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**RECOMMENDATIONS FOR A CORE SET OF INDICATORS OF
BIOLOGICAL DIVERSITY**

Note by the Executive Secretary

1. BACKGROUND

1. At its second meeting, the SBSTTA recognized the vital importance of monitoring and assessment of biological diversity, particularly with regard to Article 7 of the Convention, and further recognized that the primary responsibility for undertaking monitoring and assessment of biological diversity lies with individual Parties.

2. The SBSTTA advocated a two-track approach to assessment and indicator development. In the short term, actual assessment should be carried out of sectors and components of biological diversity which were already reasonably well-known and understood. Use should, in particular, be made of indicators known to be operational. Longer-term programmes involving research and capacity-building should be developed in areas needing advances in knowledge.

3. The SBSTTA recommended that the Executive Secretary be requested by the Conference of the Parties to produce, in consultation with a liaison or expert group, recommendations for a preliminary core set of indicators of biological diversity, particularly those related to threats.

4. This advice by the SBSTTA, contained in its recommendation II/1, was endorsed by the Conference of the Parties in decision III/10.

5. The Executive Secretary participated in the sixth Global Biodiversity Forum : 'Dialogue on Biodiversity Indicators and Implementation Targets', held at UN Headquarters on 3-4 April 1997. Through informal consultations the nucleus of a liaison group on indicators was constituted. It was agreed that the group would assist the Executive Secretary with the preparation of the pre-session documents needed for the consideration by the third meeting of the SBSTTA of the implementation of Article 7. The documents in question are the present document and those supporting consideration of items 7.1 and 7.2 of the provisional agenda (documents UNEP/CBD/SBSTTA/3/7 and 8).

6. The liaison group subsequently held a working meeting in Wageningen, The Netherlands from 30 May to 2 June 1997, at the invitation of the Government of the Netherlands. The meeting considered in detail the preparation of the present document. A full background document on a core set of indicators of biological diversity was drafted. This document was subsequently edited by members of the liaison group and will be available for information to the third meeting of the SBSTTA as document UNEP/CBD/SBSTTA/3/Inf.13. The present document represents a synthesis of the full background document. The report of the meeting of the liaison group is contained in document UNEP/CBD/SBSTTA/3/Inf.11.

7. The report of the sixth Global Biodiversity Forum *Exploring Biodiversity Indicators and Targets under the CBD* will also be available for information to the third meeting of the SBSTTA as document UNEP/CBD/SBSTTA/3/Inf.14.

2. INTRODUCTION

2.1 The need for a core set of indicators

8. The Convention requires development of indicators to monitor the status and trends of biological diversity and, in turn, the implementation of the Convention. More specifically, the COP has requested that a *core set of indicators* be developed and used, through a two-track approach, for national reporting and in the thematic areas important to the Convention. This Note represents a synthesis of the conclusions of the meeting of the liaison group. The meeting considered recommendations for developing a globally applicable core set of quantitative indicators which allow the aggregation of local and national information into a global database, thus providing information to help Parties make key policy and management decisions relating to the conservation and sustainable use of biodiversity.

9. Biodiversity indicators are information tools, summarising data on complex environmental issues to indicate the overall status and trends of biodiversity. They can be used to assess national performance and to signal key issues to be addressed through policy interventions and other actions. Effective biodiversity management systems need three basic elements:

- ! Verifiable targets;
- ! Up-to-date information about status of, and projections for, biodiversity;
- ! A plan for taking corrective measures.

10. Indicators thus link the fields of policy-making and science: policy makers set the targets and measures while scientists determine relevant variables of biodiversity, monitor current state, determine baselines and develop models to make projections of future biodiversity status. Once chosen, indicators give direction to the monitoring and research programmes. Therefore, the choice of the core set of indicators requires co-operation between policy makers and scientists. The indicators have to measure a range of different elements, summarised in the table below:

Indicator types	Status and trends (State)	Processes of threat (Pressure)	Effectiveness of measures (Response)
Objectives of CBD			
Conservation of biological diversity			
Sustainable use of its components			
Fair and equitable sharing of benefits			

	First track		Second track
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2.2 Biodiversity indicators: definitions, assessment methods and organisation

11. Indicators are quantitative measures against which aspects of policy performance can be measured. The use of reference points, such as targets or benchmarks, distinguishes indicators from statistics, and allows assessment of the significance of the statistic.

12. Successful indicators quantify and simplify information so that its significance is apparent, and are both user-driven and policy relevant. They should be scientifically credible, responsive to changes in time and/or space, and be easily understood by the target audience. Presentation is an important aspect of communication: depending on the type of information to be conveyed, indicators can be represented as numbers within a text or table, as graphics, and as maps.

13. Key terms associated with biodiversity indicators are summarised in the following box.

Key terms associated with biodiversity indicators
<p>Reference points: give a means of measuring progress and identifying policy needs. They include:</p> <ul style="list-style-type: none"> • <i>baselines</i>: to measure change from a certain date or state • <i>thresholds</i>: to serve as "early warning systems" of problems • <i>targets</i>: to reflect tangible performance objectives <p>Assessment: analysis of the gap between the current state and a reference state.</p> <p>Pressure-state-response assessment framework: <i>pressures</i> are the socio-economic factors or driving forces which affect biological diversity; <i>state</i> is the state of biological diversity; and <i>responses</i> are the measures which are taken in order to change the current or projected state.</p>

2.3 Hierarchies for organising indicators and a proposed assessment framework

14. There are many ways of organising indicators. In this Note the objectives and articles of the Convention of Biological Diversity have been used as the guiding principle.

15. Setting the baseline for measurement has important practical and political implications. Four relevant options can be postulated for the core set:

- ! at the time of the Convention's entry into force;
- ! before any human interference;
- ! before major interference by industrial society;
- ! as an agreed set of characteristics representing a similar cultural landscape with high biodiversity.

16. Measurement in relation to the date of entry into force of the Convention has obvious attractions. However, it is hard to assess whether changes are positive or negative without an optimal baseline for comparison, and using a 1993 baseline could be seen as a bias towards those developing countries which have already lost much of their biodiversity. Using the state before human appearance is more appropriate, but causes practical problems since there is no unambiguous baseline in history and ecosystems are also transitory in nature. A *postulated baseline set in pre-industrial times* is therefore suggested as the best, albeit imperfect, option available.

17. A particular problem relates to the distinction between intensively managed areas and self-regenerating, extensively managed areas. Comparing farmland with the original ecosystem it replaced is of little value, since it will simply show that most of the original biodiversity has disappeared, although the land may have important cultural and even biological values of its own. Therefore it is suggested that in agricultural areas the usual pre-industrial baseline is interpreted as a *pre-industrial agricultural baseline* rather than being compared to the original vegetation.

18. It should be noted that the postulated baseline for self-regenerating or man-made areas is not necessarily the desired state. In practice, governments have to balance biodiversity requirements against other needs and choose their objectives for biological diversity somewhere along the axis between zero (ecosystem completely deteriorated) and the baseline.

3. TOWARDS A CORE SET OF INDICATORS

19. In this section, four sets of indicators will be elaborated: *state*, *pressure*, *use* and *response*. The proposed indicators are divided in 1st track and 2nd track indicators, giving an estimation of whether they could be applied in the short term or in the middle-to-long term.

3.1 State indicators

20. Three main categories of universal state indicator are proposed and outlined in the table below:

- ! Ecosystem quantity,
- ! Ecosystem quality and
- ! The relative number of threatened and extinct species.

Element	First track indicator	Second track indicator
Ecosystem quantity	Self-regenerating and man-made area as percentage of total area	Self-regenerating area per habitat type ¹ as percentage of 1993 and of postulated pre-industrial baseline
		Remaining self-regenerating area by size class category
Ecosystem quality (i) species abundance relative to postulated baseline	Distribution or abundance of a few selected species as percentage of postulated baseline per country	Extended list of selected species which provide a more detailed and representative picture of the change in biodiversity per country
	Number of indigenous species of one or more selected groups as % of postulated baseline per country	
Ecosystem quality (ii) Ecosystem structure	Ecosystem structure variables are promising because they can offer a lot information over large areas with relatively little effort. Several options are available for both 1st and 2nd track ²	
Threatened or extinct species and habitat types	Number of threatened and extinct species as % of particular considered group per country ³	As 1st track, but extended data

21. To facilitate communication and to assure that natural capital can be incorporated into national accounts, each Party could develop a ***national index of natural capital (NCI)***. The index would use a single figure to express an aggregation of multiple state indicators, expressed as a percentage. NCI would be the product of quantity and quality of ecosystems

3.2 Pressure indicators

22. Pressure indicators show which anthropogenic factors are having the most profound impact on current and future biodiversity. Five types of pressure indicators are suggested and outlined in the following table:

- ! Habitat loss
- ! Overharvesting

1 Proposed habitat types include marine and coastal regions, temperate mixed and broadleaved forests, tropical wet forests, tropical dry forests, temperate needle leaf and broadleaved forests, freshwaters, tundra, desert and semi-desert, grassland and agricultural land

2 For example, the ratio between dead and living wood; % area intact understorey; % areas sustainable managed forest; % of major habitat qualifying as wilderness; % area of vital reefs, mangrove and/or sea grass coverage in marine ecosystems; etc. Each region can choose its own, appropriate core set of quality variables, which can gradually be improved over time.

3 The IUCN Red List of Threatened Species provides useful definitions of specific categories of threat. It also provides an important set of data concerning species falling under these categories.

- ! Species introductions
- ! Pollution
- ! Potential climate change

Element	First track indicators	Second track indicators
Habitat loss	Annual conversion of self-generating area by habitat type as % of remaining area	A range of region-specific variables and decision rules
	Annual land use change from self-regenerating area into agriculture, permanent pasture and built-up land	
	Share of riversheds dammed or channelized as % of the whole river	
	Percent of coastal zone with a population density exceeding 100 inhabitants/km ²	
	Percent of coastal zone within 30 km of a town or city > 100.000 inhabitants	
Harvest	Total amount harvested per unit effort	Total amount harvested relative to estimate of sustainable offtake levels
		Average size per unit of offtake of a given species relative to a baseline
		Amount of agricultural area lost in 10 yrs due to erosion as % of agricultural area brought into agriculture in this period
Species introductions	Total number of non-indigenous species as a % of a particular group per country	Relative abundance/biomass of non-indigenous species as a % of a particular group
Pollution		Average exceedence of soil water and air standards (<u>critical loads</u>) of particular pollutants.
Climate change	Change in mean temp. per 50x50km gridcell averaged per country over 20-years	Change in max and min temp and precipitation per 50x50km gridcell over 20 years

3.3 Use indicators

23. These indicators gauge the usefulness of biodiversity to human populations and assess the sustainability of use. Arguably much of the utility value of biodiversity will be country-specific. However core indicators might track those elements of biodiversity that - because they are traded on international

markets or provide transboundary life-support services - are of regional or global importance. Two categories of use core indicators are proposed and outlined in the table below:

- ! Those useful for measuring ecosystem goods
- ! Those useful for measuring ecosystem services.

Element	First track indicator	Second track indicator
Ecosystem goods	Total amount harvested per species and grand total over time.	Percent of wild species with known or potential medicinal uses
Ecosystem services	Total and per km ² carbon stored within forests per country referenced to baseline	Percent of transboundary watershed area assessed as "low risk of erosion"
		People's perception of biodiversity compared with other political issues

3.4 Response/capacity indicators

24. This indicator measures capacity to implement the Convention and assesses future requirements. Examination of the first set of national reports, which will focus on measures taken for the implementation of Article 6 of the Convention, will indicate response indicators employed by Parties in the preparation of these reports and suggest areas where capacity-building is required. In accordance with decision III/9 of the COP, these reports should be submitted no later than 1 January 1998.

25. Work on benchmarks and indicators is currently being undertaken by the Interim Secretariat of the Convention to Combat Desertification, *inter alia* through a consultative process including experts from Governments, international organizations and the scientific community. A preliminary set of response indicators identified under this process (contained in document A/AC.241/Inf.4 of 22 November 1996) includes:

- functional national coordination unit;
- effective participation of actors involved in defining national priorities;
- effective support from international partners;
- adequate diagnosis.

26. Following the sixth Global Biodiversity Forum referred to above, a report entitled *Strengthening the First Set of National Reports under the Convention on Biological Diversity: a discussion paper on indicators, targets and other types of information that could be included in the first national reports by CBD Parties* is under preparation. It is anticipated that this report will be finalized before the meeting of the SBSSTA and that it will be available for information as document UNEP/CBD/SBSTTA/3/Inf.15.

27. The Secretariat is preparing further guidelines for the preparation of national reports under the Convention. It is anticipated that a preliminary draft of this document will also be available for information at the meeting, as document UNEP/CBD/SBSTTA/3/Inf.16.

28. The Secretariat, in collaboration with the secretariats of the CITES, CMS, Ramsar and World Heritage Conventions and UNEP, has commissioned a feasibility study for a harmonised information management infrastructure for biodiversity-related treaties. This study is conceived as an essential prerequisite for country-focused capacity-building and development of harmonized reporting and information management activities. It is expected that the study will be completed in six months and that a workshop to discuss the conclusions of the study and identify means of implementation will be held at the Eighth Meeting on Coordination of Secretariats of Environmental Conventions to be held in January 1998.

29. Setting generally applicable capacity targets and indicators is difficult, as capacity requirements are highly specific and dependent on the nature of the problem being addressed (see Appendix 4 *Biodiversity Capacity Indicators and Targets* to document UNEP/CBD/SBSTTA/3/Inf.13).

4. IMPLEMENTING A CORE SET OF INDICATORS

30. The SBSTTA advocated, and the COP endorsed, a two-track approach to assessment and indicator development. Paragraphs 20 to 22 of Recommendation II/1 identify high priority and other important tasks. The Executive Secretary will continue to develop the work identified in Recommendation II/1 and decision III/10. The liaison group mechanism has proved to be appropriate and collaboration has been initiated with relevant processes and institutions with a view to sharing expertise, avoiding duplication and harmonizing activities and guidance. It is expected that the programme specialist with the responsibility for the coordination of work on identification, monitoring and assessment will have been recruited by the end of 1997.

31. A preliminary outline for the development of these activities under a two-track approach, as recommended by the liaison group, is given below.

32. The SBSTTA may wish to recommend to the COP that it request the Executive Secretary to continue with these activities with a view to reporting back to the COP at its fifth meeting.

Activity	Details	Ways and means	Time scale
<i>First track</i>			
Roster of experts	Establish a roster based upon submissions of names by countries and relevant organizations	Secretariat	Immediately
Contributions	Contact relevant institutions and processes to seek information and expertise, and to explore collaboration	Secretariat	Immediately
Further development of core set of indicators	Incorporate recommendations from SBSTTA3 and other reports	Liaison group, incorporating further expertise	Further meeting in 1997 if funds available
Support from financial mechanism	Liaison with GEF Secretariat on methodologies and priorities for supporting national development of indicators	Secretariat	Ongoing
Development of indicators in thematic areas	Agreed core sets of indicators for coastal and marine, agro-biodiversity, forest and freshwater systems	Liaison group	For SBSSTA4
Capacity assessment	Questionnaire distributed to countries following agreement on core set of indicators and analysis of first national reports	Developed by Secretariat with assistance of liaison group	Questionnaire ready by COP4
Training	Development of methodology sheets, guidelines and public information.	Liaison group	Guidelines by SBSTTA4
Training	Development of training systems for harmonisation of methods by national data analysts.	Liaison group	After COP4
Agreed core set of indicators	Recommendations made available to Parties for inclusion in the second national report.	Secretariat	As soon as available, and one year prior to deadline for report
<i>Global Biodiversity Outlook</i>	Data from initial core indicators for inclusion in GBO-2	Secretariat	Publication likely by COP5
<i>Second track</i>			
Research and development	Develop research proposal		Submission to agencies by mid-1999
Pilot programme	Set up pilot programmes to develop and test the secondary indicators		Completed by May 1999
Second set of indicators	Further development of core indicators		Available for preparation of third national reports