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BIODIVERSITY AND CLIMATE CHANGE

I. INTRODUCTION

1. The Conference of the Parties at its tenth meeting adopted a comprehensive decision on biodiversity and climate change (decision X/33), proving guidance to Parties on assessing and reducing impacts of climate change on biodiversity, ecosystem based approaches to mitigation and adaption and reducing the impacts of climate change measures.

2. In that decision, the Conference of the Parties requested the Executive Secretary, in collaboration with relevant international organizations, to identify areas which, through conservation and restoration of carbon stocks and other ecosystem management measures, might have high potential for climate change mitigation and make this information widely available (decision X/33, para. 9(c)). It also requested the Executive Secretary to support, as appropriate, Parties and relevant organizations and processes to design and implement ecosystem-based approaches for mitigation and adaptation as they relate to biodiversity (decision X/33, para. 9(e)).

3. The Conference of the Parties at its twelfth meeting further requested the Executive Secretary to promote ecosystem-based approaches to climate change adaptation and disaster risk reduction (decision XII/20, para. 7 (a)), to compile experiences with ecosystem-based approaches to climate change adaptation and disaster risk reduction (decision XII/20, para. 7 (c)), and to develop, further to paragraph 8(u) of decision X/33, guidance on enhancing the positive and minimizing the negative impacts on biodiversity of climate-change adaptation activities (para.7(d)).

4. The present note responds to these requests as described in the following paragraphs. The Conference of the Parties also decided, in its multi-year programme of work up to 2020 (decision XII/31), to address at its thirteenth meeting, among other issues, the implications of the 2030 Agenda for Sustainable Development[1] and of other relevant international processes for the future work of the Convention. With regard to the present agenda item, other relevant international processes include the Sendai Framework for Disaster Risk Reduction, and the Paris Agreement on Climate Change. Thus, these processes are briefly considered (in section II below), and the aforementioned requests are examined in this context.

5. The Secretariat commissioned the United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC) to prepare a technical study to review and summarize current knowledge on the potential contribution of a wide range of ecosystems, other than forests, to climate change mitigation. Both the United Nations Framework Convention on Climate Change

* UNEP/CBD/SBSTTA/20/1/Rev.1.

[1] General Assembly resolution 70/1, annex.

(UNFCCC) and the Convention on Biological Diversity have provided substantial guidance involving the conservation, sustainable use and restoration of forests, and actions related to these are already a part of many countries' strategies to address climate change. Therefore, the study focuses on a number of other ecosystem types, beyond forests, with a high potential to contribute to climate change mitigation and adaptation. The purpose of the study is to provide biodiversity managers with a reference document on the additional benefits of managing these ecosystems for carbon sequestration and storage. The study provides information on the capacity of existing management techniques for peatlands, grasslands and savannahs, coastal ecosystems and agro-ecosystems to sustain and enhance carbon stocks and carbon sequestration. It makes recommendations for maximizing synergies with biodiversity conservation and sustainable use, climate change adaptation, disaster risk reduction and sustainable development. The study was prepared with financial support from the European Union and the Government of Germany. The full study is presented in UNEP/CBD/SBSTTA/20/INF/3 and the key messages of that review are provided in section III below.

6. In follow-up to the fourth edition of the *Global Biodiversity Outlook*, the Secretariat commissioned a group of experts to prepare a review on the contribution of the Aichi Targets to climate mitigation, and the role of models and scenarios to inform pathways to achieve biodiversity and climate objectives. In UNEP/CBD/SBSTTA/19/INF/15, the Secretariat presented a preliminary version of this report. As requested by the Subsidiary Body at its nineteenth meeting, the preliminary report was made available for peer review from 4 December 2015 to 22 January 2016. Comments were received from four Parties (New Zealand, Brazil, Argentina and Peru) and three organizations (the Global Forest Coalition, Indigenous peoples' and Community Conserved Territories and Areas Consortium and UNEP-WCMC). The revised report of the review has been issued as UNEP/CBD/SBSTTA/20/INF/29, and findings of that review are reflected in sections III and V below. The review was prepared with financial support from the European Union.

7. Addressing ecosystem-based approaches to climate change adaptation and disaster risk reduction the Secretariat issued a notification (2015-02-17) requesting information from Parties and organizations on their experiences in implementing ecosystem-based approaches to climate change adaptation and disaster risk reduction. The Secretariat received 21 responses to the notification.[2] The Secretariat also commissioned a compilation of experiences with ecosystem-based approaches to climate change adaptation and disaster risk reduction and the preparation of a synthesis report drawing upon a variety of sources of information, including the submissions to the notification referred to above, fifth national reports, national biodiversity strategies and action plans, and scientific literature. The synthesis report included an analysis of issues, such as valuation and cost-effectiveness, trade-offs, limits to adaptation, participation of indigenous peoples and local communities and gender. The synthesis report was prepared with financial support from the European Union.

8. Further, a technical workshop on ecosystem-based approaches to adaptation and disaster risk reduction was hosted by the Government of South Africa in Johannesburg from 28 September to 2 October 2016. The workshop was funded by the European Union and the Governments of Germany, South Africa and Sweden and was attended by experts and practitioners from a wide range of countries and organizations. The purpose of the workshop was to review the first draft of the synthesis report, to share and discuss experiences on national and regional efforts to implement ecosystem-based approaches to adaptation and disaster risk reduction. The preparation of the synthesis report and organization of the workshop were guided by a technical reference group.[3]

[2] Twelve were from Parties (India, Switzerland, Japan, Australia, Belgium, Canada, Colombia, the European Union (including Italy, Germany and the European Commission) Mexico and the Government of British Columbia) and nine were from organizations (the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations, Indian Council of Forestry Research and Education, Blue Solutions Initiative of the German Environment Ministry, Jagruti Gramin Vikas Sanstha, Eklari, the Royal Society, the International Union for the Conservation of Nature, Tebtebba and the World Wildlife Fund).

[3] Comprising representatives of the following organizations: the Convention on the Conservation of Migratory Species (CMS), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), the

9. The synthesis report was made available for peer review by Parties and relevant organizations from 1 December 2015 to 4 January 2016. Comments were received from four Parties (the European Commission, Government of Mexico, Government of Brazil and the Government of Canada) and three organizations (Food and Agriculture Organization of the United Nations (FAO), Royal Society, and WWF) and incorporated into the final report, which has been issued as UNEP/CBD/SBSTTA/20/INF/2. A brief summary of the key messages of the synthesis report is presented in section IV below.

10. Section VI of the present note provides a brief report on the activities of the Secretariat in promoting ecosystem-based approaches to climate change mitigation, adaptation and disaster risk reduction, and in collaboration with the Secretariat of UNFCCC and other organizations.

11. The Conference of the Parties requested the Executive Secretary to further develop advice on possible indicators to assess the contribution of reducing emissions from deforestation and forest degradation, and the role of conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+) to achieve the objectives of the Convention and to assess potential mechanisms to monitor impacts on biodiversity from these activities and other ecosystem-based approaches for climate change mitigation measures (decision XI/19, para. 18). The Executive Secretary was also requested to compile information on experiences, lessons learned and best practices on the contribution REDD+ activities towards achieving the objectives of the Convention and the Strategic Plan for Biodiversity 2011–2020 (decision XII/20, para. 7(e)).

12. The Executive Secretary invited Parties and relevant organizations through notification 2015-018 to provide information related to the requests above. The Secretariat received submissions from 13 Parties and 10 organizations. This information is contained in document UNEP/CBD/SBSTTA/20/INF/30 which also includes information on recent developments on REDD+ at UNFCCC COP 21, an overview of recent forest-related commitments and further details of the potential contribution to, and impacts of REDD-plus on the Strategic Plan for Biodiversity 2011-2020. Options for the use of indicators and potential monitoring mechanisms to assess the impacts of REDD+ activities on biodiversity and a summary of experiences, lessons learned and best practices are synthesized in UNEP/CBD/SBSTTA/20/10.Add.1.

II. THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT, THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION AND THE PARIS CLIMATE CHANGE CONFERENCE 2015

The 2030 Agenda for Sustainable Development

13. On 25 September 2015, the General Assembly adopted resolution 70/1 entitled, "Transforming our world: the 2030 Agenda for Sustainable Development". The Agenda includes 17 Sustainable Development Goals (SDGs) and 169 associated targets which are integrated and indivisible, and balance the three dimensions of sustainable development: economic, social and environmental. The Agenda was accepted by all countries and is a plan of action for people, the planet and prosperity. It is anticipated that the Agenda will be implemented by a collaborative partnership of Governments, the private sector, civil society, the United Nations system and other actors.

14. Three of the SDGs are particularly relevant for the programme of work on climate change and biodiversity, and the climate change-related Aichi Biodiversity Targets (10, 14 and 15). Through Goal 13 countries aim to take urgent action to combat climate change and its impacts. Relevant targets under Goal 13 include the strengthening of resilience and adaptive capacity to climate-related hazards and natural disasters.

United Nations Environment Programme (UNEP), the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Office for Disaster Risk Reduction (UNISDR), the World Meteorological Organization (WMO), BirdLife International, Conservation International, the International Union for the Conservation of Nature (IUCN), the Ramsar Convention, and the World Wildlife Fund (WWF).

15. Through Goal 14, countries aim to conserve and sustainably use the oceans, seas and marine resources for sustainable development. Relevant targets under Goal 14 include sustainable management of marine and coastal ecosystems, and minimizing and addressing the impacts of ocean acidification.

16. Through Goal 15, countries have pledged, to protect, restore and promote the sustainable use of terrestrial ecosystems, combat desertification, halt and reverse land degradation and halt biodiversity loss. Relevant targets under Goal 15 include the conservation, restoration and sustainable use of various types of ecosystems, and combating desertification and restoring degraded land.

17. The SDGs are indivisible and integrated. This means that, in order to achieve Goals 14 and 15, which are most directly related to the Convention, Goal 13 and other goals will have to be achieved, and vice versa. Therefore, actions undertaken under the Convention on Biological Diversity will contribute positively to Goal 13 and to the objectives of the United Nations Framework Convention on Climate Change.

The Sendai Framework for Disaster Risk Reduction 2015-2030

18. The Sendai Framework for Disaster Risk Reduction 2015-2030, adopted by the Third United Nations World Conference on Disaster Risk Reduction, held in Sendai, Japan, from 14 to 18 March 2015, will serve as the global framework to guide disaster risk reduction efforts over the next 15 years (2015-2030). The framework puts emphasis on disaster prevention through risk-sensitive development programming, as well as on disaster response and reconstruction. For the first time in an international disaster risk reduction framework the sustainable management of ecosystems is recognized as a way to build disaster resilience; and ecosystems need to be taken into account in three priority areas: (a) undertaking risk assessments; (b) risk governance; and (c) investing in resilience. The framework further acknowledges the need to tackle environmental drivers of disaster risk, including ecosystem degradation and climate change, as well as the environmental impacts of disasters. The Conference of the Parties has already adopted decisions relating to disaster risk reduction, notably decision XII/20 that encourages Parties to incorporate disaster risk reduction into relevant national plans and strategies. The Sendai Framework further supports this integration.

Outcomes of the Paris Climate Change Conference 2015

19. The Paris Climate Change Conference was held from 30 November to 13 December 2015. It included the twenty-first session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) and the 11th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 11).

20. On 13 December 2015, COP 21 adopted the Paris Agreement on Climate Change,[4] which is aimed at holding the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels. It also aims to increase the ability to adapt to the adverse impacts of climate change and to foster climate resilience and low greenhouse gas emissions development.[5]

21. Parties to the Paris Agreement are expected to take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases.[6] According to Article 4, paragraph 1(d), of UNFCCC, these include biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems.

22. The Agreement establishes a global goal on adaptation, which seeks to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change. It acknowledges that adaptation action should consider, among other things, ecosystems. In the planning and implementation of adaptation action

[4] United Nations Framework Convention on Climate Change, Conference of the Parties, twenty-first session, decision 1/CP.21 (see FCCC/CP/2015/10/Add.1).

[5] Article 2 of the Agreement.

[6] Article 5.

at the national level, Parties to the Agreement may include the assessment of climate change impacts and vulnerability, taking into account vulnerable people, places and ecosystems, and building the resilience of socioeconomic and ecological systems.[7]

23. Parties to the Agreement are required to prepare, communicate and maintain successive nationally determined contributions (NDCs), which may include mitigation co-benefits arising from Parties' adaptation and/or economic diversification plans.[8] These NDCs may be updated every five years and each new NDC is expected to increase the ambition of a Party's climate mitigation actions. UNFCCC COP 19 requested Parties to prepare intended nationally determined contributions (INDCs),[9] and the decision adopting the Paris Agreement states that INDCs that are communicated before the entry into force of the Agreement are to be considered as a Party's first NDC.[10] As at 11 February 2016, 161 countries had prepared and submitted INDCs to the Secretariat of UNFCCC.[11]

24. The Paris Agreement is very important for the implementation of the Convention on Biological Diversity, and particularly for the achievement of the vision of the Strategic Plan for Biodiversity 2011 2020. Under baseline projections, average global temperatures could be expected to increase by 4°C,[12] resulting in catastrophic climate change impacts, such as regime shifts in ecosystems, substantial species loss, substantial increase in extinction risk for terrestrial and freshwater species, widespread coral reef mortality and accelerated ocean acidification, and the potential for "tipping points" to be crossed in some biomes with large detrimental effects on biodiversity and ecosystem services.

25. The full implementation of existing climate change policies, along with INDCs[13] presented in preparation for the UNFCCC COP 21 would reduce the long-term temperature projections, but the estimated aggregate greenhouse gas emissions levels resulting from INDCs do not fall within least-cost 2°C scenarios.[14] Rather, current emissions reduction efforts specified in INDCs would likely result in a global average temperature increase of about 3°C.

26. Therefore, the Paris Agreement notes that much greater emission reduction efforts will be required than those associated with the INDCs in order to hold the increase in the global average temperature to below 2°C or to 1.5°C above pre-industrial levels.

27. Although Parties to the Paris Agreement have agreed to hold the global temperature increase to well below 2°C, this temperature increase still poses a risk to biodiversity. At 2°C, climate change would place many species and ecosystems with limited adaptive capacity under very high risk, particularly Arctic-sea-ice and coral reef systems. Other impacts include ocean acidification and declining glaciers. Even at a global average temperature increase of 1.5°C, the risks for unique and threatened systems are high.[15] In this context, while a precise assessment cannot currently be made, keeping global temperature increases closer to 1.5°C rather than 2°C, is likely to significantly reduce the negative impacts on biodiversity, especially in the most vulnerable ecosystems.

28. The decision adopting the Paris Agreement invited the Intergovernmental Panel on Climate Change (IPCC) to provide a special report in 2018 on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways.

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[7] Article 7

[8] Article 4.

[9] UNFCCC COP decision 1/CP.19.

[10] UNFCCC COP decision 1/CP.21.

[11] http://www4.unfccc.int/submissions/INDC/Submission%20Pages/submissions.aspx.

[12] UNEP (2015). The Emissions Gap Report 2015. United Nations Environment Programme (UNEP), Nairobi.

[13] The Emissions Gap Report presents an assessment of the 119 INDCs submitted by 1 October 2015, covering 146 countries and 85-88 per cent of global GHG emissions in 2012.

[14] UNEP (2015).

[15] Pörtner, et al 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, United States, pp. 411-484.

III. BIODIVERSITY AND CLIMATE CHANGE MITIGATION

29. While the priority for dealing with global warming remains urgent and deep cuts in greenhouse gas emissions, better protection, management and restoration of natural and managed ecosystems can make significant contributions to climate mitigation by reducing emissions from deforestation and other land-use change, and by enhancing carbon sinks.

30. Implementation of the Strategic Plan for Biodiversity 2011-2020 and achievement of the Aichi Biodiversity Targets can therefore contribute to efforts to mitigate climate change. Target 5 of the Strategic Plan for Biodiversity 2011-2020 aims to reduce, by 2020, the rate of loss of all natural habitats, including forests, by at least half and where feasible close to zero, and to significantly reduce degradation and fragmentation. Target 15 aims to enhance, by 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks, through conservation and restoration, thereby contributing to climate change mitigation and adaptation.

31. The Conference of the Parties, in paragraph 8 (n) of decision X/33 invited Parties and other Governments to implement ecosystem-based approaches for mitigation through, for example, conservation, sustainable management and restoration of natural forests, natural grasslands and peatlands, mangroves, salt marshes and seagrass beds.

32. The study referred to in paragraph 5 above (UNEP/CBD/SBSTTA/20/INF/3) highlights ways in which the management, protection and restoration of ecosystems can contribute to climate change mitigation by reducing emissions from ecosystem degradation and by enhancing carbon sinks. As noted above, since actions involving the conservation, sustainable use and restoration of forests are already part of many countries' strategies to address climate change, the study focuses on ecosystems other than forests. Paragraphs 33 to 44 below provide some highlights of the study.[16]

33. Improving the way ecosystems are managed and used can be a key component in efforts to mitigate climate change and adapt to its consequences. According to recent estimates, terrestrial and coastal ecosystems store more than five times as much carbon in plant biomass and soil organic matter as is currently contained in the atmosphere, and land-use change and degradation of vegetation and soils are responsible for about 10 per cent of the total anthropogenic carbon emissions, including those from fossil fuel combustion.

34. At the same time, terrestrial ecosystems not affected by land-use change remove a net amount of around 2.5 gigatons of carbon (Gt C) per year from the atmosphere. While in the past the terrestrial carbon sink has mostly been attributed to forests, a recent analysis of remote sensing data suggests that other ecosystems, in particular dryland systems, such as tropical savannahs and shrublands, also make a significant contribution. The sink function of these water-limited ecosystems is very sensitive to climatic variations.

35. Worldwide, living vegetation, dead plant matter and the top 2 metres of soils together contain 2,850 – 3,050 Gt C. In peatlands and permafrost soils, significant amounts of carbon (more than 2,000 Gt according to some current estimates) are also stored at greater depths (Ref: Ciais et al. 2013). The spatial distribution of biomass and soil carbon across different regions and biomes is highly uneven. Figure 1 below provides a comparison of different ecosystem types according to their spatial extent and average carbon stocks. Table 1 below provides some selected facts about different ecosystem types and their carbon content.

36. Sustainable land-use practices that maintain carbon stocks or enhance sequestration can provide a range of additional benefits that are crucial for sustainable development.

37. Efficient land-use policies are those that integrate climate change mitigation and adaptation, disaster risk reduction and sustainable development, while also providing biodiversity benefits. Research from a wide variety of ecosystems and socio-ecological settings shows that management options that

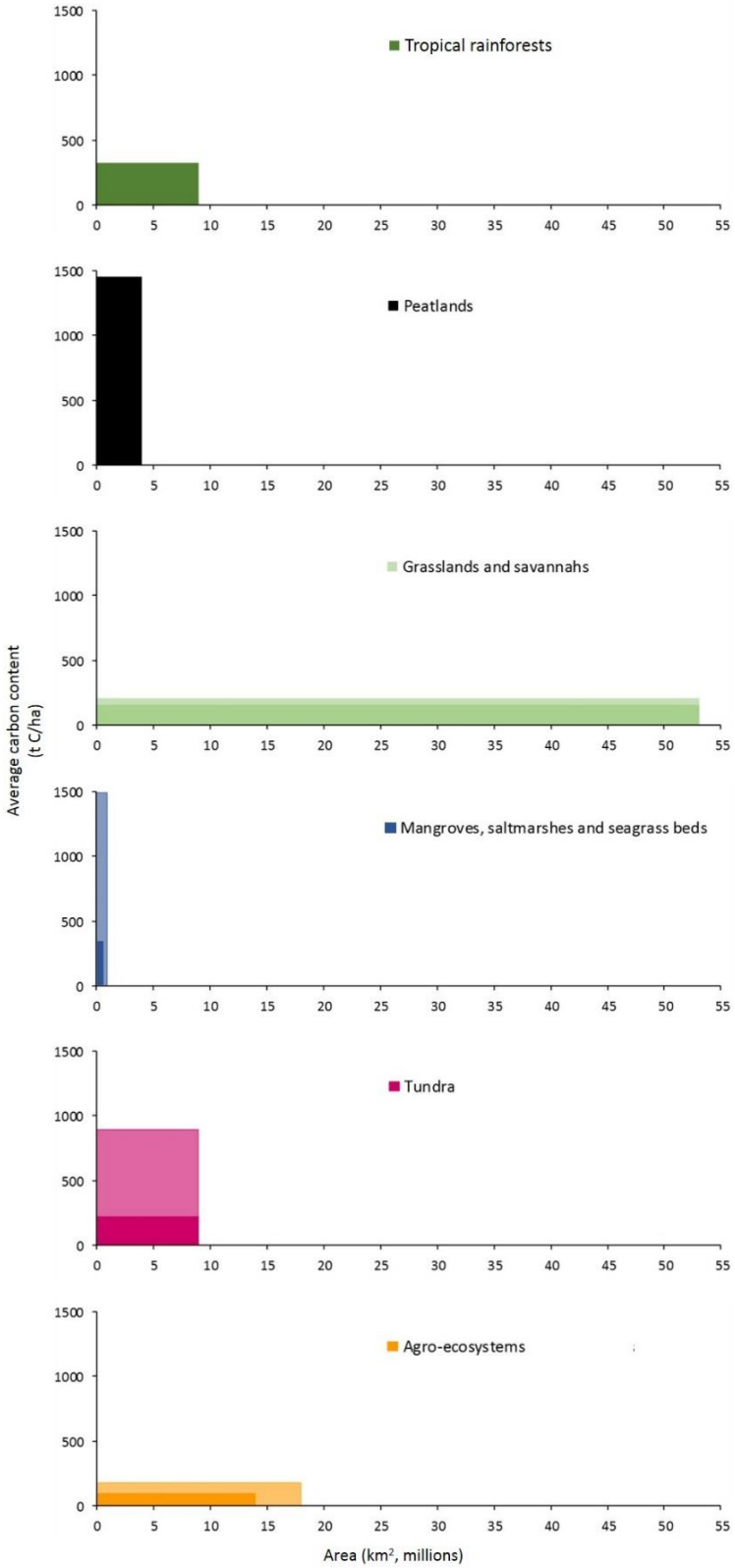
[16] Complete references are available in the full study.

avoid or reverse greenhouse gas emissions from ecosystems are in most cases also beneficial for biodiversity and the continued delivery of important ecosystem services.

Table 1. Selected facts about different ecosystem types

Peatlands	- An average peatland holds about 1,500 tons of soil carbon per hectare – 10 times as much as a typical mineral soil. - Conversion of peatlands to agricultural use can lead to emissions on the order of 25 t of C per hectare per year. - Global carbon emissions from fire in drained peatlands can reach up to 2 Gt C in some years, and also pose a severe risk for human health.
Grasslands, savannahs	- Grasslands play an important role in the terrestrial carbon balance because of their large area, as they occur over around 40 % of the earth's land mass. - Many grasslands are seriously overgrazed, and their restoration could potentially lead to a significant uptake of carbon – up to 45 million tonnes per year. - Soil carbon stocks have been shown to decline by up to 60 % following the conversion of grasslands to agriculture.
Mangroves, saltmarshes, seagrass beds	- Coastal ecosystems characterized by mangrove, saltmarsh or seagrass vegetation have particularly high rates of carbon sequestration and can take up 1.4 – 1.6 t of C per hectare per year. - All three types of coastal vegetated ecosystems are being destroyed at an alarming rate and between 30 and 50 % of their original area has already been lost. - Coastal vegetation is also of crucial importance for erosion control and disaster risk reduction.
Tundra	- The permanently frozen soils of the tundra, together with permafrost under boreal forests, are the world's largest reservoir of organic carbon, containing more than 1,700 Gt C. - The physical and chemical processes triggered by melting of permafrost can lead to the release of large amounts of stored carbon as carbon dioxide or methane. - There are no proven and effective means to curb the process of permafrost thawing other than by reducing greenhouse gas emissions to mitigate climate change.
Agro-ecosystems	- Current agricultural practices deplete soil carbon stocks over large areas; better soil management could reduce net emissions from agriculture by the equivalent of up to 1.4 Gt C each year by 2030. - Unless agricultural production methods and consumption patterns become more efficient and sustainable, increasing demand for food will lead to further large-scale conversion of grasslands, forests and peatlands. - About 75 million hectares of cropland went out of use in countries of the former Soviet Union since 1990, leading to a carbon uptake of around 200 million tons per year; this land reserve is likely to come under pressure for re-conversion.

Figure 1. Comparison of major ecosystem types according to their global area extension and average carbon stocks per hectare[17]



[17] Where the sources provide values as a range rather than a single figure, this is indicated by darker shading for the lower estimate and lighter shading for the upper values provided.

38. Successful mitigation of climate change, including through ecosystem-based approaches, can also create a positive feedback loop, as it reduces the risk of negative impacts of climate change on ecosystems and their carbon stocks. Using the full potential of ecosystem-based approaches to climate change, and designing these measures to enhance the contribution of biodiversity to carbon stocks in line with Aichi Target 15, can help to address several development challenges simultaneously.

39. A perceived lack of knowledge about the mitigation benefits that can be achieved through managing non-forest ecosystems often hinders the uptake of such actions, as well as their mainstreaming across climate, biodiversity and other policies. However, there is a growing body of information, data and methodologies that can provide the basis for concrete planning and target-setting.

40. While there has been much discussion on the contribution of ecosystem and their services to climate change mitigation, the role of biodiversity itself has been the subject of debate. There is growing evidence however, that biodiversity does influence carbon sequestration and storage. Two main mechanisms have been identified. The first is through increased primary production, and the second is through increased resilience of ecosystems to disturbances that could reduce carbon stocks and sequestration capacity.

41. Increased primary production can be driven by complementarity between species with different ecological requirements and symbiotic effects. It can also be influenced by trophic cascades in which predators alter ecosystem carbon cycling largely through their indirect effects on plant or microbial community composition and structure, by controlling grazing pressure of herbivores.

42. There is strong and increasing evidence to suggest that higher levels of biodiversity within an ecosystem type can enhance the resilience and function of ecosystems and thus the permanence, and possibly size, of the ecosystem carbon pool. It also highlights studies that suggest that some individual species (such as highly productive plant species) or functional groups (such as pollinators or seed dispersers) may have a disproportionately higher contribution to carbon sequestration and storage. Also, ecosystem characteristics such as intactness and naturalness are positively correlated to biodiversity and ecosystem resilience and hence to the ability of ecosystems to sequester and store carbon.

43. The study makes the following recommendations:

(a) Countries should assess the extent of ecosystem degradation and conversion and the drivers of these processes, as well as opportunities for the restoration and sustainable use of ecosystems, and act on identified opportunities for integrated land-use management providing climate and biodiversity benefits;

(b) Where ecosystem-based measures to address climate change are envisaged, they should be based on landscape-scale planning involving active engagement of stakeholders across sectors. This can enhance the efficiency, viability and local ownership of measures, given competing demands on terrestrial and coastal areas and the fact that the most suitable areas for different uses are distributed unevenly across landscapes and may be covered by a range of property rights and legitimate stakeholder interests. This is particularly true for areas where access to resources is shared between large numbers of people, or where use rights are unclear or overlapping, as is often the case in grassland or coastal ecosystems;

(c) Review of the incentives that are in place for different land uses should be carried out to identify opportunities where reforms could make a transition to more sustainable management approaches economically viable and enable positive contributions to local and national economies;

(d) Governments and organizations, including donors, with an interest to support integrated land management in a particular region should invest in the collection of baseline data for the planning of mitigation and adaptation actions based on ecosystems, as location-specific and ready-to-use information can facilitate action, leveraging large gains for biodiversity and sustainable development;

(e) While many options for ecosystem-based approaches to address climate change are likely to benefit biodiversity, some risks are also becoming apparent, in particular for natural grasslands; these should be taken into account when looking for actions that provide multiple benefits. Where measures carrying potential risk such as afforestation of non-forest lands, or the conversion of natural ecosystems for the cultivation of biofuels are considered, the likely outcomes in terms of carbon sequestration and greenhouse gas emissions, climate change adaptation, disaster risk reduction, biodiversity conservation and support to local livelihoods should be carefully assessed.

44. An associated report commissioned by the Secretariat (UNEP/CBD/SBSTTA/20/INF/29)[18] highlights how the achievement of Aichi Target 11 (increasing the area and efficacy of protected areas) and Aichi Target 5 (reducing the rate of loss of natural habitats, especially forests) can contribute to climate mitigation through avoided greenhouse gas emissions. It also shows that active and passive ecosystem restoration (Aichi Target 15) can contribute significantly to enhanced carbon sequestration.

45. As reported in the fourth edition of the *Global Biodiversity Outlook*, deforestation rate have declined sharply in recent decades in some areas such as the Brazilian Amazon as a result of public policies, contributing to biodiversity conservation and greatly reduced carbon emissions. In addition, a significant part of recently deforested areas are regenerating. Recent studies show that forest restoration, through natural regeneration in neotropical areas as a whole, can sequester substantial quantities of carbon (about 3 MgC/ha/yr over 20 years for above-ground carbon). Somewhat higher sequestration rates can be obtained through active reforestation.

46. The study showed that greenhouse gas mitigation potential over 30 years is substantially higher for planting forests than "first generation" biofuels currently in use. Passive forest recovery through natural succession is also more efficient than most biofuel crops. Sugarcane has the highest GHG mitigation potential of all widely used biofuel sources from dedicated crops. Some advanced biofuels, when coupled with carbon capture and storage, may potentially have a greater mitigation potential than ecosystem recovery. However, there are large uncertainties over the land area for dedicated bioenergy crops without competing with other land uses.

47. Overall, there is a substantial potential to reduce losses of carbon from ecosystems through avoided habitat change and to sequester carbon through restoration, perhaps contributing up to half of the total efforts for total emission reduction. However, these estimates are subject to large uncertainty. In addition, while at a global scale, climate warming is driven predominantly by carbon dioxide and other greenhouse gases and short-term carbon pollutants, biophysical effects of vegetation are also important both through albedo (capacity to reflect sunlight) and through latent heat fluxes linked to evapo-transpiration of water. These effects are less well quantified than the greenhouse effects, adding to uncertainties. However, all these uncertainties are being reduced by recent assessments and studies.

IV. BIODIVERSITY AND CLIMATE CHANGE ADAPTATION

48. Ecosystem-based approaches to adaptation and disaster risk reduction can contribute to the achievement of the Strategic Plan for Biodiversity 2011–2020, particularly Target 15 which aims that by 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

49. The Conference of the Parties, in paragraphs 8 (j) and (l) of decision X/33, invited Parties and other Governments to implement, where appropriate, ecosystem-based approaches for adaptation, to integrate ecosystem-based approaches to adaptation into relevant strategies. In paragraph 7 (c) of decision XII/20, the Conference of the Parties requested the Executive Secretary to compile experiences with ecosystem-based approaches to climate change adaptation and disaster risk reduction and to share them through the clearing-house mechanism.

[18] Full references can be found in the report.

50. Key messages of the synthesis report on experiences with ecosystem-based approaches to climate change adaptation (EbA) and disaster risk reduction (Eco-DRR) referred to in paragraph 9 above (UNEP/CBD/SBSTTA/20/INF/2) are presented in the following paragraphs.

51. EbA and Eco-DRR can deliver multiple benefits beyond adaptation and reducing disaster risk. Examples include the restoration and conservation of coastal vegetated ecosystems such as mangroves for protection from storm surges, which also enhances carbon sequestration, livelihoods and opportunities for community engagement, for example, by maintaining the ecosystem services that provide clean water, food and fiber; supporting poverty reduction; heritage conservation, and preservation of local identities.

52. Economic valuation can aid in illustrating the benefits of EbA and Eco-DRR measures. Valuation should be part of a suite of measures and incentives to encourage the implementation of the ecosystem approach when appropriate. However, quantifying the economic benefits of EbA and Eco-DRR may be difficult given the nascent stage of programmes and activities implemented. Furthermore, quantifying the economic benefits of EbA and Eco-DRR may not be the only, or the best, way to demonstrate their value given that non-monetary benefits, such as cultural, spiritual, research or educational benefits, are equally important.

53. Costs and benefits of EbA and Eco-DRR activities may not be distributed equally among stakeholders or sectors of society, creating incentives for some to implement EbA, but not for others. Methodologies for understanding how the benefits and costs of EbA are distributed are therefore essential for evaluating EbA benefits.

54. The consideration of trade-offs or unintended consequences when implementing EbA and Eco-DRR should be present throughout the risk assessment, scenario planning, and adaptive management approaches for EbA and Eco-DRR implementation. In addition to monitoring the short-term provisions of services, managers should also monitor the long-term evolution of slowly changing variables.

55. Limits to EbA and Eco-DRR must be recognized in addressing adaptation and disaster risk reduction. Ecosystems are subject to climate change impacts, and therefore any intervention utilizing ecosystem-based approaches can be vulnerable to change. Furthermore, ecosystems can only support adaptation if they maintain functionality under a changing climate. It is therefore important to assess the status and vulnerability of ecosystems to climate change and to avoid actions that could increase their vulnerability, and to also analyse potential vulnerabilities of the EbA options themselves to climate change impacts.

56. There should be increased engagement between the scientific and development communities, and project executors in developing and implementing EbA and Eco-DRR activities, making use of best available guidance to ensure optimal and appropriate use of ecosystems for adaptation and DRR. This would avoid, for example, the use of exotic species in restoration efforts.

57. Eco-DRR and EbA are cross-disciplinary fields and require effective engagement and coordination of multiple stakeholders such as engineers, academics, local and indigenous communities, civil society and the private sector. EbA and Eco-DRR would benefit from effective mechanisms for promoting co-production of knowledge between stakeholders and channelling this knowledge into decision-making.

58. EbA and Eco-DRR can be scaled up through effective mainstreaming into policy and practice. This needs to take place at multiple levels of policymaking, planning, programming, budgeting and implementation. Embedding EbA and Eco-DRR into all relevant sectors, ministries and national plans can provide an enabling framework and direct funding towards implementation.

59. Mainstreaming of EbA and Eco-DRR is most effective when top-down and bottom-up approaches converge. It is important to engage indigenous peoples and local communities as well as practitioners in policymaking processes, and ensure that knowledge, lessons and experience feed into policymaking processes.

60. Many countries have mainstreamed EbA and Eco-DRR into national plans, strategies and targets, including national biodiversity strategies and action plans (NBSAPs) under the Convention on Biological Diversity, National Adaptation Programmes of Actions (NAPAs) under UNFCCC, disaster management plans, development policy, and drought relief policy. Case studies of mainstreaming EbA and Eco-DRR through these national plans, strategies and targets are provided in the report.

61. Cooperation among biodiversity management, adaptation, development and disaster reduction communities results in a greater ability to design interventions that deliver multiple dividends.

62. Strong coordination between focal points for multilateral environmental agreements (MEAs) such as the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat, the United Nations Convention to Combat Desertification, UNFCCC and CBD can help to ensure that synergies between MEAs are harnessed.

63. Monitoring and evaluation are important policy instruments that can enable review of policy and plans based on progress made and challenges encountered. It is important to consider both risk-informed decision-making and opportunity-informed decision-making.

64. Coastal vegetation restoration and conservation can also provide carbon sequestration benefits, and initiatives to include coastal vegetation in REDD+ or payment-for-ecosystem services can provide important opportunities for implementation of EbA and Eco-DRR.

65. Disasters can provide an opportunity to "build back better", and incorporate opportunities provided by nature and ecosystems to reduce disaster risk, such as mangrove conservation initiatives.

66. Indigenous, traditional and local knowledge systems - and forms of analysis and documentation such as community mapping - can play a significant role in identifying and monitoring climatic, weather and biodiversity changes and impending natural hazards, similar to early warning systems.

67. Effective EbA and Eco-DRR should consider the kind of support that communities need for adaptation and DRR (e.g. through needs assessments). Listening to the differentiated needs of indigenous peoples and local communities (IPLCs) is necessary since interventions that do not consider their needs, roles and aspirations can be detrimental to IPLCs livelihoods and cultures.

68. EbA and Eco-DRR activities should ensure prior and informed consent, and Government and other institutional support, including resource mobilization, promotion for community-led initiatives and respect for local forms of governance.

69. Gender mainstreaming should be a significant aspect of adaptation and disaster risk reduction planning and implementation process to ensure success and sustainability of policies, programmes and projects.

70. Successful examples of gender mainstreaming can be seen from grass-roots women's organizations in the Americas, where women's groups are now training local governments on how to reduce disaster risk and build partnerships – these models have been successful and are now being considered as policy options, including at the regional level.

V. ENHANCING THE POSITIVE AND MINIMISING THE NEGATIVE IMPACTS OF ADAPTATION ACTIONS ON BIODIVERSITY

71. Paragraph 8 (u) of decision X/33 invites Parties, other Governments and relevant organizations to increase positive and reduce negative impacts of climate change mitigation and adaptation measures on biodiversity, inter alia, based on results from strategic environmental assessments (SEAs) and environmental impact assessments (EIAs) that facilitate the consideration of all available climate change mitigation and adaptation options.

72. In paragraph 7 (d) of decision XII/20, the Conference of the Parties requested the Executive Secretary to develop, further to paragraph 8 (u) of decision X/33, guidance on enhancing the positive and

minimizing the negative impacts on biodiversity of climate-change adaptation activities in cooperation with the Joint Liaison Group of the Rio Conventions.

73. In response to these decisions, the Executive Secretary has prepared guidance on enhancing the positive and minimizing the negative impacts on biodiversity of climate-change mitigation and adaptation activities. The guidance is based on recent literature, case studies and experiences, and builds on the information provided by the first and second Ad Hoc Technical Expert Groups on Biodiversity and Climate Change. The guidance is contained in UNEP/CBD/SBSTTA/20/INF/1.

74. The guidance proposes the following principles for increasing positive and reducing negative impacts of climate change response activities on biodiversity:

(a) Application of the ecosystem approach;

(b) Consideration of traditional knowledge and full involvement of indigenous peoples and local communities and other stakeholders;

(c) Building on a scientifically credible knowledge base;

(d) Consideration of ecosystem-based approaches versus technological/engineered solutions;

(e) Application of strategic environmental assessments (SEAs) and environmental impact assessments (EIAs);

(f) Inclusion of the value of biodiversity and ecosystem services in decision-making;

(g) Allowing for monitoring and evaluation, and adaptive management.

75. There are specific adaptation options for different sectors and ecosystems, which can maximize positive and minimize negative impacts on biodiversity. Examples are set out for agricultural systems, freshwater ecosystems, forestry and forests, marine and coastal ecosystems and dry and sub-humid lands ecosystems.

VI. USE OF INTEGREATED MODELS ANS SCENARIOS TO EXPLORE FUTURE PATHWAYS TO ADDRESS CLIMATE AND BIODIVERSITY GOALS

76. Keeping global warming within 2°C or less is essential for avoiding high risks of degradation of biodiversity and ecosystem services, especially in vulnerable systems such as coral reefs and mountains; even within these limits, significant negative impacts are inevitable. However, as reflected in the main messages of the fourth edition of the *Global Biodiversity Outlook*, land-use change is currently the largest driver of biodiversity loss in terrestrial ecosystems and is projected to remain so for most of this century under most trend ("business as usual") scenarios, as more land is required for the production of food, agricultural commodities, wood and bioenergy as well as for urban and infrastructure development. Land-based approaches to climate-change mitigation may increase or decrease land-use change, and its impact on biodiversity, depending on the strategy adopted.

77. Three main approaches for land-based mitigation of greenhouse gas emissions are currently being explored:

(a) Deployment of bioenergy, and bioenergy with carbon capture and storage. Most scenarios presented in IPCC's fifth assessment report that are compatible with keeping temperature increases within 2°C or less rely on this strategy;

(b) Halting deforestation, reducing forest degradation and promoting ecosystem restoration. These mitigation strategies are the basis of REDD+ as well as major bilateral agreements. They also correspond to key Aichi Biodiversity Targets 5, 11, 15 among others;

(c) Reducing GHG emissions from food systems. Moderation of the projected increases in consumption (consistent with healthy diets) and reductions in food waste, as well as further increases in agricultural productivity, could substantially reduce the need for additional land area to be cultivated and also contribute to improving human health.

78. These approaches are likely to vary greatly in their direct land-use impacts on biodiversity and ecosystems. Analyses using scenarios developed with integrated assessment models can provide important insights to the synergies and tradeoffs among these different approaches because they model and account for many of the complex interactions between various components of the earth system.[19] The study commissioned by the Executive Secretary (UNEP/CBD/SBTTSTA/20/29) examined a number of relevant scenario exercises for these insights.

79. The fourth edition of the *Global Biodiversity Outlook* used global scenarios developed in the context of the United Nations Conference on Sustainable Development ("Rio+20") to explore the range and feasibility of pathways to achieve the objective of halting biodiversity loss by 2050 (consistent with the Vision of the Strategic Plan), while holding global warming to below 2°C, providing sufficient food for all and meeting other human development goals. The scenarios demonstrated that plausible pathways exist for simultaneously meeting these objectives; they include elements of each of the three approaches described in para 77 above in various combinations.

80. Four scenarios were developed for the fifth assessment report of IPCC (RCP2.6, 4.5, 6.0 and 8.5), with projections of climate change as well as land-use change. In contrast with the aforementioned "Rio+20" scenarios, none of the four RCP emission scenarios, when combined with their related land-use scenarios, seem favourable for biodiversity. While RCP2.6 projects a reasonable probability of meeting the 2°C limit for warming, it is currently associated with a socioeconomic scenario that has large land-use impacts including extensive deforestation due to land conversion for food crops and bioenergy and consequent reductions in species diversity. The IPCC RCP4.5 scenario is far more favorable in terms of land use impacts on biodiversity but is associated with a high probability of exceeding 2°C warming. Scenarios RCP 6.0 and 8.5 are associated with still higher risks from climate change. However, these scenarios do not mean that achieving the 2°C climate warming target and mitigating land-use impacts on biodiversity are incompatible. Indeed, other scenario exercises demonstrate that ecosystem-based mitigation can contribute to biodiversity conservation and make large contributions to overall climate mitigation (estimated in the IPCC report to be 20-60 per cent of total abatement until 2030) even when trade-offs among approaches are accounted for.

81. As a follow-up to the fourth edition of the *Global Biodiversity Outlook*, efforts are now under way, in cooperation with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and IPCC, to develop a new generation of sustainability scenarios that will explicitly examine impacts on land-use change and biodiversity of various pathways for development and climate change mitigation. These will make use of the set of "shared socioeconomic pathways" that are due to be completed in 2016. The shared socioeconomic pathways cover a wide range of possible developments in population and economic growth and describe trends for land-use regulation, agricultural intensification, environmental impacts of food consumption and waste, and trade of agricultural commodities.

VII. COOPERATION WITH THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE AND OTHER RELEVANT ORGANIZATIONS

82. In response to paragraph 9 (e) of decision X/33, paragraph 7 of decision XI/21 and paragraph 7 (a) of decision XII/20, the Secretariat continues to engage with relevant international organizations and processes. The Secretariat aims, through these interactions, to contribute to a reduction in the impacts of climate change, and climate change mitigation and adaptation activities on biodiversity and biodiversity-based livelihoods. The Secretariat also aims to promote ecosystem-based approaches to climate change mitigation and adaptation, and disaster risk reduction. Through these actions, the Secretariat is contributing to the achievement of Aichi Biodiversity Targets 10, 14 and 15. The work of the Secretariat in this regard has been supported by the European Union and Germany.

83. Since the last progress report to the Subsidiary Body on Scientific, Technical and Technological Advice, the Secretariat has:

[19] The recent IPBES Assessment of methodologies for scenario analysis and modelling of biodiversity and ecosystem services is relevant in this regard. (See UNEP/CBD/SBSTTA/20/13).

(a) Contributed to the Structured Expert Dialogue under the UNFCCC on the 2013–2015 review of the adequacy of the long-term global goal to ensure that global temperature increases does not exceed 2°C. The Secretariat provided information on the Updated Synthesis Report on Ocean Acidification and the findings of the fourth edition of the *Global Biodiversity Outlook*;

(b) Contributed to the National Adaptation Expo of the Least Developed Countries Expert Group where the Secretariat organized an event on ecosystem-based approaches to climate change adaptation;

(c) Participated in the Nairobi Work Programme 9th Focal Points Forum;

(d) Cooperated with partner organizations to strengthen attention to ecosystem based disaster risk reduction, including incorporating the Strategic Plan for Biodiversity 2011-2020 and relevant decisions of the Convention on Biological Diversity into the DRR agenda and the outcomes of the Third United Nations World Conference on Disaster Risk Reduction;

(e) Participated in the twentieth and twenty-first sessions of the Conference of the Parties to UNFCCC and meetings of its subsidiary bodies, and a number of parallel events, including the Rio Conventions Pavilion, highlighting the importance of the conservation and sustainable management of ecosystems in the new climate agreement. The Secretariat also shared the early results of the synthesis report on ecosystem-based approaches to climate change adaptation and disaster risk reduction, the management of ecosystems in the context of climate change adaptation, and the contribution of the Aichi Targets to land based mitigation described in sections III, IV and VI above.

84. With a view to continuing to promote ecosystem-based approaches to climate change mitigation and adaptation and disaster risk reduction, and to contributing to a reduction in the impacts of climate change and mitigation and adaptation measures on biodiversity and biodiversity based livelihoods, the Secretariat will continue to engage and collaborate with the Secretariats of UNFCCC and UNCCD and other relevant processes. In particular, the Secretariat will continue to engage with the Nairobi Work Programme, the Least Developed Countries Expert Group, the Conference of the Parties to UNFCCC and its subsidiary bodies and the preparation of the special report of the Intergovernmental Panel on Climate Change on the impacts of global warming of 1.5°C above pre-industrial levels, focusing particularly on the impacts on biodiversity and ecosystem services.

85. FAO has developed the *Voluntary Guidelines to Support the Integration of Genetic Diversity into National Climate Change Adaptation Planning.* These guidelines were approved by the Conference of FAO at its 39th session and are aligned with the National Adaptation technical guidelines prepared by the UNFCCC Least Developed Countries Expert Group. They are presented in UNEP/CBD/SBSTTA/20/INF/4). The guidelines aim to assist countries in managing genetic resources to adapt to agriculture and build resilience into agricultural and food production systems. The Secretariat will collaborate with the FAO Commission on Genetic Resources for Food and Agriculture to jointly promote the guidelines and the technical note prepared by the Secretariat entitled "Promoting synergies in addressing biodiversity and climate change adaptation issues: linking national adaptation plans and national biodiversity strategies and action plans" (see UNEP/CBD/COP/12/INF/29).

VIII. CONCLUSION AND SUGGESTED RECOMMENDATION

86. The Subsidiary Body on Scientific, Technical and Technological Advice may wish to adopt conclusions along the following lines:

The Subsidiary Body on Scientific, Technical, and Technological Advice

1. *Welcomes* the following reports, and takes note of the summary information provided in the note prepared by the Executive Secretary on biodiversity and climate change:[20]

[20] UNEP/CBD/SBSTTA/20/10.

(a) The synthesis report on experiences with ecosystem-based approaches to climate change adaptation and disaster risk reduction;[21]

(b) The study entitled "Managing ecosystems in the context of climate change mitigation: A review of current knowledge and recommendations for action";[22]

(c) The report on the contribution of the Aichi Targets to climate mitigation;[23]

(d) The guidance on enhancing the positive and minimizing the negative impacts on biodiversity of climate change adaptation activities;[24]

2. *Takes note* of the synthesis report on further advice on possible indicators and potential mechanisms to assess contributions to, and impacts of REDD+ on biodiversity[25] and the further information provided in UNEP/CBD/SBSTTA/20/INF/30;

3. *Encourages* Parties, other Governments and relevant organizations to increase and share knowledge on ecosystem-based approaches to climate change adaptation and disaster risk reduction and to make use of this knowledge to better inform decision-making.

Suggested recommendation to the Conference of the Parties

The Subsidiary Body on Scientific, Technical, and Technological Advice recommends that the Conference of the Parties at its thirteenth meeting adopt a decision along the following lines:

The Conference of the Parties,

Reaffirming paragraph 8 of decision X/33 inviting Parties to implement ecosystem-based approaches for mitigation and adaptation,

Noting that cooperation amongst the biodiversity, climate change adaptation and disaster reduction communities can result in a greater ability to design interventions that deliver multiple benefits,

Noting the potential for synergies at the national level provided by the 2030 Agenda for Sustainable Development,[26] the Sendai Framework for Disaster Risk Reduction 2015-2030,[27] the Strategic Plan for Biodiversity 2011 - 2020 and the Paris Climate Agreement, [28]

Noting the need for the full and effective participation of indigenous peoples and local communities including through prior informed consent, and the need to pay particular attention to their differentiated needs in order to avoid detrimental impacts on their livelihoods and cultures,

Noting that gender-responsive approaches are critical to ensure the success and sustainability of adaptation and disaster risk reduction policies, programmes and projects,

1. *Welcomes* the Paris Agreement on Climate Change;[28]

2. *Encourages* national focal points to the Convention, using the information contained in UNEP/CBD/SBSTTA/20/INF/3 and UNEP/CBD/SBSTTA/20/INF/29 and other tools and guidance under the Convention, to cooperate with their counterparts in the United Nations Framework Convention on Climate Change in the development of nationally determined

[21] UNEP/CBD/SBSTTA/20/INF/2.

[22] UNEP/CBD/SBSTTA/20/INF/3.

[23] UNEP/CBD/SBSTTA/20/INF/29.

[24] UNEP/CBD/SBSTTA/20/INF/1.

[25] UNEP/CBD/SBSTTA/20/10/Add.1.

[26] General Assembly resolution 70/1, annex.

[27] General Assembly resolution 69/283, annex II.

[28] United Nations Framework Convention on Climate Change, Conference of the Parties, twenty-first session, decision 1/CP.21 (see FCCC/CP/2015/10/Add.1).

contributions and in the implementation of the domestic measures aimed at achieving such contributions;

3. *Recognizes* that ecosystem based approaches to climate change adaptation and disaster risk reduction can be technically feasible, politically desirable, socially acceptable, economically viable and beneficial and that implementation and investment into these approaches is increasing at the national level;

4. *Encourages* Parties, other Governments and relevant organizations:

(a) To consider impacts on biodiversity and related social, environmental, and economic impacts associated with climate change and disasters, including the costs of inaction and the value of investing in actions timeously in order to reduce impacts;

(b) To take into consideration the status of biodiversity and ecosystems and their future vulnerability to climate change impacts when planning and implementing ecosystem-based approaches to adaptation and disaster risk reduction activities, and to avoid activities that would increase the vulnerability and reduce the resilience of ecosystems;

(c) To consider potential trade-offs throughout the development and implementation of ecosystem-based approaches to adaptation and disaster risk reduction. Spatial tools to identify areas of high priority for ecosystem-based adaptation and disaster risk reduction, as well as risks, can also assist in decision-making;

(d) To raise awareness among decision-makers in relevant sectors, and at different levels of government, about ecosystem-based approaches to adaptation and disaster risk reduction;

(e) To develop and implement ecosystem-based approaches to adaptation and disaster risk reduction that are based on the best available science as well as traditional knowledge to ensure the most appropriate use of ecosystems and to avoid maladaptation and potential trade-offs;

(f) To promote the wide use of ecosystem-based approaches where appropriate, including in urban areas and agricultural landscapes;

(g) To develop improved monitoring and evaluation methods, noting that such methods are best developed early in the planning phase, and to systematically assemble and analyse evidence to assess the effectiveness of ecosystem-based adaptation;

(h) To make use of existing tools and guidance on ecosystem-based approaches to adaptation and disaster risk reduction and to further develop and refine these tools and guidance, and share experiences around these processes through the clearing-house mechanism;

(i) To increase the availability of, and access to, local climate data and projections of future climate change for assessing vulnerabilities and risks in the preparation of adaptation strategies;

(j) To share and disseminate knowledge on matters referred to in the present paragraph through the clearing-house mechanism;

5. *Requests* the Executive Secretary to prepare, in collaboration with the appropriate United Nations agencies and international organizations, guidelines for the design and effective implementation of ecosystem-based approaches to adaptation and disaster risk reduction, for consideration by the Conference of the Parties at its fourteenth meeting. The guidelines should consider existing guidance, including that developed under the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change, and include information on:

(a) Tools for assessing the effectiveness of ecosystem-based approaches to adaptation and disaster risk reduction at various scales;

(b) The design and implementation of ecosystem-based approaches to adaptation and disaster risk reduction at difference scales, including at the subnational and local levels;

(c) Trade-offs, thresholds of change and limits to adaptation;

(d) Options for monitoring and evaluation of ecosystem-based approaches to climate change adaptation and disaster risk reduction activities, and their effectiveness;

6. *Invites* the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and *requests* the Executive Secretary, to promote and facilitate contributions from relevant experts to the special report of the Intergovernmental Panel on Climate Change on the impacts of global warming of 1.5°C above pre-industrial levels, focusing, inter alia, on the impacts on biodiversity and ecosystem services, and on the contribution of the conservation and sustainable use of biodiversity, and of ecosystem restoration, to efforts to keep global warming within a limit of 1.5°C.

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