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# FACILITATING THE IMPLEMENTATION OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020 AND THE AICHI BIODIVERSITY TARGETS THROUGH SCIENTIFIC AND TECHNICAL MEANS

*Note by the Executive Secretary*

## I. INTRODUCTION

1. At its tenth meeting the Conference of the Parties adopted the Strategic Plan for Biodiversity 2011-2020 (decision X/2) and decided that, at its eleventh meeting, it would address, *inter alia*, a review of progress by Parties in the implementation of the Strategic Plan, its corresponding goals and the Aichi Biodiversity Targets, including experience in setting or adapting national targets and the corresponding updating of national biodiversity strategies and action plans.

2. At its eleventh meeting, the Conference of the Parties adopted decision XI/3 on monitoring progress in implementation of the Strategic Plan including an indicator framework. In paragraphs 11 and 12 of decision XI/3 A, the Conference of the Parties requested the Executive Secretary to undertake a number of tasks to enhance the ability of Parties and the global community at large to monitor progress in implementing the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets, in particular in relation to the indicators contained in the annex to that decision. The Conference of the Parties also requested the Executive Secretary to provide regular progress reports on the development and use of indicators and associated monitoring systems (paragraph 16 of decision XI/3 B).

3. Also at its eleventh meeting, the Conference of the Parties adopted decision XI/13 B on identifying scientific and technical needs related to the implementation of the Strategic Plan. Specifically, in paragraph 1 of that decision, the Conference of the Parties requested the Executive Secretary to prepare information on:

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(a) Scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets;

(b) Existing policy support tools and methodologies developed or used under the Convention and their adequacy, impact and obstacles to their uptake, and gaps and needs for further development of such tools and methodologies;

(c) The adequacy of observations, and of data systems, for monitoring the biodiversity attributes addressed in the Aichi Biodiversity Targets; and

(d) Options for assessing the effects of the types of measures taken in accordance with the provisions of the Convention;

and to report on progress on these matters to a meeting of the Subsidiary Body prior to the twelfth meeting of the Conference of the Parties.

4. Further to decisions XI/3 and XI/13, this note is intended to support the Subsidiary Body in reviewing the adequacy of policy support tools (section II) and the adequacy of data, observations and indicators (section III). The note also addresses new and emerging issues (section IV) in follow up to decision XI/11.

5. The note is accompanied by a number of addenda on Strategic Goals A through D[1] of the Strategic Plan for Biodiversity 2011-2020 which provide a detailed analysis of these issues for each of the Aichi Biodiversity Targets. The targets under Strategic Goal E are addressed by the Ad Hoc Open-ended Working Group on Article 8(j) and Related Provisions (Target 18)[2] or the Ad Hoc Open-ended Working Group on Review of Implementation (Targets 17 and 20) while Target 19 corresponds to agenda item 3(b) and is being addressed in a cross-cutting manner for each target.

6. Options for assessing the effects of the types of measures taken in accordance with the provisions of the Convention (paragraph 1(d) of decision XI/13 B) are addressed in a separate note (UNEP/CBD/SBSTTA/17/3).

7. The note draws upon submissions from Parties and observers provided in response to notifications SCBD/STTM/DC/ac/81207 (2013-005) of 21 January 2013, and SCBD/STTM/DC/RH/VA/81439 (2013-018) of 22 February 2013.

8. Eleven Parties (Argentina, Australia, Bolivia, Bulgaria, Canada, China, Colombia, Mexico, the European Union, France and the United Kingdom) and eight organizations (BirdLife, Conservation International, the Global Biodiversity Information Facility (GBIF), the Group on Earth Observations Biodiversity Observation Network (GEO-BON), the International Union for Conservation of Nature (IUCN), the Secretariat of the Convention on Migratory Species of Wild Animals (CMS), the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and Japan Civil Network for the United Nations Decade on Biodiversity) responded to notification 2013-005 on scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020. The submissions are available at: http://www.cbd.int/sbstta/submissions.

[1] The document on Strategic Goal D does not cover Target 16, which is being addressed by ICNP.

[2] Several Parties expressed concerns about the absence of traditional and local knowledge, innovations and practices in the assessment of progress towards the Aichi Biodiversity Targets being undertaken by SBSTTA and called for reflections on how the Convention process could better integrate the outcomes of the work under Article 8(j) as a cross-cutting issue relevant to all Aichi Biodiversity Targets.

9. Three Parties (Argentina, Brazil and China) and three organizations (ETC Group, Ottawa River Institute, Wilson Center) responded to notification 2013-018 on new and emerging issues. The submissions are available at: http://www.cbd.int/emerging.

10. An earlier draft of this note was subjected to peer-review from 5 to 15 July 2013. Comments from 17 Parties (Canada, Cook Islands, Fiji, Japan, Kiribati, Marshall Islands, Mexico, Micronesia (Federated States of), Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) and two organizations (Conservation International and Food and Agriculture Organization of the United Nations) were received and are reflected in this note.[3]

## II. POLICY SUPPORT TOOLS AND METHODOLOGIES DEVELOPED OR USED UNDER THE CONVENTION AND THEIR ADEQUACY, IMPACT AND OBSTACLES TO THEIR UPTAKE, AND GAPS AND NEEDS FOR FURTHER DEVELOPMENT OF SUCH TOOLS AND METHODOLOGIES

11. A variety of policy support tools and methodologies have been developed under the Convention and its Protocols. These tools and methodologies complement the guidance provided through the Convention's various programmes of work and are designed to facilitate their implementation. Tools and methodologies include the following:

(a) Sets of outcome-oriented global targets (2010 target, Strategic Plan for Biodiversity 2011-2020; Global Strategy for Plant Conservation);

(b) Principles and guidance such as those characterizing the ecosystem approach, the guiding principles on invasive alien species* and the voluntary guidelines on biodiversity-inclusive impact assessment providing broad guidance;

(c) The programmes of work developed under the Convention whose implementation varies in accordance with national capacities and circumstances;

(d) Tools and methods such as step-by-step guidance on the implementation of the programme of work on protected areas, case-study databases and tool boxes, providing more practical information on how an issue might be approached. Unlike the former three, these tools and methods are not formally agreed through decisions by the Conference of the Parties, though their existence and utility may be acknowledged. Further, in some cases the tools and methodological guidance may have been developed in response to requests from the Conference of the Parties.

12. In addition to policy support tools and methodologies developed under the Convention, a large number of relevant tools and methodologies have been developed by Parties and other partners and these have been in many cases acknowledged by the Conference of the Parties. In some cases, these tools and methodologies were directly recognized in decisions of the Conference of the Parties (e.g. decision IX/15 inviting Parties to make use of the framework and experiences of the Millennium Ecosystem Assessment; decision X/2 inviting Parties to make use of the findings of the study on The Economics of Ecosystems and Biodiversity; decision IX/9 inviting Parties and others to ensure the effective implementation of the Global Plan of Action for Animal Genetic Resources of the Food and Agriculture Organization of the United Nations).

[3] Comments were provided by experts in their individual capacity. 14 Pacific Island States made a joint submission prepared at the margins of the Regional Workshop for the Pacific Countries on the Preparation of the Fifth National Report (Nadi, Fiji, 22-26 July 2013).

* The guiding principles are contained in decision VI/23. One representative entered a formal objection during the process leading to the adoption of this decision and underlined that he did not believe that the Conference of the Parties could legitimately adopt a motion or a text with a formal objection in place. A few representatives expressed reservations regarding the procedure leading to the adoption of this decision (see UNEP/CBD/COP/6/20, paras. 294-324).

13. The first meeting of the Ad Hoc Open-ended Working Group on Review of Implementation considered an assessment of the thematic programmes of work as well as of the principles, guidelines, and other tools arising from the work on the cross-cutting issues identified under the Convention. This analysis included an assessment of the impact of these instruments in facilitating the implementation of the Convention which remains essentially valid today.

14. With regards to tools used under the Convention and their adequacy, the annex to the note by the Executive Secretary on the review of programmes of work, guidance and tools developed under the Convention (UNEP/CBD/WG-RI/1/3/Add.2) provided a preliminary list of tools for implementation developed under the Convention and an analysis of their effectiveness, which led to the decision that a gap analysis should be conducted prior to the development of new principles, guidelines and other tools under the Convention (paragraph 32 of decision VIII/10).

15. To update and complete the earlier analysis, the Executive Secretary invited submissions from Parties and partners through notification 2013-005, which in its Appendix I listed some 70 policy support tools and methodologies developed under the Convention, including strategies; programmes of work; tools, guidelines or principles acknowledged in decisions of the Conference of the Parties; and those developed by the Secretariat of the Convention on Biological Diversity.

16. A target-by-target analysis of the adequacy of tools and methodologies for advancing work towards each target, based both on the responses to the guiding questions in the notification and additional analysis by the Secretariat, is contained in the four addenda complementing this note. The paragraphs below contain some more general observations and conclusions that could be drawn from the detailed analysis.

17. Firstly it is worth noting that Parties use different types of tools in different ways depending on their specific needs, expectations and their capacity to access, use and apply such tools at the national level. Some countries draw on the general guidance provided by programmes of work or principles and guidelines and further elaborate these for application at national or subnational level. Other countries prefer very detailed modules on how to go about a specific problem and information on how other countries have approached an issue and then follow this guidance or adapt it for their domestic purposes. In that regard, the utility of a particular tool to a country may change over time and not all tools will have the same level of relevance to countries.

18. Secondly, and noting the point above, submissions in response to the notifications recognized that the tools and methodologies developed under the Convention are generally technically sound and comprehensive and draw on inputs from multiple stakeholders from different regions. In addition, a range of useful tools and guidance has been developed by Parties and other partners. Together these provide a good basis along the gamut of approaches from which Parties or natural resource managers can choose for a particular purpose.

19. Thirdly, the impact of a tool or methodology varies from one tool to another. The Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets stands out in terms of its broad acceptance as a framework for the biodiversity community as well as a tool for mainstreaming biodiversity into other sectors and communities. While most Parties are in the process of updating, or have already updated, their national strategies and action plans, including by setting corresponding national targets, the Strategic Plan is also influencing work programmes and strategies of other partners and processes. The Global Strategy for Plant Conservation, as a "plant subset" of the Strategic Plan, continues to be particularly effective in engaging a community active in *in situ* and *ex situ* conservation of plants.

20. Among the thematic programmes of work, the programme of work on protected areas is widely recognized and used and has both led to, and is a consequence of, the preparation of a whole range of supporting materials and guidance. The document on progress in implementing Target 11 prepared for

the eleventh meeting of the Conference of the Parties (UNEP/CBD/COP/11/26) provides evidence on its use and impact. Other programmes of work are particularly relevant to certain Parties (e.g. island biodiversity, marine and coastal biodiversity, mountain biodiversity, dry and sub-humid lands biodiversity) or stakeholders (forest biodiversity, agricultural biodiversity, inland water biodiversity) and can serve as tools for mainstreaming biodiversity within national, regional and sectoral policies.

21. Work on the cross-cutting areas identified by the Convention has led to the adoption of programmes of work (e.g. incentive measures), principles (e.g. ecosystem approach); guidelines (e.g. impact assessment); combinations thereof (e.g. invasive alien species, sustainable use) and protocols (access and benefit-sharing, biosafety, liability and redress under the Biosafety Protocol).

22. Fourthly, obstacles to the uptake and use of tools could include factors such as lack of ownership, them not being rooted in the reality of potential users, or their inability to speak and reach out to multiple stakeholders, making them effectively inaccessible for certain users. Along those lines, one of the submissions noted that there appears to be limited awareness of the tools developed under the Convention, possibly because those requesting that a tool be developed may not be the same people using it nationally. The people working on the ground, who might benefit from the tool, may not know of its existence. Moreover, the tools developed under the Convention would tend to be better known by the national authority responsible for the Convention than at subnational or local level where they might be of relevance.

23. The note prepared for the sixteenth meeting of the Subsidiary Body (UNEP/CBD/SBSTTA/16/2) provided a preliminary analysis of the scientific and technical needs for the achievement of the Aichi Biodiversity Targets. The various addenda to this document identify some gaps in policy support and methodologies for each of the Aichi Biodiversity Targets. Drawing upon those documents, there follows a list of potential gaps. The following gaps are provided to support discussion by the Subsidiary Body and is intended to be neither definitive nor exhaustive:

(a) Target 1 - Tools and methodologies for coherently monitoring or assessing levels of awareness at the global scale are limited;

(b) Target 2- There is a need to develop tools and methods to recognize the complete range of biodiversity values including its social and cultural importance;

(c) Target 3 - The identification and development of tools or methodologies to address non-economic incentives, such as the incentive effect of institutions (e.g. land tenure) would help to fill a gap;

(d) Target 4 - A major gap is the limited application of the social sciences as human actions are critical to sustainable and equitable biodiversity management, attempts to redress the rapid decline of biodiversity and ecosystem services should be informed by an understanding of why people – individually and collectively – claim, use and value biodiversity, including how the values and behaviour of individuals and collectives shape and are shaped by institutions. While this gap is identified in relation to target 4 it is relevant to many of the Aichi Biodiversity and in particular those under Strategic Goal A;

(e) Target 5 – Land-use change remains the most significant driver of biodiversity loss. While it is addressed in all thematic programmes of work under the Convention on a biome-by-biome basis, there is a need to consider land-use change in a more integrated and holistic way to achieve Target 5, as decisions on land use in one area or ecosystem have multiple effects in other areas and ecosystems. There are a large number of tools and approaches for spatial planning (and related concepts such as land-use planning, ecological and economic zoning) used by Parties (especially at the subnational level) and by organizations, including tools and approaches for recognizing trade-offs and to facilitate discussions among stakeholders to resolve potential conflicts. However, these are not readily accessible

to all Parties and stakeholders. Work to compile and to facilitate exchange of these tools and approaches could fill this gap;

(f) Target 6 - Gaps mostly surround the need for greater communication and cooperation between the fisheries sector and the environment sector;

(g) Target 7 - A major gap is the lack of policy coherence, and to some extent consensus, on the most appropriate models for global sustainable agricultural development. There is an ongoing debate on this subject essentially between approaches based on further intensification and simplification of agriculture (e.g., monocultures relying on a limited number of crops, with intensive external inputs) *versus* approaches based on re-establishing ecosystem services, increasing diversity and emphasizing small-scale production systems (noting that these approaches are not necessarily mutually exclusive). Likely, a balance between the two approaches would be required, but there is limited consensus on what that balance is in practice;

(h) Target 8 - A more thorough review is required to determine if more information related to critical loads, safe ecological limits and thresholds for different pollutants in different ecosystems and on different categories of organisms is warranted. Other possible gaps include the need for additional guidance to address the drivers of nutrient pollution, particularly subsidies, and policies to reduce the use of non-biodegradable plastics that constitute a major source of marine debris;

(i) Target 9 - Potential gaps in international regulatory framework related to invasive alien species have been reviewed under the Convention. Possible gaps include animals introduced as pets, aquarium and terrarium species, live bait and live food, and introductions resulting from international web-based market places. Material to explain how the implementation of international standards can be undertaken is currently lacking, as already recognized by the Conference of the Parties. Methodology gaps may also include: (i) how to develop strategies to prevent potential alien species from becoming invasive to the country; (ii) pathway analysis; (iii) prevention of aquatic invasive invertebrates; and (iv) cost-benefit analysis of eradicating or controlling invasive alien species;

(j) Target 10 - The main gap is the absence of accessible tools to amalgamate the existing guidance in various fields, at the ecosystem level;

(k) Target 11 - Despite the large volume of guidance on protected areas, a number of gaps do exist. These include the need for tools and guidance on:

(i) The recognition and/or integration of indigenous and community conserved areas and private reserves in national protected area systems;

(ii) The equitable management of protected areas;

(iii) The integration of protected areas into the wider landscape and seascape;

(iv) The protection of inland water ecosystems;

(v) Safeguarding protected areas threatened by industrial activities such as mining, or road and dam construction;

(vi) The designation and management of protected areas in the open oceans and deep seas; and

(vii) The design and management of protected areas and protected area networks under scenarios of climate change, especially those that exceed an average 2 degrees warming for this century.

(l) Target 12 - Gaps include the need to coordinate existing species management approaches, to better address extinction pressures associated with illegal harvest and trade, and the need to develop assessment methodologies for those species that are not currently reflected in red-lists such as fungi and invertebrates and then use that information to develop recovery plans;

(m) Target 13 - Additional tools may be needed to enhance the protection of crop wild relatives in protected areas and to promote on-farm conservation at the landscape level;

(n) Target 14 - Possible gaps include methodologies or tools for identifying and prioritizing those ecosystems that are particularly important for the provision of goods and services important for well-being particularly of women, indigenous and local communities, and the poor and vulnerable and guidance for assisting Parties in managing ecosystems for the delivery of multiple ecosystem services;

(o) For Target 15 - Tools and methodologies could be compiled to help in identifying potential areas for restoration, including through assessments of costs and benefits, including co-benefits.

24. In conclusion, it appears that the policy support tools and methodologies developed under the Convention or otherwise available to Parties are generally useful and technically sound but that additional efforts should be devoted to communicate their existence and value to potential users, including through the clearing-house mechanism of the Convention, and in some cases to develop additional explanatory and/or practical demonstration material. It is important to note that decision support tools need to be tailored to the level at which decisions are made. In that regard, global tools can serve primarily for communicating and highlighting general issues and to provide guidance for the development of more specific national and subnational decision support tools. Additional efforts under the Convention should be dedicated to supporting countries in the development of tools suitable for national and subnational application as the global policy support tools and guidance currently available appear to be adequate for making progress towards the Aichi Biodiversity Targets.

## III. THE ADEQUACY OF OBSERVATIONS, AND OF DATA SYSTEMS, FOR MONITORING THE BIODIVERSITY ATTRIBUTES ADDRESSED IN THE AICHI BIODIVERSITY TARGETS

25. Effective monitoring of the status and trends of biodiversity is necessary to enable Parties, individually, and collectively through the Conference of the Parties, to review the implementation of the Convention, the Strategic Plan for Biodiversity 2011-2020, national biodiversity strategies and action plans and assess progress towards the Aichi Biodiversity Targets and related national targets. Indeed monitoring is an obligation of Parties to the Convention (Article 7(b)) and the global monitoring of biodiversity is identified in the Strategic Plan as one of a number of key elements to ensure its effective implementation. Specifically paragraph 25 (a) of the Strategic Plan notes that "work is needed to monitor the status and trends of biodiversity, maintain and share data, and develop and use indicators and agreed measures of biodiversity and ecosystem change."

26. The report on the adequacy of biodiversity observation systems to support the Aichi Biodiversity Targets (UNEP/CBD/SBSTTA/15/INF/8), prepared in 2011 by the Group on Earth Observations Biodiversity Observation Network in collaboration with other organizations, and welcomed by the Subsidiary Body in recommendation XV/1, listed variables, datasets and indicators available for monitoring progress towards each Aichi Biodiversity Target, highlighted the gaps and data limitations and on that basis, assessed the adequacy of information for tracking progress towards each target. The report noted that the observation systems at global level are generally adequate for Strategic Goals B and

C (i.e. Targets 5 through 13), though improvements should be made to enhance coverage, resolution or cover additional components. For Targets 4 and 15, elements for a global observation system exist but major components are yet to be put in place to enable an adequate assessment of progress. Observation systems for the remaining targets considered in this note (Targets 1, 2, 3, 14, and 19) were considered inadequate when the analysis was undertaken. The report also noted that for all targets, including those with inadequate global observation systems, a wealth of observations exists at sub-global level and that these could serve as the core for building global systems that would enable assessing the status of achievement of the targets within a few years.

27. Equally, several submissions responding to notification SCBD/STTM/DC/ac/81207 (2013-005) noted a general inadequacy of biodiversity data or referred to specific gaps and one submission maintained that the limited availability of biodiversity information (observations and monitoring data) can make the application of certain tools difficult.

28. The following paragraphs discuss the need to improve *in-situ* observations, remote sensing information, data management and analysis and the availability of indicators in general terms. More detailed information relating to each Aichi Biodiversity Target is contained in the addenda to this note (documents UNEP/CBD/SBSTTA/17/2/Add.1, 2, 3, and 4). This note builds upon and updates the information provided to the Conference of the Parties at its eleventh meeting (UNEP/CBD/COP/11/27).

*In situ observations*

29. *In-situ* observations are being undertaken at various levels, frequencies and over different durations. *In-situ* observations are an essential component of tracking changes in biodiversity. However they are generally expensive and to be useful as a contribution to global monitoring they should be predictable in terms of coverage and frequency and follow a sampling protocol. It should be a priority to ensure the maintenance and continuity of existing long-term monitoring programmes. *In-situ* observation systems developed for regional, national or local monitoring can be important for supporting decision making at sub-global scales. At the global scale, these systems can collectively enable qualitative assessments (e.g. the Ramsar Convention assesses, based on national reports, the percentage of wetlands in which biodiversity is improving, stable or declining). However, because of lack of consistent protocols, they cannot be quantitatively aggregated for global assessments.

30. Systematic observations at the level of biomes, ecosystems, and habitats are being undertaken for forests as part of national forest inventories and as contributions to the Global Forest Resources Assessments led by FAO. Systematic observations on a number of other ecosystem types or biomes are being undertaken as part of regional programmes and initiatives (e.g. for mountain ranges, river basins, mangroves, coral reefs etc.), or as part of national programmes (e.g. wetlands, protected areas). In many cases, *in-situ* observations are being combined with remote sensing data.

31. Systematic observations are also being undertaken for selected taxonomic groups, particularly those for which a combination of available expertise, conservation concern and degree of organization have led to concerted efforts, led for example by various IUCN species specialist groups, BirdLife International and its national partners, and the Tropical Ecology Assessment and Monitoring (TEAM) network. Similarly, a number of initiatives have rallied around functional groups such as invasive alien species, migratory species or pollinators. Further some specific species are the particular focus of efforts under species-based conventions (CITES, CMS and its agreements) or efforts linked to species of particular concern (e.g. great apes, elephants, tigers) and efforts to prevent them from being driven into extinction (e.g. Alliance for Zero Extinction).

32. In addition to data and observations being generated by trained specialists, the potential for citizen science to contribute valuable information is increasingly being recognized. Already ornithological information draws to a large extent on volunteer efforts and this success is due to a

combination of the existence of passionate individuals with often a lot of expertise, the existence of sampling protocols used worldwide, and a high potential to organize and mobilize volunteers that enjoy contributing to a larger objective, with professionals who analyse the information and communicate the results in a meaningful way. Citizen science has a great potential for cost-effective generation of data and observations. However, for such an initiative to generate quality data that can contribute to systematic long-term monitoring, it needs to be well planned, carefully managed and adequately funded with a view to long-term sustainability and accuracy.

33. Other observations come as a result of taxonomic, ecological or other projects and initiatives that generate quality data but are not part of long-term observations and monitoring. Significant investments have already been made to "discover" this data and to make it accessible and enable analysis across data holders. The Global Biodiversity Information Facility helps to link a network of biodiversity information facilities by providing the informatics infrastructure and related services in support of biodiversity research and monitoring.

34. An additional criterion to fill in existing gaps in monitoring for regions/continents where data is sparse is the assessment of important biophysical gradients in these regions and a careful stratification of monitoring sites to cover the whole extent of these gradients. If the main gradients are captured, modelling can easily fill in unobserved areas. This can be more cost-effective than trying to achieve complete geographical coverage.

35. In conclusion, priorities should be: (i) the continuation of existing *in-situ* observation efforts so as to have the assurance of reliable time series information; (ii) the mobilization of existing data; (iii) enhancement of modelling efforts which can provide a cost-effective way of filling some gaps; and (iv) leverage of additional monitoring through well-planned and adequately financed citizen science. Plans for filling observation gaps should be developed with a view to their sustainability and with a view to fill gaps in coverage along major biophysical gradients.

*Remote sensing information*

36. The Group on Earth Observations (GEO) is an effort through which countries coordinate activities to optimizing observations along nine societal benefit areas including biodiversity and ecosystems through an optimal mix of space-based, airborne and *in-situ* observing platforms within an interoperability framework. As part of the implementation of the GEO Work Plan 2012-2015[4] a large number of organizations and researchers seek to convert primary observation data into value-added products, models, maps and other analysis tools and services, thereby increasing the availability of useful information to the biodiversity community. GEO also promotes an open data policy for satellite imagery.

37. The decision to distribute Landsat data freely via the Internet has led to a significant uptake, usage and development of value-added products and services as evidenced by the numbers of downloaded scenes and the economic benefits from the expansion of services from their analysis for a range of users. The Instituto Nacional de Pesquisas Espaciais (INPE) in Brazil reports that the free availability of near real-time imagery of the Amazon forest has led to increased awareness of, and participation by stakeholders in conservation and sustainable management of forests, and enhanced compliance with forest legislation. Calls have been made to other agencies to follow these examples. For instance in a letter to the Director General of the European Space Agency and copied to the Director General of DG Enterprise and Industry of the European Commission, dated February 2013, the Executive Secretary called for the free and open access to relevant services from the Global Monitoring for Environment and Security (GMES) programme so as to facilitate their wide application and use in support of decision-making and policy development as related to the conservation and sustainable use of biodiversity.

[4] http://www.earthobservations.org/geoss_imp.php

38. Even where data is available, the cost of further processing and analysis, and in some cases limited technical capacities, limit the preparation of products derived from geospatial data that would be suitable to support decision-making. Moreover, technical advances and changes in monitoring techniques often prevent the production of comparable products suitable for monitoring over time, at given intervals. Furthermore, in many countries remote sensing capacities are not located in the institutions responsible for biodiversity. Biodiversity planners therefore need to systematically engage with the agencies that hold land use and land cover information and participate in spatial planning processes so as to bring biodiversity considerations into the discussion.

39. In a review study on the use of remote sensing information for biodiversity management and planning, which is currently underway under the auspices of UNEP-WCMC, the following conclusions are emerging:[5]

(a) Remote sensing already makes important contributions to the monitoring and assessment of biodiversity, and thereby contributes to positive outcomes for biodiversity. For example, the monitoring of deforestation in the Brazilian Amazon has allowed policies to reduce deforestation to be identified, implemented and enforced and has also helped to inform public opinion in support of these actions;

(b) There is a large potential for remote sensing to provide enhanced contributions to the monitoring and assessment of biodiversity, but this potential is often not reached due to a number of obstacles that need to be overcome, for example:

(i) Limited harmonization of methodologies and data collection - Greater coordination of methods in data collection and processing is required for harmonized earth observation products. For example, a harmonized habitat monitoring methodology, devised by both earth observation and biodiversity researchers, would allow for uncertainties related to the inter-comparison of national-level habitat classification systems to be reduced. Harmonizing methodologies and data collection will be key if we are to link observing systems worldwide to successfully establish an integrated global biodiversity monitoring system;

(ii) Limited time series data - Many of the products of remote sensing, and their demonstration initiatives, are one-off, providing spatial snapshots rather than temporal change analyses, limiting their utility for tracking the Aichi Biodiversity Targets. The lack of time series of important *in situ* biological data sets to compare against remotely sensed observations is also an important constraint;

(iii) Limited access to data from remote sensing - While some data of appropriate spatial and temporal coverage and resolution is freely available, access to other potentially valuable and complementary data incurs a financial cost. Free and open access to all taxpayer-funded satellite remote sensing imagery would address this significant constraint. In addition, limited internet access, particularly in developing countries, hinders accesses to datasets even when freely available;

(iv) Limited capacity in many countries to process data and interpret results - Significant computational power and human resources may be required to

[5] The study, once completed, will be made available for information of delegates of SBSTTA-17.

process the data and create the kinds of analytical products suitable to inform indicators and assessments of progress towards the Aichi Biodiversity Targets;

(v) Lack of communication between date providers and (potential) users - Creating a dialogue between data providers and users is key to realizing the potential of remotely sensed data. To date, this dialogue has been limited. A closer relationship between the earth observation community and potential users in the biodiversity policy and management communities would help to enhance understanding, align priorities, identify opportunities and overcome challenges, ensuring data products more effectively meet user needs.

(c) Current developments have the potential to improve value of remote sensing data and provide near-real-time monitoring. Key areas of development surround land-cover change and water/air quality among others, for example:

(i) Land-cover change has been the main area of use of remote sensing for biodiversity monitoring to date, and therefore it is the most developed. However the majority of work has been done around forests. Expansion of the use of remote sensing to monitor land-cover change in other habitats such as grassland, savannah and wetlands is a key area of development over the next years;

(ii) Further, remote sensing has considerable potential in monitoring the spatial extent of polluting material both in the upper atmosphere, on the land surface and in the marine environment. Though this is a relatively new application of earth observation satellite technology, it is a promising field of development;

(iii) Innovations in remote sensing techniques in other areas offer additional opportunities including helping to fill some of the key gaps for targets for which it has proven difficult to develop indicators using only *in-situ* data. However, *in-situ* data and statistical modelling are also required to create comprehensive indicators.

40. In conclusion, it will be important for Parties to express their needs for remote sensing data and products and to convey these to the community that can help deliver such products. In many countries, the technical capabilities to prepare land-cover change analyses exist but these are not automatically at the disposal of those responsible for biodiversity. The need to draw on such resources becomes even more pressing with opportunities to use remote sensing approaches for ecosystem accounting. The seventeenth meeting of the Subsidiary Body offers space for discussion on how to overcome barriers to the use of remote sensing for tracking trends in biodiversity.

*Data management and analysis*

41. In its report on the Adequacy of Biodiversity Observation Systems to support the CBD 2020 Targets (UNEP/CBD/SBSTTA/15/INF/8), prepared in 2011, the Group on Earth Observations Biodiversity Observation Network (GEO BON), in collaboration with other organizations, identified a need to improve the means of gathering and analysing data and to speed up its transformation into knowledge so as to enable rapid policy responses. To achieve this, GEO BON called for enhancements in data, knowledge and capacity and technology transfer frameworks and notes that several instruments to promote such enhancements have already been put in place.

42. The Global Biodiversity Informatics Outlook (GBIO), prepared by the participants of the Global Biodiversity Informatics Conference (Copenhagen, July 2012) hosted by the Global Biodiversity Information Facility, proposes a strategy for delivering biodiversity knowledge for science and policy by

making better use of biodiversity data and information.[6] In an integrated way, the Global Biodiversity Informatics Outlook provides a framework combining existing initiatives with new requirements for creative collaboration and investment with a view to servicing the needs of end users. Research funding bodies should evaluate their biodiversity investments in the light of this framework. The GBIO is being provided as an information note to the seventeenth meeting of the Subsidiary Body.

43. The GBIO strategy proposes actions in the following areas:

(a) Creating a *culture* of shared expertise, robust common data standards, policies and incentives for data sharing and a system of persistent storage and archiving of data;

(b) Mobilizing biodiversity *data* from all available sources to make it promptly and routinely available. Data should be gathered only once, but used many times. This includes data in all forms from historic literature and collections to the observations made by citizen scientists; from the readings of automated sensors to the analysis of the genetic signatures of microbe communities;

(c) Providing the tools to convert data into *evidence* by enabling this data to be discovered, organizing it into views that give it context and meaning. This includes major collaborative efforts to improve the accuracy of data and its fitness to be used in research and policy, to provide a taxonomic framework, and to organize information about the traits of species and the interactions between them; and

(d) Generating *understanding* of biodiversity and our impacts upon it, by applying the evidence in models, tools for visualization and identifying gaps to prioritize future data gathering.

44. While most of the twenty components under these four areas are directly targeted at the scientific community, the five components under *culture* are relevant to biodiversity policymakers, particularly with regard to recommended actions over the short, medium and long term, as shown below:

(a) Biodiversity knowledge network - Benefiting from the expertise of the whole global community. This entails, *inter alia*, the development and wide use of a shared identity management system for contributors of data and the creation of open source tools and interfaces;

(b) Data standards - Ensuring data can be understood and used across systems and across disciplines. This entails, *inter alia*, the development and wide use of interoperable standards and common vocabularies to support planned data use and reuse in the other components;

(c) Persistent storage and archives - Creating a stable data archiving infrastructure to ensure no data is lost or mislaid. This entails, *inter alia,* guidance on how to organize data to simplify future archival and maintenance and how to plan storage facilities that will guarantee long-term access and interoperability with a view to the establishment of data repositories that provide a persistent home for research data and key citizen science data products;

(d) Policy incentives - Creating a policy framework that actively encourages the sharing and reuse of biodiversity data, however this data has arisen. This entails, *inter alia,* increased funding for digitization efforts and the creation of persistent storage and data archives; and

(e) Open access and reuse culture - Making data-sharing the norm. This entails mechanisms for citing data and improved data quality citations akin to citing scientific publications.

[6] The summary is accessible from http://www.gbif.org/orc/?doc_id=4937.

45. The Global Biodiversity Informatics Outlook provides a framework for managing, analysing, using and communicating biodiversity data. GBIO provides a framework around which funders, policymakers, researchers, information technology specialists, educators and the general public can unite to advance our ability to manage and analyze biodiversity information and data.

*Indicators*

46. In its decision XI/3, the Conference of the Parties took note of the indicative list of indicators (annexed to the decision), recognized that these provided a starting point for assessing progress in the achievement of the Strategic Plan for Biodiversity 2011-2020 at various scales, and invited Parties to use them, in a flexible way, in their updated NBSAPs and reporting. The Conference of the Parties also decided that the framework should be kept under review. Further, the Conference of the Parties requested the Executive Secretary, in collaboration with the Biodiversity Indicators Partnership and other partners to:

(a) Provide *capacity-building* to support use of the indicators by Parties (paragraph 11);

(b) *Further develop the global indicator framework* (paragraphs 12 (b) and (c));

(c) Further develop *practical information* on the application of the indicators, including online (paragraphs 12 (a), (g) and (h);

(d) Promote *collaboration* on indicators with other conventions and other sectors and to assist the process to establish the sustainable development goals (paragraphs 12 (d), (e) and (f)).

47. Concerning *capacity-building*, the Biodiversity Indicators Partnership has focused on strengthening capacities at national level to track and report on progress against national biodiversity targets being established in response to decision X/2, *inter alia*, through a series of regional capacity-building workshops and the training of biodiversity indicator facilitators (responding to paragraph 11 (c)). Guidance material emerging from these capacity-building events and from technical work on indicators (paragraph 11 (a)) and details on progress achieved through these activities are provided in an information note and on the web pages of the Biodiversity Indicators Partnership.[7]

48. Support and guidance to assist Parties to initially establish and apply a few simple, cost-effective and easily applicable indicators for reporting (paragraph 11 (c)) has also been provided to Parties through sessions on indicators included in regional workshops on updating NBSAPs and in regional workshops on the preparation of fifth national report.

49. Concerning the *further development of the global indicator framework*, with a view to ensuring that each Aichi Biodiversity Target can be monitored by at least one global indicator by 2014 (paragraph 12 (b)), a number of additional indicators for global use have been identified by the Biodiversity Indicators Partnership in addition to those already included in the annex to decision XI/3. These are: the Biodiversity Barometer (to track public awareness and attitudes on biodiversity for Target 1), the number of fisheries certified by the marine Stewardship Council (for Target 6), and the loss of reactive nitrogen to the environment (for Target 8) and the Ocean Health Index (for Target 10). In addition, Targets 16 and 17 can be monitored on the basis of information provided by countries to the Convention concerning ratification of the Nagoya Protocol and updating of NBSAPs. Together, these address a number of the gaps previously identified. It is expected that these indicators will be reflected in the second edition of the Aichi Passport,[8] being launched at the seventeenth meeting of the Subsidiary Body.

[7] www.bipindicators.net and www.bipnational.net

[8] The first edition of the Aichi Passport can be accessed from: http://www.unep-wcmc.org/the-aichi-passport-app-now-available_936.html

50. Additional indicators are available at national level as noted below and in the addenda to this note (documents UNEP/CBD/SBSTTA/17/2/Add.1, 2, 3, and 4). Therefore, even for a few Aichi Biodiversity Targets for which currently no global indicator exists, it is expected that sufficient indicator information at the subglobal level or proxy information will be available to complement the findings provided by Parties and from the scientific literature, thereby enabling assessments of progress towards each target by the time of the twelfth meeting of the Conference of the Parties.

51. In paragraph 12 (c) of decision XI/3, the Conference of the Parties requested the Executive Secretary, working with others, to propose a limited number of simple, easily applicable and cost-effective indicators that can potentially be used by Parties, as appropriate, and taking into account their particular conditions and priorities. In the same decision, Parties are invited and encouraged, where appropriate, to apply the indicators that are ready for global use and to contribute national data to global indicators as a contribution to coordinating indicator production (paragraphs 6 and 7).

52. In considering this, and without implying a comprehensive, necessary, sufficient or minimum set of indicators that will meet all the needs of Parties in monitoring progress towards all of the Aichi Biodiversity Targets, and recognizing the diverse circumstances and individual needs of Parties in developing indicators for their own purposes within the context of NBSAP revision, implementation and monitoring, the following suggestions are made.[9] The most simple, easily applicable and cost-effective indicators that can potentially be used by Parties are likely to include indicators that meet one or more of the following characteristics:

(a) Indicators relating to the activities of Parties in response to the Aichi Biodiversity Targets. These process indicators based on the actions of Parties are usually simpler to collect than outcome indicators of trends in biodiversity threats, status and associated ecosystem service benefits. Although not a substitute for outcome indicators, indicators of the actions of Parties regarding policies, plans, processes and mechanisms revised, reformed, adopted or established, or information on financial resources mobilized, are complementary and can assist in monitoring progress in a range of Aichi Biodiversity Targets, especially under Goals A and E. Examples of such process indicators include: Trends in communication programmes and actions promoting social corporate responsibility, trends in integration of biodiversity and ecosystem service values into sectoral and development policies, or trends in implementation of national biodiversity strategies and action plans, including development, comprehensiveness, adoption and implementation;

(b) Indicators for which data is already available nationally and which may be in use in other contexts and for other processes, for example those collated by United Nations agencies such as FAO, those reported in the MDG process, or within regional bodies such as the United Nations Economic Commissions or free-trade areas. Examples of such indicators include: trends in extent of selected biomes, ecosystems and habitats (derived for forests from the contributions to the FAO Global Forest Resources Assessment); trends in proportion of total freshwater resources used (MDG indicator 7.5)), or trends in water quality in aquatic ecosystems;

(c) Indicators derived from available data relating to particular sites, populations or taxa within countries that can be easily compiled into a national aggregate or index. Such data may be available from government or non-governmental sources which, if compiled, can be aggregated into an overall trend index. Examples include trends in coverage of protected areas or trends in abundance of selected species (based on available data from which a national population abundance index akin to the Living Planet Index could be constructed);

[9] These draw on the work of an informal group of experts established by the Executive Secretary and working through an electronic discussion forum.

(d) Indicators developed regionally or globally through the compilation of national data or using global data which is available at a resolution sufficient to permit national disaggregation. Downscaling of such existing regional or global indicators, subject to appropriate validation and where such datasets and indicators are not maintained by individual Parties themselves, could be a cost-effective solution in some cases. Examples include trends in extinction risk of species (national Red List Indices can be derived from global datasets for a range of taxonomic groups, but they are more robust if based on national-scale red list assessments) or trends in protected area condition and/or management effectiveness including more equitable management (protected area management effectiveness assessments using standard methods are being undertaken and repeated in increasing numbers of protected areas worldwide. Information should be available from national protected area authorities. In addition results are collated internationally and can be disaggregated nationally).

53. Many of the operational indicators deemed ready for use at global level contained in the indicative list of indicators annexed to decision XI/3, that is those indicators placed in Category (A), meet one or more of the characteristics listed above. These indicators therefore represent a possible starting point for Parties seeking to develop simple, cost-effective indicators.[10] There will be other important indicators that are easily applicable at national level or which could be developed given modest investments in new monitoring, data gathering or expert assessment, and appropriate analytical and institutional capacity, including many of those classified as "(B)" (i.e. indicators which could be used at the global level but which require further development to be ready for use) and "(C)" (i.e. additional indicators for consideration for use at the national or other sub-global level) in decision XI/3.

54. Work is ongoing concerning the further development of *practical information* on the indicators (paragraph 12 (a)) and the further development of the online database on indicators for the Strategic Plan for Biodiversity 2011-2020 (paragraph 12 (g)). Fact sheets are already accessible on all indicators developed globally (both through the BIP pages and the CBD indicators database). The database has been updated in the light of decision XI/3. Plans are underway to better link it with the web pages of the Biodiversity Indicators Partnership. It should also be linked to the online reporting tool referred to in paragraph 56 as well as to the pages of the NBSAP Forum.[11]

55. Work is underway to develop an explanatory practical toolkit on each of the Aichi Biodiversity Targets, including possible steps for measuring progress towards these targets, taking into account national conditions and priorities, in line with the request in paragraph 12(h) of decision XI/3. A draft will be issued as an information note for participants in the seventeenth meeting of SBSTTA.

56. The practical toolkit will support the online tool for national reporting that is under development to complement the fifth national reports. This tool will enable countries to enter information on regional, national and/or subnational targets, how they link to the Aichi Biodiversity Targets, how countries intend to assess progress and, where possible, which indicators would be used and how they link to the indicators contained in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 contained in decision XI/3. Through the online reporting tool, countries can periodically update progress towards each of their national targets. It will also enable identifying indicator development needs at national level. The tool will also facilitate technical cooperation among Parties on monitoring and the design and application of indicators.

57. As indicated in addenda to this note (documents UNEP/CBD/SBSTTA/17/2/Add.1, 2, 3, and 4), there are a range of indicators and associated data sources available for use by Parties to assist them in assessing progress towards each of the Aichi Biodiversity Targets and associated national targets. They provide a starting point for the development of the practical toolkit.

[10] Detailed technical descriptions of indicators are prepared and compiled through the Biodiversity Indicators Partnership and are available from www.bipindicators.net.

[11] http://nbsapforum.net/

58. Concerning *collaboration* on indicators with other processes, the indicative list of indicators annexed to decision XI/3 already notes which indicators are also used in other processes and the Biodiversity Indicators Partnership is actively looking for existing indicators in other processes and sectors that could be used for monitoring progress towards selected Aichi Biodiversity Targets. This is facilitated by the increasing recognition of the Strategic Plan for Biodiversity 2011-2020 as a common framework for strategic planning.

59. The Secretariat has been providing inputs to the process for developing the SDG process, including by providing information related to the goals, targets and indicators of the Strategic Plan. The report on "Statistics and indicators for the post-2015 development agenda", prepared by the United Nations System Task Team on the Post-2015 Development Agenda Working Group on Monitoring and Indicators, prepared by over 60 United Nations entities, references decision XI/3 and the indicators framework developed under the Convention. [12]

60. The identification and addition of new indicators has involved further collaboration with different sectors, for example the addition of a new indicator on the number of certified fisheries and the re-housing of the forest certification indicator within the Forest Stewardship Council. The Biodiversity Indicators Partnership will continue to identify and develop new indicators for monitoring progress towards the Aichi Biodiversity Targets and cross-sectoral engagement and collaboration is considered essential for success.

61. The Conference of the Parties also invited the Group on Earth Observation Biodiversity Observation Network (GEO–BON) to continue its work on the identification of essential biodiversity variables (paragraph 13 of decision XI/3). GEO BON is identifying a list of Essential Biodiversity Variables that should be monitored by regional, national and subnational networks. Essential Biodiversity Variables obey a set of criteria: (a) they are measurable with current methods and resources; (b) they are scalable and can be used by systems monitoring areas of different size; (c) they are sensitive to ecological change in time intervals relevant for decision-making (a few months to a few decades); (d) they are generalizable across different biogeographical realms and taxa; and (e) they are relevant to assess the 2020 targets.

62. These variables are organized into six major categories: genetic composition, species populations, species traits, community composition, ecosystem structure and function. Information organized around these variables allows merging observations from different sources and systems, but it is sufficiently detailed to allow spatial modelling of the influence of different drivers on biodiversity and the validation of scenarios under different policy choices. Most biodiversity indicators being developed for the Aichi Biodiversity Targets can be derived from Essential Biodiversity Variables datasets, with several Essential Biodiversity Variables, such as species population abundances, informing multiple targets.

63. The Essential Biodiversity Variables can assist Parties to the Convention on Biological Diversity in establishing monitoring systems that address their reporting needs and provide the observational datasets for assessments to be developed by the Intergovernmental Platform on Biodiversity and Ecosystem Services.

64. In conclusion, the ability to measure progress towards the Aichi Biodiversity Targets is improving and some gaps have already been filled. The guidance of the Conference of the Parties emphasizes the flexibility of using different indicators, encouraging the use of indicators that Parties consider suitable for their purposes, while at the same time pointing out the advantage of developing a smaller set of indicators based on a standardized methodology to support coherent data collection and analysis at the global level. Resources to develop new indicators and collect the necessary data for them are scarce and additional resources need to be identified to maintain and enhance biodiversity monitoring

[12] http://www.un.org/en/development/desa/policy/untaskteam_undf/UNTT_MonitoringReport_WEB.pdf

systems. Smart choices are needed to continue or develop cost-effective monitoring systems, including by using proxies or expert assessment to complement indicators for which good data exists. A move towards more harmonized use of indicators across countries is desirable and there are indicators among those ready for use at global level that are particularly suitable for use at national level.

## IV. NEW AND EMERGING ISSUES

65. Proposals for possible new and emerging issues may point to scientific and technical needs that should be addressed under the Convention or in collaboration with partners. It is therefore appropriate to discuss new submissions in the context of the discussions on the identification of scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets.

66. By 6 August 2013 three Parties (Argentina, Brazil and China) and three organizations (ETC Group, Ottawa River Institute and Wilson Center) had responded to notification 2013-018 on new and emerging issues. In its submission, Brazil recommended that the Convention process should focus on the implementation of its objectives and the fulfilment of obligations already established by past meetings of the Conference of the Parties and that for this reason no new issues should be added to the agenda for the Subsidiary Body. Argentina, Brazil, China, the ETC Group and the Wilson Center provided additional relevant information on components, organisms and products resulting from synthetic biology techniques that may have impacts on the conservation and sustainable use of biological diversity and associated social, economic and cultural considerations as called for in paragraph 3(a) of decision XI/11.

67. The scientific and technical analysis of synthetic biology as a possible new and emerging issue relating to the conservation and sustainable use of biological diversity will be undertaken by the Subsidiary Body on Scientific, Technical and Technological Advice at its eighteenth meeting and these submissions will be taken up in the analysis being prepared for that meeting.

68. The Ottawa River Institute called for work to be undertaken on the impacts of neonicotinoid insecticides on biodiversity. In its justification, the Institute noted that many studies have documented deaths of honeybees and other plant pollinators exposed to neonicotinoid insecticides during agricultural operations. The Institute argued that this creates threats to food security, placing at risk the global supply of the approximately 60 per cent of crop plant species that are pollinator dependent. The submission is summarized in the annex to this note.

69. In considering this proposal under agenda item 3(c) the Subsidiary Body may wish to take into account that the Multidisciplinary Expert Panel of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) decided to include in the IPBES Draft Work Programme 2014-2018[13] a Fast Track Assessment (FTA) on the theme of pollination and its impact on food security (to be undertaken by March 2015), while also noting that the proposal from the Ottawa River Institute is broader in scope.

[13] http://www.ipbes.net/images/IPBES%20Work%20Programme%20Review%20Draft%20-%20for%20online%20review.pdf

*Annex*

**SUMMARY OF THE SUBMISSION OF THE OTTAWA RIVER INSTITUTE ON NEW AND EMERGING ISSUES**

The submission of the Ottawa River Institute was accompanied with information as called for in paragraph 11 of decision IX/29 and applies the criteria listed in paragraph 12 of the same decision to justify that the issue should be taken up in the work under the Convention, summarized as follows:

(a) *Relevance to the objectives of the Convention:* The issue of impacts of neonicotinoid insecticides on biodiversity is relevant to the conservation of biological diversity and the sustainable use of its components;

(b) *New evidence of unexpected and significant impacts on biodiversity:* The magnitude of impacts of neonicotinoid insecticides on biodiversity and non-target organisms was not foreseen when these chemicals were registered. Repeated exposures to neonicotinoid insecticides can cause chronic, cumulative neurological damage in non-target organisms (as well as in target pests) which is not addressed in risk assessments for new chemicals;

(c) *Urgency of addressing the issue/imminence of the risk/magnitude of actual and potential impact on biodiversity:* Many groups of organisms found in agricultural areas are experiencing catastrophic declines, including birds, bats, amphibians, bumblebees, butterflies, moths and carabid beetles. There is an urgent need for greater understanding of the degree to which exposure to neonicotinoid insecticides may be contributing to these declines, and how exposure to these chemicals may be interacting with other negative pressures on biodiversity in agricultural areas;

(d) *Actual geographic coverage and potential spread, including rate of spread:* Neonicotinoids are now the now the most widely used crop insecticides in the world. They are marketed in over 120 countries to protect more than 140 crops.;

(e) *Evidence of the absence or limited availability of tools to limit or mitigate the negative impacts of the issue on conservation and sustainable use:* Systemic pesticides (such as neonicotinoid insecticides) are continuously present during the entire period of crop growth. This makes it difficult to avoid exposure of non-target organisms to these pesticides. The limited availability of integrated pest management tools specifically applicable to systemic pesticides poses unique challenges for conservation and sustainable use of biodiversity;

(f) *Magnitude of actual and potential impact on human well-being:* To date, concern about impacts of neonicotinoid insecticides on human well-being have largely focused on their unintended negative effects on pollinating insects (and to a lesser extent, predatory arthropods) and consequent effects on agricultural crop production. A recent study indicates that certain neonicotinoid insecticides exert excitatory effects on mammalian acetylcholine receptors similar to nicotine, a neurotoxin of brain development and a known risk factor for sudden infant death syndrome, low-birth-weight infants, and attention deficit/hyperactivity disorder;

(g) *Actual and potential impact on productive sectors and economic well-being:* The strongest evidence for actual adverse impacts of neonicotinoid insecticides on productive sectors relates to yield of pollinator-dependent crops such as almonds. Potential impacts of continued use of neonicotinoid insecticides must be examined in the context of a broader suite of factors affecting agricultural productivity and sustainability. Long-term economic well-being of the agriculture sector will require greater efforts to reduce its reliance on external chemical inputs and fossil fuels, so as to maintain food security and avoid unpredictable spikes in food prices.

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