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### **POST-2020 GLOBAL BIODIVERSITY FRAMEWORK: SCIENTIFIC AND TECHNICAL INFORMATION TO SUPPORT THE REVIEW OF THE UPDATED GOALS AND TARGETS, AND RELATED INDICATORS AND BASELINES**

### **SCIENTIFIC AND TECHNICAL INFORMATION TO SUPPORT THE REVIEW OF THE PROPOSED GOALS AND TARGETS IN THE UPDATED ZERO DRAFT OF THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK**

*Note by the Executive Secretary*

#### **I. INTRODUCTION**

1. The post 2020 global biodiversity framework is due to be adopted by the Conference of the Parties at its fifteenth meeting. The Co-Chairs of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework, together with the Executive Secretary, developed a “zero draft” of the framework, published in January 2020, as requested by the Working Group at its first meeting.<sup>1</sup> An “updated zero draft” was published in August 2020, in the light of the discussions of the second meeting of the Working Group.<sup>2</sup> A “first draft” will be prepared ahead of the third meeting of the Working Group, taking into account the outcomes of the twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice and the third meeting of the Subsidiary Body on Implementation.

2. The “updated zero draft”, like the earlier version of the post-2020 global biodiversity framework, includes the 2050 Vision for Biodiversity<sup>3</sup> and proposes a set of goals for 2050 and associated milestones for 2030. It also contains a Mission and 20 Targets for 2030. The updated zero draft also contains information on the purpose of the framework, its theory of change, implementation support mechanisms, enabling conditions, and considerations for responsibility and transparency.

3. The Working Group at its second meeting invited the Subsidiary Body on Scientific, Technical and Technological Advice at its twenty-fourth meeting to carry out a scientific and technical review of the updated goals and targets, and requested the Executive Secretary to provide information to support that review. Accordingly, the present document provides information to support the scientific and technical review of the proposed goals and targets in the updated zero draft of the post-2020 global biodiversity

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\* CBD/SBSTTA/24/1.

<sup>1</sup> CBD/WG2020/2/3.

<sup>2</sup> CBD/POST2020/PREP/2/1.

<sup>3</sup> The 2050 Vision for Biodiversity is a world of “Living in harmony with nature” where “by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.” It was originally adopted in decision X/2.

framework. It complements the note by the Executive Secretary on proposed indicators and monitoring approach for the post-2020 global biodiversity framework (CBD/SBSTTA/24/3/Add.1).

4. In section II, information is provided on the relationship between the 2050 Vision for Biodiversity and the proposed mission, goals and targets, taking into account the *Global Assessment Report on Biodiversity and Ecosystem Services* of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the fifth edition of the *Global Biodiversity Outlook*<sup>4</sup> (GBO-5) and the second edition of the *Local Biodiversity Outlooks*, and other literature.

5. In sections III and IV, respectively, information is provided on each of the proposed goals and targets with the aim to:

- (a) Outline the relevance of the topic addressed by the proposed goal or target;
- (b) Summarize the current status and trends;
- (c) Provide information to inform considerations of the level of ambition, particularly with respect to the quantitative elements of the proposed goals and targets, and addressing to the extent possible what the available evidence suggests is required to achieve the 2050 Vision (and proposed goals) and what may be feasible in the time frame of the post-2020 global biodiversity framework;
- (d) Identify how the proposed targets relate to the proposed goals and illustrate the types of actions that may be employed to achieve the proposed targets.

6. In order to keep the document to a reasonable length, only a brief summary treatment of the issues addressed by the proposed goals and targets can be provided. Thus, the analysis in this document is further supported by a series of information documents which are under development.<sup>5</sup> The analysis of Goals A and B also draws on an information document (CBD/SBSTTA/24/INF/9) prepared by a group of experts convened by the Earth Commission in collaboration with Future Earth and the Secretariat of the Convention on Biological Diversity.

7. In section V below, the scopes of the proposed goals and targets are reviewed with respect to coverage of the Articles of the Convention, the drivers of biodiversity loss and the levers/leverage points for transformative change identified by IPBES, and the areas of transition outlined in GBO-5 and LBO-2. This review is supported by an information document that provides a more systematic review of these areas (CBD/SBSTTA/24/INF/21). In section V, a review of potential linkages with an updated Global Strategy for Plant Conservation is provided and more detailed considerations of this issue is contained in CBD/SBSTTA/24/INF/20.

8. The process for developing the post-2020 global biodiversity framework cuts across the work of the Convention and its subsidiary bodies. As such the information in this note is linked to a number of additional documents prepared for both the twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice and the third meeting of the Subsidiary Body on Implementation. Examples of these include the proposed indicators and monitoring approach for the post-2020 global biodiversity framework,<sup>6</sup> the review of progress in the implementation of the Convention and the Strategic Plan for Biodiversity 2011-2020,<sup>7</sup> options to enhance planning, and reporting, and review mechanisms with a view to strengthening the implementation of the Convention.<sup>8</sup> These interlinkages should be kept in mind when considering this issue.

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<sup>4</sup> CBD/SBSTTA/24/2.

<sup>5</sup> This document and the associated information documents will be revised following a peer-review process and reissued for the consideration of the Subsidiary Body on Scientific, Technical and Technological Advice at its twenty-fourth meeting. They are being provided now to inform the discussions during the informal session in preparation for the twenty-fourth meeting of the Subsidiary Body.

<sup>6</sup> CBD/SBSTTA/24/3/Add.1.

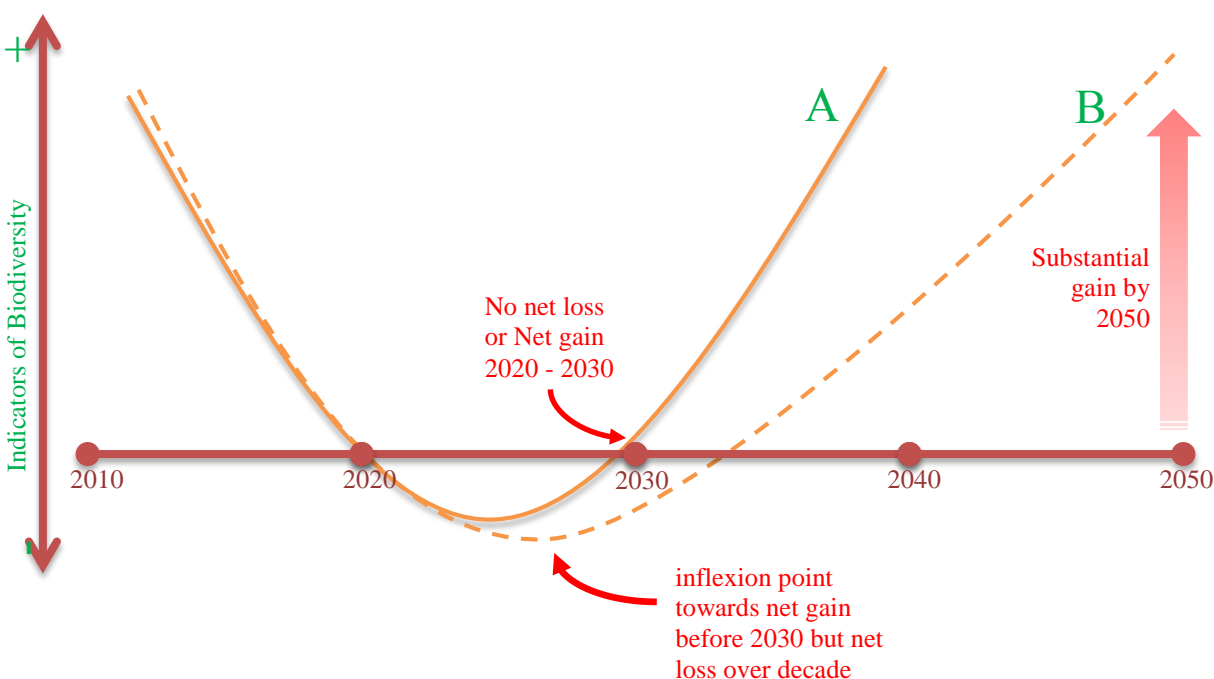
<sup>7</sup> CBD/SBI/3/2.

<sup>8</sup> CBD/SBI/3/11.

## II. RELATIONSHIP BETWEEN THE VISION AND PROPOSED MISSION, GOALS AND TARGETS

9. At its fourteenth meeting, the Conference of the Parties agreed that the 2050 Vision for Biodiversity remained relevant for the post-2020 global biodiversity framework. Current trends show that most indicators of biodiversity (including ecosystem extent, species conservation status and population abundance) and nature’s contributions to people, are declining. Given that the 2050 Vision envisages an improved status for biodiversity and nature’s contributions to people and that the current status of and business-as-usual scenarios for biodiversity show continuing declines, pathways towards the 2050 Vision would require that these declines are progressively reduced, halted and reversed globally.<sup>9</sup> Models and scenarios suggest that this is feasible, at least for some indicators of biodiversity. As set out in GBO-5, a portfolio of actions would be needed involving transformative change in the management of land and oceans, and of production and consumption patterns across all sectors, particularly food and agriculture.

10. The proposed 2050 goals of the framework seek to translate the 2050 Vision into more tangible outcomes for biodiversity (ecosystems, species and genetic diversity), for people (ecosystem services), for the sharing of benefits from the use of genetic resources, as well as the means of implementation necessary to reach the Vision. Each goal is designed to represent a desired state of biodiversity in 2050 and has associated milestones for 2030 to gauge progress.



11. The proposed 2030 mission provides a summary statement of what is to be achieved in the decade 2021-2030 and how. The proposed mission statement, “To take urgent action across society to put nature on a path to recovery for the benefit of people and planet,” highlights the urgency of action. It also implies that the downward trend in biodiversity should be halted and reversed (the inflection point) before 2030. A more ambitious approach would see no-net loss of the status of biodiversity and nature’s contributions to people

<sup>9</sup> Mace et al (2018), Aiming higher to bend the curve of biodiversity loss. *Nature Sustainability* 1, pp. 448-451. <https://doi.org/10.1038/s41893-018-0130-0>; Leclère et al (2020), Bending the curve of terrestrial biodiversity needs an integrated strategy. *Nature*, volume 585, pp. 551–556. <https://doi.org/10.1038/s41586-020-2705-y> and section III of GBO-5.

during the decade 2021-2030, or even a net gain, while a less ambitious approach would see the status in 2030 below current levels, but still on an upward curve (see figure 1, curves A and B).<sup>10</sup>

12. The proposed 2030 targets are action-oriented and represent desired achievements for 2030 that are necessary to place the world on a path to be able to reach the 2050 goals and the 2050 Vision. This should therefore be reflected in the formulation of the targets in such a way as to promote immediate action (in 2021) even if the target year for the result is 2030.

13. Given the information above, the proposed goals in the framework should be consistent with the 2050 Vision, and the actions set out in the proposed mission and targets should be commensurate with achieving the proposed 2030 milestones. The information provided in sections III and IV is intended to assist the Subsidiary Body in assessing this. Further, for the proposed targets to be commensurate with the 2050 Vision and the proposed goals, they must sufficiently address the direct and indirect drivers of biodiversity change. This is reviewed in section V of the document.

### III. INFORMATION TO SUPPORT THE SCIENTIFIC AND TECHNICAL REVIEW OF THE PROPOSED GOALS

#### Ecosystems, species and genetic diversity:<sup>11</sup>

*Goal A - The area, connectivity and integrity of natural ecosystems increased by at least [X%] supporting healthy and resilient populations of all species while reducing the number of species that are threatened by [X%] and maintaining genetic diversity*

14. This proposed goal addresses all three levels of biodiversity: ecosystems, species and genetic diversity. Here, they are examined in turn.

#### *Ecosystems*

15. The extent and integrity of ecosystems are essential for the protection of species and genetic diversity, ecosystem functioning and for the continued provision of ecosystem services or nature's contributions to people. This proposed element of the goal is thus indispensable to the achievement of the 2050 Vision for Biodiversity (Living in harmony with nature where, by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people).

16. "Natural" ecosystems are understood to be those whose species composition is predominantly native and determined by the climatic and geophysical environment. Integrity refers to the compositional functional, structural and spatial components of ecosystems. Connectivity is important to maintain the integrity of ecosystems across otherwise fragmented patches.

17. While the status and trends of ecosystem vary by ecosystem type and by geographic area, overall, currently, both the extent and integrity of most natural ecosystems continue to decline, and these trends continue under business-as-usual scenarios. This would lead to further extinctions, further reductions in the abundance of species populations and genetic diversity and continued decline in ecosystem functions and services. In some cases, major disruptions in ecosystem functioning at regional scales is projected and the stability of the earth system could be compromised. However, other scenarios demonstrate that it is possible to reverse these trends and to achieve a substantial increase in the overall extent and integrity of natural

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<sup>10</sup> In practice, at any given level of overall ambition, it may be more feasible to achieve more progress for some indicators than for others. As further explored in section III for Goal A, changes in the diversity and abundance of species in any ecosystem due to the restoration of ecosystems would be expected to lag behind the curve for ecosystem extent. For example, even with achieving no-net loss or net-gain in ecosystem extent by 2030 (by a combination of reducing and halting loss and degradation and increasing restoration) (see curve A in figure 1), this might not be achieved for species indicators (see curve B in figure 1).

<sup>11</sup> The text in this subsection is largely based on CBD/SBSTTA/24/INF/9 and Diaz et al (2020) Set ambitious goals for biodiversity and sustainability, *Science* 370, 411-413, <https://doi.org/10.1126/science.abe1530>. It also draws on the IPBES Global Assessment and the fifth edition of the *Global Biodiversity Outlook* and references therein. Additional references are indicated in the text for specific points.

ecosystems by 2050, which would help to protect species, genetic diversity and the provision of ecosystem services.

18. To reach the 2050 Vision, a significant net increase in both area and integrity of natural ecosystems is needed. This will need to be achieved by avoiding further loss where possible, reducing current rates of loss elsewhere, and restoring both converted and degraded ecosystems in order to reverse overall trends. Models, scenarios and other studies suggest that an increase in the extent of natural ecosystems of the order of 10 to 15 per cent, globally, across all ecosystem types, by 2050 may be feasible.<sup>12</sup> A viable pathway towards such an outcome requires that net gain, or at minimum no net loss, be achieved by 2030.

19. While ecosystem restoration will be an essential part of efforts to achieve this goal, priority should be given to retaining existing natural ecosystems. In particular, the loss of existing intact and wilderness areas, areas with high integrity and biodiversity value, rare or vulnerable ecosystems, those essential for planetary function, and those which cannot be restored should be avoided. With regard to restoration, it should be noted that the recovery of ecosystem integrity (including species diversity and abundance and communities of interacting species within ecosystems) lags behind recovery of ecosystem extent. So, achieving no net loss in biodiversity by a certain date would require achieving no net loss in ecosystem extent at an earlier date. Net gain, or no net loss approaches, if not qualified, carry high risk of harmful outcomes. Thus, in accounting for net changes, safeguards would be needed, for example, to ensure that any loss is replaced by the same or similar ecosystems and that critical ecosystems are not lost.

20. The outcomes of conservation and restoration activities for the abundance and diversity of species, genetic diversity and ecosystem functions and services strongly depend on location; spatial targeting is therefore essential to achieve synergies with other aspects of this goal.

21. The conservation and sustainable use of biodiversity is also important in areas beyond “natural” ecosystems including in agricultural and urban environments. Such “managed” ecosystems (those whose biotic composition is the result of deliberate manipulation by people) can provide important habitats, and contribute to habitat connectivity, for some species, as well as being essential for ecosystem functioning and services.

22. Proposed target 1, addressing land-/sea-use change, contribute directly to improving ecosystem extent, while targets 4 – 7 address other direct drivers of biodiversity decline. Proposed target 2 on area-based conservation would address most direct drivers for specific sites. Proposed targets 9, 10 and 11 would directly contribute to improving the integrity of managed ecosystems. Proposed targets 12-20 would contribute to all aspects of this goal by addressing the indirect drivers of biodiversity change.

### *Species*

23. Maintaining the diversity of species and ensuring that populations of species are healthy are clearly indispensable to the achievement of the 2050 Vision. Further, conserving species diversity and abundance is essential for the integrity (functioning and composition) of ecosystems and directly conserves genetic diversity.

24. Currently, the global species extinction rate is at least tens to hundreds of times higher than the average over the past 10 million years, and the rate is increasing. About 1 million species (or 13 per cent) are currently threatened with extinction, although the extinction risk varies significantly across taxa.<sup>13</sup> For comprehensively assessed taxonomic groups, the proportion ranges from 7 to 63 per cent across groups,

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<sup>12</sup> For example, see Leclère et al. (2020). Bending the curve of terrestrial biodiversity needs an integrated strategy. *Nature*. 585, 551–556 <https://doi.org/10.1038/s41586-020-2705-y>. Strassburg et al (2020). Global priority areas for ecosystem restoration. *Nature* 586:724–729. <https://doi.org/10.1038/s41586-020-2784-9>

<sup>13</sup> IPBES (2019). Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany. <https://ipbes.net/global-assessment>

averaging about 24 per cent.<sup>14</sup> The status of threatened species continues to decline and will continue to do so under business-as-usual scenarios. For most species in the wild, population abundance is declining globally, indicators showing, up until 2016, a 68 per cent decline since 1970, including a 32 per cent decline since 2000.<sup>15</sup>

25. To reach the 2050 Vision, it will be necessary to reduce both the extinction rate (i.e. prevent species extinctions) and the extinction risk (i.e. reduce the number of species threatened with extinction and improve the status of threatened species), as well as to maintain or improve the population abundances and the natural geographical extent of all species.

26. Scenarios suggest that a plausible pathway towards the 2050 Vision is to prevent an increase in extinction rates in the coming decade and to reduce them progressively through 2050, towards being as close as possible to background levels by 2050.<sup>16</sup> Halting human-induced extinction completely by 2030 is likely not realistic, especially given that certain threats such as climate change will continue to intensify and there are unavoidable time lags associated with conservation action. However, where both the species at risk and the drivers of decline are known, extinctions can probably be avoided given sufficient political will and investment. Scenarios also suggest that it would be feasible to reduce the proportion of species threatened with extinction in the wild by 2030 and aim to reduce extinction risk across all species by 2050. Efforts to reduce extinction rate and risk should prioritize evolutionary distinct species to conserve evolutionary lineages across the entire “tree of life,” as well as species in ecological and functional groups that have globally relevant roles either because they intervene in regulating processes at the continental or larger scales, such as migratory animals, or because they are locally important across a large number of ecosystems around the world, such as pollinators, scavengers, top predators, and large-bodied mammals and trees.

27. In most cases the ecological role of species (community assemblage and ecosystem functioning, and in turn the generation of some ecosystem services) depends on its existence in locally sufficient numbers. The goal could aim to improve, or at least maintain current levels by 2030, and progressively increase the diversity and abundance of populations of species thereafter, towards 2050. This would require halting and reversing the currently ongoing decline of both threatened and common species. Efforts should prioritize retaining and restoring local population diversity, abundances and ranges of species that have particularly important functional roles in ecosystems and to avoid increases in the abundance and spread of invasive alien species.

28. Actions to achieve this element of the goal are identified under the various proposed targets. Proposed targets 1 and 4-7 address the direct drivers of species loss (land-/sea-use change, exploitation of organisms, invasive alien species, pollution and climate change, respectively). Protected areas and other effective area-based conservation measures (proposed target 2) are also an essential contribution to the achievement of this element of the goal. In addition, species-specific management interventions (proposed target 3) will be needed to ensure the conservation of some species including the most endangered among them. Proposed targets 12-20 would contribute to all aspects of this goal by addressing the indirect drivers of biodiversity change.

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<sup>14</sup> IUCN (2020). The IUCN Red List of Threatened Species. Version 2020-2. Summary Statistics. <https://www.iucnredlist.org/resources/summary-statistics>

<sup>15</sup> WWF (2020). Living Planet Report -2020: Bending the curve of biodiversity loss. WWF, Gland, Switzerland. <https://livingplanet.panda.org/en-us/>

<sup>16</sup> There are different estimates of background extinction rate depending on the methodology used and the species considered. For example, some estimates suggests that the background rate of extinction is approximately 1 extinction per million species per year, while the background rate of extinction for mammals has been conservatively estimated at 2 mammal extinctions per 10,000 species per 100 years and for plants the background rate of extinction has been estimated at 0.05 to .13 extinctions per million species per year. For further details see Pimm et al (2006). Human impacts on the rates of recent, present, and future bird extinctions. *Proceedings of the National Academy of Sciences* 103 (29) 10941-10946; <https://doi.org/10.1073/pnas.0604181103>; Ceballos et al (2015). Accelerated modern human-induced species losses: Entering the sixth mass extinction. *Science Advances* 1(5), e1400253. <https://doi.org/10.1126/sciadv.1400253>; Gray (2019). The ecology of plant extinction: Rates, traits and island comparisons. *Oryx*, 53(3), 424-428. <https://doi.org/10.1017/S0030605318000315>.

*Genetic diversity*

29. Genetic diversity is critical for the long-term stability, adaptability and resilience of biodiversity, both at the species and ecosystem levels.

30. It is important to address the genetic diversity of both wild and domesticated species as their dynamics are very different. The genetic diversity of wild species provides the variation essential to maintain ecosystem stability and ensure benefits to people, and supports species survival and adaptation, linking explicitly to ecosystems and species. Domesticated species include all components of agricultural biodiversity (crops and livestock). Genetic variation across the gene pool, including wild relatives of crops and livestock is necessary to sustain food and nutrition security and production systems to cope with pests and disease, changing environmental conditions and climate change. It is essential that genetic diversity be conserved to allow the process of natural selection and evolution to continue, including on farm and ex situ for domesticated species.

31. There is limited information on the status of genetic diversity of wild species but overall negative trends in biodiversity (including extinction risk, abundance, habitat loss and degradation) suggest that it is in overall decline. More information is available for domesticated species, species used in agriculture, species used for food and medicine, or species which are otherwise directly used by people. The genetic diversity of major crops is comparatively well conserved ex situ. However, declines in the diversity of many domesticated species and their wild relatives is well documented.

32. It is important to conserve genetic diversity across all species. Determining precise quantitative targets for maintaining genetic diversity may be difficult, but current knowledge suggests a minimum of 90 per cent by 2050 would be consistent with the 2050 Vision.<sup>17</sup> Though there are knowledge gaps in genetic diversity data, with technical advances in “omics”, specifically genomic analysis, decreasing costs and better data stewardship, more frequent genetic monitoring could occur. While population abundance is a key factor in the maintenance of genetic diversity, it is not a sufficient indicator since it does not account for within-population genetic diversity, hence the need for genetic diversity to be explicitly included in the Goals.

33. Actions to achieve this element of the goal are identified under the various proposed targets. Proposed targets 1 and 4-7 address the direct drivers of biodiversity loss and would therefore contribute to the conservation of genetic diversity across all species. Protected areas and other effective area-based conservation measures (proposed target 2) would contribute to the conservation of genetic diversity of wild species, including the wild relatives of domesticated species (especially if targeted measures are taken). In addition, species-specific management interventions (proposed target 3) are critical for the conservation of genetic diversity of many threatened species. These interventions include ex situ conservation measures that could be extended to include ex situ conservation of domesticated species. Proposed target 9 would directly contribute to the in situ conservation of genetic diversity of domesticated species while also contributing to agricultural productivity and sustainability. Proposed target 12 on access and benefit sharing would also provide incentives in support of this goal. Proposed targets 13-20 would contribute to all aspects of this goal by addressing the indirect drivers of biodiversity change.

**Nature's contributions to people<sup>18</sup>**

**Goal B** - *Nature's contributions to people have been valued, maintained or enhanced through conservation and sustainable use supporting global development agenda for the benefit of all*

34. Nature's contributions to people (a concept similar to and inclusive of ecosystem services) refers to all the contributions from biodiversity to people's quality of life. They include (a) material contributions, such as the production of food, feed, fibre, medicines and energy, (b) regulating services, such as the regulation of air and water quality, climate regulation, pollination, regulation of pests and diseases and

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<sup>17</sup> CBD/SBSTTA/24/INF/9.

<sup>18</sup> The text in this subsection is largely based on CBD/SBSTTA/24/INF/9 and Diaz et al (2020), Set ambitious goals for biodiversity and sustainability, *Science*, 370, 411-413, <https://doi.org/10.1126/science.abe1530>, as well as the IPBES *Global Assessment*, GBO-5, and the references therein. Additional references are indicated in the text for specific points.

provision of habitat, and (c) other non-material contributions, such as learning, inspiration, health, physical and psychological experiences and supporting identities, as well as maintaining options for the future.

35. The need to maintain, and where appropriate, enhance nature's contributions to people provides a strong rationale for the conservation and sustainable use of biodiversity. They are essential elements of the 2050 Vision and underpin most of the Sustainable Development Goals.

36. Spatial analysis of the provision and need for ecosystem services shows that nature's contributions to people, for example to water quality regulation, coastal disaster risk reduction and pollination, are not evenly distributed across the world. Human needs also vary depending on the location. Where the two coincide, nature's contributions to people are highest. In some areas, however, people's needs and access to nature's contributions are not adequately met. The number of people who can benefit from nature's contributions to people depends not only on nature's ability to provide the benefit, but also on societies' ability to manage their distribution, fairly and equitably, within and between generations.

37. Of the 18 categories of nature's contributions to people analysed in the IPBES *Global Assessment on Biodiversity and Ecosystem Services*, 14 have shown a consistent declining global trend over the past 50 years. Almost all of the categories relating to the regulation of environmental processes are in decline, suggesting that the capacity of ecosystems to sustain nature's contributions to people are being compromised. The only categories of nature's contributions to people showing an increasing trend are those relating to material benefits, such as the provision of food, feed, materials and energy. However, the continued provision of these contributions may be compromised by the ongoing decline in ecosystems extent and integrity as well as in the decline of the regulating services that support such provision. Poorer groups of people are often most likely to suffer the impacts of declining contributions of nature.

38. Declines in nature's contributions to people will worsen under business-as-usual scenarios, with water quality regulation, coastal protection and pollination all significantly compromised by 2050. As a result, up to 5 billion people, largely in Africa and South Asia, would face higher water pollution and insufficient pollination for food and nutrition. Hundreds of millions of people across all continents would face heightened coastal risk. However, under scenarios of sustainable development, these negative trends could be reduced, eliminated or reversed.<sup>19</sup>

39. An ambitious goal for nature's contributions to people could help to:

(a) Deliver greater food security for 4 billion people, including the 2 billion who remain hungry, the more than 500 million people who are highly dependent on fisheries, and the more than 150 million households harvesting wild meat;<sup>20</sup>

(b) Deliver improved drinking water for about 600 million people currently dependent on untreated sources, enhance resilience for 75-300 million people at risk of coastal storms and 1 billion people living in floodplains;<sup>21</sup>

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<sup>19</sup> Chaplin-Kramer et al (2019). Global modelling of nature's contributions to people. *Science* 366, 255–258. <https://doi.org/10.1126/science.aaw3372>

<sup>20</sup> FAO. 2019. *State of the World's Biodiversity for Food and Agriculture*. FAO Commission on Genetic Resources for Food and Agriculture. Rome <http://www.fao.org/3/CA3129EN/CA3129EN.pdf>; Willett et al. (2019). Our Food in the Anthropocene: The EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems. *The Lancet* [http://dx.doi.org/10.1016/S0140-6736\(18\)31788-4](http://dx.doi.org/10.1016/S0140-6736(18)31788-4); Nielsen et al (2019). The Importance of Wild Meat in the Global South. *Ecological Economics* 146: 696-705. <https://doi.org/10.1016/j.ecolecon.2017.12.018>

<sup>21</sup> WHO (2019). <https://www.who.int/news-room/fact-sheets/detail/drinking-water>; Jeandron et al. (2019). Predicting quality and quantity of water used by urban households based on tap water service. *Clean Water* 2: 23. <https://doi.org/10.1038/s41545-019-0047-9>; Di Baldassarre et al (2013). Socio-hydrology: conceptualising human-flood interactions. *Hydrology and Earth System Sciences*, 17: 3295–3303. <https://doi.org/10.5194/hess-17-3295-2013>



(c) Maintain the well-being of about 4 billion people who rely on natural medicines for their health care and the 50 per cent of the global population living in urban areas;<sup>22</sup>

(d) To provide about one third of the efforts needed to achieve the goals of the Paris Agreement.<sup>23</sup>

40. Nature's capacity to continue delivering its contributions to people is reliant on the area and integrity of both natural and managed ecosystems and their constituent species and within-species genetic diversity. Thus, actions to reach proposed targets 1 and 4-7, which address the direct drivers of biodiversity loss (respectively, land/sea use change, exploitation of organisms, invasive alien species, pollution and climate change), as well as the proposed targets on effective area-based conservation measures (target 2), will indirectly contribute to this Goal. Proposed targets 7-11 will directly contribute to realizing benefits to people from nature's contributions through ecosystem-based approaches ("nature-based solutions") to climate change mitigation and adaptation, disaster risk-reduction, sustainable management of wild species, sustainable agricultural ecosystems, regulation of air and water, and urban green spaces. Proposed targets 12-20 would contribute to all aspects of this goal by addressing the indirect drivers of biodiversity change, and also by influencing the distribution of benefits.

### **Fair and equitable sharing of benefits from the utilization of genetic resources**

*Goal C. The benefits, from the utilization of genetic resources are shared fairly and equitably*

41. The fair and equitable sharing of benefits from the utilization of genetic resources is one of the three objectives of the Convention on Biological Diversity and the primary objective of Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. A framework for the implementation of this objective of the Convention is provided in Article 15 of the text of the Convention while the Nagoya Protocol aims to further operationalize it. A number of additional international instruments and processes address this issue, including the International Treaty on Plant Genetic Resources for Food and Agriculture (see also proposed target 12). Access and benefit-sharing (ABS) also provides an important incentive for the conservation and sustainable use of biodiversity.

42. Information on the benefits derived from ABS agreements is limited. Looking specifically at the Nagoya Protocol, 27 Parties have reported having received benefits from granting access to genetic resources and/or associated traditional knowledge for their utilization, and some of those benefits are contributing to the conservation and sustainable use of biodiversity. Given that the benefits received take various forms (monetary and non-monetary), and that often the content of the ABS agreements are confidential, it is not currently possible to put an overall value on the total amount of benefits shared. With respect to the International Treaty on Plant Genetic Resources for Food and Agriculture, which facilitates access to plant genetic resources for farmers and plant breeders to develop new crop varieties and adapt agricultural production to a changing environment, over 5.5 million samples have been transferred globally, through more than 76,000 contracts known as Standard Material Transfer Agreements by February 2020.<sup>24</sup> More generally, an analysis of corporate reports and websites of cosmetic and food companies found that references to ABS appear to be receiving increasing attention including by 17 per cent of beauty companies (up from 2 per cent in 2009) and 5 per cent of food and beverage companies (up from 2 per cent in 2012).<sup>25</sup>

<sup>22</sup> Bodeker et al (2005). WHO. *Global Atlas of Traditional, Complementary and Alternative Medicine*. Geneva, Switzerland: World Health Organization. <https://apps.who.int/iris/handle/10665/43108>

<sup>23</sup> Griscom et al (2017) Natural climate solutions. PNAS 114 (44) 11645-11650; <https://doi.org/10.1073/pnas.1710465114> and Roe, S., et al (2019). Contribution of the land sector to a 1.5 °C world. *Nature Climate Change*. 9, 817–828. <https://doi.org/10.1038/s41558-019-0591-9>.

<sup>24</sup> International Treaty on Plant Genetic Resources for Food and Agriculture - <http://www.fao.org/plant-treaty/en/>

<sup>25</sup> Union for Ethical BioTrade (2019). UEBT Biodiversity Barometer 2019, Special Edition – Asia - <https://static1.squarespace.com/static/577e0feae4fcb502316dc547/t/5d0b61d53df5950001ac0059/1561027031587/UEBT+Biodiversity+Barometer+2019+.pdf>

43. While information on benefits shared is sparse, particularly in monetary terms, it is likely a very small proportion of the total revenues of the relevant sectors. For context, as of 2019, the global seed market is valued at about USD 60 billion<sup>26</sup> and the total global pharmaceutical market at about USD 1.25 trillion.<sup>27</sup> Almost three-quarters of new drugs are either derived from or are synthetic mimics of a natural products.<sup>28</sup>

44. Given that the benefits derived from the access and use of genetic resources and associated traditional knowledge can take various forms, including monetary and non-monetary benefits, consideration should also be given to how information on the different types of non-monetary benefits can be collected in consistent way and in a way which allows information to be aggregated.

45. Proposed Target 12 on ABS measures directly contributes to achieving this Goal. Further proposed targets related to the integration of biodiversity values in planning processes (target 13), improving biodiversity information (target 19) and more equitable decisions making (target 20) would indirectly support the achievement of this target by helping to create an enabling environment.

### **Means of implementation**

*Goal D - Means of implementation are available to achieve all goals and targets in the framework*

46. The post-2020 global biodiversity framework will need to be implemented primarily through activities at the national or subnational levels, with supporting action at the regional and global levels. However, the capacity for implementing the Convention in terms of human, technical and financial resources is limited in most countries, especially in developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition. Reaching the 2050 Vision for biodiversity will require that the necessary means of implementation are available to enable Parties and stakeholders to undertake the necessary actions. These means of implementation will be required throughout the life of the post-2020 global biodiversity framework at level commensurate with the ambition of the other goals.

47. There are multiple types of means of implementation, including, among other things, the provision of financial resources in accordance with Articles 20 and 21 of the Convention, capacity building, technology transfer, the sharing of experiences and lessons learned, partnerships, required for the effective implementation of the post-2020 global biodiversity framework. The capacity which currently exists in countries must be further built upon so that it can be substantially increased from current levels if the post-2020 global biodiversity is to be effectively implemented. The specific means for implementation required may vary from country to country, according to national needs and circumstances, however a Goal on this issue can be seen as a common commitment by all countries to increase the means of implementation available and their efficiency.

48. Inadequate funding levels are a major impediment to effective biodiversity conservation in many countries and may be associated with failures to meet global targets.<sup>29</sup> Conservation investment has been

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<sup>26</sup>Businesswire (2021) <https://www.businesswire.com/news/home/20200206005534/en/Global-Seed-Market-2020---This-Market-was-Worth-a-Value-of-USD-61.50-Billion-in-2019---ResearchAndMarkets.com> (accessed 29/01/21).

<sup>27</sup>Statista (2021) <https://www.statista.com/statistics/263102/pharmaceutical-market-worldwide-revenue-since-2001/> (accessed 29/01/21).

<sup>28</sup> Of the new drugs developed between 1981 and 2019 18.4% were biological, 3.8% were natural, 0.8% were a natural botanical product, 18.9% were derived from a natural product but with a semisynthetic modification, 11.5% were a synthetic natural product mimic, 3.2% were synthetic but with a pharmacophore that was from a natural product, 11% were synthetic but with a pharmacophore that was from a natural product and a natural product mimic and 7.5% were a vaccine. For further details see Newman and Cragg (2020) Natural products as sources of new drugs over the nearly four decades from 01/1981 to 09/2019. *Journal of Natural Products*. 83, 770-803. <https://doi.org/10.1021/acs.jnatprod.9b01285>

<sup>29</sup> Waldron et al (2013) Targeting global conservation funding to limit immediate biodiversity declines. *Proceedings of the National Academy of Sciences*. 110 (29) 12144-12148; <https://doi.org/10.1073/pnas.1221370110>

demonstrated to reduce biodiversity loss.<sup>30</sup> Spending on biodiversity provides a very high social return on investment.<sup>31</sup> Thus, while increased biodiversity resource mobilization from all sources is not only necessary to reduce, halt and reverse biodiversity loss (i.e. to bend the curve on biodiversity loss) it is also likely to generate net economic benefits for both present and future generations.

49. Current global biodiversity finance is of the order of \$100 billion per year, while estimates of funding needs for a comprehensive post 2020 global biodiversity framework are of the order of \$800 billion per year, giving a funding gap of the order of \$700 billion per year. These estimates include not only the costs of conservation interventions (protected areas, control of invasive alien species and protection of ecosystems in coastal and urban areas), but also the estimated costs of transforming agricultural, forestry and fishery sectors to sustainability.<sup>32</sup> Currently more than \$500 billion is spent on subsidies considered particularly harmful to biodiversity; removal of such subsidies could greatly reduce the funding need.<sup>33</sup>

50. Actions to achieve this element of the Goal are identified under the various proposed targets. Proposed target 19 (information) would contribute to building technical capacity. Proposed target 18 (financial resources) directly contributes to the provision of financial resources. Proposed target 17 (incentive measures) could directly and indirectly support resource mobilization, supported by proposed target 13 (biodiversity mainstreaming). Proposed target 12 (access and benefit-sharing) also has the potential to generate funding and other non-monetary benefits which could be used to support the implementation of the post-2020 global biodiversity framework nationally.

#### IV. INFORMATION TO SUPPORT THE SCIENTIFIC AND TECHNICAL REVIEW OF THE PROPOSED TARGETS

##### A. Reducing threats to biodiversity

##### Land-/sea-use change<sup>34</sup>

*Target 1. By 2030, [50%] of land and sea areas globally are under spatial planning addressing land/sea use change, retaining most of the existing intact and wilderness areas, and allow to restore [X%] of degraded freshwater, marine and terrestrial natural ecosystems and connectivity among them.*

51. This proposed target relates to habitat loss, a major direct driver of biodiversity loss. Under business-as-usual scenarios, land use change (including deforestation and the loss and fragmentation of wetlands, savannahs, grasslands, and other ecosystems) is projected to remain the largest driver of terrestrial biodiversity loss, mainly due to the expansion of agriculture as well as infrastructure development. To achieve the 2050 Vision and the proposed Goals, the loss of existing intact and wilderness areas through land/sea use change must be avoided, reduced and reversed. This is to be achieved by both decreasing the

<sup>30</sup> Waldron et al (2017) Reductions in global biodiversity loss predicted from conservation spending. *Nature*, 551(7680), 364-367. <https://doi.org/10.1038/nature24295>; Seidl et al (2021) The effectiveness of national biodiversity investments to protect the wealth of nature. *Nature Ecology and Evolution*. <https://doi.org/10.1038/s41559-020-01372-1>

<sup>31</sup> Johnson et al (2020). Global Futures: modelling the global economic impacts of environmental change to support policy-making. Technical Report, January 2020. <https://www.wwf.org.uk/globalfutures>; Waldron et al (2020) Protecting 30% of the planet for nature: costs, benefits and economic implications. Working paper; Second report of the High-level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011-2020 - <https://www.cbd.int/financial/hlp/doc/hlp-02-report-en.pdf>

<sup>32</sup> Deutz et al (2020). Financing Nature: Closing the global biodiversity financing gap. The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability. <https://www.paulsoninstitute.org/key-initiatives/financing-nature-report/>; Waldron et al (2020) *op. cit.*; A discussion of these results is provided in CBD/SBI/3/5/Add.2. Estimation of resources needed for implementing the post-2020 global biodiversity framework preliminary second report of the panel of experts on resource mobilization. See proposed Target 18, for more detailed information on the range of estimates of current expenditures and funding needs.

<sup>33</sup> See proposed Target 17 for more information on the status of harmful subsidies.

<sup>34</sup> The text in this subsection is largely based on GBO-5, and references therein, in particular the sections on the sustainable land and forest transition, the sustainable freshwater transition and the sustainable fisheries and ocean transition and the references contained therein. Additional references are indicated in the text for specific points.

loss and degradation (increasing the retention) and increasing the restoration of natural habitats. More effective and widespread spatial planning will be crucial in accomplishing this.

52. In order to put biodiversity on a path to recovery by 2030 in line with the proposed Mission of the post-2020 global biodiversity framework, there would need to be a net gain of natural ecosystem area by 2030, while preventing the loss of existing intact and wilderness areas, as well as areas with high biodiversity value (see proposed Target 2) or keeping such loss to an absolute minimum. Restoration may include: (a) restoring converted lands back to natural habitats; (b) improving the ecological integrity of degraded natural habitats; and (c) rehabilitating converted and degraded lands (e.g. degraded agricultural lands) to improve both productivity and integrity. Ambition in the first of these (e.g., restoring agricultural lands back to natural ecosystems) may be limited by competing demands for land; nevertheless, studies show that up to 55 per cent of converted land could be restored while maintaining current production if existing yield gaps could be closed by 75 per cent.<sup>35</sup> The second and third components would be limited only by logistical and other practical constraints. The contribution to the desired outcomes for ecosystems, species and genetic diversity (proposed Goal A), as well as cost-effectiveness, can be enhanced by evidence-based prioritization of the areas to be retained and restored. For example, restoring 15 per cent of converted lands in priority areas could avoid over 60 per cent of expected extinctions.<sup>36</sup>

53. Given competing demands for land and sea areas, comprehensive spatial planning across all landscapes and seascapes (i.e., marine spatial planning) will be needed to allow socioeconomic development to continue while also conserving biodiversity and maintaining ecosystem services in line with the levels of ambition suggested above, and to ensure connectivity between natural habitats. Currently, spatial planning is practiced variously and unevenly among countries. Comprehensive spatial planning would be complemented by protection of specific areas with high biodiversity value (see proposed target 2), and by measures to reduce the other direct (proposed targets 4-7) and indirect drivers (proposed targets 8, 13-20) of biodiversity loss and ecosystem degradation.

#### **Area-based conservation measures<sup>37</sup>**

***Target 2.** By 2030, protect and conserve through well connected and effective system of protected areas and other effective area-based conservation measures at least 30 per cent of the planet with the focus on areas particularly important for biodiversity.*

54. Protected areas and other effective area-based conservation measures, if well-sited and designed, and managed effectively and equitably, remain essential measures to conserve biodiversity. Currently over 16 per cent of land and about 8 per cent of oceans are covered by protected areas registered in the World Database on Protected Areas.<sup>38</sup> Taking into account recent announcements and commitments on protected areas into as well as estimates of the size of other effective area-based conservation measures (OECMs), the targets of having 17 per cent terrestrial areas and 10 per cent of marine area under protection, as expressed in Aichi Biodiversity Target 11, are likely to have been met or exceeded.<sup>39</sup> However, despite improvements, coverage of areas of importance to biodiversity show significant gaps. For example, 19 per cent of Key Biodiversity Areas are completely within protected areas and while the protection of these areas is currently

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<sup>35</sup> Strassburg et al (2020). Global priority areas for ecosystem restoration. *Nature* 586:724–729. <https://doi.org/10.1038/s41586-020-2784-9>

<sup>36</sup> Strassburg et al (2020). *Op. cit.*

<sup>37</sup> The text in this subsection is largely based on GBO-5, and references therein, in particular the sections on the sustainable land and forest transition, the sustainable freshwater transition and the sustainable fisheries and ocean transition and the references contained therein. Additional references are indicated in the text for specific points.

<sup>38</sup> UNEP-WCMC and IUCN (2021) Protected Planet: The World Database on Protected Areas (WDPA)s. <https://www.protectedplanet.net/en>

<sup>39</sup> SCBD (2020) *Global Biodiversity Outlook 5*. Montreal. <https://www.cbd.int/gbo5>

increasing, 39 per cent have no protection.<sup>40</sup> Moreover, many protected areas are not effectively or equitably managed.

55. In order to safeguard ecosystem diversity, reduce the rate and risk of extinction and improve species population abundance as well as maintain and enhance many ecosystem services and nature's contributions to people in line with the Goals proposed in the updated draft of the post-2020 global biodiversity framework, protected area and OECM coverage needs to be expanded with appropriate prioritization and management improved. Estimates vary regarding the proportion of the planet that should be within protected areas and OECMs. For example, covering all currently identified Alliance for Zero Extinction sites and other Key Biodiversity Areas, hotspots of endemic species, and other areas with a high density of threatened species from the IUCN Red List, would require 2.4 per cent additional to the current terrestrial protected area coverage.<sup>41</sup> However, adequately covering species niche's for birds, mammals and amphibians would require expanding current areas to about 34 per cent of the land area.<sup>42</sup>

56. Many recent proposals converge on protecting about 30 per cent of the land surface by 2030, with the possibility of higher targets established subsequently,<sup>43</sup> and given future scenarios for land-use change and taking into account the potential for other effective area based conservation measures, such a target is likely feasible.<sup>44</sup> However, the importance of focusing on biodiversity outcomes rather than spatial area is emphasized; an increase in coverage alone will not be sufficient.<sup>45</sup> Also, to ensure provision of ecosystem services and to maintain integrity of planetary ecological processes, natural ecosystems need to be maintained and restored beyond protected areas and biodiversity also needs to be nurtured in managed ecosystems (see proposed targets 1 and 9).

### Active species management and Reducing human-wildlife conflict

**Target 3.** *By 2030, ensure active management actions to enable wild species of fauna and flora recovery and conservation, and reduce human-wildlife conflict by [X%].*

57. This proposed target addresses two distinct issues:

#### *Active species management*<sup>46</sup>

58. Based on information in global Red List assessments, species-specific management interventions will be needed to ensure the conservation of at least 2707 threatened species and therefore to achieve the species component of proposed Goal A. Based on this global data there are on average (median) about 40

<sup>40</sup> BirdLife International, IUCN and UNEP-WCMC (2020). Protected area coverage of Key Biodiversity Areas - [www.keybiodiversityareas.org](http://www.keybiodiversityareas.org)

<sup>41</sup> Dinerstein et al (2019). A Global Deal for Nature: Guiding principles, milestones, and targets. *Science advances*, 5(4), eaaw2869. <https://doi.org/10.1126/sciadv.aaw2869>.

<sup>42</sup> Hanson et al (2018). Global conservation of species' niches. *Nature*, volume 580, 232–234. <https://doi.org/10.1038/s41586-020-2138-7>

<sup>43</sup> Dinerstein, et al (2019), *Op. cit.*; Visconti et al (2019). Protected area targets post-2020. *Science*. 364. eaav6886. <https://doi.org/10.1126/science.aav6886>; IUCN (2016). Increasing marine protected area coverage for effective marine biodiversity conservation. [https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC\\_2016\\_RES\\_050\\_EN.pdf](https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_050_EN.pdf);

<sup>44</sup> Immovilli and Kok (2020). Narratives for the 'Half earth' and 'Sharing the planet' scenarios. A literature review, PBL Netherlands Environmental Assessment Agency, The Hague, PBL publication number 4226. <https://www.pbl.nl/en/publications/narratives-for-the-%E2%80%9Chalf-earth%E2%80%9D-and-%E2%80%9Csharing-the-planet%E2%80%9D-scenarios>; Leclère et al (2020) Bending the curve of terrestrial biodiversity needs an integrated strategy. *Nature* <https://doi.org/10.1038/s41586-020-2705-y>

<sup>45</sup> Maxell et al (2020) Area-based conservation in the 21<sup>st</sup> century. *Nature*, volume 586, pages 217–227. <https://doi.org/10.1038/s41586-020-2773-z>; Pimm et al (2018) How to protect half of Earth to ensure it protects sufficient biodiversity *Science Advances*. 4 (8). <https://doi.org/10.1126/sciadv.aat2616>

<sup>46</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to Aichi Biodiversity Target 12. Additional references are indicated in the text for specific points.

threatened species per country, but about ten countries contain over 200 such species.<sup>47</sup> Similar active measures have been instrumental in preventing a significant number of bird and mammal extinction in past decades, and have demonstrated that, in principle, it is possible to prevent extinction in most cases where both the species and the cause of the threat are known.<sup>48</sup> However, these interventions are mostly “emergency room” type interventions and full recovery is only possible if the underlying drivers of loss are addressed.<sup>49</sup>

59. Relevant actions related to this aspect of the proposed target include species reintroductions, species recovery actions (such as vaccinations, supplementary feeding, provision of breeding sites, planting and protection of seedlings) and ex situ conservation. The scope of the target could be expanded to include ex situ conservation of genetic resources at the sub-species level, including for crops and livestock. Species-specific management interventions are needed in addition to protected areas (proposed target 2) and addressing of the direct drivers of biodiversity loss (proposed targets 1, 4-7).

#### *Reducing human-wildlife conflict*<sup>50</sup>

60. Human-wildlife conflict is commonly described as conflict that occurs between people and wildlife, through the actions of and threats posed by wildlife that have an adverse effect on human life, health, well-being, and/or livelihoods. As a result of those actions and threats humans may damage or eliminate wildlife. These responses can be intentional and unintentional. Reducing human-wildlife conflict and improving co-existence is important both to improve human health and well-being (e.g. avoiding danger, property damage, and disease transmission) and to reduce threats to wildlife, both deliberate (e.g. reprisals against large land mammals that may damage crops or threaten human life or livestock). It is an essential element of efforts to maintain or reintroduce many keystone species and usual requires targeted management interventions.

61. It is difficult, at present, to determine the specific quantitative level or amount of human wildlife conflict. In order to identify such a level, it will be necessary to identify appropriate indicators of such conflict.

62. Human-wildlife conflict may be exacerbated by poorly planned development including encroachment into wild areas, conversion, distractions, degrading or reducing area of natural habitats, the feeding of wildlife, waste management and some tourism activities (some of these issues are addressed in proposed target 1 on spatial planning). It may be reduced by the better planning of development, including of agriculture and infrastructure, and by mitigation, including compensation,<sup>51</sup> and control measures. It may also be managed by empowering indigenous peoples and local communities and the use of rights-based approaches as well as through education, awareness raising, compensation for damage and other incentive measures (some of these issues are addressed under proposed target 20 on participation in decision-making). Further it is important to note that some human -wildlife interactions can also be positive. Thus, this issue is closely related to the issues addressed in proposed target 4 on the harvesting, trade and use of wild species of fauna and flora and proposed target 8 on the benefits from biodiversity related to nutrition, food security, livelihoods, health and well-being.

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<sup>47</sup> Bolam et al (in review) Preventing extinctions post-2020 requires recovery actions and transformative change, <https://www.biorxiv.org/content/10.1101/2020.11.09.374314v1.abstract>

<sup>48</sup> Bolam et al (2020) How many bird and mammal extinctions has recent conservation action prevented? *Conservation Letters*, e12762. <https://doi.org/10.1111/conl.12762>

<sup>49</sup> Bolam et al (in review), *op. cit.*

<sup>50</sup> The text in this subsection draws primarily on Nyhus (2016): Human-wildlife conflict and coexistence, *Annual Review of Environment and Resources*, 41. [10.1146/annurev-environ-110615-085634](https://doi.org/10.1146/annurev-environ-110615-085634), Luc Hoffmann Institute (2020): The state of knowledge and practice on human-wildlife conflicts. <https://luchoffmanninstitute.org/wp-content/uploads/2020/03/LucHoffmannInstitute-humanwildlifeconflict-web.pdf>. Additional references are indicated in the text for specific points.

<sup>51</sup> Ravenelle and Nyhu (2017) Global patterns and trends in human-wildlife conflict compensation. *Conservation Biology*. 31, 1247–1256, <https://doi.org/10.1111/cobi.12948>.

**Reducing threats from overexploitation and unsustainable use<sup>52</sup>**

**Target 4.** *By 2030, ensure that the harvesting, trade and use of wild species of fauna and flora is legal, and safe.*

63. This proposed target addresses the direct exploitation of organisms, a major direct driver of biodiversity loss. The direct exploitation of wild populations of species is the largest direct driver of biodiversity loss in marine ecosystems and the second largest in terrestrial and freshwater ecosystems. While directly impacting the species that are the target of exploitation (e.g., fish, wild meat, timber, medicinal plants), it often also causes collateral harm to other species and affects the functioning of ecosystems. Since people depend on wild species for food, medicine, construction materials and other products, unsustainable consumption jeopardizes these uses as well as the livelihoods of those engaged (see also proposed target 8). Currently, many species on the IUCN Red List are threatened by overexploitation and trade, including illegal trade. About a third of the world's marine fish stocks are overfished and under business-as-usual scenarios this is projected to worsen. Unregulated harvesting, trade and use of wild species can also increase the risk of invasive alien species (addressed under proposed target 5) and the emergence of disease. While legal use is not necessarily sustainable, illegal trade is associated with threats to biodiversity and human health. Further, while broad concepts of sustainability might include safety for human and animal health inter alia, reducing the risk of future pandemics is useful for clarity. Promoting sustainable use is therefore integral to achieving the 2050 Vision and the proposed Goals of the post-2020 global biodiversity framework. It is also one of the three objectives of the Convention which also recognizes the customary sustainable use of biodiversity by indigenous peoples and local communities.

64. A range of actions will be required to reach the proposed target. For example:

(a) Scenarios suggest that investing in fisheries management (inclusive of distant water fleets), combatting illegal, unreported and unregulated fishing and removing harmful subsidies, could, by 2030, end overfishing, rebuild many stocks, and reduce threats to endangered species while increasing the provision of food, reducing costs and prioritizing the nutritional and livelihood needs of those most dependent on fisheries;<sup>53</sup>

(b) A combination of measures is needed to ensure that the supply of wild meat is sustainably and legally managed at the source; to reduce the demand for unsustainably managed and/or illegal wild meat in towns and cities, and to enable governance, while respecting customary sustainable use;<sup>54</sup>

(c) The introduction and enforcement of stronger regulation, through national measures as well as CITES could drastically reduce the illegal and unregulated trade in endangered species and that posing particular risks for human health.<sup>55</sup>

65. Actions to address the legality, sustainability and safety of the use of wild species of fauna and flora need to take place at the point of harvest, during transportation and trade, and at point of final consumption

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<sup>52</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections on Aichi Biodiversity Target 4, 14 and 14 and section related to Pathways to the 2050 Vision for Biodiversity. Additional references are indicated in the text for specific points.

<sup>53</sup> Costello et al (2016) Global fishery prospects under contrasting management regimes. *Proceedings of the National Academy of Sciences* 113 (18) 5125-5129 <https://doi.org/10.1073/pnas.1520420113>; Cabral et al (2019) Designing MPAs for food security in open-access fisheries. *Scientific Reports*. 9(1):8033. <https://doi.org/10.1038/s41598-019-44406-w>; Costello et al (2020) The future of food from the sea. *Nature*. 588, 95-100. <https://doi.org/10.1038/s41586-020-2616-y>

<sup>54</sup> Coad L et al (2019) Towards a sustainable, participatory and inclusive wild meat sector. Bogor, Indonesia: CIFOR. <https://doi.org/10.17528/cifor/007046>

<sup>55</sup> IPBES (2020). Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany, <https://doi.org/10.5281/zenodo.4147317>

– the latter affecting overall demand.<sup>56</sup> Thus, proposed targets 18 and 19 are synergistic with this one. Proposed target 17 provides direct support to all elements of this target through the focus on eliminating harmful subsidies and redirecting subsidies to support legal, sustainable and safe harvest, trade and use of wild species. Actions should also respect the customary sustainable use of biodiversity by indigenous peoples and local communities (proposed Target 8, which is closely related to this target, is also relevant in this regard). The IPBES Assessment on sustainable use of wild species, due to be finalized in 2022, will provide further useful information relevant to this proposed target and proposed target 8.

### **Preventing and controlling invasive alien species<sup>57</sup>**

**Target 5.** *By 2030, manage, and where possible control, pathways for the introduction of invasive alien species, achieving [50%] reduction in the rate of new introductions, and control or eradicate invasive alien species to eliminate or reduce their impacts, including in at least [50%] of priority sites.*

66. Invasive alien species are one of the main direct drivers of biodiversity loss at the global level, and in some ecosystems, such as many island ecosystems, they are the leading cause of biodiversity decline. Some invasive alien species are also agents of infectious disease. For example, *Batrachochytrium dendrobatidis*, the causal agent of chytrid fungal disease and spread mainly through trade in amphibians, has contributed to the decline of over 500 amphibian species (6.5 per cent of all described amphibian species), 90 of which are presumed extinct, making it the most destructive invasive species on record.<sup>58</sup>

67. There is no evidence of slowing in the rate of invasion, at least for unintentional introductions linked to travel and trade.<sup>59</sup> Indeed, the projected growth in shipping is likely to increase the risk of invasions by between 3 and 20 times by 2050.<sup>60</sup> Further a recent assessment has projected that the number of established invasive alien species per continent is expected to increase by 36% between 2005 and 2050.<sup>61</sup> Currently more species are moving closer to extinction due to increased pressure from invasive alien species, than those native species given a better survival chance thanks to eradication or control of biological invaders. However, more than 800 eradications of invasive mammals on islands (almost 200 since 2010) have been successful, with positive benefits for an estimated 236 native terrestrial species on 181 islands.<sup>62</sup>

68. To achieve the 2050 Vision and the proposed Goals of the post-2020 global biodiversity framework it will be necessary to limit the spread and impact of invasive alien species.<sup>63</sup> This requires limiting new introductions and eradicating or controlling those invasive alien species that pose a significant risk for threatened species or the provision of ecosystem services. Preventing the introduction of invasive alien

<sup>56</sup> Coad et al (2019) Towards a sustainable, participatory and inclusive wild meat sector. Bogor, Indonesia: CIFOR.

<https://doi.org/10.17528/cifor/007046>; Booker (2019) Engaging local communities in tackling illegal wildlife trade: A synthesis of approaches and lessons for best practice. *Conservation Science and Practice*, 1(5), e26. <https://doi.org/10.1111/csp2.26>; Lavorgna and Sajeva (2020) Studying Illegal Online Trades in Plants: Market Characteristics, Organisational and Behavioural Aspects, and Policing Challenges. *European Journal of Criminal Policy and Research*. <https://doi.org/10.1007/s10610-020-09447-2>

<sup>57</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section on Aichi Biodiversity 9. Additional references are indicated in the text for specific points.

<sup>58</sup> Scheele et al (2019). Amphibian fungal panzootic causes catastrophic and ongoing loss of biodiversity. *Science* 363, 1459-1463, <https://doi.org/10.1126/science.aav0379>; Fisher and Garner (2020) Chytrid fungi and global amphibian declines. *Nature Reviews Microbiology* 18, 332–343. <https://doi.org/10.1038/s41579-020-0335-x>

<sup>59</sup> Seebens et al (2017). No saturation in the accumulation of alien species worldwide. *Nature Communications* 8: 14435. <https://doi.org/10.1038/ncomms14435>

<sup>60</sup> Sardain et al (2019). Global forecasts of shipping traffic and biological invasions to 2050. *Nature Sustainability* 2: 274–282. <https://doi.org/10.1038/s41893-019-0245-y>

<sup>61</sup> Seebens et al (2021). Projecting the continental accumulation of alien species through to 2050. *Global Change Biology* 27: 970–982. <https://doi.org/10.1111/gcb.15333>

<sup>62</sup> Jones et al (2016). Invasive mammal eradication on islands results in substantial conservation gains. *Proceedings of the National Academy of Sciences*. 113:4033–4038. <https://doi.org/10.1073/pnas.1521179113>

<sup>63</sup> McGeoch and Jetz (2020). Measure and Reduce the Harm Caused by Biological Invasions *One Earth*, 1, 171-4. <https://doi.org/10.1016/j.oneear.2019.10.003>



species in the first place is likely to be far more cost-effective than attempting to eradicate alien species once they become established. Given the number of pathways of introduction that exist, as well as the number of already established invasive alien species, prioritization may be required in both cases, focusing efforts on those invasive alien species which are particularly detrimental, such as those which are the main driver of decline of threatened species.<sup>64</sup>

69. The IUCN Global Register of Introduced and Invasive Species documents the cumulative number of invasive alien species and therefore provides baseline information for assessing progress in reducing introductions and a standard Environmental Impact Classification of Alien taxa has been developed.<sup>65</sup> Identification of priority sites would be needed to provide a baseline for assessing progress in control and eradication efforts. The IPBES Assessment on invasive alien species, due to be finalized in 2023 will provide further useful information relevant to this proposed target.

70. Progress towards this target could, depending on the invasive alien species being addressed, contribute to the attainment of the elements of proposed target 1 related to land and sea use and restoration. It may also contribute to the effective management of protected areas and other effective area-based conservation measures (proposed target 2).

### **Reducing pollution<sup>66</sup>**

**Target 6.** *By 2030, reduce pollution from all sources, including reducing excess nutrients [by x%], biocides [by x%], plastic waste [by x%] to levels that are not harmful to biodiversity and ecosystem functions and human health.*

71. Many forms of pollution impact on biodiversity and in various ways. Excess nutrients (especially nitrogen and phosphorus) cause eutrophication and ‘dead zones’ in freshwater and coastal areas, it also negatively impacts and affects species composition in terrestrial, freshwater and coastal ecosystems, and contributes to air pollution, climate change and stratospheric ozone depletion. Pesticides, a type of biocide, directly kill some organisms and indirectly harm others. Plastic waste endangers marine animals, among other impacts. Artisanal mining often pollutes freshwater ecosystems with hazardous materials like mercury and cyanide. Noise and light pollution also disrupt the behaviour of many species.<sup>67</sup> Most of these pollutants also have negative impacts on human health. Most forms of pollution are increasing in most parts of the world. Under business-as-usual scenarios, rates of nitrogen pollution are projected increase in many regions but decrease in others.<sup>68</sup> Rates of plastic pollution are projected to increase 2.6 times by 2040, almost tripling the cumulative plastic waste in the oceans.<sup>69</sup>

<sup>64</sup> Essl et al (2020) The Convention on Biological Diversity (CBD)’s Post-2020 target on invasive alien species – what should it include and how should it be monitored? In Frameworks used in Invasion Science. *NeoBiota* 62: 99–121. <https://doi.org/10.3897/neobiota.62.53972>

<sup>65</sup> Pagad et al (2018). Introducing the Global Register of Introduced and Invasive Species. *Scientific Data*, 5, 170202. <https://doi.org/10.1038/s41559-020-01322-x>; IUCN (2020) IUCN EICAT Categories and Criteria. The Environmental Impact Classification for Alien Taxa: First edition. Gland, Switzerland and Cambridge, United Kingdom. <https://doi.org/10.2305/IUCN.CH.2020.05.en>

<sup>66</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections on Aichi Biodiversity Target 8. Additional references are indicated in the text for specific points.

<sup>67</sup> Sanders et al (2020). A meta-analysis of biological impacts of artificial light at night. *Nature Ecology & Evolution*. 5, 74–8). <https://doi.org/10.1038/s41559-020-01322-x>; Duarte et al (2021). The soundscape of the Anthropocene ocean. *Science* 371(6529), eaba4658. <https://doi.org/10.1126/science.aba4658>; Slabbekoorn (2019). Noise pollution. Quick Guide. *Current Biology* 29(19). <https://doi.org/10.1016/j.cub.2019.07.018>.

<sup>68</sup> Biodiversity Indicators Partnership (2020). Trends in Nitrogen Deposition. <https://www.bipindicators.net/indicators/trends-in-nitrogen-deposition>, based on information from the International Nitrogen Initiative <https://initrogen.org/>; and Lamarque et al (2013) The Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP): overview and description of models, simulations and climate diagnostics. *Geoscientific Model Development*. 6, 179–206. <https://doi.org/10.5194/gmd-6-179-2013>

<sup>69</sup> Lau et al (2020). Evaluating scenarios toward zero plastic pollution. *Science* 369(6510) <https://doi.org/10.1126/science.aba9475>.

72. To achieve the 2050 Vision and the proposed Goals of the post-2020 global biodiversity framework it will be necessary to reduce substantially levels of pollution. Different metrics will be needed for different types of pollution. With regard to nitrogen a target of at least halving nitrogen waste by 2030, has been proposed,<sup>70</sup> and case experience suggests that such a target would be feasible.<sup>71</sup> With regard to pesticides, a number of studies show that pesticide use could be significantly reduced while increasing yields and reducing costs, especially when combined with the redesign of agricultural production systems (on-farm biodiversity could be both a contributor and a beneficiary to such a shift, see proposed Target 9). For example, empirical evidence shows that, in many systems, pesticide use can be reduced by between 20 per cent and 65 per cent without reducing yields or farmer income when accompanied by appropriate agronomic practices.<sup>72</sup> In some cases, improved yields and/or incomes can accompany reductions in pesticide use. With regard to plastic, a recent expert study on plastic waste estimates that pollution rates could be reduced by about 40 per cent (from 2016 to 2040) through a combination of replacing, recycling and waste management, suggesting that a reduction of about 20 per cent by 2030 would be feasible with current and foreseeable technologies.<sup>73</sup> More generally, reduction in waste and pollution would be enabled by shifts to a more circular economy and many actions taken under the Basel, Rotterdam, Stockholm and Minamata Conventions could contribute to this target. Actions to reach this target may also be linked to the proposed targets on production practices and supply chains (target 14) and unsustainable consumption patterns (target 15) as both of these issues can contribute to the generation of waste and pollution.

#### **Climate change mitigation and adaption<sup>74</sup>**

**Target 7.** *By 2030, increase contributions to climate change mitigation adaption and disaster risk reduction from nature-based solutions and ecosystem-based approaches, ensuring resilience and minimizing any negative impacts on biodiversity.*

73. Climate change is already impacting biodiversity and is projected to have progressively greater impacts becoming the largest driver of biodiversity loss in the second half of this century. The impacts on biodiversity are much greater at 2 degrees C than at 1.5 degrees C above pre-industrial levels. Thus, effective climate action, including stringent reductions in the use of fossil fuels, is a prerequisite to slowing and reversing biodiversity loss. Moreover, climate change impacts undermine ecosystem resilience and thus weaken the contribution of ecosystems to both mitigation and adaptation of climate change.

74. A number of ecosystem-based approaches, such as conservation, ecosystem restoration and improved management of agriculture, can contribute to both mitigation and adaptation, while also contributing to biodiversity goals, the provision of ecosystem services and disaster-risk reduction. In fact, a number of studies indicate that such “nature- based solutions” could provide about one-third of the total net

<sup>70</sup> Sutton et al (2021). The Nitrogen Decade: mobilizing global action on nitrogen to 2030 and beyond. *One Earth* 4(1), 10-14. <https://doi.org/10.1016/j.oneear.2020.12.016> and Colombo Declaration on Sustainable Nitrogen Management. [https://papersmart.unon.org/resolution/uploads/colombo\\_declaration\\_final\\_24\\_oct\\_2019.pdf](https://papersmart.unon.org/resolution/uploads/colombo_declaration_final_24_oct_2019.pdf)

<sup>71</sup> For example, Cui et al (2018), Pursuing sustainable productivity with millions of smallholder farmers. *Nature* 555, 363–366. <https://doi.org/10.1038/nature25785>.

<sup>72</sup> Lechenet et al (2017). Reducing pesticide use while preserving crop productivity and profitability on arable farms. *Nature Plants* volume 3(17008). <https://doi.org/10.1038/nplants.2017.8>; Jacquet et al (2011). An economic analysis of the possibility of reducing pesticides in French field crops. *Ecological Economics* 70(9),1638-1648. <https://doi.org/10.1016/j.ecolecon.2011.04.003>; Vasileiadis et al (2016). Farm-scale evaluation of herbicide band application integrated with inter-row mechanical weeding for maize production in four European regions. *Weed Research* 56(4), 313-322. <https://doi.org/10.1111/wre.12210>; National Research Council. 2003. *Frontiers in Agricultural Research: Food, Health, Environment, and Communities*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/10585>.

<sup>73</sup> The Pew Charitable Trusts and SYSTEMIQ (2020). *Breaking the Plastic Wave. A comprehensive assessment of pathways towards stopping ocean plastic pollution.* [https://www.pewtrusts.org/-/media/assets/2020/10/breakingtheplasticwave\\_mainreport.pdf](https://www.pewtrusts.org/-/media/assets/2020/10/breakingtheplasticwave_mainreport.pdf)

<sup>74</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the sustainable climate action transition. Additional references are indicated in the text for specific points.

emission reduction effort required to keep climate change close to 1.5 degrees C above pre-industrial levels.<sup>75</sup> Further, actions to increase contributions to climate change mitigation adaptation and disaster risk reduction from nature-based solutions and ecosystem-based approaches are also closely related to proposed target 10 which also addresses nature-based solutions.

75. To ensure fairness, equity and effectiveness, indigenous peoples and local communities must be fully involved in the development and implementation of ecosystem-based approaches. In addition, while many ecosystem-based approaches have co-benefits for biodiversity, this is not always the case, and careful assessment of synergies and trade-offs is required. In particular, tree planting is not always appropriate, especially of non-native species in monoculture plantations. The phase-out of fossil fuels requires the development of alternative, renewable energy sources, as well as improved energy efficiency. Inevitably, renewable energy as well as some adaptation measures, have potential impacts on biodiversity. It will be important therefore to avoid or minimize any such negative impacts.

#### **Meeting people's needs through sustainable use and benefit-sharing<sup>76</sup>**

*Target 8. By 2030, ensure benefits, including nutrition, food security, livelihoods, health and well-being, for people, especially for the most vulnerable through sustainable management of wild species of fauna and flora.*

76. Biodiversity is the source of many goods and services on which human well-being depends. These are particularly important for people living in vulnerable situations. However, while they are essential to well-being, the pressures placed on biodiversity to deliver them often impacts their continued provision. Conversely the maintenance, in quantity and quality, of these benefits provides an important incentive for the conservation and sustainable use of biodiversity. Ultimately it will not be possible to reach the 2050 Vision if the benefits provided by biodiversity, particularly those related to nutrition, food security livelihoods, health and well-being are not ensured.

77. Wild species of flora and fauna contribute to human well-being in multiple ways. Contributions to food and nutrition are particularly important. For example, globally it is estimated that bushmeat can make up to 85 per cent of protein intake of people living in or near forests while more than 30 million people are estimated to be reliant on reef-based resources to meet their food, income and livelihood needs.<sup>77</sup>

78. The actions needed to reach this target will also overlap with those required for proposed target 3 related to the active management of wild species of fauna and flora.

79. The IPBES Assessment on sustainable use of wild species, due to be finalized in 2022 will provide further useful information relevant to this proposed target and proposed target 4.

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<sup>75</sup> Griscom et al (2017). Natural climate solutions. PNAS 114 (44) 11645-11650; <https://doi.org/10.1073/pnas.1710465114> and Roe, S., et al (2019). Contribution of the land sector to a 1.5 °C world. *Nature Climate Change*. 9, 817–828. <https://doi.org/10.1038/s41558-019-0591-9>.

<sup>76</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections related to the sustainable food systems transition, the sustainable agriculture transition and the biodiversity-inclusive One Health Transition. Additional references are indicated in the text for specific points.

<sup>77</sup> Sumaila (2017) Investments to reverse biodiversity loss are economically beneficial. *Current Opinion in Environmental Sustainability*. 29, 82-88. <https://doi.org/10.1016/j.cosust.2018.01.007>

### **Sustainability of agriculture and other managed ecosystems<sup>78</sup>**

**Target 9.** *By 2030, support the productivity, sustainability and resilience of biodiversity in agricultural and other managed ecosystems through conservation and sustainable use of such ecosystems, reducing productivity gaps by at least [50%].*

80. Currently, land-use change from the expansion of agriculture is the largest driver of biodiversity loss. In addition, many agricultural practices, such as intensive tillage, inappropriate or excessive fertilizer and pesticide use as well as the overuse of antibiotics in livestock also tend to reduce biodiversity. Unsustainable practices in other managed ecosystems, such as those used for pasture, forestry and aquaculture, are also having negative impacts on biodiversity. To achieve the 2050 Vision and the proposed Goals of the post-2020 global biodiversity framework there is a need to increase the productivity (i.e. reduce productivity gaps) of production landscapes, and in particular of existing agricultural areas, in order to limit and reduce the demand for land and water resources. Achieving the 2050 Vision and the proposed Goals will also require reducing pesticide use, overuse of fertilizers and water and improve the management of soils and forests. This proposed target focuses on these objectives and specifically on how enhanced biodiversity in agricultural and other managed ecosystems can contribute to these objectives.

81. A number of possible actions can be taken to support the productivity, sustainability and resilience of biodiversity in agricultural and managed ecosystems. Most of these actions centre around the sustainable intensification of production practices which includes improving the efficiency of use of land and inputs of water, fertilizers and pesticides, including through genetic improvements to crops and livestock, substituting external inputs, and designing or redesigning systems based on agroecological principles. Examples of the types of actions needed include increasing the use of integrated pest management, reducing and more targeted use of pesticides, antibiotics, fertilizers and irrigation water, decreasing soil erosion, decreasing residues and runoff of pesticides and excess nutrients, increasing resource use efficiency and reducing pollinator-dependent yield deficits. Some of these actions would also contribute to proposed target 6 related to reducing pollution from all sources, including excess nutrients. The actions to reach this target would also have co-benefits for biodiversity and help to improve the diversity and abundance of organisms, in particular insects and birds, including the abundance of pollinators and natural enemies of pests. Other actions could include the conservation or restoration of native habitats within working landscapes of agricultural and other managed ecosystems. A recent study recommended that 20 per cent of native habitat to support conservation and ecosystem services.<sup>79</sup>

### **Nature-based solutions and ecosystem services<sup>80</sup>**

**Target 10.** *By 2030, ensure that, nature-based solutions and ecosystem approach contribute to regulation of air quality, hazards and extreme events and quality and quantity of water for at least [XXX million] people.*

82. The proposed target relates to the benefits provided to people in relation to the services provided by ecosystems (or nature's contributions to people) such as regulating water flow, preventing erosion, providing protection against extreme events through physical barriers, or filtering pollutants. Such key ecosystems may include forests and wetlands especially in upstream areas, coral reefs, mangroves and sea-grass beds. These ecosystem services underpin the health and well-being of people, therefore safeguarding these ecosystem services is a key element of the 2050 Vision for Biodiversity. The protection and restoration of such

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<sup>78</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections related to the Aichi Biodiversity Target 7, the sustainable food systems transition, and the sustainable agriculture transition. Additional references are indicated in the text for specific points.

<sup>79</sup> Garibaldi et al (2020) Working landscapes need at least 20% native habitat. Conservation Letters. e12773.  
<https://doi.org/10.1111/conl.12773>

<sup>80</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to Aichi Biodiversity Target 14. Additional references are indicated in the text for specific points.

ecosystems to address societal needs are variously known as ‘ecosystem-based approaches’, ‘nature-based solutions’ or ‘green infrastructure’.

83. Globally about half of the world’s population (3.6 billion people) live in areas which are potentially water-scarce at least one month out of the year.<sup>81</sup> More than 80 per cent of urban dwellers were exposed to air pollution which exceeded limits set out by the World Health Organization.<sup>82</sup> Between 2000 and 2019 there were more than 7,000 recorded disaster events which affected more than 4 billion people and caused approximately 1.2 million deaths. The majority of these were related to floods (44 per cent of events) and storms (28 per cent of events) followed by droughts (5 per cent of events) and wildfires (3 per cent).<sup>83</sup> Under various scenarios, the decline of regulating services originating from biodiversity is expected to increase. For example, a recent assessment concluded that by 2050, under future scenarios of land use and climate change, 4.5 billion people will be affected by poor water quality as a result of diminishing ecosystem services. This decline will be particularly detrimental in Africa and South Asia. Similarly, half a billion people by 2050 are projected to face coastal risks, such as shoreline erosion and flooding.<sup>84</sup> Other estimates suggest that on our current trajectory the degradation of, and unsustainable pressures on, the natural environment and global water resources will put at risk 52 per cent of the world’s population, 45 per cent of global gross domestic product and 40 per cent of global grain production.<sup>85</sup> However, some of these threats could be significantly reduced under sustainable development scenarios.

84. Actions to promote this target include reducing the direct pressures on the ecosystems that provide such services (see proposed targets 1, 3-6), and proactive measures to conserve and restore key ecosystems (see proposed targets 1 and 2), or to create or recreate green and blue spaces in urban areas (see proposed target 11). It has been estimated that more 1.7 billion people could benefit from the application of nature-based solutions to watershed management.<sup>86</sup> While nature-based solutions are increasingly used around the world, information on the extent of their use and the number of people currently benefiting from them is incomplete. While nature-based or ecosystem-ecosystem based approaches often have co-benefits for biodiversity and help to create incentives for their use and their mainstreaming into decision making and planning processes, these co-benefits are not always guaranteed. Furthermore, in most cases nature-based or ecosystem-based solutions will not be sufficient on their own to fully meet objectives for water and air quality or to completely prevent or mitigate extreme events and hazards.

#### **Access to green/blue spaces<sup>87</sup>**

**Target 11.** *By 2030, increase benefits from biodiversity and green/blue spaces for human health and well-being, including the proportion of people with access to such spaces by at least [100%], especially for urban dwellers.*

<sup>81</sup> United Nations World Water Assessment Programme/UN-Water. (2018) The United Nations World Water Development Report 2018: Nature-Based Solutions for Water. Paris, UNESCO. <https://www.unwater.org/publications/world-water-development-report-2018/>

<sup>82</sup> World Health Organization (2016). WHO Global Urban Ambient Air Pollution Database. [https://www.who.int/phe/health\\_topics/outdoorair/databases/cities/en/](https://www.who.int/phe/health_topics/outdoorair/databases/cities/en/)

<sup>83</sup> United Nations Office for Disaster Risk Reduction (2020). Human cost of disasters. An overview of the last 20 years 2000-2019. <https://www.undrr.org/media/48008/download>

<sup>84</sup> Chaplin-Kramer et al (2019) Global modelling of nature’s contributions to people. *Science* 366, 255–258. <https://doi.org/10.1126/science.aaw3372>

<sup>85</sup> WWAP (2019), *The United Nations World Water Development Report 2019: Leaving No One Behind*. Paris, UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000367306>

<sup>86</sup> Abell et al (2017), *Beyond the Source: The Environmental, Economic and Community Benefits of Source Water Protection*. Arlington, Virginia, United States of America, The Nature Conservancy. <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/a-natural-solution-to-water-security/?src=r.global.beyondthesource>

<sup>87</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the sustainable cities and infrastructure transition. Additional references are indicated in the text for specific points.

85. Green and blue spaces (i.e. areas of vegetation, inland and coastal waters generally in or near to urban areas) tend to have positive effects on human physical and mental well-being. For example, the critical importance of urban nature in providing resilience in time of crisis has been demonstrated by the COVID-19 pandemic, during which access to green spaces in cities and the countryside has been an important factor in supporting health and well-being while people observe social distancing requirements. Additionally, in many places such areas also provide important connections to nature for people. Green and blue spaces can provide important habitat for species, provide ecosystem services and help mediate extreme events, if managed with such objectives in mind.

86. Information on access to biodiverse green and blue spaces is limited. In 2019 about 47 per cent of people lived within 400 metres of an open public space, but with significant regional variation.<sup>88</sup> This includes all places which are available for public use include squares, plazas and streets, as well as parks and recreational areas; many such areas may have little value for biodiversity.

87. While all people require access to green and blue spaces for their physical and psychological well-being, access to such spaces is generally more limited for urban dwellers. As such actions towards this target should give specific attention to urban dwellers. Access to green and blue spaces can be increased by creating such spaces and/or increasing access to them. In this sense issues related to the interconnections between urban environments and other areas should be considered. Actions towards this target will likely require the direct involvement and participation of city and other sub-national authorities as these entities often have the mandate for the planning and development of urban environments. Actions towards this target may also contribute to the attainment of the proposed goals related to land and sea use change and restoration (target 1) as well to the proposed target related to protected areas and other effective area-based conservation measures (target 2).

#### **Access and benefit-sharing<sup>89</sup>**

***Target 12.** By 2030, increase by [X] benefits shared for the conservation and sustainable use of biodiversity through ensuring access to and the fair and equitable sharing of benefits arising from utilization of genetic resources and associated traditional knowledge.*

88. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources is one of the three objectives of the Convention on Biological Diversity, further supported by the Nagoya Protocol. Sharing the benefits from the use of genetic resources creates incentives for the conservation and sustainable use of biodiversity and contributes to the creation of a fairer and more equitable economy to support sustainable development. This proposed target links directly to proposed Goal C of the post-2020 global biodiversity framework.

89. The main action required to reach this target is for countries that provide and use genetic resources to put in place appropriate measures for the access and benefit-sharing of genetic resources and ensure that such measures are applied. There is much information on measures put in place in the context of the Nagoya Protocol. For example, many countries have put in place ABS measures (96 Parties to the Nagoya Protocol and 24 non-Parties), have established one or more competent national authorities (80 Parties and 7 non-Parties) and have designated one or more checkpoints for collecting and receiving relevant information (80 Parties and 7 non-Parties). A number of additional international instruments and processes address this issue, including the International Treaty on Plant Genetic Resources for Food and Agriculture, the FAO Commission on Genetic Resources for Food and Agriculture, the Pandemic Influenza Preparedness Framework for the Sharing of Influenza Viruses and Access to Vaccines and Other Benefits, and the process

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<sup>88</sup> United Nations (2020). Goal 11: Make cities inclusive, safe, resilient and sustainable.  
<https://www.un.org/sustainabledevelopment/cities/>

<sup>89</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the Aichi Biodiversity Target 16. It also draws on information contained in the Access and Benefit-sharing Clearing-House –  
<https://absch.cbd.int/countries>.

to develop an agreement on the Conservation and Sustainable Use of Marine Biodiversity of Areas Beyond National Jurisdiction.

90. Proposed Goal C of the post-2020 global biodiversity framework focuses on the benefits shared (i.e. the outcomes). However, there is little systematic information on benefits shared (see Goal C). This proposed target could complement the Goal by focusing on the measures to be taken to ensure of facilitate benefit-sharing.

## **B. Tools and solutions for implementation and mainstreaming**

### **Integration of biodiversity<sup>90</sup>**

***Target 13.** By 2030, integrate biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies and accounts at all levels, ensuring that biodiversity values are mainstreamed across all sectors and integrated into assessments of environmental impacts.*

91. Reaching the goals of the post-2020 global biodiversity framework and the 2050 Vision for Biodiversity will require that biodiversity moves from the periphery of decision making to become a core consideration in decision and planning processes across government and all sectors of the economy and of society, recognizing the multiple values of biodiversity. Progress towards this target will support the attainment of most of the proposed goals and targets of the post-2020 global biodiversity framework.

92. Over 90 countries have compiled accounts in line with the System of Environmental-Economic Accounting (SEEA) and at least 24 countries have published ecosystem accounts under the Experimental Ecosystem Accounting programme, part of the SEEA framework. A sample of the Voluntary National Reviews for implementation of the Sustainable Development Goals shows that approximately half of the reporting countries have mainstreamed biodiversity throughout their reports. 47 of the 170 Parties that have developed, updated or revised their national biodiversity strategies and action plans (NBSAPs) after the adoption of the Strategic Plan for Biodiversity 2011-2020 include links to poverty eradication and/or integrate this objective into their principles, targets and/or actions, and 40 Parties indicate that biodiversity has been integrated into their national development plan or equivalent instruments.

93. Further progress towards this target will require a range of actions and many of these will directly or indirectly contribute to the attainment of all of the other proposed targets in the post-2020 global biodiversity framework.<sup>91</sup> Generally, there will be a need for greater and more explicit recognition of all biodiversity values in key national strategic policy and planning documents. This will need to be supported by the further development and more effective use of instruments or policy tools for addressing biodiversity and ecosystem services and functions in a comprehensive manner within and across different sectors and policy areas. For such instruments and tools to be effective, they will need to be underpinned by effective biodiversity monitoring and quality biodiversity information (proposed target 19). More specific actions to reach this target will include greater efforts to incorporate biodiversity values and considerations into sectoral policies, including policies related to development, forestry, agriculture, fisheries, energy, finance, and other economic sectors; to develop natural capital accounts; to undertake more effective strategic environmental assessments and environmental impact assessments and to further develop of tools, guidelines and methodologies to support institutions in decision-making among other things. The IPBES Methodological assessment regarding the diverse conceptualization of multiple values of nature and its benefits, including biodiversity and ecosystem functions and services, due to be finalized in 2022 will provide useful information with regard to the multiple values of biodiversity.

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<sup>90</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the Aichi Biodiversity Target 2. Additional references are indicated in the text for specific points.

<sup>91</sup> The draft long-term approach to mainstreaming and the associated action plan, currently submitted to the Subsidiary body on Implementation at its third meeting, identifies a range of pertinent strategic action areas and provides an indicative list of possible actions. For more information see CBD/SBI/3/13 and CBD/SBI/3/13/Add.1.

**Sustainable production and supply chains<sup>92</sup>**

**Target 14.** *By 2030, achieve reduction of at least [50%] in negative impacts on biodiversity by ensuring production practices and supply chains are sustainable.*

94. The production and supply chains used to meet the increasing demand for goods and services is directly linked to unsustainable use, one of the main direct drivers of biodiversity loss. Reducing the negative impacts on biodiversity from production practices and supply chains will be important in making progress towards the 2050 Vision for Biodiversity.

95. By some estimates, 90 per cent of global biodiversity loss and half of global greenhouse gas emissions can be linked to the extraction and processing of natural resources.<sup>93</sup> The impacts of production systems and supply chains related to food (agriculture in terrestrial environments, affecting freshwater and coastal areas too, and fisheries in marine environments), as well as forestry, are particularly important, though the impacts vary greatly with the commodity produced as well as the mode of production. For example, intensive systems of timber production, such as plantations and clear cutting, may reduce species richness by 13-44 per cent while extensive forest management systems have minimal impact.<sup>94</sup> Extractive industries, energy and infrastructure development also have large impacts. An important dimension of production practices and supply chains is trade patterns. While these trade patterns have advanced economic and social development they have also created a situation where the spatial impacts of production are decoupled from consumption.<sup>95</sup> The impacts of resource-intensive production processes are generally shifting from high-income importing countries to low income exporting countries,<sup>96</sup> with over 80 per cent of the impacts of food crop consumption in industrialised countries occurring in other countries for example.<sup>97</sup> Actions towards this target and the monitoring of progress require assessment and disclosure of the dependencies and impacts of production practices and supply chains on biodiversity so that they can be taken into account by business, policymakers and the general public, and the impacts progressively reduced. More sustainable practices can be further supported through the further promotion of environmental impact assessment practices, labelling and certification schemes and/or moratoria as well as including environmental considerations in trade contracts, policies and agreements.<sup>98</sup> The actions taken to reach this target could directly or indirectly contribute to many of the proposed targets in the post-2020 global biodiversity framework including the proposed targets on land use change (target 1), the management actions to enable wild species of fauna and flora (target 3), the harvesting, trade and use of wild species of fauna and flora (target 4), invasive alien species (target 5), reducing pollution (target 6) and the productivity, sustainability and resilience of biodiversity (target 9).

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<sup>92</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections related to the Aichi Biodiversity Targets 4 and 7. Additional references are indicated in the text for specific points.

<sup>93</sup> IRP (2019) *Global Resources Outlook 2019: Natural Resources for the Future We Want. A Report of the International Resource Panel*. United Nations Environment Programme. Nairobi, Kenya. <https://www.resourcepanel.org/reports/global-resources-outlook>

<sup>94</sup> Chaudhary et al (2016), Impact of Forest Management on Species Richness: Global MetaAnalysis and Economic Trade-Offs. *Scientific Reports*. 6, 23954; <https://doi.org/10.1038/srep23954>

<sup>95</sup> IPBES (2019), Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, IPBES secretariat, Bonn, Germany. 56 pages. <https://doi.org/10.5281/zenodo.3553579>.

<sup>96</sup> UNEP and IRP (2020). *Sustainable Trade in Resources: Global Material Flows, Circularity and Trade*. United Nations Environment Programme. Nairobi, Kenya. <https://www.unenvironment.org/resources/publication/sustainable-trade-resources-global-material-flows-circularity-and-trade>

<sup>97</sup> Chaudhary and Kastner (2016) Land use biodiversity impacts embodied in international food trade. *Global Environmental Change* 38, 195-204. <https://doi.org/10.1016/j.gloenvcha.2016.03.013>

<sup>98</sup> The draft long-term approach to mainstreaming and the associated action plan, referenced above, contains a strategic action area directly relevant to this target and provides an indicative list of possible actions. For more information see CBD/SBI/3/13 and CBD/SBI/3/13/Add.1.



## Sustainable consumption<sup>99</sup>

**Target 15.** *By 2030, eliminate unsustainable consumption patterns, ensuring people everywhere understand and appreciate the value of biodiversity, and thus make responsible choices commensurate with 2050 biodiversity vision, taking into account individual and national cultural and socioeconomic conditions.*

96. Unsustainable consumption underlies each of the main direct drivers of biodiversity loss. Reaching the 2050 Vision will require that the use of biological resources does not exceed the capacity of the earth to generate them. This target is closely related to proposed target 14 related to supply chains.

97. Patterns of consumption globally are currently unsustainable and are having negative impacts on both species and ecosystems. Between 2011 and 2016, the ecological footprint has remained at approximately 1.7 times the level of biocapacity – in other words, requiring ‘1.7 Earths’ to regenerate the biological resources used by our societies.<sup>100</sup> Further, a recent analysis showed that global stocks of natural capital had declined per person by nearly 40 per cent between 1992 and 2014, compared with a doubling of produced capital and a 13 per cent increase in human capital over the same period.<sup>101</sup>

98. Generally, actions towards this target will need to focus on those which will reduce the overall demand for resources and limit waste. This will be required action across society, with governments having a particularly important role to play in creating an enabling environment for actions by the private sector and individuals, including through achieving elements of proposed target 17 on incentives. Sustainable consumption patterns can be achieved in two main ways. The first is by improving efficiencies and reducing waste from current consumption patterns. Significant efforts are already ongoing in this respect; however, the aggregated demand for resources continues to increase, and therefore the impacts of their use remain well above safe ecological limits. Therefore, the second important action will be putting in place measures and tools to reduce the overall demand for resources. This could include promoting changes in consumer preferences for the amount and type of resources which are consumed, promoting the use of goods from sustainable sources, support for biodiversity friendly business, developing national procurement policies that are in line with the objectives of the Convention, and the development of methods to promote science-based information on biodiversity in consumer and producer decisions. It is important to note that while the global demand for resources needs to be reduced there will be regional variation, and in some countries and regions consumption patterns may need to increase to meet societal objectives related to development and poverty alleviation. Finding ways to address this need in a sustainable way will be important. Further, the impacts of consumption and what is considered sustainable will vary between types of resources and products and how these are extracted, harvested and/or produced.<sup>102</sup> The actions taken to reach this target could directly or indirectly contribute to many of the proposed targets in the post-2020 global biodiversity framework, including the proposed targets on land use change (target 1), the management actions to enable wild species of fauna and flora (target 3), the harvesting, trade and use of wild species of fauna and flora (target 4), reducing pollution (target 6) and the productivity, sustainability and resilience of biodiversity (target 9).

## Biosafety<sup>103</sup>

<sup>99</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections related to the Aichi Biodiversity Targets 4 and 7. Additional references are indicated in the text for specific points.

<sup>100</sup> Global Footprint Network (2020). Ecological Footprint. <https://www.footprintnetwork.org/our-work/ecological-footprint>. The ecological footprint was estimated to be about 1.6 planets in 2020 – the decrease, probably temporary, driven by the global economic slowdown resulting from the COVID-19 pandemic.

<sup>101</sup> Managi and Kumar (2018). *Inclusive Wealth Report 2018*. United Nations Environment Programme: <https://www.unenvironment.org/resources/report/inclusive-wealth-report-2018>

<sup>102</sup> The draft long-term approach to mainstreaming and the associated action plan, currently submitted to the Subsidiary body on Implementation at its third meeting, identifies a range of pertinent strategic action areas and provides an indicative list of possible actions. For more information see CBD/SBI/3/13 and CBD/SBI/3/13/Add.1.

<sup>103</sup> The text in this subsection draws on document CBD/SBI/3/3 and the information contained in the Biosafety Clearing House – <http://bch.cbd.int/>. Additional references are indicated in the text for specific points.

**Target 16.** *By 2030, establish and implement measures to prevent, manage or control potential adverse impacts of biotechnology on biodiversity and human health reducing these impacts by [X].*

99. The Convention on Biological Diversity requires that Parties should, as far as possible and as appropriate, establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health.<sup>104</sup> A target on biotechnology therefore has the potential to advance biosafety considerations under the Convention including and the Cartagena Protocol on Biosafety. The Convention also includes provisions to facilitate access to environmentally safe biotechnologies for the conservation and sustainable use of biodiversity.

100. Biotechnology encompasses a range of specific technologies and products and is an evolving area with rapid technological developments. Biotechnology can have positive, neutral or negative impacts on biodiversity depending on the products that are developed and/or how they are used. The proposed target focuses on preventing, managing or controlling, potential adverse impacts. There is no systematic quantitative information currently available on actual and potential adverse impacts of biotechnology on biodiversity or on reductions of such impacts through biosafety measures.

101. Actions to achieve this target should take into account mechanisms already in place under the Cartagena Protocol. 55 per cent of Parties to the Cartagena Protocol reported having fully introduced the necessary legal, administrative and other measures for the implementation of the Protocol; an additional 39% of Parties report that they have measures partially place, and these cover most of the Parties that report taking decisions on LMOs for intentional introduction into the environment. The publication and use of information in the Biosafety Clearing House is progressively improving, including by developing countries. For example, by January 2020, 2,055 risk assessment reports and 2,134 decisions on introduction into the environment had been notified to the Clearing House.

#### **Incentives<sup>105</sup>**

**Target 17.** *By 2030, redirect, repurpose, reform or eliminate incentives harmful for biodiversity, including [X] reduction in the most harmful subsidies, ensuring that incentives, including public and private economic and regulatory incentives, are either positive or neutral for biodiversity.*

102. Harmful incentives, including subsidies, are a major indirect driver of biodiversity, particularly as they affect decisions around land-use, consumption and production patterns, overexploitation, pollution and climate change. Substantial and widespread changes to harmful incentives, will be a necessary and critical step to ensure the conservation and sustainable use of biodiversity.

103. The value of subsidies that are harmful or potentially harmful to biodiversity is estimated at about \$500 billion per year.<sup>106</sup> The most harmful elements include government support to agriculture (about \$230 billion, including \$116 billion from OECD countries), and capacity-enhancing subsidies for fishing fleets over \$ 20 billion.<sup>107</sup> Taking into account environmental costs, other externalities and lost tax revenue the

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<sup>104</sup> Convention on Biological Diversity, Article 8(g).

<sup>105</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the Aichi Biodiversity Targets 3. Additional references are indicated in the text for specific points.

<sup>106</sup> OECD (2020) A Comprehensive Overview of Global Biodiversity Finance. <https://www.oecd.org/environment/resources/biodiversity/report-a-comprehensive-overview-of-global-biodiversity-finance.pdf>

<sup>107</sup> OECD (2019), Producer and Consumer Support Estimates. OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>; Sumaila et al (2019). Updated estimates and analysis of global fisheries subsidies. Marine Policy, 109, 103695. <https://doi.org/10.1016/j.marpol.2019.103695>; Deutz et al (2020) Financing Nature: closing the global biodiversity financing gap.

total cost of subsidies that damage nature is estimated to be on the order of \$4-6 trillion per year.<sup>108</sup> Harmful subsidies greatly exceed the finance that is allocated to promote conservation and sustainable use of biodiversity (see proposed target 19). Revenue generated from biodiversity-relevant taxes is estimated at \$7.4 billion per year.<sup>109</sup>

104. A necessary first step in reaching a target on this issue is the identification of those incentives which are harmful to biodiversity. In most countries and regions, there are likely to be a number of incentives which are having negative effects on biodiversity. In the redirection, repurpose, reform or elimination of harmful incentives priority may be given to those particularly harmful to biodiversity and those which also impede other societal objectives or are not effective from a socio-economic perspective. A total phase out of such incentives could be envisaged. Financial savings from redirection, repurposing, reform and/or elimination of harmful subsidies has the potential to make resources available for the conservation and sustainable use of biodiversity as well as for other societal objectives.<sup>110</sup> Actions towards this target will support progress towards most of the other proposed targets in the post-2020 global biodiversity framework, and in particular those addressing the direct and indirect drivers of biodiversity loss and those related to meeting people's needs through sustainable use and benefit-sharing.

### **Financial resources<sup>111</sup>**

**Target 18.** *By 2030, increase by [X%] financial resources from all international and domestic sources, through new, additional and effective financial resources commensurate with the ambition of the goals and targets of the framework and implement the strategy for capacity-building and technology transfer and scientific cooperation to meet the needs for implementing the post-2020 global biodiversity framework.*

105. The progress towards a target on resource mobilization will have implications on the feasibility of achieving the other proposed targets and goals in the post-2020 global biodiversity framework. The lack of financial resources has frequently been noted as a limitation to the conservation and sustainable use of biodiversity.

106. OECD data suggest that global biodiversity finance is on the order of \$78 – 91 billion per year (2015-2017 average). Data reported to the Convention on Biological Diversity is consistent with these estimates. This funding comes from a variety of sources, including domestic sources (about \$67.8 billion per year), international public biodiversity finance (\$3.9 billion per year between 2015 and 2017 for finance that has biodiversity as a principal focus, and \$9.3 billion per year if other finance with significant elements related to biodiversity) and the private sector (conservatively \$6.6-13.6 billion per year).<sup>112</sup> In 2018-2022, funding directly relevant to biodiversity provided through the GEF was about \$1.3 billion. More recent and comprehensive estimates which, among other things account for expenditure on natural infrastructure, biodiversity offsets and additional contributions from the business and finance sectors, suggest that biodiversity finance is between about \$120 billion and \$140 billion. However, given the risk of double

<sup>108</sup> Coady et al (2019) “Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates” IMF Working Paper 19/89. International Monetary Fund. <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509> and Dasgupta (2021) The Economics of Biodiversity: The Dasgupta Review HM Treasury. United Kingdom. <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>

<sup>109</sup> OECD (2020), *Tracking Economic Instruments and Finance for Biodiversity - 2020*, available at

<https://www.oecd.org/environment/resources/tracking-economic-instruments-and-finance-for-biodiversity-2020.pdf>

<sup>110</sup> The draft long-term approach to mainstreaming and the associated action plan, currently submitted to the Subsidiary Body on Implementation at its third meeting, identifies a range of pertinent strategic action areas and provides an indicative list of possible actions. See CBD/SBI/3/13 and Add.1.

<sup>111</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the Aichi Biodiversity Targets 20. It also draws on document CBD/SBI/3/5 and its related addenda. Additional references are indicated in the text for specific points.

<sup>112</sup> OECD (2020) A Comprehensive Overview of Global Biodiversity Finance.

<https://www.oecd.org/environment/resources/biodiversity/report-a-comprehensive-overview-of-global-biodiversity-finance.pdf>

counting, the lower of these figures may be closer to the true value.<sup>113</sup> Biodiversity funding through international flows including official development assistance doubled during the last decade, but total funding is estimated to have increased more modestly.

107. Determining funding needs for the implementation of the post-2020 global biodiversity framework is challenging given that the framework is still under development and different methodological approaches exist for estimating financial needs. Recent estimates of funding needs, per year, focussing primarily on expanding and improving protected areas suggests funding needs in the range of \$103-178 billion or \$149-192 billion. Protecting urban and coastal ecosystems and controlling invasive alien species is estimated to cost an additional \$200 billion, while the estimated costs for transforming agricultural, forestry and fishery sectors are estimated at \$442-580 billion. This gives a total estimate of \$722 -967 billion per year.<sup>114</sup>

108. These estimates suggest a funding gap of the order of \$700 billion per year. However, this gap could be closed substantially by subsidy reform (see proposed target 17) both by reducing the need for finance and through the contributions that may be made from redirected subsidies. Further processes related to access and benefit sharing (proposed target 12) have the potential to generate some of the funding necessary to address the funding needs associated with the implementation of the post-2020 global biodiversity framework.

109. Actions towards this target should bear in mind the provisions of Article 20 of the Convention. A combination of resources from domestic and international sources as well as from the public and private sectors will be needed. Some additional resources could come from a combination of (a) reducing subsidies causing harm to biodiversity and thereby reducing the total funding need; (b) making use of funds redirected from subsidy reform; (c) generating additional resources from all sources, including domestic and international sources as well as public and private sources; (d) making use of funds which also serve other objectives, such as addressing climate change, where objectives coincide or overlap (e) enhancing the effectiveness and efficiency of resource use. Proposals have been made for a new financial institution guided by the principle of fiscal equivalence: those who benefit from the good in question should also pay for the costs of provision. Such a mechanism would incentivize nations to supply global benefits of conserving biodiversity, for example through protected areas.<sup>115</sup>

110. The targets that relate to biodiversity mainstreaming (proposed target 13) and incentives (proposed target 17) are supportive of this target. In addition, processes related to access and benefit sharing (proposed target 12) have the potential to generate some of the funding necessary to address the funding needs associated with the implementation of the post-2020 global biodiversity framework. Furthermore, this target will support all of the other proposed targets.

### **Knowledge<sup>116</sup>**

**Target 19:** *By 2030, ensure that quality information, including traditional knowledge, is available to decision makers and public for the effective management of biodiversity through promoting awareness, education and research.*

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<sup>113</sup> Deutz et al (2020). Financing Nature: Closing the global biodiversity financing gap. The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability. <https://www.paulsoninstitute.org/key-initiatives/financing-nature-report/>

<sup>114</sup> Deutz et al (2020), *op. cit.*; Waldron et al (2020) Protecting 30% of the planet for nature: costs, benefits and economic implications. Working paper analysing the economic implications of the proposed 30% target for areal protection in the draft post-2020 Global Biodiversity Framework. [https://www.conservation.cam.ac.uk/files/waldron\\_report\\_30\\_by\\_30\\_publish.pdf](https://www.conservation.cam.ac.uk/files/waldron_report_30_by_30_publish.pdf). For a further discussion of this issue, see CBD/SBI/3/5/Add.2.

<sup>115</sup> Dröste et al (2019), Designing a global mechanism for intergovernmental biodiversity financing, *Conservation Letters*. 2019; volume 12, issue 6: e12670. <https://doi.org/10.1111/conl.12670>; Dasgupta (2021), *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury, United Kingdom. <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>

<sup>116</sup> The text in this subsection draws on GBO-5, and references therein, in particular the section related to the Aichi Biodiversity Targets 20. Additional references are indicated in the text for specific points.

111. Quality and timely biodiversity information is required to identify threats to biodiversity, to determine priority actions for conservation and sustainable use and to determine if such actions are effective. Biodiversity information, including traditional knowledge, will underpin progress towards all of the proposed goals and targets of the post-2020 global biodiversity framework. It will also be essential in tracking the progress in the attainment of these. Despite important advances in recent years, biodiversity information remains limited or absent for many issues.

112. Biodiversity information is growing at a rapid rate, and indicators are becoming more readily available and various national, regional and global biodiversity observation networks are being established. While there is no single indicator for the availability of biodiversity information, growth is demonstrated by, for example, the number of species assessed for extinction risk in the IUCN Red List, which has doubled in the past decade, passing 120,000 species in 2020, or the number of species occurrence records freely accessible through the Global Biodiversity Information Facility (GBIF), which has reached more than 1.6 billion. The Barcode of Life Data System (BOLD) has established a library of more than half a million public 'Barcode Index Numbers'. Further, through remote sensing, information on the extent and quality of ecosystems is increasingly available. However, important gaps in biodiversity information remain. For example, species data is still strongly biased towards animal species, especially birds, and higher plants, and many of the most diverse ecosystems, especially in the tropics, are still greatly under-represented. IUCN Red List assessments still only covers 6 per cent of described species. In addition to these gaps, important challenges remain in terms of the ease of access and use of information, its timeliness and quality. Moreover, the lack of socioeconomic data relevant to biodiversity, including gender-specific data, can lead to misleading information and compromise effective management.

113. Recognizing the knowledge, innovations, practices, institutions and values of indigenous peoples and local communities, and ensuring their inclusion and participation in environmental governance (proposed target 20), often enhances their quality of life as well as the conservation, restoration and sustainable use of biodiversity. However, traditional and indigenous knowledge remains poorly recognized, and is still often marginalized.<sup>117</sup>

114. Progress towards this target will require greater support for data acquisition, management and sharing. This includes efforts to address major imbalances in the location and taxonomic focus of biodiversity studies and monitoring as well as to address knowledge gaps related to the consequences of biodiversity loss for people, including indigenous peoples and local communities, women, youth, and people living in vulnerable situations. The greater recognition and support for the role of indigenous peoples and local communities in monitoring the status, trends and threats to biodiversity will be important in this respect. Further actions to better share biodiversity information, for example through national clearing-house mechanisms, will be needed. Scaling up use and support of recent technological advances in monitoring, cataloguing and sharing biodiversity information will be important to filling information gaps.

## **Participation**<sup>118</sup>

**Target 20:** *By 2030, ensure equitable participation in decision-making related to biodiversity and ensure rights over relevant resources of indigenous peoples and local communities, women and girls as well as youth, in accordance with national circumstances.*

115. Reaching the 2050 Vision for biodiversity will require a whole of society approach. Given this, it is important that the views, perspectives and experiences of all groups are taken into account in decision making processes related to biodiversity. This will require equitable participation in decision making, with

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<sup>117</sup> IPBES (2019), Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany; Forest Peoples Programme et al (2020), *Local Biodiversity Outlooks 2: The contributions of indigenous peoples and local communities to the implementation of the Strategic Plan for Biodiversity 2011–2020 and to renewing nature and cultures*. A complement to the fifth edition of the *Global Biodiversity Outlook*. Moreton-in-Marsh, England, [www.localbiodiversityoutlooks.net](http://www.localbiodiversityoutlooks.net).

<sup>118</sup> The text in this subsection draws on GBO-5, and references therein, in particular the sections related to the Aichi Biodiversity Targets 14 and 17. Additional references are indicated in the text for specific points.

particular attention being needed to ensure that the views and rights of indigenous peoples and local communities, women and girls, and youth are effectively taken into account. Equal rights to relevant resources, particularly land, may be considered an important component of an enabling environment, as a means to enable conservation and sustainable use of biodiversity by all actors and to contribute to social objectives, including poverty alleviation, health and human well-being.

116. Analysis of national biodiversity strategies and action plans (NBSAPs) has shown that opportunities for effective action in support of biodiversity have been missed due to insufficient involvement of indigenous peoples and local communities, women, youth and a broad set of stakeholders. For example, only 40 Parties reported that indigenous peoples and local communities were involved in the revision processes of their national biodiversity strategies and action plans. Similarly, less than half of recent NBSAPs have included some reference to gender or women's issues, often on a limited basis.

117. Reaching this target will require a greater recognition of the role of indigenous peoples and local communities, women and youth as leaders and key actors in action towards biodiversity conservation and sustainable use and that these groups are further enabled and encouraged to play this role. Similarly, ensuring that their rights, particularly as they relate to owning, using, accessing, controlling, transferring, inheriting and otherwise taking decisions about land and related resources, are respected would contribute to the effective implementation of the post-2020 global biodiversity framework as well as broader societal objectives, including issues addressed in the 2030 Agenda for Sustainable Development. The progress towards this target would contribute to the attainment of the other proposed targets in the post-2020 global biodiversity framework.

#### IV. SCOPE OF THE PROPOSED GOALS AND TARGETS

118. This section reviews the scope of the proposed goals and targets in relation to the articles of the Convention, the drivers of biodiversity loss, the levers/leverage points for transformative change identified by IPBES, and the areas of transition proposed in GBO-5 and LBO-2. A summary is provided here and more detailed information is provided in CBD/SBSTTA/24/INF/23.

119. The proposed goals and targets of the framework address all three objectives of the Convention and most of its substantive provisions. However, a few provisions are incompletely and/or not explicitly addressed. For example, while proposed target 19 refers to traditional knowledge and proposed target 20 refers to the participation of indigenous peoples and local communities in decision-making, the provisions of Article 8(j) are not fully addressed.<sup>119</sup> Article 9 on ex situ conservation is addressed in proposed target 3 but only in the context of threatened species. The proposed targets do not completely address Article 13 on public education and awareness, but parts are covered by proposed targets 15 and 19.<sup>120</sup> Matters related to Articles 7(b) and 8(l), which require the identification and monitoring of activities that have or are likely to have significant adverse impacts on biodiversity and for such activities to be regulated or managed, and Article 14 on impact assessment are implicit in many of the proposed targets but not covered explicitly. Article 16 on technology is not directly in a target.

120. The proposed targets of the framework explicitly address each of the main direct drivers of biodiversity loss identified in the IPBES *Global Assessment*, namely land and sea use change (proposed target 1), exploitation of organisms (target 4), invasive alien species (target 5), pollution (target 6), and climate change (target 7). However, in keeping with the respective roles of the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change (UNFCCC), the proposed target on climate change covers only those mitigation actions contributed by biodiversity and ecosystems.

121. With respect to the indirect drivers of biodiversity loss, as categorized by IPBES, the proposed targets of the framework address many aspects of the economic drivers, including production (targets 9),

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<sup>119</sup> Tradition knowledge is also addressed in the section of the updated zero draft of the post-2020 global biodiversity framework relating to implementation support mechanisms.

<sup>120</sup> The issue of education and awareness is also addressed in the sections of the updated zero draft of the post-2020 global biodiversity framework relating to implementation support mechanisms and outreach, awareness and uptake.

supply chains (target 14), consumption (target 15), incentives (targets 17) and financial resources (target 18). Some aspects of the indirect drivers related to governance, institutions, values, beliefs, norms (for example in proposed targets 13, 19 and 20) and technological drivers (explicitly in proposed target 16, and implicitly in proposed target 9) are addressed in framework. Demographic drivers are not addressed in the updated zero draft of the post-2020 global biodiversity framework.

122. Two of the five levers (incentives, and strengthening law and policy) for transformational change identified by the IPBES *Global Assessment* are completely addressed. With regard to the leverage points identified by the IPBES *Global Assessment*, waste and consumption are addressed in proposed target 15, and externalities and tele-coupling are partly addressed in target 14. Inequality and justice and inclusion are partially addressed in terms of equitable participation (proposed target 20).

123. The proposed targets address most aspects of the eight areas of sustainability transition outlined in GBO-5. Three of them align very closely with particular proposed targets. The land and forest transition is addressed by proposed target 1 while proposed target 2 is also relevant. The sustainable agriculture transition is addressed by proposed target 9. The sustainable climate action transition is largely addressed by proposed target 7. The freshwater transition is largely addressed through proposed targets 1, 2, 5, 6 and 10 while the fisheries and oceans transition is addressed through targets 1, 2, 4, 6, 7, 8, and 9. However, as demonstrated by these multiple cross-references, freshwater and marine issues are perhaps less clearly identifiable in the framework than terrestrial issues. Aspects of the Food systems transition relating to waste and consumption are addressed in proposed target 15, but with no particular or explicit focus on food. The cities and infrastructure transition is partly addressed through proposed targets 10 and 11. The Biodiversity-inclusive One Health transition is partly covered through proposed targets 1, 4, 9, 10 and 11, but with no particular focus on a One Health approach.

124. Gender is an important consideration across the framework. Gender specific actions may be particularly relevant for targets 8-11, 13, 15, 19 and 20.

125. The proposed goals and targets largely cover the scope of the Aichi Biodiversity Targets, but with more comprehensive approaches to land-/sea-use change, sustainable use, and nature-based solutions. It also addresses supply chains, biosafety, and urban green spaces and green infrastructure. On the other hand, there is less prominence of public awareness (Aichi Target 1), fisheries and aquaculture (Aichi Targets 6 and 7), and coral reefs (Aichi Target 10). Coverage of traditional knowledge and indigenous peoples and local communities is less developed than in Aichi Target 18.

126. Links between the updated zero draft of the post-2020 global biodiversity framework and the Sustainable Development Goals are examined in information document CBD/SBSTTA/24/INF/12.

## **V. LINKS TO A POTENTIAL UPDATED GLOBAL STRATEGY FOR PLANT CONSERVATION**

127. This section reviews how the proposed goals and targets of the post-2020 global biodiversity framework may relate to an updated Global Strategy for Plant Conservation (GSPC). The GSPC was adopted in 2002 and updated in 2010. It represented the first use of outcome-oriented targets under the Convention. The latest review of the Strategy has shown that, while the targets of the GSPC were not met, countries have made considerable progress towards achieving many of them. The progress is the result of actions under the strategy, with several new initiatives developed specifically to address GSPC targets. In the absence of the GSPC, these actions would not likely have taken place. These include the establishment of a World Flora Online, which provides an open-access web-based compendium of the world's 350,000 species of vascular plants and mosses, and a Global Tree Assessment, which aims to have completed Red List assessments for all the world's tree species. Some of the lessons learned from the implementation of the GSPC were that the GSPC provided an important entry point for many non-governmental organisations to support for the implementation of the Convention on Biological Diversity. It has stimulated considerable growth in networks and partnerships at national and global levels and has resulted in the development of a broadly-based, multi-stakeholder, united community, committed to ensuring the conservation and sustainable use of plant diversity into the future. The experiences also point to the potential benefit for a Global Strategy for Plant Conservation that is updated and harmonized within the broader context of the post-2020 global biodiversity

framework and which and more firmly embedded within it that was the case for the Strategic Plan for Biodiversity 2011-2020.<sup>121</sup>

128. All of the proposed goals and targets of the post-2020 global biodiversity framework are relevant to plant conservation. Some of them are amenable to the setting of specific sub-targets (or components) for plants. Such specificity could support monitoring since, in many cases, knowledge is more complete for plants, especially higher plants, than for other taxa. For example, more specific sub-goals for the conservation of plant species and plant genetic diversity could be established under proposed Goal A. Similarly a sub-target related to proposed target 2 could specify the in situ conservation of plant diversity and of areas of particular importance for plants, while a sub-target related to proposed target 3 could cover the ex situ conservation of wild and domesticated plant species and genetic diversity. In addition, a sub-target related to proposed target 4 could include a focus on the sustainable use of medicinal plants, timber species and other harvested wild plants and/or provide a focus on the benefits of medicinal plants and of plant diversity for nutrition. Further information on a possible approach to an updated Global Strategy on Plant Conservation and how it might relate to the post-2020 global biodiversity framework is provided in document CBD/SBSTTA/24/INF/20.

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<sup>121</sup> Secretariat of the Convention on Biological Diversity (2020). *Global Biodiversity Outlook*, fifth edition. Montreal. <https://www.cbd.int/gbo5>; Sharrock (2020). *Plant Conservation Report 2020: A review of progress in implementation of the Global Strategy for Plant Conservation 2011-2020*. Secretariat of the Convention on Biological Diversity, Montreal, Canada, and Botanic Gardens Conservation International, Richmond, United Kingdom. *Technical Series No. 95*. <https://www.cbd.int/gbo5/plant-conservation-report-2020>