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REPORT OF THE VIRTUAL SESSIONS OF THE FIFTH SCIENCE-POLICY FORUM FOR BIODIVERSITY AND THE EIGHTH INTERNATIONAL CONFERENCE ON SUSTAINABILITY SCIENCE

Note by the Executive Secretary

1. In decision 14/2, paragraph 2, the Conference of the Parties invited the scientific and other relevant communities working on scenarios and related assessments to take into account issues which are relevant to the development of the post-2020 global biodiversity framework including: the broad range of underlying drivers and systemic and structural issues related to biodiversity loss; combinations of policy approaches at multiple scales and under different scenarios; the identification of potential synergies, trade-offs and limitations related to biodiversity that should be considered in order to identify effective policies and measures to enable the achievement of the Sustainable Development Goals. In decision 14/24 B, paragraphs 2 and 8, the Conference of the Parties invites Parties, other Governments and relevant organizations to further promote open access to biodiversity-related data that facilitates capacity-building as well as technical and scientific cooperation and also requests the Executive Secretary, in collaboration with partners and subject to the availability of resources, to further promote and facilitate technical and scientific cooperation.

2. Pursuant to the above decisions, various institutions decided to jointly organize the fifth Science Policy Forum for Biodiversity and the eighth International Conference on Sustainability Science prior to the fifteenth meeting of the Conference of the Parties to discuss and make recommendations on how science, technology and innovation could contribute to the effective implementation of the post-2020 global biodiversity framework in order to bend the curve of biodiversity loss and obtain positive biodiversity outcomes and foster transformative change towards achieving the 2050 vision. In light of the postponement of the fifteenth meeting of the Conference of the Parties, the co-organizers have convened five virtual sessions in April 2021, to provide science-based inputs to the preparation of the post-2020 global biodiversity framework.[1]

3. The virtual sessions were organized by the International Union of Biological Sciences, Consortium of Scientific Partners on Biodiversity, University of Tokyo (Institute for Future Initiatives), Secretariat of the Convention on Biological Diversity, Ministry of Ecology and Environment of China, Chinese Society for Environmental Sciences, United Nations Environment Programme, United Nations Environment Programme-World Conservation Monitoring Centre, United Nations Environment Programme-International Ecosystem Management Partnership, Global Biodiversity Information Facility, International Science Council, Institute for Global Environmental Strategies, University of Stockholm and the Inter-American Institute for Global Change Research. Other contributors included the United Nations Development Programme, the Chinese Academy of Sciences, the University of Bonn (West African Biodiversity and

[1] The virtual sessions were announced to Parties, other Governments and relevant stakeholders through notification 2021-022

Ecosystem Services), the Group on Earth Observations Biodiversity Observation Network, NatureServe, VertNet and the Young Ecosystem Service Specialists.

4. The executive summary below has been prepared on the basis of the various recommendations made during the virtual sessions.

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EXECUTIVE SUMMARY

Advancing solutions for transitions

1. Scenarios and models, including Nature Future Framework (NFF), can play a powerful role in enabling transformative change through a holistic and transdisciplinary approach coupling multiple models to describe various indirect drivers at local scale. We need to develop integrated scenarios and models which can capture different value systems including indigenous and local knowledge through a participatory approach while avoiding mismatch of spatial scales, values, institutions, and supply–demand of ecosystems. When possible, nature-based solutions such as natural infrastructure/blue-green infrastructure should be used as an alternative to technical infrastructure, using a bottom-up approach.

Biodiversity-based solutions for achieving the Sustainable Development Goals

2. Biodiversity is a viable source of solutions for sustainability transitions in achieving the United Nations Sustainable Development Goals (SDGs). New solutions can be developed based on innovative technologies embedded in local contexts. These solutions should address hunger and poverty reduction, health and well-being, sustainable communities, production and consumption, clean water and climate actions, while enhancing biodiversity protection.

3. There are multiple synergies between the SDGs triggered by sustainable biodiversity use and conservation at local level that have the potential to be scaled up at national and regional levels. Working on *scaling-up* successful practices for enhancing biodiversity conservation, sustainable use and benefit sharing, should be one of the overarching efforts across the post-2020 GBF.

Emphasizing equity and local community

4. The post-2020 GBF needs to address systemic challenges and build greater equity into our value systems. Addressing systemic challenges require nexus approaches; a notable case in point is to develop green livelihood options in parallel with biodiversity conservation and ecosystem restoration while addressing impacts of climate change. There is a need to redesign mechanisms to strengthen participation of indigenous peoples and local communities through rights-based approaches, taking into account the existing drivers, pressures and circumstances that influence human activities.

Aim for a net gain

5. The post-2020 GBF should aim for a net gain in the status of biodiversity and nature's contribution to people ("nature positive") by 2030. To achieve this, we need to build new economic and financial systems that account for the essential benefits society derives from nature and use a science-based approach to develop inclusive wealth indicators as a better measure of sustainable prosperity.

6. There is still a need for clarity and specification of the outcome goals and targets in the post-2020 GBF. Net outcomes and principles, including evaluation of all biodiversity losses and gains could help prioritize conservation goals and setting clear limits to counterbalance losses with gains through appropriate mitigation measures. However, biodiversity is not interchangeable so inappropriate substitutions should be banned.

7. Investments in nature, including halting further land-use change, supporting restoration and creating sustainable food systems, are key to preventing future pandemics. Integrated land-use planning as well as inclusive and responsible land governance are key enablers of land degradation neutrality. In particular, businesses in the food sector should address their environmental impacts by strengthening governance of supply chains, promoting sustainable consumption patterns, improving distribution efficiency, and engaging stakeholders to increase political will and jointly identify solutions for a global sustainability transition.

Financial resources and capacities

8. In the coming decade, substantial increases in financial and other resource flows to enhance capacity development, in particular, for developing countries will be required. This should include technology transfer, access to data and information and capacities for planning, implementing and monitoring actions of the post-2020 GBF at a global scale. A culture of data sharing, capacity-building, technology transfer, strengthening the biodiversity research infrastructure, including collections, good science-based education, and a significant increase in resource mobilization towards developing countries are needed to implement and track the post-2020 GBF.

INTRODUCTION

9. The world community is currently in the process of developing an ambitious post-2020 global biodiversity framework (GBF) to be adopted at the fifteenth meeting of the Conference of the Parties. The framework is intended, inter alia, to accelerate efforts to halt and reverse the global decline of biodiversity, contribute to the 2030 Agenda for Sustainable Development and facilitate the transformational changes needed to place the global community on a path towards realizing the 2050 Vision of "Living in Harmony with Nature".

10. How to realize this vision in practical terms, including by mainstreaming biodiversity and fostering transformative change, should be examined by scientists, policymakers and other relevant stakeholders at various levels. It is also necessary to discuss these issues among other multilateral environmental agreements (including biodiversity-related conventions, the United Nations Convention to Combat Desertification (UNCCD), the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement), and within the context of the 2030 Agenda for sustainable development.

11. In this regard, the fifth Science-Policy Forum for Biodiversity is intended to provide space for scientists, policymakers and other relevant stakeholders to discuss and make recommendations on how science, technology and innovation could contribute to the effective implementation of the post-2020 global biodiversity framework in order to bend the curve of biodiversity loss and obtain positive biodiversity outcomes and foster transformative change towards achieving the 2050 CBD vision.

12. In light of the postponement of the fifteenth meeting of the Conference of the Parties, and consequently of the fifth Science-Policy Forum for Biodiversity and the eight International Conference on Sustainability Science, the co-organizers have decided to organize a virtual segment of the above events to keep the momentum and provide science-based input relevant for the development of the post-2020 global biodiversity framework.

13. The objective of the virtual segment was to promote a science-policy dialogue on, inter alia, the key factors for success and for scaling-up nature-based solutions, the need to operationalize enabling conditions while reaching measurable impacts on biodiversity at global scales, and current research advances and gaps in biodiversity mainstreaming and towards sustainability transitions.

14. The programme comprised five main sessions and four breakout groups, held respectively on 13, 15, 19, 21 and 23 April 2021. The sessions took the form of panel presentations followed by a moderated discussion as well as questions and answers with the participants. The agenda of the virtual sessions and the list of speakers are available at: https://science4biodiversity.org/

15. This information document summarizes the main discussions of each session and presents the main conclusions and recommendations, thus providing ample insights to Parties for their consideration. For more details, all presentation materials and the sessions' recordings are available on the Forum's website.

I. SESSION I: A FRAMEWORK FOR TRANSITION: TOWARDS THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

16. Following the welcoming addresses by the main co-organizers, three presentations revealed the current framework from the *Global Assessment Report on Biodiversity and Ecosystem Services* issued by

the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, a UNEP Synthesis Report on recent major assessments, and the current stage of development of the post-2020 global biodiversity framework. Two breakout groups were then established to discuss the following issues.

A. Advancing solutions for transitions

17. This breakout group explored the feasibility, approaches, needs, opportunities and challenges of using scenarios and models as possible practical solutions to inform policy- and decision-making towards the achievement of zero net biodiversity loss. The IPBES assessment described four different types of scenarios that can support policy review. IPBES has also been leading development of a new conceptual framework for biodiversity scenarios called Nature Future Framework (NFF). Participants reviewed the relationships between indirect and direct drivers of biodiversity loss and the linkages between biodiversity, ecosystem services, climate change adaptation and human well-being. Through this session, speakers and participants discussed how the NFF can be operationalized and localized to achieve the targets of the Global Biodiversity Framework and several of the Sustainable Development Goals.

18. The first set of examples of solutions were research outputs from the PANCES Project which developed original future scenarios and various simulation models in Japan. In 2016, a group of nearly 100 experts across Japan started a national scale scenario analysis of nature and ecosystem services to help the Government revise the existing National Biodiversity Strategy and Action Plan in Japan. PANCES stands on the “Predicting and Assessing Natural Capital and Ecosystem Services through an Integrated Social-Ecological Systems Approach”, which is funded by the Environment Research and Technology Development Fund (S-15) from the Ministry of the Environment, Japan. PANCES scenarios case study in Japan demonstrated exploratory scenario analysis of following cases 1) the underuse of nature due to declining population and an aging society with low birth rate, and 2) the introduction of renewable energy for decarbonization, two critical issues for biodiversity loss. Plausible future scenario narratives for 2050 developed in the PANCES project were translated into local landscape management scenarios using socio-economic conditions described in the narratives. The LANDIS-II model, a forest landscape model, was used to simulate the biodiversity and ecosystem services for each future scenario. The introduction of renewable energy into abandoned land to meet the local energy demand without damaging the habitat suitability for raptors was considered. Participants considered that it is also possible to improve biodiversity and ecosystem services by changing landscape management activities and that collaboration with various stakeholders is necessary to strike a balance between decarbonization and biodiversity conservation. Thus, the NFF should be localized to meet local needs and contexts.

19. The second example of the advancing solutions for transitions considered the Nature Future Framework developed by the IPBES Task Force on Scenarios and Models. Participants considered that NFF plays a role in catalysing the development of scenarios of desirable futures for nature, that can capture the multiplicity of relationships between people and nature. It helps to inform assessments of policy options across multiple scales. The NFF is a heuristic model that captures diverse, positive values for human–nature relationships in a triangular space. It considers three main perspectives of valuing nature: nature for nature, nature for society and nature as culture, and builds on the three core values of nature (intrinsic, instrumental and relational values). The NFF triangle illustrates how it is possible to emphasize a complex mixture of values for appreciating nature depending where in the triangle one is situated. Thus, it allows for a plurality of perspectives to be held in different times, contexts and spaces. As such, the NFF approach and the triangle approach can be used both for continuously opening up plural perspectives on the creation of nature scenarios and as an actionable framework for developing consistent scenarios and models across multiple scales and levels.

20. The third example of solutions for transitions was based on a study on urban river restoration and future scenarios in Chinese Taipei. The case study provides a retrospective policy evaluation from a system thinking approach. The research aimed to tackle the overuse of freshwater resources in the context of urbanization and the degradation of the aquatic ecosystem in order to improve the understanding of the effectiveness of urban river ecosystem restoration mechanisms at the local level. Longitudinal study

systematically can track how the local governments in Chinese Taipei utilized blue-green infrastructure to improve the provisioning of urban ecosystem services. Asides from the traditional hard human-made infrastructure and nature-based infrastructure (i.e. the constructed wetlands necessary for restoring urban river ecosystems), soft human-made infrastructure, including both formal and informal rules, human or social infrastructure, such as involvement of non-governmental organizations or even elementary schools, are equally important and should deserve attention from scholars and policymakers. System thinking-oriented research design and results also aimed to remind researchers and practitioners the importance of understanding sustainability problems from a human-nature coevolution perspective, instead of focusing on linear relationships with a simple locus of responsibility. The urban river is a social-ecological system made out of circular arranged events. The solutions to restore urban rivers should consider the network of feedback and its domino effects. Participants also considered the importance of integrating zero net biodiversity loss and CO_2 emission reduction, restructuring relationship between natural capital and produced capital, post-COVID-19 green recovery, participatory approach and incorporation of indigenous and local knowledge into scenario analysis, and harmonizing renewable energy development and biodiversity conservation.

Key messages:

- Scenarios and models including NFF can play a powerful role in operationalizing transformative change through a holistic and transdisciplinary approach and coupling multiple models to describe various indirect drivers at local scale.
- Integrated scenarios and models that can capture different value systems, including indigenous and local knowledge through a participatory approach, should be developed.
- The mismatch (misfit) of spatial scales, values, institutions, and supply–demand of ecosystem services needs to be considered from a system thinking perspective to design effective solutions.
- There is a need to harmonize and maximize efforts and solutions for biodiversity, climate change and sustainable production and consumption (circular economy).
- Natural infrastructure and blue-green infrastructure as a nature-based solution can be used as an alternative to technical infrastructure and show the importance of bottom-up collaboration involving local community or network governance with non-governmental organizations or multiple stakeholders as building blocks of social and human infrastructures.

B. Enabling Conditions for transitioning to zero net habitat loss (Zero net deforestation, land degradation and land use change)

21. This breakout group discussed the enabling conditions, transformations and transitions needed to bend the curve of habitat loss, in particular, to stop terrestrial habitat loss. Two pathways ought to be put in place to achieve zero net habitat loss, which include halting deforestation and restoring natural habitats. In this session, discussions addressed the feasibility of implementing enabling conditions to simultaneously achieve ambitions under the CBD and the SDGs.

22. First, synergies between *Land Degradation Neutrality* (LDN) as well as other "no net loss" approaches and the post-2020 global biodiversity framework were discussed. LDN is integral to SDG Target 15.3, is a voluntary "no net loss" approach to keeping land in balance at the national level, thereby maintaining natural integrity of food, water, energy and nature, and accelerating the achievement of all SDGs. The 197 Parties of the United Nations Convention to Combat Desertification (UNCCD) came to an agreement on the definition of LDN in 2015 as "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems". LDN is to be achieved through a combination of measures that "avoid, reduce and reverse" land degradation (LDN response hierarchy) and requires integrated land use planning decisions to counterbalance expected losses with measures to achieve equivalent gains within the same land type. Moreover, LDN fully acknowledges and counts on the vital role the biodiversity-related conventions play in ensuring "no net loss" in systems managed for conservation – thus, if there are no significant negative impacts in the indicators of LDN (i.e. land cover change, land productivity dynamics, soil organic carbon plus any other indicator deemed relevant in a particular country or context), and the guiding principles of LDN are followed (social and environmental safeguards), then any project

contributing in a positive way to any other "no net loss" initiative will contribute to the achievement of LDN. Finally, UNCCD has, in collaboration with several biodiversity-related conventions, championed the need to ensure connectivity of terrestrial ecosystems, which will be key to optimizing the location of biodiversity corridors relative to other SDG objectives. The *Scientific Conceptual Framework for Land Degradation Neutrality*, endorsed by UNCCD Parties in 2017, provides a scientific foundation for understanding, implementing and monitoring LDN, and has been explicitly designed to create a bridge between the vision and the practical implementation of LDN in a way that can be leveraged by other MEAs. The earth observation community has embraced a federated approach to bring all relevant data and tools behind the efforts to achieve LDN through the Group on Earth Observation (GEO) LDN Initiative. This "open tent" philosophy has significantly reduced the burden on countries as well as organizations because they are able to leverage existing platforms, processes and initiatives. This practical approach has led to significant country buy-in: 127 countries are now pursuing LDN targets, and there are already 450 million hectares in LDN commitments, which is almost half of the global land restoration commitments tallied across all global initiatives (see this recent PBL report). To facilitate a harmonized approach to pursuing LDN at the subnational level, a checklist for LDN Transformative Projects and Programmes has been prepared to help country-level project developers and their technical and financial partners design effective land-based interventions that deliver multiple benefits.

23. An enabling environment that fosters multiple environmental, social and economic benefits is required in order to avoid, reduce or reverse land degradation. It is critical that the post-2020 GBF addresses the systemic drivers of biodiversity loss. Even though this is challenging, targets will not be effective without identifying and holding to account incumbent economic actors, sectors and incentives that are responsible for biodiversity loss. In the context of food systems for example, commodity traders may have leverage to support more sustainable practices in supply chains. At the same time, the finance sector invests in unsustainable food system practices and there is a lack of transparency in land transactions between governments and agribusinesses. The goals and targets included in the post-2020 GBF have important political effects for steering the direction of actions and mobilising involvement of diverse actors in the food system. The ambition should be that such actors go beyond limiting biodiversity loss in their activities to supporting restoration and moving towards 'net gain' through regenerative practices.

24. Strengthening governance in CBD would include agreeing to SMART international and national targets to support implementation, creating a system of robust and transparent reporting, and improving accountability and enforcement mechanisms. In practical terms, CBD could develop a voluntary peer review mechanism and adopt a compulsory review mechanism linked to a formal review of individual member states' performance. Therefore, countries most needing support to implement CBD obligations could be targeted for peer review and exchange of best practices as well as financial and capacity building support. In terms of engaging with stakeholders, there is evidence that inclusive multi-stakeholder processes at all levels of CBD governance can help achieve mainstreaming of biodiversity policies within governments and businesses. At the national level, it is important to consider the concerns of all relevant actors and support NBSAP implementation when internalizing international legal obligations into national policy, thus reducing ambiguity and ensuring accountability.

25. Focusing on how to achieve zero net loss or degradation of biodiversity, or to increase areas under protection, with a focus on state or public-sector interventions, was part of the discussion. Target 14, on sustainable supply chains and Action 4 on sustainability standards and certification were addressed from a private sector perspective. In the case of private-sector commitments to achieving zero deforestation in the palm oil sector, there has been a clear trend towards favouring Zero Gross Deforestation (ZGD) over Zero Net Deforestation (ZND) over the past decade. ZGD and ZND are often conceived as alternatives, but each may be useful at different scales or in different contexts. For example, ZGD may promote accountability by individual companies, while ZND might be more appropriate at jurisdictional scales, where equity and leakage may be more important concerns. However, reconciling the two concepts in this way requires at least aligning, if not integrating, public and private governance of supply chains. This seems to be missing from the post-2020 global biodiversity framework draft. While engagement with and participation by the

private sector are mentioned in the Zero Draft, the need to align and integrate private and public policies is not yet explicitly formulated.

26. On the question concerning the importance of addressing the needs of indigenous people and communities in sustainable supply chain governance, it was considered that participation by communities and indigenous people is an absolute minimum requirement for achieving sustainable supply chains. The post-2020 GBF could go even further by seeking not just participation and engagement by these groups but promoting their leadership in conservation. It could also align with the promotion of improved integration between public and private policies to explain and consider the case of zero-deforestation supply chain commitments. These may be understood as originating in consumer markets or at least serving consumer interests. This implies at least the possibility of imposing a foreign value system in areas where zero deforestation commitments are implemented. For example, zero deforestation commitments frame forest conservation as an economic optimisation problem (i.e., to find the optimal configuration of land use to maximise agricultural production without incurring deforestation), which entails imposing market-based values in production contexts. This imposition may be inappropriate and has the potential to marginalise communities and their values. For example, communities may be deprived of using forests in traditional ways if forests are “set aside” for conservation. They may be deprived of opportunities for development that would otherwise be afforded by expanding agriculture or smallholder farmers may be excluded from accessing markets if zero deforestation compliance is impossible. This highlights the problems of leaving supply chain sustainability to the private sector and market forces. Instead, promoting community leadership and adopting a more integrated approach involving multiple stakeholders – through, for example, jurisdictional approaches – could increase equity by: incorporating broader values in land-use planning and conservation design; accommodating stakeholders for whom zero gross deforestation is impossible (by aiming for zero net deforestation outcomes at the jurisdictional scale); and directing finance from mechanisms such as REDD+ towards not only conservation but also the development of sustainable production practices and market access, certification, value-chain development, etc. The post-2020 GBF could explicitly promote leadership by indigenous people and local communities, alongside improving the integration of public and private governance. This would bring it beyond merely seeking the participation and engagement of indigenous peoples and communities, which is the absolute minimum requirement, and give more credibility to the notion of “sustainability” currently specified in Target 14.

27. Expanding protected and conserved areas (PCAs) is slightly positive for regional and global economic outputs. This is because production sectors (such as agriculture) have alternative areas where they can expand in the future, whereas more PCAs means more nature-based revenues. However, smaller-scale distribution of costs and benefits will be key. The World Economic Forum now ranks biodiversity loss as a top-five risk to the global economy, and the draft post-2020 global biodiversity framework proposes an expansion of conservation areas to 30% of the earth’s surface by 2030 (hereafter the “30% target”), using protected areas (PAs) and other effective area-based conservation measures (OECMs). Two immediate concerns are how much a 30% target might cost and whether it will cause economic losses to the agriculture, forestry and fisheries sectors. Conservation areas also generate economic benefits (e.g. revenue from nature tourism and ecosystem services), making PAs/Nature an economic sector in their own rights. If some economic sectors benefit, others experience a loss, and high-level policy makers need to know the net impact on the wider economy as well as on individual sectors. Expanding PAs to 30% of the total land surface would generate higher overall output (revenues) than non-expansion (an extra $64 billion to $454 billion per year by 2050). The net output, accounting for changes in costs, could best be characterised as neutral-to-positive. The main immediate difference between expansion and non-expansion of PAs is therefore in broader economic and social values. Expansion of PAs outperforms non-expansion in mitigating the very large economic risks of climate change and biodiversity loss. The 30% target would also increase by 63% to 98% the area recognized as indigenous peoples and local communities’ land-based nature stewardship contributions (with appropriate rights and governance frameworks). The value of socially inclusive conservation shall be further emphasised, given some histories of displacement and violent exclusion in the past.

Key messages:

- Integrated land use planning as well as inclusive and responsible land governance, are key enablers of LDN.
- For avoiding, reducing and reversing land degradation an enabling environment which fosters multiple environmental, social and economic benefits is required.
- ZGD and ZND are often conceived as alternatives, but each may be useful at different scales or in different contexts. However, reconciling the two concepts requires at least aligning, if not integrating, public and private governance of supply chains.
- It is critical to address the systemic drivers of biodiversity loss with ambitious targets. The ambition should be that actors go beyond limiting biodiversity loss to supporting restoration and moving towards ‘net gain’ through regenerative practices.
- This would require taking into account economic actors, sectors and incentives that are most responsible for biodiversity loss. In the context of food systems, for example, it would require reconsidering official and unofficial incentives, and adding transparency in land transactions between governments and agribusiness.
- There is still a need for clarity and specification of the outcome goals and targets in the post-2020 GBF. Net outcomes and principles, including evaluation of all biodiversity losses and gains could help prioritize conservation goals and setting clear limits to counterbalance losses with gains through appropriate mitigation measures. However, biodiversity is not interchangeable so inappropriate substitutions should be banned.
- An economic balance of the costs (public funds) and revenues of 30% of land in conservation, might be the instrument to provide a new perspective of that target, also contributing to the zero net habitat loss.

II. SESSION II: ROUND TABLE ON BIODIVERSITY MONITORING AND DATA

28. The success of the global biodiversity framework fundamentally relies on fit-for-purpose indicators with enough and credible data. Core data available to policymakers must be tailored through repeatable workflows and methodologies to underpin indicators, research and decision processes at all scales. Filling spatial, temporal and taxonomic data gaps, a culture of data sharing and attribution, capacity-building and resource mobilization are needed to generate the information needed to implement and track the global biodiversity framework. New opportunities to scale up data mobilization include engaging the private sector and development actors to share biodiversity data from environmental impact assessments; and integrating data from DNA-based biodiversity sampling (eDNA)

The data challenge – what are some of the big issues surrounding the availability of data that we face as we move into discussion of the draft global biodiversity framework?

29. Analyses of national reports by NatureServe have shown that parties to CBD are 11 times more likely to use nationally generated indicators than global indicators for tracking progress towards CBD targets. A list of recommended indicators developed by the Ad Hoc Technical Expert Group (AHTEG) in the last decade saw limited uptake by Parties, with only 22% using these indicators on forest cover, protected areas and species extinction risk. There was minimal uptake of indicators for targets within Goals A, D and E of the Aichi Biodiversity Targets. This inconsistency on how Parties track targets at a national scale leads to challenges in comparisons between Parties and aggregating national progress to global progress.

30. The new global biodiversity framework provides hope in the form of headline indicators that Parties can adopt to structure target tracking and reporting processes. However, selection criteria must be applied to these indicators to ensure that:

- indicators are scalable, i.e. global indicators can be disaggregated to national scale that gives locally valid results;
- indicators are fit for purpose for the target;
- indicators use common methodologies and data standards;
- indicator production is sustained over time through biodiversity observation systems;

31. The development of indicators should harness the expertise at a national scale through the representation of national experts in the selection, maintenance and updating of indicators, and leverage the utility of existing data visualization technologies for streamlining target tracking. Further work is required to develop repeatable indicator workflows that integrate both existing national and global data.

32. In the Strategic Plan for Biodiversity 2011-2020, targets were developed independently from the process of developing indicators and whether there was data to measure progress. Of 98 global indicators, only 31 were considered available today and 10 “under active development”. For the new framework, indicators are being developed at the same time as the targets through the global consultation process. 106 documents submitted by 60 Parties plus the USA, and 281 documents submitted by 189 observers provide the basis for the indicator analysis for the draft monitoring framework contained in CBD/SBSTTA/24/INF/16. The analysis identified 155 available indicators and many indicators are under active development. Gaps still remain for indicators on: sustainable use; nature´s material contributions including food, water and others; maintenance of genetic diversity; non-material contributions, e.g. health and culture; access to genetic resources and benefit sharing; capacity-building, technology transfer and scientific cooperation; and gender-disaggregated indicators.

33. Conservation and restoration actions implemented in megadiverse countries have the greatest potential to contribute to meeting global targets. In Colombia, for example, there are three main challenges to ensuring biodiversity monitoring systems allow for tracking progress towards targets:

(a) Better collection of long-term data on ecosystems, communities and species populations at ecologically or politically relevant scales through the strengthening of diverse networks of citizens or community-based science;

(b) Developing symmetrical, global and national collaborations to overcome technical bottlenecks that prevent the downscaling of global data and the upscaling of local data;

(c) Better communication between scientists and stakeholders to ensure user-friendly decision-support systems that make data available for diverse users.

34. The CBD needs to go beyond setting targets and suggesting indicators, and support the development of workflows for the collection, analysis and reporting of biodiversity data.

Key data needs – what needs to happen to meet some of the challenges outlined above?

35. The best data needs to be made available to make decisions at all scales, for example, in relation to the target relating to connectivity – i.e. “the area, connectivity and integrity of natural ecosystems increased by at least [X%]…”.

36. The Group on Earth Observations Biodiversity Observation Network (GEO BON) has workflows in place to develop essential biodiversity variables (EBVs) using biodiversity datasets that feed into connectivity tools and metrics that monitor the state of biodiversity and drive conservation action. There are currently limitations in the application of these workflows at large scales, but these are improving. GEO BON provides support for this approach in the provision of open tools and data for building capacity, working with stakeholders and actors in the development of co-designed conservation scenarios and solutions through knowledge hubs and providing data through biodiversity observation networks (BONs).

37. EBVs make the best use of sparse biodiversity data to decipher complex biodiversity change, spatial scaling patterns and temporal dynamics. Presently, there is limited use of models and scenarios in biodiversity trend analysis and policy support. EBVs combine in situ observations with remote-sensed observations and modelled datasets fitted within a biodiversity model. For the post-2020 framework, a range of data sources need to be integrated with tailored workflows to calculate a range of indicators. This is the approach, for example, of EuropaBON – the European Biodiversity Observation Network.

38. Many areas in the world have moved from being data-poor to data-rich, but we need to understand how useful and representative the data is in order to develop meaningful and effective targets and indicators. For example, 90% of currently available primary biodiversity data is within 2km of a road and, overall, under

4% of the world's land has been sampled, with a strong bias towards the global North. This only provides us with a limited amount of information on the most diverse ecosystems. Assessing these biases and their implication is crucial for developing effective management solutions. We need to collate better and more representative data to understand where species are.

39. When standards are created and modes of data-sharing developed, such as the centralization of standardized data repositories, we can develop a much more representative view of biodiversity, which can be used to better inform policy management. Only once we have meaningful layers of different dimensions of diversity, can the data provide the basis for developing targets and tracking progress.

The data and monitoring investment – how to address the challenges and needs for biodiversity monitoring and data availability?

40. Biodiversity monitoring data must be interoperable and integrated. The challenge is in horizontally integrating data of the same type, and vertically integrating data across different types. Inventories cover a range of data collection from fully structured surveys to unstructured surveys. While there is growth in unstructured data, e.g. through citizen science, the type of data we need for monitoring is semi-structured and structured. Tools for sharing unstructured data exist through standards such as the Darwin Core and ABCD.

41. However, those models and standards only partially capture the types of data needed for monitoring. Simple data models can encapsulate a general view of how we report on a survey or inventory process, and the Humboldt extension to Darwin Core, currently in the process of ratification through the Biodiversity Information Standards community, provides the minimum information vocabulary needed for sharing this type of data.

42. We need to better understand how our ecosystems function. For example, only 18% of data on soils is concerned with understanding the function of soils. Countries in the global North have a better infrastructure for sharing these types of data and we need to increase the representation of this data in data-poor regions to ensure equity between regions in knowledge and data accessibility.

43. Better biodiversity monitoring and availability of data will reduce uncertainty in biodiversity analysis, improving the generality and validity of theoretical knowledge and the quality of conservation assessments and actions. Well-resourced biodiversity observation networks through GEO BON, and biodiversity information facilities through the Global Biodiversity Information Facility (GBIF), are urgently needed.

44. Decision XIII/31 included a set of voluntary guidelines that set out key steps to improve the flow of accessible biodiversity data, including: promoting open data access through policy incentives; promoting the use of common data standards; investing in digitization; enhancing capacity in biodiversity informatics; encouraging data sharing from the private sector; and engaging with and supporting networks for data mobilization and access, e.g. GBIF, GEO BON and the Ocean Biodiversity Information System (OBIS) for marine data.

45. Existing common standards enable institutions to share data from a wide range of diverse evidence sources, and people who have possession of that data need to be encouraged to use those standards and available tools to share their data. Capacity is at the heart of this. GBIF´s Biodiversity Information for Development (BID) programme, funded by the European Union, shows how a modest level of investment has enabled institutions from dozens of countries in sub-Saharan Africa, the Caribbean and Pacific to share their data using common standards, building a community of practice with sufficient knowledge and skills through training and capacity development. A similar programme in Asia funded by the Ministry of Environment, Japan, the Biodiversity Information Fund for Asia (BIFA), has shown similar results. At the same time, the private sector is being encouraged to share data associated with environmental impact assessments, often in data-poor areas, through stricter project financing conditions and a growing desire to increase companies' social licence to operate. This includes the new 'Data4Nature Initiative' targeting development banks and agencies to adopt data-sharing policies. A further opportunity to scale up data

mobilization is the integration of data from DNA-based sampling of the environment (eDNA), especially helpful in bringing together information on distribution of under-represented taxonomic groups such as micro-organisms, fungi and arthropods.

46. During the round-table session, attendees were polled on the following questions, which provided an interesting insight into views on the current challenges and the extent to which the current wording of Target 19 adequately addresses these issues in the Zero Draft of the global biodiversity framework:

- Do you regard lack of biodiversity monitoring and availability of data as significant barriers to implementation of the global biodiversity framework?
    - Response: Yes (91%), No (2%), Don't Know (7%)
- What do you see as the most significant barrier to the availability of data to inform implementation of the GBF?
    - Response: Lack of data-sharing policies and practices (24%); Financial resources (19%); Lack of knowledge about available tools and resources (19%); Non-standard formats for collecting data (14%); Technical infrastructure (3%); Other (4%).
- Do you think that the new Target 19 should include an explicit reference to the development of biodiversity monitoring systems?
    - Response: Yes (82%); No (9%); Don't know (9%).

III. SESSION III: HARNESSING SCIENCE, TECHNOLOGY AND INNOVATION TO SUPPORT THE IMPLEMENTATION OF THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

47. The third session provided an opportunity to further discuss how science, technology and innovation could be better harnessed to support the implementation of the post 2020 global biodiversity framework, especially at the regional, national and local levels, building on the outcomes of the UN Summit on Biodiversity (Leaders' Dialogue 2) held in September 2020.

A. Breakout Group 1: biodiversity, climate and livelihoods: implications for the post-2020 global biodiversity framework

48. This session provided an opportunity to discuss the intertwined challenges of biodiversity loss, climate change, and land use change, emphasizing equity and local community at the core. The panelists proposed improvements for the post-2020 global biodiversity framework (GBF) from four aspects: targets, enabling conditions and pathways, instruments and tools, and actions.

Targets

49. The coming decade is crucial. The fifteenth meeting of the Conference of the Parties is the last best chance to reposition nature at the heart of sustainable development. In 2020, at the UN Biodiversity Summit, 65 heads of States united to endorse Leaders' Pledge for Nature to reverse the loss of biodiversity by 2030 for sustainable development. To achieve this goal, the post-2020 GBF should aim for a net gain in the status of biodiversity and nature's contribution to people ('nature positive') by 2030, which will help us to achieve the 2050 goal of the world's people living in harmony with nature.

50. The various environmental problems are interlinked – the nexus of climate, biodiversity and land use is a notable case in point. In the post-2020 GBF, however, the relationships between these different environment problems and the need to address them in a systemic manner have not been fully accounted for. We should reflect further and aim to address these systemic challenges in order to create a robust and achievable GBF.

51. Nature's benefits and risks are inequitably distributed. For example, the richest 10% emit 50% global GHGs. However, equity issues have not been adequately honoured. The post-2020 GBF should operate to build greater equity into our value systems.

Enabling conditions and pathways

52. To reinvigorate the vision of just and informed transformation, we need to involve a fundamental change in technological, economic and social organization of society, including world views, norms, values and governance.

53. Ensuring transparency in the development of eco-technologies is key. Freely given, prior and informed community guidance, as was demonstrated in the case of Maori's participation in Dr Esvelt's research, has profoundly changed the approach to eco-technology projects, in ways that people of very different backgrounds have endorsed. But a challenge has been the lack of incentives to share plans with communities at early stages. This can be addressed with the United Nations hosting a registry to provide a point of coordination for scientists, funders and journals to incentive transparency and require community sponsorship and leadership to a greater extent in eco-technology innovation and application.

54. Changing the way we understand and manage humankind's relation with nature will be crucial. We need to address environmental emergencies and human wellbeing together. For that, we need new integrative science to focus on drivers for restoration of nature and for society to adapt and to stay within ecological limits instead of only focusing on pressures. We also need major shifts in investment patterns and innovative management and regulation that can overcome inertia and opposition from vested interests and can align financial flows with conservation and restoration.

55. Introducing shifts in the way we produce and use data is also important. Informed decision-making requires innovative data solutions that make data relevant and easily accessible, lead to better and easier national reporting, capable of aggregating over different levels, inclusive, customizable; and, finally, make data matter to policy makers. These strategies drive better decisions and will set us on a right track.

56. Rethink implications of equity issues. We can start by thinking how equity issues can be injected into the Driver-Pressure-State-Impact-Response framework. How do drivers result from, mitigate or exacerbate inequalities? Who uses and pollutes resources and sinks? How is exposure to benefits and risks distributed? How are impacts distributed? Who is able to adapt? Who pays for residual damages? How do responses redistribute rights, risks and responsibilities? An example of proper solution: reducing footprint of production and consumption in fact means that western countries and rich people worldwide need to significantly reduce footprint to make some space for low-income countries to increase theirs. This might include increased financial flows towards developing countries, innovative resource mobilization mechanism, and capacity development.

57. Strengthen participation of indigenous peoples and local communities through rights-based approaches and various whole-of-society mechanisms. Land degradation affects 3.2 billion people, but often it is the people living on the land, indigenous peoples and local communities, that are good at and have protected the bulk of biodiversity. Despite this, many of them are marginalized and severely affected by climate change and biodiversity loss. We need to redesign relationships and mechanisms to enable inclusiveness.

58. The human-nature interdependencies require nexus approaches emphasizing livelihoods improvement in biodiversity conservation and ecosystem restoration, while addressing impacts of a changing climate. We need win-win efforts. As demonstrated in the case of seed banks established all over China, community participatory conservation hinged on women empowerment utilizes local knowledge and builds local capacities. This will strengthen community resilience in unfavourable conditions or in times of crisis, such as the COVID-19 pandemic.

Instruments and tools

59. We need to design or re-design instruments taking into account the existing drivers, pressures and context that influence human activities. For example, direct drivers to biodiversity loss include land use change, direct exploration and climate change, amongst others. When developing instruments, we must address land use change, as well as other drivers. Furthermore, if we take a closer look at who owns the land, the fact is that in many countries women are not allowed to inherit land. The issue of gender ownership of land is a very critical matter in addressing biodiversity, agriculture and food security. Only the right

instrument(s) will lead to desired output, outcome and impact. There are many good efforts underway, but the need is still far greater than what has so far been achieved.

60. We need to extend beyond economic efficiency by both improvement and proper accounting for natural capital. We must address externalities in finding solutions to correct policy failure and make sure we invest in sustainability rather than reinforcing business as usual approaches. Rising GDP does not reflect risks, as it does not account for declines in natural capital. Properly valued, natural capital will generally far outweigh other measures of planetary wealth. Inclusive wealth, which accounts for economic, natural, human and social capital, is a better measure of sustainable prosperity.

Action

61. We need to transform food, water and energy systems to meet growing human needs in an equitable, resilient and environmentally friendly manner. But these terms must be defined in a concrete and credible way that will demonstrate the full value of nature-based solutions and other ecological-economic approaches. One example for such transformation is to adjust dietary structures when appropriate to reduce current GHG emissions and the pressure on biodiversity. It is critical to reduce food and water waste and ensure energy efficiency. A healthy planet requires downward adjustment of land and water allocated to conventional agriculture in order for nature and people to thrive. Ecosystem services and biodiversity must be enhanced and valued.

62. We need to design green livelihood options for local people and communities. Such options should be designed to capture the interest of local communities and to invite private funding to participate in the process. One such model is the development of ecotourism, where local communities and private investors can both benefit from a shared environment. During the UN decade of ecological restoration, there are new models for linking downstream environmental protection benefits with upstream employment on protecting and restoring biodiversity, storing carbon and improving the prosperity of all people, especially those in poorer rural situations.

B. Breakout Group 2: The current landscape of renewable energy technologies and applications, and its impact on conservation and sustainable use of biodiversity

63. This breakout group explored following three questions:

- How different renewable energy technologies can drive ecosystem change and contribute to biodiversity conservation and ecological restoration as nature-based solutions (NbS)?
- How can we promote a sustainable energy transition without losing biodiversity and producing negative social impacts?
- How policies and projects of renewable energy and NbS can be operationalized and implemented to achieve the targets of the Global Biodiversity Framework and the Sustainable Development Goals?

64. A review of renewable energy and biodiversity was presented including its implications for achieving Post 2020 Global Biodiversity Framework. Renewable energy is one of the most promising strategies to massively cut carbon emissions and help mitigate climate change, which will likely have massive benefits to biodiversity, but can also create context-specific trade-offs through multiple mechanisms. The trade-offs between increased renewable energy promotion and biodiversity conservation are a “green vs. green dilemma” (Koppel et al., 2014) in that both are legitimate policy targets, but these trade-offs are not yet conceptualized properly and comprehensively. Large-scale modelling exercises and comprehensive environmental impact assessments should be implemented to explore the effects of different renewable energy scenarios/pathways on biodiversity in a spatially and temporally explicit manner. In addition, it is required to build strong biodiversity provisions in relevant finance streams from multilateral development banks and funds that are instrumental for renewable energy expansion.

65. Research on digital innovation in the woody biomass supply chain in Japan demonstrated how various digital technologies can facilitate woody biomass without degradation of local biodiversity. Key challenges of the woody biomass supply chain in Japan include very low domestic wood share, low forestry productivity, and the topographical complexity of Japan. However, digital technologies can be used to overcome these challenges. Concentration can be seen on the use of data, ICT and information-sharing to support value creation in local supply chains. Furthermore, digital market platforms were discussed as a key mechanism for numerous challenges, such as business model integration and stakeholder relationship-building. Digital technologies facilitate several mechanisms, e.g. information-sharing, transparency, interconnectivity, value maximization, and automation. Such mechanisms and solutions can contribute to alleviating challenges in the woody biomass supply chain including by: (a) building stakeholder respect, relationships and trust; (b) improving biomass quality control (moisture content, size, etc.); (c) promoting business model integration for higher value creation; (d) transportation infrastructure from forest; and (e) incentivising local community revitalization and socioeconomic development.

66. As regards environmental governance and energy infrastructure transitions, sustainable energy transitions with positive impacts on biodiversity and society require insights from: a) environmental and land governance; b) ethnographic studies of situated social identities; and c) emerging conceptualisations of energy infrastructure and emphasized importance cross sectoral collaboration toward energy infrastructure transitions. In addition, we need to understand that impact occurs at multiple scales: urban, regional, national and trans-local. Thus, sustainable energy transition requires many relevant conceptual lenses from these disciplines/fields.

67. Participants discusses maximizing synergies and minimizing trade-offs between renewable energy and biodiversity conservation; filling gaps of renewable and biodiversity between developed and developing countries as well as between urban and rural areas; and how to integrate discussion between biodiversity community and energy community (climate change community) by materializing the concept of nature-based solutions.

Key messages:

- Renewable energy can create context-specific trade-offs, considering that renewable energy installations, ancillary infrastructure, and upstream/downstream activities could affect biodiversity through multiple mechanisms. It is important to delineate and conceptualize the trade-offs between biodiversity and renewable energy in a comprehensive manner.
- We need large-scale modelling exercises and comprehensive environmental impact assessments that explore the effects of different renewable energy scenarios/pathways on biodiversity in a spatially and temporally explicit manner.
- We need to reduce/eliminate misalignment between policies on renewable energy expansion and biodiversity conservation.
- Digital technologies can facilitate several mechanisms such as information-sharing, transparency, interconnectivity, value maximization, and automation to alleviate challenges in the woody biomass supply chain as a nature-based solution.
- Meeting biodiversity and energy transition targets requires combined attention to: a) energy infrastructure transitions; b) changing land use; and c) situated social identities.

IV. SESSION IV: LINKS BETWEEN LOSS OF BIODIVERSITY, CLIMATE CHANGE AND ZOONOSIS

68. In this session scientists discussed and made recommendations on possible ways to incorporate actions in the post-2020 GBF to avoid or minimize future pandemics by restoring the balance between nature and humans, considering also climate change.

69. Our ecosystem is facing a great threat from accelerated climate change. There is evidence that climate warming would cause local extinction and range contraction of species, and increase risk of zoonotic diseases, which is exacerbated by habitat destruction and fragmentation due to human activities. Therefore,

to counter the influence of climate change on biodiversity and zoonotic diseases, it is necessary to expand and connect wildlife habitats, to reduce biodiversity loss and prevalence of zoonotic diseases.

70. To realize the proposed 2030 goals of the draft global biodiversity framework, it is essential to increase investment on biodiversity conservation and zoonotic disease control, to develop novel technologies for measuring biodiversity, detecting zoonotic diseases, restoring degenerated habitats, and to set up financial supporting and technology transfer mechanisms to developing countries for reducing poverty and biodiversity conservation.

Key messages:

71. On Policies for Addressing Environmental Aspects of Zoonotic Disease Risks:

- The destruction of nature is driving up the risk for zoonotic diseases. More investment in environmental science is needed to understand these risks.
- System approaches and tools offer opportunities to inform improved decision-making and policies.
- Reducing zoonotic risks means addressing the root causes of environmental destruction, particularly in food systems.
- Science of full cost accounting of costs and benefits of biodiversity and nature are also needed.

72. On the relationship between climate change, biodiversity and health:

- A short history of some IUBS activities shows the importance of education, and the sharing of stories on the need to make connections among conservation efforts, the interrelations among ecosystems and human health, as one species.
- An analysis of past science for biodiversity fora shows that nature-based solutions have a great monitoring potential for biodiversity mainstreaming, climate change, health and well-being.
- An analysis of proposed targets 4, 6, 7, 8, 11 and 16 shows potential for implementation, connections with SDGs, as well as weaknesses.
- For mainstreaming biodiversity, climate change and global health it is important to promote behavioural changes. One way will be through education, with a bottom-up, cross-generational and culturally sensitive approach. Storytelling, converting research (well science informed) into the larger public, while embracing traditional knowledge, will increase awareness of the oneness of our world and humanity and the interlinkages of our health with Earth health, biodiversity and climate change.
- At the higher (national, regional and international) level, collaborative research on the observed changes in nature, due to climate change might inform policymakers to prevent new pandemics.
- Understanding and monitoring the ways in which biodiversity changes affect different constituents of human well-being in the short and long terms, is of paramount importance.
- For scientists, it is important to keep in mind collaboration, technology transfer, capacity building and translation, on these global issues, while taking into account SDG 12.8 “By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.”
- The use of nature-based solutions and ecosystem approaches is key when implementing mainstreaming.
- The GBF implementation and strategies must be inclusive, as it is a global challenge.

73. On the relationship among zoonosis, climate change and forests:

- Protected areas can stop the spread of zoonotic diseases.
- Forest restoration can decrease the transmission risk of zoonotic diseases.
- However, restoring in a way that increases the density of forest edges can increase the transmission risk of some diseases (i.e., yellow fever).

- We need to better understand what the trade-offs are between the different diseases.
- We need to better understand the thresholds affecting the transmission risk of zoonotic diseases, since these relationships are not linear.
- We need to better understand which configuration can maintain a low transmission risk for as many diseases as possible – i.e. in landscapes with low (10-20%) and intermediate coverage (~30%).
- Investments in nature, including halting land use change and restoration, are key to preventing the next pandemic.
- More science, including social and behaviour change science, is needed to improve risk assessment and potential policy responses.
- Shifting food systems to become more nature positive will reduce risks from zoonotic diseases.

V. SESSION V, PART I: YOUNG SCHOLARS AND PROFESSIONALS SESSION: ECOLOGICAL RESTORATION - FRAMING CHALLENGES AND OPPORTUNITIES

74. The session was introduced with an overview of the soon to be launched UN Decade of Ecological Restoration. It is clear that a massive upscaling of restoration is required to prevent, halt and reverse the degradation of ecosystems worldwide and mitigate the climate crisis. The identification of areas where benefits can be optimised, and costs minimised to increase the chances of success in restoration works is of critical importance. Spatial planning can significantly increase the restoration cost-effectiveness. However, trade-offs between environmental and social benefits must be accounted for, implementation of restoration happens at local scale and must respect social safeguards. The success of the UN decade on restoration will in many parts depend on the enthusiasm, knowledge and practical work done by young scholars and professionals.

75. Case studies from three continents illustrated the complexity on the local scale. In Latin-America, innovations of nature-based solutions address the interconnectedness between urban and non-urban areas through open space strategies and planning. The active integration of academia, scientific institutions, and international organizations are key to directing towards participatory processes that can overcome the changes of authorities across periods of government. Findings from urban case studies in Asia, identified three aspects of socio-ecological misfits that inhibit the successful implementation of urban river restoration for the long-term goal of improving human-nature relation: problem of lacking feedback loops, problem of trade-offs and lack of system resilience strategies. In African cities nature is very much seen as part of the solution of building back better following the pandemic and in many African cities, nature is much closer to where people live; small community structures allow connectivity and distribution of nature pockets across the city.

76. What could be said about realistic targets for ecological restoration at the end of the decade? It is clear that we need to focus not only on area-based targets, but also on ecosystem integrity and functions. Global policy needs to address the potential severe trade-offs between carbon capture and storage, and biodiversity. It is important to develop targets related to diverse landscapes to avoid risk of prioritising planting of monocultures of fast-growing trees, instead of managing multifunctional landscapes. There is a need for a clear definition and standardisation of nature-based solutions within both CBD and UNFCCC, to avoid a focus too much tied to carbon offsetting.

77. Further, there is a need for restoration professionals to bring indigenous peoples and local communities (IPLCs) and multiple stakeholders into the restoration process at a meaningful early stage, already when defining goals and targets and to ensure that power dynamics are taken into account in the participatory approaches that are designed and implemented during projects. Consent is always essential even if restoration is assumed to bring benefits to IPLCs.

Key messages:

- Ecological restoration has a great potential to address a wide set of biodiversity and climate challenges, and young scholars and professionals play an important role, particularly in the global South.
- Presently there are calls for rather massive investments in nature's capacity to capture and store carbon. Given this pressure, we need to ensure that restoration does not just emphasize on carbon and result in biased financing towards forest ecosystems or monoculture plantations. Clear targets emphasizing the importance of different ecosystems and prioritizing ecosystem integrity and functions, with appropriate safeguards for biodiversity, human rights and rights of indigenous peoples and local communities must be given.
- Nature is deeply intertwined with and influenced by social, economic, and political forces; therefore, nuanced understandings of dynamic people-nature relationships are crucial to inform restoration activities that can support positive ecological outcomes alongside social well-being.
- Urban areas often have the incentives, resources and knowledge enabling local governments to take the lead in developing new innovative methods and technology for successful restoration in severely degraded sites, as well as developing inclusive methods for participatory restoration, incorporating social and cultural dimensions in restoration activities.

VI. SESSION V, PART II: BIODIVERSITY SOLUTIONS FOR CHANGE (SDG LAB)

78. In this session, the SDG Labs teams of academicians from a range of research disciplines and practitioners discussed the possibility to develop solutions to complex problems that help to make progress towards implementation of the United Nations Sustainable Development Goals (SDGs). Solutions that SDG Labs propose are anchored on biodiversity, evidence-based, have legitimacy within the stakeholder groups, identifying pathways to societal transformation, mapping actors, and evaluating synergies, trade-offs and risks. Viable biodiversity-based solutions for sustainability already exist and new solutions can be developed based on new technologies embedded into local context.

79. Solutions proposed by SDG Lab teams include:

- Novel cropping system for biodiversity sustainable use and food security (agriculture, value chain, environmental policies), biodiversity digitization including into policy making processes (Armenia).
- Biodiversity driven co-designed eco-tourism to support sustainability (Madagascar).
- Conservation of biodiversity and native plant species through traditional agroforestry system for livelihood, water protection and sustainable life (Thailand).
- Biodiversity for homestead windbreak and gardens for the environmental and socio-cultural sustainability (Japan).
- Managing development by considering internal migration because of droughts; using biodiversity will support livelihood and will stop further habitat loss (Uganda).
- Biodiversity of tea species in the garden produce socio-economic and ecological benefits (China).
- There are multiple synergies between SDGs triggered by biodiversity use and conservation at local level that have potentiality to be scaled up to regional and national levels.

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