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Items resulting from the work programme of the Science-Policy Interface for the triennium 2022–2024
Coordination activities of the Science-Policy Interface with other intergovernmental scientific panels and bodies

Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies

Report by the Executive Secretary

Summary

As defined in decisions 23/COP.11 and 19/COP.12, the Science-Policy Interface (SPI) of the United Nations Convention to Combat Desertification (UNCCD), under the leadership of the Bureau of the Committee on Science and Technology (CST), is requested by the Conference of the Parties (COP) to interact with several existing scientific mechanisms in order to provide the CST with clear and well-defined thematic guidance on scientific knowledge requirements for implementing the UNCCD.

By its decision 18/COP.15, the COP adopted the SPI work programme for the triennium 2022–2024, as contained in the annex to that decision, which includes six coordination activities with external scientific panels and bodies and the assumption by the SPI of a primary role in the quality assurance of the third edition of the Global Land Outlook and all related documents. Further to that decision, as part of the SPI's cooperation with the Intergovernmental Panel on Climate Change (IPCC), the COP requested the SPI to analyse the key messages of the sixth assessment reports on climate change adaptation and mitigation in order to provide the CST with clear and well-defined thematic guidance on new scientific knowledge relevant to implementing the UNCCD.

This document presents the coordination activities undertaken by the SPI as well as a summary of the key findings relevant to the UNCCD emerging from the IPCC sixth assessment reports. The CST may wish to consider these findings for the development, as appropriate, of recommendations to the COP.

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Contents

I. Background

1. In line with its mandate, as defined in decisions 23/COP.11 and 19/COP.12, the Science-Policy Interface (SPI) of the United Nations Convention to Combat Desertification (UNCCD), under the leadership of the Bureau of the Committee on Science and Technology (CST), is requested by the Conference of the Parties (COP) to interact with several existing scientific mechanisms in order to provide the CST with clear and well-defined thematic guidance on scientific knowledge requirements for implementing the UNCCD. Also, by its decision 23/COP.11, the COP called upon international science-advisory bodies, scientific institutions and networks, the scientific community, and other relevant stakeholders to support the work carried out in the provision of scientific advice in order to support the position of the UNCCD as a global authority on scientific, indigenous and local knowledge pertaining to desertification/land degradation and drought (DLDD).

2. In line with the above-mentioned decision, decision 18/COP.15 assigned the SPI to coordinate with several scientific mechanisms:

(a) The third edition of the Global Land Outlook (GLO) of the UNCCD and other evidence-based communications;

(b) The Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES) of the United Nations Environment Programme (UNEP);

(c) The Intergovernmental Panel on Climate Change (IPCC);

(d) The Intergovernmental Technical Panel on Soils (ITPS) of the Global Soil Partnership (GSP) of the Food and Agriculture Organization of the United Nations (FAO);

(e) The International Resources Panel (IRP) of UNEP;

(f) The Global Land Indicators Initiative (GLII) of the United Nations Human Settlements Programme;

(g) The Integrated Drought Management Programme (IDMP), a joint initiative of the World Meteorological Organization and the Global Water Partnership.

3. Furthermore, the COP, in decision 20/COP.15, requested the SPI, in close collaboration with the secretariat, to continue to contribute to and cooperate with other scientific panels and bodies dealing with DLDD issues, and also requested the secretariat to continue its efforts to clarify the potential benefits, costs, conditions and procedures for establishing more formal relationships with these panels and bodies. Moreover, in decision 19/COP.13, the COP encouraged the SPI to continue fostering partnerships with scientific bodies and institutions, international organizations, civil society organizations and other relevant stakeholders, and to invite the representatives of these entities to its meetings as external observers when feasible, with a view to strengthening substantive exchanges and collaboration.

4. In line with decision 18/COP.15, this document presents a synthesis report, including policy-oriented recommendations resulting from the coordination activities conducted by the SPI during the triennium 2022–2024.

II. Coordination activities of the Science-Policy Interface work programme 2022–2024

5. In keeping with decision 18/COP.15, the SPI, as part of the SPI work programme for the biennium 2022–2024, cooperated with the aforementioned scientific mechanisms, and the activities and sub-activities proposed in the annex to that decision were accomplished. Specifically, the SPI, with support from the secretariat:

(a) Assumed a primary role in the quality assurance of the first and final drafts of the GLO Thematic Report on Rangelands and Pastoralists, which has included extensive scientific review of all elements by all members of SPI, and a detailed review by nine SPI members;

(b) Contributed to preliminary discussions on a possible third edition of the GLO;

(c) Also contributed to the scientific review of the IPBES Thematic assessment of the interlinkages among biodiversity, water, food and health (Nexus assessment)[1] and the IPBES Thematic assessment of the underlying causes of biodiversity loss, determinants of transformative change and options for achieving the 2050 vision for biodiversity (Transformative change assessment),[2] submitting 198 and 20 comments, respectively;

(d) Analysed the key messages of the IPCC Sixth Assessment Report (AR6), IPCC Working Group II (WGII) contribution entitled, Climate Change 2022: Impacts, Adaptation and Vulnerability;[3]

(e) Analysed the key messages of the IPCC AR6 Working Group III (WGIII) contribution, entitled Climate Change 2022: Mitigation of Climate Change;[4]

(f) Monitored the activities of the ITPS and participated in the hybrid Global Symposium on Soils and Water;[5]

(g) Monitored the activities of the IRP, including the publication of the Global Resources Outlook 2024;[6]

(h) Monitored the activities of the GLII to ensure the harmonization of land indicators developed by the GLII to measure tenure security,[7] with land indicators used to measure progress towards land degradation neutrality;

(i) Following decisions 17/COP.15 and 18/COP.15, cooperated with the IDMP on their efforts towards: (i) the harmonization of drought resilience terminology and definitions; (ii) the enhancement of methodological approaches to monitoring and assessing drought risk in natural and managed ecosystems; (iii) the systematic integration of the findings from drought resilience assessments into drought early warning systems and drought resilience planning; and (iv) IDMP published “Drought and Water Scarcity” which highlighted the differences and the similarities between these two conditions.

(j) Following decision 20/COP.15, explored with the IDMP how data on land-use change and land degradation could support early warnings of weather, water, ocean and climate hazards and the future development of climate services projects; and

(k) Participated in consultations with the IDMP regarding preparations for the Drought Resilience +10 Conference anticipated to take place in Geneva from 30 September to 2 October 2024, particularly related to the workstreams on drought impact monitoring and assessment and on ecosystems and drought.

6. In accordance with decision 20/COP.15, para. 7, the SPI worked in close collaboration with the secretariat towards clarifying the potential benefits, costs, conditions and procedures relevant to the scientific mechanisms listed in paragraph 2 with respect to establishing more formal relationships with each of them.

III. Scientific reports relevant to the United Nations Convention to Combat Desertification

7. For those scientific reports listed among the coordination activities identified in the SPI work programme (decision 18/COP.15) which became available in time for the SPI to complete an analysis, the SPI has conducted an analysis and synthesis of key messages in order to provide the CST with clear and well-defined thematic guidance on new scientific knowledge relevant to implementing the UNCCD. These include:

[1] See: https://www.ipbes.net/nexus.
[2] See: https://www.ipbes.net/transformative-change.
[3] See: https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/.
[4] See: https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/.
[5] See: https://www.fao.org/events/detail/symposium-soils-and-water/en.
[6] See: https://www.unep.org/resources/Global-Resource-Outlook-2024.
[7] See: https://gltn.net/download/the-glii-land-indicators/?wpdmdl=13889&ind=0.

(a) The IPCC AR6 WGII report, Climate Change 2022: Impacts, Adaptation and Vulnerability (IPCC AR6 WGII);[8]

(b) The IPCC AR6 WGIII report, Climate Change 2022: Mitigation of Climate Change (IPCC AR6 WGIII).[9]

8. The text for the Summary for Policymakers (SPM) for both IPCC AR6 WGII and WGIII reports was negotiated by Member States, line by line, and then approved in respective sessions of the IPCC. The background on the IPCC report preparation and approval with respect to these two IPCC reports is provided in annex I to this document.

9. The SPI analysis focused primarily on the key messages in the SPM for each report. The SPI also consulted the technical summary for each report, which are primarily based on the executive summaries of the underlying individual chapters, and provide a synthesis of key findings based on multiple lines of evidence. This approach helped ensure that the synthesis conducted by the SPI would result in conclusions relevant to the UNCCD as well as the critical detail necessary for the formulation of actionable policy-oriented recommendations.

10. Recognizing that the language of the SPMs of IPCC reports has already been inter-governmentally agreed, the SPI drew directly from IPCC key messages for this document, referencing the respective key messages from each respective SPM to provide a clear line of sight.

11. The full methodology employed by the SPI to analyse these reports is provided in annex II to this document.

A. Sixth Assessment Report – Climate Change 2022: Impacts, Adaptation and Vulnerability

12. The IPCC AR6 WGII report provides an updated global assessment of the impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels. It also reviews vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change.

13. The IPCC AR6 WGII SPM documents that human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts, losses and damage to nature and people, approaching irreversibility in some cases, and further affecting the ability of ecosystems and society to adapt. (See IPCC AR6 WGII SPM key messages B1.1, B1.2; B.1.4; B1.5, B1.6, C2.5)

14. The results of the assessment indicate that, since the fifth assessment cycle reports were published in 2014, there is increasing evidence that degradation and destruction of ecosystems by humans increases the vulnerability of people. Unsustainable land-use and land cover change, unsustainable use of natural resources, deforestation, loss of biodiversity, pollution, and their interactions, adversely affect the capacities of ecosystems, societies, communities and individuals to adapt to climate change. Loss of ecosystems and their services has cascading and long-term impacts on people globally, especially for Indigenous peoples and local communities who are directly dependent on ecosystems to meet basic needs. (See IPCC AR6 WGII SPM key message B.2.1)

15. The assessment documents that the future vulnerability of ecosystems to climate change will be strongly influenced by the past, present and future development of human society, including from overall unsustainable consumption and production, increasing demographic pressures and persistent unsustainable use and management of land, oceans, and water. While agricultural development contributes to food security, unsustainable agricultural expansion, driven in part by unbalanced diets, increases ecosystem and human vulnerability and leads to competition for land and/or water resources. (See IPCC AR6 WGII SPM key message B.2.3) Climate change will increasingly put pressure on food production

[8] See: https://www.ipcc.ch/report/ar6/wg2/.
[9] See: https://www.ipcc.ch/report/ar6/wg3/.

and access, especially in vulnerable regions, undermining food security and nutrition. (See IPCC AR6 WGII SPM key message B.4.3.) The resulting biodiversity loss and degradation, damages to and transformation of ecosystems are already key risks for every region due to past global warming and will continue to escalate with every increment of global warming. (See IPCC AR6 WGII SPM key message B.4.1)

16. Degradation and loss of ecosystems is also a cause of greenhouse gas (GHG) emissions and is at increasing risk of being exacerbated by climate change impacts, including droughts and wildfires. (See IPCC AR6 WGII SPM key message D.4.2) Enhancing adaptation and resilience to climate and weather extremes, including but not limited to extreme precipitation and/or heat events and wildfires, can reduce widespread, pervasive impacts on ecosystems and society. (See IPCC AR6 WGII SPM key messages B1.1 B1.2, B1.6; B.2, B3.1)

17. The AR6 WGII SPM describes the growing impact of droughts and flooding. Between 2010–2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability. Vulnerability at different spatial levels is exacerbated by inequity and marginalization linked to gender, ethnicity, low income or combinations thereof, especially for many Indigenous peoples and local communities. (See IPCC AR6 WGII SPM key message B.4.2)

18. The SPM also highlights climate-related displacement and involuntary migration. In the mid- to long-term, displacement will increase with the intensification of heavy precipitation and associated flooding and drought, among other climate change-induced drivers. At progressive levels of warming, involuntary migration from regions with high exposure and low adaptive capacity will occur. (See IPCC AR6 WGII SPM key message B.4.7) Increasing adaptive capacities minimizes the negative impacts of climate-related displacement and involuntary migration for migrants and sending and receiving areas. (See IPCC AR6 WGII SPM key message C.2.12)

19. Section D of the AR6 WGII SPM focuses on how countries can respond in a sustainable way through climate resilient development. Climate resilient development integrates adaptation measures and their enabling conditions (Section C) with mitigation to advance sustainable development for all. Climate resilient development involves questions of equity and system transitions on land, in oceans and ecosystems, in urban areas and infrastructure, in energy, industry and society, and includes adaptations for human, ecosystem and planetary health. Pursuing climate resilient development focuses on both where people and ecosystems are co-located as well as the protection and maintenance of ecosystem function at the planetary scale. Pathways for advancing climate resilient development are development trajectories that successfully integrate mitigation and adaptation actions to advance sustainable development.

20. The AR6 WGII SPM emphasizes that improving environmental management and climate change adaptation measures is necessary to achieve the climate resilient development needed to meet the Sustainable Development Goals (SDGs) relating to health and wellbeing, food and water security, urban area challenges, and gender and social inequity. (See AR6 WGII SPM messages B1.2, B1.3, B1.4, B1.5, B1.6, B2.3, B4.3, B4.5 and C1.1) The AR6 WGII technical summary (TS) focuses on leverageable co-benefits for climate resilience, derived from ecosystem health, ecosystem protection and restoration, conservation agriculture, sustainable land management, and integrated catchment management. (See IPCC AR6 WGII TS key message TS.E.3.5)

21. The AR6 WGII SPM indicates that protecting and restoring ecosystems is essential for maintaining and enhancing the resilience of the biosphere. Degradation and loss of ecosystems is also a cause of GHG emissions and is at increasing risk of being exacerbated by climate change impacts, including droughts and wildfire. Climate resilient development avoids adaptation and mitigation measures that damage ecosystems. (See IPCC AR6 WGII SPM key message D.4.2)

22. The SPM emphasizes that landscape approaches such as ecosystem-based adaptation (e.g. urban agriculture and forestry, river restoration) have been applied ever more frequently. Combined ecosystem-based practical and structural adaptation responses are under development, and there is growing evidence of their potential to reduce adaptation costs and

contribute to drought management, flood control, sanitation, water resources management, landslide prevention and coastal protection. (See IPCC AR6 WGII SPM key messages B 6.1, C2.5, and C2.7)

23. The SPM also documents how effective adaptation options, together with supportive public policies, enhance food availability and stability and reduce climate risk for food systems while increasing their sustainability. Effective options include cultivar improvements, agroforestry, community-based adaptation, farm and landscape diversification, and urban agriculture. Institutional feasibility, adaptation limits of crops and cost effectiveness also influence the effectiveness of the adaptation options. Agroecological principles and practices and other approaches linked to natural processes support food security, nutrition, health and well-being, livelihoods and biodiversity, sustainability and ecosystem services. These services include pest control, pollination, buffering of temperature extremes, and carbon sequestration and storage. (See IPCC AR6 WGII SPM key message C.2.2)

24. The AR6 WGII SPM points out that feasible and effective adaptation options are available to reduce risks to people and nature. There are a range of options, such as disaster risk management, early warning systems, climate services and risk information sharing, with broad applicability across sectors, which provide greater benefits to other adaptation options when combined. Integrated, multi-sectoral solutions that address social inequities, differentiate responses based on climate risk, and cut across systems increase the feasibility and effectiveness of adaptation in multiple sectors. (See IPCC AR6 WGII SPM key messages C2, C2.1, C2.11, C2.13 and Figure SPM.4)

25. The SPM indicates that integrated, multi-sectoral solutions that address social inequities and differentiate responses based on climate risk and local circumstances will enhance food security and nutrition. (See IPCC AR6 WGII SPM key message C.2.2) Embedding effective and equitable adaptation and mitigation in development planning can reduce vulnerability, conserve and restore ecosystems, and enable climate resilient development. Integrated and inclusive system-oriented solutions based on equity and social and climate justice reduce risks and enable climate resilient development. (See IPCC AR6 WGII SPM key message D.1.3) Inclusive, integrated and long-term planning at local, municipal, sub-national and national scales, together with effective regulation and monitoring systems and financial and technological resources and capabilities, can foster a positive urban and rural system transition. (See IPCC AR6 WGII SPM key message C.2.6)

26. The SPM emphasizes that taking integrated action for climate resilience is essential to avoid climate risk. Equitable partnerships between local and municipal governments, the private sector, Indigenous peoples, local communities and civil society can, including through international cooperation, advance climate resilient development. (See IPCC AR6 WGII SPM key message D.3.1)

27. The AR6 WGII SPM also focuses on capacity-building and knowledge management. Enhancing knowledge, including Indigenous and local knowledge, on risks, impacts and their consequences, and available adaptation options promotes societal and policy responses. A wide range of top-down, bottom-up and co-produced/developed processes and sources can deepen climate knowledge and sharing, including capacity-building at all scales, and educational and information programmes, using the arts, participatory modelling and climate services. (See IPCC AR6 WGII SPM key messages C5, C5.3)

B. Sixth Assessment Report – Climate Change 2022: Mitigation of Climate Change

28. The IPCC AR6 WGIII report provides an updated global assessment of climate change mitigation and its sources, exploring methods to limit or prevent GHG emissions and remove them from the atmosphere. The report evaluates current scientific knowledge on the effectiveness of mitigation strategies across various sectors, including those linked to land use and management. It emphasizes pathways to achieving global climate goals, such as limiting global warming to 1.5°C or 2°C above pre-industrial levels, while assessing the

economic, technological, and policy options available to reduce emissions and enhance sustainability.

29. Human-induced climate change is a consequence of more than a century of net GHG emissions from unsustainable energy use, land use and land use change, lifestyle and patterns of consumption and production. Without urgent, effective and equitable mitigation actions, climate change increasingly threatens the health and livelihoods of people around the globe, ecosystem health and biodiversity. There are both synergies and trade-offs between climate action and the pursuit of other SDGs. Accelerated and equitable climate action in mitigating and adapting to climate change impacts is a critical component of sustainable development. (See AR6 WGIII SPM key message D.1.1)

30. Land is both a source and a sink for GHG emissions. The AR6 WGIII SPM indicates that, in 2019, approximately 22 per cent (13 GtCO2-eq)[10] of total net anthropogenic GHG emissions came from the agriculture, forestry and other land use (AFOLU) sector. (AR6 WGII SPM key message B.2.1) Land overall constituted a net sink of –6.6 (±4.6) GtCO2 per year for the period 2010–2019, comprising a gross sink of –12.5 (±3.2) GtCO2 per year resulting from responses of all land to both anthropogenic environmental change and natural climate variability. (See AR6 WGIII SPM key message B.2.2)

31. The SPM suggests that in pathways modelled by the IPCC[11] that reach global net zero GHG emissions, at the point they reach net zero GHG of global emissions, CO_2 reductions of 13 per cent (4 to 20 per cent) by CO_2 mitigation options in the AFOLU sector will be required. The rapid deployment of AFOLU measures features in all pathways that limit global warming to 1.5°C. When sustainably implemented, AFOLU mitigation options can deliver large-scale GHG reductions and enhanced removals. The AFOLU sector offers significant short-term mitigation potential at relatively low cost and can provide 20–30 per cent of 2050 emission reductions described in scenarios that limit warming to 2°C. (See AR6 WGIII SPM key messages C.3.4, C.9, C9.2)

32. AFOLU carbon sequestration and GHG emission reduction options have co-benefits in terms of biodiversity and ecosystem conservation, food and water security, wood supply, and livelihoods, land tenure and land-use rights of Indigenous peoples, local communities and small landowners. These include enhancing sustainable agricultural productivity and resilience, increasing food security, providing additional biomass for human use, and addressing land degradation. (See AR6 WGIII SPM key messages C9.2, D1.4)

33. The SPM cautions that all mitigation strategies face implementation challenges, including technology risks, scaling and costs. Many challenges, including pressure on land, are significantly reduced in modelled pathways that entail a more efficient use of resources. Mitigation in the AFOLU sector cannot compensate for shortfalls in other sectors. (See AR6 WGIII SPM key message C.3.6)

34. The AR6 WGIII SPM emphasizes that AFOLU carbon sequestration and GHG emission reduction options have both co-benefits and risks in terms of biodiversity and ecosystem conservation, food and water security, wood supply, and livelihoods, land tenure and land-use rights of Indigenous peoples, local communities and small landowners. Many options have co-benefits but those that compete for land and land-based resources may pose risks. The scale of benefit or risk largely depends on the type of activity undertaken, deployment strategy (e.g. scale, method), and context (e.g. soil, biome, climate, food system, land ownership) which vary geographically and over time. Risks can be avoided when AFOLU mitigation is pursued in response to the needs and perspectives of multiple

[10] A carbon dioxide equivalent or CO_2 equivalent, abbreviated as CO_2-eq, is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential, by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential. In this document, CO_2-eq is expressed in gigatons, abbreviated as Gt.

[11] The assessment of future pathways in the Sixth Assessment Report covers near-term (to 2030), medium-term (up to 2050) and long-term (to 2100) time scales, combining an assessment of existing pledges and actions with an assessment of emission reductions and their implications, associated with long-term temperature outcomes up to the year 2100. The assessment of modelled global pathways addresses ways of shifting development pathways towards sustainability.

stakeholders to achieve outcomes that maximize co-benefits while limiting trade-offs. (See AR6 WGIII SPM key messages C.9.2)

35. The SPM further elaborates that scaling successful policies and measures relies on governance that emphasizes integrated land-use planning and management framed by SDGs with support for implementation. (See AR6 WGIII SPM key message C.9.5) This is important for methods such as soil carbon sequestration and biochar which can improve soil quality and food production capacity. Ecosystem restoration and reforestation sequester carbon in plants and soil, can enhance biodiversity and provide additional biomass, however they can also displace food production and livelihoods. This calls for integrated approaches to land-use planning to meet multiple objectives, including food security. (See AR6 WGIII SPM key message D.1.6)

36. The AR6 WGII SPM reports that land-related mitigation options with potential co-benefits for adaptation include agroforestry, cover crops, intercropping, perennial plants, the restoration of natural vegetation and the rehabilitation of degraded land. These can enhance resilience by maintaining land productivity and protecting and diversifying livelihoods. Restoration of mangroves and coastal wetlands sequesters carbon while also reducing coastal erosion and protecting against storm surges, thus reducing the risks from sea level rises and extreme weather. (See AR6 WGIII SPM key message D.2.2)

37. The SPM makes clear that mitigation options have synergies with many SDGs, however some options may also have trade-offs. The synergies and trade-offs vary dependent on context and scale. (See AR6 WGIII SPM Figure SPM.8) AFOLU mitigation options, when sustainably implemented, can deliver large-scale GHG emission reductions and enhanced removals, but cannot fully compensate for delayed action in other sectors. Barriers to implementation and trade-offs may result from the impacts of climate change, competing demands on land, conflicts with food security and livelihoods, the complexity of land ownership and management systems, and cultural aspects. (See AR6 WGIII SPM key message C.9)

38. The AR6 WGIII SPM also points out that realizing the AFOLU mitigation potential entails overcoming institutional, economic and policy constraints and managing potential trade-offs. Land-use decisions are often spread across a wide range of landowners; demand-side measures depend on billions of consumers in diverse contexts. Barriers to the implementation of AFOLU mitigation include insufficient institutional and financial support, uncertainty over long-term additionality and trade-offs, weak governance, insecure land ownership, low incomes and the lack of access to alternative sources of income, and the risk of reversal. (See AR6 WGIII SPM key message C.9.3)

39. The SPM cautions that AFOLU carbon sequestration and GHG emission reduction options have risks in terms of biodiversity and ecosystem conservation, food and water security, wood supply, livelihoods, land tenure and land-use rights of Indigenous peoples, local communities and small landowners. If AFOLU measures are deployed badly, when combined with the increasing need to produce sufficient food, feed, fuel and wood, they may exacerbate trade-offs with the conservation of habitats, adaptation, biodiversity and other services. (See AR6 WGIII SPM key message C.9.2 and TS Tables TS.7)

40. The SPM documents how coordinated cross-sectoral policies and planning can maximize synergies and avoid or reduce trade-offs between mitigation and adaptation. (See AR6 WGIII SPM key message D.2) Synergies and trade-offs depend on the development context, including inequalities and consideration of climate justice. They also depend on means of implementation, intra- and inter-sectoral interactions, cooperation between countries and regions, and the sequencing, timing and stringency of mitigation actions, governance and policy design. Maximizing synergies and avoiding trade-offs pose particular challenges for developing countries, vulnerable populations, and Indigenous peoples with limited institutional, technological and financial capacities, and constrained social, human and economic capital. Trade-offs can be evaluated and minimized by giving emphasis to capacity-building, finance, governance, technology transfer, investments, and development and social equity considerations with meaningful participation by Indigenous peoples and vulnerable populations. (See AR6 WGIII SPM key message C.9.3)

41. The AR6 WGIII also describes how trade-offs in terms of employment, water use, land-use competition and biodiversity, as well as access to, and the affordability of, energy, food and water can be avoided through well-implemented land-based mitigation options, especially those that do not threaten existing sustainable land uses and land rights, though more frameworks for integrated policy implementation are required. The sustainability of bioenergy and other bio-based products is influenced by feedstock, land management practice, climatic region, the context of existing land management, and the timing, scale and speed of deployment. (See AR6 WGIII SPM key message D.1.5)

42. The SPM indicates that the feasibility of mitigation options varies according to context and time. The feasibility of some options may increase when combined or integrated, such as using land for both agriculture and centralized solar production. (See AR6 WGIII SPM key message E.1.2) Land-related mitigation options with potential co-benefits for adaptation include agroforestry, cover crops, intercropping, perennial plants, the restoration of natural vegetation and the rehabilitation of degraded land. These can enhance resilience by maintaining land productivity and protecting and diversifying livelihoods. Restoration of mangroves and coastal wetlands sequesters carbon while also reducing coastal erosion and protecting against storm surges, thus reducing the risks from sea level rises and extreme weather. (See AR6 WGIII SPM key message C.9.1)

43. The AR6 WGIII SPM emphasizes the strong link between sustainable development, vulnerability and climate risks. Limited economic, social and institutional resources often result in high vulnerability and low adaptive capacity, especially in developing countries (medium confidence). Several response options deliver both mitigation and adaptation outcomes, especially in human settlements, land management, and in relation to ecosystems. Coordinated cross-sectoral policies and planning can maximize synergies and avoid or reduce trade-offs between mitigation and adaptation. (See AR6 WGIII SPM key message D.2)

44. The SPM also describes how coordinated policies, equitable partnerships and integration of adaptation and mitigation within and across sectors can maximize synergies, minimize trade-offs and thereby enhance the support for climate action. Even if extensive global mitigation efforts are implemented, there will be a significant need for financial, technical and human resources for adaptation. The absence of or limited resources in social and institutional systems can lead to poorly coordinated responses, thus reducing the potential for maximizing mitigation and adaptation benefits, and increasing risk. (See AR6 WGIII SPM key message D.2.4)

45. Economic instruments and financial incentives have been effective in reducing emissions, complemented by regulatory instruments mainly at the national, sub-national and regional levels. This includes the removal and/or redirection of subsidies to improve public revenue with the aim of yielding environmental and sustainable development benefits. (See AR6 WGIII SPM key message E.4.2)

46. The AR6 WGIII SPM emphasizes how context-specific policies and measures have been effective in demonstrating the delivery of AFOLU carbon sequestration and GHG emission reduction options, however the above-mentioned constraints hinder large-scale implementation (medium confidence). Deploying land-based mitigation can draw on lessons learned from regulations, policies, economic incentives, payments and diverse forms of knowledge such as Indigenous, local and scientific knowledge. Indigenous peoples, private forest owners, local farmers and communities manage a significant share of global forests and agricultural land, playing a central role in land-based mitigation options. Scaling successful policies and measures relies on governance that emphasizes integrated land-use planning and management framed by SDGs, with support for implementation. (See AR6 WGIII SPM key message C.9.4)

IV. Conclusions and recommendations

47. All seven coordination activities have provided SPI members with a broader perspective of the work of other scientific mechanisms, contributing additional context and scientific grounding to the work completed on the two scientific assessments by the

SPI during the 2022–2024 triennium. The outcomes of those assessments can be found in ICCD/COP(16)/CST/2 and ICCD/COP(16)/CST/3, respectively.

48. From the analysis completed on the key messages of the IPCC AR6 WGII and AR6 WGIII assessment reports, the SPI drew seven main conclusions which they found relevant to the UNCCD.

49. Conclusion 1: Optimizing land use allocation by incentivizing sustainable land management (SLM) and land restoration efforts on less productive, degraded, or marginal lands can improve land use efficiency while sequestering carbon and enhancing biodiversity and ecosystem services.

50. Conclusion 2: Trade-offs between different ecosystem services, and between societal objectives including climate change mitigation and adaptation, can be managed through integrated landscape approaches that aim to create a mosaic of land uses, including conservation, agriculture, forestry and settlements, where each is sited with consideration given to land potential and socio-economic objectives and context.

51. Conclusion 3: SLM-aligned approaches such as agroecological farming, which are designed to work with natural processes to support climate change mitigation and adaptation, can build climate-related local resilience to food insecurity.

52. Conclusion 4: Integrated, multi-sectoral land management strategies and solutions that also address social inequities increase the feasibility and effectiveness of adaptation where climate change and land degradation interactions have increased vulnerability.

53. Conclusion 5: Gradually redirecting subsidies and incentives for private sector investment currently allocated to agriculture and forestry towards initiatives that promote SLM designed to deliver mitigation and adaptation co-benefits can contribute to addressing land degradation while reducing emissions.

54. Conclusion 6: In order to accelerate the achievement of the SDGs while building climate resilience, it will be necessary to strengthen, prioritize and scale successful integrated land use planning and management policies aligned with land degradation neutrality.

55. Conclusion 7: Broader societal and more effective policy responses to the interaction of climate change and DLDD will require the development of communities of practice and learning which will provide educational opportunities while promoting greater interaction among those working in these domains.

56. Parties may wish to consider these conclusions when engaging in consultations on a draft decision to be considered by the COP based on the draft text for negotiations that can be found in document ICCD/COP(16)/CST/10 which, following decision 33/COP.15, contains all draft decisions prepared for Parties for consideration at CST 16.

Annex I

Background on report preparation and approval by the Intergovernmental Panel on Climate Change

[English only]

1. The Intergovernmental Panel on Climate Change (IPCC) prepares comprehensive assessment reports about the state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place. This Annex provides important background information on how the two IPCC reports analysed by the Science-Policy Interface (SPI) in the triennium 2022–2024 were prepared by the IPCC.

2. In its decision IPCC/XLI-4, the IPCC decided that it will continue to prepare comprehensive assessment reports every five to seven years. The current sixth assessment report (AR6) cycle began in 2015 and was completed in 2022, responding to IPCC decision IPCC/XLIII-6.

3. Two AR6 reports were completed in the triennium 2022–2024 in time for the SPI to review them and develop policy-oriented recommendations for consideration at the sixteenth session of the Committee on Science and Technology (CST 16). These were the contributions of IPCC working group II (WGII) on climate change impacts, adaptation and vulnerability and working group III (WGII) on the mitigation of climate change (WGIII).

4. The IPCC finalized the second part of the AR6, Climate Change 2022: Impacts, Adaptation and Vulnerability, the WGI contribution to AR6, on 25 February 2022, during the 12th session of WGII and 55th session of the IPCC. By its decision IPCC-LIV- 4, in accordance with Section 4.4 of Appendix A to the Principles Governing IPCC Work, the IPCC approved the Summary for Policy Makers and accepted the underlying scientific-technical assessment of the IPCC AR6 WGII.

5. The IPCC finalized the third part of the AR6, Climate Change 2022: Mitigation of Climate Change, the WGIII contribution to AR6, on 6 August 2021, during the 14th session of WGIII and 56th Session of the IPCC. By its decision IPCC-LIV- 4, in accordance with Section 4.4 of Appendix A to the Principles Governing IPCC Work, the IPCC approved the Summary for Policy Makers and accepted the underlying scientific-technical assessment of the IPCC AR6 WGIII.

6. Confidence in key findings of the AR6 SPM is indicated using IPCC calibrated language; the underlying scientific basis of each key finding is indicated by references to the main report, so that each finding in the SPM is grounded in an evaluation of underlying evidence and agreement. A level of confidence is expressed using five qualifiers: very low, low, medium, high and very high, and typeset in italics, e.g., *medium confidence*. The following terms have been used to indicate the assessed likelihood of an outcome or a result: virtually certain 99–100% probability, very likely 90–100%, likely 66–100%, about as likely as not 33–66%, unlikely 0–33%, very unlikely 0–10%, exceptionally unlikely 0–1%. Additional terms (extremely likely 95–100%, more likely than not >50–100%, more unlikely than likely 0–<50%, extremely unlikely 0–5%) may also be used when appropriate. Assessed likelihood is typeset in the IPCC SPM in italics, e.g., *very likely*. This is consistent with IPCC AR5.

7. The technical summaries of the IPCC AR6 WGII and WGIII were designed to act as a bridge between the comprehensive assessment of the WGI chapters and its Summary for Policy Makers. Each technical summary was primarily built from the Executive Summaries of the individual chapters and atlas, and provides a synthesis of key findings based on multiple lines of evidence.

Annex II

Science-Policy Interface methodology for the analysis of key messages

[English only]

1. As per decision 18/COP.15, during the triennium 2022–2024, the Science-Policy Interface (SPI) conducted a review and analysis of the Intergovernmental Panel on Climate Change (IPCC) sixth assessment cycle report (AR6), developed by working group II (WGII), entitled Climate Change 2022: Impacts, Adaptation and Vulnerability, as well as the IPCC AR6 report developed by working group III (WGIII), entitled Climate Change 2022: Mitigation of Climate Change.

2. The SPI provided a scientific review of both reports during the 2020–2021 biennium.

3. The SPI analysis of the approved IPCC AR6 WGII and WGIII reports summarized in this document was based on inputs by individual SPI working group members captured during a series of virtual working meetings, and the 17th meeting of the SPI in May 2023, where the categories and primary focus of the AR6 reports and key messages relevant to the United Nations Convention to Combat Desertification (UNCCD) were defined.

4. The SPI analysis focused on the key messages in the SPM and also used the Technical Summary and underlying chapters to ensure the synthesis underway would lead to the formulation of actionable policy-oriented recommendations. Preliminary drafts were refined by the entire SPI at its 18th meeting in September 2023, after which the SPI Co-Leads of the IPCC coordination activity working group drafted preliminary policy-oriented recommendations. These were refined further with support from the secretariat in order to transform them into the necessary format for consideration by policymakers.

5. The Co-Leads integrated the AR6 WGII and WGIII conclusions and policy-oriented recommendations prior to the 19th Meeting of the SPI in March 2024, where the SPI discussed and further refined the recommendations.

6. The Co-Leads worked to ensure the final list of policy-oriented recommendations were relevant to the UNCCD. These recommendations are based on key messages drawn from the SPMs of both AR6 reports. To ensure a clear line of sight, the elements of the key messages which were drawn upon to craft the conclusions and recommendations are referenced in the text of this document.

7. A final review of the conclusions and recommendations open to all members of the SPI was completed in June 2024.