STRENGTHENING SYNERGIES

How action to achieve post-2020 global biodiversity conservation targets can contribute to mitigating climate change

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Authors
Xavier de Lamo (UNEP-WCMC), Martin Jung (IIASA), Piero Visconti (IIASA), Guido Schmidt-Traub (SDSN), Lera Miles (UNEP-WCMC), Valerie Kapos (UNEP-WCMC)

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Strengthening synergies

How action to achieve post-2020 global biodiversity conservation targets can contribute to mitigating climate change

The essential contribution of nature to addressing climate change provides an opportunity to strengthen the links between the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity. As we move towards the next Conferences of the Parties of both Conventions, there is a need to assess explicitly the role of nature in helping to meet the goals of these agreements efficiently and effectively. This series of reports aims to shed light on this topic by assessing the potential contribution that achieving biodiversity conservation targets can make to climate change mitigation. By doing so, it aims to provide both context and mandate for discussions under both Conventions on the role of nature-based solutions in climate change mitigation and links to biodiversity conservation action.

Key Messages

1. The climate and biodiversity crises are fundamentally connected and more integrated approaches are needed to address them effectively. To directly tackle the interconnected factors behind them, actions which capitalize on the contributions of nature, commonly known as Nature-based Solutions (NbS), can play a more central role.

2. The one-year delay in the 2020 Conferences of Parties to the UNFCCC and the CBD caused by the COVID-19 crisis provides a unique opportunity to bring new scientific advances to inform and strengthen the links between both international agendas and their national implementation. To facilitate the alignment and better understand the potential synergies between these agendas, there is a need to assess the role that achieving biodiversity conservation targets can play in efforts to mitigate climate change.

3. This report presents the first results of ongoing research aiming to inform progress by making explicit and quantifying the role that achieving biodiversity conservation targets can play in securing the emissions reductions needed to meet the objectives of the Paris Agreement. This report, the first output of this effort, looks at the carbon stocks associated with areas identified as possible priorities to meet proposed global biodiversity conservation targets.

4. The analysis presented here identifies the regions where global action will deliver the most to achieve post-2020 biodiversity conservation goals and mitigate climate change. It shows that the strategic choice of areas to be managed for conservation, increasing such areas to 30% of land globally, could safeguard more than 500 gigatons of carbon. When prioritizing areas for conservation management, taking account of biodiversity and carbon together can secure 95% of the biodiversity benefits and nearly 80% of the carbon stock that could be obtained by prioritizing based on either value alone.

5. These results reveal the high potential for maximizing synergies between biodiversity conservation and climate change mitigation and highlight the usefulness of novel multicriteria optimization tools to guide decisions on where to implement NbS to maximize benefits for these two objectives. Such information can make a vital contribution to helping decision makers move from aspiration to ambitious and effective policies and concerted efforts to meet international commitments. It can also inform the inclusive decision-making processes involving indigenous peoples, local communities and other stakeholders that are crucial to operationalizing effective NbS.

6. In future, this work will advance beyond knowledge of carbon stocks to increase understanding of the impacts of both conservation and restoration action on greenhouse gas emissions from land-use and land-use change. Working with partners in a set of pilot countries, future research will adapt these analytical approaches to fit national circumstances and priorities to help guide national implementation of the biodiversity and climate conventions.

1 Nature is a key ally in the fight against climate change

Climate change and biodiversity loss are interlinked. Conversion of natural ecosystems is a significant source of greenhouse gas emissions, as well as a major driver of biodiversity loss. In a downward spiral, these carbon emissions drive further climate change[1]. Furthermore, climate change is projected to become the next major driver of biodiversity loss, reducing the resilience of natural ecosystems and releasing yet more stored carbon[2]. Ongoing loss of biodiversity also affects society's ability to mitigate and adapt to the worsening impacts of climate change.

Understanding these interactions is critical to address climate change and biodiversity loss in an integrated manner. Recent major reports by the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) highlight the critical role of nature in limiting global warming to well below the 2°C threshold set by the Paris Agreement, and stress the need for urgent and coordinated global action to address both crises. In their 25th Conference, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) underlined the need to address biodiversity loss and climate change in an integrated manner[3].

Nature can contribute to tackling climate change. Actions which capitalize on the contributions of nature to achieve societal and human development goals, commonly known as 'nature-based solutions', can contribute simultaneously to both climate change mitigation and adaptation as well as biodiversity conservation. Such actions would also strengthen synergies across multilateral international conventions on biodiversity and climate change and the UN Sustainable Development Goals.

BOX 1

What are Nature-based Solutions (NbS)?

The International Union for Conservation of Nature (IUCN) defines NbS as *'actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits'*.

Nature-based solutions include, among others, 'traditional' biodiversity conservation measures such as designation and management of protected areas and other effective conservation measures (OECMs) or restoration of degraded ecosystems. When NbS are intentionally used to respond to climate change, they may be referred to as *'nature-based climate solutions'* or *'natural climate solutions'*.

1. Secretariat of the Convention on Biological Diversity (2020) *Global Biodiversity Outlook 5.* Montreal.
2. 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.* Díaz, S. *et al.* (eds.). IPBES secretariat, Bonn, Germany. 56 pages.
3. UNFCCC Decision 1/CP.25

2 The global biodiversity and climate summits (CBD COP15 and UNFCCC COP26) are key opportunities to bring about the transformative change needed to tackle the climate and biodiversity crises

Calls to coordinate and strengthen the links between the global biodiversity and climate agendas are growing. Nature-based solutions (NbS) are one of the priorities identified by the UK UNFCCC COP 26 Presidency to achieve the goals set by the Paris Agreement. Given that NbS have the potential to provide a strong policy connection between the three Rio Conventions — on Biodiversity, Climate Change and Desertification — this provides an opportunity for Presidencies and Secretariats of all three agreements to work together to achieve closer linkages in the lead up to and through the 2021 Super Year for Nature. Further, more than 75 countries supporting the Leaders' Pledge for Nature have committed to addressing a range of environmental challenges including climate change and biodiversity loss 'in an integrated and coherent way'.

Greater ambition and action are needed to bend the curve of biodiversity loss and greenhouse gas emissions. Despite growing consensus at the recent United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) Conference of Parties (COPs) on the need for integrated action at country and local levels to tackle both crises, nature-based solutions are still absent in many national climate pledges and country strategies. The postponed COPs of the UNFCCC and the CBD represent an opportunity to bring new scientific advances to bear as countries decide the scale and scope of actions necessary to make progress on meeting the goals of these agendas.

The draft post-2020 global biodiversity framework sets out an ambitious plan to ensure that the shared vision of living in harmony with nature is fulfilled, while making explicit links to the Paris Agreement. The latest update to the zero draft[4] of the post-2020 global biodiversity framework includes four long-term goals for 2050 and twenty action-oriented targets to be achieved by 2030. Among many others, it includes targets on increasing: the use of spatial planning (target 1); protected and conserved area (target 2); and contributions to climate change mitigation, adaptation and disaster-risk reduction from nature-based solutions and ecosystem-based approaches (target 7).

4. https://www.cbd.int/doc/c/3064/749a/0f65ac7f9def86707f4eaefa/post2020-prep-02-01-en.pdf

3 Recent scientific advances can provide guidance and tools to coordinate and strengthen the links between global environmental agendas

There is a need to jointly consider the contributions of nature-based solutions for climate change mitigation, biodiversity conservation and other policy goals. Even though some estimates of the mitigation potential of individual nature-based solutions exist, considerable scientific work remains to reduce the uncertainty of those estimates[5]. It is also necessary to develop methods that explicitly assess the dual role that nature-based solutions can play in both achieving global and national biodiversity targets and securing the emissions reductions needed to meet the objectives of the Paris Agreement.

New research provides a basis for assessing how progress towards biodiversity conservation can contribute to climate change mitigation objectives. Several recent exercises have analysed relationships among biodiversity and carbon. In one of the most recent and innovative of these[6], the Nature Map Initiative has developed new ways of analysing biodiversity and carbon values spatially to help achieve the full climate mitigation potential of nature-based solutions in the terrestrial realm. As well as novel method development, the Nature Map analysis incorporates large amounts of newly available global biodiversity data not included in previous efforts, building the largest globally consistent spatial dataset on species ranges to date. These advances make it possible to address a range of biodiversity targets and assess synergies and trade-offs with carbon storage, providing tools that can help authorities to advance towards more integrated land use planning that maximizes gains for progress towards multiple policy objectives.

5. Jia, G., *et al.* (2019) *Land–climate interactions.* In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla et al. (eds.)].
6. https://naturemap.earth

4 Where are the world's key areas for achieving emerging global biodiversity targets and how much carbon is stored in them?

Nature Map can provide guidance on where action can deliver the most to achieve post-2020 global biodiversity conservation goals and mitigate climate change. The analytical framework developed by the Nature Map Initiative makes it possible to identify the land areas that, if effectively managed, would contribute the most to achieving goals and targets currently under discussion for the post-2020 global biodiversity framework, such as Goal A.2[7] or Target 2[8], while safeguarding global carbon stocks. It does so through a multi-criteria approach for optimizing outcomes for biodiversity conservation and mitigation of climate change at a global scale. Benefits for biodiversity conservation are quantified as the improvement of species' conservation status, assessed individually for each of the world's terrestrial vertebrate species and a representative set of plant species. Benefits for climate change mitigation are assessed based on the amount of carbon stored in the vegetation and soils. Nature Map's multicriteria optimization algorithm uses this information to hierarchically rank the world's terrestrial landscapes based on their relative value in halting biodiversity loss and mitigating climate change. This also allows us to assess trade-offs and synergies across biodiversity and climate change mitigation.

Conservation priorities are widely distributed across the planet. Nature Map's analysis identifies as the most important regions to prioritize implementation of nature-based climate solutions well-known biodiversity hotspots such as Brazil's Atlantic Forest, Mesoamerica, large parts of Mediterranean biomes and South-East Asia, but also other hotspots on the coast of West African Coast, Papua New Guinea and the East Australian Rainforest (Figure 1). Other areas show high value mainly because of the vast amounts of carbon they contain, including lowlands south of the Hudson Bay, the Amazon rainforest and the Congo Basin, among others. The effective conservation and sustainable management of such areas, through applying integrated spatial planning to address land use change would make a significant contribution to the achievement of both climate and biodiversity goals.

The contribution of biodiversity conservation actions to climate change mitigation can be increased through the strategic placement of these actions. Analyses carried out by the Nature Map Initiative show how explicitly including carbon storage in multi-criteria spatial optimization frameworks can be useful to guide decisions on where to implement NbS to increase nature's contribution to climate change mitigation while safeguarding significant numbers of species on land at the same time.

Figure 2 shows how carbon stocks and the improvement of species' conservation status could increase with the amount of land managed for conservation, and how this increase varies depending on the conservation focus (biodiversity, carbon or both simultaneously).

7. The number of species that are threatened is reduced by [X%]
8. 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.

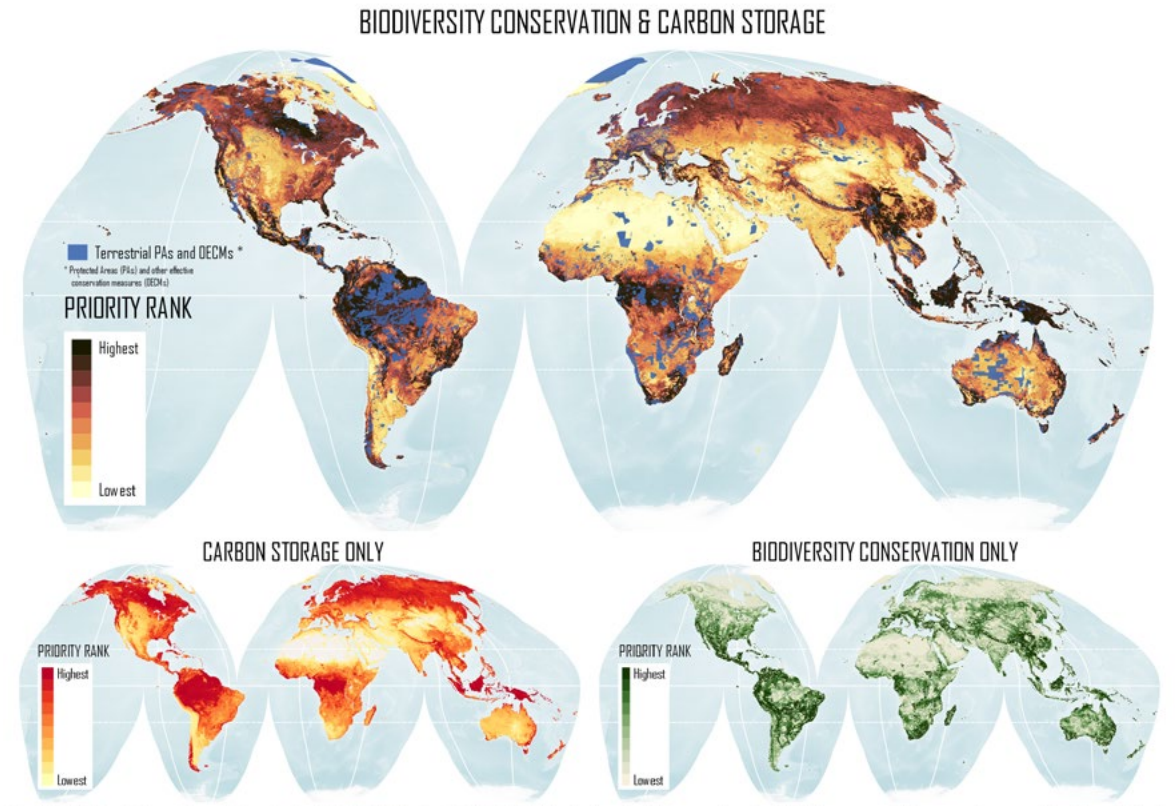

Figure 1. Areas of global significance for conservation according to various criteria: (a) Areas of global significance for biodiversity conservation and the mitigation of climate change. (b) Areas of global significance for climate change mitigation only. (c) Areas of global significance for biodiversity conservation only. In certain areas, the spatial patterns for individual criteria (maps b & c) vary considerably, which highlights the value of a joint optimization (map a). Data collated and analysed by Nature Map consortium. See input maps at https://www.unbiodiversitylab.org – Nature Map. Contact Martin Jung (jung@iiasa.ac.at) for further information on method. The boundaries and names shown and the designations used on maps do not imply official endorsement or acceptance by UN Environment Programme or contributory organisations.

Figure 2 shows the results of an array of conservation scenarios run using Nature Map's multicriteria spatial optimization framework and its outcomes in terms of stored carbon and the number of species conserved. From left to right of the panel, conservation priority is given to (1) carbon, (2) biodiversity and (3) biodiversity and carbon jointly.

The results of this analysis indicate that the strategic placement of areas to be managed for conservation, to increase global totals to 30% of land – as provisionally stated in target 2 of the zero draft of the post-2020 global biodiversity framework – could protect approximately 378 (if biodiversity is prioritized) to 640 gigatons of carbon (if carbon is prioritized). However, prioritizing both biodiversity conservation and carbon retention could safeguard more than 500 gigatons of carbon, while reducing the extinction risk of almost 88% of the species considered in the study. In other words, concentrating areas to be managed for conservation in priority areas for both benefits could deliver almost 80% of the maximum climate change mitigation benefits while delivering almost 95% of the maximum biodiversity benefits. This illustrates the high potential for maximizing synergies between biodiversity conservation and climate change mitigation on land.

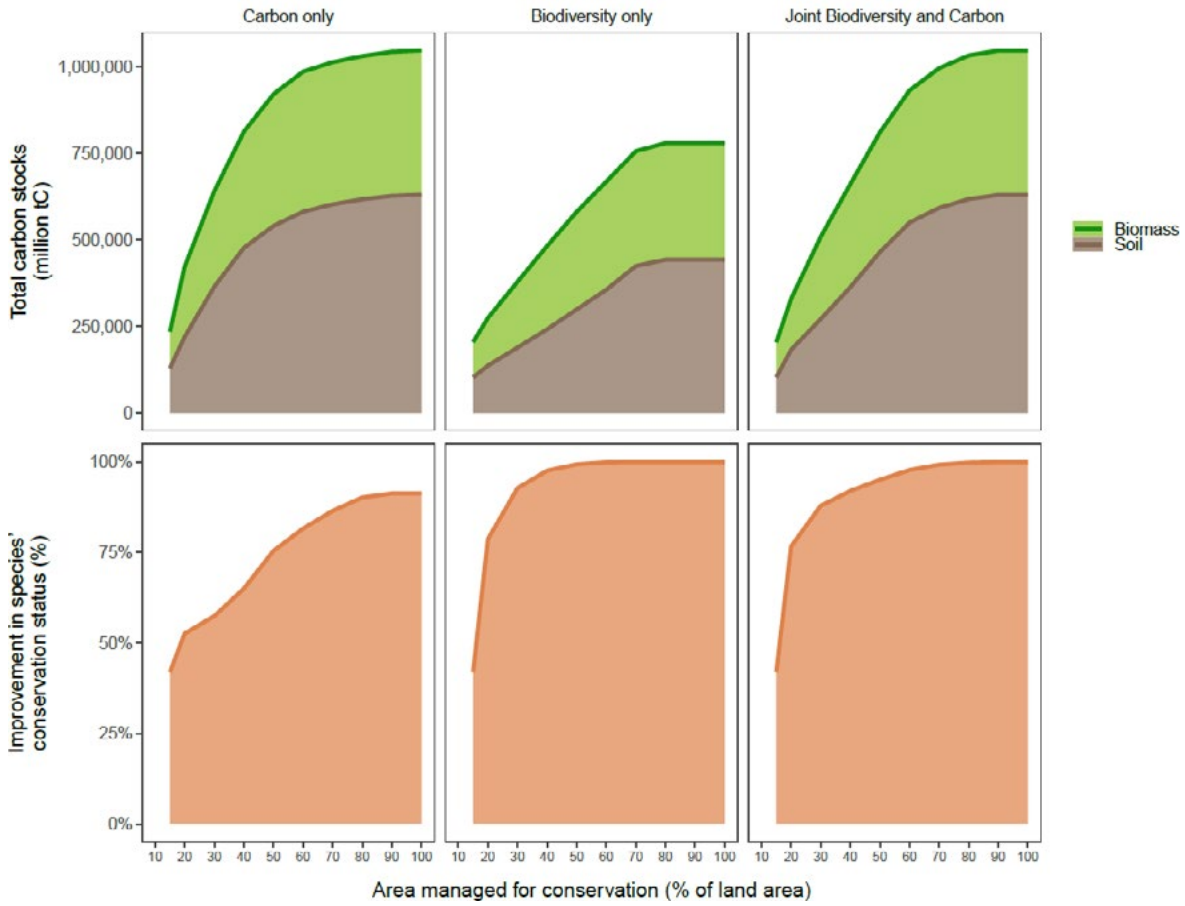

Figure 2. Area plots showing the increase of climate change mitigation benefits (measured as amount carbon conserved in millions of tonnes of carbon, in the 3 top plots) and biodiversity conservation benefits (measured as % of species whose conservation status is improved, in the 3 bottom plots) with the amount of land (measured as % of world's land area) optimally managed for conservation for different prioritization scenarios (carbon only in the left side, biodiversity only in the centre, and biodiversity and carbon simultaneously in the right). The results show that using multi-criteria optimization to prioritize for carbon and biodiversity jointly can help deliver substantial benefits for both objectives.

5 Looking forward

Amid growing urgency to harness all available opportunities to mitigate climate change and reduce biodiversity loss, nature-based solutions are gaining momentum due to their potential to align action to meet targets across different international conventions in a cost-effective way. New research, such as that presented in this report, is revealing the synergies and trade-offs between actions aiming to contribute to climate change mitigation, biodiversity conservation and other sustainable development goals, and is now able to assess more accurately the role that nature-based solutions can play within the wide array of measures that would need to be taken to meet the objectives of the Paris Agreement. Such information, in conjunction with other knowledge, for example on socio-economic issues related to land rights, is critical for policymakers to set ambitious global environmental targets, matched with ambitious national biodiversity commitments and climate pledges.

Science can help to maximize the impact of nature-based solutions for climate, biodiversity and other goals. This document illustrates the role that increasing the area managed for conservation – through legally protected areas or other effective area-based conservation measures, such as territories conserved by indigenous peoples and local communities, hunting reserves or military training areas – can play in mitigating climate change. It highlights the importance of tools for strategically selecting the location of those areas, based on the best available data and scientific methods to support culturally inclusive participatory planning processes at national and local level, and help maximize their contribution to achieving multiple policy goals. Additionally, it provides information that can be used in prioritizing actions aiming to contribute to targets 2 and 7 of the zero draft of the post-2020 global biodiversity framework to maximize synergies across the climate and biodiversity conventions.

Priority areas for achieving different biodiversity targets are under varying levels and types of pressure. The effective conservation of priority locations and landscapes could indeed help secure the future for millions of species and mitigate climate change simultaneously. However, these areas are under varying levels and types of threat. Northern peatlands in Siberia and the Hudson Bay, for instance, are highly vulnerable to permafrost thaw driven by global warming. Extensive areas of tropical forests in the Amazon, the Congo Basin and South East Asia are threatened by land use conversion due to agricultural expansion and extractive activities. The nature and magnitude of these threats will ultimately determine the type and feasibility of actions needed to address them effectively.

National and subnational governments are key to putting theory into practice. As global progress is driven by national and local action, it will be crucial to apply these analytical approaches to inform national and sub-nationa scale decision-making. The Nature Map Initiative is working with a set of pilot countries to explore how these analyses can be adapted to fit national circumstances and priorities and help guide national efforts under the biodiversity and climate conventions. The outcomes of this work are expected to provide the knowledge base needed for developing

similar approaches in a much wider range of countries and in this way, inform decision-making and action towards achieving climate and biodiversity goals.

Further scientific analyses are needed to better estimate the full climate change mitigation potential of achieving biodiversity targets. To assess more comprehensively the potential impacts of meeting biodiversity targets on greenhouse gas emissions, further analysis will be needed. Because mitigation policies and compliance targets determined by UNFCCC negotiations are expressed in terms of GHG emissions and removals rather than carbon stocks, it is necessary to estimate potential emissions reductions from safeguarding carbon stocks. This requires information on the likelihood for any given area that without conservation or sustainable management it would be converted, resulting in emissions, and an understanding of the proportion of the carbon stock likely to be lost to the atmosphere. In addition, it would also be necessary to make explicit and quantify the role that achieving ecosystem restoration targets can play in mitigating climate change. This information will be made available through upcoming products developed by the Nature Map Initiative.

UNEP-WCMC
219 Huntingdon Road Cambridge
CB3 0DL
United Kingdom

+44 (0)1223 277314
info@unep-wcmc.org
www.unep-wcmc.org

UN environment programme WCMC