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IDENTIFICATION, MONITORING AND ASSESSMENTS OF COMPONENTS OF BIOLOGICAL DIVERSITY AND PROCESSES WHICH HAVE ADVERSE IMPACTS

1. INTRODUCTION

1. Article 25, paragraph 2, calls upon the SBSTTA to provide scientific and technical assessments of the status of biological diversity, and to prepare scientific and technical assessments of the effects of types of measures taken in accordance with the provisions of the Convention.

2. At its first meeting, the SBSTTA proposed a medium-term programme of work in recommendation I/2. Item 1.1.2 of this proposed medium-term programme of work was:

> "Alternative ways and means in which the Conference of the Parties could start the process of identification, monitoring and assessment of components of biological diversity, as well as processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity in accordance with Article 7".

3. Decision II/1 of the COP took note of the proposed medium-term programme of work and requested the SBSTTA, in considering its programme of work for 1996, to ensure that the programme was based on the priorities set for the programme of work by the COP for 1996 and 1997. The second meeting of the COP generally recognised the importance of identifying, monitoring and assessing not only the components of biological diversity but also of the processes and categories of activities that have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity. The COP specifically included in its own medium-term programme of work an item on the "identification, monitoring and assessment" of biological diversity, which the COP may

consider at its third meeting. One of the issues that it may consider under this heading is "Options for implementing Article 7 of the Convention" (item 8.1 see UNEP/CBD/SBSTTA/2/3/Inf.10).

4. The relevance and importance to the Convention of the identification, monitoring and assessment of the components of biological diversity, as well as processes and categories of activities that have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, are considered in more detail in documents UNEP/CBD/SBSTTA/2/2 and UNEP/CBD/SBSTTA/2/4. As explained in document UNEP/CBD/SBSTTA/2/2, the issues raised by items 3.1, 3.2, 3.3 and 3.4 of the provisional agenda of this meeting of the SBSTTA are so interrelated that the Secretariat advises that this Note be considered in conjunction with the notes prepared by th Secretariat to support the consideration by the SBSTTA of the other items.

5. This Note follows on from discussions at the first meeting of SBSTTA on "Alternative ways and means in which the Conference of the Parties could start the process of considering the components of biological diversity particularly those under threat and the identification of action which could b taken under the Convention", which was supported by document UNEP/CBD/SBSTTA/1/4. This document elaborated on categories of information to be considered and described systems for identifying components of biological diversity under threat at the ecosystem, species and genetic levels. A further note by the Secretariat for the same meeting (UNEP/CBD/SBSTT A/1/6) elaborated on scientific and technical information to be included in national reports. The present Note attempts to take discussion in these documents further by outlining possible strategic approaches to th assessments of biological diversity and the threats to it to be undertaken by the COP.

6. As noted in document UNEP/CBD/SBSTTA/2/2, with a limited knowledge and understanding of biological diversity and with limited resources, it is clearly not possible to identify, monitor and assess the whol of biological diversity. It is of paramount importance, therefore, that identification, monitoring and assessment be carried out in as efficient and as strategic or action -oriented a manner as possible.

7. To be strategic, it is vital that priorities for identification, monitoring and assessment be set. Such priorities should consider the importance of the particular components of biological diversity and the processes and activities affecting them, but may also need to take into account the possibilities or otherwise of implementing actions based on the knowledge gleaned. In the context of the Convention, Article 7 provides the framework within which these priorities are to be identified. Article 7 provides the that Parties "shall, as far as possible and as appropriate, in particular for the purposes of Articles 8 to 10:

> (a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I;
>
> (b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to thos requiring urgent conservation measures and those which offer the greatest potential for sustainable use;
>
> (c) Identify processes and categories of activities which have or are likely to hav significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques; and
>
> (d) Maintain and organise, by any mechanism, data derived from identification and monitoring activities pursuant to subparagraphs (a), (b) and (c) above".

8. Article 7 of the Convention calls on the Parties to identify, monitor and assess the components of biological diversity as well as the processes and categories of activities that have or are likely to have significant adverse impact on the conservation and sustainable use of the biological diversity. Clearly, it is neither realistic, nor necessarily desirable, for any Party to report on all components of its biological diversity. This is implicitly acknowledged in that Annex I gives indicative guidelines for th components of biological diversity that should be considered, as follows:

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

9. These indicative guidelines, however, do not provide much by way of guidance in that they us terms that do not have well-accepted meanings or that are open to extremely broad interpretation. They thus do not necessarily help the Parties in developing their own priorities in a manner that also supports the aims of the Convention.

10. There appears, therefore, to be a need for more specific guidance to enable the Parties to develop their priorities for identification, monitoring and assessment. Although the responsibility for the setting of such priorities rests, of co urse, with the individual Parties themselves, certain principles and practices have very widespread applicability and are therefore likely to be of wide relevance to th COP.

11. An important and immediate way in which the Conference of the Parties could start the process of identifying, monitoring and assessing the of components of biological diversity in accordance with Article 7 is to consider developing the guidance provided by Article 7 so that it might further assist th Parties in developing their o n priorities. This Note explores how the SBSTTA might contribute to this development by considering some of the scientific and technical aspects of developing Annex I.

12. Neither Article 7, Annex I, nor the Convention itself provide much by way of guidance as to how the COP might start the process of identifying activities that have or might have an adverse impact on biological diversity. While recognising that many such activities are dependent upon local conditions, it seems that the Parties would nonetheless benefit from some general guidance as to what types of activities are generally acknowledged as falling within the meaning of Article 7(c) so as to begin the process of identification, monitoring and assessment in a manner that allows them to better contribute to the aims of the Convention. In order to meet the aims of the Convention with limited resources, the Parties will again need to set priorities. For this reason, the Parties will need an understanding of the relative importance of the different activities that have or may have an advers impact on biological diversity. In this light, the present Note outlines some well-accepted processes and activities, and some of the issues involved in assessing and monitoring these processes, in order to assist the SBSTTA in considering what type of recommendation might be appropriate to the COP, so that the COP might be able to start the process of identification, monitoring and assessment within th framework of the Convention.

2. IDENTIFYING THE COMPONENTS OF BIOLOGICAL DIVERSITY

Interpretation of Annex I

13. Annex I provides some guidance in deciding which aspects of biological diversity should b considered important, but still sets out an extremely wide range of components to be considered. Moreover, several of the terms used in the Annex do not have settled meanings. The SBSTTA may wish to provide some further interpretation of Annex I. Individual Parties are likely to need to determine their own priorities, both sectorial (which aspects of biological diversity to concentrate on) and geographic (which parts of the country are of highest priority), for assessing biological diversity within the general framework provided by Article 7 and Annex I. The SBSTTA may wish to provid some guidelines to the COP on setting these priorities.

Ecosystems or habitats containing high diversity

14. High diversity in this context presumably principally means high species diversity. For most terrestrial ecosystems, such areas can be identified, at least at a coarse scale, using existing knowledg of patterns of diversity (e.g., in general, warmer areas support more species than colder ones, wetter areas more than drier ones; less seasonal areas more than very seasonal ones; and areas with varied topography support more species than uniform ones) . A more detailed picture can emerge using th various inventory techniques discussed in the Note to the previous item of the provisional agenda (document UNEP/CBD/SBSTTTA/2/1), including surveys of indicator groups, although these should be interpreted with caution, as diversity in different taxa is not necessarily highly correlated at fin geographical scales. Identifying high-diversity areas does not necessarily require the identification of all component species. The SBSTTA may wish to provide the COP with an indicative overview of high - diversity ecosystems and habitats (e.g., lowland tropical moist forest, coral reefs, Mediterranean climate heathland). The SBSTTA may also wish to advise the COP on whether the term "high diversity" is to be interpreted globally, regionally or nationally. In global terms, some high latitude or very arid countries may have no high -diversity ecosystems. However, within each country some ecosystems will be much more diverse than others. The SBSTTA may also like to elaborate on definitions of high diversity other than that related to species diversity.

Ecosystems or habitats containing large numbers of endemic or threatened species

15. Identifying such areas requires rather more knowledge of the componen t species than the above. Identification of endemic species requires that the complete distribution of the species in question be known; the identification of threatened species requires that the status of that species has been assessed. The SBSTTA may wish to draw the attention of the COP to existing assessments of threatened and endemic species, which may assist the COP in identifying such areas. The term "larg numbers" is not defined within Annex I and is open to a range of interpretations, dependent in large measure on the group or groups of organisms being considered. Thus, BirdLife International has carried out a global analysis of Endemic Bird Areas (EBAs) in which an EBA was defined as an area with at least two restricted-range bird species present, while IUCN classified a Centre of Plant Diversity (CPD) as any area with at least 100 endemic plant species. The SBSTTA may wish to provide advice to the COP on realistic interpretations of the term "large numbers" in different contexts.

Ecosystems or habitats containing wilderness

16. The concept of wilderness is that of an extensive area where human impact is minimal or non-existent. The concept is problematic in that there are now probably no significant areas on Earth without human impact, at the very least from air- or water-borne pollutants and greenhouse gases. Th definition may therefore be modified to that of an extensive area without visible signs of human impact (roads, dwellings, agricultural land). Wilderness is often equated with naturalness, but again this may often not be the case. Many terrestrial areas that are now largely or entirely uninhabited may have been extensively modified by humankind in the past so that the existing landscape is at least to some extent anthropogenic. The SBSTTA may like to develop a more specific definition of wilderness that takes these factors into account. It may also like to consider whether it is relevant to regard deep-sea regions as wilderness in this context.

Ecosystems required by migratory species

17. The SBSTTA may wish to consider recommending the adoption of the definition of migratory species used by the Bonn Convention (the Convention on Migratory Species or CMS). It may also wish to draw the attention of the COP to the appendices to the CMS as the most suitable available starting-point for lists of migratory species. Most non-aquatic migratory species are birds, a large proportion of which use wetlands at one or more stages of their migratory cycle. A significant proportion of wetlands of international importance has been identified under the Ramsar Convention. The SBSTTA may wish to consider recommending that Ramsar sites be used as a basis for identifying ecosystems required by migratory species. This would be particularly pertinent in light of the existing Memoranda of Co - operation that exist between the Convention on Biological Diversity and both the CMS and Ramsar Conventions.

Ecosystems and habitats of social, economic, cultural or scientific importance

18. Ecosystems of economic importance may be defined as those that provide goods and services of economic value to humankind. These may be ecosystems of which components are directly exploited through fisheries or other forms of consumptive harvest, that is, which have direct use value, or they may provide services or indirect values (e.g., watershed protection, carbon sequestration). The former are generally easier to quantify and characterise than the latter. The SBSTTA may wish to consider identifying the former in some detail, concentrating in particular on ecosystems and habitats that are of importance for fisheries, timber, non-fisheries wild foods, and medicines. The SBSTTA may also wish to consider reviewing methodologies for the assessment of indirect values or ecosystem services. To date, there has been relatively little success in this field.

19. Many ecosystems and habitats of social and cultural importance are likely also to be of economic importance in the sense outlined above. Others, however, will not. Of particular note ar areas of religious or sacred significance (e.g., Kaya forests in East Africa, Tapu forests in Polynesia). Some of these are not only of great cultural importance, but they are often also important for th maintenance of threatened and endemic species. The SBSTTA might like to consider initiating a global review of these and assessing their current state of protection. Elsewhere, ecosystems and habitats may be of considerable recreational importance, which may also be considered a form of economic importance. These are often parks or other protected areas. Conflicts may arise in these cases betwee management priorities for recreation and those for the conservation and maintenance of biological

diversity. The SBSTTA might like to consider reviewing the existing literature on this, with a view to developing guidelines for the resolution of such conflicts. This might involve harnessing some of th value associated with recreational use for the purposes of maintaining biological diversity.

20. Many ecosystems and habitats of scientific importance will be also of importance under one or more of the other criteria discussed here. That is, they are likely to be unique, or representative, or hav important numbers of threatened or endemic species, or have high diversity. In addition, areas of ecosystem or habitat that have been the subject of long-term study are of great scientific value even if they do not necessarily meet the other criteria above. Such areas are capable of providing insights into ecosystem and habitat changes over time and are thus extremely important for monitoring and assessment. The SBSTTA might like to consider recommending the development of a register of such long-term study sites for the global monitoring of biological diversity. The SBSTTA will be mindful of initiatives in this regard currently being undertaken by, *inter alia* , the UNESCO Man and th Biosphere Programme and the Smithsonian Institution.

Ecosystems and habitats that are representative

21. The identification of representative ecosystems and habitats requires a standardised classification system. Problems with this are elaborated on in the Note to item 3.1 on the provisional agenda (document UNEP/CBD/SBSTTA/2/2). The SBSTTA may wish to offer advice on the choice of such a standardised system, and also on which components should be considered in determining whether a given ecosystem or habitat is indeed representative. The SBSTTA may also wish to draw th attention of the COP to existing regional or global reviews of ecosystems or habitats that have assessed whether representative samples of ecosystems are being protected, such as the IUCN Reviews of th Protected Areas Systems in Oceania, the Afrotropical and Indomalayan Realms.

Ecosystems and habitats that are unique

22. The identification of unique ecosystems or habitats requires careful considerations of scale. This is because the more detailed a classification system (i.e., the more fin -scaled), the more likely a given area of ecosystem or habitat is to be different from any other in its phy sical and biotic characteristics, and therefore to be classifiable as unique. The SBSTTA may wish to offer advice to th COP on a realistic scale on which to consider the uniqueness of habitats and ecosystems. It may also wish to consider whether a unique habitat or ecosystem may be best defined on the basis of having a significant number of endemic species, therefore qualifying for consideration under the first category of ecosystems and habitats above.

Ecosystems and habitats associated with key evolutio ary or other biological processes

23. The association with key evolutionary processes is a very problematic concept. Far too little is known about the mechanisms of long-term evolution to enable particular ecosystems and habitats to b singled out with confidence as being of importance. Any attempts to identify such areas will by their nature take the form of essentially untestable hypotheses. The SBSTTA may wish to review such hypotheses to determine whether the concept can be made operational. The SBSTT may wish to elaborate further on the concept of key biological processes other than evolutionary ones.

Species and communities that are threatened

24. The term "community" is undefined, but presumably means assemblages of species that commonly occur together. Methodologies for identifying threatened species have been reviewed at some length in UNEP/CBD/SBSTTA/1/4. The SBSTTA may wish to recommend to the COP that as much use as possible be made of existing global assessments of threatened species, in particu lar the IUCN Red List of Threatened Animals and the IUCN Red List of Threatened Plants, as the basis for identifying threatened species.

Wild relatives of domestic or cultivated species

25. These may be of importance as potential new domesticates, and also because they may have genes of value in improving already existing domesticates. It is important to consider how closely related a wild species or population must be in order to be considered important. The SBSTTA may wish to consider reviewing the concep t of primary, secondary and tertiary gene pools to determin whether this is the most appropriate framework for this. The primary gen -pool consists of wild populations of the domesticated species; the secondary gen -pool consists of wild species that may b easily hybridised with the domesticated species and are almost always in the same genus; the tertiary gene-pool consists of wild species generally in the same family, or section of the family, that may b hybridised with some difficulty. The SBSTTA may wish to decide whether to advise that only primary and secondary gene pools be considered in most cases, if this concept is adopted. The SBSTTA may also wish to consider the likely impact that new technologies for gene transfer will have on the whol concept of a gen -pool.

26. The SBSTTA may wish to recommend that the tables of wild relatives of domestic stock and wild relatives of domestic crops provided in th *Biodiversity Data Sourcebook* be used as a basis for identifying priority species and groups of species.

Species and communities that are of medicinal, agricultural or other economic value

27. This is presumably intended to mean all wild and domesticated species that have a direct economic value. This value may be obtained from consumptive or non-consumptive use. With regard to wild species, the most important aspects of consumptive use in economic terms are fisheries and th use of timber and other woody products from trees. However, a very wide range of other animal and plant species is also used, for a variety of purposes. The most important uses are food and medicine, but clothing, ornaments, pets, recreation, and a host of minor products such as dyes and wax may also be significant. The SBSTTA may wish to provide some guidance to the COP in the setting of priorities for identifying and monitoring economically important species. Such priorities should consider both th importance to humankind of the use, and the impact such use has on the target species and the habitats and ecosystems in which it oc curs. These two factors are not necessarily correlated. The SBSTTA may wish to consider how the assessment of species of economic importance undertaken under th Convention may best be co -ordinated with the activities of the FAO in reporting on fisheries and forestry.

Species and communities which are of social, scientific or cultural importance

28. Many species of social, scientific or cultural importance may also be expected to hav economic importance, and therefore to be included above. However, some m ay not. Determining th social or cultural importance of a species requires an understanding of prevailing cultural mores, which may change greatly from place to place, even in quite small geographical areas. Gaining such an understanding is usually a laborious, time-consuming process, and relies on the knowledge of indigenous peoples.

29. Species and communities of scientific importance may include those that show unique or unusual biological properties, those that have been or are in the process of being intensively studied, and those that occupy a unique or unusual systematic position (e.g., species with no known close living relatives, or species apparently intermediate between two higher taxa). The SBSTTA may wish to consider drawing up a set of criteria of scientific importance, with indicative species.

Species and communities that are of importance for research into the conservation and sustainable use of biological diversity, such as indicator species

30. In general, most species of importance for res earch into the conservation and sustainable use of biological diversity may be expected to be included in one or other of the categories above (notably threatened species and economically important species). Indicator species or communities, which ar essentially surrogates for wider measures of biological diversity, may be an exception to this. Although a wide range of species and higher taxa have been proposed as indicators, very few satisfactory indicator species have yet been identified, chiefly because each species responds to changes in its environment in a unique way. The SBSTTA may wish to review the theory of indicator species in mor detail before suggesting lists of indicator species. The SBSTTA will wish to be mindful of discussion on indicator species in UNEP/CBD/SBSTTA/2/4.

Described genomes and genes of social, scientific or economic importance

31. No persuasive paradigms have yet been established for interpreting or assessing the social, scientific or economic importance of genes or genomes. This is largely because of the importance of genes and is effectively only felt when they are phenotypically expressed in some way; attempts may b made to evaluate the latter (i.e., the phenotypic expression), but there is no clear way of relating this directly to the gene or genome itself. Problems of evaluating genes and genomes are addressed in mor detail in the Note to item 11 of the provisional agenda (document UNEP/CBD/SBSTTA/2/13).

3. IDENTIFYING, MONITORING AND ASSESSING PROCESSES AND CATEGORIES O ACTIVITIES THAT ARE OR ARE LIKELY TO HAVE SIGNIFICANT ADVERSE IMPACTS ON BIOLOGICAL DIVERSITY

32. We use the term "threats" as a shorthand for processes and categories of activities that are or are likely to have significant adverse impacts on biological diversity.

33. Biological diversity losses that are above the background rates are the result of a wide range of proximate causes. Identifying these causes is relatively straightforward and there is widespread agreement on the major categories, which include conversion of habitat, overexploitation, pollution and

the effects of introduced species. For a range of reasons, assessing the impacts of these different causes is, in contrast, very problematic in the great majority of cases. First, assessment requires monitoring through time of both the presumed stressor and the species or ecosystem that is being affected. Relatively little such monitoring has been carried out to date, particularly for time periods long enough to permit the detection of significant tr ends. Second, it is often very difficult to disentangle natural variations -- for example, in the population and distribution of species -- from those caused by human activities. Third, virtually all species and ecosystems are affected by a range of human influences that interact in complex and often ill-understood ways.

34. Constructing a taxonomy of threats is similarly problematic. This is because virtually all human activities impinge on biological diversity in one way or another, and also because on activity can have a wide range of different impacts. For example, the harvest of wild trees directly affects populations of the tree species concerned; it also structurally affects the habitat of other species that live in or on the trees; it may affect the water-retaining ability of the land in which the trees grow; it is also likely to have an impact on the local microclimate; and it will have a (slowly cumulative) effect on carbon sequestration with concomitant impacts on global climate. Impacts may be l ocally and immediately felt, may be long-term, or may be experienced far from their point of origin.

Factors affecting ecosystems

35. Assessing factors that adversely affect ecosystems is usually more problematic than assessing those that affect individual species. Currently much attention is focused on the concept of ecosystem "health" (resilience), which is defined as the system's ability to maintain its structure (organisation) and function (vigour) over time in the face of external stress. Negative fact ors are those that adversely affect health. Here, less importance is attached to the maintenance of individual elements of an ecosystem (species and populations) as long as health is not impaired.

36. It is generally admitted that, as is the case with human and societal health, goals and definitions with respect to ecosystem health will be determined socially as much as scientifically. Furthermore, many ecological processes operate over decades or longer, and therefore require long-term data series (i.e., on this time-scale) before it will be possible to begin to understand them. Even then, the analysis of data available will at best generate hypotheses (often several competing ones), which need to be tested, preferably by experimental manipulation, again over time periods of the same order as those of the processes being studied. However, activities affecting the environment and policy decisions controlling those activities have impacts over far shorter timescales.

Factors affecting species

37. Quite simply, any factor that causes a sustained and continuing decline in the population of a species is a threat to that species, as it will eventually lead to its extinction. These factors may operat by causing either increased mortality or decreased reproductive success. Factors are often categorised as either *direct* or *indirect*. The former affect the population of the species directly (e.g., overexploitation, predation by introduced species); the latter affect its habitat (e.g., deforestation, canalisation of rivers).

38. At present, the Convention provides little explicit guidance for identifying activities and processes that have or are believed to have an adverse effect on biological diversity. The SBSTTA may wish to consider whether the following is a useful framework for categorising these. It may wish to

consider proposing that such a framework, or a modified version of it, be adopted by the COP as an Annex to the Convention:

Proximate threats

39. The following factors may have a direct effect on biological diversity:

i) Overharvest or overkill of wild species;

ii) Introduced species as competitors, predators, carriers of disease, or habitat disruptors;

iii) Habitat destruction or deterioration through conversion, fragmentation, or changing habitat quality;

iv) Pollution by toxins (e.g., heavy metals), changing nutrient balances (e.g., eutrophication, acid rain), or physical contaminants (e.g., sedimentation and/or siltation); and

v) Climate change, either locally or globally.

Categories of activities leading to these threats

40. The following categories of human activity may lead to the proximate threats listed above:

i) Harvest of wild species for consumption

ii) Killing of wild species as pests or weeds

iii) Deliberate introduction of exotic species

iv) Accidental introduction of exotic species

v) Conversion of land to settled agricultur

vi) Shifting cultivation on too short a cycl

vii) Overstocking by domestic livestock

viii) Accidental or deliberate burning, or change in natural fire regime

ix) Mining/dr dging

x) Dam construction

xi) Canalisation

xii) Road construction

xiii) Urbanisation

xiv) Overuse for recreational reasons

xv) Drainage of wetlands

xvi) Burning of fossil fuels

xvii) Use of potentially polluting chemicals in agricultur

xviii) Use of potentially polluting chemicals in industrial processes

xix) Production of polluting chemicals as a by-product of industrial processes

xx) Production of human effluent and other domestic waste products

Ultimate causes of these threats

41. Within the context of human society, most of these threats can ultimately be attributed to five main factors:

i) land tenure;

ii) population change;

iii) cost-benefit imbalances;

iv) cultural factors; and

v) misdirected economic incentives.

Monitoring processes and categories of activities that may have an adverse effect on biological diversity

42. Monitoring the threats to biological diversity identified above is not a straightforward task, chiefly because many threats operate over a very wide area and because, as described abo ve, impacts may be experienced far distant from the source of the threat, as in the case of air - and water-borne pollutants. Three complementary approaches may be adopted to deal with this: extensive monitoring, usually using remote sensing or aerial photography; detailed sampling of particular sites; and the use of pressure indicators to predict areas or ecosystems that may be expected to be under adverse influence.

43. Remote sensing can be used to monitor extensive areas, but at present has limitations i n terms of the environmental parameters it can record. It is, for example, extremely useful for monitoring th clearance and fragmentation of forest cover, but is much less useful for monitoring changes in forest quality or in species composition within forests. Similarly, it may be able to give some indication of sediment loads in rivers, but cannot generally register soluble pollutants.

44. Sampling particular sites may give a much more accurate local picture, but extrapolation to a more general picture s often based on questionable assumptions. For example, the intensity of hunting and its effect on wildlife populations has been found to be highly variable over quite short distances among communities in the Amazon basin.

45. The use of pressure indicators -- for example, proximity to urban or industrial centres, or roads -- may allow broad indications of threat, but because of local variability, these require ground-truthing before they can be used with confidence.

46. The SBSTTA may wish to review thes methods of monitoring pressures and consequently to recommend ways in which their use can be integrated.

Assessing processes and categories of activities that may have an adverse effect on biological diversity

47. With some notable exceptions, such as intensive hunting pressure and the influence of a few introduced species on oceanic islands, our understanding of the impacts of the activities outlined abov on biological diversity is still limited. There is an urgent need to assemble those case studies that do exist on this and also to develop a programme of further study directly linking pressures to th

assessment of the state of biological diversity. The SBSTTA might like to review existing studies and outline some priorities for further study.

48. Of particular importance is the need to link the ultimate causes of threats to biological diversity, outlined above, far more closely to the proximate threats. One of the major aspects of this is an understanding of the socio-economic issues surrounding the us of biological diversity. The SBSTTA may wish to review existing methodologies for this.