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# FOREST BIOLOGICAL DIVERSITY: STATUS AND TRENDS AND IDENTIFICATION OF OPTIONS FOR CONSERVATION AND SUSTAINABLE USE

Note by the Executive Secretary

## EXECUTIVE SUMMARY

In response to paragraph 12 of decision IV/7, of the Conference of the Parties and to paragraph 4 of recommendation IV/1 A of the Subsidiary Body on Scientific, Technical and Technological Advice, the Executive Secretary has prepared the present note, which contains: (i) a progress report on the work programme for forest biological diversity, as adopted by the Conference of the Parties in its decision IV/7; and (ii) a preliminary assessment of the status and trends and identification of options for the conservation and sustainable use of forest biological diversity.

With regard to progress made in the implementation of the work programme since the fourth meeting of SBSTTA, the Secretariat has undertaken the following activities:

(a) Updating the website on forest biological diversity;

(b) Updating the roster of experts for forest biological diversity;

(c) Signing a Memorandum of Understanding with the Centre for International Forestry Research (CIFOR);

(d) Launching a process of gathering case-studies from countries in which the ecosystem approach has been applied in sustainable management practices;

(e) Starting a comprehensive analysis of the ways in which human activities influence forest biological diversity; and

(f) Initiating an analysis of methodologies to advance the elaboration of criteria and indicators for forest biological diversity.

With regard to the report on the status and trends and identification of options for conservation and sustainable use, called for in paragraph 12 of decision IV/7, the present note presents a preliminary assessment of the current knowledge and methodologies for assessing the status and trends of forest

* UNEP/CBD/SBSTTA/5/1.

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biological diversity and recalls currently used methodologies and ongoing processes regarding options that have already been identified by several relevant institutions and forums, including those proposed in the context of the Convention.

## SUGGESTED RECOMMENDATIONS

The Subsidiary Body may wish to recommend that Conference of the Parties:

1. Takes note of the progress made in the implementation of the work programme for forest biological diversity;

2. Establishes an ad hoc technical expert group on forest biological diversity with the mandate:

(a) To carry out a comprehensive assessment of status and trends of forest biological diversity, including an assessment of the impact of, and lessons learnt from, measures taken, and

(b) To identify options for conservation and sustainable use of forest biological diversity, applying the principles of the ecosystem approach.

(c) To complete its work in time for the seventh meeting of SBSTTA, before the sixth meeting of Conference of the Parties.

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## I. INTRODUCTION

1. At its fourth meeting, held in Bratislava in May 1998,the Conference of the Parties adopted decision IV/7 on forest biological diversity, including a work programme contained in the annex thereto. The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), at its fourth meeting urged the Executive Secretary to promote the implementation of the programme of work in accordance with decision IV/7 of the Conference of the Parties and to report to the Subsidiary Body at its fifth meeting on progress made, as well as on actions required for the future development of the programme of work. In addition, decision IV/7, paragraph 12, requests SBSTTA to provide advice on the status and trends of forest biological diversity and the identification of options for the conservation and sustainable use of forest biological diversity to the Conference of the Parties at its sixth meeting.

2. The Executive Secretary has, therefore, prepared the present note, which, first, describes, in section II, the main activities that the Secretariat has undertaken regarding the implementation of the work programme for forest biological diversity since the fourth meeting of SBSTTA. Secondly, the note presents in section III a preliminary assessment of the current knowledge of and on methodologies for assessing the status and trends of forest biological diversity. Parts A and B of this section give a general picture of the current available scientific and technical information on the status and trends of forest biological diversity. Part B recalls methodologies and ongoing processes regarding options that have already been identified by several relevant organizations and forums, including those of the Convention. Bearing in mind that forest biological diversity will be substantially reviewed at the seventh meeting of SBSTTA, it was felt that in order to get a comprehensive picture of forest biological diversity, a step by step process could be used regarding the assessment of the status and trends of forest biological diversity for the consideration of Conference of the Parties at its sixth meeting, by starting at the fifth meeting of SBSTTA and completing the assessment at the seventh meeting. The preparation of section III has benefited from the scientific support of the Centre for International Forestry Research (CIFOR) and from comments from, inter alia, the secretariat of the Intergovernmental Forum on Forests (IFF), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Global Environment Facility (GEF).

## II. PROGRESS REPORT ON THE IMPLEMENTATION OF THE WORK PROGRAMME FOR FOREST BIOLOGICAL DIVERSITY

### A. Updating the Convention website on forest biological diversity

3. The Secretariat has updated the Convention website on forest biological diversity that was first made available in August 1998 in order to take into account new elements. The website now includes and emphasizes decision IV/7 of the Conference of the Parties and the work programme for forest biological diversity as contained in the annex thereto, as well as relevant decisions of the Conference of the Parties and recommendations of SBSTTA. It also contains relevant information regarding related processes such as the Intergovernmental Forum on Forests (IFF), as well as cross-cutting issues such as indicators of biological diversity and the ecosystem approach. It will provide references for scientific and technical documentation and will link with relevant organizations.

### B. Updating the roster of experts for forest biological diversity

4. As of 15 October 1999, the Convention's roster of experts on forest biological diversity contains 392 names of expert from 91 countries. Pursuant to decision IV/16, annex I, paragraph 19, of the fourth meeting of the Conference of the Parties, the Executive Secretary together with the national focal points and relevant bodies is requested to "regularly update the rosters of experts, including the information on each expert". Therefore, the Secretariat has initiated this process of updating the roster by requesting all the national focal points and relevant bodies: (i) to confirm whether information provided previously is still valid; and (ii) to provide new names of experts on forest biological diversity, as appropriate. The updated roster of experts will be used for future activities to be undertaken in the context of the implementation of

the work programme such as peer-review or any liaison group or ad hoc technical expert group to be established.

C. Cooperation with other bodies: memorandum of understanding with the Centre for International Forestry Research

5. Pursuant to Articles 7, 12, 17, and 18 of the Convention on Biological Diversity and, in particular, Article 24, as well as to decisions IV/7 and IV/15 of the Conference of the Parties, the Secretariat has negotiated a memorandum of understanding with the Centre for International Forestry Research (CIFOR). Both Parties signed the memorandum in October 1999. This initiative is aimed to promote the work programme for forest biological diversity within and to strengthen Secretariat links with the scientific community dealing with forest biological diversity and to allow the Secretariat to draw upon sound scientific expertise, when appropriate. The memorandum of understanding provides for research, cooperation and related activities in the field of forest biological diversity including, inter alia, exchange of scientific information, identification and proposal of solutions to forest biological issues in countries Parties to the Convention.

D. Element 1 of the work programme for forest biological diversity: case-studies on the ecosystem approach

6. Element 1 of the programme of work for forest biological diversity calls for case-studies from countries in which the ecosystem approach has been applied in sustainable forest-management practices. This could assist other countries in developing their own national actions and approaches under this work programme. The ecosystem approach has been recognized by the Conference of the Parties as the primary framework of action to be taken under the Convention (decision II/8). Moreover, the ecosystem approach is to be considered substantially by SBSTTA at its fifth meeting and by the Conference of the Parties at its fifth meeting (decision IV/1 B). Therefore, the Secretariat saw as of particular relevance to give priority to this action under element 1 of the work programme and, accordingly, has requested Parties to submit case-studies illustrating integration of the ecosystem approach in sustainable forest-management practices. The product of this work, which will also benefit from the outcomes of the next meetings of SBSTTA and the Conference of the Parties, should be available at the seventh meeting of SBSTTA.

E. Element 2 of the work programme for forest biological diversity: comprehensive analysis of the ways in which human activities influence forest biological diversity

7. Since the 1980s, many initiatives have been undertaken to understand the proximate and underlying causes of deforestation and forest degradation. The discussions on this issue culminated at the United Nations Conference on Environment and Development (UNCED) in connection with the negotiations for Agenda 21 (and, in particular, chapter 11), the Convention on Biological Diversity, and of the Forest Principles. However, there was still a need to address the issue of the causes of deforestation and forest degradation, and the Intergovernmental Panel on Forests (IPF) followed by the Intergovernmental Forum on Forest (IFF) have again addressed this matter. The United Nations Environment Programme (UNEP) has also played an important role in this area, supporting, for example, a global workshop on underlying causes of deforestation held in Costa Rica in January 1999. At its third session, IFF considered this issue as a matter needing further clarification and while stressing the importance of the IPF' s proposals for action on underlying causes of deforestation and forest degradation identified additional proposals. 1/ The first of these proposals is of particular relevance to element 2 of the work programme for forest biological diversity, as it calls for further study and for practical measures to address the chains of causality of the underlying causes of deforestation and forest degradation within each country.

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1/ See IFF report: (www.un.org/esa/sustdev/IFF.htm)

8. Among the many causes of deforestation and forest degradation, fires are becoming of major concern in recent years. Besides the commitment of several international institutions to address this matter as, in particular, the United Nations Environment Programme (UNEP), the informal, high-level Inter-Agency Task Force on Forests (ITFF) also raised this issue and is currently seeking to propose ways and means to help countries to create sustainable capacity to prevent or mitigate the effects of forest fire episodes in vulnerable region of the world. 2/

9. The Secretariat has also started to work in the area of the causes of deforestation and forest degradation regarding a comprehensive analysis of the ways in which human activities influence forest biological diversity as referred in Element 2 of the work programme for forest biological diversity. Results of such preliminary and on-going work, which involves in particular the scientific support of CIFOR, are reflected in Section below on "Assessment of status and trends of forest biological diversity" which recalls the main proximate and underlying causes of forest biological diversity losses. This work has also benefited from the outcome of IFF 3 and of the Global workshop on underlying causes of deforestation and forest degradation (San Jose de Costa Rica, January 1999).

### F. Element 3 of the work programme for forest biological diversity: methodologies to advance the elaboration of criteria and indicators for forest biological diversity

10. A number of initiatives are trying to respond to the call from the Forest Principles and chapter 11 of Agenda 21 for the identification of criteria and indicators to evaluate progress towards sustainable forest management. Most of these initiatives have developed "biodiversity" or "ecological" criteria and indicators (such as the processes of Montreal, Helsinki, Tarapato, UNEP/FAO, ITTO or "Lepaterique"). While they differ somewhat in content and/or structure they are rather similar in objectives and approach. They all incorporate the main following fundamental elements: extent of forest resources, forest biological diversity, forest health and vitality, productive and protective functions of forests, socio-economic benefits and needs. In this regard, FAO has been supporting its member countries in the field of indicators of sustainable management, in particular Central American countries ("Lepaterique process"), African and Near East dry countries and, also, the Helsinki process countries. This organization has also launched field projects and workshops for helping countries in the definition and implementation of criteria and indicators at the forest-management level.

11. However, much can be done to improve forest management and conserve forest biological diversity without worrying whether or not all criteria for sustainable forest management are being achieved. Biological diversity criteria and indicators have essentially the same drawbacks as large-scale satellite surveys: they do not assess directly biological diversity but rather "processes that maintain and generate biological diversity (Stork et al., 1997)". Some authors (Watt et al., 1999) argue that direct measurement of biodiversity at the site level is preferable to indirect measurement even if this indirect assessment is based on an understanding of the factors that determine biodiversity. CIFOR is currently working in both directions, trying to develop biological diversity criteria and indicators (Stork et al., 1997; Boyle et al., 1998) and rapid biological diversity assessment methods (Gillison et al., 1996; Gillison & Carpenter, 1997; Watt et al., 1999).

12. Monitoring of specific indicators may provide useful information on trends in the status of forest ecosystems and potential early warning signals. However, indicators may be most useful at the site level and their usefulness for overall forest management may be limited. It should also be noted that most site level surveys are likely to be too detailed for the current needs of the Convention, but are essential in providing ground-truth data for validating national or regional surveys. The use of indicators for biological diversity is further discussed in document UNEP/CBD/SBSTTA/5/12. Moreover, Element 3 of work programme for forest biological diversity, calls for assessment of experiences gained in the national and

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2/ In the context of Element 2 of the programme of work on forest biological diversity, the Secretariat will collaborate closely with ITFF on this issue.

regional processes, identifying common elements and gaps in the existing initiatives and improving the indicators for forest biological diversity. Such assessment should be completed for the seventh meeting of SBSTTA.

### G. Action required for the future development of the work programme on forest biological diversity

13. In paragraph 2 of its decision IV/7, the Conference of the Parties urged Parties, countries, international and regional organizations, major groups and other relevant bodies to collaborate in carrying out the tasks identified in the work programme. As it was adopted in 1998, the work programme for forest biological is at an early stage. Moreover it reflects a rolling three-year planning horizon (paragraph 4 of the work programme) and each of its phases should be subject to periodic review and its development should take into consideration recommendations made by SBSTTA (paragraph 5 of the work programme).

14. In view of this and of the fact that forest ecosystems will be considered for in-depth discussion by the Conference of the Parties at its sixth meeting, it will be appropriate to provide an assessment on the state of implementation of the work programme for SBSTTA at its seventh meeting. Accordingly, SBSTTA may wish to recommend that the Conference of the Parties requests Parties, countries, international and regional organizations, major groups and other relevant bodies to provide relevant information on the implementation of the work programme through, inter alia, case-studies, entries in national reports or other means as appropriate.

15. To promote further development of the work programme for forest biological diversity and to contribute to its progress, SBSTTA may wish to recommend the establishment of an ad hoc technical expert group on forest biological diversity. The mandate of such an ad hoc technical expert group could include:

(a) In accordance with request of the Conference of the Parties, as contained in decision IV/7, paragraph 12, to evaluate the current status of scientific, technical, and technological knowledge on forest ecosystems, with specific reference to:

(i) Current status and trends of, and major threats to, forest biological diversity;

(ii) Options for the conservation and sustainable use of forest biological diversity; in relation with further elaboration of the ecosystem approach and its relationship to sustainable forest management

(b) To provide advice and recommendations on specific ways and means for more effectively implementing the work programme for forest biological diversity, and for reporting on progress at regional and international levels to COP.

## III. PRELIMINARY ASSESSMENT OF THE STATUS AND TRENDS AND IDENTIFICATION OF OPTIONS FOR THE CONSERVATION AND THE SUSTAINABLE USE OF FOREST BIOLOGICAL DIVERSITY

### A. Background

16. Forests are the most biologically diverse terrestrial ecosystems on earth: "together, tropical, temperate and boreal forests provide the most diverse set of habitats for plants, animals and micro-organisms, holding the vast majority of the world' s terrestrial species" (decision II/9, annex). There are many definitions of forests (and forest ecosystems or types of forest such as the one used by FAO, the World Conservation Monitoring Centre (WCMC) or the World Resources Institute (WRI); see annex II). However, there is no global agreement on such definitions. The FAO definitions are probably the most used. They are mainly based on vegetation cover (rate of crown cover of trees) with little or no reference to the structure/composition (biological diversity) and functions (goods and services) of forests.

17. Ecosystem functioning or functions denotes the total sum of processes operating at the ecosystem level, such as the cycling of matter, energy and nutrients, as well as those processes operating at lower ecological levels which affect pattern or processes at the ecosystem level (Mooney et al. 1995). A sound ecosystem functioning depends upon the maintenance of a whole range of interactions between biotic and abiotic components and their particular structure. In turn, goods and services provided by forest biological diversity depend upon the long-term maintenance of such sound and healthy ecosystem functioning.

18. Human beings are largely dependent, either directly or indirectly, for their sustenance, health, well being and enjoyment of life on fundamental biological systems and processes. This is especially true in the case of forest ecosystems. Among the most important services provided by forest ecosystems and forest biological diversity for the three main forest biomes (boreal, temperate, tropical forests) and for mangroves, the following can be mentioned: protection of water resources and regulation of hydrological flows, soil formation and protection, nutrient storage and cycling, pollination, trophic-dynamic regulations of populations, habitat for resident and transient populations, reservoirs and sinks of carbon dioxide, climate regulation, maintenance of regional ecosystems, recovery from unpredictable events (Scope 1996; Abramovitz 1998). The main goods that forest biological diversity include: timber and wood products, food, medicinal resources, ornamental plants, breeding stocks and population reservoir events (Scope 1996; Abramovitz 1998).

19. Some of these goods and services and products (such as timber and other export products) provided by forest ecosystems and forest biological diversity components have direct use value and directly translate into substantial financial benefits. The financial value of others such as watershed protection, regulation of hydrological flows, soil fertility maintenance, carbon storage by forests is more difficult to estimate as they represent indirect use values and they are not usually counted.

20. The cultural and spiritual values of forests such as research, education and monitoring, recreation, are "existence" or non-use values and therefore even far more difficult to estimate. That does not mean that they do not exist but rather that there are structural and conceptual weaknesses in our actual perception of the total economic value of forest biological diversity. These non-use values have been recognized and stressed in chapter 11 of Agenda 21 and in the first alinea of the preamble of the Convention on Biological Diversity.

## B. Overview of the status of forest biological diversity

### 1. Forest cover and forest conservation

21. There is between 35 to 40 million square kilometres of forest in the world (FAO, 1999) while less than 8 per cent of this surface can be classified as IUCN protected area categories I-VI (Iremonger et al., 1997). In several places a significant number of theoretically protected areas are in reality poorly protected or not protected at all. Therefore, the percentage of actually protected forests is likely much less than eight per cent. Regarding forest cover, data on forest cover are "in no way exact" (Persson & Janz, 1997) and rely on the quality of the primary data sources.

22. FAO figures are country-based and adjusted to common reference year, terminology but inventory results are not available and, reliability is therefore country level dependent. It is worth recalling that FAO considers natural forests in tropical and temperate developing countries to encompass all stands except plantations and includes stands that have been degraded to some degree by agriculture, fire, logging and other factors (WRI et al., 1999). However, given these caveats these data still represent the best available approximations together with WCMC data on forest cover and types.

23. There are several global efforts to assess the world' s forest resources. The major efforts to assess forest cover have being carried out by FAO (State of the World' s Forest 1997 and 1999), the International Geosphere-Biosphere Programme (IGBP), the European Commission' s Joint Research Centre (JRC - Project TREES) and the World Conservation Monitoring Centre (WCMC). These initiatives

provide the most comprehensive information currently available regarding forest cover. However, each of the above-mentioned efforts uses different definitions, sources and methods for classifying forest vegetation.

24. The FAO Global Forest Resources Assessment 2000 (FRA 2000, FAO, 1999) will try to correct some of the above-mentioned limitations and should be the most comprehensive and complete assessment of forest resources as it will try to combine the best of bottom-up (relying on local, national statistics, inventory or data) and top-down (global and pan-tropical remote-sensing coverage) approaches. However, FRA 2000 will not avoid some very crucial problems (Persson & Janz, 1997) such as the difficulty to give accurate information about the likelihood of high biodiversity and the lack of accurate, current and reliable statistics on forests and forest species in several countries.

25. The assessment of forest ecosystems in terms of components, structure and functioning appears to be an even much more difficult issue.

(a) Regarding forest ecosystem components, knowledge remains limited, particularly regarding tropical natural forests. However, the work of FAO concerning forest and genetic resources and that by UNEP (Global Biodiversity Assessment, 1995) must be highlighted as well as those by many national and international research institutions. On the other hand, CBD National Reports show that country species inventories often provide good basic data, in particular regarding forest trees, birds and mammals whereas those inventories vary from one country to another. However, when it comes to invertebrates or micro flora and fauna, data becomes scarce.

(b) Knowledge on forest ecosystem structure and functioning remains also limited, although some initiatives have been undertaken, e.g on the functional roles of boreal, temperate and tropical forest ecosystems, by the Scientific Committee on Problems of the Environment (SCOPE) and DIVERSITAS under the SCOPE Ecosystem Functioning of Biodiversity Program.

### 2. Forest species extinction

26. Regarding forest species extinction, available data are not usually reliable especially in tropical forests where a great proportion of living organisms is still unknown. Rates of species extinction in forests have generally been obtained through species-area estimates based on the theory of island biogeography, which are imprecise for several reasons (Whitmore & Sayer, 1992; Barbault & Sastrapradja, 1995). Nonetheless, the central message from practically all theoretical studies on extinction is that (Barbault & Sastrapradja, 1995) for all the biomes:

(a) Species are becoming extinct or committed to extinction at an unprecedented rate,

(b) The extinction risk increases with decreasing population size,

(c) The most important reason for population extinction or decreasing size is habitat destruction or degradation.

(d) In addition, the earth biological diversity as a whole faces an unprecedented situation due to the global climate changes which unpredictable consequences on forest biological diversity could even worsen the situation.

## C. Trends of forest biological diversity

### 1. Causes and mechanisms for forest biological diversity losses

27. Among the major proximate causes 3/ of forest biological diversity losses, the following are to be recalled: logging of natural forests, introduction of invasive species, uncontrolled forest fires, pollution (of soil, water, and atmosphere) industrial agriculture and forestry, land conversion and global change.

28. The following underlying causes 4/ of forest biological diversity losses are of particular importance:

(a) Growing populations increase demand on forest natural resources;

(b) Unsustainable production and consumption patterns;

(c) Globalization of trade encouraging consumption which in turn provides "short-term" incentive for further exploitation of natural forests;

(d) Global economic systems and policies that under-value forest biological diversity and some of its related goods and most of its services;

(e) Loss of cultural identity, spiritual value and land rights which reduces the variety of approaches to conservation and sustainable use of forest biological diversity;

(f) National and local institutional systems that fail to promote sustainable use due to, inter alia, a breakdown in national rules of law, corruption, illegal logging, animal poaching and illegal trade;

(g) Deficiencies in the flow of scientific and traditional knowledge to decision-makers.

### 2. Major trends of forest biological diversity

29. For the above-mentioned reasons, the global trend, at least for the next three decades, will almost certainly be towards increased biological diversity losses at an unpredictable rate. The main proximal cause of forest biological diversity loss being habitat destruction and degradation, change in forest cover is an important indicator of forest biological diversity trends (see FAO data, FAO, 1999).

Declining forest quality and health

30. Condition or "quality" (biological diversity, health, age profiles, etc.) of the remaining forests is also likely to decline in the foreseeable future. Only one fifth of the Earth' s original forests remains in large relatively natural undisturbed ecosystems (Bryant et al., 1997). Data for forest dependent species are scarce. For closed tropical forests, the number of species would be reduced by 4% to 8% over the next quarter century because of deforestation (Reid, 1992). Other estimates of species that will become extinct or committed to extinction in tropical forests over the next quarter of century range from 2% to 25% in the groups examined (variously: plants, birds, plants and birds, and all species) (Barbault & Sastrapradja, 1995). These likely under-estimates, based on deforestation, are likely to be conservative given the potential impact of forest fragmentation on species extinction.

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3/ See GBA, 1995; Abramovitz, 1998. These proximate causes of forest biological diversity losses are the most frequently mentioned even in national reports received from Parties.

4/ See GBA, 1995; Abramovitz, 1998. These underlying causes of deforestation and forest degradation are also the most frequently mentioned in national reports received from Parties.

On-going current conservation measures and initiatives and their limitations

31. Forest biological diversity is currently either conserved by protecting forest species, forest ecosystems or by sustainable use of managed forests. Less than 8% of the world' s forests belong to one of the IUCN protected area management categories (Iremonger et al., 1997). The global network of protected areas is extensive and continuing to grow. There remains, however, considerable scope for expanding the network further, both through conservation of natural areas or traditionally maintained landscapes and through restoration of biologically degraded ecosystems. The major gaps in the forest protected area network are (Green & Paine, 1997):

(a) A preponderance of small rather than large protected areas, jeopardizing their integrity. There is, though, some evidence that protected areas of intermediate sizes may be viable (Sayer & Iremonger, 1998);

(b) A lack of application of the full range of iucn management categories in some regions;

(c) Unmet targets in the representation of major biomes within the global network particularly with respect to temperate broad-leaf and evergreen sclerophyllous forests;

(d) A majority of countries and dependent territories with less than 10% of their total land area represented in protected areas;

(e) Finally, many legally protected areas only exist on paper.

32. In response to this situation, there is an urgent need to identify concrete and efficient options for conservation and sustainable use. The following section gives an overview regarding options that have already been identified within as well as outside the Convention on Biological Diversity.

## D. Options for conservation and sustainable use of forest biological diversity: ongoing methodologies and processes

### 1. Background

33. In the context of the Convention on Biological Diversity, the general framework for any option for the conservation and the sustainable use of forest biological diversity is entailed in several the provisions of the Convention (Articles 8, 9, 7, 11, 12 and 13). In addition, the relevant framework for options regarding specifically forest biological diversity is constituted by decision IV/7 of the Conference of the Parties and the work programme for forest biological diversity as contained in the annex to that decision.

34. The primary framework of action to be undertaken under the Convention and therefore any option for the conservation and sustainable use of biological diversity in general and forest biological diversity in particular is the ecosystem approach. 5/ In the context of work of the Convention on Biological Diversity and of IPF, the ecosystem approach was also early identified as the base of options for conservation and sustainable use of forest biological diversity. The Conference of the Parties, at its fourth meeting, underscored the importance of this approach in the conservation and sustainable use of forest biological diversity (decision IV/7, element 1 of the programme of work).

35. Traditional forest-related knowledge (TFRK) in particular could also play an important role in terms of options for conservation and sustainable use of forests biological diversity. Paragraph 3 (d) of the programme of work considers that one of the objectives of the work programme for forest biological diversity is to identify traditional forest systems of conservation and sustainable use of forest biological diversity and to promote the wide application, use and role of traditional forest-related knowledge in

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5/ See decisions II/8 and IV/1 B of the Conference of the Parties and the note by the Executive Secretary on the ecosystem approach, prepared for the current meeting of SBSTTA (UNEP/CBD/SBSTTA/5/11).

sustainable forest management. Moreover, element 1 of the programme of work calls for the development of methodologies to advance such integration of into sustainable forest management.

36. Outside the Convention on Biological Diversity, many forums, processes and organizations have also identified and developed options and related activities in the area of conservation and sustainable use of forest biological diversity. The IPF/IFF process, in particular, as stressed in decision IV/7, along with its many side initiatives 6/ has played an important role in identifying priority issues and in producing an important reservoir of methodologies and directions for options for the conservation and sustainable use of forest and forest biological diversity. The work of ITFF is also to be underlined as the Secretariat of the Convention on Biological Diversity has worked in very close contact with it.

37. Among organizations, FAO, UNEP, UNDP, UNESCO, the World Bank and GEF have also already identified and developed options for the conservation and sustainable use of forest and forest biological diversity as well as, among non-governmental organizations, IUCN, WWF, WCMC and WRI. Several international agreements such as Convention on Wetlands, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the World Heritage Convnetion, also propose methodologies or processes for options with regard to particular components of forest biological diversity.

## 2. Options for the conservation of forest biological diversity

### (a) In situ conservation

38. Traditional conservation strategies have envisaged protected areas and networks of protected areas, as the ultimate expression and focus of in-situ conservation of large contiguous areas, buffered by land uses which operate in support of in situ conservation of biological diversity. In this regard, paragraph 3 (h) of the programme of work notes that one of the objectives of the work programme for forest biological diversity consists of identifying the contribution of networks of protected areas to the conservation and sustainable use of forest biological diversity, and paragraph 17 calls for the sharing of relevant technical and scientific information on networks of protected forest areas and networking modalities. This constitutes a primary option for conservation of forest biological diversity. It is then of particular notice that the third session of IFF identified a proposal of action encouraging countries to contribute to a global and regional assessment of the current status of protected area in view of, inter alia, reaching the establishment of biogeographically balanced networks of forest protected areas.

39. The provisions of the Convention on Biological Diversity entail a holistic and ecosystem approach to protected areas and propose a comprehensive approach to in situ conservation options going beyond simply creating protected areas. In fact, protected areas today serve a much broader array of social and ecological functions than the parks of the past. This perspective was also raised during the third session of IFF as reflected in one of IFF proposals for actions, which encourages countries to develop and implement appropriate strategies for the protection of the full range of forest values. At its third session, IFF also called for cooperation for developing methodologies for assessing the conditions of and management effectiveness in existing protected areas and their surrounding landscapes, as well as forest protected areas networks.

40. However, most of forest biological diversity is found outside protected areas and this is where the emphasis should be put. Even the most ambitious exponents of biodiversity protection only advocate the allocation of around 10% of forests to parks and reserves and obviously the fate of much biodiversity will depend upon what happens to the residual 90% of the forest estate.

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6/ Such as, in particular, the initiative of Costa Rical and NGOs,; of Brazil and United States of America; of Austria and Indonesia; and of Australia.

41. Forest biodiversity will therefore have to be conserved outside protected areas, in sustainably managed forests with due account of adaptive management along with the precautionary principle. Such conservation should occur in various kinds of land uses: in managed forests, in agro-forests and in agro-ecosystems (agricultural areas in forest land).

(a) In managed forests, conservation of forest biological diversity will be mainly achieved through ecosystem management which means an interdisciplinary, holistic environmental approach to maintaining natural diversity and productivity while sustaining human culture.

(b) Conservation of forest biological diversity in agro-forest includes better practices to make such plantations or gardens more penetrable for biological diversity at all levels.

(c) In agro-ecosystems the management of patches of native forests within the agricultural landscape is critical to the conservation of forest biological diversity at the landscape level.

Overview of institutions and relevant processes regarding options for conservation activities

42. The research sector contributes substantially to the identification of options for the conservation of forest biological diversity. "Saving biodiversity" and "Protecting the environment" are, for instance, two of the five major research thrusts of CGIAR' s research agenda. Several of the 16 CGIAR centres are directly involved in forestry related research and developing options in the area of conservation of forest biological diversity:

(a) The International Plant Genetic Resources Institute (IPGRI). It works to strengthen the conservation and use of plant genetic resources including forest trees;

(b) The International Centre for Research in Agroforestry (ICRAF) which aims to improve human welfare by alleviating poverty, improving food and nutritional security, and enhancing environmental resilience in the tropics;

(c) The International Institute of Tropical Agriculture (IITA), which works on trees and soil.

(d) CIFOR has a specific research program on conservation of forest biodiversity and genetic resources and is also working indirectly to preserve biodiversity through its other research programs. Within its biodiversity program, CIFOR is currently undertaking research on rapid biodiversity assessment, on impacts of human disturbance on forest biological diversity and developing criteria and indicators for biodiversity conservation in managed production forests.

43. The role of the FAO Panel of Experts on Forest Gene Resources is to be mentioned as it is concerned with in situ conservation (as well with ex situ conservation). It systematically reviews work in the field of forest genetic resources, world-wide, discusses and documents priorities for action at national, regional and global levels based on up-to-date information received from member countries. It also made recommendations on the main focus and operational priorities of FAO and its national and international partners.

44. The World Bank commitment in seeking options for the conservation of forest biological diversity has recently considerably increased, in particular since the 1997 special session of the General Assembly. In this regard, the WWF-World Bank Alliance appears to be a very promising initiative entailing new options. GEF, as the leading multilateral entity responding for the global threat to biodiversity and as the financial mechanism of the Convention on Biological Diversity, plays a so fundamental role in the area of forest biological diversity.

45. The World Heritage Convention as well as the Convention on Wetlands contribution to forest biological diversity conservation is also to be underlined. Thirty-three World Heritage Tropical Forest (WHTF) sites representing 26.6 million ha have been designated and an additional 63 tropical forest sites have been identified for World Heritage nomination (CIFOR & UNESCO, 1999). Several forest ecosystems are protected under the RAMSAR Convention although the exact number is difficult to figure, as forests are not identified as such in the Ramsar database. The same statement applies to the UNESCO' s Man and the Biosphere programme (MAB), most of the 357 MAB sites include forest

ecosystems. All these sites constitute major pilot projects from which interesting options could draw upon.

46. CITES also contributes to conservation of forest biological diversity and future options could be built upon its experience.

47. Among non-governmental organizations, IUCN and WWF have made major contributions to conservation and sustainable use of forest biological diversity. IUCN has contributed through, inter alia, its Red List of endangered species which includes forest species, and the IUCN protected areas categories which applies to forest ecosystems. IUCN also works closely with WWF on forests awareness raising, dissemination of information, and development of pilot activities and programs. IUCN and WWF have recently launched a joint project: Forests for Life Strategy which addresses social and environmental problems associated with loss of forests and of forest quality.

48. Since 1984, the World Resources Institute (WRI) has focused extensively on issues supporting the conservation, sustainable use, and equitable distribution of benefits of biodiversity the totality of genes, species, and ecosystems throughout the world. WRI's Forest Frontiers Initiative (WRI, 1997) is a multi-disciplinary effort to promote stewardship in and around the world's last major non-fragmented natural forests by influencing investment, policy, and public opinion.

(b) Ex situ conservation

49. Ex situ conservation is also an essential component of forest biological diversity conservation. So far, only crop plants of economic importance and a few animal species have been subject to real concerted ex situ conservation programmes. Very few tree species and forest species – the majority of which are not yet described by science – have benefited from ex situ conservation concern.

50. In the area of ex situ conservation, the role of FAO Panel of Experts on Forest Gene Resources should be again emphasized. The Panel, which reports to the Committee of Forestry and through it to the Council and Conference of FAO, is the most important body guiding the work of FAO on forest genetic resources; it is complemented, in some aspects of the work, by the FAO Commission on Plant Genetic Resources.

## 3. Options for sustainable use of forest biological diversity

51. Within the work of the Convention, options regarding the sustainable use of forest biological diversity is mainly addressed in the work programme as contained in the Annex of decision IV/7. The enhancement of holistic and inter-sectoral ecosystem approaches as well as the advancement of the integration of traditional forest- related knowledge into sustainable forest management and the development of cooperation on the conservation and sustainable use of forest biological resources at all levels, ranging from community to inter- organization level, at the national and international levels, constitute priority options.

52. Regarding the ways in which human activities influence biological diversity and how to minimize or mitigate negative influences, several options have been identified by the Conference of the Parties, such as those concerning research activities related to the influences of human activities on forest biological diversity; the dissemination of research results and synthesis of reports of the best available scientific and traditional knowledge on key forest biological diversity issues; and a call for case-studies on assessing impacts of fires and alien species on forest biological diversity.

Overview of organizations and processes activities regarding options of sustainable use

53. Several international and non governmental organizations through, inter alia, their different programmes, work actively for the promotion of sustainable use of forest biological diversity. In this regard, the FAO Tropical Forestry Action Plan, launched in 1985, with UNDP, UNEP, UNESCO and the

World Bank is one of them. FAO is identifying options for sustainable use of forests, through, inter alia, the work of its Committee on Forestry. The Organization undertakes many collaborative activities with other institutions or forums such as the Secretariat of the Convention to Combat Desertification, the International Union of Forestry Research Organizations (IUFRO) and CIFOR (for example, on low impact forest harvesting practices) or the European Commission.

54. IUFRO, which deals explicitly with forestry research, links forest research institutes and scientists into a world-wide network. Many of IUFRO's subject and working groups are concerned with environmental matters and with the sustainable use of natural renewable resources, including conservation of ecosystems and genetic resources of specified priority species.

55. The mandate of the International Tropical Timber Organization (ITTO) includes the promotion of research and development with special reference to forest management and reforestation, wood utilization and marketing. Within the framework of its "Target 2000", ITTO is also encouraging and supporting programmes and projects on sustainable utilization and conservation of tropical forests and the genetic resources they contain. ITTO has prepared guidelines on the conservation of biological diversity in tropical production forests in 1993 and criteria and indicators for sustainable management of natural tropical forests in 1998 which is an on going process.

56. UNESCO deals specifically with research and training aspects of forest genetic resource conservation, notably through its Man and the Biosphere Programme and the International Network of Biosphere Reserves (see e.g. Batisse 1986). Within the world network, research and training on forest genetic resources is underway at such locations as Mata Atlantica (Brazil), Dja (Cameroun), Changbai (China), etc. These experiences entail very interesting options to sustainable use of forest biological diversity.

57. UNDP has initiated a Global Programme on Forest (GPF) in 1997 to promote sustainable forest management and related public and private sector partnerships at country level in order to support sustainable livelihoods. This programme is directly linked to the work of the IPF/IFF processes and constitutes UNDP' s follow up to the IPF proposals for action.

58. In the private sector, with regard to forest products entering the market place, the prospect of voluntary and independent certification of the quality of management of the forests and the eco-labelling of forest products from which they originate has emerged as one of the promising option in terms of incentive mechanisms. Such certification relies upon the definition and implementation of forest management standards consistent with the conservation and sustainable use of forest biological diversity.

## E. Conclusion

59. In spite of the huge and rich amount of initiatives, forums, mechanisms and binding and non-binding instruments that have been carried out and/or adopted since UNCED and despite the participation of many countries in all these processes, the global status of forests and forest biological diversity remains extremely worrying.

60. There is still important lack of knowledge in the status and trends of forest biological diversity. In this regard, FAO Global Forest Resources Assessment 2000 (FRA 2000, FAO, 1999) is a hopeful project, particularly as far as forest biological diversity will be further integrated into ongoing work, as requested by COP (decision IV/7, paragraph 4). Development of agreed and appropriate criteria and indicators for forest biological diversity that will take into account the ecosystem approach would also be particularly useful and, in this matter, the ongoing work undertaken within the Convention on indicators of biological diversity will constitute an important base. However, due to the current critical forest situation, necessary immediate actions should not be postponed until the completion of the work on criteria and indicators or the full knowledge on status and trends of forests is gathered, in accordance with the precautionary principle.

61. There is also a lack of knowledge and understanding about the linkages between forest biological diversity processes and the goods and services provided by forest ecosystems. As stressed among other issues by the liaison group on the ecosystem approach that met in Paris in September 1999 7/, this could explain why non-wood products and forest biological diversity services are under-valued or not valued at all. This lack of knowledge is likely to concern most decision-makers and stakeholders at all levels, which affect in turn the way forest biological diversity is perceived, managed and used.

62. As stated in the note, many causes of deforestation and forest degradation take place outside the forest sector ("underlying causes of deforestation and forest degradation" 8/). Therefore, they have to be addressed within the appropriate forums where Parties and countries are called upon to integrate forest biological diversity considerations (decision IV/7, paragraph 3). The lack of knowledge mentioned above on forest ecosystems processes and related goods and services is likely one of the impediments to make these other forums aware of the importance to integrate the full value of forest biological diversity in their specific concern.

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7/ See document (UNEP/CBD/SBSTTA/5/11).

8 / See, in particular, IFF 3 meeting documentation and report (www.un.org/esa/sustdev/IFF.htm) and also the report of the Workshop on the Underlying Causes of Deforestation and Forest Degradation, Costa Rica, January 1999.

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## INDICATIVE GLOSSARY

FAO 9/ definitions of forest include:

Forest areas in developed countries are defined as land where tree crowns cover 20% of the area. This includes open forests, forest roads and fire breaks, temporary cleared areas, young stands expected to achieve at least 20% crown cover upon maturity, etc.

Forest areas in developing countries are defined as land with tree crown cover (or equivalent stocking level) of more than 10% and area of more than 0.5 hectare.

This definition includes: forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry purposes, including rubberwood plantations and cork oak stands.

Frontier forests (WRI) 10/

Frontier forests are large, relatively intact forest ecosystems. A frontier forest must meet the following criteria:

- It is primarily forested.
- It is large enough to support viable populations of all species associated with that forest type even in the face of natural disasters of a magnitude to occur once in a century.
- Its structure and composition are determined mainly by natural events, and it remains relatively unmanaged by humans, although limited human disturbance by traditional activities is acceptable.
- In forests where patches of trees of different ages occur naturally, the landscape shows this type of heterogeneity.
- It is dominated by indigenous tree species.
- It is home to most, if not all, other plants and animals that typically live in this forest.

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9/ Source: FAO (1998), FAO (1999), WRI (1999).

10/ Source: WRI (1997, 1999).

FWCMC / CIFOR11/ definitions of forest include:

Tropical forests

Mangroves: Natural forests with > 30% canopy cover, composed of species of mangrove tree, generally along coasts in or near brackish or salt water.

Disturbed natural forest: Any forest type above that has in its interior significant areas of disturbance by people, including clearing, felling for wood extraction, anthropogenic fires, road construction, etc.

Exotic species plantation: Intensively managed forests with > 30% canopy cover, which have been planted by people with species not naturally occurring in that country.

Native species plantation: Intensively managed forests with > 30% canopy cover, which have been planted by people with species that occur naturally in that country.

Other Forest Definitions

Undisturbed forest: Forests where there has been no known human intervention or where the last significant intervention was long enough ago to have allowed the natural species composition and processes to become re-established

Old growth forest: The old growth forests have been described by the adjective primeval, ancient, wilderness, virgin, pristine while in forester's terminology they are called as over-matured, decadent, and senescent, old growth. The old growth forests may be defined as a climax forest that has never been disturbed by man. The old growth forests can be classified as per the age and disturbance criteria.

For age criteria:

(1) Has the forest reached an age at which the species composition is relatively stable or in other words has it reached a climax?

(2) Has the forest reached an age at which average net annual growth is close to zero?

(3) Have the dominant trees reached the average life expectancy for that species on that type of site?

(4) Has the forest's current annual growth rate declined below the life time average annual growth rate?

For disturbance criteria:

(5) Has the forest been extensively or intensively cut?

(6) Has the forest ever been converted by people to another type of ecosystem?

Natural forest: A forest composed primarily of naturally established indigenous species (by opposition to plantation)

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11/ Source: Iremonger et al., 1997.

Semi-natural forest: Semi natural forests can be defined as neither a forest undisturbed by man nor a plantation as defined separately. They represent mainly managed forests modified by man through silviculture and assisted regeneration.

Secondary forest: Forest regenerating naturally after intense/drastic human and/or natural disturbance of the original forest vegetation, and involving a major change in canopy species composition from that of primary forests growing on similar site conditions in the area. Secondary forest can be said to have reverted to primary forest when canopy species composition approaches that of primary forest growing on similar site conditions in the area.

Forest fallow: A secondary forest committed to be converted "back" to agriculture before while still at an early stage of evolution. It refers to any complex of woody vegetation deriving from the clearing of natural forest for swidden agriculture and is an intermediate class between forest and non-forest land uses.

Plantation: A forest which has been planted by people with species occurring naturally (native species plantation) or not (exotic species plantation) in that country.

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