UNEP

CBD

Convention on Biological Diversity

Distr.
GENERAL

UNEP/CBD/AHTEG/BD-CC-2/2/5
5 April 2009

ORIGINAL: ENGLISH

SECOND AD HOC TECHNICAL EXPERT GROUP ON
BIODIVERSITY AND CLIMATE CHANGE
First meeting
London, 17–21 November 2008

REPORT OF THE FIRST MEETING OF THE SECOND AD HOC TECHNICAL EXPERT GROUP ON BIODIVERSITY AND CLIMATE CHANGE

INTRODUCTION

1. The second Ad Hoc Technical Expert Group (AHTEG) on Biodiversity and Climate Change was convened in response to paragraph 12 (b) of decision IX/16 B of the Conference of the Parties to the Convention on Biological Diversity.

2. The purpose of this AHTEG is to provide biodiversity-relevant information to the United Nations Framework Convention on Climate Change through the provision of scientific and technical advice and assessment on the integration of the conservation and sustainable use of biodiversity into climate change mitigation and adaptation activities.

3. In order to facilitate the full and effective completion of the terms of reference as outlined in annex III to decision IX/16, the AHTEG will convene two meetings. The first meeting addressed two main issues: (i) identifying risks and vulnerabilities; and (ii) enhancing scientific and technical links between biodiversity and climate change mitigation. Accordingly, the first meeting was convened in order to address the following elements of the terms of reference:

(a) Identifying relevant tools, methodologies and best practice examples for assessing the impacts on and vulnerabilities of biodiversity as a result of climate change;

(b) Proposing ways and means to improve the integration of biodiversity considerations and traditional and local knowledge related to biodiversity within impact and vulnerability assessments with particular reference to communities and sectors vulnerable to climate change;

(c) Identifying opportunities to deliver multiple benefits for carbon sequestration, and biodiversity conservation and sustainable use in a range of ecosystems including peatlands, tundra and grasslands;

(d) Identifying opportunities for, and possible negative impacts on, biodiversity and its conservation and sustainable use, as well as livelihoods of indigenous and local communities, that may arise from reducing emissions from deforestation and forest degradation;

(e) Identifying options to ensure that possible actions for reducing emissions from deforestation and forest degradation do not run counter to the objectives of the Convention on Biological Diversity but rather support the conservation and sustainable use of biodiversity.

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4. Sources of information for this meeting include background documents prepared by the Secretariat of the Convention on Biological Diversity and the World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC). The Group also considered the findings of the previous AHTEG on biodiversity and climate change as contained in the CBD Technical Series Nos. 10 and 25. Finally, the Group considered views submitted by Parties on ways to integrate biodiversity considerations in climate-change-related activities as called for in the Secretariat notification of 21 August 2008 (ref No. SCBD/STTM/JW/ac/64561) and input from Parties, relevant organizations and individuals as submitted to the online dialogue on climate change and biodiversity convened by the Secretariat from 6 to 17 October 2008.

ITEM 1. OPENING OF THE MEETING

5. Ms. Jaime Webbe and Mr. Tim Christophersen of the Secretariat of the Convention on Biological Diversity presented a statement on behalf of the Executive Secretary, Dr. Ahmed Djoghlaf. Mr. Robert Watson, Chief Scientist of Defra welcomed participants, on behalf of the Governments who provided funding for the meeting including the United Kingdom of Great Britain and Northern Ireland, Belgium, Denmark and the Flemish Government.

ITEM 2. ORGANIZATIONAL MATTERS

2.1. Election of officers

6. After a self-introduction of participants, the Group elected Mr. Robert Watson and Mr. Guy Midgley as its Co-Chairs.

2.2. Adoption of the agenda

7. The provisional agenda for the meeting, prepared by the Executive Secretary (UNEP/CBD/AHTEG/BD-CC-2/1/1) was before the Group for consideration and adoption. In order to better define the agenda, participants were invited to consider what the main messages of the workshop report may be. A number of participants made interventions highlighting the need to produce a report that is tailored to the intended audience within the process of the United Nations Framework Convention on Climate Change (UNFCCC), bearing in mind terminology and the agenda items under discussion within the UNFCCC. In particular, participants emphasized the need to identify:

- The economic/human well-being implications of the impacts of climate change on biodiversity;
- The tools and methodologies that are available to assess impacts;
- The risks posed to biodiversity as a result of the projected impacts of climate change on extreme weather events;
- The full range of measures that are available for climate change mitigation and the role of biodiversity in sequestering carbon and protecting sinks within these measures;
- Specific geographic areas or mitigation activities in which there is a significant potential for carbon sequestration and the protection of sinks and for biodiversity conservation and sustainable use;
- Specific geographic areas or mitigation activities in which focusing on carbon sequestration has the potential to have significant negative impacts on biodiversity;
- The real costs and benefits of different mitigation measures; and
- The methodologies and definitions under discussion within the UNFCCC that may have an impact on whether activities have positive or negative impacts on biodiversity.

8. Based on the above, the Group decided to consider mitigation first and then impacts. The organization of work and the agenda were adjusted accordingly.

2.3 Organization of work

9. Under this item, the Group considered the proposed organization of work for the meeting as contained in annex II of the annotated agenda (UNEP/CBD/AHTEG/BD-CC-2/1/1/Add.1). The Group decided to change the organization of work in order to reflect working hours of 9 a.m. to 6 p.m. and to facilitate the consideration of mitigation first and impacts second. The group also agreed to create a number of break-out groups to assist with the drafting of the report to be presented to UNFCCC and to the second meeting of the AHTEG.

ITEM 3: BIODIVERSITY AND CLIMATE-CHANGE MITIGATION

10. The group began consideration of the agenda items on mitigation by brainstorming on the main issues concerning the links between biodiversity and climate change mitigation. In particular, participants identified a number of key messages including:

- The need to discuss both the general principles with regards to mitigation measures and the protection of sinks and the details of how such measures should/could be implemented in order to promote multiple benefits and guard against negative impacts on biodiversity;
- The need, when evaluating synergies between biodiversity and climate change mitigation, to consider the social/use dimensions – especially with regards to sustainable development;
- The recognition that not all mitigation activities are equal when considering biodiversity benefits;
- The need to have an accurate understanding of where and to what extent carbon is sequestered in ecosystems in order to evaluate the extent to which current measures effectively protect sinks;
- The reality that carbon stocks in biodiverse systems are generally more stable and have a lower risk than some non-diverse stocks, due to higher ecosystem resilience;
- The need to identify the relationship between biodiversity, ecosystem services and carbon sequestration.

11. Participants also identified a number of opportunities for win-win situations for climate change mitigation and biodiversity conservation and sustainable use including:

- Reducing emissions from deforestation and forest degradation;
- Reforestation;
- Afforestation (under certain circumstances);
- Forest conservation;
- Sustainable agriculture and agro-forestry (under certain circumstances); and
- Avoided ecosystem degradation and ecosystem restoration.

12. In order to identify relevant information within the background documents prepared for the AHTEG, Mr. Barney Dickson from UNEP-WCMC introduced a summary of available scientific information on the links between biodiversity and its conservation and sustainable use and climate-change mitigation (UNEP/CBD/AHTEG/BD-CC-2/1/5).

13. Ms. Jaime Webbe from the Secretariat introduced participants to the information in the background documents on ways and means to achieve multiple benefits for carbon sequestration and biodiversity conservation and sustainable use in a range of ecosystems (UNEP/CBD/AHTEG/BD-CC-2/1/6). Ms. Webbe highlighted opportunities in agricultural ecosystems (conservation agriculture and agro-forestry), forest ecosystems (sustainable forest management and

afforestation and reforestation), wetlands (sustainable land management and the restoration of degraded wetlands) and protected areas management (the expansion of the protected areas network and improved governance in protected areas).

14. In order to fully consider the above issues and agenda items, the AHTEG broke into two working groups to identify (i) opportunities to deliver multiple benefits for biodiversity and carbon sequestration in forest ecosystems including within REDD, chaired by Mr. Ian Noble of the World Bank, and (ii) opportunities to deliver multiple benefits for biodiversity and carbon sequestration in forest ecosystems and the potential impacts of non land based mitigation measures, chaired by Mr. Nick Davidson of the Ramsar Convention on Wetlands.

15. Working Group 1 started by identifying a number of key issues to be addressed, and subsequently worked on these issues in four parallel drafting groups:

(a) The rationale for the inclusion of biodiversity considerations in the climate debate;

(b) Possible contributions from the Convention on Biological Diversity constituency to the UNFCCC mitigation debate in the form of 'lessons learnt';

(c) Opportunities and challenges of REDD for Indigenous peoples; and

(d) Key methodological issues in the REDD debate and their possible impacts on biodiversity.

16. Working group 2 began by identifying common messages with regards to opportunities to deliver multiple benefits in non-forest ecosystems. The group particularly emphasized the need to maintain existing stocks of carbon in ecosystems while also identifying opportunities to enhance sequestration in a manner that is beneficial for biodiversity conservation and sustainable use. The group also identified the differences in opportunities for capturing multiple benefits in intensively managed ecosystems versus lightly managed ecosystems. In order to elaborate discussions further, working 2 group also broke into four parallel drafting groups:

(a) The implications of cross-cutting issues such as fire management and feedbacks on the achievement of multiple benefits for biodiversity and carbon sequestration;

(b) Opportunities for multiple benefits in intensively managed and lightly managed ecosystems;

(c) Tables on the carbon and biodiversity 'value' of different ecosystems and the potential impacts of various mitigation measures on biodiversity; and

(d) The impact of non-land based mitigation measures on biodiversity.

17. Following work in small drafting groups, the two working groups reported to plenary on the outline of their contribution to the workshop report and on progress in drafting the text for the report. Based on the reports it was decided that the working groups would continue their work in order to finish the rough draft of the report.

18. The working groups reconvened in plenary for a second time in order to present their draft text. In discussions on the text presented, participants emphasized the need to ensure that the final document is relevant for both the CBD community and the UNFCCC community. Participants also called for a statement on the state of affairs if we achieved zero emissions but didn't address tropical deforestation and forest degradation.

19. Participants further discussed the extent to which the draft document adequately addressed biodiversity content and agreed to examine how the two issues of climate change mitigation and biodiversity could be better integrated into the text of all sections of the draft document. The group also expressed the need to develop a table that identifies the unrealized potential of ecosystems with regards to climate change mitigation and to add a paragraph that soil carbon is one carbon pool that is connected to above ground pools and is formed as a result of biodiversity.

20. With regards to the work of both working groups, participants emphasized that the input to the UNFCCC should focus on anthropogenic climate change, although natural changes are important with regards to carbon accounting.

ITEM 4. IMPACTS OF CLIMATE CHANGE ON BIODIVERSITY

21. Ms. Jaime Webbe introduced participants to the information contained in the background documents on tools and methodologies for assessing the impacts on and vulnerabilities of biodiversity as a result of climate change (UNEP/CBD/AHTEG/BD-CC-2/1/4) including experimental studies, modelling and observations by indigenous and local communities. Ms. Webbe also reminded participants of the needs identified in CBD Technical Series No. 10 with regards to impact assessments.

22. Ms Webbe further presented an overview of views submitted by Parties on the integration of biodiversity into climate-change-related activities with respect to identifying risks and vulnerabilities (UNEP/CBD/AHTEG/BD-CC-2/1/2). Finally, Ms. Webbe presented relevant conclusions from the open-access online dialogue on biodiversity and climate change convened by the Secretariat from 6 to 17 October 2008, including the potential role of botanic gardens in impact assessments.

23. Ms. Hanna Hoffmann introduced participants to some of the decisions and documents relevant to discussions held under the UNFCCC process and informed the meeting on documents prepared for the forthcoming Poznan conference.

24. During discussions, participants identified a number of challenges that remain when considering assessments of the impacts of climate change on biodiversity including:

- There are many observations that are consistent at the species level with observations of climate change however, future predictions include varying degrees of uncertainty both with regards to climate change and with regards to the relationship of this change to natural ecosystems;
- There is a high degree of certainty in temperature-limited systems, however there is very little certainty for water-limited systems;
- There is also a good deal of information on the susceptibility of species to absolute temperature changes but relatively little information on the impacts of different rates of change;
- There has been little analysis of modelling methodologies, which has given rise to some concern over envelope modelling and uncertainty with regards to bio-regional models;
- There is a lack of information on the impacts of climate change on ecosystem services and local livelihoods;
- Climate change often acts in synergy with and exacerbates other drivers of biodiversity loss; there is therefore a need to develop models that can clarify the links between climate change and other human pressures;
- There is relatively little information on the impacts of climate change on genetic diversity, including genetic diversity among crops and livestock;
- Down-scaled models are often inconsistent or contradictory when compared to global models; and
- There is a need to consider indirect impacts such as feedbacks between changes caused by climate change and the impacts of these changes on local climatic conditions.

25. Based on the above challenges, participants identified a number of steps and recommendations including:

- Impact assessments should focus on what is known about ecosystem functions and their tolerances rather than focusing on uncertainty;

- Guidelines or standards should be developed for models predicting the impacts of climate change on biodiversity, and models should be linked to observations and experimental methodologies;
- A stronger link should be made between the climate change modelling community and the natural resource/natural systems modelling community;
- Climate change impacts on biodiversity should be linked to impacts on sustainable development;
- When presenting predictions on the impacts of climate change on biodiversity, a range of uncertainties and a range of models should be provided; and
- The AHTEG should consider the work of the Global Terrestrial Observation System (GTOS).

26. Mr. Barney Dickson (UNEP-WCMC) introduced a summary of available scientific information on the vulnerability of biodiversity to the impacts of climate change and mitigation and adaptation activities (UNEP/CBD/AHTEG/BD-CC-2/1/3).

27. Before breaking into a drafting group, participants discussed a number of additional key messages that also needed to be addressed with relation to impacts including: the importance of the natural adaptive capacity of biodiversity and the role that other pressures have on natural adaptation, the cost of the negative impacts of climate change on biodiversity, the importance of considering elements of sustainable development, the links between the impacts of climate change on extreme weather events and biodiversity, and the need to redefine certain concepts of conservation in light of the impacts of climate change (such as invasive alien species).

28. In the working group, participants identified three main questions:

(a) What do we know about the impacts of climate change on biodiversity that has not already been said;

(b) How reliable is our knowledge of the impacts of climate change on biodiversity (assessment of tools); and

(c) What guidance can be provided on the assessment of the impacts of climate change on biodiversity at the national and local level, and what additional tools are needed?

ITEM 5. PEER REVIEW OF THE REPORT

29. Under this item, participants considered the two draft reports developed by the working groups. Participants considered the headline messages only.

30. During the discussion of the document on the links between biodiversity and climate change mitigation presented by working group 1, participants placed emphasis on having a clear first message. Participants also suggested that the report should be shortened through the consolidation of repetitive paragraphs and the deletion of others. Finally some participants offered to adjust detailed text where there was concern regarding the robustness of the studies currently referenced.

31. Also during the discussion of the report presented by working group 1, the expert from Brazil disassociated himself from the section on biofuels for the reasons outlined in annex II to the report.

32. During the discussion on the document on the impacts of climate change on biodiversity and tools and methodologies for impact assessments presented by working group 2, participants reviewed the headline messages. Participants also discussed how the discussion of the impacts of climate change on biodiversity is linked to the discussions on mitigation.

33. Participants also discussed the executive summary for the document to be presented to the UNFCCC. Finally participants reviewed maps based on a presentation by Mr. Jeff Price of WWF US on overlays of areas of high biodiversity value with maps of carbon value.

ITEM 6. OTHER MATTERS

34. Under this item, participants raised two additional items (1) an action pledge under the Nairobi work programme on impacts adaptation and vulnerability to climate change and (2) follow up to the background documents prepared by UNEP/WCMC.

35. In particular the group agreed to issue an action pledge in response to paragraph 43 (d) of UNFCCC document FCCC/SBSTA/2008/9, which identifies the need to strengthen research on biophysical and physical climate systems to reduce scientific uncertainties associated with climate projections. In particular, under the lead of Mr. Jeff Price of WWF US, a number of members within the group will analyze existing tools to assess biophysical impacts and will develop guidelines to improve these assessments in so far as they relate to biodiversity.

36. Furthermore, the group thanked the World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC) for their work in preparing the summary of available scientific information on the vulnerability of biodiversity to the impacts of climate change and mitigation and adaptation activities (UNEP/CBD/AHTEG/BD-CC-2/1/3) and the summary of available scientific information on the links between biodiversity and its conservation and sustainable use and climate change mitigation (UNEP/CBD/AHTEG/BD-CC-2/1/5), and requested UNEP-WCMC to finalize these documents, in the light of the comments received from AHTEG members, by 14th February 2009.

ITEM 7. ADOPTION OF THE REPORT AND CLOSURE OF THE MEETING

37. The Group considered a draft procedural report from the first meeting of the AHTEG. The Group considered the report and approved it.

38. In the closing to the meeting the Co-Chairs informed participants of the next steps in the finalization of the report including the revision of the report for Poznan and the transmission of a longer report to the next meeting of the AHTEG.

39. It was decided that the longer document will undergo the peer-review along with the revised background documents produced by UNEP-WCMC from mid-February to mid-March.

40. The participants also suggested that a third AHTEG meeting be convened after the next AHTEG meeting on adaptation in order to peer review the final report.

41. Participants also requested a review of the dates for the second meeting since it currently overlaps with sessions of the UNFCCC.

42. The representative of the Bureau of the Conference of the Parties thanked participants for their efforts and reminded them of the importance of their work in providing scientific and technical advice to the UNFCCC process.

43. The meeting closed at 5:30 p.m. on Friday, 21 November 2008.

Annex I

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Annex II

EXPLANATION PROVIDED BY THE BRAZILIAN REPRESENTATIVE IN THE AHTEG FOR DISASSOCIATING HIMSELF FROM THE WHOLE PARAGRAPH ON BIOFUELS

There is a wide range of systems and conditions under which biofuels are produced, including different feedstocks used, varying production schemes and management practices, land ownership and land-use systems. A general reference to "some first generation biofuels" in the paragraph does not capture this important nuance. A specific kind of biofuel (e.g. ethanol or bio-diesel) can be produced using different feedstocks and in different ways, which have substantially different implications in terms of impacts in land-use change and greenhouse gas emissions mitigation. 1/

Regarding direct and indirect adverse consequences of biofuel production on biodiversity, the quantification of indirect land-use change effects from biofuel production will always be highly scientifically uncertain, not only due to lack of data (although it can be improved in time), but because it relies heavily on imponderable and often unrelated variables, such as land-use policies and regulation in different countries and the commodities markets behaviour. There are no scientific solid indicators that measure the indirect land-use change impacts associated to the production of biofuels in different countries.

Those who have a minimum understanding of ethanol production know that sugarcane is not well suited for rain forest climates. The recently issued "Human Development Report 2007/2008" by the United Nations Development Programme, which focuses on climate change, acknowledges that "(i)n Brazil, the sugar production that sustains the ethanol industry is concentrated in the southern State of São Paulo. (...) As a result, the development of biofuels has had a limited environmental impact, and has not contributed to rainforest destruction."2/ Moreover, a comprehensive UNCTAD report on biofuels states that "(s)everal countries in Africa, Asia and Latin America (…) have large areas potentially available for energy crop production without affecting forests and other sensitive ecosystems."3/ Sadly, defamatory campaigns against biofuels have the potential to hinder the liberalised market of biofuels and, consequently, prevent degraded areas in developing countries from being recovered in order to produce alternative fuels.

The sentence "advanced generation technologies will only have significant potential to reduce greenhouse gas emissions without adversely affecting biodiversity if feedstock production avoids, directly and indirectly, loss of natural ecosystems, or uses native grasses and trees on degraded lands" is prejudging the impacts of technologies that are not yet in place. Moreover, it is not taking into consideration the recognised positive impacts of croplands for biofuel production on degraded lands, even if not only native species are involved.

1/ For instance, IPCC WGIII Report (p. 344) recognizes that "(e)thanol from sugar cane, as produced in Brazil, provides significant reductions in GHG emissions compared to gasoline and diesel fuel on a 'well-to-wheels' basis. These large reductions result from the relatively energy efficient nature of sugar cane production, the use of bagasse (the cellulosic stalks and leaves) as process energy and the highly advanced state of Brazilian sugar farming and processing. Ongoing research over the years has improved crop yields, farming practices and process technologies. In some facilities the bagasse is being used to cogenerate electricity which is sold back to the electricity grid." While the same Report recognizes that "(i)n contrast, the GHG benefits of ethanol made from corn are minor (Ribeiro & Yones-Ibrahim, 2001). Lifecycle estimates range from a net loss to gains of about 30%, relative to gasoline made from conventional oil." Ibidem, p. 344.

2/ United Nations Development Programme - UNDP, "Human Development Report 2007/2008 - Fighting Climate Change: Human Solidarity in a Divided World", UNDP, New York, 2007, p. 143.

3/ UNCTAD, "The Emerging Biofuels Market: Regulatory, Trade and Development Implications", UNCTAD/DITC/TED/2006/4, United Nations, New York and Geneva, 2006, p. 29.

Regarding certifiable standards, although concerns regarding the sustainability of biofuel production are legitimate, applying labelling and certification to these non-conventional fuels is an extremely complex task, given that there is a wide choice of feedstock and different routes of production, which depends on the national circumstances of producer countries. Existing different methodologies of life cycle analysis, whose interpretation of results (assessment) is usually controversial, lead to the necessity to make judgments, which can be rather subjective. Transparency is certainly a concern in these procedures. Moreover, reliable methods for comparing the life cycle impacts of different products are questionable and, thus, comparability is rarely easy, given the different assumptions that are used in the analyses.

Annex III

DRAFT FINDINGS OF THE AD HOC TECHNICAL EXPERT GROUP ON BIODIVERSITY AND CLIMATE CHANGE

EXECUTIVE SUMMARY

A. Climate change and biodiversity interactions

- Maintaining natural ecosystems (including their genetic and species diversity) is essential to meet the ultimate objective of the UNFCCC because of their role in the global carbon cycle and because of the wide range of ecosystem services they provide that are essential for human well-being;
- Climate change is one of multiple interacting stresses on ecosystems, including habitat fragmentation through land-use change, over-exploitation, invasive alien species, and pollution;
- While ecosystems are generally more carbon dense and biologically more diverse in their natural state, the degradation of many ecosystems is significantly reducing their carbon storage and sequestration potential, leading to increases in emissions of greenhouse gases and loss of biodiversity at the genetic, species and landscape level;
    - Hypothetically, if all tropical forests were completely deforested over the next 100 years, it would add as much as 400GtC to the atmosphere and increase the atmospheric concentration of carbon dioxide by about 100ppm, contributing to an increase in global mean surface temperatures of about $0.6\ ^0$C;
    - Recent studies estimate that unmitigated climate change could lead to a thawing of Arctic permafrost releasing at least 100GtC into the atmosphere by 2100, thus amplifying global mean surface temperature changes.

B. Impacts of climate change on biodiversity

- Changes in the climate and in atmospheric carbon dioxide levels have already had observed impacts on natural ecosystems and species. Some species and ecosystems are demonstrating some capacity for natural adaptation, but others are already showing negative impacts under current levels of climate change, which is modest compared to most future projected changes;
- Climate change is projected to increase species extinction rates, with approximately 10 per cent of the species assessed so far at an increasingly high risk of extinction for every 1^0C rise in global mean surface temperature within the range of future scenarios typically modelled in impacts assessments (usually $<5^0$C global temperature rise);
- Projections of the future impacts of climate change on biodiversity have identified wetlands, mangroves, coral reefs, Arctic ecosystems and cloud forests as being particularly vulnerable. In the absence of strong mitigation action, there is the possibility that some cloud forests and coral reefs would cease to function in their current forms within a few decades.
- Further climate change will have predominantly adverse impacts on many ecosystems and their services essential for human well-being, including the potential sequestration and storage of carbon, with significant adverse economic consequences, including the loss of natural capital;
- Enhancing natural adaptation of biodiversity through conservation and management strategies to maintain and enhance biodiversity can reduce some of the negative impacts from climate change and contribute to climate change mitigation by preserving carbon sequestration and other key functions; however there are levels of climate change for which natural adaptation will become increasingly difficult.

C. Biodiversity and climate change mitigation through LULUCF activities including REDD

- Maintaining natural and restoring degraded ecosystems, and limiting human-induced climate change, result in multiple benefits for both the UNFCCC and CBD if mechanisms to do so are designed and managed appropriately, for example through protection of forest carbon stocks, or the avoided deforestation of intact natural forests and the use of mixed native forest species in reforestation activities;

- LULUCF activities, including reduced deforestation and degradation, that maintain, sequester and store carbon can, in concert with stringent reductions in fossil fuel emissions of greenhouse gases, play a necessary role in limiting increases in atmospheric greenhouse gas concentrations and human-induced climate change;
- Primary forests are generally more carbon dense, biologically diverse and resilient than other forest ecosystems, including modified natural forests and plantations, accordingly, in largely intact forest landscapes where there is currently little deforestation and degradation occurring, the conservation of existing forests, especially primary forests, is critical both for preventing future greenhouse emissions through loss of carbon stocks and continued sequestration, as well as for conserving biodiversity;
- In forest landscapes currently subject to clearing and degradation, mitigation and biodiversity conservation can be best achieved by reducing deforestation, and reducing forest degradation through the sustainable management of forests and through forest restoration;
- In natural forest landscapes that have already been largely cleared and degraded, mitigation and biodiversity conservation can be enhanced by growing new carbon stocks (through reforestation, forest restoration and improved forest management) which, through the use of mixed native species, can yield multiple benefits for biodiversity;
- Implementing REDD activities in identified areas of high carbon stocks and high biodiversity values can promote co-benefits for climate change mitigation and biodiversity conservation and complement the aims and objective of the UNFCCC and other international conventions, including the Convention on Biological Diversity;
- The specific design of potential REDD mechanisms (e.g., carbon accounting scheme, definition of reference scenarios, time frame, etc.) can have important impacts on biodiversity conservation;
    - Addressing forest degradation is important because degradation leads to loss of carbon and biodiversity, decreases forest resilience to fire and drought, and often leads to deforestation;
    - Both intra-national and inter-national displacement of emissions under REDD can have important consequences for both carbon and biodiversity, and therefore require consideration for achieving mutual benefits;
- While it is generally recognized that REDD holds potential benefits for forest-dwelling indigenous and local communities, a number of conditions would need to be met for these co-benefits to be achieved, e.g., indigenous peoples are unlikely to benefit from REDD where they do not own their lands; if there is no principle of free, prior and informed consent, and if their identities are not recognized or they have no space to participate in policy-making processes;
- The implementation of a range of appropriately designed land-management activities (e.g., conservation tillage and other means of sustainable cropland management, sustainable livestock management, agro-forestry systems, maintenance of natural water sources, and restoration of forests, peatlands and other wetlands) can result in the complementary objectives of the maintenance and potential increase of current carbon stocks and the conservation and sustainable use of biodiversity;
- Climate mitigation policies are needed to promote the conservation and enhanced sequestration of soil carbon, including in peatlands and wetlands, which is also beneficial for biodiversity;
- The potential to reduce emissions and increase the sequestration of carbon from LULUCF activities is dependent upon the price of carbon and is estimated to range from 1.3-4.2 $GtCO_2$-eq per year for forestry activities (REDD, sustainable forest management, restoration and reforestation), and 2.3-6.4 $GtCO_2$-eq per year for agricultural activities for a price of US$ 100/tCO_2-eq by 2030.

D. Biodiversity and climate change mitigation through renewable energy technologies and geo-engineering

- There is a range of renewable energy sources, including onshore and offshore wind, solar, tidal, wave, geothermal, biomass and hydropower and nuclear, which can displace fossil fuel energy, thus reducing greenhouse gas emissions, with a range of potential implications for biodiversity and ecosystem services;
- While bioenergy may contribute to energy security, rural development and avoiding climate change, there are concerns that, depending on the feedstock used and production schemes, many first

generation biofuels (i.e., use of food crops for liquid fuels) are accelerating deforestation with adverse effects on biodiversity, and if the full life cycle is taken into account, may not currently be reducing greenhouse gas emissions; 4/

- Large-scale hydropower, which has substantial unexploited potential in many developing countries, can mitigate greenhouse gas emissions by displacing fossil fuel production of energy, but can often have significant adverse biodiversity and social effects; and

Artificial fertilization of nutrient limited oceans has been promoted as a technique to increase the uptake of atmospheric carbon dioxide, but it is increasingly thought to be of limited potential and the biodiversity consequences have been little explored.

4/ The expert from Brazil disassociated himself from this statement.