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KEY SCIENTIFIC AND TECHNICAL NEEDS RELATED TO THE IMPLEMENTATION OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020 AND RELATED RESEARCH

Note by the Executive Secretary

INTRODUCTION

1. The Conference of the Parties at its twelfth meeting took note of the key scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020, as identified by the Subsidiary Body on Scientific, Technical and Technological Advice at its seventeenth meeting, for use in future considerations on the implementation of the Strategic Plan and achievement of the Aichi Biodiversity Targets. Parties were invited to take action to address the identified gaps (decision XII/1, para. 14) and the Executive Secretary was requested to identify existing and possible ways and means to address the scientific and technical needs in cooperation with relevant organizations and to strengthen scientific and technical capacities in Parties (para. 20(a)), and to report on this item to the Subsidiary Body at a meeting held prior to the thirteenth meeting of the Conference of the Parties (para. 20(d)).

2. In decision XII/31, the Conference of the Parties decided to address, at its thirteenth meeting, ways and means to enhance the implementation of Article 12 of the Convention, in particular training and capacity-building for developing countries to support implementation of the Strategic Plan for Biodiversity 2011-2020. Paragraph (a) of Article 12, which refers to training, will be addressed by the Subsidiary Body on Implementation at its first meeting. Paragraphs (b) and (c), which refer to promoting and encouraging research that contributes to the conservation and sustainable use of biological diversity, and to promoting and cooperating in the use of such research, will be addressed by the Subsidiary Body on Scientific, Technical and Technological Advice in the context of addressing the scientific and technical needs identified by the Subsidiary Body at its seventeenth meeting.

3. These two matters are considered in the present note. Recent actions, and ways and means, to address the scientific and technical needs identified at the seventeenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, are described in section I. Matters of research related to the conservation and sustainable use of biodiversity, including recent developments in relevant

* UNEP/CBD/SBSTTA/19/1.

international research programmes, are considered in section II. Further considerations and conclusions are presented in section III.

4. Some of the matters addressed in this note may also be considered by the Subsidiary Body on Implementation.[1]

I. ADRESSING SCIENTIFIC AND TECHNICAL NEEDS

5. At the seventeenth meeting of the Subsidiary Body, Parties noted the following:

> "There is an abundance of policy support tools and methodologies available to Parties that enable action to implement the Strategic Plan for Biodiversity 2011-2020 and achieve the Aichi Biodiversity Targets. The lack of tools or guidance, for some targets, or the difficulties of applying them in some countries, should not prevent most countries from taking effective action to implement the Strategic Plan. New tools should only be developed when there is a clearly demonstrated need. The focus should be on facilitating the use of existing tools by making them easily available, explaining their conditions of use, and by adapting them to specific national circumstances, bearing in mind the sovereign right of countries to choose their own approaches, visions, models and tools in accordance with national circumstances and priorities".[2]

6. In fact, the work of the Subsidiary Body at its seventeenth meeting was based on a comprehensive review, prepared by the Executive Secretary, of the scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020 (see UNEP/CBD/SBSTTA/17/2 and Add.1-4).[3] These documents reviewed, for Aichi Biodiversity Targets 1 to 15, the existing policy support tools and methodologies developed or used under the Convention, their adequacy, their impact, the obstacles to their uptake, and gaps and needs for further development of such tools and methodologies, as well as the adequacy of observations and data systems for monitoring the biodiversity attributes addressed in the Aichi Biodiversity Targets. The existing policy support tools and methodologies reviewed in these documents include those developed by a number of existing partner organizations, including United Nations organizations, the International Union for Conservation of Nature (IUCN), non-governmental organizations and others, as well as national and regional agencies. As further discussed in section III, this information will be provided online through the CBD's website and updated, for example, to include the information contained in the present document.

7. Further to decision XII/1, paragraph 14, the Executive Secretary invited Parties to submit information on actions that they had taken to address the key scientific and technical needs (notification 2015-045, issued on 21 April 2014). Eight submissions were received (from Australia, Bahrain, Canada, the European Union and its Member States, Japan, Mexico, New Zealand and Oman). Information provided that is relevant to the key scientific and technical needs identified by the Subsidiary Body is summarized under the specific subsections below. Some of the submissions provided information on matters beyond the gaps identified, complementing the information provided in document UNEP/CBD/SBSTTA/17/2 and its addenda. The full submissions are available at https://www.cbd.int/sbstta19/submissions/.

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[1] The Subsidiary Body on Implementation was established by decision XII/26, It mandate includes: "(b) Assist the Conference of the Parties in preparing decisions on enhancing the implementation of the Convention, as appropriate", including "(c)… recommendations to overcome, obstacles encountered in implementing the Convention and any strategic plans adopted under it." Therefore, some of the elements of this Note will also be taken up in detail at the first meeting of the Subsidiary Body on Implementation

[2] Subsidiary Body recommendation XVII/1, annex II. The Conference of the Parties, in its decision XII/1, paragraph 15, took note of this annex.

[3] UNEP/CBD/SBSTTA/17/2/Add.1 (addressing the Targets of Goal A of the Strategic Plan, i.e. Targets 1-4), UNEP/CBD/SBSTTA/17/2/Add.2 (addressing Goal B, i.e. Targets 5-10), UNEP/CBD/SBSTTA/17/2/Add.3 (addressing Goal C, i.e. Targets 11-13), UNEP/CBD/SBSTTA/17/2/Add.4 (addressing Targets 14 and 15 of Goal D). These documents drew upon information provided by Parties in response to notification 2013-005, and updated information provided earlier on the review of programmes of work, guidance and tools developed under the Convention in UNEP/CBD/WGRI/1/3/Add.2.

8. Further to decision XII/1, paragraph 20(a), the following subsections also address actions by the Executive Secretary in cooperation with relevant organizations to address the identified needs and associated capacities in Parties.[4] It should be noted that some actions identified may be relevant to more than one specific scientific and technical need.

9. In addition, it should be noted that in decision XII/2, the Conference of the Parties requested the Executive Secretary to enhance its work on technical and scientific cooperation and technology transfer. As part of this work, the Executive Secretary will work to facilitate the communication of technical and scientific needs and priorities of the Parties, and link such needs with support for technical and scientific from relevant global, regional and national organizations and initiatives. Progress on this work will be reported to the first meeting of the Subsidiary Body on Implementation.

A. Social sciences

10. The Conference of the Parties noted the need for better ways to draw on social sciences to motivate choices consistent with the objectives of the Strategic Plan for Biodiversity 2011-2020 and to develop new approaches through, among other things, a better understanding of behavioural change, production and consumption patterns, policy development, and the use of non-market tools. The need was also noted for more effective communication, education and public awareness efforts to be spread more widely through school systems and other channels and to devise communication and awareness strategies on biodiversity, complementing communication, education and public awareness efforts with other perspectives including research on intercultural and intracultural communication experiences.

11. These issues may also be taken up by the Subsidiary Body on Implementation at its first meeting.

12. Background information related to this need can be found in UNEP/CBD/SBSTTA/17/2/Add.1 in the analysis related to Aichi Biodiversity Target 4. A note on the role of social sciences in achieving the Strategic Plan for Biodiversity 2011-2020 and its Aichi Targets had been prepared for the seventh Trondheim Conference on Biodiversity, which was held in Trondheim, Norway, from 27 to 31 May 2013.[5]

13. Among the actions undertaken by Parties to address this need as identified in their submissions are the following:

(a) The Department of the Environment of Australia is investigating the potential to apply behavioural insights to improve environmental policy and programme outcomes;

(b) Japan reported on a series of surveys on public awareness of biodiversity through opinion polls and the development of environmental education programmes for elementary and middle school students;

(c) New Zealand identified enhanced environmental decision-making and behaviour change as a target area for the 2015 investment round of its Environmental Research Fund. In 2014, New Zealand launched a national strategic plan for science in society to encourage and enable better engagement with science and technology across New Zealand society;

(d) Mexico listed a number of existing awareness raising tools which are being used at the national level, including strategies which contain a component on environmental education and culture.[6]

14. The 2015 *World Development Report: Mind, Society and Behaviour*, published by the World Bank,[7] addresses how research from the natural and social sciences on how people think and make decisions can be integrated into development economics and policy.

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[4] These matters will be further addressed at the first meeting of the Subsidiary Body on Implementation in relation to technical and scientific cooperation and to training.

[5] Available at: www.cbd.int/sbstta/doc/trondheim-paper-1-social-en.pdf.

[6] For example, *Estrategia Nacional de Educación Ambiental para la Sustentabilidad 2006-2014*, *Estrategia de Comunicación y Cultura para la Conservación*.

15. Despite these initiatives, it appears that further work is needed to fully address this gap, (this could include, for example, applying the issues addressed in the *World Development Report* to support the implementation of the Strategic Plan for Biodiversity 2011-2020). Consistent with the findings of the paper prepared for the Trondheim Conference, this situation could be improved through additional research, pilot projects and the development and compilation of tools where appropriate, in the following specific areas:

(a) Behavioural change research, including detailed assessments on motives and barriers to pro-biodiversity behaviour, and on how to use these strategies to discourage detrimental behaviours and promote beneficial behaviours towards envisaged policy outcomes;

(b) Social marketing strategies and techniques to build ownership among individuals as agents of change (these may build on participatory pedagogical tools used in environmental education, anthropological studies and behavioural studies);

(c) Participatory processes that support the design of institutions to facilitate long-term planning and support the development of social, moral and economic incentives for people to sustainably manage biodiversity and ecosystem services.

16. With regard to more effective communication, education and public awareness strategies, the Conference of the Parties requested the Executive Secretary, in decision XII/2 C, paragraph 2, to undertake a number of activities. It is expected that the outcomes of these activities will support Parties in their efforts to address the gaps identified. The outcomes of these activities will be considered by the Subsidiary Body on Implementation at its first meeting.[8]

B. Data and information, and evaluation and assessment

17. The Conference of the Parties noted the need for more accessible, affordable, comprehensive, reliable and comparable data and information streams through, among other things, facilitated access to remote sensing, better collection and use of in situ observations, proxies, citizen science, modelling, biodiversity monitoring networks, better application of data standards and interoperability related to data acquisition and management to produce policy-relevant products, including indicators and scenarios to inform decision-making. It also noted the need to improve and promote methodologies for assessing the status and trends of species and ecosystems, hotspots and conservation gaps as well as ecosystem functions, ecosystem services and human well-being, at the national, regional and global levels.

18. Background information related to these needs can be found in UNEP/CBD/SBSTTA/17/2, section III.

19. Among the actions taken by Parties to address this need as identified in their submissions are the following:

(a) Australia provided information on its National Plan for Environmental Information, which is intended to improve the quality and accessibility of environmental information through the development of national environmental information infrastructure as well as guides, standards, tools and

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[7] Available at: http://www.worldbank.org/en/publication/wdr2015.

[8] Activities include:

(a) Facilitating the development of a global communication strategy;

(b) Developing, improving and updating toolkits for communication, education and public awareness, taking into account new research on communication, marketing and social marketing perspectives;

(c) Conducting a workshop, on the basis of a review of existing knowledge and a gap analysis and in collaboration with representatives of different stakeholder groups and taking into account behavioural analysis studies, to develop and utilize messaging approaches for the specific target groups in the context of the different Aichi Biodiversity Targets;

(d) Collaborating with the United Nations Educational, Scientific and Cultural Organization and other relevant actors to integrate issues related to the conservation and sustainable use of biodiversity into actions for Education for Sustainable Development, as appropriate.

examples to enable the production of environmental accounts. Australia also noted the online Monitoring, Evaluation, Reporting and Improvement Tool that has been developed for the reporting requirements of the natural resource management projects and programmes of the Government of Australia, as well as the Atlas of Living Australia which aggregates and makes accessible biodiversity data from multiple sources, including citizen science data. A comprehensive report on the state of the environment in Australia is prepared every five years, with the next report due in 2016;

(b) Canada noted in its submission, in particular, the development of a web-based data platform for more efficient analysis of marine mammal aerial survey photographs by engaging the public, and of a national scientific peer-review process to develop a scientific approach for assessing the impacts of anthropogenic pressures on ecosystem components and their functions. Canada also reported on the launch of a national assessment of biodiversity science required to address policy needs;

(c) The European Union and its member States noted in their submission several activities, including: (a) the "Building the European Biodiversity Observation Network" project to enhance biodiversity data collation, analysis and provisioning to stakeholders; (b) the Biodiversity Information System for Europe which provides full documentation and access to data, indicators and assessments; (c) the Horizon 2020 research project, which includes integrated assessments and science-policy interfaces and a particular focus on nature-based solutions; and (d) the BiodivERsA network, which supports and promotes excellence in research for innovative opportunities for the conservation and sustainable management of biodiversity;

(d) Japan provided information on its project "Monitoring Sites 1000", which was established to continuously track changes in ecosystems at fixed points in the long term. Japan periodically conducts its National Survey on the Natural Environment and is currently undertaking the projects "Comprehensive Research for the Observation, Forecast and Evaluation of Asian Biodiversity", and "Strategic Research on Global Mitigation and Local Adaptation to Climate change" as well as a comprehensive assessment of biodiversity and ecosystem services in Japan;

(e) Mexico noted that data and information are being collected and coordinated through CONABIO (*Comisión nacional para el conocimiento y uso de la biodiversidad*). CONABIO aims to share information related to knowledge, conservation and sustainable use of biodiversity in an efficient manner with various users to facilitate decision-making. One of the main tools is the national information system on biodiversity which integrates information from more than 9.2 million specimens housed in various collections, as well as observations and records from the field. CONABIO also organizes the production of field guides on certain species and activities related to citizen science, such as a portal for the public to register and share observations;[9]

(f) New Zealand noted various initiatives, including (a) the environmental monitoring website Land Air Water Aotearoa which provides online access to information about the quality and availability of the natural resources of New Zealand; (b) Landcare Research, which organizes an annual citizen science project to survey the abundance and variety of garden birds; and (c) remote-sensing technology tools for use in forest management developed by the Crown research institute, Scion. New Zealand is also in the process of implementing a national system to monitor, assess and report on the status of and trends in biodiversity at the national level. An environmental reporting bill is currently before the New Zealand Parliament.

[9] Further information is provided in the note made available to the twelfth meeting of the Conference of the Parties on the role of CONABIO and other national biodiversity institutes, among members of the Consortium of Scientific Partners on Biodiversity in (a) supporting their respective national governments in the implementation of the Convention, particularly through the management, analysis and sharing of data and information; and in (b) cooperating with partners and institutions outside their own countries on technical and scientific issues relevant to the objectives of the Convention and the implementation of the Strategic Plan for Biodiversity 2011-2020 (UNEP/CBD/COP/12/INF/39, "Options for enhancing technical and scientific cooperation and clearing-house mechanisms").

20. In recent years, DNA sequence-based species identification technology ("DNA barcoding") has emerged as a rapid and cost-effective approach to species identification, with a number of potential applications related to the conservation and sustainable use of biodiversity, including identification and tracking of endangered species, including species in international trade, and the identification of invasive alien species, pests and pathogens (see UNEP/CBD/SBSTTA/18/INF/20). To realize this potential, investment is needed to expand DNA barcode reference libraries for priority taxonomic groups of organisms, with a special focus on endangered species (including CITES species) and potentially invasive species. The CBD Secretariat has been collaborating with the international barcode of life network to deliver training and capacity-building in these techniques.

21. To address the priority needs identified by Parties related to biodiversity observations and monitoring, the Conference of the Parties also invited Parties, indigenous and local communities and other relevant stakeholders to collaborate with the Group on Earth Observations Biodiversity Observation Network (GEO-BON) and other relevant organizations that contribute to building observation systems and to biodiversity monitoring (decision XII/1, para. 16). In this context, GEO-BON is undertaking a number of activities to assist Parties in producing more reliable, accessible and timely observations to support the implementation of the Strategic Plan for Biodiversity 2011-2020 and assessment of progress towards the Aichi Biodiversity Targets. A full report will be made available in an information note. Some of the most relevant activities include:[10]

(a) Ongoing work to develop Essential Biodiversity Variables and associated indicators (see also UNEP/CBD/SBSTTA/19/5);

(b) The development of a framework for national biodiversity observation systems together with capacity-building activities and an online toolkit to facilitate the start-up or enhancement of national and regional biodiversity observation systems ("BON in a box"). The toolkit will include state-of-the-art tools for biodiversity observation design, data collection, management, analysis and reporting, characterized with a series of tags (for example, ease of use, scale of application, intensity of use) to allow for easy discovery and appropriate application. The toolkit will be regionally customized and regularly updated. BON in a Box is being piloted in Latin America (led by Colombia's Humboldt Institute on behalf of GEO-BON). The first version of "BON in a Box: Latin America" (in Spanish, Portuguese and English) will be released at the nineteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice and at GEO-XII Plenary (Mexico City, 11-12 November 2015). In early 2016, work on a regional toolkit for Africa will commence in cooperation with the "Connect" project (see para. 23, below) to customize the toolkit based on user needs in this region, and the work will be extended to other regions as resources become available. In addition to the regional toolkit versions, GEO-BON is also planning to develop a marine version as well as customized suites of tools for specific applications in response to varying national capacity.

22. GEO-BON addresses the biodiversity "Societal Benefit Area" under the Group on Earth Observations (GEO), which is developing a Global Earth Observation System of Systems (GEOSS). In preparation for the GEO-XII Plenary, an "Eye on Earth Summit" is being held in Abu Dhabi, United Arab Emirates, in October 2015 in cooperation with the United Nations Environment Programme (UNEP), including a special initiative on biodiversity monitoring.

23. The Secretariat of the Global Environment Facility, the United Nations Environment Programme and the UNEP World Conservation Monitoring Centre (UNEP-WCMC), in collaboration with the Secretariat of the Convention on Biological Diversity, are developing a project called "Connect: Mainstreaming biodiversity information into the heart of decision-making". The project will include activities in three African countries aimed at strengthening the connection between government decision makers and data providers in order to provide policy-relevant, spatially explicit information that will meet ongoing national needs.

[10] These activities have been developed in the light of the cross-cutting issues identified by Parties at the seventeenth meeting of the Subsidiary Body (see recommendation XVII/1, annex II, para. 15).

24. The regional assessments under the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) are expected to strengthen capacities related to the collection and use of biodiversity data. The IPBES assessment on methodologies for scenario analysis and modelling of biodiversity and ecosystem services is also relevant (see paragraph 40 below).

25. Building upon the work of partners through the Biodiversity Indicators Partnership, the fourth edition of the *Global Biodiversity Outlook* drew upon a wide range of indicators, to determine trends and progress towards the Aichi Biodiversity Targets. Further information relating to indicators for the assessment of the status of implementation of the Strategic Plan for Biodiversity 2011-2020 will be available for consideration by the Subsidiary Body under agenda item 3.4 in the form of the report of the Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020 (document UNEP/CBD/SBSTTA/19/5), convened in response to decision XII/1, paragraph 20(b).

26. As noted by Parties at the seventeenth meeting of the Subsidiary Body, the *Global Biodiversity Informatics Outlook* represents a road map and a framework for enhancing access to and the sharing of historic and legacy data, as well as new observations and measurements from remote sensing, local monitoring activities and citizen science. The *Outlook* promotes a globally coordinated approach to mobilizing biodiversity information and to enhancing efforts to make data public and accessible for use in policy and research.

27. The Conference of the Parties has taken a number of decisions that call upon Parties and others to improve the accessibility of biodiversity-related data and information. In decision VIII/11, paragraph 3, the Conference of the Parties invited Parties and other Governments, as appropriate, to provide free and open access to all past, present and future public-good research results, assessments, maps and databases on biodiversity, in accordance with national and international legislation. Adopted more recently, the Capacity Building Strategy for the Global Taxonomy Initiative contains a target to "provide free and open access to the relevant biodiversity information for the public by 2016".[11] In decision XI/2, paragraph 13, the Conference of the Parties called upon Parties and other stakeholders to consider how they could most effectively address barriers to data access that are under their direct control with a view to contributing to the achievement of the Aichi Biodiversity Targets. The Conference of the Parties also noted the recommendations[12] made in this respect by the Conservation Commons and requested the Subsidiary Body to develop further guidance. An information document will be provided which draws upon the *Global Biodiversity Informatics Outlook* and the recommendations of the Conservation Commons.

C. Planning and mainstreaming

28. The Conference of the Parties noted the need for improvement and better use of appropriate planning tools, and approaches for mainstreaming, in implementing the Strategic Plan for Biodiversity 2011-2020 through, among other things: biodiversity safeguards, tools and methods for spatial planning, including integrated land use and coastal and marine planning, valuation of biodiversity, ecosystem functions and ecosystem services; and mainstreaming biodiversity into sustainable development and other relevant policy sectors.

29. These issues may also be taken up by the Subsidiary Body on Implementation at its first meeting.

30. Further, at the global workshop on reviewing progress and building capacity for the revision process of national biodiversity strategies and action plans that took place in Nairobi, in November 2013,

[11] Decision X1/29, annex, Action 6.

[12] "A review of barriers to the sharing of biodiversity data and information, with recommendations for eliminating them" (UNEP/CBD/COP/11/INF/8), available at https://www.cbd.int/doc/meetings/cop/cop-11/information/cop-11-inf-08-en.pdf, prepared in response to decision X/15 (para. 5(c)) in which the Conference of the Parties requested the Executive Secretary, subject to available resources, to explore, in collaboration with Parties, other Governments, relevant partners and members of the Conservation Commons, ways to promote free and open access to data and information for conservation purposes, and report back on progress at the next meeting of the Conference of the Parties.

Parties identified the lack of information on existing case studies of successful initiatives related to mainstreaming biodiversity.

31. Background information related to these needs can be found in the following documents: (a) for valuation in UNEP/CBD/SBSTTA/17/2/Add.1, in the analysis related to Aichi Biodiversity Target 2; (b) for spatial planning in UNEP/CBD/SBSTTA/17/2/Add.2, in the analysis related to Target 5; and (c) for mainstreaming in UNEP/CBD/SBSTTA/17/2/Add.1 in relation to Targets 2 and 4, and in UNEP/CBD/SBSTTA/17/2/Add.2 in relation to Targets 6 and 7.

32. Among the actions undertaken by Parties to address this need, as identified in their submissions and review comments, are the following:

(a) Australia highlighted its Environment Protection and Biodiversity Protection Act 1999, which requires persons to integrate biodiversity considerations into development, planning and approval processes. Australia referred to the National Landcare Programme, which provides funding for environmental and sustainable agriculture projects and mainstreams environmental protection, restoration and ecosystem services into the practices of subnational bodies, land managers, farmers, fishers and the broader community. Australia also referred to the Green Army, a programme providing opportunities for young Australians to gain exposure, training and experience in environmental and heritage conservation; and to a "MyEnvironment" smartphone application. Australia also highlighted their Business and Biodiversity Initiative;

(b) Bahrain provided information on a project relating to the application of the ecosystem approach, which, among other elements, included an evaluation of the economic value of ecosystem services in the study area, the identification of the beneficiaries of direct services provided by marine resources, and provided the basis for the development of a management plan for the area;

(c) Canada highlighted its National Conservation Plan, which aims to conserve Canada's natural heritage through conservation and stewardship actions including in working landscapes and seascapes. The Plan will, inter alia, support the creation and enjoyment of protected areas and green spaces, support the restoration of degraded ecosystems, thereby providing habitat for wildlife and clean water, and support the recovery of species at risk. The National Conservation Plan will leverage existing successful initiatives to help foster an appreciation for nature and to build a "community of stewards" among Canadians of all ages;

(d) Japan noted that, in 2015, it would revise its National Spatial Strategy, which guides comprehensive spatial development, with a view to promoting the preservation of biodiversity and the conservation, restoration and utilization of natural environments to build a sustainable nation in harmony with nature. Japan is also carrying out and collecting case examples for economic valuations of biodiversity and ecosystem services. Like Australia, Japan highlighted their Business and Biodiversity Partnership;

(e) Mexico reported on the use of planning and management instruments, such as environmental impact assessments and spatial planning and zoning processes, as well as the application of policy instruments on, among other things, protected areas, fisheries, sustainable use, biological corridors, and forest resources;

(f) New Zealand reported on the development of guidance on the concepts and current good practice related to biodiversity offsetting as well as a biodiversity offsets accounting system.

33. With regard to biodiversity safeguards, the Conference of the Parties, in its decision XII/3, adopted voluntary guidelines on safeguards in biodiversity financing mechanisms and urged Parties, other Governments, business organizations and other stakeholders to take them into account when selecting, designing and implementing biodiversity financing mechanisms, and when developing instrument-specific safeguards for them, with a view to harnessing their positive effects and avoiding or mitigating negative effects. The Subsidiary Body on Implementation at its first meeting is expected to consider information provided by Parties that have undertaken reviews and assessments of their existing legislation and policies governing biodiversity financing mechanisms and identified opportunities for mainstreaming

biodiversity and strengthening current policies and their complementary safeguards. The Subsidiary Body on Implementation will also consider the report of the Dialogue Workshop on Assessment of Collective Action in Biodiversity Conservation (Panajachel, Guatemala, 11-13 June, 2015).

34. With regard to specific safeguards for biodiversity in the context of reducing emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks in developing countries, (REDD+) the Conference of the Parties, in its decision XI/19, recalled, among other things, the guidance and safeguards adopted by the Conference of the Parties to the United Nations Framework Convention on Climate Change[13] and took note of further advice on the application of these safeguards.[14] The Conference of the Parties, at its twelfth meeting, received a progress report of the Executive Secretary on information relevant to the application of safeguards for biodiversity in this context.[15]

35. With regard to tools and methods for spatial planning, the Executive Secretary, in follow-up to decision XII/23, organized an expert workshop on marine spatial planning in Montreal, Canada, from 9 to 11 September 2014. Building on the outcomes of the expert workshop, work is being undertaken by the Secretariat in collaboration with Parties, other Governments and relevant organizations to further develop practical guidance for marine spatial planning. Further workshops as part of the Sustainable Ocean Initiative will also address marine spatial planning.

36. With regard to economic valuation instruments, as noted in UNEP/CBD/SBSTTA/17/2/Add.1, the study on the economics of ecosystems and biodiversity (TEEB) provides a comprehensive guide to valuation tools.[16] Recent work on valuation has focused on developing further guidance on the use of tools (economic and non-economic), the circumstances under which they may be used, and how they could be best be embedded in broader frameworks, for instance assessments of ecosystems and their services. Under IPBES, as part of its work programme 2014-2018, an expert group is currently working on the development of a preliminary guide on the diverse conceptualization of the multiple values of biodiversity and nature's benefits to people.[17]

37. Issues related to ecosystem functions and ecosystem services are covered under subsection E, below.

38. The Conference of the Parties, in its multi-year programme of work up to 2020 (decision XII/31), decided to address, among other issues, strategic actions to enhance national implementation, in particular through mainstreaming and the integration of biodiversity across relevant sectors, including agriculture, forests and fisheries, and the implications of the post-2015 development agenda and the sustainable development goals and of other relevant international processes for the future work of the Convention. The Subsidiary Body on Scientific, Technical and Technological Advice will address scientific and technical aspects of these matters under agenda item 3.1 (UNEP/CBD/SBSTTA/19/2), while the Subsidiary Body on Implementation at its first meeting will also address strategic actions with respect to mainstreaming and the integration of biodiversity within and across sectors under its agenda item 5.2.

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[13] Appendix I to decision 1/CP.16 of the Conference of the Parties to UNFCCC.

[14] Annex to decision XI/19.

[15] See UNEP/CBD/COP/12/21.

[16] Available at http://www.teebweb.org/our-publications/teeb-study-reports/ecological-and-economic-foundations/.

[17] Other ongoing or recently concluded work on economic valuation instruments include two guides that were presented and used at the subregional capacity-building workshop on resource mobilization for CARICOM member States, held in Saint John's, Antigua and Barbuda, from 18 to 21 May 2015: *Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean* (World Resources Institute, 2014) and *Guidance Manual on Valuation and Accounting of Ecosystem Services for Small Island Developing States*, (UNEP, 2014). In addition, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), in close collaboration with the Helmholtz Centre for Environmental Research, is currently implementing a global project on methods for integrating ecosystem services into policy, planning, and practice: "ValuES". The project has arranged cooperation agreements with GIZ partner projects in Brazil, Costa Rica, India, Namibia and Mexico, and strives for cooperation with other interested initiatives and regional networks.

D. Linking science and policy

39. The Conference of the Parties noted the need for better integration of science and policymaking and for improved science-policy interfaces, particularly at the local and national levels and through the use of IPBES, and the improved and wider use of tools to promote policy coherence and policy evaluation and to produce scenarios and options relevant to policymakers.

40. With regard to the need for improved science-policy interfaces at the national level, in their submissions:

(a) Australia noted that its National Environmental Science Programme, the National Climate Change Adaptation Research Facility, the National Threatened Species Scientific Committee, and the Office of Water Science all support decision-makers by offering the best available environmental information;

(b) Mexico reported that an online forum had been created to facilitate the exchange of information between the focal point for IPBES and a network of national experts to facilitate knowledge development in support of decision-making;

(c) New Zealand reported on its practice of appointing science advisors.

41. IPBES is currently implementing its work programme 2014-2018, including the preparation of regional and subregional assessments. The process of undertaking these assessments is expected to strengthen science-policy interfaces at the regional and subregional levels. IPBES is also developing a catalogue of policy support tools and methodologies for use. This work builds upon the review prepared for the Subsidiary Body at its seventeenth meeting.[4] The ongoing work of the IPBES task force on capacity-building is also relevant. Further information is provided in UNEP/CBD/SBSTTA/19/9 and an associated information note.

42. The importance of policy coherence was also highlighted in the fourth edition of the *Global Biodiversity Outlook*. The further consideration of the implications of the findings of the fourth edition by the Subsidiary Body under agenda item 3.1 may be relevant in this regard, in particular as regards the ways and means of promoting policy coherence across sectors and in cross-sectoral policies. Further information is contained in UNEP/CBD/SBSTTA/19/2.

43. With regard to policy evaluation, tools to evaluate the effectiveness of policy instruments for the delivery of the Strategic Plan for Biodiversity 2011-2020 will be addressed by the Subsidiary Body under agenda item 3.3. A review of national experience in the use of such tools using information contained in the fourth and fifth national reports and other relevant information is available in UNEP/CBD/SBSTTA/19/4.

44. With regard to scenarios and options relevant to policymakers, IPBES is in the process of preparing a fast-track assessment of methodologies for scenario analysis and modelling of biodiversity and ecosystem services. This work is expected to support Parties in addressing the need for improving and promoting methodologies for assessing the status and trends of species and ecosystems, hotspots and conservation gaps as well as ecosystem functions, ecosystem services and human well-being. Parties were invited to review the draft of the assessment by notification 2015-061, dated 25 May 2015. The work will be completed and considered at the fourth session of the IPBES Plenary, in February 2016. Any implications of this assessment for the work of the Convention will be considered by the Subsidiary Body at its twentieth meeting.

E. Maintenance, conservation and restoration of ecosystems

45. The Conference of the Parties noted the need for better understanding of ecosystem processes and functions and their implications for ecosystem conservation and restoration, ecological limits, tipping points, socio-ecological resilience and ecosystem services as well as improved methodologies and indicators for monitoring ecosystem resilience and recovery, in particular for vulnerable ecosystems.

46. Background information related to these needs can be found in the analysis related to Aichi Biodiversity Target 11 in UNEP/CBD/SBSTTA/17/2/Add.3, and in the analysis related to Aichi Biodiversity Targets 14 and 15 in UNEP/CBD/SBSTTA/17/2/Add.4.

47. Some of the terms referred to above (para 44) are used in the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets. Drawing upon the third edition of the *Global Biodiversity Outlook*, the rationale for the Plan notes the risk of crossing "thresholds or "tipping points".[18] Both Target 4 (impacts on natural resources) and Target 6 (impacts of fisheries) call for impacts to be kept "within safe ecological limits". Target 7 refers to a related concept: bringing pollution to levels "that are not detrimental to biodiversity and ecosystem functioning". Target 10 applies to "vulnerable ecosystems". Targets 14 and 15 refer to ecosystem services, resilience and recovery.

48. With regard to activities of Parties in addressing this need, the European Union and its member States, in their submission responding to notification 2015-045, dated 21 April 2015, noted the mapping and assessment of ecosystems and their services exercise ongoing in their countries. Bahrain provided information on a number of projects, including for the rehabilitation of degraded coastal areas and the recovery of fish stocks. Japan highlighted the role of its law for the promotion of nature restoration, its national park law, as well as plans for ecosystem maintenance and recovery work undertaken under this law. Japan also noted a number of initiatives based upon the Action Plan for the Conservation and Sustainable Use of Socio-ecological Production Landscapes (Satoyama). Mexico reported on the work undertaken in the context of the Mexican Strategy for Plant Conservation, including a symposium on ecosystem restoration.

49. With regard to ecological limits and tipping points a variety of work to better understand these concepts has been undertaken. A number of relevant articles related to the third edition of the *Global Biodiversity Outlook* have been published in scientific journals further describing and deepening our understanding of the tipping point concept.[19]

50. No one can accurately predict how close ecosystems are to tipping points or how much additional pressure might bring them about. What is known from past examples, however, is that, once an ecosystem shifts to another state, it can be difficult or impossible to return to its former state, on which economies and patterns of settlement had been built for generations. Due to their potentially large impacts on biodiversity, ecosystem services and human well-being, and therefore the difficulty or near impossibility of mitigating them, tipping points are a major concern for scientists, managers and policymakers. It can be extremely difficult for societies to adapt to rapid and potentially irreversible shifts in the functioning and character of an ecosystem on which they depend. While it is almost certain that tipping points will occur in the future, the dynamics in most cases cannot yet be predicted with enough precision to rely on specific and targeted interventions to avoid them. Responsible risk management therefore requires a precautionary approach to human activities known to drive biodiversity loss.

51. Thresholds or tipping points occur at a range of scales from local to regional, and may have globally significant impacts. The idea and policy relevance of tipping points for the terrestrial biosphere at the planetary scale remains controversial, however. The related concept of planetary boundaries has gained considerable attention and has been seized upon as a useful concept by policymakers in the

[18] The underlying technical report for the third edition of the *Global Biodiversity Outlook* provides a comprehensive review of thresholds and tipping points relevant to biodiversity and ecosystem services (CBD Technical Series No. 50 *Biodiversity Scenarios: Projections of 21st Century Change in Biodiversity and Associated Ecosystem Services*). The third edition of the *Global Biodiversity Outlook* and its underlying report considered thresholds or tipping points to be a situations in which an ecosystem experiences a shift to a new state, with significant changes to biodiversity and the services to people it underpins. These tipping points occur at a range of scales from local to regional. Tipping points have the potential to interact with each other, augmenting their overall impact.

[19] Leadley, P et al. 2014. Interacting regional-scale regime shifts for biodiversity and ecosystem services. BioScience Oxford University Press. Available at http://bioscience.oxfordjournals.org/content/early/2014/06/25/biosci.biu093.full and Ramprasad Sengupta. 2013.

environmental arena. Following the initial development of the concept, several critiques have been published and the concept has subsequently been revised.[20]

52. Work is under way on the development of tools and methodologies on ecosystem restoration under the CBD Forest Ecosystem Restoration Initiative[21] in cooperation with partners from the Global Partnership on Forest and Landscape Restoration. For example, IUCN and the World Resources Institute have developed a pilot version of a Restoration Opportunities Assessment Methodology (ROAM) and Guidebook, to provide a flexible and affordable framework approach for countries to rapidly identify and analyse forest landscape restoration potential and locate specific areas of opportunity at the national or subnational level. The Secretariat of the Convention, through the Forest Ecosystem Restoration Initiative, is leading activities to incorporate specific biodiversity considerations into ROAM.

53. The "Caring for Coasts" Initiative,[22] welcomed by the Conference of the Parties in decision XII/19 and supported by the Ramsar Convention and East Asian-Australasian Flyway Partnership, BirdLife International, Wetlands International, and the CBD Secretariat, with support from Environment Canada, constitutes an "umbrella" initiative for a range of efforts addressing the restoration of coastal wetlands, by providing coordination, sharing best practices and encouraging raised awareness and strengthened commitments, including engagement by the private sector.

54. With regard to methodologies for monitoring ecosystem resilience and recovery, the Scientific and Technical Advisory Panel of the Global Environment Facility recently published a "Resilience Adaptation Transformation Assessment and Learning Framework".[23] IUCN has continued its work on the development of the *Red Lists of Ecosystems* which compiles information on the state of the world's ecosystems at different geographic scales with the central objective of assessing the risk of ecosystem collapse.[24]

55. With regard to vulnerable ecosystems, the fourth edition of the *Global Biodiversity Outlook* reported that some habitats including mountains and rivers are especially vulnerable to multiple anthropogenic pressures. While mitigating climate change is clearly the key long-term priority, urgent measures to relieve other pressures can make mountain ecosystems more resilient, protecting their biodiversity and the livelihoods of millions of people who depend on them. In fact, in the fourth edition of the *Global Biodiversity Outlook*, actions to enhance progress towards Aichi Biodiversity Targets 5, 6, 7, 8, 9, 10 and 15 include reducing the pressures on and, where necessary, enhance the protection and restoration of those ecosystems providing essential services (including mountain areas acting as "water towers" among others).

56. The Conference of the Parties, in its decision XII/23, adopted priority actions to achieve Aichi Biodiversity Target 10 for coral reefs and closely associated ecosystems. It also urged Parties and invited other Governments and relevant organizations to consolidate and further strengthen current efforts to manage coral reefs as socio-ecological systems undergoing change due to the interactive effects of multiple stressors. A specific workplan on biodiversity and acidification in cold-water areas will be discussed by the Subsidiary Body at its twentieth meeting.

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[20] For example, Mace, G. et al. 2014. Approaches to defining a planetary boundary for biodiversity. *Global Environmental Change* 28, pp 289–297; Steffen, W. et al 2015. Planetary boundaries: Guiding human development on a changing planet *Science* 347, p. 6223.

[21] The Forest Ecosystem Restoration Initiative (FERI) was welcomed by the Conference of the Parties in its decision XII/19, is supported by the Korea Forest Service of the Republic of Korea, and implemented by the Secretariat of the Convention in close collaboration with a range of partners including the Forest and Landscape Restoration Mechanism of the United Nations Food and Agriculture Organization, launched in June 2014, which will support selected countries in the implementation of national forest and landscape restoration efforts/large scale programmes.

[22] See also http://www.birdlife.org/content/caring-coasts-initiative.

[23] http://www.stapgef.org/stap/wp-content/uploads/2015/05/Summary-Resilience-Adaptation-Transformation-Assessment-Learning-Framework-May-2015.pdf.

[24] See: http://www.iucnredlistofecosystems.org/.

57. Every two years, the Food and Agriculture Organization of the United Nations and the Mountain Partnership Secretariat prepare, with input from the Secretariat of the Convention on Biological Diversity, the report of the Secretary-General on Sustainable Mountain Development, which provides the basis for General Assembly resolutions on sustainable mountain development. In its last resolution, 68/217, the Assembly took note of decision X/30, in which the Conference of the Parties, among other things, had invited Parties, other Governments and stakeholders to take specific actions for the conservation, sustainable use and benefit-sharing of mountain biological diversity. The report of the Secretary-General for 2015 report is expected in fall.

F. Economic instruments

58. The Conference of the Parties noted the need for better understanding of the performance of economic instruments and their wider use in achieving the objectives of the Strategic Plan for Biodiversity 2011-2020, as well as poverty eradication strategies, taking into account national socioeconomic conditions, and the need for improved guidance and tools to develop positive incentives and for the identification, elimination, phasing out or reform of harmful incentives, consistent and in harmony with the Convention and other relevant international obligations, as well as the integration of biodiversity in national accounting, as appropriate, and reporting systems.

59. These issues may also be taken up by the Subsidiary Body on Implementation at its first meeting.

60. Background information related to this need can be found in UNEP/CBD/SBSTTA/17/2/Add.1, in the analysis related to Aichi Biodiversity Targets 2 and 3.

61. At its twelfth meeting, the Conference of the Parties, adopted milestones for the full implementation of Aichi Biodiversity Target 3 on incentive measures and took note of the associated modalities described in a note by the Executive Secretary (decision XII/3, paragraphs 19-21 and annex I). The modalities provide more extensive guidance on how to achieve the milestones.[25] (See UNEP/CBD/WGRI/5/4/Add.1). These Subsidiary Body on Implementation, at its first meeting, will consider progress in achieving these milestones on the basis of submissions by Parties.

62. In its submission, Mexico mentioned a number of instruments which have had positive impacts, such as payment for environmental services, REDD+, and its own national forest programme. Japan noted the provision of support to local governments for the formulation of statutory plans related to the conservation of biodiversity in local regions and the promotion of initiatives based on these plans. As of 2014, support has been provided to 64 organizations for projects promoting the conservation of biodiversity. Previously organizations have continued or expanded their activities even after the support had ended.

63. One of the milestones for the full implementation of Aichi Biodiversity Target 3, adopted by the Conference of the Parties at its twelfth meeting, is the finalization of national analytical studies that identify: candidate incentive measures (including subsidies harmful for biodiversity) for elimination, phase-out or reform; and opportunities to promote the design and implementation of positive incentive measures. An analysis of the fifth national reports received at the time of preparation of this note reveals limited progress made in this regard. The Parties that provided information on the implementation of Aichi Target 3, mostly referred to the provision of various positive incentive measures. A limited number of countries referred to harmful subsidies and few reported concrete success stories. Exceptions include the report of India on the reform of fertilizer subsidies; and the report of Pakistan on the removal of electricity subsidies in an irrigation context.

64. Several studies on identifying, eliminating and phasing or reforming incentives that are harmful to biodiversity have been prepared or are being planned. These include a study by the Institute for

[25] See UNEP/CBD/COP/12/INF/20. Resource Mobilization: Modalities for the Full Operationalization of Aichi Biodiversity Target 3.

European Environmental Policy (IEEP) entitled "Overcoming obstacles to green fiscal reform"[26] as well as work being undertaken by the Working Party on Biodiversity, Ecosystems and Water of the Organization for Economic Cooperation and Development (OECD) as part of its agreed work programme for 2015-16 on how to overcome obstacles to policy reform. OECD has also recently released a study on biodiversity offsets[27] and is also undertaking work on policy response indicators for Aichi Biodiversity Target 3.

65. With regard to the integration of biodiversity in national accounting, it was noted in UNEP/CBD/SBSTTA/17/2/Add.1 that the revised System of Environment-Economic Accounting (SEEA 2012) had been finalized. The SEEA 2012 Central Framework was adopted as an international statistical standard by the United Nations Statistical Commission at its forty-third session, in 2012. The global partnership on Wealth Accounting and the Valuation of Ecosystem Services (WAVES) continues to promote the inclusion of natural resources in development planning and national economic accounts. Further initiatives related to national accounting, additional to those reported in UNEP/CBD/SBSTTA/17/2/Add.1, include the following:

(a) A project on Advancing National Capital Accounting, supported by the Government of Norway and implemented through a cooperative effort of the United Nations Statistics Division, UNEP, and the Secretariat of the Convention, which seeks to make progress at the global level through the preparation of global training materials, as well as at the national level through tailored support to six pilot countries (Bhutan, Chile, Indonesia, Mauritius, Mexico, South Africa, and Viet Nam);

(b) The UNEP Project on Ecosystem Services which seeks to support countries in advancing environment-economic accounting, including ecosystem accounting, in several pilot countries (Chile, Lesotho, South Africa, Trinidad and Tobago, and Viet Nam);

(c) The initiative on Valuation and Accounting of Natural Capital for Green Economy.

66. Issues related to economic valuation, covered under section III above are also relevant to economic instruments. Tools for assessing the effectiveness (or "performance") of policy measures, including economic instruments, are addressed in document UNEP/CBD/SBSTTA/19/4.

G. Traditional knowledge

67. The Conference of the Parties noted the need for better ways to include relevant indigenous and traditional knowledge systems and the collective actions of indigenous and local communities to complement scientific knowledge in support of the effective implementation of the Strategic Plan for Biodiversity 2011-2020, with the approval and involvement of the holders of such knowledge, innovations and practices.

68. These issues may also be taken up by the Ad Hoc Open-ended Inter-sessional Working Group on Article 8(j) and Related Provisions at its ninth meeting.

69. With regard to actions undertaken by Parties to address this need, New Zealand reported on its efforts to integrate western science and traditional knowledge, including an estuary monitoring toolkit, use of cultural indicators, monitoring frameworks, and assessment tools.

70. At its twelfth meeting, the Conference of the Parties recognized the World Indigenous and Local Community Land and Sea Managers Network, an initiative of the Government of Australia now facilitated by the United Nations Development Programme Equator Initiative (decision XII/12 A). The Network promotes and facilitates community-to-community exchanges, including those involving traditional knowledge relevant for conservation and sustainable use of biodiversity.

[26] Withana, S. (2015): *Overcoming obstacles to green fiscal reform*; available at http://www.greengrowthknowledge.org/sites/default/files/Withana_Overcoming_obstacles_to_green_fiscal_reform.pdf.

[27] Forthcoming at http://www.oecd.org/env/resources/biodiversity.htm.

71. A number of other relevant activities have been initiated by the Conference of the Parties. For example, the development of guidelines for the repatriation of traditional knowledge, relevant for conservation and sustainable use of biodiversity, in response to decision XII/12 C, is currently under way and will be considered by the Ad Hoc Open-Ended Inter-Sessional Working Group on Article 8(j) and Related Provisions at its ninth meeting.

72. The Conference of the Parties has also initiated a number of activities concerning the collective actions of indigenous peoples and local communities. In response to decision XII/3 on resource mobilization, the Secretariat organized a dialogue workshop to discuss the various methodologies at hand to document and evaluate the contribution of collective action, including experiences and lessons learned in applying such methodologies, to guide Parties in providing information on this contribution through the financial reporting framework of the Convention.[28]

73. Under the Convention, work has been undertaken on indicators related to traditional knowledge. The Secretariat continues to investigate inter-agency partnerships in collecting information for indicators on traditional knowledge and, in particular, works closely with the International Labour Organization on traditional occupations, the United Nations Educational, Scientific and Cultural Organization on traditional languages and the International Land Coalition (and the International Fund for Agricultural Development and the Food and Agriculture Organization of the United Nations) on status and trends in land tenure and changing land use of traditional territories. An international training workshop on community-based monitoring, indicators on traditional knowledge and customary sustainable use and community protocols was held in Panajachel, Guatemala, from 8 to 10 June 2015. The report of the meeting was submitted to the Ad hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020 (Geneva, Switzerland, 14-17 September 2015), as well as the Subsidiary Body, as an information document.

74. IPBES has established a task force on indigenous and local knowledge systems. Under its 2014-2018 work programme, the task force continues to develop procedures for and approaches to working with indigenous and local knowledge. Experts from the Secretariat of the Convention participate actively in the work of the task force, including by serving as its chairperson, and providing information to the IPBES Secretariat on mechanisms for the effective participation of indigenous peoples and local communities.

H. Scientific and technical cooperation

75. The Conference of the Parties noted the need to foster improved scientific and technical cooperation among Parties, scientific networks and relevant organizations, in order to match capabilities, avoid duplication, identify gaps and achieve efficiencies and the need to enhance the clearing-house mechanism of the Convention to make scientific and technical cooperation more effective.

76. Technical and scientific cooperation will also be addressed by the Subsidiary Body on Implementation at its first meeting.

77. The following are among the actions undertaken by Parties to address this need as identified in their submissions:

(a) Australia noted examples of scientific cooperation, including the cooperation established by the Great Barrier Reef Marine Park Authority to address its needs for scientific information; the Antarctic Science Strategic Plan of the Australian Antarctic Division; the work of the Australian Government Office of the Supervising Scientist and the Environmental Research Institute in protecting the Alligator Rivers Region of Australia's Northern Territory from the impacts of uranium mining activities; and Bush Blitz, a cross-sector partnership drawing on the knowledge and expertise of

[28] The results of the dialogue workshop also contribute to the implementation of decision XII/5 on Biodiversity for poverty eradication and sustainable development, and decision XII/1 on the mid-term review of progress in implementation of the Strategic Plan for Biodiversity 2011-2020, including the fourth edition of the *Global Biodiversity Outlook*.

government, non-government organizations, industry and scientific institutions to document the biodiversity of Australia by studying the plants, animals and microorganisms of the National Reserve System;

(b) Mexico noted the signing of a memorandum of cooperation between CONABIO and the Institute Alexander Von Humboldt (Colombia) and the National Institute for Biodiversity of Costa Rica (InBIO), which aims to increase scientific and technical exchanges on themes of common interest;

(c) New Zealand provided information on the practice of identifying ten national science challenges in order to take a more strategic approach to the its investment in science. Identified challenges relevant to biodiversity include the biological heritage science challenge and the sustainable seas science challenge. New Zealand also noted the establishment of a participatory science platform to create research partnerships between communities and scientists and the role of the International Relationships Fund to support activities that initiate, develop and foster collaborations leveraging international science and innovation.

78. Further to decision XII/2 B, the Secretariat is working to enhance technical and scientific cooperation and technology transfer under the Convention, including through the Bio-Bridge Initiative (see UNEP/CBD/COP/12/INF/33) and to promote the strengthening of national clearing-house mechanisms. A report on relevant activities will be made available for the first meeting of the Subsidiary Body on Implementation.

79. In this context, the Secretariat is also collaborating with other relevant initiatives, including the Climate Technology Centre and Network (CTCN) and the capacity-building activities under IPBES. Information on the latter is provided in UNEP/CBD/SBSTTA/19/9.

80. The Climate CTCN, established by the Conference of the Parties to the United Nations Framework Convention on Climate Change, became operational in 2014. The mission of CTCN is to stimulate technology cooperation and enhance the development and transfer of technologies to developing country Parties at their request. It provides technical assistance to developing countries and knowledge sharing and training, with financing to individual developing countries of up to US$ 250,000 for enabling activities on climate mitigation and adaptation and mitigation. “Technologies” are understood in a broad sense to include methodologies and policies. About one third of projects comprise ecosystem-based approaches to climate change adaptation. The Secretariat of the Convention is exploring with the Centre ways and means to promote collaboration among the partners of the CTCN Consortium and Network and national focal points of the Convention and to further facilitate access to grants for ecosystem-based approaches to climate change mitigation and adaptation. Further information on CTCN will be provided in an information document.

I. Different approaches

81. The Conference of the Parties noted the need to strengthen non–monetary valuation tools and methodologies for the maintenance of ecosystem functions.

82. With regard to actions taken by Parties to address this need, Japan noted the relevance of the International Partnership for the Satoyama Initiative, launched at the tenth meeting of the Conference of the Parties and which, as of April 2015, comprised 167 organizations and the Governments of 16 countries.

83. New Zealand noted the preparation of a report on the contribution of ecosystem services delivered by indigenous biodiversity and natural ecosystems to the wellbeing of New Zealanders, as well as the publication of a comprehensive overview of the state of ecosystem services in 2013.

84. Contributions of collective actions of indigenous and local communities for the achievement of the Strategic Plan and the Aichi Biodiversity Targets, as requested by the Conference of the Parties in decision XII/1, will be addressed by the Subsidiary Body under agenda item 3.1.

II. BIODIVERSITY RESEARCH

85. As noted in the introduction, the Conference of the Parties, in its decision XII/31, decided to address, at its thirteenth meeting, ways and means to enhance the implementation of Article 12 of the Convention, which provides that:

"The Contracting Parties, taking into account the special needs of developing countries, shall:

(a) Establish and maintain programmes for scientific and technical education and training in measures for the identification, conservation and sustainable use of biological diversity and its components and provide support for such education and training for the specific needs of developing countries;

(b) Promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, inter alia, in accordance with decisions of the Conference of the Parties taken in consequence of recommendations of the Subsidiary Body on Scientific, Technical and Technological Advice; and

(c) In keeping with the provisions of Articles 16, 18 and 20, promote and cooperate in the use of scientific advances in biological diversity research in developing methods for conservation and sustainable use of biological resources."

86. While the Conference of the Parties has made a number of references in its decisions to capacity-building,[29] which relates to Article 12(a), among other provisions, this will be the first time that it addresses Article 12 specifically.

87. Paragraph (a) of Article 12 relates to education and training and will be addressed primarily by the Subsidiary Body on Implementation at its first meeting in preparation for the thirteenth meeting of the Conference of the Parties. Paragraphs (b) and (c) relate, respectively, to research and its application and will be addressed primarily through the Subsidiary Body on Scientific, Technical and Technological Advice. All three paragraphs suggest that Parties should both take national action and cooperate internationally, including taking into account the needs of, and providing support for, developing countries. Paragraph (b) makes specific reference to the role of the Subsidiary Body on Scientific, Technical and Technological Advice, through the Conference of the Parties, in guiding the actions of Parties in this regard. Paragraph 2(d) of Article 25 which mandates the Subsidiary Body to "Provide advice on scientific programmes and international cooperation in research and development related to conservation and sustainable use of biological diversity" is also relevant in this regard. While paragraph (c) explicitly links to Articles 16 (Access to and transfer of technology), 18 (Technical and scientific cooperation), and 20 (Financial resources) of the Convention, these provisions are also relevant to the other paragraphs of the Article.

88. Effective implementation of Article 12 is important in underpinning the substantive provisions of the Convention. This is reflected in Aichi Biodiversity Target 19: "By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied". Moreover, the Strategic Plan for Biodiversity 2011-2020 (decision X/2, annex) identifies "ongoing research on biodiversity and ecosystem function and services and their relationship to human well-being" as a key element for ensuring effective implementation of the Plan, including this among the "support mechanisms for research, monitoring and assessment".[30]

89. Paragraph 14 of decision XII/1, in which the Conference of the Parties took note of the key scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020, as identified by the Subsidiary Body at its seventeenth meeting, and invited Parties to take action to

[29] Of particular relevance is the capacity-building strategy for the Global Taxonomy Initiative (decision XI/29).

[30] Together with monitoring, assessment, traditional knowledge and capacity-building and technical and financial resources (decision X/2, annex, para. 25).

address the identified gaps, can be seen as an application of Article 12, paragraph (b). Thus, the Subsidiary Body may wish to consider what further actions might be taken, including the promotion and encouragement of national and international research programmes.

90. In their submissions in response to notification 2015-045, some Parties provided information on relevant national and international research programmes.[31]

91. It is noted in the Strategic Plan for Biodiversity 2011-2020 that research (on biodiversity and ecosystem function and services and their relationship to human well-being) is facilitated by, among other things, DIVERSITAS – the International Programme of Biodiversity Research, the Programme on Ecosystem Change and Society and other global change research programmes of the International Council for Science (ICSU)[32] In follow-up, DIVERSITAS developed a research agenda on biodiversity and ecosystem services: the DIVERSITAS vision 2012-2020.[33]

92. Recently, DIVERSITAS – and the other ICSU sponsored global change research programmes (the International Geosphere-Biosphere Programme, the International Human Dimensions Programme and the World Climate Research Programme, as well as projects that arose out of the Earth System Science Partnership) have been brought together under one umbrella as Future Earth, an international research platform on global environmental change and sustainability. As part of its Strategic Research Agenda, Future Earth has identified key priorities for the next three to five years. These priorities are: (a) the promotion of interdisciplinary science relevant to major global sustainability challenges; (b) the development of the products and services needed to meet these challenges; (c) to pioneer approaches to co-design and co-produce solutions-oriented science, knowledge and innovation for global sustainable development; and (d) to enable and mobilize capacities to co-produce knowledge, across cultural and social differences, geographies and generations. Future Earth includes a number of ongoing research programmes that were initiated under DIVERSITAS, including the former DIVERSITAS core programmes[34] In addition, new initiatives under Future Earth include work on global biodiversity monitoring, prediction and reporting and on linking earth system and socio-economic models to predict and manage changes in land use and biodiversity.

93. Thus, Future Earth, among other initiatives, can help to generate information and tools to address the scientific and technical needs, including those identified by the Subsidiary Body and the Conference of the Parties, to achieve the Aichi Biodiversity Targets and the 2050 Vision of the Strategic Plan for Biodiversity, as well as the broader Sustainable Development Goals. These programmes also engage an international network of scientists that can support work under the Convention as well as IPBES. The technical reports underpinning the preparation of the third and fourth editions of the Global Biodiversity Outlook were led or co-led by bioDISCOVERY, a programme of DIVERSITAS.

94. The work of Future Earth is guided by a Science Committee.[35] The Secretariat of Future Earth has recently been established with an Executive Director and a global hub located in Montreal. Further

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[31] As noted above, this information is available at https://www.cbd.int/sbstta19/submissions/.

[32] Decision X/2, annex, footnote 2. 1. The Strategic Plan also notes, with respect to assessments, the role of IPBES (para. 25(b)), and, with respect to monitoring, the roles of GEO-BON, GBIF and the Biodiversity Indicators Partnership (footnote 20).

[33] Larigauderie et al. 2012. Biodiversity and ecosystem services science for a sustainable planet – the DIVERSITAS vision 2012-2020. *Current Opinion in Environmental Sustainability*, 4: 101-5. Available at: http://www.diversitas-international.org/resources/publications/scientific-publications-1/Larigauderie-et-al_COSUST_2012_4.pdf

[34] These are: bioGENESIS (which promotes the development of new strategies and tools for documenting biodiversity, understanding the causes and consequences of diversification and connecting evolutionary biology and diversity to human well-being) bioDISCOVERY (which aims to promote the improvement of biodiversity assessments across spatial and temporal scales, different levels of biological organization, and attributes, processes and functions of biodiversity, thereby responding to needs with regard to assessing, monitoring, understanding and predicting biodiversity change); and ecoSERVICES (which investigates the impact of biodiversity change on ecosystem functioning and services, and human well-being), as well as ecoHEALTH (which seeks to understand the health implications of current and anticipated global environmental change to identify solutions to promote both human health and ecosystem integrity); and the Global Mountain Biodiversity Assessment.

[35] See: http://www.futureearth.org/science-committee.

information on Future Earth will be provided in an information note. The Secretariat is currently developing a memorandum of understanding with the Secretariat of Future Earth.[36]

III. FURTHER CONSIDERATIONS AND CONCLUSIONS

95. The foregoing account summarizes the progress that is being made in addressing the scientific and technical needs identified by the Subsidiary Body at its seventeenth meeting, including through the development of tools and guidelines, research and monitoring at the national and international levels. Submissions of actions by Parties were relatively few. Nonetheless, there has been significant progress by some organizations and partnerships to address the gaps identified at SBSTTA-17 and to develop ways and means to address the needs of Parties.

96. In particular, the establishment and consolidation in recent years of internationally coordinated programmes on biodiversity monitoring, assessment and research (through GEO-BON, IPBES and Future Earth, together with established partners, such as GBIF, IUCN and its various Commissions[37] and the Biodiversity Indicators Partnership and its members[38]) have the potential to further contribute to responding to the scientific and technical needs under the Convention.

97. Addressing scientific and technical needs under the Convention could be further facilitated by:

(a) Further work by Parties to identify their biodiversity monitoring, assessment and research needs at the national level and by SBSTTA to identify global research needs, and to communicate these needs clearly;

(b) Promoting communication and linkages between the Convention and the international programmes on biodiversity monitoring, assessment and research, including through SBSTTA, multi-stakeholder workshops and participation of national focal points in the implementation of the work programme of IPBES;

(c) Strengthened in-country efforts to link science and policy, including through enhanced communication between data providers and users including decision makers;

(d) The provision of adequate funding for biodiversity monitoring and assessment at the national level, especially in developing countries, as well as for internationally coordinated programmes on biodiversity monitoring, assessment and research;

(e) Further efforts to promote free and open access to, and the long-term maintenance of, all past, present and future public-good research results, assessments, maps and databases on biodiversity.

98. Addressing the scientific and technical needs under the Convention could also be facilitated by further enhanced cooperation in the development of portals to facilitate access to policy support tools and methodologies, as well as to related case studies and evaluations of the use of such tools. Such an approach could assist countries in identifying promising options for national application. As indicated in paragraph 6, above, this could draw upon the information compiled for SBSTTA-17 as well as information on the Convention's website, the NBSAP forum and specialized portals. This work would build upon the ongoing collaboration between the CBD Secretariat, IPBES, UNDP and other partners and contribute to supporting technical and scientific cooperation among Parties.

99. Issues related to training and technical and scientific cooperation will be further considered at the first meeting of the Subsidiary Body on Implementation.

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[36] Taking advantage of the colocation of the Future Earth and CBD Secretariats, a joint workshop to facilitate a better understanding, by delegates to the Subsidiary Body, of the research envisaged under Future Earth, as well as a potential to influence research by explaining the Convention's scientific and technical needs to Future Earth researchers, is planned to be held back-to-back with the nineteenth meeting of the Subsidiary Body.

[37] See: https://www.iucn.org/about/union/commissions/.

[38] See: http://www.bipindicators.net/.

IV. SUGGESTED RECOMMENDATION

100. The Subsidiary Body on Scientific, Technical and Technological Advice, *recalling* its recommendation XVII/1 and paragraphs 14-16 of decision XII/1 of the Conference of the Parties, may wish to:

(a) *Take note* of the information provided in the note by the Executive Secretary,[39]

(b) *Note* that some of the issues addressed may be taken up by the Subsidiary Body on Implementation at its first meeting.

(c) *Welcome* the ongoing efforts of partner organizations to support Parties in addressing the scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020;

(d) *Welcome* the collaboration among Parties, GEO-BON, UNEP, GEF and other organizations to strengthen national biodiversity monitoring systems;

(e) *Welcome* the *Global Biodiversity Informatics Outlook,* and, recalling paragraph 3 of decision VIII/11, paragraph 13 of decision XI/2, and Action 6 of the Capacity Building Strategy for the Global Taxonomy Initiative (annex to decision XI/29), *request* the Executive Secretary to work with relevant organizations to further promote open access to biodiversity related data and transparency in the development of derived metrics;

(f) *Welcome* the establishment of the *Future Earth* programme, invite its Science Committee, when developing and implementing its research agenda, to take into account the Strategic Plan for Biodiversity 2011-2020, and requests the Executive Secretary to collaborate with the Future Earth Secretariat to this end;

(g) *Request* the Executive Secretary:

(i) To continue collaboration with IPBES, UNDP and other partners to promote the coordinated development of portals to facilitate access to policy support tools and methodologies, as well as to related case studies and evaluations of the use of such tools;

(ii) Subject to the availability of resources, to collaborate with relevant organizations in order to compile information on tools to support the implementation of the Strategic Plan for Biodiversity 2011-2020, including assessments of motives and barriers to behavioural change, social marketing strategies, engagement techniques and participatory processes for the design of institutions to facilitate behaviours and promote social and economic incentives;

(iii) In collaboration with the CITES Secretariat and the international barcode of life network, to compile information and tools on applied DNA sequence-based technology for species identification ("DNA barcoding"), promote the development of DNA barcode reference libraries for priority taxonomic groups of organisms, with a special focus on endangered species (including CITES listed species) and potentially invasive species, and to promote capacity-building activities on the application of these techniques for the conservation and sustainable use of biodiversity.

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[39] UNEP/CBD/SBSTTA/19/3.