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Aligning climate action to 1.5°C with biodiversity planetary boundaries: Three key priorities at COP26 and beyond

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True climate mitigation ambition must be understood as reaching the Paris Agreement 1.5ºC goal within biogeochemical and ecosystem planetary limits: i.e. *in a way that helps reverse, rather than accelerate,* the 6th mass extinction and biodiversity crisis.

For this, we urgently need a paradigm shift *away* from viewing 'nature' simply as a 'solution' to climate, *to* a more comprehensive view underscoring both (i) that biodiversity and healthy natural ecosystems *underpin and condition* our ability to reach ambitious climate goals, and (ii) how ambitious up-front deep decarbonization is key to ensure biodiversity conservation into the future, and hence our ability to reach the 1.5ºC goal.

Recent science indicates that the viable 1.5ºC emission reduction pathways that do not overstep biogeochemical and ecosystem planetary boundaries may be much more limited than previously assessed in the IPCC 1.5ºC Special Report, given that many recur to significant land-based carbon-dioxide removal (CDR) adding land-conversion at a time when we need unprecedented ecosystem conservation efforts. This reinforces the urgency of drastic emission cuts today as the only true option if we want to maintain a living—and hence liveable—planet.

This Brief highlights three key priorities—at COP26 and beyond—to ensure 1.5ºC climate action towards mid-century net zero is aligned with biogeochemical and biodiversity planetary boundaries.

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RECOMMENDATIONS

Politically align climate action to 1.5ºC with biodiversity and ecosystem planetary boundaries. 1/CP.26 could read:

- The COP "*Urges* Parties, in order to reach the 1.5ºC long term temperature goal [and in accordance with Article 4.1 of the Paris Agreement, Article 4.1 (d) of the Convention, and to operationalize 1/CP.25 paragraph 15], to conduct rapid greenhouse gas emissions reductions *alongside* ambitious conservation and restoration of natural terrestrial and marine ecosystems."

Strengthen the science through a Joint IPCC-IPBES Special Report on climate and biodiversity. 1/CP.26 could read:

- The COP "*Invites* the IPCC and IPBES to provide a Joint Special Report on the linkages between biodiversity and climate change [in particular assess the sustainability thresholds of land-based climate mitigation measures, clarify the carbon-storage capacity of land sinks, and develop emission reduction pathways that reach the 1.5ºC goal while keeping within ecosystem integrity and planetary boundaries and ensuring other Sustainable Development Goals (e.g. food security) can be met.]"

Explore LT-LEDS as a tool to integrate ecosystems in low-emissions planning. 1/CMA.3 could include:

- The COP "*Invites* Parties to use LT-LEDS as a tool to promote and explore integrating biodiversity and ecosystem integrity into long-term, low-emissions mitigation and adaptation planning."

POLICYBRIEF

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1. TRUE CLIMATE MITIGATION AMBITION IS REACHING 1.5ºC WITHIN BIOPHYSICAL AND ECOSYSTEM PLANETARY LIMITS

Healthy and biodiverse ecosystems are our life support system, as well as a key carbon sink (absorbing over half of our carbon emissions over the last decade) – undermining these ecosystems may actually put at risk our ability to reach the 1.5ºC goal. Vice versa, climate change threatens the ability of ecosystems to act as carbon sinks and risks turning them into sources of emissions.[2]

Recent IPCC and IPBES Reports have been increasingly clear that we need an integrated response between the climate and biodiversity crises. Yet a full translation of this integrated approach into climate governance is still pending.

Preserving ecosystems and halting biodiversity loss requires not only unprecedented efforts of ecosystem conservation, restoration, and sustainable management *today* (which is where most focus is placed today), but also ensuring ecosystems are preserved into the future, which requires reducing land-use conversion pressures and *keeping them low throughout coming decades*.[3]

Yet concerningly, recent research finds that 97% of pathways assessed by the IPCC to reach 1.5ºC (or even 2ºC) goal depend on bioenergy (to replace fossil-fuels) and bioenergy with carbon capture and storage BECCS (used as CDR) at scales leading to further land-use conversion, overstepping what the authors call a 'precautionary sustainability threshold' of bioenergy crop production (0.5 M km^2—the current level).[4] The study also finds that 33% of IPCC 1.5ºC or 2ºC pathways bank on 5 Gt/CO_2/yr removals by BECCS by 2050[5] (requiring bioenergy crops on an area at least twice Argentina) or above, significantly trespassing the IPCC-IPBES Co-Sponsored Workshop Report's (CSWR) upper sustainability threshold (2.5 Gt/CO_2/yr). Even the recent IEA's Net Zero Emissions pathway – hailed for phasing-out of fossil fuels by 2050—projects a 65% increase in bioenergy and BECCS by that date.

Scientists caution that "large-scale BECCS and its associated land use would likely steer the earth system closer to or beyond planetary boundaries associated with freshwater use, biosphere integrity, and biochemical flows."[6] Even smaller bioenergy expansion promises to have severe negative biodiversity consequences: 50% of the best bioenergy growing land is located in biodiversity hotspots,[7] with Central and South America, Africa, and Southeast Asia most at risk for increased land-use conversion and conflicts.[8]

The IPCC 1.5ºC Special Report clearly states that only through rapid and deep economy-wide decarbonization (including scaling-up demand side measures) can we reach the 1.5ºC goal with minimal use of CDR (and little or no BECCS). The recent science highlighted above thus indicates that if we do not significantly accelerate deep emission cuts today, we may be precisely locking ourselves into emission reduction pathways that to reach the 1.5ºC would require unviable deployment of bioenergy, BECCS or other CDR with large land-footprints (e.g. removing 1Gt/CO_2/yr through afforestation would require planting trees on an area twice the size of California).[9]

At the same time, overly positive narratives around the role of 'Nature' as a 'Solution' have overpromised the size of the sink that nature conservation, regeneration and managed ecosystems can provide, and therefore their role in mitigation. Taking into account implementation and biogeochemical constraints, new research estimates the sequestration potential of 'natural' CDR (e.g. reforestation, improved forest management and soil carbon sequestration) at 100-200 Gt/CO_2 to 2100, significantly lower than previous assessments (up to 800 Gt/CO_2).[10] This research therefore points to the importance of halting further ecosystem loss (especially of carbon rich ecosystems) to preserve the natural land carbon sink and avoid increased LULUCF emissions. It also reinforces that 'nature' cannot be a substitute for ambitious emission reductions—dispelling the imaginary of a massive and untapped land potential available to offset large-scale fossil emissions, which many corporations are still banking on to reach their net zero goals.[11]

Clarifying the role of ecosystems in reaching 1.5ºC is fundamental to the ambition discussion at hand at COP26. Fully integrating biodiversity and ecosystems into the climate discussion reinforces the current call for upfront ambitious mitigation with an additional scientific urgency, . It:

i. Underscores that to keep the 1.5ºC goal in reach we need urgent action on *both* (i) deep decarbonization (fossil fuel phaseout, and scaling-up demand side measures—which are a key win-win) *and* (ii) minimizing emissions from LULUCF, by preserving and restoring natural ecosystems, and scaling-up sustainable land use.[12]

2 IPCC, AR6, WGI

3 Land-use conversion is the first driver of biodiversity loss (IPBES GAR, 2019).

4 Creutzig, F. *et al.* (2021) Considering sustainability thresholds for BECCS in IPCC and biodiversity assessments. GCB Bioenergy.

5 *Ibid.*

6 *Ibid*, based on Heck, V. *et al.* (2018) Biomass-based negative emissions difficult to reconcile with planetary boundaries. *Nature Climate Change,*

7 Santangeli, A., *et al.* (2016). Global change synergies and trade-offs between renewable energy and biodiversity. GCB Bioenergy, 8(5),

8 Hof, C., *et al.* (2018). Bioenergy cropland expansion may offset positive effects of climate change mitigation for global vertebrate diversity. *PNAS*

9 Nolan, C. J. *et al.* (2021) Constraints and enablers for increasing carbon storage in the terrestrial biosphere, *Nature*

10 *Ibid.*

11 Waring, B. There aren't enough trees in the world to offset society's carbon emissions – and there never will be, April 2021, *The Conversation* and Mackenzie, K. Big Oil's Net-Zero Plans Show the Hard Limits of Carbon Offsets, (March 2021), Bloomberg

12 Continuing R&D on technological CDR measures such as 'DACCS' is also important, yet frontloading emission reductions during the 2020s is essential to safeguard against CDR's potential future failure of delivery. Grant, N. *et al.* (2021), Confronting mitigation deterrence in low-carbon scenarios, *Environmental Research Letters,*

ii. Reinforces the call to ensure accountability on our path towards the collective mid-century net zero goal. Parties' plans towards their mid-century net zero goals must clearly prioritize the 'Zero' (deep emission cuts), and limit dependence on the 'Net' (limiting emissions compensations through CDR). This recent science therefore severely questions the compatibility with the 1.5ºC goal—accounting for biogeochemical and ecosystem planetary boundaries—of net zero announcements and plans that bank on large-scale compensation.

2. COP26: PARTIES MUST START FULLY ALIGNING CLIMATE AMBITION WITH BIODIVERSITY PLANETARY BOUNDARIES

Current climate ambition narratives integrate only partially (if at all) the exact role that preserving healthy ecosystems now *and into the future* plays in our ability to reach the 1.5ºC goal. For those focused on climate ambition, biodiversity and ecosystems (often reduced as – 'Nature') are still often viewed as one of multiple thematic buckets in the climate arena—a nice 'add on'—rather than as a key underpinning condition to reach the 1.5ºC. This requires therefore integrating ambitious action on both fronts. The High Ambition Coalition COP26 Leaders' Statement[13] illustrates well this disconnect—in it, 27 Heads of State call for ambitious mitigation towards 1.5ºC, yet make no mention of the importance of conducting—*in parallel to* deep decarbonization—ambitious ecosystem conservation and sustainable land use. This omission appears all the more incoherent as most of HAC signatory Parties champion biodiversity elsewhere: over half are members of the High Ambition Coalition for Nature and People, and two-thirds committed in the Leaders' Pledge for Nature to:

> "mainstreaming biodiversity [...] into those key international agreements and processes which hold levers for change, including the [...] UNFCCC [...] by ensuring that across the whole of government, policies, decisions and investments account for the value of nature and biodiversity, promote biodiversity conservation, restoration, sustainable use [...] *we commit ourselves not simply to words, but to meaningful action* and mutual accountability to address the planetary emergency."[14]

On the other hand, the overly positive narrative of those championing biodiversity (or 'nature') in the climate arena raises several yet unresolved challenges. In addition to overpromising 'Nature' as a mitigation solution (see Part 1), in using this overly positive narrative advocates omit or barely mention key trade-offs or contention points (e.g. bioenergy and land-based CDR), thereby failing to systematically connect and underscore the importance of deep decarbonization today and scaling-up of demand side measures to protect ecosystems throughout coming decades. Furthermore, the Nature Based Solutions (NBS) approach gives the impression ecosystem approaches are low-hanging fruit for climate action, when the reality is more sobering: despite decades of attempted international coordinated action ecosystem destruction continues and failed commitments abound from Parties and Non-State Actor (e.g. the CBD Aichi targets, and the 2014 New York Declaration on Forests, etc.). It is yet to be seen if a non-legally binding agreement like the Glasgow Declaration on Forests offers sufficient guarantees to keep countries accountable to their deforestation reduction commitments and ensure delivery of both finance and tenure rights so urgently needed by to communities and especially indigenous peoples.

3. COP26: ALIGNING CLIMATE MITIGATION AMBITION TO 1.5ºC WITH BIODIVERSITY AND ECOSYSTEMS PLANETARY BOUNDARIES

Aligning 1.5ºC climate action with biodiversity and ecosystem planetary boundaries requires serious, renewed action from political leaders, policymakers, scientists, corporations, and civil society. COP26 offers at least three key opportunities to anchor this, providing a political signal and jumpstarting operationalization of more coherent climate and biodiversity action in coming years.[15]

3.1 Politically anchor climate action to 1.5ºC with biodiversity and ecosystems planetary boundaries

COP26 marks the critical turning point where Parties must start to align climate mitigation ambition to 1.5ºC with biodiversity and ecosystems planetary boundaries. Promoting the conservation of ecosystems is key, so is ensuring strict environmental safeguards for climate mitigation transitions. The coal phase-out merits particular attention. G20 nations agreed to actively "cooperate on deployment and dissemination of zero or low carbon emission and renewable technologies, including sustainable bioenergy." Strict environmental safeguards will need to be applied (including the IPCC-IPBES CSWR's sustainable deployment threshold) to ensure coal phase-out does not provide a free pass to a bioenergy industry whose current practices scientists have repeatedly called out as are highly controversial both in their 'climate neutrality' claims, and the negative biodiversity

13 High Ambition Coalition COP26 Leaders' Statement

14 Leaders' Pledge for Nature

15 Elsewhere, we and others have presented a menu of options for better integrating climate and biodiversity action at COP26 and beyond. E.g., Deprez, A., *et al.* (2021) "Aligning high climate and biodiversity ambitions in 2021 and beyond: why, what, and how?," IDDRI Study.

impacts of bioenergy policies which promote forest-clearing and tropical deforestation. Many leaders today have not yet headed over 500 scientists' warnings on these impacts.[16]

Within the COP26 Decision Parties should explicitly emphasize the need for integrated ambitious action on economy-wide deep decarbonization and natural ecosystems preservation, in to reach the mid-century net zero and 1.5ºC goals within planetary boundaries. Operationalizing the COP25 Decision climate-biodiversity provision[17] in this way, would help provide a key political signal and textual hooks for further operationalization of ambitious integrated biodiversity and climate action in coming years, and helps frame the overarching picture of environmental integrity needed under Article 6.[18] The COP should also seek to mainstream terrestrial and marine biodiversity issues throughout the UNFCCC's Bodies, for example by calling the Secretariat to provide an assessment report on this by COP27.

3.2. Strengthen the science by inviting the IPCC and IPBES to author a Special Report on climate and biodiversity linkages

The IPCC-IPBES co-sponsored workshop highlighted the need for integrated action, and AR6 WGII and WGIII will likely include further elements on climate-biodiversity linkages, but key issues remain. A joint IPCC-IPBES Special Report therefore has a critical role to play in informing and helping guide Parties' and NSA's climate mitigation commitments and planning to be aligned with the 1.5ºC goal within ecosystem planetary limits. This namely by clarifying the scope of viable 1.5ºC emission reduction pathways, given indications that land-based CDR at large (or even 'moderate') deployment promises severe negative impacts on biodiversity, or risks even surpassing biogeochemical planetary boundaries.

Such a report would have been a key input into the 2023 Global Stocktake, helping Parties assess collective progress to the Paris Agreement's long-term goals in light of ecosystem planetary limits. Yet a more realistic timeline is starting in 2023 at the launch of AR7—delivered by mid-decade, this Report would remain highly valuable to help accelerate mitigation ambition. Three key issues that previous IPCC Reports and the IPCC-IPBES CSWR have not yet fully assessed, and which should therefore be central to a joint climate-biodiversity Special Report are:

i. Further assess sustainability thresholds for bioenergy (with and without CCS) and other land-based CDR and mitigation measures (e.g. afforestation);

ii. Detail out the biodiversity, land-use conversion and food security impacts of different 1.5ºC mitigation pathways;

iii. Assess and develop sustainability pathways that reach both the 1.5ºC goal while keeping within biogeochemical and ecosystem planetary boundaries and ensuring other Sustainable Development Goals (e.g. food security) can be met.

3.3. Use LT-LEDS as a tool to explore low-emissions planning aligned with biodiversity and ecosystem integrity

LT-LEDS are a key tool to help Parties reach the Paris Agreement's long-term goals, in the context of sustainable development, and are being increasingly used by Parties to detail out plans that underpin and build trust in the realism of their net zero announcements.

Better integrating biodiversity and ecosystem boundaries in LT-LEDS would enable Parties to: (i) map, anticipate and avoid trade-offs up to 2050, getting locked-in to pathways incompatible with reaching climate, biodiversity and sustainable development goals (e.g. risk that extensive land-based CDR exacerbates land-use conflict and human-rights abuses, food insecurity, etc.); (ii) inform more integrated and coherent climate and biodiversity policymaking (e.g. to be reflected in NDCs and NBSAPS); (iii) attract finance from Development Banks who are increasingly mainstreaming SDG alignment, and halting funding to harmful practices,[19] (iv), and ultimately, improve Parties' ability to deliver a low-emissions pathway that is most in line with the 1.5ºC goal in the context of planetary boundaries. This integration is also key in the run-up to the Global Stocktake, helping assess progress towards the Paris Agreement long-term goals in the context of broader ecosystem planetary boundaries.

16 Woodwell, Letter Regarding Use of Forests for Bioenergy (2020); Grunwald, M. The 'Green Energy' That Might be Ruining the Planet, (March 2021), Politico

17 1/CP.25, para 15 "the essential contribution of nature to addressing climate change and its impacts and the need to address biodiversity loss and climate change in an integrated manner."

18 A collectively reckoning is needed on the limited role for compensation when the goal is to reach mid-century net zero within planetary boundaries.

19 Riaño, M.A. *et al.* (2021), Financing the 2030 Agenda: an SDG alignment framework for Public Development Banks, ETTG

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