UNEP

CBD

CONVENTION ON BIOLOGICAL DIVERSITY

Distr.
GENERAL

UNEP/CBD/AHTEG-2010-Ind/1/3
5 October 2004

ENGLISH ONLY

AD HOC TECHNICAL EXPERT GROUP ON
INDICATORS FOR ASSESSING
PROGRESS TOWARDS THE 2010
BIODIVERSITY TARGET
Montreal, 19-22 October 2004
Item 3.2 of the provisional agenda*

# INDICATORS FOR ASSESSING PROGRESS TOWARDS THE 2010 TARGET: POSSIBLE INDICATORS FOR DEVELOPMENT

*Note by the Executive Secretary*

## INTRODUCTION

1. In its decision VII/30, the Conference of the Parties (COP) to the Convention on Biological Diversity adopted a framework for assessing progress at the global level towards the 2010 target, and for communicating effectively trends in biodiversity related to the three objectives of the Convention. The Conference of the Parties agreed that a limited number of trial indicators, for which data are available from existing sources, be developed and used in reporting, *inter alia*, through the Global Biodiversity Outlook (paragraph 3). The table on indicators adopted in annex I of decision VII/30 is reproduced in annex I to this note.

2. The Conference of the Parties requested the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), with the assistance of an ad hoc technical expert group, to:

(a) Review the use of the indicators listed in column B of the indicators table (indicators for immediate testing), *inter alia*, by reviewing a draft of the Second Global Biodiversity Outlook;

(b) Identify or develop indicators listed in column C of the indicators table (possible indicators for development), ensuring that the full set of indicators is limited in number;

and report on the results to the Conference of the Parties at its eighth meeting.

3. This document discusses available information on the possible indicators for development. More detailed information on the most promising indicators is provided in relevant information documents.

4. To exchange views on the indicators listed in column C and to enable experts to propose additional indicators, an electronic discussion forum was established. During a period of two months, experts and CBD focal points were invited to submit comments and make suggestions.

5. This document summarizes the results of the discussion forum pertaining to the possible indicators for development.

* UNEP/CBD/AHTEG-2010-Indicators/1/1.

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## I. FOCAL AREA: STATUS AND TRENDS OF THE COMPONENTS OF BIOLOGICAL DIVERSITY

6. In accordance with Article 2 of the Convention, biological diversity includes living organisms from all sources and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems.

7. Indicators on trends in extent of selected ecosystems and trends in abundance and distribution of selected species as well as on the coverage of protected areas have been considered ready for immediate testing and are discussed in the note on indicators for assessing progress towards the 2010 target: possible indicators for development (UNEP/CBD/AHTEG-2010-Ind/1/2).

8. Two additional indicators on threatened species and genetic diversity, respectively, were considered important but not yet ready for testing and use.

### *A. Possible indicator 9: Change in status of threatened species*

9. The Red List of the World Conservation Union (IUCN) is recognized as the most authoritative and objective system for classifying species at high risk of extinction. Red List Indices illustrate the relative rate at which species in a particular group change in overall threat status (i.e. projected extinction risk), based on population and range size and trends as quantified by Red List categories. The indices can be calculated for any representative set of species that has been fully assessed at least twice. They are calculated from the number of species in each Red List category, and the number changing categories between assessments as a result of genuine improvement or deterioration in status.

10. Red List Indices show a fairly coarse level of resolution, but are uniquely representative, being based on information from all species in a taxonomic group worldwide. The Red List Index has been developed by the Red List Consortium (IUCN, BirdLife International, Conservation International and NatureServe).

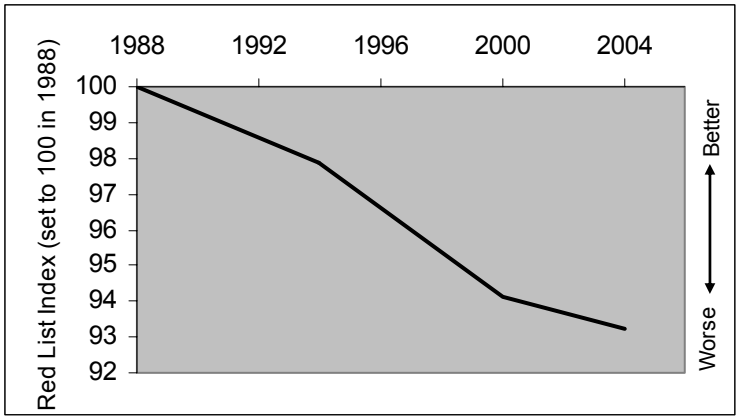
11. Similarly to many species trends indices (e.g. the LPI, United Kingdom headline indicator for wild birds, and the European common bird index), the Red List Index sets a baseline of 100 in the baseline year. It measures the proportional change from this baseline value, showing how the threat status of species in particular taxonomic groups changes over time. For example, a decline in 10 per cent in the Red List Index shows that the threat status of a particular taxonomic group has deteriorated by 10 per cent, relative to a baseline set in the year of first assessment (e.g. 1988 for birds). A significant diminution in downward trend would show that the 2010 target has been met.

12. The Red List Index measures the rate of change of the state of biodiversity, because it relates to the rate at which species are slipping towards extinction at a particular time. It measures the changing relative aggregate extinction risk across entire taxonomic groups (e.g., birds, amphibians, etc.) including those in the non-threatened category of "Least Concern". It is thus not confined to threatened species but also documents the status of non-threatened species.

13. Figure 1 shows that the overall threat status for the world's birds has deteriorated steadily during 1988–2004 and that it has decreased by nearly 7 per cent. A preliminary Red List Index for amphibians for 1980–2004 shows a similar rate of decline. Indices are in development for other groups, including mammals, reptiles, freshwater fish, sharks, rays and chimeras, freshwater molluscs. 1/

*Figure 1. The Red List Index for all bird species (n = 250 genuine status changes/2,469 species in categories EW to NT in at least one assessment).*

1/ The IUCN Species Programme will release at the World Conservation Congress in Bangkok a Global Species Assessment as part of the 2004 Red List update. This assessment applies the Red List Index to three global species databases – birds, mammals, and amphibians.




14. The workshop group at the Royal Society "Beyond extinction rates" meeting 2/ recommended testing if variation in the quality of data used in Red List assessments introduces systematic biases to the RLI. This might happen, for example, if genuine status changes are more likely to be recorded in well-studied species with better data, and if such species are also more likely to be receiving conservation attention.

15. The discussion forum proposed to move this indicator from the category "to be developed" to the category "for immediate testing" considering that it one of the most advanced is now effectively in use.

### *B. Possible indicator 10: Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance*

#### *1. Genetic diversity of domesticated animals*

16. The Informal Panel of Experts on the Development of the Global Strategy for Animal Genetic Resources (AnGR) discussed and agreed, in their second meeting in March 1998, a framework that provides criteria and indicators to be used as a basis for evaluating progress in implementation of the Global Strategy. 3/ This framework was used as basis for a survey conducted in 2000 to evaluate the progress made in the implementation of the Global Strategy. The results have been summarized and presented to the Second Session of the Intergovernmental Technical Working Group on AnGR in September 2000. 4/

17. The evaluate progress in the implementation of the Global Strategy an initial set of criteria and indicators has been prepared. The Panel also recommended that a periodic Report on the State of the World's Animal Genetic Resources for Food and Agriculture be prepared, to provide a basis from which to evaluate progress in the improved use, development and conservation of animal genetic resources, drawing on the Domestic Animal Diversity Information System (DADIS), as a cost-effective mechanism to monitor and periodically report on the status of the world's animal genetic resources.

18. Among the indicators listed in annex II of document CGRFA/WG-AnGR-1/98/Inf.1 the most relevant to measure sustainable use 5/ of animal genetic resources are:

(a) Number of countries that have adopted breeding strategies to better use locally adapted animal genetic resources;

(b) Total number of breeds, for which sustainable action plans have been prepared or are under development;

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2/ London, 21-22 July 2004. See http://www.twentyten.net/Powerpoints/Species_%20final_%20report.ppt

3/ The report is available at; http://dad.fao.org/en/refer/library/reports/panel2.pdf

4/ CGRFA/WG-AnGR-2/00/ INF/2 E available at: http://dad.fao.org/en/refer/library/reports2/itwg/2-00-inf2.pdf

5/ These indicators are equally relevant to the focal area on sustainable use.

(c) Number of countries implementing improved animal recording systems;

(d) Total number of breeds for which breeding strategies have been implemented.

19. The following indicators are considered most relevant to measure the conservation of animal genetic resources:

(a) Number of breed conservation action plans currently completed or under development.

(b) Number of breeds designated in each category of extinct, critical and endangered.

(c) Number of breeds in which adequate samples of AnGR have been collected and are stored in genome banks.

20. Another very relevant indicator contributing to both sustainable use and conservation would be indiscriminate crossbreeding with exotic breeds. At this point of time, however, there is no concrete data available to measure it.

21. The Food and Agriculture Organization of the United Nations (FAO) has established DAD-IS, the clearing house mechanism for animal genetic resources. This central system facilitates documentation of AnGR at national level.

22. The FAO World Watch List for domestic animal diversity 6/ provides information on the current state and recent trends of over 5,000 animal breeds. A global early warning system for AnGR is under development.

23. The Centre for Genetic Resources (CGN) of Wageningen University considers that an indicator on he number of breeding males that are characteristic for landscapes/production environments that are important for biodiversity, such as for example unfertilised alpine meadows, better reflects genetic diversity of livestock than the overall number of breeds.

### *2. Genetic diversity of cultivated plants*

24. The Commission on Genetic Resources for Food and Agriculture (CGRFA) is developing a set of core indicators to monitor implementation of the Global Plan of Action on the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (GPA). A document on Monitoring the implementation of the GPA (CGRFA-09/2/7 7/), prepared for the Ninth Session of the CGRFA, contains in its annex a list of – mostly process-oriented – core indicators for monitoring the implementation of the GPA.

25. Members of the CGRFA adopted these indicators and suggested that "higher order indicators" be developed. These would "…facilitate a more general analysis of the state of genetic resource conservation and use, and the sharing of such information with other forums, including the Convention on Biological Diversity, the Commission on Sustainable Development and the Organization for Economic Cooperation and Development."

26. In September 2002, FAO and IPGRI held an expert consultation on the "Review and development of indicators for genetic diversity, genetic erosion and genetic vulnerability (GDEV)". 8/ The meeting considered the possibilities of developing composite indicators based on a list of potential indicators in the following categories:

(a) Number and share of species used;

(b) Number and share of crop varieties;

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6/ http://dad.fao.org/cgi-dad/$cgi_dad.dll/Reference?Eng#World%20Watch%20List%20for%20Domestic%20Animal %20Diversity

7/ accessible at: ftp://ext-ftp.fao.org/ag/cgrfa/cgrfa9/r9w7e.pdf

8/ ftp://ext-ftp.fao.org/ag/cgrfa/cgrfa9/r9o4e.pdf

(c) Endangered varieties; genetic erosion;

(d) Dynamics of diversity on farm (traditional systems); farmer management and traditional knowledge; 9/

(e) Dynamics of diversity on farm and in reserve (modernized systems);

(f) Variation in use and environmental amplitude;

(g) *Ex situ* collections

27. The Centre for Genetic Resources (CGN) of Wageningen University considers that an indicator on breeds and varieties that are characteristic for landscapes/production environments that are important for biodiversity, such as for example unfertilized alpine meadows, better reflects genetic diversity of crops than the number and share of crop varieties. A second indicator is the area of low production/high biodiversity agriculture. 10/

28. Another possible indicator might be trends in population sizes, particularly for rare species or species at the margins of their geographic ranges. Population size is a reasonably good surrogate for genetic status because inbreeding and genetic drift within small populations tends to erode genetic diversity. Focusing on species at the range margins may provide a good indicator of trends affecting both species diversity as well as their genetic diversity and reproductive status.

### *3. Genetic diversity of fish species*

29. The Department of Fisheries of FAO has proposed the following general indicators of trends in genetic diversity of domesticated fish species and fish species of major importance:

(a) Loss of wetlands or change in land use;

(b) Number of dams on a river;

(c) Species composition of catch - large, late maturing, and migratory fish probably will decrease as a result of development. 11/

## II. FOCAL AREA: SUSTAINABLE USE

30. One of the objectives of the Convention is the sustainable use of the components of biodiversity (Article 1). Articles 6, 7 and 10 provide additional elements and obligations for Parties to ensure the sustainability of projects and policies and to monitor the use of components of biodiversity that are important for their conservation.

31. Through a series of three regional workshops and a fourth open-ended workshop a set of practical principles, operational guidelines, and associated instruments have been developed leading to the adoption, through decision VII/12, of the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity. The workshops developed an indicative list of indicators for measuring the decline in the status of categories of biodiversity components contained in document UNEP/CBD/SBSTTA/9/INF/8.

32. While the indicators proposed in this document and those discussed below provide information on specific sectors it may be desirable to develop a global index on ecosystem services ("big green index"). The ecological footprint measures the size of land required to sustainably meet the consumption. While human consumption amounted to 70 per cent of the Earth's capacity in 1961 it is now at 120 per cent. 12/ The average global ecological footprint was calculated at is 2.3 ha per person.

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9/ This indicator is equally relevant to the focal area on traditional knowledge

10/ CGN has developed an extended list of indicators

11/ Related to 3 would be change in trophic structure of catch, but this must interpreted carefully because can indicate many things, such as climate change, habitat loss/degradation, pollution or other nutrient input, and over-fishing.

12/ Living Planet Report 2002 http://www.wwf.org.uk/filelibrary/pdf/livingplanet2002.pdf)

### *A. Possible indicator 11: Area of forest, agricultural and aquaculture ecosystems under sustainable management*

33. Document UNEP/CBD/COP/6/INF/21/Add.1 on the refinement of the 16 targets of the Global Strategy for Plant Conservation reviews the scope, terminology, base-line information, technical and scientific rationale of those target, including target 6 ("At least 30 per cent of production lands managed consistent with the conservation of plant diversity").

#### *1. Forest*

34. Criteria and indicators for sustainable forest management have been developed on a regional or biome-specific basis. 13/ FAO (2001) has compiled the nine systems of criteria and indicators for sustainable forest management. 14/ More recently, an International Conference on the contribution of criteria and indicators for Sustainable Forest Management 15/ has analysed and compared the status of implementation of international criteria and indicator processes. The area of certified forest has risen from about 2 per cent in 2000 to almost 4 per cent in 2003. 16/ 17/ However, while certified production systems may be sustainable, uncertified systems are not necessarily unsustainable.

#### *2. Agriculture*

35. Led by OECD, substantial progress has been made in developing agri-environmental indicators. 18/ These cover *inter alia* the use of pesticides and fertilizers, and impacts on soil, water and biodiversity at genetic, species and habitat levels. 19/,20/ The global area of certified croplands has been estimated at 2 per cent in 2000. 21/ In the same year, between 1 and 3 per cent of the managed pasture lands, which are estimated to be about 50 per cent of total pasture lands, have been certified. 22/

36. In indicator on the area and percentage of organic farming and local trade versus long-distance trade has been proposed. 23/

#### *3. Aquaculture*

37. In recent years, a number of certification and labelling systems have been introduced for fisheries. For example, the Aquaculture Certification Council (ACC) certifies aquaculture facilities that apply best

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13/ More than 150 countries are participating in nine eco-regional processes to develop and implement criteria and indicators for sustainable forest management, all of which include conservation of biodiversity. As most of these processes have begun only in the last few years, it is anticipated that much more information will be available on sustainable forest management in future. Currently there are no globally agreed criteria and indicators, but FAO is facilitating a process to harmonize the various sets.

14/ Castañeda, F., C. Palmberg-Lerche, & P. Vuorinen. 2001. Criteria and Indicators for Sustainable Forest Management: A Compendium. Forest Management Working Paper 5. FAO Forestry Department.

15/ International Conference on the Contribution of Criteria and Indicators for Sustainable Forest Management: The Way Forward (CICI-2003) Volume 2, CICI - 2003, 3 - 7 February 2003, Guatemala City, Guatemala (http://www.fao.org/DOCREP/005/J0077E/J0077E00.htm#TopOfPage)

16/ see also UNEP/CBD/COP/7/INF/33

17/ Information on FSC is available at: http://www.certified-forests.org

18/ http://www.oecd.org/topic/0,2686,en_2649_33795_1_1_1_1_37401,00.html

19/ OECD. 2001. Environmental Indicators for Agriculture, Volume 3: Methods and Results. OECD, Paris.

20/ OECD. 2002. Report of the OECD expert meeting on Agri-Biodiversity Indicators, Zürich 5-8 November, 2001. OECD, Paris.

21/ Willer, Hella and Minou Yussefi (2001) Organic Agriculture Worldwide 2001: Statistics and Future Prospects. BIOFACH/IFOAM/*Stiftung Ökologie & Landbau*, Germany (http://www.soel.de/)

22/ Batello, pers. □omm.. Cited in UNEP/CBD/COP/6/INF/21/Add.1

23/ see document Proposed-sustainable-use-indicator-ortiz-elci.pdf submitted by the Environment Liaison Centre International to the discussion forum of the Convention on Biological Diversity on indicators for assessing progress towards the 2010 target accessible at: https://www.biodiv.org/2010-target/forums/indicators-thread.shtml?postid=521.

management practices to ensure social and environmental responsibility, food safety and traceability throughout the production chain. 24/

38. The marine trophic index 25/ is also an indicator of sustainable use. Possible additional indices and indicators include:

(a) The Fish in Balance (FIB) index (FAO);

(b) The number of commercial fish stocks that are overexploited (data source: FAO);

(c) The amount of bycatch (data source: FAO) and the effects of longline fishing operations on some key species like albatrosses and petrels (data source: Birdlife International, Agreement on the Conservation of Albatrosses and Petrels);

(d) The percentage of world landings caught illegally (data source: University of British Columbia);

(e) The number of aquatic species being farmed and where they are farmed (data source: FAO FishStat database from 1984);

(f) Trophic levels of farmed species and market value of these species (data source: FAO FishStat database from 1984);

(g) Increase or decrease on fish consumption. FAO has consumption data (availability) that would also indicate if people are eating more or less fish;

(h) Area and percentage of mangroves globally under sustainable community management and local trade versus long-distance trade. 26/

### *B. Possible indicator 12: Proportion of products derived from sustainable sources*

39. Various systems for certifying the sustainable origin of products are in use, including for agriculture, aquaculture, fisheries, forest management and horticulture. These can be area or product based. Increasingly, they are complemented by more stringent certification and labelling schemes. Ecolabels, including for organic foods and fibres, non-wood forest products, eco-forestry and eco-tourism, provide market-based incentives that reward producers for environmentally sound practices. Driven by consumer demand and trade regulations, the share of certified management systems and products has significantly increased over the past years. However, third-party certification is usually difficult to obtain, particularly for small-scale producers, and can be of limited interest to producers relying on domestic markets. Nevertheless, many of these may take considerations of sustainable management into account.

40. Document UNEP/CBD/COP/6/INF/21/Add.1 on the refinement of the 16 targets of the Global Strategy for Plant Conservation reviews the scope, terminology, base-line information, technical and scientific rationale of those target, including target 12 (“30 per cent of plant-based products derived from sources that are sustainably managed”).

41. With respect to aquaculture and fisheries, about 160 products certified under the Marine Stewardship Council are now on sale. 27/

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24/ http://www.aquaculturecertification.org/accprocp.html

25/ see also UNEP/CBD/AHTEG-2010-Ind/1/2 and UNEP/CBD/AHTEG-2010-Ind/1/INF/5

26/ see document Proposed-sustainable-use-indicator-ortiz-elci.pdf submitted by the Environment Liaison Centre International to the discussion forum of the Convention on Biological Diversity on indicators of for assessing progress towards the 2010 target accessible at: https://www.biodiv.org/2010-target/forums/indicators-thread.shtml?postid=521.

27/ http://www.msc.org/assets/docs/news_and_reports/Annual_report03_English.pdf

## III. FOCAL AREA: THREATS TO BIODIVERSITY

42. Article 14 of the Convention requires Parties, *inter alia,* to avoid or minimize adverse effects on biodiversity. Among the direct drivers of change that potentially threatened biodiversity, invasive alien species and the anthropogenic production of reactive nitrogen have been recognized as particularly threatening. Unlike for example climate change, ozone and persistent organic pollutants, these are not addressed in other intergovernmental processes.

43. Numbers and costs of invasive alien species are more difficult to ascertain and no recognized methodology exists for this indicator. This indicator is therefore treated in column C of the indicators table.

### *Possible indicator 13: Numbers and costs of invasive alien species*

44. Numbers and costs of invasive alien species are difficult to ascertain and no recognized methodology exists for this indicator. The Global Invasive Species Programme (GISP) and the IUCN Invasive Species Specialist Group examine the feasibility of this indicator.

## IV. FOCAL AREA: ECOSYSTEM INTEGRITY AND ECOSYSTEM GOODS AND SERVICES

45. Ecosystem integrity reflects the capability of a system to support services of value to humans. 28/ Indicators under the focal area on ecosystem integrity and ecosystem goods and services provide information on the quality and health of ecosystems and their productive capacity. This information complements the information on the area coverage of ecosystems addressed through the indicator on trends in extent of selected biomes, ecosystems and habitats.

46. While two indicators on the integrity of inland water and marine ecosystems are considered ready for testing and use, a range of additional indicators related to terrestrial ecosystems require further development.

### *A. Possible indicator 14: Application of the trophic index to freshwater and possibly other ecosystems*

47. The trophic index is a measure of the mean trophic level of all species or a species assemblage in a system. Changes in the trophic index indicate changes in the species composition of the system.

48. The trophic index approach is applicable to freshwater, and possibly other ecosystems such as savannahs and temperate grasslands. However, the indicator depends on the accuracy and completeness of species data and their trophic level. Inland fisheries data are frequently not disaggregated to species, reports are incomplete and quantities are often estimated. Data on hunting and bushmeat are only available for regulated and legal use.

### *B. Possible indicator 15: Connectivity/fragmentation of ecosystems*

49. To assess the effects of habitat fragmentation on species diversity, spatial data are required on the pattern and rate of habitat loss 29/ and species distribution across the landscape. In the case of forested habitats, interpretation of the patterns of forest cover change requires consideration of the distribution of forest types as well as the characteristics of forest species present and their ability to cope with fragmentation or deforestation. 30/ To quantify the spatial patterns of forest cover change, different spatial indices (or metrics) have been developed in the recent years. The main aspects that these attempt

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28/ See for example http://www.ozestuaries.org/indicators/Def_ecosystem_integrity.html for more detailed definitions.

29/ E.g. Iida, S., T. Nakashizuka. 1995. Forest fragmentation and its effect on species diversity in sub-urban coppice forests in Japan. Forest Ecology & Management 73: 197-210.

30/ Dale, V.H., S. M. Pearson. 1997. Quantifying habitat fragmentation due to land use change in Amazonia. In: Laurance, W., R. Bierregaard (eds.). Tropical Forest Remnants. The University of Chicago Press, Chicago, pp. 400-414.

to capture are a loss of total habitat area, an increase of patch abundance and density, a decrease of patch size, a reduction in core area, and an increase in patch edges. 31/ 32/ A few of the most generally applicable indicators are:

(a) Patch density, which refers to the number of fragments per unit area as a basic measure of the fragmentation of large patches;

(b) Patch size distribution, which is a key component of ecosystem fragmentation, providing information on the progressive change through time in the size of ecosystem fragments;

(c) The length of edge between land uses, which is useful for assessing habitat availability for species that either prefer or avoid certain types of ecotones;

(d) Core metrics represent the interior area of patches after a user-specified edge buffer is eliminated. The edge buffer represents the distance at which the core or interior of a patch is unaffected by the edge of the patch, and hence requires ecosystem-specific information on edge effects. Core area integrates the effects of patch size, shape, and edge effect distance into a single measure and has been used as an indication of the extent of large forest patches in a landscape; 33/

(e) In landscapes dominated by patches of a wide range of sizes, metrics such as mean patch size or number of patches might be more suitable to characterise temporal and spatial differences in landscape structure.

50. The current availability of forest cover datasets is sufficient to allow the assessment of forest fragmentation at global and country level. Therefore, fragmentation can be used as an indicator of ecosystem integrity for forests. A global estimate of forest fragmentation 34/ uses a methodology that could be applied to assess connectivity/fragmentation of forests and other ecosystem types. The analysis would have to be repeated based on a future set of satellite images to provide a time-series, which could inform on indicator on connectivity/fragmentation, which is yet to be developed. Examples of a fragmentation index have also been proposed. 35/

51. A more complete assessment of possible indicators on connectivity/fragmentation of ecosystems is provided in document UNEP/CBD/AHTEG-2010-Ind/1/INF/10.

### *C. Possible indicator 16: Incidence of human-induced ecosystem failure*

52. The Global Environment Outlook (GEO) Year Book 2003 36/ provides data on two indicators related to natural disasters:

(a) Number of people killed by natural disasters; and

(b) Number of people affected by natural disasters.

53. For the period 1986 –2002, the average total number of reported deaths from natural disasters was approximately 46 000 per year for the world as a whole. Actual numbers vary considerably from one year to the next, and no clear trend is discernible.

54. Over the same period, the number of people affected globally by natural disasters, including those injured and left homeless, has risen substantially. In 2002, this figure reportedly reached a total of 600

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31/ Franklin, S. 2001. Remote Sensing for Sustainable Forest Management. Lewis Publishers. USA. 407 p.

32/ McGarigal, K. 2002. Landscape pattern metrics. In: A. H. El-Shaarawi and W. W. Piegorsch, (eds.). Encyclopedia of Environmetrics Volume 2. John Wiley & Sons, Sussex, England. Pp. 1135-1142.

33/ Wolter, P., M. White. 2002. Recent forest cover type transitions and landscape structural changes in northeast Minnesota, USA. Landscape ecology 17: 133-15.

34/ Wade, T. G. *et al*. 2003. Conservation Ecology 7(2) [online]. www.consecol.org/vol7/iss2/art7

35/ Newton, A.C. and V. Kapos. 2002. Biodiversity indicators in national forest inventories Unasylva 53(210): 56-64. http://www.fao.org/DOCREP/005/Y4001E/Y4001E09.htm

36/ GEO Yearbook 2003. UNEP. Year of publication: 2004.

million. Economic losses are estimated to have multiplied five times since the 1970s, to a total of US$ 629 billion for the 1990s, 37/ while it should be noted that many costs are unaccounted for, especially in developing countries.

### *D. Possible indicator 17: Health and well-being of people in biodiversity-based-resource dependent communities*

55. Several indices have been proposed:

(a) The Human Well-being Index (HWI) weighs official national statistics on health, population, household wealth, national wealth, knowledge and culture, community (freedom and governance) and equity (household equity and gender equity); 38/

(b) The Ecosystem Well being Index (EWI) is calculated from about 50 indicators on land, water, air, species and genes and resource use; 39/

(c) The HWI and EWI can be combined into a barometer of sustainability; 40/

(d) The Genuine Progress Indicator (GPI) 41/ rates consumption associated with a smaller ecological footprint as more positive than consumption associated with a larger ecological footprint.

56. Such indices would be suitable if they could be applied to a finer than the national scale, so as to assess the well-being of people in biodiversity-based-resource dependent communities, e.g. forest-dwelling communities and nomadic herders. However, relevant statistics are rarely available.

57. An indicator relating to the incidence of vector-borne diseases provides a direct link between human and environmental health.

### *E. Possible indicator 18: Biodiversity used in food and medicine*

58. Food and medicine represent two of the most obvious uses of biodiversity, and ones that affect people most directly (see also see UNEP/CBD/COP/7/INF/33). Recently, there has been renewed attention to the value of a diverse diet for human nutrition and health, 42/,43/,44/,45/ which is seen as an important element in countering the global trend towards obesity and other diet-related diseases in urbanized populations. 46/,47/ In addition, the rural poor still largely depend on a diverse range of

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37/ International Federation of Red Cross and Red Crescent Societies 2002. World Disaster Report 2002. Geneva.

38/ Prescott-Allen, R. 2001. The Wellbeing of Nations: A Country-by-Country Index of Quality of Life and the Environment. IUCN, IDRC.

39/ Prescott-Allen, R. 2001. The Wellbeing of Nations: A Country-by-Country Index of Quality of Life and the Environment. IUCN, IDRC.

40/ The Barometer of Sustainability is a tool for measuring and communicating a society's well-being and progress toward sustainability. It provides a systematic way of organizing and combining indicators so that users can draw conclusions about the conditions of people and the ecosystem and the effects of people-ecosystem interactions. It presents those conclusions visually, providing anyone, from villager to head of state, with an immediate picture of human and ecosystem well-being.

41/ Proposed in 1995 by Redefining Progress, a policy research group based in San Francisco, USA.

42/ Kennedy, G; Nantel G; Shetty P 2003. The scourge of "hidden hunger": global dimensions of micronutrient deficiencies. FAO, Rome.

43/ Johns, T. Plant genetic diverstiy and malnutrition. Practical Steps in the Development and Implementation of a Global Strategy Linking Plant Genetic Resource Conservation and Nutrition. Afr. J. Food & Nnutr. Sci. (AJFNS - online version) 2 (2). http://www.ajfand.net/issueIIIfiles/timothyjohns.htm

44/ Popkin BM, Horton S and S Kim. 2000. The nutrition transition and prevention of diet-related diseases in Asia and the Pacific. Food Nutr. Bull. 22(suppl): 58.

45/ Burlingame, B. 2001 What is a Nutrient? J. Food Comp. Anal. 14: 1.

46/ http://www.unu.edu/env/plec/cbd/Montreal/papers/Johns.pdf

47/ WHO/FAO. 2002. Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO expert consultation, Geneva 28 January-1 February 2002. WHO technical report series 916.

cultivated and harvested wild food sources. 48/,49/ Most people in developing countries still rely predominantly on traditional medicines, mostly derived from plants, for their primary health care, and recently, there has been increased demand for herbal medicines in developed countries. 50/

59. About 30,000 of the roughly 250,000 identified plant species are edible and about 7,000 have been cultivated or collected by humans for food at one time or another. 51/,52/ However, when data are aggregated to the global level, only 30 crops account for 95 per cent of dietary energy (calories) or protein. Just three species: wheat, rice and maize alone provide more than half of the global plant-derived energy intake. The diversity within these species is immense. Estimates of the number of distinct varieties of the rice species, *Oryza sativa*, for example, range from tens of thousands to more than 100,000.

60. As the foregoing discussion illustrates, developing an indicator on biodiversity used for food is essentially a question of scale and level of aggregation. Possible indicators might include:

(a) The total number of species typically used by a community or nation; and

(b) The number of species providing, for example, 90 per cent or 95 per cent of energy, fat, protein and/or total mass of the food intake of a particular community or nation.

61. Globally consistent data are available only for option (ii) and are held by the FAO. Such information could be complemented by samples surveyed according to option (i). In each case the absolute number could be complemented by an index of the evenness of the distribution of species making up total foods. With such data, changes over time could be monitored. The data could also be aggregated regionally and globally.

## V. FOCAL AREA: STATUS OF TRADITIONAL KNOWLEDGE, INNOVATIONS AND PRACTICES

62. In accordance with article 8(j) of the Convention, Parties should, *inter alia,* respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities, embodying traditional lifestyles relevant for the conservation and sustainable use of biodiversity. This provision and related guidance provided by the Conference of the Parties recognize the role of indigenous and local communities in managing and maintaining biodiversity.

63. The close association between language and cultural knowledge and practices, including traditional ecological knowledge and associated biodiversity management practices, is widely recognized. 53/ While additional indicators need to be developed, the Conference of the Parties decided to use trends in indigenous languages and speakers as a proxy for trends in traditional knowledge, innovations and practices. The development of additional indicators on the status of traditional knowledge, innovations and practices has been assigned to the Ad hoc Open-ended Working Group on Article 8(j) and Related Provisions.

## VI. FOCAL AREA: STATUS OF ACCESS AND BENEFIT-SHARING

64. The fair and equitable sharing of benefits arising out of the utilization of genetic resources is one of the objectives of the Convention (Article 1). The terms and conditions for access to genetic resources and benefit-sharing are addressed in articles 15, 16 and 19 of the Convention. In accordance with the

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48/ Hladik, C.M. et al. 1993. Tropical forests, people and food. Biocultural interactions and applications to development. Man and the Biosphere Series. Volume 13. UNESCO and Parthenon Publishing, Paris and Carnforth.

49/ FAO 1988 The State of the World's Plant Genetic Resoruces for Food and Agriculture.

50/ http://www.who.int/mediacentre/factsheets/2003/fs134/en/

51/ http://www.ipgri.cgiar.org/nus/docs/UOCFramework.doc

52/ FAO1998. The state of the world's plant genetic resources for food and agriculture. FAO, Rome.

53/ See for example document UNEP/CBD/WG8J/1/INF/4 http://www.biodiv.org/doc/meetings/tk/wg8j-01/information/wg8j-01-inf-04-en.pdf; Posey, D.A. 1999. Cultural and spiritual values of biodiversity. UNEP Nairobi, 731p.

table included in annex I, the development of indicators on the status of access and benefit-sharing has been assigned to the Ad hoc Open-ended Working Group on Access and Benefit-sharing. The Working Group will consider this issue at its next meeting to be held from 14 to 18 February 2005, in Bangkok, Thailand. In order to assist the Working Group in this task, document UNEP/CBD/WG-ABS/3/6 entitled "Strategic Plan: Future evaluation of progress – the need and possible options for indicators for access to genetic resources and in particular for the fair and equitable sharing of benefits arising from the utilization of genetic resources", is being prepared by the Secretariat.

## VII. FOCAL AREA: STATUS OF RESOURCE TRANSFERS

65. The need for financial, technical and technological resources for the implementation of the Convention is reflected in a number of provisions. Paragraph 2 of article 20 of the Convention *inter alia* requests developed country Parties to provide new and additional financial resources to enable developing country Parties to meet the incremental costs of implementing the provisions and obligations of the Convention. Article 21 establishes a financial mechanism for the Convention. In accordance with paragraph 2 of article 16, access to and transfer of technology relevant to the attainment of the objectives of the Convention to developing countries should be provided and/or facilitated under fair and favourable terms.

66. The Conference of the Parties adopted an indicator on official development assistance, which can draw on official statistics provided by relevant bodies, and an indicator on technology transfer, which needs to be developed.

### *Possible indicator 19: Indicator for technology transfer*

67. Article 16 of the Convention, on access to and transfer of technology, recognizes that both access to and transfer of technology among Contracting Parties are essential elements for the attainment of the objectives of the Convention. It requires Contracting Parties to provide and/or facilitate access to and transfer of technologies that are relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant damage to the environment. Each Contracting Party is to take legislative, administrative or policy measures with the aim that Contracting Parties, in particular those that are developing countries, which provide genetic resources are provided access to and transfer of technology which makes use of those resources.

68. Article 19 of the Convention requires Contracting Parties to establish measures to provide for the effective participation in biotechnological research activities of Parties, especially developing countries, which provide genetic resources for such research. Contracting Parties are also to take practicable measures to promote and advance priority access by such Parties, on a fair and equitable basis, to the results and benefits arising from biotechnologies based upon the genetic resources provided.

69. Designing an indicator for implementation of these commitments is a complex and challenging task. Sifting through national export statistics (both for goods and services) in order to identify the transfer of pertinent technology would be tedious work requiring large input in terms of time and manpower. Such an endeavour may also encounter conceptual problems in light of varying goods and services classifications on which national export statistics are based; moreover, these export classifications may often not be disaggregated enough to enable the identification of technologies for conservation and sustainable use. In this connection, it is also noteworthy that technologies for conservation and sustainable use include multiple-use technologies, whose beneficial effects on biodiversity will crucially depend on the specific recipient. This feature will also make the simple use of national export statistics very difficult. Finally, with regard to technologies that make use of genetic resources, which are often privately owned, trade secret provisions may impede getting comprehensive information on such private sector technology transfer.

70. In light of these considerations, the development of two possible indicators could be envisaged.

(a) One option that could be taken into consideration, especially with regard to technologies for conservation and sustainable use, is to expand the Development Co-operation Directorate of the

Organisation for Economic Co-operation and Development (OECD DAC) biodiversity marker 54/ with a view to identify national ODA programmes with a large technology component. The indicator could consist of the aggregate value of the technology transferred. As this marker only covers bilateral ODA, it could be supplemented with information from relevant multilateral funding institution such as GEF. It is, however, uncertain whether pertinent information at such disaggregated level will be available at these multilateral institutions. Furthermore, it was recently decided by the DAC Working Party on Statistics to incorporate the Rio markers in regular CRS reporting for a trial period of three years, with the understanding that coverage and quality of the data received will be reviewed in 2007. Hence, for procedural reasons, the amendment of the biodiversity marker as suggested here might only be feasible after the extended trial period and the review to be undertaken in 2007.

(b) Option (a) would not include the transfer of technologies carried out by the private sector, which is of particular relevance for technology that makes use of genetic resources. A possible option in this regard would be to use national information on access and benefit-sharing arrangements that are implemented by relevant actors that utilize genetic resources. An indicator could be built by aggregating the value of technology transferred pursuant to those benefit-sharing arrangements that include provisions on the transfer of pertinent technologies. While this indicator would not include all transferred technologies that make use of genetic resources, it would cover those technologies that are transferred pursuant to a benefit-sharing arrangement, which may be deemed to be of particular relevance in light of Articles 19/1 and 19/2 of the Convention on Biological Diversity.

54/ *See* UNEP/CBD/AHTEG-2010-Ind/1/2 and UNEP/CBD/AHTEG-2010-Ind/1/INF/8.

*Annex*

**PROVISIONAL INDICATORS FOR ASSESSING PROGRESS TOWARDS THE 2010 BIODIVERSITY TARGET**

| A: Focal area | B: Indicator for immediate testing | C: Possible indicators for development by SBSTTA or Working Groups |
|---|---|---|
| Status and trends of the components of biological diversity | Trends in extent of selected biomes, ecosystems and habitats | |
| | Trends in abundance and distribution of selected species | |
| | | Change in status of threatened species (Red List indicator under development) |
| | | Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance |
| | Coverage of protected areas | |
| Sustainable use | | Area of forest, agricultural and aquaculture ecosystems under sustainable management |
| | | Proportion of products derived from sustainable sources |
| Threats to biodiversity | Nitrogen deposition | |
| | | Numbers and cost of alien invasions |
| Ecosystem integrity and ecosystem goods and services | Marine trophic index | Application to freshwater and possibly other ecosystems |
| | | Connectivity/fragmentation of ecosystems |
| | | Incidence of human-induced ecosystem failure |
| | | Health and well-being of people living in biodiversity-based-resource dependent communities |
| | Water quality in aquatic ecosystems | |
| | | Biodiversity used in food and medicine |
| Status of traditional knowledge, innovations and Practices | Status and trends of linguistic diversity and numbers of speakers of indigenous languages | Further indicators to be identified by WG-8j |
| Status of access and benefit-sharing | | Indicator to be identified by WG-ABS |
| Status of resource transfers | Official development assistance provided in support of the Convention (OECD-DAC-Statistics Committee) | |
| | | Indicator for technology transfer |

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