and why?

- Forest Management
 - FCCC definition acceptable for boreal biome
 - (no threshold need be specified if there is full carbon accounting)
 - raises the question of the need for definition of “managed forest land”
- Forest Degradation and Improvement
 - uncomfortable terms because value judgements, but there seems to be a need to have these terms
 - depends on the stakeholder/context - not the biome
 - requires a temporal component

Forest Degradation and Improvement

- Suggestions for definition:
 - When a group of stakeholders agree on a value attributed to a state of the forest, degradation is a decrease in that value and improvement is an increase.
 - Hence, implementation of these concepts requires harmonization on values between stakeholders.

Group 5: Task 3

Follow-up Process

Objective and Scope

- Satisfy the requirements of all the international conventions and fora in a streamlined way
- The ultimate list of forest-related definitions should be based on accepted indicators of SFM.
- Converge on FRA definitions
- Regional and sectoral definitions classification and accounting schemes should fit into the global framework of definitions

Next Steps

- Transmit results of this meeting to various C&I processes and take account of developments in those processes, e.g., revised indicators.
- Establish an inter-secretariat working group
- Negotiate joint reporting structure on the model of FAO/ECE/EuroStat/ITTO joint forest sector questionnaire

- Develop a list of terms that should be harmonized.
- Prepare a “manual” for the clarification and development of new terms and definitions that could serve all stakeholders
- Investigate the need for additional biome-level and forest type-related thresholds
- Make differences between definitions visible and transparent

Next Steps (Cont'd)

- Ask FCCC and CBD how much data in TBFRA and FRA already serves their purposes.
- Discussion/working groups by topics?

Responsibilities for Main Tasks

- Biome-specific scientific groups
- Peter Holmgren
- Meeting participants to provide info relevant definitions to new Inter-secretariat,
- Meeting participants to act as bridge to other groups
- Inter-Secretariat Working Group (FAO, IPCC, FCCC Secretariat, CBD Secretariat, IUFRO):
 - Prepare the list of terms to be harmonized
 - Establish discussion/working groups to address the list of terms
 - Negotiate joint reporting structure

Time Schedule

- March - UNFF
- July - Kotka IV: Consider the implications of this meeting for FRA process; analyse existing FRA terms and definitions; possible expansion
- April, 2003 - Ministerial Conference
- September, 2003 - WFC