

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

***FAO – IPCC-CIFOR- IUFRO-UNEP
11 - 13 september 2002 - Rome, Italië***

Eveline Trines, Ministerie van VROM, Den Haag
Gijs van Tol, Expertisecentrum LNV, Wageningen/Ede



**landbouw, natuurbeheer
en visserij**

© 2002 Expertisecentrum LNV, Ministerie van Landbouw, Natuurbeheer en Visserij

Rapport EC-LNV nr. 2002/169
Ede/Wageningen, 2002

Teksten mogen alleen worden overgenomen met bronvermelding.

Deze uitgave kan schriftelijk of per e-mail worden besteld bij het Expertisecentrum LNV onder vermelding van code 2002/169 en het aantal exemplaren.

Oplage	40 exemplaren
Samenstelling	Eveline Trines, Ministerie VROM, Den Haag Gijs van Tol, Expertisecentrum LNV, Wageningen/Ede
Druk	Ministerie van LNV, directie IFA/Bedrijfsuitgeverij
Productie	Expertisecentrum LNV Bedrijfsvoering/Vormgeving en Presentatie Bezoekadres : Marijkeweg 24 Postadres : Postbus 30, 6700 AA Wageningen Telefoon : 0317 474801 Fax : 0317 427561 E-mail : Balie@eclnv.agro.nl

Inhoudsopgave

1	Achtergrond, doel en programma	5
1.1	Doel van de bijeenkomst	5
1.2	Programma en werkwijze	5
2	De resultaten van de 5 werkgroepen	7
2.1	Groep 1. Bos in relatie tot andere landgebruik en de overgang/omzetting van bos naar niet-bos (en omgekeerd).	7
2.2	Groep 2. Veranderingen binnen het bos	7
2.3	Groep 3. Bosbeheer en de conditie van bossen	7
2.4	Groep 4. Classificatie van bossen	8
2.5	Groep 5. Specifieke problemen van low forest cover countries.	8
3	Plenaire bespreking van de resultaten en vervolgacties	9
4	Te nemen acties	11
	Bijlage 1: Agenda	13
	Bijlage 2: De taken van de 5 groepen	15
	Bijlage 3: Concept conclusies en aanbevelingen	17
	Bijlage 4: Analytical Framework on forest-related definitions	37
1	Introduction	38
2	Objectives	40
3	Approach	41
3.1	Methodology	41
3.2	Scope	42

4	Comparative framework and Options for harmonization of definitions	46
4.1	Forest	46
4.2	Threshold Defining Stand Characteristics	47
4.2.1	Expansion of Existing Definitions of Forest	49
4.2.2	Summary of Options	49
4.3	Forest Land	49
4.3.1	Relationship with 'Forest'	50
4.3.2	Relationship with Other Land Use Classes	50
4.3.3	Summary of Options	52
4.4	Non-forest	52
4.4.1	Definitions	52
4.4.2	Option for Further Work	55
4.5	Changes between Forest and Non-forest	55
4.5.1	Definitions	55
4.5.2	Afforestation and Natural Expansion of Forest	55
4.5.3	Reforestation	57
4.5.4	Deforestation	57
4.5.5	Summary of Options	58
4.6	Forest Degradation	58
4.6.1	Definitions	58
4.6.2	Compatibility of Existing Definitions	59
4.6.3	Composite Index	59
4.6.4	Other Considerations	61
4.6.5	Summary of Options	62
4.7	Managed Forests	62
4.7.1	Definitions	62
4.7.2	Summary of Options	64
4.8	Forest Classification	64
4.8.1	Biome	64
4.8.2	Forest Type	65
4.8.3	Forest Ecosystem	67
4.8.4	Differentiated vs. Universal Definitions	67
4.8.5	Summary of Options	69
4.9	Natural Forest vs. Forest Plantation	69
4.9.1	Definitions	69
4.9.2	Summary of Options	71
4.10	Low Forest Cover	71
4.10.1	Definition Approaches	71
4.10.2	Summary of Options	72
5	Conclusions	73
	REFERENCES	75

1 Achtergrond, doel en programma

De noodzaak voor een proces van harmonisatie is aangegeven in de 2e sessie van UNFF, CBD CoP 6 en UNFCCC SBSTTA 16.

In de eerste bijeenkomst (23- 25 januari, 2002 in Rome) is vastgesteld dat:

- meer algemeen geaccepteerde definities van bos gerelateerde onderwerpen de coördinatie tussen de verschillende internationale conventies kan verbeteren en de lasten voor rapportage kan beperken.
- zo veel mogelijk aangesloten zou moeten worden bij bestaande definities
- de definities in artikel 3.3. en 3.4 van het Kyoto protocol compatible zijn, met uitzondering van "reforestation"

de "biome specific approach" niet aansluit bij het huidig landgebruik en de status van bossen, en dat het gebruik van "bostypen" (of vegetatietypen) mogelijk beter voldoet. Naar aanleiding van deze eerste bijeenkomst is een "Analytical Framework on forest-related definitions" opgesteld.

1.1 Doel van de bijeenkomst

Het doel van deze bijeenkomst was de bespreking van het framework, met als resultaat opties te formuleren voor het harmoniseren van forest-related definities, voorstellen te doen voor het implementeren van de opties en aanbevelingen te maken voor verdere acties.

De basis voor de besprekingen vormde het "Analytical Framework on forest-related definitions" (zie bijlage 4). De belangrijkste definities die onder de loep genomen zijn, zijn: forest, afforestation, reforestation, deforestation, degradation, en managed vs. un-managed forest.

De bijeenkomst is georganiseerd door FAO, in samenwerking met IPCC, CIFOR, IUFRO en UNEP. Aan de bijeenkomst namen 54 mensen uit alle continenten deel; van de belangrijke internationale conventies was vooral UNFCCC (cq IPCC) sterk vertegenwoordigd. De CCD was niet aanwezig. Voor Nederland namen deel E. Trines (VROM) en G. van Tol (ECLNV)

1.2 Programma en werkwijze

Na de opening door de plaatsvervangend DG van de FAO, M. Hosny El Lakany, en een korte plenaire sessie met o.a. inleidingen door de voorzitter, W. Killmann (FAO), de moderator en opsteller van het analytical framework, M. Simula (Indufor), werd een groot deel van de tijd besteed aan discussie in vijf werkgroepen. Voor het algehele programma en de discussiethema's van de 5 groepen, zie respectievelijk bijlage 1 en bijlage 2.

2 De resultaten van de 5 werkgroepen

2.1 Groep 1. Bos in relatie tot andere landgebruik en de overgang/omzetting van bos naar niet-bos (en omgekeerd).

De definities van FRA, UNFCCC en CBD zijn in hoge mate vergelijkbaar. Er zijn 2 belangrijke verbeterpunten:

1. UNFCCC hanteert een flexibele range van drempelwaarden voor bos (minimale hoogte 2 – 5 m., oppervlakte 0,05 – 1 ha); landen zijn vrij om binnen deze range te kiezen. Keuze voor de door FRA gehanteerde grenswaarden (hoogte 5 m en oppervlakte vanaf 0,5 ha) heeft grote voordelen omdat dan aangesloten kan worden bij de reeds bestaande inventarisaties.
2. FRA kent geen bos met overwegend ander landgebruik (veeweide b.v.), UNFCCC wel. Het is nog niet duidelijk hoe dit kan worden opgelost.

Verder zijn er enkele kleine verbeterpunten, zoals het nader omschrijven van tijdelijk onbebost land in CBD en UNFCCC, de aanbeveling aan FRA om bij afforestation niet alleen planten en zaaien, maar ook bevorderen van spontane verjonging op te nemen, en de aanbeveling aan UNFCCC om de eis van "50 jaar niet bos" voor bebossing te laten vallen.

2.2 Groep 2. Veranderingen binnen het bos

Het begrip "forest degradation" is niet bruikbaar om een status van bossen aan te geven; kronenbedekking is slechts een van indicatoren voor de degradatie van bossen. Verlies aan "veerkracht" is een andere indicator voor degradatie, maar hiervoor zijn geen duidelijke grenswaarden. Alternatieven, zoals een samengestelde index of natuurlijkheid als referentie lijken ook niet erg bruikbaar. In het eerste geval is weging van de onderdelen een gevoelig punt, in het 2^e geval is natuurlijkheid niet objectief te definiëren en zijn de functies niet direct gebonden aan natuurlijkheid. Andere ondersteunende termen zijn beter bruikbaar, zoals rehabilitatie (herstel van functies, aar bos niet identiek aan situatie voor degradatie) en restoration (zelfde functies en structuur als voor degradatie). Een nadere analyse van de rapportage verplichtingen is wenselijk voor verdere harmonisatie pogingen.

2.3 Groep 3. Bosbeheer en de conditie van bossen

Het definiëren van "beheerd" en "onbeheerd" bos blijkt complex, mede doordat er verschillende schaalniveaus zijn en doordat het begrip "forest management" uit het Engelse taalgebied in veel Europese landen niet bestaat en wordt opgesplitst (bv Duits: Forstliche planung, Forsteinrichtung, Verwaltung, Betriebswirtschaft). De definitie van "forest management" van UNFCCC wordt onderschreven; met de component "duurzaamheid" wordt in deze definitie impliciet gesteld dat er ook niet-duurzaam beheer is.

De bossen die volgens de FAO classificatie vallen onder de definitie "managed" sluiten hier niet goed op aan; onder de FAO definitie vallen zowel bossen die duurzaam beheerd worden (in de zin van SFM, met evenwichtige aandacht voor alle

bosfuncties) als ook bossen die niet op duurzame wijze worden beheerd of geëxploiteerd. Strikt genomen is namelijk ook bij niet duurzame exploitatie meestal sprake van "planning" en "management" om efficiënt te werk te gaan. P.M. Relevantier dan de discussie beheerd of onbeheerd is het om informatie te verschaffen over de doelstellingen van het beheer en de mate waarin de verschillende functies gerealiseerd worden; dat wordt momenteel in verschillende regio's uitgewerkt aan de hand van Criteria en Indicatoren voor duurzaam bosbeheer (o.a. in Helsinki-proces, Montreal-proces, Tarapoto-proces).

Voor de definities van boscondities is onderscheid gemaakt in "planted forest" en "natural forest".

- planted forest (volgens ITTO definitie), met subgroep plantation forest (conform FRA en ook CBD, maar met uitzondering van het begrip secundair bos¹).
- "natural forest" met als subgroepen
 - Primary forest (CBD definitie) is identiek met undisturbed forest (FRA definitie); "old growth" wordt beschouwd als een subset van primaire bossen.
 - Degraded (primary) forest ITTO definitie; Gegeven de conclusies van groep 2 lijkt hier modified meer op zijn plaats; belangrijk voor de verdere onderverdeling is welke functies worden vervuld en in welke mate de bossamenstelling wordt beïnvloed. (zie schema bijlage 3. Conclusies)

De categorie "semi-natural forest" wordt ook beschouwd als subcategorie; deze zou zowel onder aangeplant of onder natuurlijk bos kunnen worden ingedeeld. (PM. Achteraf is het misschien toch te overwegen om deze categorie op het eerste niveau te handhaven (naast aangeplant en natuurlijk bos) en daarin mengvormen onder te brengen zoals "enrichment plantings" of "plantations" met veel natuurlijke ontwikkelingen. Deze categorie is met name voor Europa belangrijk. vT).

2.4 Groep 4. Classificatie van bossen

De conclusie is dat voor FRA, CCD, CBD en UNFCCC niet persé verdere differentiatie van de kernbegrippen (b.v. naar bostypen) noodzakelijk is. Wel lijken alle processen baat te hebben bij een algemene bosclassificatie. De indeling van FAO in ecologische zones is hiervoor het meest geschikt; de indeling is gebaseerd op vijf hoofdgroepen (tropical, sub-tropical, temperate, boreal en polar), die verder is ingedeeld in 20 klassen. Een verdere onderverdeling kan bruikbaar zijn voor sommige processen, maar is niet voor iedereen nodig. Een aanvullend niveau van bosclassificatie zou vooral gebaseerd moeten zijn op bosfuncties (zie ook managed / unmanaged)

2.5 Groep 5. Specifieke problemen van low forest cover countries.

Voor landen met weinig bos (<10 % van het landoppervlak) is geen aparte classificatie nodig; wel kan het nuttig zijn om een "procesdimensie" (zoals verwoestijning, overexploitatie, regeneratie etc.) toe te voegen als "verklarende factor".

¹ De term secundair bos uit de CBD definitie sluit niet aan bij de gangbare invulling van het begrip secundair bos zoals dat vooral in de tropen wordt gehanteerd.

3 Plenaire bespreking van de resultaten en vervolgacties

De resultaten van de groepen zijn plenair besproken; dat leverde echter geen wezenlijke veranderingen meer op. Vastgesteld wordt dat de resultaten (c.q. aanbevelingen) nu opgepakt moeten worden binnen de verschillende mondiale processen.

Daartoe zijn de volgende concrete stappen voorgesteld:

- uitdragen van de resultaten via een breed verspreide "policy brief"
- voorstel om de FAO indeling in ecologische zones te gebruiken als basis voor de bosclassificatie in alle verdragen
- streven naar verdere harmonisatie van de rapportage verplichtingen (UNFF heeft hiertoe ook al een aanzet gegeven).
- Inbreng in de government review van de IPCC Good Practice Guidance (verwacht in december 2002).

De vertegenwoordigers van internationale processen die deelnamen aan de bijeenkomst spelen ook een belangrijke rol spelen bij de verdere uitwerking van de aanbevelingen; het is daarom spijtig dat de CBD zo zwak vertegenwoordigd was.

De (concept) conclusies van de bijeenkomst zijn opgenomen in bijlage 3.

Tot slot was er algemene steun voor de opvatting dat er geen noodzaak is voor verdere bijeenkomsten van dit expert Panel.

4 Te nemen acties

Uit de bijeenkomst volgen geen specifieke acties voor directe opvolging door EC-LNV of anderen.

Wel zijn de resultaten van de bijeenkomst (zoals in concept vermeld in bijlage 3) van belang voor alle vertegenwoordigers in internationale gremia. Zo veel mogelijk aansluiten bij bestaande en algemeen geaccepteerde definities van bos gerelateerde onderwerpen kan de coördinatie tussen de verschillende internationale conventies kan verbeteren en kan de lasten voor rapportage beperken.

Het onderhavige verslag zal in Nederland verspreid worden aan alle bij dit dossier betrokken ambtenaren en deskundigen.

De deelnemerslijst en de werkgroepverslagen zijn op aanvraag beschikbaar bij Gijs van Tol (tel: 0317 – 474875; e-mail: g.van.tol@eclnv.agro.nl)

Bijlage 1: Agenda

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

Rome, 11–13 September 2002

PROVISIONAL AGENDA

Wednesday, 11 September 2002

08.00 – 09.00	Registration of participants	
09.00 – 09.30	Statements on the process by: FAO IPCC IUFRO CIFOR UNEP IPCC	M. Hosny El-Lakany G. Love H. Schmutzenhofer R. Nasi J. Mackensen D. Tirpak
09.30 - 09.45	Stocktaking, objectives, scope, expected results of meeting and further steps	W. Killmann
09.45 – 10.15	Coffee break	
10.15 – 10.25	Latest developments in CDM, IPCC and FRA processes of relevance to meeting	D. Schoene P. Holmgren
10.25 – 10.45	Introduction into Draft Analytical Framework	M. Simula
10.45 - 11.00	Tasks of Working Groups	M. Simula
11.00 - 12.00	Start of group work	
12.00 – 13.30	Lunch	
13.30 – 15.00	Group work	
15.00 – 15.30	Coffee break	
15.30 – 17.30	Group work	
20.00	Dinner hosted by Mr M. Hosny El-Lakany, ADG	FO

Thursday, 12 September 2002

08.30 – 09.00	Review of progress of group work (plenary)	M. Simula
09:00- 10.00	Group work	
10.00 – 10.30	Coffee break	
10.30 – 12.00	Group work	
12.00 – 13.30	Lunch	
13.30 – 15.00	Group work	
15.00 – 15.30	Coffee break	
15.30 – 17.30	Stocktaking and interchange (subplenaries)	

Friday, 13 September

08.30 – 10.00	Group work	
10.00 – 10.30	Coffee break	
10.30 – 12.00	Presentation and discussion of group work (plenary)	M. Simula
12.00 – 13.30	Lunch	
13.30 – 15.00	Presentation and discussion of group work	M. Simula
15.00 – 15.30	Coffee break	
15.30- 16.00	Results and further steps	M. Simula
16.45-17.00	Closing session	FAO

Bijlage 2: De taken van de 5 groepen

Voor:

Groep 1: Bos in relatie tot andere landgebruik en de overgang/omzetting van bos naar niet-bos (en omgekeerd),

Groep 2. Veranderingen binnen het bos

Groep 3. Bosbeheer en de conditie van bossen

Taak:

- kritische analyse van de in het framework gebruikte termen;
- wenselijkheid van eventuele harmonisatie;
- analyse van de geformuleerde opties,
- aanbevelingen voor eventuele harmonisatie van kernbegrippen,
- suggesties voor aanpassing definities
- toets van de praktische haalbaarheid en praktische gevolgen van een harmonisatie van de definities en aanbevelingen voor vervolg acties

Groep 4. Classificatie van bossen en (de later afgesplitste)

Groep 5. Specifieke problemen van low forest cover countries.

Taak:

- analyse van het nut van gedifferentieerde definities voor bos klassen,
- alternatieven voor een classificatie van bossen die nuttig is voor internationale processen,
- voor welke bos gerelateerde termen en definities is een gedifferentieerde benadering nuttig, en wat zijn de gevolgen,
- hoe low forest cover definiëren, en wat zijn de gevolgen
- aanbevelingen voor vervolgacties voor het harmonisatie proces binnen en tussen internationale processen

Bijlage 3: Concept conclusies en aanbevelingen

FAO – IPCC-CIFOR- IUFRO-UNEP DRAFT

Second Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders

Rome, September 11-13, 2002

CONCLUSIONS AND RECOMMENDATIONS

Need and Tools for Harmonization

The Meeting reiterated the need for harmonization between forest-related definitions of core terms used by different international processes and instruments to reduce errors in employing terms, the reporting burden of countries and related costs.

Harmonization in this context means improved comparability, compatibility and consistency between definitions, establishment of linkages, and description of relationships between terms. The process of harmonization involves documentation of similarities and differences between definitions for which analytical tools can be used.

It was recognized that each international convention or process is context-specific and applies its own definitions for forest-related terms. However, the use of these terms and how they are defined should be as consistent as possible. As an example, “degradation” as used by COP7 of UNFCCC in its mandate to IPCC means in reality a short-term human-induced reduction of carbon stock in the forest, while under other processes it is related to any change in the forest condition, leading to a reduced capacity to supply goods and services from the forest.

The Meeting emphasized the need for accuracy in the definition of terms which are used for different purposes under various processes. Consistency with the current use of the terms in other fora should be considered before adopting new definitions for widely used terms .

The comparative analytical framework of forest-related definitions between international processes should be developed further. Such a framework, drawing on comparative matrices and the set concepts, identifies (i) the presence of various elements or parameters contained in the respective definition (e.g. minimum crown cover) and (ii) any quantitative measure given (e.g., 10%). The framework can be used effectively to compare definitions, thereby improving communication and clarifying the need and feasibility of developing new definitions.

Status of Harmonization

In the definitions of the following terms, the two expert meetings have concluded that the differences are minor and ways have been identified for how they could be further harmonized:

- Forest
- Forest land
- Forested Land
- Other wooded land
- Non-forest
- Reforestation
- Forest degradation
- Forest improvement

Some other terms are used primarily in a regional rather than a global context, such as:

- Old-growth forest
- Semi-natural forest

The current definitions of the following terms have certain shortcomings, and proposals for new formulations or adaptations were made. However, some further work may be required to finalize this task through a cooperative effort between the relevant bodies. These terms are:

- Other land (other than forest and other wooded land)
- Afforestation
- Deforestation
- Forest rehabilitation
- Forest restoration
- Forest fragmentation
- Secondary forest

A number of “supporting” terms, referring to the condition or quality of forests would still benefit from an effort towards coining common, broadly accepted definitions. This follow-up work could take place in cooperation with the processes and bodies which have a mandate or an interest in using them. These terms include, *inter alia*,

- Forest plantation
- Natural forest
- Naturalness of forest and other forest conditions
- Managed and unmanaged forest
- Consideration of quality of forest management and, in particular, sustainable forest management in different contexts.

Forest and Change Processes between Forest and other Land Classes

The three international processes which have defined ‘forest’ deal with the concept from different viewpoints:

- FRA deals with trees as a resource in the following categories: forest (including forest plantations), other wooded land, and other land with trees outside of forests,
- The Marrakech Accord (MA) of the Kyoto Protocol (KP) is mainly concerned with measuring and accounting carbon and carbon stock changes and define all areas containing trees within country-defined structural parameters as forest,

- CBD is concerned primarily with biodiversity issues and appears to follow the FRA definition of forest with the exception that temporarily unstocked areas are not explicitly included.

However, all the definitions include threshold parameters covering minimum area, minimum height, and crown cover. As the processes have different purposes, their parameters have been defined differently: in the case of the KP, each of the threshold parameters has a range of optional values within which parties must choose a specific value; the other two processes specify the same fixed values for them. In addition, the FRA specifies a minimum strip (stand) width and defines a maximum period for which a forest may remain temporarily unstocked.

Threshold parameters for defining forest under KP are flexible within a fixed range. Reporting burden could be reduced if countries apply the same threshold parameters for UNFCCC/KP and FRA reporting. The values chosen might actually differ from the definitions they employ nationally. The Marrakech Accord provides strong incentives for Annex I Parties to provide data based on a forest area delineation consistent with the information that has historically been reported to FAO or other international bodies. In many instances, countries did in fact not report data to FAO that were based on their respective national definitions, but rather data that were adjusted to the commonly agreed FRA definition.

In the future, there may be a need to add new parameters for the sub-classification of forest, such as level of stocking in relation to potential (e.g., unstocked/understocked/stocked forest), tree, and potential of land for trees.

Including 'temporarily unstocked areas' in the CBD definition of forest would make it essentially the same as the FRA definition. The UNFCCC/KP rules require parties to provide information on how they distinguish temporarily unstocked forests after harvesting from deforestation. This is compatible with the FRA 10-year default for the temporary period.

The FRA and CBD definitions of forest include a predominant land-use component. Lands where non-forestry uses predominate are not classified as forest even where the tree cover exceeds the threshold values of the other parameters. In FRA, these areas are instead covered as "trees outside of forests". The UNFCCC/KP does not make this distinction. The impact is illustrated in figure 1.

There is a need to clarify the related term "predominantly forestry" in the FRA definition. Its current wording refers to land-use, or forests that are used for purposes of production, protection, multiple use or conservation (i.e. forest in national parks, nature reserves and other protected areas), as well as forest stands on agricultural lands (e.g., windbreaks and shelterbelts of trees with a width of more than 20 m, rubberwood plantations and cork oak stands). However, stands of trees established explicitly for agricultural production and agroforestry systems are excluded.

The Meeting concluded that it was not appropriate to further incorporate social considerations into the core definition of forest. These could instead be included in further characterization of forest. The international frameworks for criteria & indicators for Sustainable Forest Management would be an appropriate instrument for this purpose.

FRA already collects data on forest plantations and categorizes plantations managed for fiber production, protection etc., as forest, but plantations managed for tree crops as non forests. UNFCCC/KP defines all plantations (including their afforestation and reforestation) as forest.

There is a need for further harmonizing the terms afforestation and deforestation in future provisions of UNFCCC/KP with the FRA definitions which would contribute to reduced reporting requirements.

It was recognized that permanent forest loss is almost always human induced and rarely a natural occurrence. The definitions of deforestation are specific to the

purposes of the two processes; however, compatibility cannot be achieved because the FRA and UNFCCC/KP definitions of forest are different. As a result, figures reported by the two processes on changes between forest and other land classes are not likely to be comparable.

The UNFCCC/KP terms 'forested land' and 'forest land' can be considered synonymous with 'forest' and, therefore, it is recommended that the use of the term 'forest' should be preferred in all contexts.

There is a need to clarify the method of classifying lands with a combined land use under the UNFCCC definitions and assess whether the UNFCCC approach can be aligned with the FRA classification by e.g., dividing the FRA land class 'other land' into sub-classes. This can be considered under the IPCC Good Practice Guidance preparation process and subsequent discussions in the SBSTA/COP of the UNFCCC/KP.

Forest Degradation and Change Processes within the Forest

Definitions of forest degradation developed by FRA, CBD, ITTO and by IPCC Task 2 in a preliminary draft were analyzed regarding occurrence and quantification of elements such as structure, function, goods and services, site, reference state, spatial and temporal scale, resilience and cause. This was done with the help of a comparative matrix (Table 1). In conclusion:

- Three clusters of shared elements, related to "structure", to "functions, goods and services" and to a "site specific reference state" emerged.
- Definitions of FRA 2000, CBD, and ITTO are comparable, whereas the current draft IPCC definition uses long-term reduction of tree crown cover as a proxy for degradation, which, however, could only be assessed ex-post over several commitment periods.
- The lower threshold for crown cover provided in the FRA2000 and IPCC definition separates degradation from deforestation²; none of the definitions quantifies a differential necessary for justifying the use of the term degradation.
- From the context of COP Decision 11/CP.7 it is obvious that the mandate to IPCC for developing a definition for direct human-induced "degradation" (sic) of forests refers less to the long-term impairment of the capacity of a forest to produce goods and services, but rather to methodologies of accounting for emissions from *short-term carbon stock decreases in a Party's managed forest over the first commitment period*. The current draft definition of IPCC Task 2 on the other hand returns a definition which alludes to the *long term aspect* of degradation. Any short term reduction of timber and carbon stocks may not represent degradation in the common sense at all, and may even reflect forest improvement, e.g. a silvicultural tending operation or a reduction of over-mature or overly dense timber. Therefore, another term, such as "stock reduction", may be preferable to "degradation" in the context of carbon monitoring.
- If this latter suggestion is followed, there is no point in trying to harmonize degradation and "stock reduction".
- Resilience is an important concept linked to degradation. It is an implicit element of most definitions. Some of the components of resilience can be assessed (e.g. soil buffering capacity). However incorporating the term resilience explicitly into existing definitions is not useful since it is difficult to be assessed. In cases of heavy damage to a forest it might be possible to conclude that resilience of the ecosystem, and its capacity to revert to its prior condition even in the long-term has been impaired. Tallying forest areas with such heavy damages, e.g. soil compaction from machinery, emission-induced element toxicities, topsoil erosion, as a separate category might be the only feasible approach to capture this element of degradation in a short run assessment.
- The choice of spatial scale of the degradation process is related to the objectives of measurement and the parameter considered (e.g. runoff in water catchments). Forest degradation should ideally be determined for the stand but, in many

² Forest degradation can occur below this threshold for crown cover, e.g. as site degradation in temporarily unstocked stands.

circumstances (e.g., fragmented forests), it can only be assessed at the forest management unit-, watershed- or landscape level. However, it might be possible to accept tradeoffs at the stand-level, as long as an overall acceptable level of goods and services is maintained at the landscape level.

- Forest naturalness appears inadequate as a reference point: (i) Given the time period of possible past human influences and natural shifts in the environment and forest ecosystems, defining naturalness objectively is difficult. (ii) there is no intrinsic attribute (besides “naturalness”) which is linked exclusively to natural forests.
- CBD and ITTO are only considering “human induced” forest degradation while FRA and IPCC do not differentiate forest degradation by cause. This can create incompatibility in reporting.

Related to the last point, in addition, there may be a need to differentiate the causes for degradation between those which are due to the current management practices of the landowner, and those which are beyond the control of the current owner (e.g., due to degradation of the watershed, pest introduced to the zone, management practices of the previous owner, etc.).

Developing a composite index for degradation incorporating various attributes in one single measure is an interesting option for research. Weighing the components of a possible composite index is also difficult as it involves value judgement. Where data on the elements of a composite index are available, these could also be directly used to measure different aspects of degradation.

The Meeting settled on the following core definition of forest degradation:

Forest degradation is the reduction of the capacity of a forest to produce goods and services.

Explanatory note: Capacity includes maintenance of ecosystem structure and functions.

Supporting terms are Forest Improvement with its subsets Forest Rehabilitation and Forest Restoration (figure 2).

Their suggested definitions are:

Forest improvement

The process of increasing the capacity of forest to supply products and services.

Explanatory note: It is opposite of forest degradation as defined in the generic definition above. Forest improvement is not synonymous to reversal of “stock reduction” as defined above, as improvements may even entail reduced stocks.

Forest rehabilitation

The process of restoring the capacity of a forest to produce products and services again.

Explanatory note: The state of the rehabilitated forest is not identical to its state before degradation.

Forest restoration

The process of restoring a forest to its state before degradation (same functions, same structure, same composition)

Forest fragmentation

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

Explanatory note: This definition, offered by CBD, is the only international definition for this term. Certain aspects, such as habitat fragmentation, may not be covered in the definition.

Managed and Unmanaged Forests, Forest Condition

Forest management is a concept which can be applied for planning, implementation, monitoring and control at national, subnational and forest management unit and stand levels. Related concepts, approaches and even terms used may differ in different parts of the world. They also depend on the management objective(s), such as: wood products, non-wood products, watershed protection, soil stabilization, recreation, conservation. A management plan is often a basic tool in managed forests and it can be formal or informal. Even in the absence of a management plan, management can be implemented through established traditional practices .

The UNFCCC definition of forest management provides a useful basis for characterizing this term in its modern context. The Meeting proposed a slight modification for the UNFCCC wording.

Forest management is the process of planning and implementing practices for stewardship and use of the forest aimed at fulfilling relevant ecological, economic and social functions of the forest.

The term unmanaged forest can have different meanings, but generally relates to the concept that neither any management decision nor any management planning or management interventions were implemented , etc. It has been disputed if the term 'unmanaged' is at all needed, since this has been argued that there are hardly forest left which are not in one or the other way managed. Lack of formal management does not necessarily mean that a forest is unmanaged or dealt with in an unsustainable manner. Lack of management may be due to intensive uncontrolled use, illegal logging, or similar reasons.

Forest condition can be characterized, *inter alia*, by the following terms: natural forest, undisturbed forest, primary forest, old-growth forests, secondary forest, semi-natural forest degraded forest, forest plantation. A key aspect is the different degrees of naturalness which are implied by these terms. Their interrelationships are depicted in Figure 3.

The Meeting made preliminary conclusions on the definitions of some of these terms:

Natural forests

Natural forests are composed of indigenous trees, they are regenerated naturally, including both spontaneous and assisted regeneration.

Comment: Further consideration of the term is required to clarify (i) whether attribute 'indigenous' necessary, (ii) whether the term 'native' (CBD) would be fully consistent with the term 'indigenous' (FRA), and (iii) whether the definition should include a reference to a forest stand rather than forest.

Primary forest

Primary forest as a subset of 'natural forest' is a forest undisturbed (directly) by man.

Explanatory note: The term 'primary forest' (as used by CBD) is fully consistent with the term 'undisturbed forest' (as used by FRA).

Comment: It may have to be clarified whether the disturbance by non-native animals should be explicitly addressed.

The CBD definition of old-growth forest is considered adequate. Whether old-growth is limited to primary forest or would be relevant to secondary or semi-natural forests merits further consideration. It is an important concept in several countries.

The CBD definition of secondary forest is broader than that developed by ITTO, as it includes both degraded (primary) and secondary forests. However, it was considered insufficient to describe the concept of secondary forests. Degraded (primary) forest

describes a forest beyond the elastic capacity (recovery) of the forest ecosystem. This raises the issue whether modified and degraded forests should be considered separately. Degraded forest may be identified as a subcategory of natural forests, secondary forests, and planted forests.

Semi-natural forest is a term which has particular importance in Europe. Semi-naturalness is sometimes difficult to identify at field level if related to the method of regeneration (planted or natural). The FRA definition for semi-natural forest does not refer to species composition (indigenous/native) which is an issue for further consideration. Semi-natural forest often implies a managed natural forest but planted forests with certain characteristics (e.g. of indigenous species) could also fall into this category.

Forest plantations are covered by various definitions and parallel terms are also being used, such as forest plantation or plantation forest. Definitions for 'planted forests' include a broad range of objectives, such as e.g., protection and production. Forest plantation or plantation forest is understood as planted forest which is intensively managed for production. Planted forest implies management (at least initially) but such a forest can also be abandoned. Changes may occur in purpose, degree of management intensity, time scale and potential reversibility (to other land uses) which also merit consideration. The Meeting reached no conclusion on whether the attribute artificially should be included in the planted forest-related definitions.

The meeting concluded that there is possibly a need for appropriate sub-classes of planted forests to capture their diversity.

Figure 4 illustrates an option for the grouping of different types of managed and unmanaged forests.

Forest Classification and the International Processes

There is a great variety of forests worldwide. In order to study, assess or manage them, many classifications have been, and continue to be developed. These classifications depend on the objectives and geographic levels (from global to local) of assessment, and sometimes also on the tools being used (e.g. remote sensing).

It is recognized that original country data would be highly useful in all international analyses and reporting. For the sake of reporting consistency among countries and over time, and to facilitate data compilation, there should, in general, be one global definition for each core term, but countries should be free to report on more disaggregated levels. Indeed, they should be encouraged to do so.

Differentiated definitions for the core forest-related terms were not recommended. However, in addition to a global definition, different processes may need qualifiers to describe specific aspects of forests related to their objectives. These qualifiers can sometimes be expressed in the form of classification with respective definitions. Specific forest types (e.g., mangroves) can also deserve their own definitions to be applied at an international level.

Some of the international processes are using forest classification systems in their work but *all* processes could probably benefit from their use. The following conclusions were made on how classification systems could be effectively used within a harmonized framework:

1. All the international processes could use, as a first order classification, the FAO global ecological zoning, which is based on the high hierarchical level of domains (i.e. tropical, subtropical, temperate, boreal, polar).
2. A further breakdown into forest types may be desirable for some of the processes but may not be necessary for others.
3. Additional levels or classification could be introduced as needed based on forest function, e.g. production, protection, ecological services, social, historic, spiritual.

In choosing between internationally applicable classification systems and respective definitions, the feasibility for countries to collect and analyze the data required should be taken into account.

Special needs and requirements of countries with low forest cover and unique types of forest (LFCCs)³

General forest definitions agreed upon as applicable to all countries and types of forest will also apply to LFCCs and countries with low forest cover conditions.

Classifying a country as a low forest cover country may have political implications that cannot be identified at present. For example, if a country is categorized as a LFCC, it is unclear whether this would imply restrictions for exporting of forest products, including non-wood forest products (NWFPs), or whether it could provide access to increased financial or technical assistance from the GEF, the multilateral development financing institutions, the Clean Development Mechanism (CDM) of the KP, bilateral agencies, etc.

A "working definition" of a LFCC could be a country where forest – as defined by FRA – covers less than 10% of the country's territory. It should also be recognized that many countries have large areas with low forest cover although they as national entities would not fall under the LFCC group as a nation.

Trees outside forests (TOF) play a large and significant role in low forest cover conditions. Therefore, special attention should be given to the inclusion of TOF in national forest assessments in LFCCs and countries which have significant areas of land with low forest cover conditions. Failing to do so would give an incomplete picture of the importance of woody vegetation in terms of energy, biological diversity, carbon sequestration, contribution to sustainable livelihoods, etc.

Forest classifications according to Ecological Domain, Ecological Zones, and Forest Types are valid also for LFCCs. However, because in many cases there will be very little forest left to actually manage, data should also be collected on the change process from forest to other land classes by type of reason, e.g., desertification (due to human impact or climate change); urbanization; overuse (overgrazing, overcutting, etc.); regeneration; migration; etc. In addition, there is a special need to consider fragile ecosystems (arid lands, mountains) as well as unique types of forests found in LFCCs.

Recommendations for further work

The recommendations directly referring to definitions are subsumed in table 2.

International Processes and Organizations

1. CBD, FAO, UNCCD, UNFCCC, and UNFF could jointly explore the possibility of adopting one common first order forest classification system as the basis for reporting considering contributions by other international/regional organizations and/or bodies such as IPCC, IUFRO, etc.
2. All processes and Organizations might consider using the term 'forest' instead of 'forest land' or 'forested land'.
3. CBD, FRA, and ITTO could consider adopting the proposed core definition of forest degradation and the proposed definitions for the supporting terms 'forest rehabilitation', 'forest restoration' and 'forest improvement'.
4. Biomass-related definitions need harmonization and could be developed under a focused process involving the relevant international processes and organizations, together with other stakeholders.

³ The term defined under the Tehran Process and the Tehran Declaration, Tehran, October 1999.

5. The CPF could consider reviewing the reporting requirements by countries under various international processes and make recommendations for further useful harmonization.
6. The international processes should use original country data for analyses and reporting.

CBD might consider

7. the inclusion of planted forest as a separate category of forest so that changes in biodiversity associated with the transformation of other forests to plantations can be duly monitored.
8. dropping the attribute 'secondary' in their definition for plantation forest in order to avoid possible confusion with spontaneous regeneration after disturbance.
9. in their definition of primary forest ITTO's definition of degraded primary forest.

FAO / FRA might consider

10. expanding the definition of afforestation to include assisted regeneration not involving direct seeding or planting;
11. reporting separately areas that are "temporarily unstocked" which are now included in the area statistics for different land categories, as such areas can be significant;
12. developing a typology for management objectives as a basis for reporting on the status of areas under different intensities or levels of forest management;
13. adopting for forest management a definition slightly modified from that of UNFCCC (2001), and include, e.g., the production of wood and non-wood forest products, biodiversity conservation, soil conservation or watershed protection;
14. referring in its definition for natural forests to their natural regeneration, and removing the wording 'not planted';
15. action, through cooperation with relevant bodies, to investigate dividing non-forest land into sub-classes which would address the various purposes for which trees and woody vegetation on these lands need to be assessed;
16. taking action to compile the various definitions into a compendium where the forest-related terms and definitions used by various international conventions and processes would be clearly referenced, explained, and described, and make this information available in the official languages of the Organization;
17. The FAO, together with the other organizers of the Meeting, should communicate the outcomes of the harmonization process of forest-related definitions into the various international processes, including organizing of side-events in connection with negotiation sessions and other official meetings.
18. The FAO, as the secretariat of the harmonization process, should be involved in the work of the various processes dealing with the issue of degradation to ensure appropriate consideration of the concerns expressed in the Meeting.

ITTO might consider

19. including in its future definitions a reference to an established definition of 'forest', and making minor adjustments to increase compatibility with the FRA and UNFCCC definitions;

20. adding a definition of natural expansion of forest in its set of definitions and make the necessary adjustments to increase compatibility with FRA, UNFCCC/KP and CBD definitions;
21. modifying their definition: "Woody vegetation regenerated naturally on land that was totally cleared of its previous forest vegetation". The appropriateness of the concepts of woody vegetation and total clearance would merit further consideration; the first concept since it could also mean shrubs below the forest threshold, and the latter concept, because it is difficult to measure. None of the ITTO definitions proposed include the notion of forest condition resulting from suppression of natural fire regime which merits further consideration;
22. adjusting their definition of planted forest to "forest that has been established by planting or seeding". Whether the qualification 'artificial' should be added merits further consideration;
23. deleting in its definition of degraded primary forest references to primary, old-growth.

Tehran Process

24. The Tehran Process, supported by UNEP as Lead Agency within the CPF, might consider to continue its work on forest definitions in relation to LFC countries and conditions clarifying possible implications for countries of using such definitions in the international contexts.

UNFCCC/IPCC might consider

25. removing the requirement for a 50-year non-forest condition for afforestation in the UNFCCC definition to be applied from the second commitment period onwards. In some countries, records are insufficient to differentiate such lands used for Kyoto afforestation. Furthermore, the treatment of afforestation and reforestation would become equivalent within the UNFCCC/KP;
26. developing an explicit definition for land eligible for revegetation which could be considered in reporting on non-forest land;
27. using the term 'stock reduction' for short-term reduction in the carbon stock and not equating it with 'forest degradation';
28. inviting all Parties to the UNFCCC, through the secretariat of the UNFCCC, to gather comments on the drafts of the Good Practice Guidance and Inventory Guidelines from representatives of the other international processes to ensure that this document does not preclude or impair the harmonization process.

Countries Reporting to International Processes

29. Parties to the international processes, through their own appropriate communication channels, should ensure good coordination between stakeholders of all the international processes at the national level.
30. Countries were encouraged to report to the international processes at more disaggregated levels than may be required by international definitions or classifications using their national classification systems while ensuring the compatibility and consistency with the international requirements. Original country data sources and definitions should be made available to illustrate where the processed data come from and to facilitate its interpretation.

Figure 1: Land Use- Land Cover Relationship

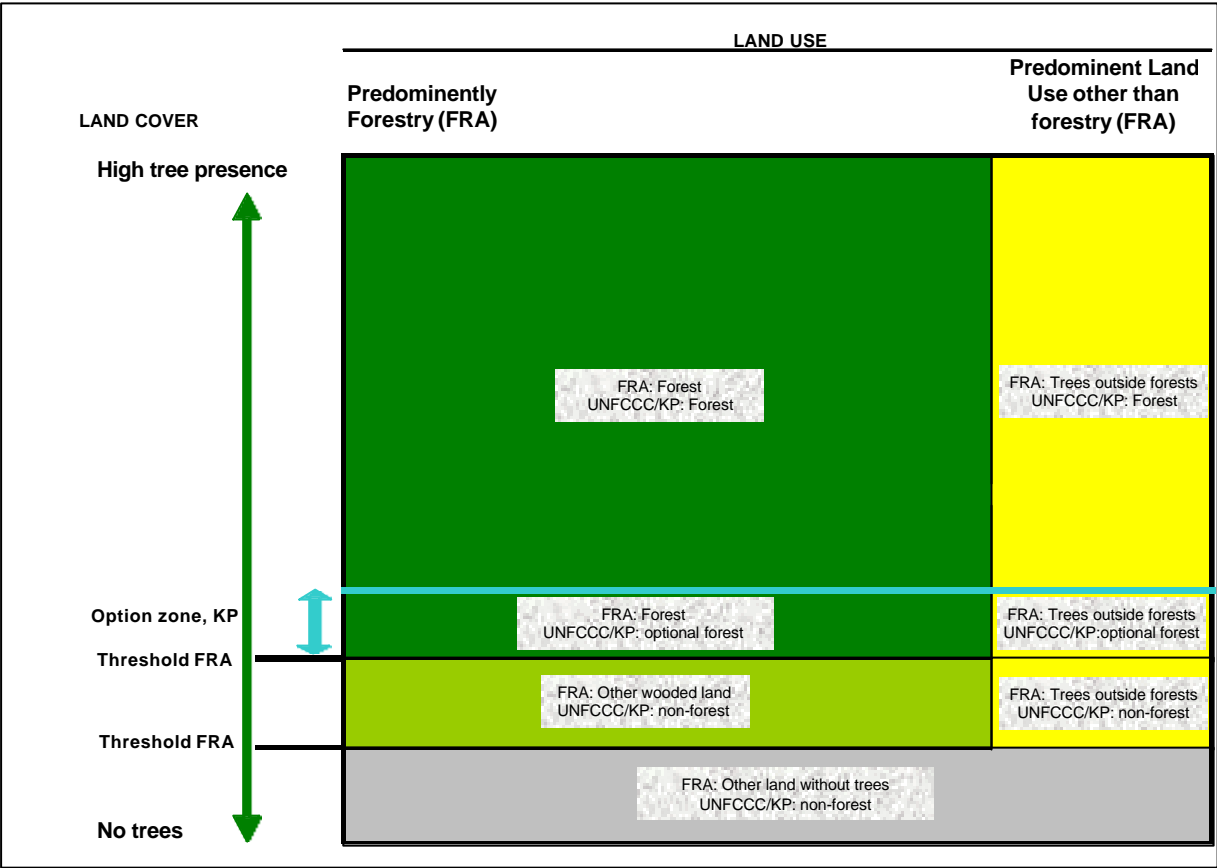


Table 1 :Matrix for Forest Degradation

Biophysical	Elements	Sub-elements	Measurable	Value-laden	FRA2000	CBD	ITTO	IPCC
Biophysical	Structure		y	n				0
		canopy cover	y	n		0	0	threshold
		stocking	y	n		0	0	0
		hor. Structure	y	n				
		vert. structure	(y)	n				
	Resilience	components?	n	n		0		0
Functions								0
	Goods							0
		wood	y	n				
		non-wood	y	(y)				
	Services							0
		biophysical	y	n				
		cultural	n	y				
	Elements	Sub-elements	Identifiable		FRA2000	CBD	ITTO	IPCC
Others?	Site specific		y					0
	Reference state		y		potential?	natural forest	natural forest	0
	Spatial scale		y			0	0	0
	Temporal scale		y		long-term	0	0	long-term
	Cause	human	y					0
		natural	(y)			0	0	0

Figure 2: Forest Degradation and supporting terms

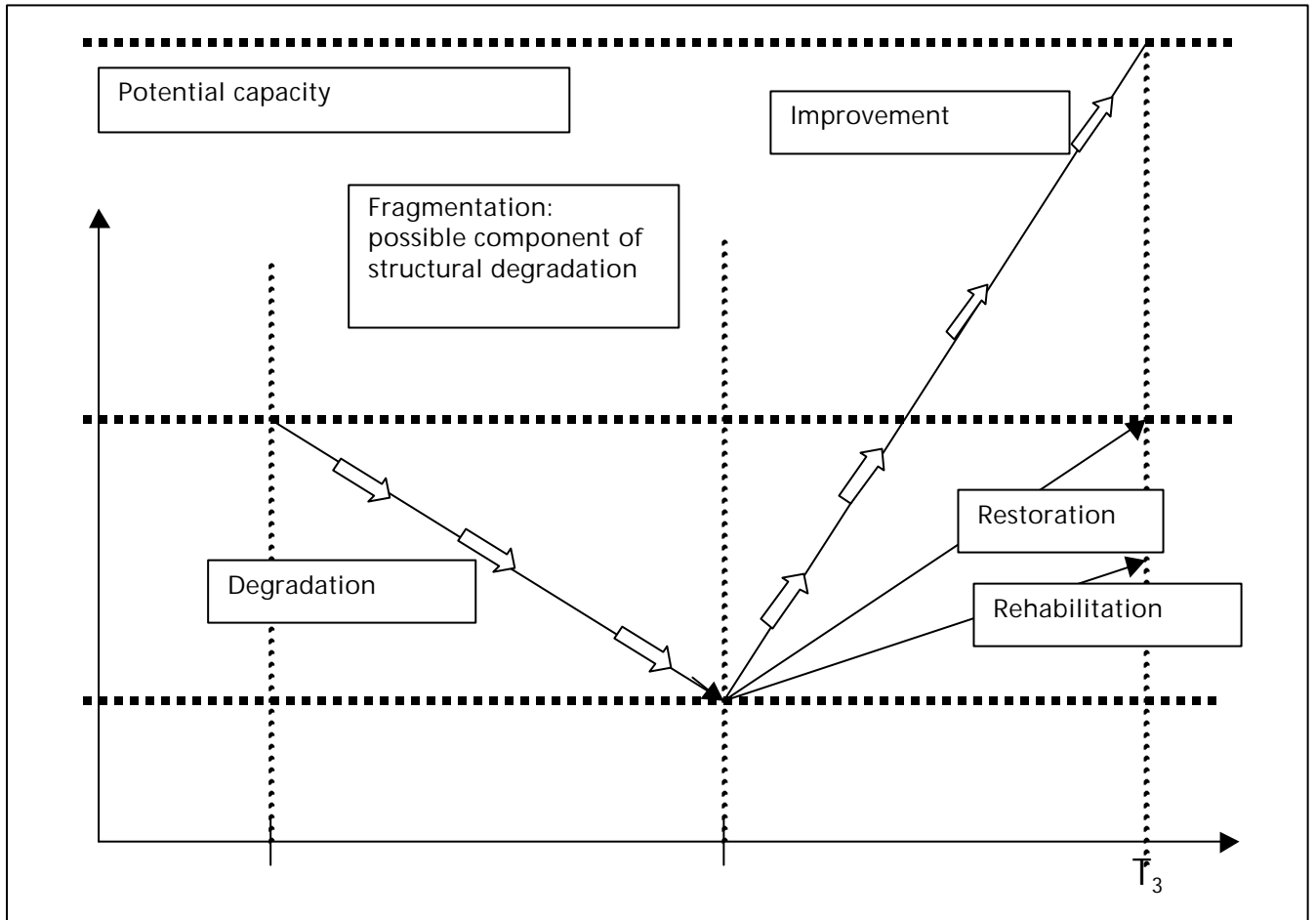


Figure 3: Forest Typology

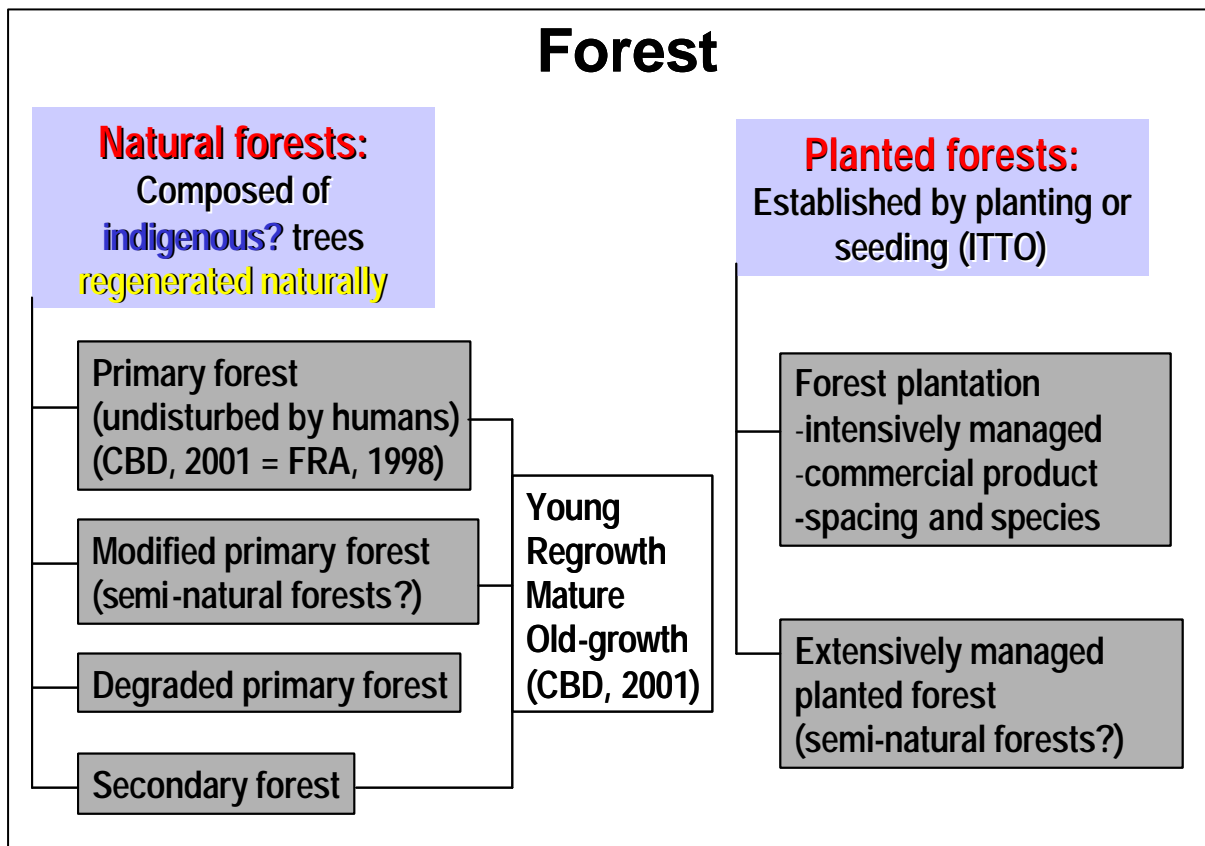


Figure 4: Managed and Unmanaged Forest

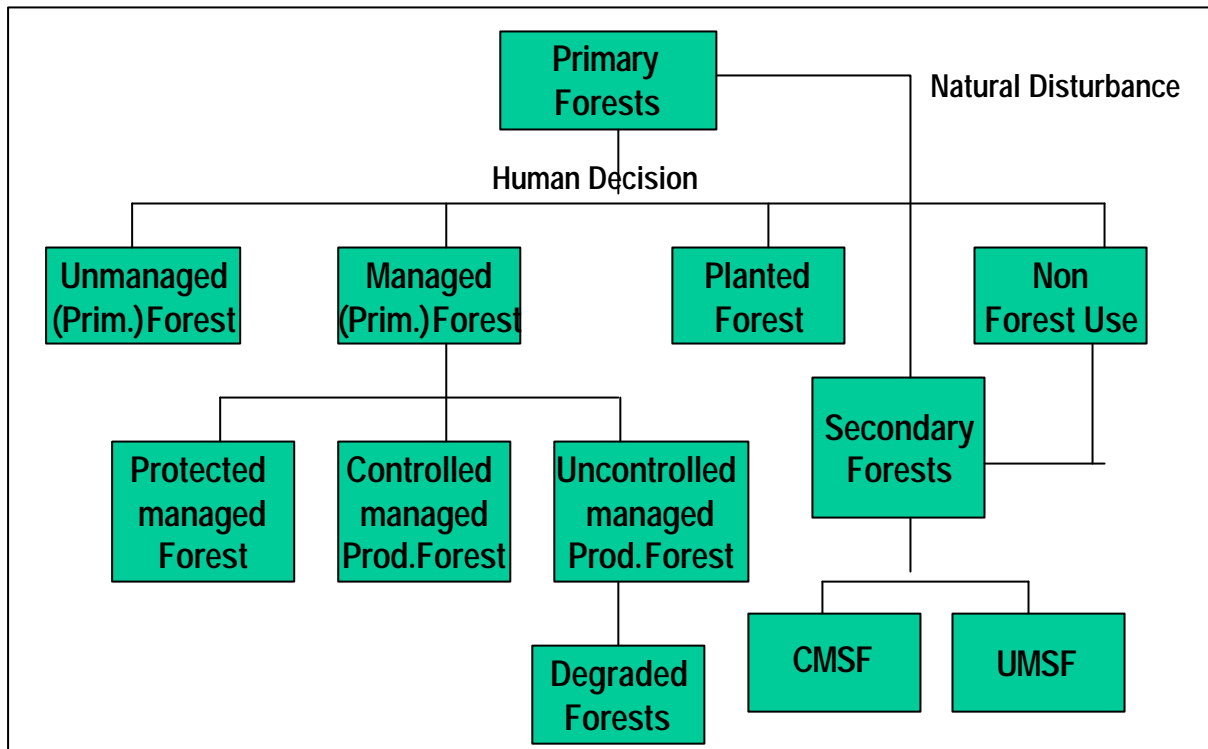


Table 2: Results of Second Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders/ Comparative Matrix

CONVENTIONS, BODIES AND PROCESSES MAY TAKE INTO CONSIDERATION THE FOLLOWING OPTIONS SUGGESTED FOR HARMONIZATION						
TERM	CBD	FRA/ FAO	ITTO	UNFCCC/IPCC	COUNTRIES	ALL
Forest	Include temporarily unstocked areas	Clarify term “predominantly forestry”	Include reference to an established definition of forest (19)		Adopt same threshold parameters for UNFCCC/KP and FRA reporting	Explore need to add additional parameters, supporting terms
		Report separately areas that are “temporarily unstocked” (11)				Replaces in all contexts the terms “forest land” and “forested land”
Non-forest Land		Discuss with other bodies possible introduction of subclasses				Replace through the term “non-forest”
Other Land		Clarify method of land classification with combined land uses; Clarify possible subdivision of term in sub- classes				
Afforestation		Further harmonization between UNFCCC and FAO required; Include assisted generation not involving direct seeding or planting (10)		Remove the requirement for 50- year non-forest condition from second commitment period onwards; (25) Further harmonization between UNFCCC and FAO required		
Deforestation		Further harmonization between UNFCCC and FAO required		Further harmonization between UNFCCC and FAO required		
Natural Expansion			Add definition of natural expansion to set of definitions (20)			

CONVENTIONS, BODIES AND PROCESSES MAY TAKE INTO CONSIDERATION THE FOLLOWING OPTIONS SUGGESTED FOR HARMONIZATION						
TERM	CBD	FRA/ FAO	ITTO	UNFCCC/IPCC	COUNTRIES	ALL
Revegetation				Develop a definition for land eligible for revegetation (26)		
Forest Improvement						Adopt definition: The process of increasing the capacity of forest to supply goods and services (opposite to forest degradation) (3)
Forest Restoration						Adopt definition: The process of restoring a forest as it was before degradation (same functions, same structure, same composition) (3)
Forest Rehabilitation						Adopt definition: The process of restoring the capacity of a forest to produce goods and services again. (his forest is not identical as it was before degradation) (3).
Forest Degradation	Adopt definition: Forest degradation is the reduction of the capacity of a forest to produce goods and services; Clarify, if this and the related definitions need qualifiers: ECOSYSTEM FUNCTION	Adopt definition: Forest degradation is the reduction of the capacity of a forest to produce goods and services Clarify, if qualifiers are needed	Adopt definition: Forest degradation is the reduction of the capacity of a forest to produce goods and services	Exchange terms: Use "stock reduction" instead of "forest degradation" They could still use the same generic definition for degradation (27)		
Forest Fragmentation	Clarify if certain aspects like habitat fragmentation are adequately covered					Adopt CBD definition: Forest fragmentation refers to any

CONVENTIONS, BODIES AND PROCESSES MAY TAKE INTO CONSIDERATION THE FOLLOWING OPTIONS SUGGESTED FOR HARMONIZATION						
TERM	CBD	FRA/ FAO	ITTO	UNFCCC/IPCC	COUNTRIES	ALL
						Process that results in the conversion of formerly continuous forest into patches of forest separated by non-forest (lands).
Forest Management		<p>Adopt definition:</p> <p>FM is the process of planning and implementing practices for stewardship and use of the forest aimed at fulfilling ecological, economic and social functions of forest (13)</p> <p>Develop a typology for management objectives (12)</p>				Clarify, if term unmanaged is not superfluous, since there are hardly any unmanaged forests
Natural Forest	Clarify, whether attribute "indigenous" is necessary, whether "native" (CBD) is fully consistent with term "indigenous" (FRA), and whether the definition should rather refer to "forest stand" than to "forest".	<p>Clarify, whether "native" (CBD) is fully consistent with term "indigenous"(FRA), and whether the definition should rather refer to "forest stand" than to "forest";</p> <p>Refer to the natural regeneration of forests and drop the wording "not planted"(14)</p>	Clarify, whether "native" (CBD) is fully consistent with term "indigenous"(FRA), and whether the definition should rather refer to "forest stand" than to "forest".			
Primary Forest	<p>Consider ITTO's definition of "primary forest" (9)</p> <p>Clarify, whether the disturbance by non- native animals should be explicitly addressed</p>		Delete in definition of "degraded primary forest"references to primary, old –growth (23)			
Old- growth Forest	Clarify if only limited to primary forest, or includes also secondary and semi- natural forest	Clarify if only limited to primary forest, or includes also secondary and semi- natural forest	Clarify if only limited to primary forest, or includes also secondary and semi- natural forest		Clarify if only limited to primary forest, or includes also secondary and semi- natural forest	

CONVENTIONS, BODIES AND PROCESSES MAY TAKE INTO CONSIDERATION THE FOLLOWING OPTIONS SUGGESTED FOR HARMONIZATION						
TERM	CBD	FRA/ FAO	ITTO	UNFCCC/IPCC	COUNTRIES	ALL
Secondary Forest	Clarify if definition should refer to species composition			Develop ITTO definition further: "Woody vegetation regenerated naturally on land that was cleared of its previous forest vegetation"		Clarify if definition should include notion of forest condition resulting from suppression of natural fire regime;
Forest Plantation	Include "planted forest" as a separate category (7) Drop the attribute secondary in "plantation forest" (8)	Clarify if subclasses are needed,	Adjust definition to "forest that has been established by planting or seeding" (22)			

Bijlage 4: Analitical Framework on forest-related definitions

Abbreviations and acronyms

%	percent
AHTEG	Ad Hoc Technical Expert Group
ARD	Afforestation, Reforestation and Deforestation
C&I	Criteria and Indicators for Sustainable Forest Management
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CIFOR	Centre for International Forestry Research
COP	Conference of the Parties
CPF	Collaborative Partnership on Forests
dbh	diameter at breast height
FAO	Food and Agriculture Organization of the United Nations
FMU	Forest Management Unit
FRA	Forest Resources Assessment
GPG	Good Practice Guidance
h	height
ha	hectare
IFF	Intergovernmental Forum on Forests
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
IUFRO	International Union of Forest Research Organizations
KP	Kyoto Protocol
LFC	Low Forest Cover
m	meter
NWFP	Non-wood Forest Products
SBSTA	Subsidiary Body for Scientific and Technological Advice
SBSTTA	Subsidiary Body for Scientific, Technical and Technological Advice
TBFRA	Temperate and Boreal Forest Resources Assessment
ToF	Trees outside forests
ToR	Terms-of-Reference
UNCCD	United Nations Convention on Combating Desertification
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
WWF	World Wide Fund for Nature

1 Introduction

Forest-related definitions are used nationally and internationally and they are currently 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 or commitments, including FAO and the International Tropical Timber Organization (ITTO). Reporting requirements to these bodies, fora and conventions represent a considerable burden for the countries, and particularly developing countries have difficulties to meet them. Differing definitions for the same term aggravate this burden.

National reporting is indispensable for most purposes. Thus, the link to national resource assessments is an essential feature of any global monitoring system. In spite of rapid development in remote sensing and related data transfer and processing technologies, global systems will have to draw on nationally produced information and analyses. For instance, changes are generally more precisely estimated using the original national inventory data than direct observations of global systems. It is therefore of high international interest to facilitate data flow between national and global levels (FAO 2002). However, diverging definitions make data integration difficult at the global level.

To assist in coping with these problems, the Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders (hereafter referred to as the Expert Meeting) was initiated by the Food and Agriculture Organization of the United Nations (FAO) and, in collaboration with the Intergovernmental Panel on Climate Change (IPCC), 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 Expert Meeting noted, *inter alia*, four key points (Proceedings... 2002):

- (i) More universally accepted and harmonized forest-related definitions might facilitate coordination between international conventions, processes and negotiations, and consequently might help to reduce the reporting burden and respective costs for countries;
- (ii) Existing definitions should be adopted (wherever possible) or improved (where necessary), before developing new ones;
- (iii) The current definitions used in the context of Article 3.3 of the Kyoto Protocol and FAO's Forest Resources Assessment 2000 are largely compatible, with the exception of differing interpretations of the term 'reforestation', as evidenced in past climate change negotiations;
- (iv) The biome-specific approach suggested for some definitions is not necessarily compatible with the actual land use or the state of forests. The biome is probably a less important driver than the forest type.

The Expert Meeting also agreed on a number of criteria for the follow-up harmonization process and made detailed recommendations on how to deal with state and change processes; forest as a land use; forest functions; and the different definitions for afforestation, reforestation, deforestation and degradation.

The Expert Meeting recommended that follow-up action be taken urgently under the umbrella of the Collaborative Partnership on Forests (CPF), with FAO acting as the

Secretariat. Furthermore, other stakeholders should be invited to participate in the process.

As part of the implementation of the recommendations, a Task Force was established under FAO's leadership to plan and implement the follow-up action.

This report is the outcome of the implementation of the Expert Meeting's recommendation to "*prepare a comprehensive analytical framework, including compilation and analysis of similarities and differences between definitions and clarification of their relationships, in order to facilitate follow-up process*". The analytical framework will be discussed by the Experts in the second meeting, to be organized in Rome, September 11-13, 2002.

The process on harmonizing forest-related definitions at international level is a response to a global call. The issue is high on the international agenda, and the need for further elaboration of forest-related definitions, particularly with regard to their possible harmonization, has been recently signaled as a priority issue by several international fora and bodies including:

- The sixth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 6), the Hague, the Netherlands, from 7 to 19 April 2002
- Twenty-Sixth FAO Regional Conference for the Near East, Tehran, Islamic Republic of Iran, 9 to 13 March 2002 (hosting the Tehran Process for Low Forest Cover Countries)
- The second session of the United Nations Forum on Forests (UNFF), New York, 4 to 15 March, 2002
- UNFCCC: 16th Session of the Subsidiary Bodies (SB16), Bonn, Germany, 5 to 14 June, 2002.^{4 5}

The follow-up work needs to be undertaken cognizant of, and drawing on the following activities:

- SBSTA of the UNFCCC considering to apply biome-specific forest definitions, and developing forest-related definitions for the afforestation and reforestation under the CDM (Article 12 of the KP);
- IPCC developing definitions for degradation and devegetation;
- ITTO working on defining degraded and secondary forests;
- The World Conservation Union (IUCN), the World Wildlife Fund (WWF) and CIFOR developing a typology of plantations;
- IUFRO working on terminology (Dobbertin & Prüller 2002);
- UNEP and IUFRO working on how low-forest cover should be defined
- Previous work on definitions by FAO, e.g. in the context of FRA and the Kotka process.

It is expected that conclusions and proposals resulting from the process on forest-related definitions will be submitted to the IPCC, the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the UNFCCC, 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), the Member Countries of the UNFF for their consideration, as well as to the participants in the so-called Kotka Process preparing the next FRA.

⁴ Extract from para 29 b): "The SBSTA also noted with appreciation the statement made by the representative of the FAO in relation to the process of harmonizing forest-related definitions, and acknowledged the importance of this initiative for the UNFCCC." (UNFCCC/SBSTA 2002)... It encouraged the IPCC to continue to work with FAO, and invited the IPCC to take into account the output from this process when developing definitions for forest degradation and devegetation of other vegetation types.

⁵ The ToR for work to developing definitions for afforestation and reforestation under the CDM mandates that SBSTA use as relevant information the reports prepared by the FAO on forest-related definitions.

2 Objectives

The objective of the process is to harmonize forest-related definitions and thus improve efficiency of processes in different international policy fora related to forests.

The objective of this report is to provide an analytical comparative framework for analyzing forest-related definitions and identification of inconsistencies and conflicts among them. The report focuses on a series of core terms for which alternative existing definitions are reviewed. Based on the comparative analysis, options for improving comparability are identified.

3 Approach

3.1 Methodology

In this report, analytical framework is understood to mean the various methods of analyzing and highlighting relevant features of forest-related definitions as well as their similarities and differences. An essential element of the framework is that the key elements are visualized, or presented in a tabular form to facilitate understanding of differences and shared features between definitions. In the tables where binary presentation is applied, '1' indicates that the instrument in question makes a reference to the concept, and '0' means that the concept is not explicitly mentioned.

The aim of the analysis is not to propose detailed formulations, but to point out optional approaches towards harmonized or more compatible formulations that would be practical and acceptable for use by various stakeholders. Harmonization relates, above all, to the process of making various definitions comparable and consistent with each other (see Box 3.1).

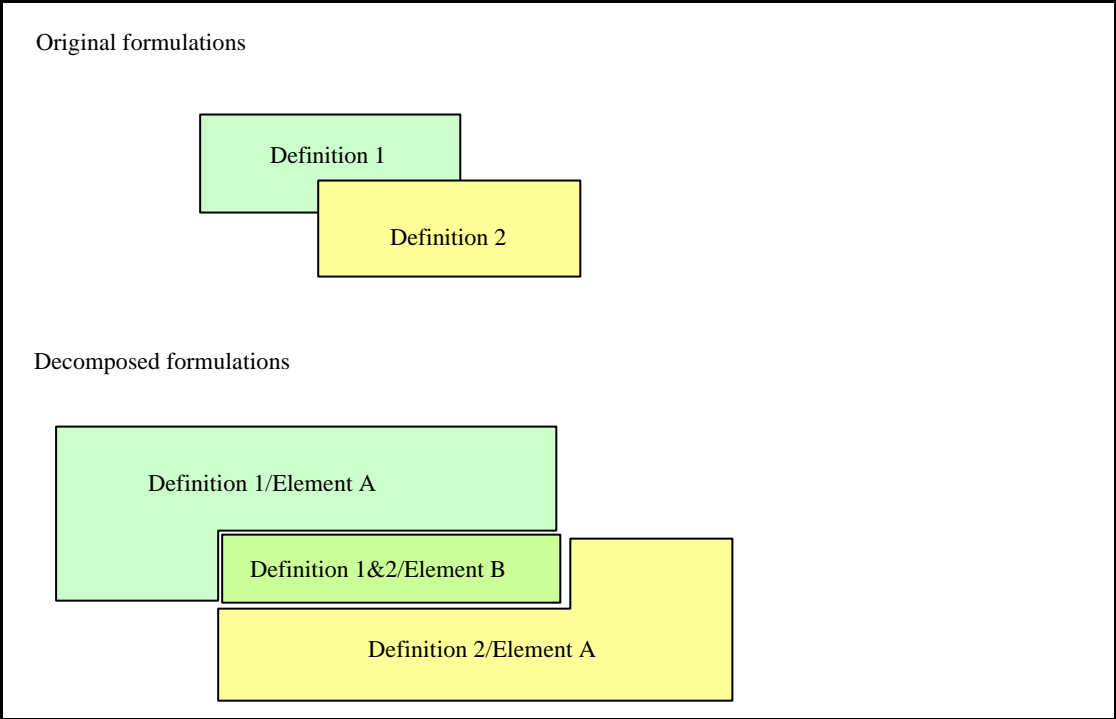
One of the principal approaches to harmonization is adjustment of data. In other words, data collected under one definition framework is adapted to the needs of another by applying conversions. These conversions may be a result of set logic, supplementary studies, scientific literature, statistics, or expert judgement. The method has been successfully applied e.g. in the context of FRA when data from national level is adjusted to global needs and vice versa. The same approach can be applied to harmonizing global definitions.

Box 3.1 Key Terminology (Countercheck with Oxford Dictionary)

In this report, the following definitions are used for key generic concepts related to harmonization. They are derived from the approach proposed in TBFRA 2000 (cf. Koehl, 2000)	
<i>Harmonization</i>	Making existing definitions, which denote the same or closely related concepts, comparable and consistent.
<i>Comparability of definitions</i>	Definitions are set so that their possible differences can be identified and data based on one definition can be converted to meet the needs of another, related definition.
<i>Compatibility of definitions</i>	Definitions are aligned, congruous, and not conflicting with each other.
<i>Consistency of definitions</i>	Internal agreement of various elements of definitions, or agreement between systems of definitions.
<i>Standardization</i>	Applying the same definitions for a concept within different contexts, or applying the same rules for how locally applicable definitions are defined.

Another approach is to decompose definitions denoting similar concepts into smaller elements. This makes it possible to identify both common and distinguishing elements based on which data can be collected and compiled to meet the requirements of various definitions (Figure 3.1). In this manner, comparability of definitions and data can be achieved.

Figure 3.1 *Decomposing of Definitions*



One of the most significant benefits of harmonization is that monitoring and reporting data on common elements could be shared by several processes without unnecessary data conversion. The analysis pays therefore special attention to compatibility with FRA definitions given its current role as the principal monitoring system at the global level. Priority areas for harmonization are those which would significantly facilitate and reduce the burden of separate data collection or laborious adjustments. A key area is land use dynamics, i.e. transfers between land use classes, which are a focal area of global monitoring.

It should be noted that standardization of definitions, i.e. using the same definitions for several frameworks, should not necessarily be the aim of harmonization. Only if differences between existing definitions are minor, it may be feasible to merge the various definitions by using common wordings. On the other hand, there may be instances, where new terms become important, and where it may be possible to standardize the respective definitions at the outset and avoid the need for later harmonization, e.g. in the new field of "carbon forestry".

3.2 Scope

The analysis is concentrated on selected core definitions related to four international processes: the UNFCCC, the CBD, the ITTO and the FRA (Table 3.1). Other Conventions and initiatives such as UNCCD, Tehran Process, UNFF, Millennium Assessment, C&I processes,

etc. have chosen not to develop separate sets of definitions, and they are largely depending on formulations provided by others.

Table 3.1 Main Processes Providing Forest-related Definitions

Process	UNFCCC	CBD	ITTO	FRA
Objective	Protection and enhancement of sinks and reservoirs of greenhouse gases ... [and] promotion of sustainable forest management practices, afforestation and reforestation <i>Source: Kyoto Protocol Art 2 (ii)</i>	The objectives of this Convention ... are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources <i>Source: Convention on Biodiversity Art. 1</i>	To promote and support research and development with a view to improving forest management ... as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests <i>Source: ITTA Agreement, Art 1 (f)</i>	Forest Resources Assessments are to estimate the benefits from the forest, ultimately including all goods and services. ... the scope of FRA should be guided by the agreed criteria for sustainable forest management, i.e. including carbon stocks, biodiversity, and productive, protective and socio-economic functions of forests <i>Source: FRA homepage http://www.fao.org/forestry/fo/fra/index.jsp</i>
Purpose of forest-related definitions ⁶	To enable assessment of carbon stocks and their changes	To enable quantification and characterization of forest biodiversity on multiple scales	To facilitate implementation of practical forest management	To enable comprehensive and integrated assessment of supply of goods and services from the forest
Available definitions	Kyoto Protocol/ Marrakech Accords/ Annex: Definitions, modalities, rules and guidelines relating to land use, land-use change and forestry activities under the Kyoto Protocol <i>http://unfccc.int/convop7/documents/accords_draft.pdf IPCC Guidelines and GPG</i>	UNEP/CBD/SBSTTA 2001. Indicative definitions taken from the Report of the <i>ad hoc</i> Technical Expert Group on Forest Biological Diversity <i>http://www.biodiv.org/programmes/areas/forest/definitions.asp</i>	ITTO 2002. ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests, Draft Report/ Appendix 9 Glossary of main terms used <i>http://www.itto.or.jp/ittcdd_ses/thirty_second_sessions.html</i>	FAO 2000a. Global Forest Resources Assessment 2000 - Main Report - FRA 2000, Forestry Paper 140 While global consistency is sought, some parameters still need further harmonization <i>http://www.fao.org/forestry/index.jsp</i>

⁶ These formulations are an interpretation made by the authors of this document.

Process	UNFCCC	CBD	ITTO	FRA
Obstacles to compatibility with other schemes	Requirement of symmetry in accounting changes in carbon stock as well as the focus on carbon stock Controversial aspects are due to differing political interests among parties	Concentration on environmental aspects	Focus on practical forest management with extensive requirements for data collection and reporting	Possible inconsistencies in long-term time series Focus on national-level assessments

The observed differences among available definitions are mainly due to the purposes for which definitions have been formulated, but also unawareness of existing definitions and political interests have caused differences. For example, the definitions for Articles 3.3 and 3.4 of the Kyoto Protocol (KP) agreed upon after extensive negotiations are highly context-specific and related to the roles of forests in climate change and carbon accounting, reporting and verification. The differences of these definitions in relation to other schemes rise mainly from their focus on carbon, and the requirement for symmetry in accounting changes in the carbon stock.

The CBD treats forests as a functional ecosystem unit which should be conserved, used sustainably, and the benefits derived from it should be equitably shared. In this sense, CBD's view on forests is function and ecosystem oriented. The differences in relation to other frameworks are mainly due to their focus on environmental aspects.

The forest-related definitions developed by ITTO (ITTO 2002) serve, in particular, to complement ITTO's guidelines for sustainable forest management. The differences with other schemes are primarily attributable to the fact that ITTO definitions are not necessarily used as a basis for reporting, which is one of the primary functions for other schemes.⁷

The different sets of definitions overlap and related definitions can be found in several instruments. The terms included in the analysis and their grouping is provided in Table 3.2.

⁷ ITTO has also developed a reporting format how member countries should provide information on the progress made towards sustainable forest management. The format is derived from the ITTO C&I process.

Table 3.2 Terms Included in the Analysis and Their Grouping

Terms/Group terms	UNFCCC	CBD	ITTO	FRA
<i>Forest</i>	Forest	Forest	(Degraded forest land)	Forest
<i>Forest land</i>	Forest land, forested land, non-forested land			
<i>Non-forest land</i>	Revegetation (de-vegetation), grazing land, crop land			Other wooded land, trees outside forest, other land
<i>Changes between forest and non-forest</i>	Afforestation, reforestation, deforestation		Afforestation, reforestation	Afforestation, reforestation, deforestation, natural regeneration, natural expansion of forests
<i>Forest degradation</i>		Degraded forest		Forest degradation
<i>Undisturbed forest</i>	Unmanaged forests ^{*)}	Primary forest, old-growth forest		Forest undisturbed by man
<i>Degraded forest^{*)}</i>		Secondary forest	Degraded primary forest, secondary forest	Natural forest disturbed by man
<i>Managed forest</i>	Forest management		Managed natural forest	Managed forest
<i>Forest aggradation^{*)}</i>			(Forest) rehabilitation, (forest) restoration	Forest improvement
<i>Fragmentation^{*)}</i>		Forest fragmentation		
<i>Forest classification</i>		Forest biome, forest type, forest ecosystem	Forest type	Ecological zone, domain
<i>Human impact^{*)}</i>	Directly and indirectly human-induced	Human induced (forest degradation)		
<i>Forest plantation</i>		Plantation forest	Planted forest	Forest plantation

^{*)} These terms are discussed in Annex 1.

4 Comparative framework and Options for harmonization of definitions

4.1 Forest

At the international level, three widely used definitions of forest have been adopted by UNFCCC, CBD and FRA (Box 4.1). However, the CBD has not included the term 'forest' in its Art. 2 (use of terms), and the definition used in this analysis is taken from the Report (of the *Ad Hoc* Technical Expert Group (AHTEG) on Forest Biological Diversity UNEP/CDB/SBSTTA 2001).

The most widely used definition is the one formulated in the FRA process. For instance, AHTEG refers to it as the 'basic' definition.

Box 4.1 Definitions of Forests

UNFCCC, 2001

'Forest' is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 meters at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 meters are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest.

UNEP/CBD/SBSTTA, 2001

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 specific non-forest 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.

FAO, 2000a (FRA)

Forest includes natural forests and forest plantations. It is used to refer to land with a tree canopy cover of more than 10 percent and area of more than 0.5 ha.

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 m. Young stands that have not yet but are expected to reach a crown density of 10 percent and tree height of 5 m are included under forest, as are temporarily unstocked areas. The term includes forests used for purposes of production, protection, multiple-use or conservation (i.e. forest in national parks, nature reserves and other protected areas), as well as forest stands on agricultural lands (e.g. windbreaks and shelterbelts of trees with a width of more than 20 m), and rubberwood plantations and cork oak stands. The term specifically excludes stands of trees established primarily for agricultural production, for example fruit tree plantations. It also excludes trees planted in agroforestry systems.

The key features included in the various definitions are presented schematically in (Table 4.1) where in the binary section '1' indicates the presence of a parameter in the definition and '0' its absence. The features are discussed in more detail in the next sections.

Table 4.1 Parameters of Definitions of 'Forest'

Parameter		UNFCCC	CBD	FRA
Binary parameters	Young stands	1	1	1
	Temporarily unstocked areas	1	0	1
	Non-forest land uses	0	1	1
	Agroforestry	0	?	1
Threshold parameters	Min. area (ha)	0.05-0.5	0.5	0.5
	Min. height (m)	2-5	5	5
	Crown cover (%)	10-30	10	10
	Temporary (years)	n/a	n/a	~10
	Strip width (m)	n/a	n/a	20

4.2 Threshold Defining Stand Characteristics

The definitions of the UNFCCC, CBD and FRA are compatible. All of them are based on land use and tree cover. Regarding tree cover, all definitions set thresholds for minimum area, tree height and canopy cover. The CBD and FRA definitions have the same numerical values for thresholds, and they apply universally in all countries. The UNFCCC thresholds differ from these in that the Parties to Kyoto Protocol can establish the numerical values drawing on their national definitions within the indicated ranges.

There is not necessarily a great need for further harmonization because the national thresholds applied under the UNFCCC definitions are largely harmonized under the FRA process. A number of countries have either adjusted their national definitions or converted their national data to make them comparable with the FRA definition, and this process is expected to continue. It is also worth noting that the UNFCCC process requires that Parties must report on changes in their forest stock as they reported in the past to FRA, i.e. applying not their national definitions but the FRA ones.

On the other hand, it should be noted that, in the context of the UNFCCC, the countries have an interest to ensure that the choice of threshold values (e.g. adoption of FRA definitions) does not lead to exclusion of significant carbon stocks from carbon accounting. It is therefore necessary to ensure that the entire classification and accounting system is able to accommodate the change without causing distortions. For instance, accumulation of carbon stocks in areas not classified as forest should be taken into consideration under other concepts such as UNFCCC's 'revegetation' or FRA's 'other wooded land' and 'other land' (see Ch. 4.4).

Definition of 'Temporary'

A pivotal feature of both the FRA and UNFCCC definitions of forest is that temporarily unstocked forest areas are classified as forest provided that their land use remains forestry⁸. There are a number of reasons why the term 'temporary' should be qualified.

Many lands which for legal or administrative reasons are classified as forest lands falling under forestry land use may not be covered with trees in a near future (or ever). On the other hand, there may be other ways than legal provisions or administrative decisions to ensure that the tree cover will be re-established and that forestry continues to be the land use. For example, existence of a management plan to reforest the land (soon) could be

⁸ This may not necessarily be true with the Kyoto Protocol.

considered a qualifier, or that the tree cover is expected to expand to more than 10% of the crown cover and reach a minimum of 5 meters in height, if the area is brought under protection and not further disturbed by human intervention. However, the practicality of such options as qualifiers in connection with the term 'temporary' would have to be carefully assessed.

The term 'temporary' is present both in the UNFCCC and FRA definitions, but only the latter one is explicit on what it means; it is defaulted at roughly 10 years. The choice of default period is necessarily somewhat artificial given the wide range of conditions where forests regenerate. The reason why the UNFCCC lacks a definition is probably the highly varied national conditions for which an agreement on one definition would be difficult to reach.

The UNFCCC and FRA definitions are harmonized in the sense that data can theoretically be converted from one threshold to another.

In practice, however, this may be difficult to achieve because data are usually insufficient to establish reliable conversion factors with regard to the period during which regeneration should occur. The other option is to standardize the default period⁹, but it is unclear whether this is feasible or even desirable. The main benefit would be better convertibility of data which must be weighed against potential disadvantages such as disrupting established and agreed reporting patterns.

The CBD definition of forest does not include the concept 'temporary', possibly because the context where it is applicable, i.e. unstocked areas, are not referred to in the definition. The rationale for this could be reviewed together with a discussion on 'unstocked areas' (see Ch. 0).

Unstocked Areas

The FRA and UNFCCC definitions state that temporarily unstocked areas, are considered forest. The CBD definition does not explicitly mention these, but makes a reference to 'young forest'. Lacking an explicit definition, it is unclear whether young forests are equal to unstocked forest or not. It would probably be rare to have a virtually clean unstocked forest without any seedlings, and this would in most cases be a temporary situation. A forest is not considered 'stocked' before it has reached the thresholds set (10% and 5 meters). Before that it would be temporarily unstocked containing tree seedlings, i.e. it would be a young forest (natural or planted). If this interpretation is correct, the various definitions would be compatible.

The omission of unstocked forest from the CBD definitions has a number of connotations related to what extent unstocked forests house forest biodiversity and whether such areas are considered part of a forest ecosystem. On one hand, emergence of unstocked areas on a temporary basis is part of forest development dynamics, be the forest managed or unmanaged. On the other hand, a definition that would allow inclusion of (large) unstocked areas could be criticized from biodiversity standpoint (e.g. vastly reduced biodiversity at least temporarily).

The difference can be considered fundamental, and the possibility to agree on a common approach in this regard could be explored. The most promising option would be to modify the CBD definition of forest to explicitly include temporarily unstocked areas. Excluding unstocked areas from the FRA and UNFCCC definitions is difficult to justify, since they are firmly anchored in the internal logic of these processes. The context where the CBD definition is used is probably still more flexible, and an adjustment of the definition may be acceptable.

⁹ Not necessarily one default value.

If this kind of consistency between definitions is not considered feasible or desirable, another option is to harmonize them through improving comparability. This could be achieved by introducing a separate category of unstocked forest within the FRA and UNFFFC definitions of forest. From an inventory standpoint this would be rather easy to accommodate, and the cost implications would be modest.

Another aspect of unstocking is degraded forest land which is discussed in Annex 1, Section 3.

4.2.1 Expansion of Existing Definitions of Forest

The current definitions of forest have been criticized for lacking environmental and social criteria, and overemphasizing production aspects (e.g., World Rainforest Movement 2002). One of the key issues is the debate on what characteristics of a 'naturally' developed forest should be present in an area qualified as forest (see Annex 1, Section 1). Forest plantations, in particular, have been criticized for being 'too simplistic ecosystems' to be considered a forest.

It has proved difficult to agree on such distinctions as well as on appropriate classification criteria, and the current definitions of forest do not yet include references to them. However, most attempts to define the 'naturalness' of forests refer to indicators such as species composition and stand structure which, in principle, can be added as attributes to existing definitions (see also Ch. 4.5.1). This may, however, lead to significant costs in data collection, since it would involve considerable field work.

Social criteria are more difficult to incorporate in definitions of forest in a manner that would make them practical to use. For instance, considerations such as "equitable sharing of benefits from forests", are difficult to operationalize, since the benefits are often intangible and it is difficult to make them comparable. 'Equitable sharing' is also a highly value-laden and context-specific concept. A possible option would be to address social issues mainly through more detailed and comprehensive conceptual frameworks (e.g. criteria and indicators) rather than through such basic and concise instruments as core definitions.

4.2.2 Summary of Options

1. Threshold values for stand characteristics used by UNFCCC are fixed. However, under GPG a case could be made for countries to voluntarily adopt the FRA definitions as also applied by CBD.
2. Assess the need to add a qualifier for the term 'temporary' in the UNFCCC and CBD definitions of forest.
3. Consider including 'temporarily unstocked areas' in the CBD definition of forest to make it essentially the same as the FRA definition. Alternatively, make the CBD definition comparable with the FRA definition, by distinguishing 'temporarily unstocked areas' as a separate class of forest in FRA.
4. Assess the need and justification for creating a sub-class of non-forest under FRA, 'degraded former forest land' to make it consistent with ITTO definition.
5. Assess the feasibility of incorporating of social considerations in the definitions of forest vs. addressing these under such comprehensive frameworks as Criteria & Indicators for SFM.

4.3 Forest Land

None of the international sets of forest-related definitions include an explicit formulation of the term 'forest land' or 'forestland' (e.g. Lund 2002). The UNFCCC definition of 'forest management' includes the term 'forest land', but it is not defined (Box 4.2). Related UNFCCC terms including 'cropland management' and 'grazing land management', which define other land uses.

Box 4.2 Definitions of Forest and Other Land Management

UNFCCC 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;

'*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;

'*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.

4.3.1 Relationship with 'Forest'

Confusion arises from the fact that the UNFCCC definitions of afforestation, reforestation and deforestation (ARD) include three other related, but undefined terms, i.e. 'forested land' 'non-forested land' and 'land without forest' (see Ch. 4.3). For example, afforestation is defined 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". In this context, it is unclear whether 'forested' refers to fully established stands or whether young forests which are not yet firmly established are included or not.

The simplest approach to make the definitions compatible would be to agree that the UNFCCC terms 'forested land' and 'forest land' are synonymous with 'forest'. Similarly, 'non-forested' and 'land without forest' would be equivalent of 'non-forest'. This would eliminate the ambiguity regarding young forests. It is also suggested that only one term be used, possibly 'forest', or that 'forest land' and 'forest' are considered synonymous. 'Non-forest' would be the symmetrical reverse of 'forest'. However, the issue of dividing non-forest into other wooded land and other land should be considered in this context (see Ch. 4.2.2).¹⁰

4.3.2 Relationship with Other Land Use Classes

Further confusion arises from the fact that the term 'forest land' appears to be referring to land use, in a similar fashion as 'cropland management' and 'grazing land management'. However, the situation is further complicated by the fact that these definitions do not exclude other land uses from an area. In other words, the available definitions do not provide clear guidance how to determine the land category for an area where a combination of different land uses is practised which is widely spread and often also a policy objective.

The problem derives from the ambiguity in the UNFCCC definition of forest which does not explicitly address the issue of combined land use. The FRA definition of forest represents a feasible approach where it is stated that 'other predominant land uses' should not be present in an area considered a forest. On the other hand, the UNFCCC definition may deliberately avoid references to land use because its main interest is carbon stock.

However, the possibility of overlap in the UNFCCC land classes makes the definitions incompatible with FRA and CBD definitions of forests, which do not allow it. In particular, they require that non-forest land uses should not be predominant in an area considered as forest.

¹⁰ This could possibly be taken up by GPG.

The FAO definition specifically excludes orchards, agroforestry and urban forests, and the CBD definition states that the area should not be primarily under agricultural or other specific non-forest land use.¹¹

The difference may become an issue in the implementation of the Kyoto Protocol. Currently, the KP definitions assign 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 may thus be excluded from forest¹². This would also make such lands ineligible under Article 12 of the UNFCCC. So far, the difference has not been an issue because the current UNFCCC definition applies only to Annex 1 countries, where forests are mainly boreal and temperate, and the distinction between forest and other land uses is usually relatively clear.

However, this difference must be explicitly addressed, when formulating a definition of forest to be applied under the CDM of the Kyoto Protocol. In developing countries, forestry is often combined with other land uses (agroforestry, silvopastoral systems etc.). Under the CBD and FRA definitions, they would not qualify as forest if other uses are predominant, whereas according to the current KP definition they would be classified as forests as long as the tree formations in these areas (fruit trees, oil palms etc.) meet the minimum criteria. The discussion to find a suitable approach is underway but still remains unresolved. If the future definition of forest under the CDM will include combinations of forest and other land uses without qualification related to predominant or primary use, it will be incompatible with the FRA and CBD definitions.

On the other hand, harmonization of these definitions could be achieved rather easily. It would suffice to split the land use class 'other land' applied by FRA into three classes: one would denote areas where trees are combined with other land uses in 'stand-like' formations within 'other land'. The second class would include 'scattered trees', i.e. patches below 0.5 ha (FRA minimum size). This corresponds to the existing FRA definition 'trees outside forest areas' (for definition see Ch. 4.3). It is debatable whether a lower boundary such as 0.05 ha (UNFCCC minimum size) should be established. It may be an impossible condition to meet, because such high-resolution data are rarely available. It may be sufficient to establish a new class without a lower boundary. The remaining area under 'other land' would constitute the third class of 'no trees present'.

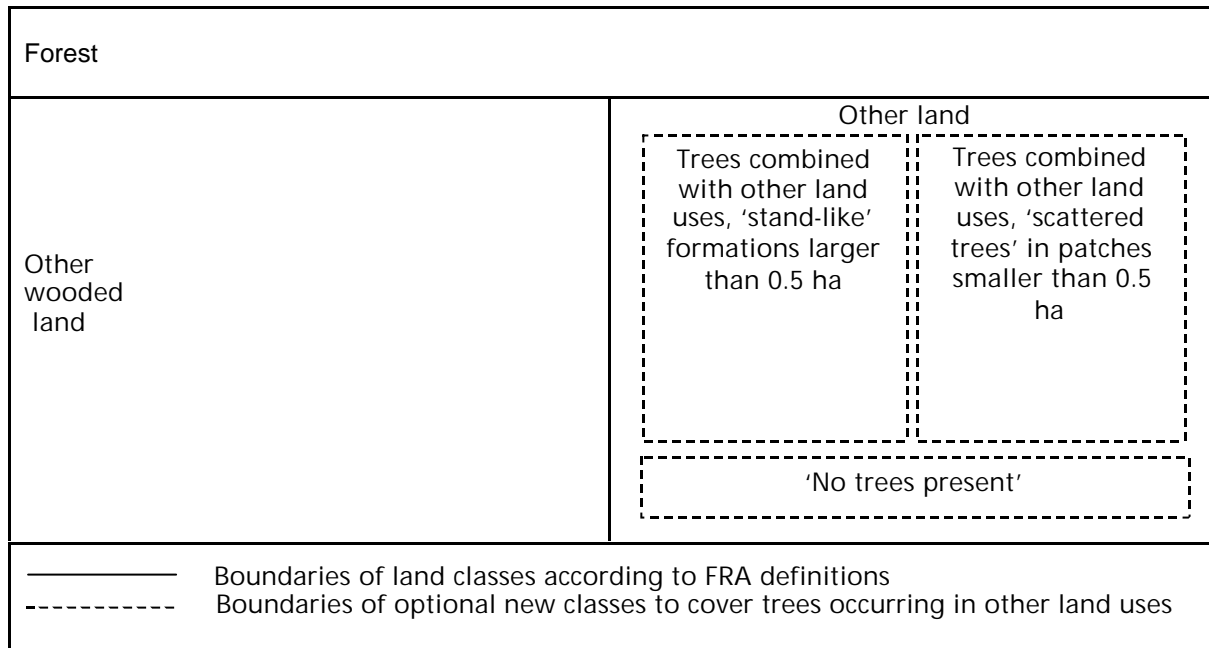
As the optional adjustment of the FRA classification would only split existing classes, it would not affect comparability with the CBD definition of forest. To some extent it might even be an improvement from the CBD's standpoint defining forest as function and ecosystem-oriented. The optional new classes could have distinguishable characteristics that may merit a separate different treatment as another, separate group of ecosystems from 'forest'.

The cost implications for countries reporting to FRA could be significant. It is not easy to distinguish combinations of land uses with remote sensing. Using current methods, it is also difficult to distinguish differences of tree cover classes with reasonable precision.

¹¹ Lands under silvo-pastoral systems where grazing is a complementary activity would be considered forest by the FRA definition.

¹² The countries may decide how they deal with such situations in reporting.

Figure 4.1 Relationship between Current FRA Land Classes and Proposed New Sub-classes Combining Forestry with Other Land Uses



4.3.3 Summary of Options

- (1) Assess whether UNFCCC terms 'forested land' and 'forest land' can be considered synonymous with 'forest' and, if so, which term(s) should be used in the future.
- (2) Clarify the method of classifying lands with a combined land use under the UNFCCC definitions and assess whether the UNFCCC approach can be aligned with the FRA classification by e.g. dividing the FRA land class 'other land' into sub-classes.

The work related to clarifying and streamlining definitions could be carried out under the process of developing Good Practice Guidance.

4.4 Non-forest

4.4.1 Definitions

'Other wooded land' and 'Trees outside forests' are terms found only in the FRA set of definitions (Box 4.3). The need for harmonization may arise from a desire to increase compatibility with the UNFCCC terminology which defines land areas eligible for 'revegetation'. Were the terms compatible, the FRA data would directly benefit the UNFCCC in terms of monitoring changes in carbon stock.

The land area, which revegetation applies to, has not been explicitly defined. Reference to vegetation that "does not meet the definitions of afforestation and reforestation contained here (reference to UNFCCC definitions)" suggests that areas which, after revegetation, qualify as forest are excluded. However, the available definitions leave it unclear whether it applies to lands under 'cropland management' and 'grazing land management' (see Ch. 4.3).

Box 4.3 Definitions of Non-forest Land, Trees Outside Forests, and Change in Vegetation

FAO 2000b

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.

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.

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.

UNFCCC, 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 definitions of afforestation and reforestation contained here [reference to UNFCCC definitions];

Devegetation lacks definition, but it can be assumed to be a symmetrical inverse of revegetation relying on same indicators and threshold values.

The proposals put forward by various countries suggest that revegetation would not apply to any of these lands, but to another, yet undefined land category outside of them. For instance, the Australian Government has suggested to consider 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 under revegetation (UNFCCC 2000b). The Government of Iceland has proposed growing of lupines, planting of grass and associated fertilization as eligible activities (UNFCCC 2000a).

The FRA definition of 'other wooded land', on the other hand, does not define a land use. It is therefore not clear whether agriculture or grazing can be practiced on 'other wooded land'. The FRA definition 'other land' includes agricultural lands and meadows outside 'forest' and 'other wooded land', but it does not provide guidance as to land uses in 'other wooded land'.

Another difference between the FRA definitions of 'other wooded land' and the areas under UNFCCC definition of land eligible for 'revegetation' is land cover. The FRA definition includes all 'woody' vegetation such as trees, shrubs and bushes. In the UNFCCC definition there are no restrictions regarding vegetation growing on land qualifying under the term revegetation (or devegetation).

Further, the UNFCCC definition of land eligible for revegetation sets a minimum limit of 0.05 ha for an eligible area, whereas the FRA applies 0.5 ha. In 'other land', this could be covered under the FRA definition 'trees outside forests' but in 'other wooded land', a new class would have to be created.¹³

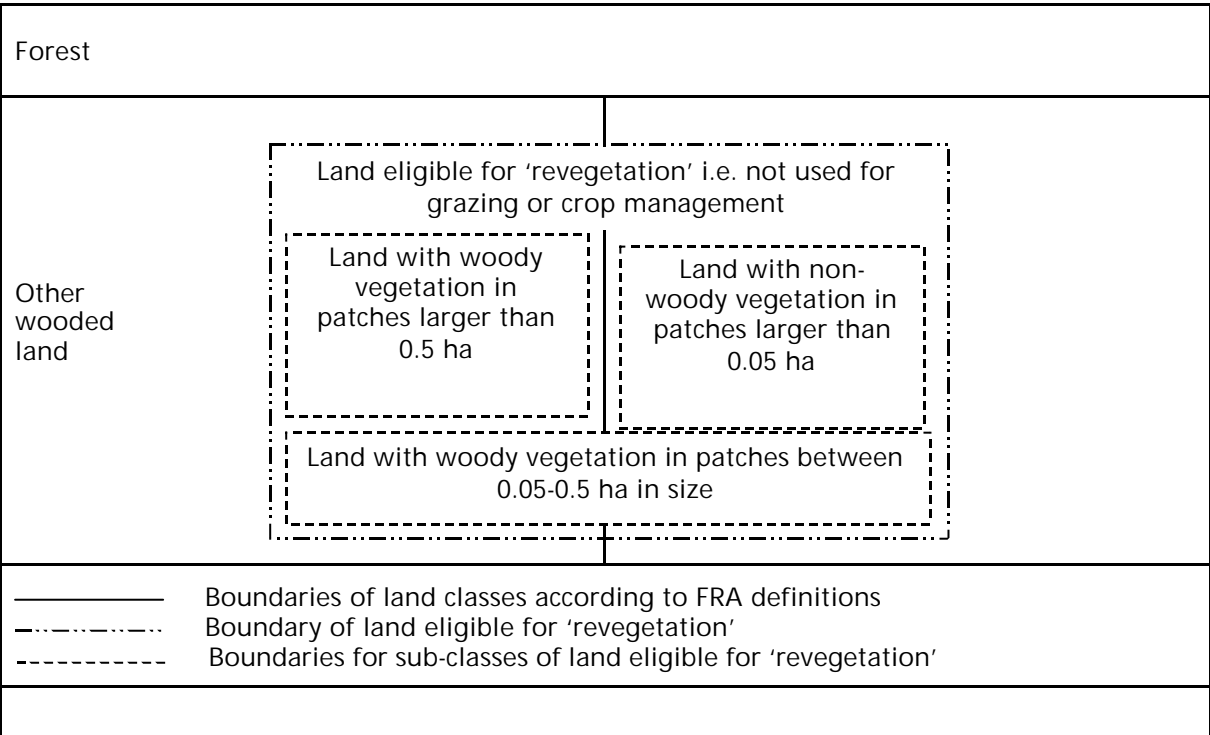
¹³ The internal consistency of the FRA definitions for 'trees outside forests' and 'other wooded land' may need a review.

The relationship between the FRA land classification and land eligible for 'reforestation' is illustrated in Figure 4.2 suggesting that harmonization of these definitions would be difficult because several new sub-classes should be created.

The biggest hurdle is probably that the FRA land classes 'other wooded land' and 'other land' should be split according to land use, which would be a new practice. If harmonization of these definitions is considered useful, the first step would therefore be to find a common understanding on treatment of land use.

Taking into account the fact that revegetation would probably be relevant only in a limited number of countries, a full harmonization may not be warranted because of the high cost involved as all countries should brake down their data accordingly.

Figure 4.2 Relationship between Current FRA Land Use Classes and Land Areas Qualifying for 'Revegetation' under UNFCCC

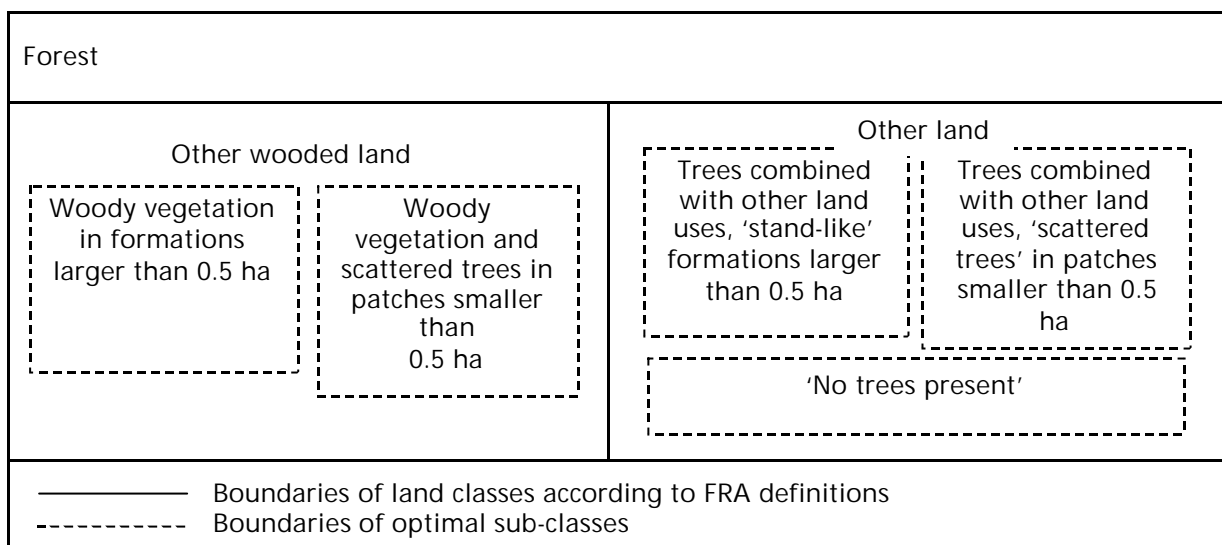


Another approach would be to aim for partial harmonization. All the UNFCCC definitions require that changes are 'human induced'. This feature is currently not distinguished under FRA definition of 'other wooded land'.

It would probably be possible and useful to distinguish between 'natural' 'other wooded land' (e.g., mountain shrubs or dry savanna) and 'human-made' 'other wooded land' (e.g., fallow or degraded land).

For consistency, it would probably also be useful to distinguish between patch sizes, i.e. 0.5 ha (FRA minimum) and 0.05 ha (UNFCCC minimum). The respective set of sub-classes are illustrated in Figure 4.3 in the area denoting 'other wooded land'. The sub-classes in the area denoting 'other land' are those proposed in Ch. 4.3.2.

Figure 4.3 Relationship of Current FRA Land Classes with the Proposed Sub-classes under 'Other Wooded Land' and 'Other Land'



4.4.2 Option for Further Work

- (1) Assess the feasibility of harmonizing the FRA land uses classes and lands qualifying under UNFCCC definition of revegetation.

4.5 Changes between Forest and Non-forest

4.5.1 Definitions

The two principal sets of definitions for deforestation, reforestation and afforestation are provided by FRA and UNFCCC. The FRA definitions of reforestation and afforestation have also been adopted by the CBD.

ITTO has developed its own definitions of afforestation and reforestation. FRA has also developed a definition for natural regeneration and natural expansion of forests. The compatibility and potential for harmonization of the various definitions were extensively discussed in the first Expert Meeting on Forest-related Definitions (Proceedings... 2002).

4.5.2 Afforestation and Natural Expansion of Forest

Afforestation, as applied by FRA 2000, is the conversion of non-forest into forest as a result of direct human action through planting or seeding. FRA does not make any qualification regarding the means of afforestation (through seeding or planting).

The Expert Meeting recommended that FAO consider expanding the FRA definition of afforestation to include assisted succession to trees not involving direct seeding or planting. The ITTO definition refers only planting, and the option of including seeding and other assisted measures as a means of afforestation could be considered.

Box 4.4 Definitions of Changes between Forest and Non-forest

<p>Afforestation <u>FAO 2000a (UNEP/CBD/ SBSTTA 2001)</u> The conversion from other land uses into forest, or the increase of the canopy cover to above the 10% threshold. <u>UNFCCC 2001</u> 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. <u>ITTO 2002</u> Planted forest on deforested land, or on non-forested land.</p>
<p>Natural expansion of forest <u>FRA 2000</u> 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.</p>
<p>Reforestation <u>FAO 2000a (UNEP/CBD/SBSTTA 2001)</u> The re-establishment of forests after a temporary (<10years) condition with less than 10% canopy cover due to human-induced or natural perturbations. <u>UNFCCC 2001</u> The direct human-induced conversion of non-forested land to forested land through planting, seedling and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. <u>ITTO 2002</u> Re-establishment of trees and understorey plants at a site immediately after removal of natural forest cover</p>
<p>Natural regeneration on forest lands <u>FAO 2000a</u> Natural succession of forest on temporarily unstocked lands that are considered as forest.</p>
<p>Deforestation <u>FAO 2000a</u> The conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold. <u>UNFCCC 2001</u> The direct human-induced conversion of forested land to non-forested land.</p>

All three definitions of afforestation are compatible in the sense that they require human action, crossing of the forest/non-forest threshold and ceasing of other predominant land uses. They differ in that the Kyoto Protocol requires that the land has not been forested within the previous 50 years, whereas the FRA and ITTO definitions do not include any such qualification. In order to contribute to harmonization and simplification of definitions, the Expert Meeting recommended that the UNFCCC consider, in the second or subsequent commitment period, dropping the requirement for a 50-year non-forest condition for afforestation. This would eliminate the need for a separate definition of reforestation and bring the UNFCCC afforestation figures into closer agreement with the FRA results.

The treatment of young forests is compatible in the UNFCCC and FRA definitions. However, the UNFCCC definition explicitly includes young forests, whereas FRA definition considers as afforested only young forest stands that have been successfully established, but may not yet have crossed the applicable thresholds. The difference is minor, and harmonization of the definitions could be considered. The ITTO definition is problematic in the sense that afforestation is a 'planted forest', but ITTO does not provide a definition

for 'forest'. ITTO may therefore consider adopting one of the existing definitions or formulate one, which is compatible with them (see Ch. 4.1).

The UNFCCC does not provide a definition for natural expansion of forest. This is logical in the sense that eligible activities include only those that are directly human-induced. ITTO, on the other hand, could consider developing a similar definition to make its set of definitions more complete.

4.5.3 Reforestation

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, which makes the FRA definition in the case of assisted natural regeneration compatible with the UNFCCC requirement that changes must be human induced. Full consistency would require FRA to separate assisted and unassisted regeneration.

The ITTO definition is compatible with these definitions as it states that reforestation takes place 'after removal of forest cover'. 'Re-establishment' does not indicate whether reforestation is human-induced or not, and an adjustment may be considered. As discussed above, the most problematic issue regarding compatibility is that the ITTO definition does not clearly refer to an established definition of forest.

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 UNFCCC definition defines reforestation as conversion of land that was forested but had been converted to non-forested land. For the first commitment period, domestic reforestation is restricted to land that did not contain forest on 31 December 1989. Reforestation, as defined by the UNFCCC, is accounted as afforestation under FRA 2000 since the land was not previously forested. The current definitions of reforestation by FRA and the UNFCCC are therefore incompatible from a land-use point of view. The definitions cannot be reconciled. The ITTO definition is close to that of FRA, and the two could be harmonized with minor adjustments.

The terms afforestation and reforestation have not yet been defined under Article 12 of the UNFCCC referring to the 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 will also introduce additional conditions. Credits for afforestation and reforestation activities that do not meet sustainable development objectives, as defined by the Party, are likely to be excluded.

4.5.4 Deforestation

A key feature of UNFCCC definition of deforestation is that the process is directly human-induced. The FRA definition, on the other hand, does not distinguish natural loss of forest from that caused by human action. While both definitions are consistent with the logic of their respective frameworks, the difference makes them incompatible with each other. The Expert Meeting recommended that FAO 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 UNFCCC.

Both definitions refer to non-temporary (long-term or permanent) change from forest to non-forest. The FRA defaults the time period for a 'temporary' unstocked state at usually a maximum of ten years, while the UNFCCC leaves it undefined (see discussion in Ch. 0).

4.5.5 Summary of Options

- (1) Expand the FRA definition of afforestation to include assisted regeneration not involving direct seeding or planting
- (2) Drop the requirement for a 50-year non-forest condition for afforestation in the UNFCCC definition to be applied from the second commitment period onwards
- (3) Consider harmonizing the treatment of young forests in the FRA and UNFCCC definitions of afforestation
- (4) Consider addition a definition of natural expansion of forest in the ITTO set of definitions that is compatible with the other existing definitions
- (5) Consider developing the ITTO definitions by including a reference to an established definition of 'forest', and making minor adjustments to increase compatibility with FRA and UNFCCC definitions
- (6) Differentiate direct human-induced deforestation and permanent forest loss due to other causes in the FRA definition of deforestation

4.6 Forest Degradation

4.6.1 Definitions

Definitions of forest degradation have been formulated by FRA and CBD. The ITTO proposal¹⁴ has adopted the CBD definition but expands it with an additional qualifier. Forest improvement describes the reverse process of forest degradation. Other terms for this purpose may, however, be considered, such as aggradation, amelioration, melioration, rehabilitation, unsustainable management etc. The Expert Meeting discussed extensively the option to develop the concept and its definition (Proceedings.. 2002). Related concepts, 'forest fragmentation' and 'forest improvement', are discussed in Annex 1, Sections 4 and 5.

Box 4.5 Definitions of Forest Degradation

FRA 2000

Forest degradation. A reduction of the canopy cover or stocking within the forest through logging, fire, windfelling or other events, provided that the canopy cover stays above 10%. 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.

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.

ITTO 2002 (adopted UNEP/CBD/SBSTTA definition with the following qualifier)

Degraded and secondary forests include all those forests and forest lands that have been altered beyond the normal effects of natural processes through unsustainable use.

IPCC (draft version developed by a Task Force)

Degradation is a long-term reduction of tree crown cover towards but not exceeding the minimum accepted 'forest' threshold.

¹⁴ ITTO is still in the process of finalizing the guidelines where degraded and secondary forests are defined.

Table 4.2 Parameters of Various Definitions of 'Forest Degradation'

Parameter		UNFCCC	CBD	ITTO	FRA
Binary parameters	Reference point defined as				
	- 'ideal' state	0	1	1	0
	- status in the beginning of the observation period	1	0	0	1
Binary parameters	Reduced supply of goods and services caused by				
	- human activities	1(?)	1	1(?)	1
	- natural causes	0(?)	0	0(?)	1
	Secondary forest	0	1	1?	0
Threshold parameters	Minimum crown cover (%)	'Accepted'			10

4.6.2 Compatibility of Existing Definitions

The FRA definition has two essential elements. The first part is trying to capture the essence of the degradation process through an operational definition using stocking or canopy cover as indicators, and defining a minimum acceptable level for them. The same approach is proposed in the draft definition formulated by IPCC for UNFCCC. However, the latter uses only crown cover as indicator, no numerical value is provided for the minimum 'acceptable' level. In both definitions any reduction in indicator and value is considered 'degradation'. These definitions of degradation are largely compatible, and a generic common definition could be developed without greatly disrupting the existing use of the term.

The latter part of the FRA definition defines 'degradation' in more general terms, as reduction of overall potential supply of goods and services. The CBD and ITTO definitions share this approach, but a notable difference is that the reference point is a 'natural' state of forest. Significant deviation (defined in various ways) from such a state is considered degradation. The FRA definition, on the other hand, does not refer to a reference point, but implies any reduction in the supply of goods and services as degradation.

4.6.3 Composite Index

The principal difficulty of applying existing definitions arises from the fact that forests produce a multitude of various goods and services, and many of these are produced simultaneously on the same piece of land. Due to trade-offs, efforts to increase production of one output may reduce the availability of another. Owing to this interdependence, one of the key issues is to define how to deal with trade-offs between outputs, i.e., whether a reduction in the supply of one good or service can be offset by an increase in the supply of another. For instance, monoculture plantation could increase wood supply but lead to loss of biodiversity.

The Expert Meeting discussed the option that 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. A negative change in any indicator (beyond a certain threshold value) would represent an element of degradation. Weighting would be justified, as various negative changes would not have an equal impact on forest functions. In principle, the use of such a composite index implies that both negative and positive

changes could be accommodated to be determined based on a combined impact. This was, however, not spelled out in the proceedings.

In some cases the supply of goods and services from a managed forest can be better than from a 'naturally' developed forest if all the economic, social and ecological functions are accounted for (e.g., planted forest on degraded marginal land) (Holmgren, pers. comm.). From this standpoint the key indicator would be the *change in the supply of goods and services* rather than the status of forest. The naturally developed forest could still be adopted as a reference point for assessing such a change.

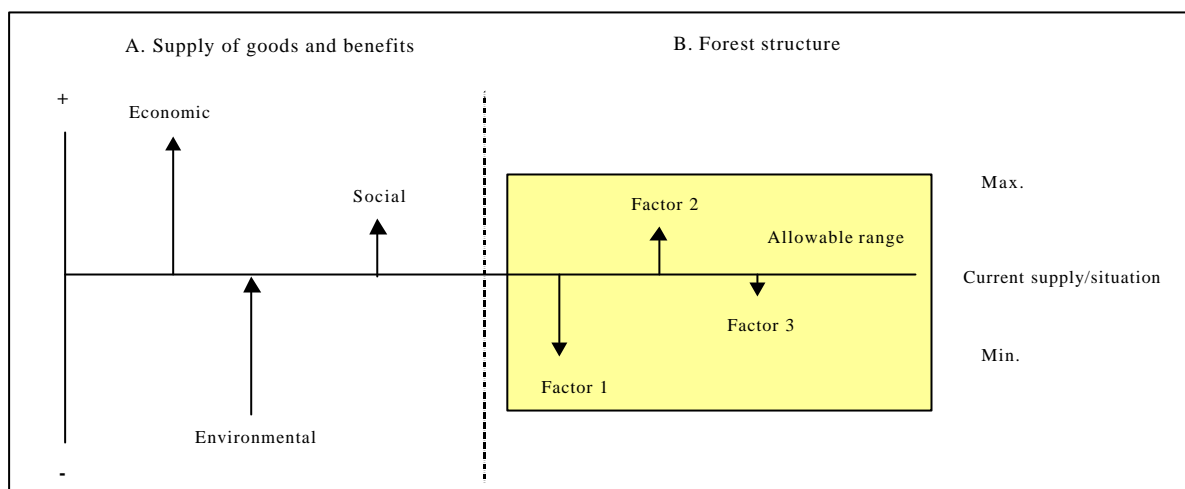
In practice, there are a number of problems associated with this approach. Above all, many of the goods and services cannot be measured using the same, neutral yardstick. For instance, trying to determine trade-offs between environmental services and production of timber is a value-based choice. Many of the services (e.g. providing aesthetic values) are also intangible.

A further problem is that the degradation in the supply of environmental services (e.g. biodiversity) may materialize long after the activities causing degradation (or improvement) have taken place. For instance, forest species do not respond immediately to deterioration in the forest environment. Indicators based solely on the *current* supply of goods and services may not be able to detect these changes.

Another problem is the reference point. One option is to use the structure of 'naturally' developed forest as benchmark. However, it is unclear what would constitute a forest in this context, i.e. whether it is (a) a single stand, or (b) a group of stands of varying ages and development stages. In the latter case it is unclear how the concept should be applied to a single stand, if at all. It is also difficult to define which point of forest succession should be adopted as a reference point (early/mature/climax), as well as to determine at what stage of succession the stand(s) to be analyzed are. Acceptable deviations from the reference point would also be difficult to determine. For instance, should replacement of a broadleaved stand with a coniferous stand earlier than would happen in 'natural' succession be considered degradation?

Provided that the problems discussed above can be satisfactorily solved, the development of a comprehensive composite index could be considered. It should probably include indicators for the current as well as the potential supply of goods and services. For instance, the current supply of goods and services could serve as the main indicator, and change of forest structure could be used as a secondary indicator which is allowed to vary within a particular range (see Figure 4.4).

Figure 4.4 Elements of Composite Index Comprising Supply of Goods and Benefits and Characteristics of Forest Structure



If this proves unfeasible, another approach could be to apply the generic definitions and develop individual indices for various aspects of degradation/improvement. Assessment on their combined effect would be done on a case-by-case basis.

4.6.4 Other Considerations

Regarding the time frame the FRA definition indicates that degradation involves a 'long-term' reduction of potential supply. The term is included to avoid all logging operations to be considered degradation, as it would often lead to improvement of the stand in the long run (e.g., thinnings).

Similarly, the damage caused by a fire would represent degradation in the short-term, but a long-term improvement in some ecosystems (Holmgren, pers. comm.). The CBD 2001 definition leaves the time frame open.

In this context, an important concept is the resilience of different forest ecosystems, which the ITTO definition refers to. The available definitions may be inadequate because they do not take into account the relative levels of resilience or buffering in different forest types.

The 'long-term reduction of potential supply' is almost equivalent to an indication that the resilience of forest has been exceeded (see above). However, the difference is that if the resilient capacity of a forest is exceeded, the result is an irreversible change. 'Long-term' may refer to a situation where the supply of goods and services is reduced for a long period time, but the resilience of the forest has not necessarily been broken down.

In other words, reference to resilience implies more dramatic and permanent changes than an indication of 'long-term' changes. Harmonization could be approached by adjusting the FRA definition to include the concept of resilience.

Neither the FRA definition nor the CBD definition indicate spatial scale for assessments. The options include individual forest management units (FMU)¹⁵, groups of small holdings, landscape, ecosystem, administrative district, national or some other level.

¹⁵ There are alternative interpretations for how a forest management unit is defined (cf. e.g., ISO 1998).

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. However, management of the entire FMU could still be sustainable, including areas with no harvesting.

Another difference between the FRA and CBD definitions is that the latter refers only to degradation that is human induced, whereas the FRA does not make this distinction. This makes the FRA definition more complete, since degradation is not always human-induced, as it can also take place for natural reasons (e.g., nutrient leaching, desertification).

In principle, this distinction is required under UNFCCC, but in practice making the distinction may be difficult (Annex 1). Given the theoretical and practical problems of distinguishing between these two cases two feasible options could be considered: (1) not defining this attribute, or (2) qualifying all degradation as 'human-induced'.

4.6.5 Summary of Options

- (1) Consider harmonizing the FRA definition of forest degradation (operational element) and the draft UNFCCC definition
- (2) Consider incorporating the concept of resilience in the existing definitions of forest degradation
- (3) Explore options to determine on what spatial scale degradation should be assessed
- (4) Analyze the feasibility of developing a composite index for forest degradation paying special attention to the justification/feasibility of (a) compensating degradation in the supply with one good or service with improvement in the supply of another one, and (b) adopting 'naturally' developing forest as a reference point for forest degradation

4.7 Managed Forests

4.7.1 Definitions

Definitions for managed forests are provided by FRA and ITTO (Box 4.6). The UNFCCC process provides a definition for forest management, which is closely related to the other two.

Table 4.3 demotes the presence of parameters in alternative definitions. The IPCC (1996) refers to an inverse concept "unmanaged forest", which contains definitional elements.

Box 4.6 Definitions of Managed Forests and Forest Management

FAO 2000a

Managed forest/other wooded land. Forest and other wooded land that is managed in accordance with a formal or an informal plan applied regularly over a sufficiently long period (five years or more).

ITTO 2002

Managed natural forest. Forest in which sustainable timber and non-wood harvesting (e.g. through integrated harvesting and silvicultural treatments), wildlife management and other uses have resulted in changes of forest structure and species composition. All major goods and service functions are maintained intact.

UNFCCC 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.

IPCC 1966

Natural, unmanaged (for wood products) forests are not considered to be either an anthropogenic source or sink, and are excluded from calculations. They can be excluded from woody biomass stocks accounting only, if there is no significant current interaction with these forests. If they are being used as a source of fuelwood, or are being affected in other ways by ongoing human activities, they should be accounted for.

Table 4.3 Parameters of Definitions of Managed Forest and Forest Management

Binary parameters	UNFCCC	IPCC	ITTO	FRA
Modification of natural forest development	0	1	1	0
Sustainable supply of goods and services	1	0	1	0
Management aims at fulfilling specific objectives/ functions	1	0	1	1
Duration of management	0	0	0	0

All three definitions related to managed forests are based on the approach that management is a purposeful action with the objective of fulfilling specific objectives or functions.

The ITTO definition states that management results in a modified forest structure or species composition, whereas the FRA and UNFCCC definitions do not define an outcome or add any qualifier to it.

This difference evokes the question, where to draw the line between managed and unmanaged stands. The ITTO definitions suggest that management is something that requires active intervention, i.e. altering natural forest development. The definition is rather broad covering a whole range of management objectives, which implies that unmanaged forests occur in rather rare circumstances. Strictly speaking, non-managed forests are limited to areas, which are in no way influenced by human intervention.

Accordingly, managed forests are not limited to production forests, as protected areas are subject to management as well. For example, semi-natural forest meadows would not be able to maintain their status without active management. Even limited interventions, such as boundary demarcation, fire protection (e.g. against human-induced fire) are part of management.

The same principles can be derived from the FAO or UNFCCC definitions, but they, in principle, go one step further. Since no outcome is defined, a mere decision not to intervene, could be considered forest management in the sense that it involves a conscious choice between alternative development paths. In other words, making a choice is the key issue. On the other hand, this interpretation would be restricted to situations, where forest management is an option. In inaccessible areas, where "active" management is not an option, no management can be practiced, and, consequently, no choices are made. The difference may be significant and should be clarified.

All of the above-mentioned definitions disqualify anthropogenic influence that occurs without a specific purpose of forest management (cf. Annex 1, Ch. 6). For instance, setting a forest accidentally in fire would not qualify as management.

The IPCC definition applicable to carbon accounting, on the other hand, is less clear in this regard. It states that "If they [forests] are being used as a source of fuelwood, or are being affected in other ways by ongoing human activities, they should be accounted for" [i.e. considered managed].

This formulation may be based on the notion that countries that are signatory to the Kyoto Protocol are responsible for protecting their forest resource against any kind of deterioration caused by humans. For instance, lack of proper fire protection should not be an excuse for not recording a reduction of carbon stock in a country's carbon accounts.

The ITTO and UNFCCC definitions include references to sustainability and maintenance of all forest functions, whereas the FRA definition does not mention these explicitly. For clarity, incorporation of these features in the FRA definition could be considered.

4.7.2 Summary of Options

- (1) Consider clarifying the distinction between managed and unmanaged forest especially as regards non-intervention, and accidental anthropogenic influence.
- (2) Consider incorporating a reference to sustainability into FRA definition of managed forests.

4.8 Forest Classification

The concepts of biome, forest type and forest ecosystem are interrelated in the sense that they serve to classify forest vegetation in various manners. The most commonly used term is forest type, which provides a basis for forest classification systems in most countries. The option to use biome as a basis for forest classification has also been discussed, mainly in conjunction with the implementation of Kyoto Protocol.

It has been suggested that biome-based classifications would be particularly suitable for developing differentiated definitions or thresholds of forest. Forest ecosystem has not yet been applied as a basis for forest classification in international processes.

4.8.1 Biome

Among the international processes and instruments analyzed under this study the CBD is the only one that has provided a definition for 'biome'. The expression 'domain' used in the FRA ecological zoning is another similar concept (Box 4.7).

Box 4.7 Definitions of Biome and Domain

UNEP/CBD/SBSTTA 2001

Forest biome. This reflects the ecological and physiognomic characteristics of the vegetation and broadly corresponds to climatic regions of the Earth. It is used in reference to boreal, temperate and tropical forest biomes.

FAO 2000a

Domain. Broader entity or level in classification, equivalent to the five thermic Köppen – Trewartha climatic groups and including the tropical, subtropical, temperate, boreal and polar domain.

A number of other formulations are available, and there is also half a dozen of other words or expressions denoting similar concepts (e.g., formation, major life form, major life zone, major community, ecoregion, ecofloristic zone, etc.). The distinguishing features highlighted in these definitions vary considerably, and the expressions are, perhaps unavoidably, often so vague that the difference in wordings has less significance for classification than the interpretation given to them by the one who is doing it. The level of classification is also unclear; one definition may consider a forest type as an example of a biome, whereas for another definition the same forest type belongs to a hierarchically lower class (Rakonczay 2002).

However, as regards harmonization, the differences between these definitions are not yet a major issue, because they are not applied in any major international process. The key issue regarding biomes is whether it is necessary to apply different definitional thresholds in different forest conditions. This has been debated in particular in conjunction with the Kyoto Protocol. If a differentiated approach is adopted, the question is then, whether it

should be done on the basis of biomes, or the current classifications based largely on forest type, or at all.

The Expert Meeting made a recommendation regarding the latter issue. It was concluded that biomes are probably less useful as a basis for different definitional thresholds than forest or vegetation types. The same conclusion was reached by Rakonczay (2002) in a recent paper commissioned by the UNFCCC. The concept of biome is not necessarily compatible with the actual land use and the way forests are managed and utilized. As the territory of many countries includes 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.

4.8.2 Forest Type

Forest type has been defined by several processes, including CBD and ITTO while the FRA applied a related concept 'ecological zone' (Box 4.8).

The CBD definition of forest type refers to "groups of forest ecosystems of generally similar composition" as a basic unit of a forest type. In the ITTO definition it is "a community of trees and associated plant species with uniform physiognomy". The FRA system of ecological zones (Box 4.9) is close to these definitions, even though the approach is broader encompassing formations without trees. In the FRA system the basic classification is done on the basis of "zones or areas with broad, yet relatively homogenous vegetation formations".

Similarities in the physiognomy (structure) of vegetation formation are distinguishing features of both the FRA and ITTO definitions. The CBD definition includes structural elements (tree and undercanopy species composition, crown closure) as well as productivity as a separate aspect. However, productivity is largely a function of ecological and climatic conditions, and it is to large extent reflected in the physiognomy, which reduces the significance of the difference.

Box 4.8 Definitions of Forest Type

UNEP/CBD/SBSTTA 2001

Forest type Within biomes, a forest type is a group of forest ecosystems of generally similar composition that can be readily differentiated from other such groups by their tree and undercanopy species composition, productivity and/or crown closure.

FAO, 2001

Ecological Zone. Defined as a zone or area with broad yet relatively homogenous natural vegetation formations, similar (not necessarily identical) in physiognomy. Boundaries of the Ecological Zones approximately coincide with Köppen-Trewartha climatic types, which are based on temperature and rainfall. An exception to this definitions are 'mountain systems', classified as one separate Ecological Zone in each domain and characterized by a high variation in both vegetation formations and climatic conditions.

ITTO 1998

Forest Type A naturally occurring community of trees and associated plant species of definite botanical composition with uniform physiognomy (structure) and growing in uniform ecological conditions whose species composition remains relatively stable over time. These are most often scientifically described at the 'association' level.

Box 4.9 FAO Global Ecological Zoning

- Tropical rain forest	- Subtropical mountain system
- Tropical moist deciduous forest	- Temperate oceanic forest
- Tropical dry forest	- Temperate continental forest
- Tropical shrubland	- Temperate steppe
- Tropical desert	- Temperate desert
- Tropical mountain system	- Temperate mountain system
- Subtropical humid forest	- Boreal coniferous forest
- Subtropical dry forest	- Boreal tundra woodland
- Subtropical steppe	- Boreal mountain system
- Subtropical desert	- Polar

Both the ITTO and FRA definitions indicate similarity of ecological conditions as another distinguishing feature between classes. In the FRA definition a specific reference is made to climatic conditions based on temperature and rainfall. This attribute, however, is missing in the CBD definition. Another slight difference is that FRA and ITTO definitions refer to 'natural' formations, whereas this is not explicitly mentioned in the CBD definition.

The definitions are still rather broad, and there is ambiguity as to what level of hierarchy they represent, and what detail of classification they require. Sometimes forest type is confused with biome or used interexchangably with it (Rakonczay 2002).

On the other hand, the concept of forest type is necessarily so diffuse that this is perhaps unavoidable. Even if there were a commonly agreed definition of forest type, it would probably not be able to provide unambiguous guidance on determining the number of classes, distinguishing characteristics between classes, etc.

Table 4.4 Parameters of Definitions of Forest Type

Binary parameters	CBD	ITTO	FRA
Basic unit			
- group of forest ecosystem	1	0	0
- community	0	1	0
- formation	0	0	1
Characteristics of basic unit			
- homogeneity	1	1	1
- naturalness	0	1	1
Distinguishing features			
- physiognomy	0	1	1
- species composition	1	1	0
- productivity	1	0	0
- crown closure	1	0	0
- climate	0	0	1
- general ecological conditions	0	1	0

The main issue may therefore not be the harmonization of various, more or less vague definitions, but reaching an agreement on the key features of the classification to be adopted, as well as an assessment of the potential gain of more detailed harmonization. One option, therefore, is to adopt an existing system as a starting point. While the number of different classifications is large, few of them have been used systematically to gather and process large quantities of global data. The FRA classification by ecological zones is the most comprehensive and widely used system, and the option to adopt it as a basis for further development should be carefully considered. This approach was also recommended by Rakonczay (2002) in his analysis of biome-based classification systems.

At the country level, the existing systems are well established, and have been developed to match the local conditions. It may therefore be advisable not to aim for harmonization of these systems with any international system, but rather to ensure that the information systems are able to provide data that is internationally required. This appears to be a highly feasible approach, as indicated by the reclassification of forest types used at the country level according to the FRA ecological zones.

4.8.3 Forest Ecosystem

The scientific community has formulated numerous definitions of ecosystem. Of the four international processes analyzed in this report, the CBD is the only one providing a definition for it (Box 4.10).

Box 4.10 Definition of Forest Ecosystem

UNEP/CBD/SBSTTA 2001

A forest ecosystem can be defined at a range of scales. It is a dynamic complex of plant, animal and micro-organism communities and their abiotic environment interacting as a functional unit, where trees are a key component of the system. Humans, with their cultural, economic and environmental needs are an integral part of many forest ecosystems

The CBD definition of ecosystem indicates, that it can be applied at different levels of definitional hierarchy. It is also a complex approach, as it involves dynamic interaction between biotic and abiotic environment, including humans. Despite the fact that ecosystem is a sound concept in ecological terms, it is difficult to apply it as a basis for forest classification. Classification systems must be based on concepts, which are rather rigid and display as little ambiguity as possible. Concepts such as forest type are more robust, even if in ecological terms they may not capture all the elements of the state and change of forest. In addition, the fact that different interpretations of the ecosystem concept are fully justified in particular contexts makes it difficult to reach an agreement on a globally applicable definition which could be operationalized through data collection. For practical purposes, it may be sufficient to adopt an appropriate classification of forest types serving as a rough proxy for classifying ecosystems.

4.8.4 Differentiated vs. Universal Definitions

It is of interest to analyze what gaps differentiated definitions are intended to fill, and whether the current systems – including the definitions they apply - could be adjusted to meet the new requirements. The main conclusions reached by Rakonczay (2002) in this regard include:

- Even in a differentiated approach, the same basic parameters of definition of forest would apply, namely: minimum area, minimum tree height at maturity, and minimum canopy cover (or another appropriate measure of density).
- The values of the above parameters influence the amount of land that is classified as forest. The effect of these parameters appears to be greatest towards the margins of the natural distribution of forests, and in areas highly impacted (disturbed/fragmented) by humans.
- No strong arguments have been identified either in favor or against defining forest on a biome-specific basis. Left unchanged long enough, any reasonable definitional scenario will detect major trends in transitions between forest and non-forest areas. As long as the system is based on a set of threshold criteria, its sensitivity (its ability to detect small changes) can be increased by reducing the spatial assessment units than by changing the definition.

It is also noteworthy that a change in a definition always entails a significant cost increase. Reporting burden during the transition period from one definition to another

would increase, inventories may become more complicated and comparability with historical data is often difficult to maintain. There is also a risk that such a change would create loopholes and perverse incentives (cf. Rakonczay 2002).

Alternative approaches include development of more accurate measurements. Reduction of spatial assessment units is one of the means for increased accuracy to detect small changes (cf. Rakonczay 2002). This option, of course, also entails a significant cost increase, but it should be compared with the costs of other approaches.

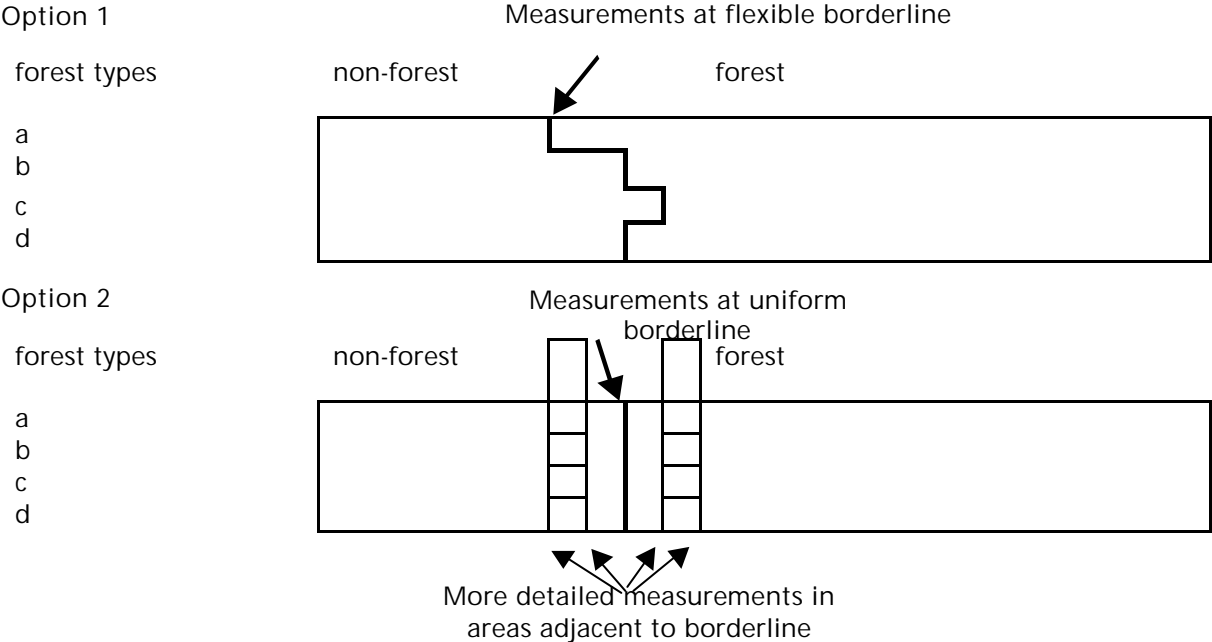
Another option is to develop an overall classification and assessment system (cf. Rakonczay 2000). Instead of focusing assessments on the extent of forest and non-forest land, the scope could be enlarged to detect changes within forest and non-forest land. This approach could achieve the same objectives as differentiated definitions (Figure 4.5).

The UNFCCC has proposed a method for assessment of carbon stock within non-forest land. Revegetation (and devegetation) is a concept intended to capture an increase of carbon stocks in case the change does not qualify as reforestation or afforestation.

Revegetation is a particularly useful concept in marginal areas of natural forest vegetation (e.g. areas subject to desertification), which has been pointed out as one of the problem areas for a non-differentiated definition of forest. Provided that appropriate monitoring methods are developed, revegetation may enable assessments that are sufficiently accurate for the purposes of UNFCCC. The FRA concepts 'other wooded land' and 'trees outside forest' serve for the same purpose, and introduction of new sub-classes in a manner suggested in Ch. 4.4 could make them more useful than at present.

Regarding changes within forest land, the existing classification could also be developed to detect changes in zones which are highly disturbed or fragmented by human activities. These are claimed to be another problem area for a non-differentiated definition of forest. There is a concern that, in strict definitional terms, an area may remain forest, even if substantial degradation has taken place (Rakonczay 2002). Detecting such changes may be possible by developing the terminology and assessment methods related to 'forest degradation' in a manner suggested earlier (see Ch. 4.5.1).

Figure 4.5 Detection of Changes in and between Forest and Non-forest Land



The problem regarding carbon accounting is that the CDM has opted to exclude from its scope other changes than those related to afforestation and reforestation. In the CDM approach, the detection of changes is strictly based on changes between forest and non-forest areas. However, if changes in carbon stock within forest areas is considered the problem that has to be addressed under the UNFCCC, the option of enlarging the scope of eligible activities to forest degradation and aggradation would be studied. Changing an existing and well-established definition of forest is a complex and intricate process involving significant costs.

4.8.5 Summary of Options

- (1) Consider harmonizing the various definitions of forest type using the FRA classification of ecological zones as a starting point.
- (2) Clarify the difference between forest type and biome in terms of their level in the definitional hierarchy.
- (3) Review the possibility of developing the terms 'revegetation/devegetation' and 'forest degradation/improvement' as an alternative to introducing a differentiated definition of forest.

4.9 Natural Forest vs. Forest Plantation

4.9.1 Definitions

Definitions of forest plantations vs. natural forests have a whole range of connotations which are subject to debate at an international level which are beyond the scope of this analysis. The key issue underlying the debate is the criticism that plantations are claimed not to fulfill the functions of a 'normal' or 'natural' forest. The available definitions are reviewed only briefly concentrating on their relationship with other definitions. Definitions of plantation forests are provided by FRA, ITTO and CBD (Box 4.11). Definitions of natural forest and semi-natural forest, which is a related concept, is provided by FRA.

Box 4.11 Definitions of Natural and Plantation Forest

FAO 2000a

Natural forest. Natural forests are forests composed of indigenous trees, not planted by man. Or in other words forests excluding plantations.

*Forest plantation.*¹⁶ Forest stands established by planting or/and seeding in the process of afforestation or reforestation. They are either:

- of introduced species (all planted stands), or
- intensively managed stands of indigenous species, which meet all the following criteria: one or two species at plantation, even age class, regular spacing.

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

ITTO, 2002

Planted forest. Forest stand that has been artificially established by planting or seeding.

UNEP/CBD/SBSTTA 2001

Plantation forest A plantation forest may be afforested land or a secondary forest established by planting or direct seeding.

The FRA definition of natural forests is based on an exclusion, 'forests *excluding* plantations', which suggests the difficulty of formulating an appropriate definition, and

¹⁶ The original text uses the term 'plantation forest'.

probably explains why other processes have limited their definitions to concern only plantations.

The three definitions of plantation provided above are very similar. All of them refer to forest stands established either through planting and seeding. The main difference is that the FRA definition provides stand characteristics, which are lacking in other definitions. Site characteristics are provided in the CBD and FRA definitions. The difference between them is that the CBD definition does not make an explicit reference to reforestation as a process, which may result in a plantation.

However, in many cases the situation is not clearcut, as planted seedlings can be mixed with naturally regenerated seedlings.

This is often the case in the European forests, where the line between semi-natural and plantation forests can be difficult to determine. Semi-natural forests often have stand characteristics, which resemble those of a 'naturally' developed forest (e.g. Buchwald 2002).

Table 4.5 Parameters of Definitions of Forest Plantations

Binary parameters	UNFCCC	CBD	ITTO	FRA
Site characteristics	n/a			
- afforested land		1	0	1
- secondary forest		1	0	1
- reforested land		0	0	1
Method of establishment	n/a			
- planting		1	1	1
- (direct) seeding		1	1	1
Stand characteristics	n/a			
- introduced species		0	0	1
- indigenous species		0	0	1
- intensively managed		0	0	1
- number of species		0	0	1
- age		0	0	1
- spacing		0	0	1

This suggests that the method of re-establishing a tree stand may have less significance for forest functions than the characteristics of the stand that ultimately develops. AHTEG (UNEP/CBD/SBSTTA 2001) pointed out that a gradient exists among plantation forests from even-aged, single species monocultures of exotic species with a fiber production objective to mixed species, native to the site with both fiber and biodiversity objectives. This gradient would probably also reflect the capability of the plantation forest to maintain 'normal' local biological diversity.

If this argument is accepted, it may be inferred further that the way in which forest stands are established would not have to be a starting point for classification from the biodiversity point of view¹⁷. If a distinct class is considered necessary, it could be established based on the characteristics of established stands. The approach proposed in the FRA definition of plantations could be a suitable starting point. On the other hand, the concepts 'afforestation' and 'reforestation' are closely tied to the forest plantation concept.

Regarding the various definitions analyzed in this study, the distinction between plantations and natural forest is particularly pertinent to forest degradation and improvement. The mere establishment of plantations has been considered forest degradation, especially if they replace natural forests (e.g. World Rainforest Movement

¹⁷ For the Kyoto Protocol, the method would remain a relevant aspect.

2002). The argument is that they should therefore be either excluded from a definition of forest, or at least should be treated separately from natural forests in terms of assessing their status, supply of goods and services, etc.

On the other hand, if a composite index of degradation could be developed, the less desirable characteristics of plantations (monoculture, uniform stand structure, etc.) could be taken into consideration as components of this index. The negative changes could be weighted against the positive contributions that plantations may have (e.g., increase in fiber production or soil protection) which would make the classification based on plantation/natural forest less relevant. However, as discussed in Ch. 4.6.3, this approach faces a number of theoretical and practical problems.

4.9.2 Summary of Options

- (1) Explore the possibilities to combine stand characteristics as a descriptor of forest plantations in addition to the method of establishment.
- (2) Assess whether the sustainability of forest plantations could be evaluated using a composite index or using the C&I frameworks.

4.10 Low Forest Cover

4.10.1 Definition Approaches

The Intergovernmental Forum on Forests (IFF) identified countries of Low Forest Cover (LFC) as being of special concern. The Tehran process initiated in 1999 has been promoting the development of appropriate relevant definitions (FAO 2002). In response, UNEP and IUFRO carried out an analysis on options to define low forest cover (Lund 1999). It suggested that one of the most interesting alternatives is classification of countries based upon a combination of variables. These include, *inter alia*, ratios of

- forest/total land area
- forest and other wooded/total land area
- existing/original forest area
- actual/potential forest area
- forest per capita

Many of the countries, which potentially qualify as low forest cover countries, are situated in dry zones. In these areas, the indicator values are very sensitive to changes of the thresholds set for the definition of forest. The accuracy of estimating forest area in marginal natural conditions is another key issue.

Two possible approaches have been discussed to increase the sensitivity and accuracy of assessments: (i) differentiated definitions based on biome or forest type, (ii) development of technical means to improve accuracy of classifications based on universal definitions (cf. Ch. 4.8.4). The development of differentiated definitions of forest has been found to increase the accuracy of various indicators in marginal areas (Rakonczay 2002). It can be assumed that improved accuracy would produce larger forest area estimates for LFC countries eliminating or reducing the underlying bias to their detriment which may be inherent in less exact approaches of measurement. However, problems with technical feasibility and cost may hinder efforts to pursue this strategy (see Ch. 4.8.4).

An alternative approach is to retain universal definitions, but increase the ability of technical means to assess the status of vegetation in marginal areas.

With respect to FRA, enhancing the ability to detect changes in the FRA classes 'other wooded areas' and 'trees outside forest' would probably increase the accuracy significantly in LFC environments. There is a cost factor involved but, as indicated earlier,

it may be less expensive and technically more feasible than using differentiated definitions. The development of the concept 'revegetation' under the UNFCCC process is another key approach (cf. Ch. 4.4).

Alternative approaches to define low forest cover are in some respects a separate issue not directly related to harmonization of definitions of the core terms of international instruments. Exploring further options for LFC definition(s) (e.g. development of combined indexes), should continue to be part of a concerted, comprehensive effort to develop compatible and harmonized definitions.

How vegetation cover is assessed in marginal areas is linked to development of definitions not only under the FRA but also within the UNFCCC (e.g. as regards the term 'revegetation'). To ensure that the definitions emerging from these processes are mutually compatible and consistent, it is necessary that all relevant parties take part in this process.

4.10.2 Summary of Options

- (1) Assess the options to increase accuracy of assessments on vegetation cover in marginal (dry) natural conditions in conjunction with the work carried out under other relevant processes, especially the FRA and UNFCCC.
- (2) Assess the feasibility of composite indices for characterizing low forest cover countries.

5 Conclusions

As the recommendations of the Expert Meeting indicated, there is an agreement on the necessity of increasing compatibility of definitions used by different international processes and the use of employing existing definitions in new applications. An improved definitional framework would facilitate reporting at country level, as it would, in particular, enable more efficient data collection and reduce the cost of reporting to various instruments. The principal strategy to achieve this would be harmonization of related definitions, i.e. making them comparable, fully compatible and increasingly consistent with each other. Standardization of definitions, i.e. adoption of similar wordings to be used under several frameworks, is a relevant option only in a few cases where differences are minor and the objectives are clearly aligned, or in emerging new contexts.

Some of the current differences between existing definitions are attributable to fundamental differences in the objectives and purposes for which the definitions have been formulated, and they simply cannot be reconciled. A case in point are the differences between definitions applied under FRA and UNFCCC, e.g., regarding reforestation and possibly also the treatment of agroforestry. Still, even in these cases, it may be possible to partially harmonize the definitions, for instance in implementation of GPG or where an optional range is given for threshold values. In other words, individual definitions could be reformulated so that part of the data collection based on them could benefit other processes (decomposition approach).

It is remarkable that various definitions differ only marginally. Incompatible features have probably grown out of differences in the context, where the definitions have been formulated. Personal experiences or interests of the people involved in definition work is another possible reason. In such cases, the potential for increased harmonization should be carefully explored.

This could often apply, even if differences are due to objectives. For instance, some of the special features found in the draft ITTO definitions are probably attributable to their principal objective, which is to provide guidelines for practical forest management rather than constitute a basis for reporting. On the other hand, both aspects are relevant in the ITTO context.

Any new international initiative to develop forest-related definitions is always a potential source of risk for confusion if the work is not aligned with the existing terms and definitions under different instruments. The added value of potential new definitions for core terms should be carefully assessed before adopting them. Some international processes have been too hermetic in the past which has probably been an additional reason for unnecessary differences. Negotiators working under international agreements should have as comprehensive information as possible on the implications of alternative definitions, including cost of data collection and reporting.

Considering efficiency it would be highly desirable that data collection at the global level be concentrated in as few institutions as possible serving various data uses and users. Strengthening of the FRA process is a recommended option in view of its effective role in the past. On the other hand, if FRA is to assume a central position in data collection, it is necessary that its procedures and especially the framework of definitions and various classifications are made as flexible as possible. While some of the requirements deriving

from other international processes may be difficult to accommodate, and do not directly serve for the FRA objectives, compatibility should be established at least on a conceptual level.

The existence of a common definitional framework would reduce the need to undertake costly adjustments in the future. With improved data collection systems (coverage, accuracy, speed, etc.), compatibility can be further increased.

The elements of the common framework were largely identified by the Expert Meeting. When defining the detailed provisions, the options presented in this discussion paper under each core term could be considered.

REFERENCES

- Buchwald, E. A. Hierarchical Terminology for More or Less Natural Forests in Relation to Sustainable Management and Biodiversity Conservation. Manuscript for Forest Ecology and Management.
- Dobbertin, M. K. & Prüller, R. 2002. Forest Terminology: Living Expert Knowledge. How to Get Society to Understand Forest Terminology. IUFRO Occasional Paper 14.
- FAO. 1998. Terms and Definitions. Forest Resources Assessment Programme Working Paper 1. FRA 2000.
- FAO. 2000a. Global Forest Resources Assessment 2000 - Main Report - FRA 2000, Forestry Paper 140.
- FAO. 2000b. On Definitions of Forest and Forest Change. Forest Resources Assessment Programme Working Paper 33. FRA 2000.
- FAO. 2001. Global Ecological Zoning for the Global Forest Resources Assessment 2000 – Final Report. Forest Resources Assessment Programme Working Paper 56. FAO, Rome, Italy.
- FAO 2002. Twenty-Sixth FAO Regional Conference for the Near East, Tehran, Islamic Republic of Iran, 9 - 13 March 2002, Tehran Process for Low Cover Forest Countries.
- FAO. 2002. Global Forest Resources Assessments - Linking National and International Efforts Final Report - Kotka IV Expert Consultation.
- IPCC. 1996. Revised 1996 Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3).
- ITTO. 1998. Criteria and Indicators for Sustainable Management of Natural Tropical Forests. Policy Development Series 7.
- ITTO. 2002. ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests Draft prepared on behalf of ITTO by an International Expert Panel held in Bern, Switzerland 18-22 February 2002.
- Kohl, M. 2000. Reliability and Comparability of TBFRA-2000 Results. In: UN-ECE/FAO 2000: Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand. Main Report. Geneva Timber and Forest Study Papers, No, 17.
- Lund, H. Gyde. 1999. Definition of Low Forest Cover (LFC). Report prepared for IUFRO. Manassas, VA. 22 p.
- Lund, H. Gyde. 2002. Coming to Terms with Politicians and Definitions.
- Proceedings of FAO/WMO/IPCC/UNEP/CIFOR/IUFRO Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders, Rome, 22-25 January 2002.
- Puustjärvi, E. & Simula M. 2002. Forest-related Definitions – Issues and Development Needs. Discussion Paper prepared for FAO/WMO/IPCC/UNEP/ CIFOR/IUFRO Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders Rome, 22-25 January 2002.
- Rakonczay, Z. 2002. Biome-specific Forest Definitions. Technical Paper. Report to the UNFCCC Secretariat.

UNFCCC. 2000a. Methodological Issues, Land-Use, Land-Use Change and Forestry, Submissions from Parties, Addendum, Subsidiary Body for Scientific and Technological Advice, Thirteenth Session. Lyon, 11-15 September 2000.

UNFCCC. 2000b. Methodological Issues, Land-Use, Land-Use Change and Forestry, Submissions from Parties, Subsidiary Body for Scientific and Technological Advice, Thirteenth Session. Lyon, 11-15 September 2000.

UNFCCC. 2001. The Marrakesh Accords and The Marrakesh Declaration. The Advance Version of the Decisions and Other Action Adopted by the Conference of the Parties at Its Seventh Session, 29 October – 9 November 2001.

UNEP/CBD/SBSTTA. 2001. Main Theme: Forest Biological Diversity. Report of the Ad Hoc Technical Expert Group on Forest Biological Diversity. Subsidiary Body for Scientific, Technical and Technological Advice, Seventh Meeting, Montreal, 12-16 November 2001.

UNFCCC/SBSTTA. 2002. Report of the Subsidiary Body for Scientific and Technological Advice on Its Sixteenth Session. Held at Bonn, from 5 to 14 June 2002.

World Rainforest Movement. 2002. South Africa: FAO Forest Definition A Threat to Biodiversity. WRM Bulletin. Issue 56, March 2002.

Personal communication

Holmgren, P. Senior Forestry Officer, Forest Resources Assessment Programme, Forest Resources Division, FAO.

**ANNEX 1
EXPLORATION OF DEFINITIONS FOR SELECTED COMPLEMENTARY TERMS**

1. Primary and Old-growth Forests

There is a wealth of definitions for primary forest, old-growth forest, virgin forest- etc. (Lund 2002). Of the four processes analyzed in this study, the CBD and FRA have developed related definitions.

Box A. Definitions of Naturalness

<p><u>UNEP/CBD/SBSTTA 2001</u> <i>Primary forest</i> A forest that has never been directly disturbed by humans and has developed following natural disturbance and under natural processes, regardless of its age. The term includes forests used inconsequentially by indigenous and local communities living traditional lifestyles. [‘Direct human disturbance’ means the intentional clearing of forest by any means (including fire) to manage or alter the forest for human use]. <i>Old growth forest</i> 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.</p> <p><u>FRA 1998</u> <i>Natural forest undisturbed by man.</i> 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.</p>

The CBD definitions of primary and old growth forest differ in two respects. First, primary forest can be of any age, as long as it has developed following natural processes, whereas old growth forests has to be – by definition – old. Second, primary forests must not have been directly disturbed by humans, apart from inconsequential traditional use. Old-growth forest may have been subject to human disturbance, but it has always developed a structure and species composition that are normally associated with old primary forests. This overlaps with the definition of primary forests. Forests without any past human disturbance also qualify under the definition of old growth forest as long as they are ‘old’ (Table A.)

Table A. Applicability of CBD Definitions (2001) of Primary and Old-growth Forest to Various Types of Forest Not Affected by Human Intervention

Human influence/age class	No or inconsequential human disturbance	Recovered to ‘natural state’ after significant human disturbance
‘Old’		
‘Young’		
Primary		
Old-growth		
Primary & old-growth		

The FRA definition of natural forests undisturbed by man also emphasizes characteristics of forest that have developed based on natural processes. However, in contrast to the

CBD terminology, the FRA definition covers all the four types of forests not affected by human intervention. The FRA definition also makes an explicit reference natural forests, thus excluding plantation forests.

The current situation is confusing because of overlapping terms. Improved clarity would require, e.g., that the four different types of forests not affected by human intervention are clearly distinguished as separate classes (Table B). The following working definitions and characterizations could be applied:

- (i) *old primary forest*: old forests with no or inconsequential human disturbance
- (ii) *young primary forest*: young forests with no or inconsequential human disturbance
- (iii) *old recovered primary forest*: old forests which have regained natural-like status after human disturbance
- (iv) *young recovered primary forest*: young forests which have regained natural like status after human disturbance

Table B. Key Characteristics of Proposed Definitions Denoting Forests not Affected by Human Intervention

Human influence/ age class	No or inconsequential human disturbance	Recovered to 'natural state' after significant human disturbance
'Old'	Old primary forest	Old recovered primary forest
'Young'	Young primary forest	Young recovered primary forest

2. Definitions Related to Degraded Forests

Definitions related to degraded forests have been developed by FRA, CBD and ITTO. In addition, the latter organization has proposed a comprehensive framework of related concepts, including secondary forests, aimed at facilitating rehabilitation and restoration of degraded forest areas (ITTO 2002).

Box B. Definitions of Degraded and Secondary Forests

ITTO, 2002

Degraded primary forest. The initial forest cover of a primary, old-growth or managed forest has been affected by unsustainable, excessive timber and wood exploitation or by such intensity of extraction of non-wood forest products, that its structure, processes, functions and dynamics are altered beyond the elastic capacity of the forest ecosystems.

Secondary forest. Woody vegetation re-growing on land that was totally (or at least 90%) cleared of its original forest vegetation.

FRA, 2000

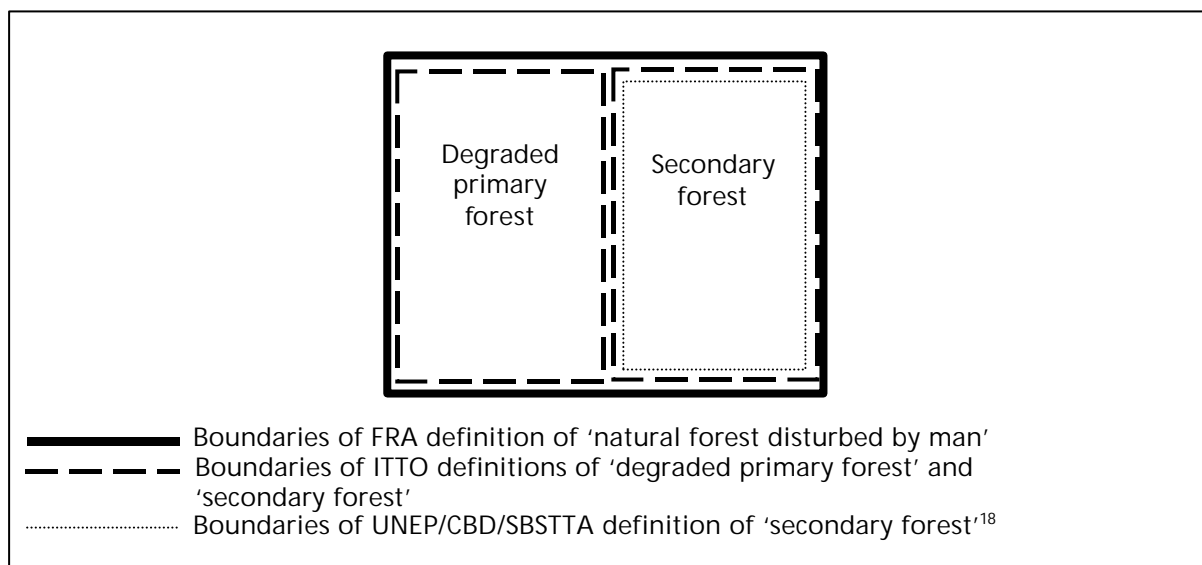
Natural forest disturbed by man. Includes (i) logged over forests associated with various intensity of logging (ii) various forms of secondary forests, resulting from logging or abandoned cultivation.

UNEP/CBD/SBSTTA, 2001

Secondary forest A secondary forest is a forest that has been logged and has recovered naturally or artificially.

The ITTO definitions distinguish between degraded primary forests and secondary forests, while the FRA definition combines them under one definition. The CBD provides only one definition for secondary forest.

Figure A. Components of Natural Forest Disturbed by Man



The main difference between the two definitions of secondary forest is that the ITTO definition sets a fixed limit for forest clearance. If this limit is exceeded the subsequent regrowth is termed secondary forest. Since the difference is minor, harmonization or even formulation of a generic definitions could be considered.

Harmonization of the FRA definition with the others could be approached by splitting the FRA definition into two classes along the lines suggested by the ITTO definitions.

3. **Degraded Forest Land**

Another definition relevant to unstocked forest areas is the term degraded forest land put forward in the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests (ITTO 2002) (Box C)¹⁹. It refers to unstocked forest areas which are so severely damaged by unsustainable use or natural causes that forest regrowth is either inhibited or substantially delayed.

Box C. ITTO Definition of Degraded Forest Land

ITTO 2002
Degraded forest land. Former forest land severely damaged by excessive timber and NWFP harvesting, poor management, repeated fire, grazing or other disturbances and land uses that damaged soil and vegetation to a degree which inhibited or severely delayed forest regrowth after abandonment.

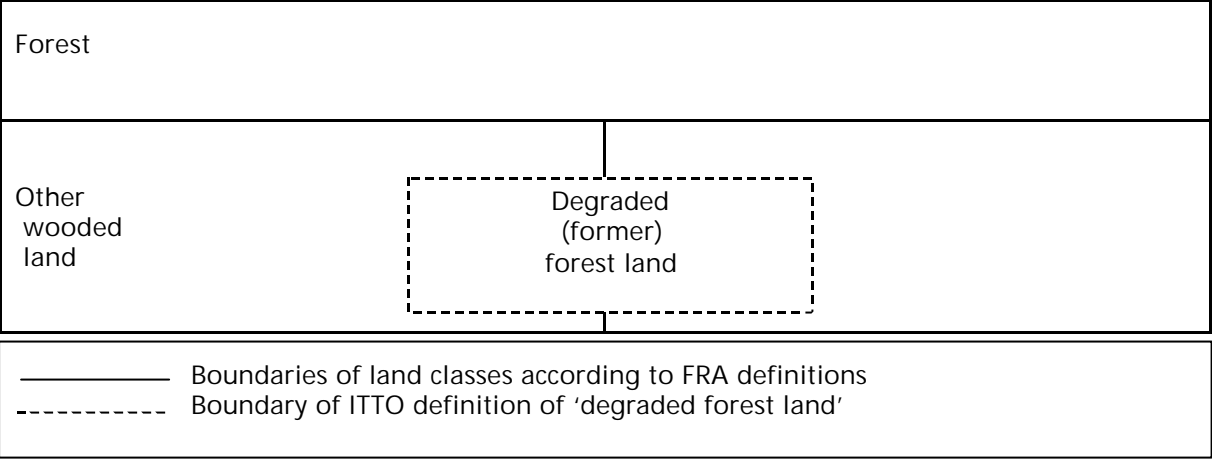
The wording suggests that forest cover is absent and that the area may remain unstocked indefinitely. Despite the reference to 'forest land', the definition implies that other land uses such as grazing, and possibly agriculture may be present in the area. On the other hand, 'after abandonment' at the end of the definition would suggest that there is no economic use present in degraded forest land. These differences make it fundamentally different from the FRA definition of forest, which requires that other predominant land uses are not present and that restoration of forest cover takes place within a established

¹⁸ Secondary forest may include planted trees as method of regeneration.

¹⁹ The Guidelines are still a draft and the definitions have not yet been endorsed by the ITTC.

timeframe (Figure B). In FRA terms, 'degraded forest land' would probably be classified as 'other wooded land' or 'other land' if the land use has not been changed.

Figure B. Relationship between Current FRA Land Classes and ITTO Definition of Degraded Forest Land



One conceivable avenue to harmonization is to assign this type of land to a new sub-class under FRA e.g. under 'degraded former forest land'. It would be extracted from existing FRA classes of non-forest land, i.e. 'other wooded land', and 'other land' (for definitions see Ch. 4.5). In technical terms, this may be feasible, since the new class could be distinguished based on a comparison of historical and current data on the extent of forest cover. Some additional ground truthing might also be necessary to clarify the current land use.

On the other hand, it is doubtful whether such adjustments are necessary, and whether the expected benefit would justify the related cost. The purposes for which the FRA and ITTO definitions have been formulated are quite different and links between them are few. The FRA definition applies to a global process focusing on national-level data collection to serve international reporting and comparisons, while the ITTO guidelines are aimed at providing guidance to practical management decisions, rather than offering a basis for reporting. Achieving compatibility between the two may therefore, in this particular case, be beneficial, but the benefits should be weighed against the respective development effort. On the other hand, national-level policy design and planning would require adequate data on degraded forest lands which cover vast areas in many countries.

4. Forest Improvement

In the FRA terminology, forest improvement is the reverse of forest degradation. However, the Expert Meeting discussed whether other terms such as aggradation, melioration, amelioration, initiation of sustainable management, etc. could be considered. Related terminology has been developed by ITTO (2002).

Box D. Definitions of Forest Improvement

FRA 2000

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 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.

ITTO 2002

(Forest) Rehabilitation. A management strategy applied in degraded forest lands that aims at re-establishing site productivity and protective functions and many of the ecological services provided by a functional forest or woodland ecosystem.

(Forest) Restoration. A management strategy applied in degraded primary forest areas. Forest restoration aims to enhance and accelerate natural processes of forest regeneration in order to regain the elastic capacity of the forest ecosystem.

The FRA definition of forest improvement based on an increase of canopy cover or stocking was formulated with the objective of providing an indicator measurable with conventional indicators. The explanatory note expands this definition to a general level, where an overall increase in the overall potential supply of benefits is the key indicator. The optional approaches to capture it are discussed in relation to forest degradation (see Ch. 4.5).

The concepts of forest rehabilitation and forest restoration were developed by ITTO (2002) as a complement to their definitions of degraded forest land and degraded primary forest areas. However, as discussed above (cf. Section 3), the term 'degraded forest land' is not compatible with other international definition frameworks such as the FRA and UNFCCC, and it is doubtful, whether harmonization should be attempted.

Forest restoration applies distinctly only to degraded primary forest areas, and it is therefore a much more restricted term than FRA's forest improvement, which applies to all forests. Further, forest restoration sets a specific target, regaining the elastic capacity of the forest ecosystem, whereas FRA's forest improvement is based on a continuum of positive changes in forest condition. One possible approach to harmonization is to incorporate forest restoration in the FRA scheme by referring to it as one of the means of forest improvement.

A parallel concept to forest improvement is stand improvement, which refers to forest improvement targeted at wood production at the stand level. Development and introduction of accepted forestry terminology of stand improvement could be considered as the activity is part of practical forest management.

5. Forest Fragmentation

Forest fragmentation is a special, and commonly encountered case of forest degradation. However, finding an agreement on a common definition has proved difficult. The only international process proposing a definition of forest fragmentation is CBD.

Box E. Definition of Forest Fragmentation

UNEP/CBD/SBSTTA 2001

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.

According to the CBD definition, fragmentation occurs only if forest patches are separated by non-forested lands. Forest can be divided into smaller blocks due to a variety of reasons, either by roads, clearing for agriculture, urbanization, or other human development. The CBD definition applies to a case where forest is fragmented by agricultural or urban development, but another common case of fragmentation is a forested landscape composed of a mosaic of mature and regenerating stands that results from forest management for wood production. Incorporation of this feature in the definition could be considered.

The definition also lacks guidance regarding scale. The purpose is to study habitats for different species at different scales, and this varies from species to species. One option would be to refer to multiple scales.

Regarding harmonization, one possible approach is to include fragmentation as one indicator in a composite index measuring the level of degradation. On the other hand, the cost factor may be significant, since there are no agreed and established methods of measuring fragmentation as yet. A variety of indicators have been used in the past to assess fragmentation, such as changes over time in edge to interior ratio, parcel size, proximity to development, percentage of forest cover, etc. However, 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.

6. Directly and Indirectly Human-induced Changes

The terms directly and indirectly human induced changes were introduced in the Kyoto Protocol. The basic approach in the Kyoto Protocol is that only changes that are directly human induced will enter carbon accounting. Of the seven change process defined by FAO, only afforestation and reforestation are entirely 'directly human-induced'. The rest may be triggered either by humans or by natural causes²⁰ (Table C).

However, the terms have not been defined in more detailed manner, and in some instances there are difficulties to determine, how to distinguish (i) human induced changes from natural changes, and (ii) directly human induced changes from indirectly induced changes.

²⁰ 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.

Table C. 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	Always	Management interventions typically influence natural development in order to accelerate forest growth, water catchment or other functions

Source: Puustjärvi & Simula 2002

In a few cases, the distinction may be clear and the triggering factor can be easily singled out. For instance, direct human-induced deforestation and permanent forest loss due to other causes (e.g. due to large-scale fire or extreme climatic conditions) can probably be distinguished with reasonable accuracy. The Marrakesh Accords cites changes that result from carbon dioxide fertilization and nitrogen deposition as examples of indirectly human-induced effects. The link is known to exist, even though the impact should probably be estimated based on theoretical models.

However, a number of other less clear cases can be identified. For instance, an immediate cause of storm damage is natural, but the underlying reason may be excessive thinning, which increased the stand's exposure to effects of strong wind, or no thinnings, which resulted in excessive h/dbh ratios and instability of individual trees. Damage caused by landslides may be traced back to removal of forest cover in higher altitudes.

It is possible that the concept will be subject to abuse. It may create a perverse incentive to gain credit for positive changes that happen naturally, and to avoid discredit for negative developments by claiming that they are natural changes, even though the triggering event may have been human action. For instance, it is unclear what level of assistance of natural regeneration is required to be considered reforestation. In favorable conditions, no assistance may be necessary, but a nominal effort may be made to ensure gain of credit. A conceptually more complex case arises when assistance to natural regeneration may not be motivated by a need to ensure the establishment of a tree stand, but by a wish to ensure a particular species composition. This would usually be termed reforestation, even though the outcome in terms of carbon sequestration is not necessarily any different from that achieved by unassisted natural regeneration.

It would be theoretically correct to distinguish between effects that are directly or indirectly human-induced, or attributable to natural causes, but it may be difficult to carry out in practice. One conceivable approach is to limit the focus of such efforts by identifying effects that can be expected to be significant and/or that can be measured with a reasonable effort. They would constitute priority areas for development of definitions and practical methods of monitoring.