



**Conference of the Parties
Committee on Science and Technology**

Fifteenth session

Abidjan, Côte d'Ivoire, 11–13 May 2022

Item 2 (c) of the provisional agenda

Items resulting from the work programme of the Science-Policy Interface for the biennium 2020–2021

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.14, the COP adopted the SPI work programme for the biennium 2020–2021, 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 for the second edition of the Global Land Outlook. Further to that decision, within the activities of the SPI coordination activity with the Intergovernmental Panel on Climate Change, the COP requested the SPI to analyse the key messages of the Special Report on Climate Change and Land (SRCCCL) and its Sixth Assessment Report (AR6), 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 SRCCCL and the part of the AR6 which became available in time for the SPI to complete the review. The CST may wish to consider these findings for the development, as appropriate, of recommendations to the COP.



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List of abbreviations

AR6	Sixth Assessment Report
CDR	carbon dioxide removal
CO ₂	carbon dioxide
COP	Conference of the Parties
CST	Committee on Science and Technology
DLDD	desertification/land degradation and drought
FAO	Food and Agriculture Organization of the United Nations
GLII	Global Land Indicators Initiative
GLO 2	Second Edition of the Global Land Outlook
GloSIS	Global Soil Information System
GSP	Global Soil Partnership
Gt	gigatons
IDMP	Integrated Drought Management Programme
IPBES	Intergovernmental Science–Policy Platform on Biodiversity and Ecosystems Services
IPCC	Intergovernmental Panel on Climate Change
IRP	International Resources Panel
ITPS	Intergovernmental Technical Panel on Soils
LDN	land degradation neutrality
PBL	Netherlands Environment Assessment Agency
SDG	Sustainable Development Goal
SLM	sustainable land management
SPI	Science-Policy Interface
SPM	Summary for Policymakers
SRCCCL	Special Report on Climate Change and Land
SSP	shared socio-economic pathway
TS	Technical Summary
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
WGI	Working Group 1
WGII	Working Group 2
WGIII	Working Group 3

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 done 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 decision, decision 18/COP.14 assigned the SPI to coordinate with several scientific mechanisms:

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

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

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

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

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

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

(g) The second edition of the Global Land Outlook (GLO) of the UNCCD.

3. Furthermore, the COP, in decision 20/COP.14, 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 further 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.14, this document presents a synthesis report, including policy-oriented recommendations resulting from the coordination activities conducted by the SPI during the biennium 2020–2021.

II. Coordination activities of the Science-Policy Interface work programme 2020–2021

5. In keeping with decision 18/COP.14, the SPI, as part of the SPI work programme for the biennium 2020–2021, 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) Contributed to the scientific review of the IPBES Scoping Report for a Thematic Assessment of the Interlinkages Among Biodiversity, Water, Food, and Health (Nexus Assessment) and the IPBES Scoping Report for a Thematic Assessment of the Underlying Causes of Biodiversity Loss and the Determinants of Transformative Change

and Options for Achieving the 2050 Vision for Biodiversity (Transformative Change Assessment), submitting 60 and 48 comments, respectively;¹

(b) Also contributed to the IPBES workshop on biodiversity and pandemics through the invited participation of the SPI co-Chair, and the scientific review of the workshop report;²

(c) Analysed the key messages of the IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems (IPCC SRCCL)³ and the IPCC Working Group I contribution Climate Change 2021: The Physical Science Basis to the Sixth Assessment Report (IPCC Sixth Assessment Report (AR6) Working Group I (WGI));⁴

(d) Contributed to the scientific review of the IPCC's Working Group II (WGII) contribution on Climate Change Impacts, Adaptation and Vulnerability to the AR6 (IPCC AR6 WGII), submitting 89 and 136 comments on the first and second order drafts, respectively;⁵

(e) Also contributed to the scientific review of the IPCC's Working Group III (WGIII) contribution on Mitigation of Climate Change to the AR6 (IPCC AR6 WGIII), submitting 93 and 129 comments on the first and second order drafts, respectively;⁶

(f) Contributed to the scientific review of all six volumes of the ITPS's Recarbonizing Global Soils – A Technical Manual of Recommended Management Practices, which covers methodologies, soil organic carbon hot spots and bright spots, an overview of practices and a set of case studies;⁷

(g) In collaboration with the Scientific and Technical Advisory Panel of the Global Environment Facility and the IRP, supported the ITPS in their development of soil organic carbon (SOC) estimation tools/models on sites useful where detailed measurements of soil organic carbon are not available or are not cost-effective, as requested in decision 16/COP.14, paras 2 and 3, and their development of guidance on the assessment and monitoring of land potential that is scientifically based and aligned with land degradation neutrality (LDN) guidance, as requested in decision 20/COP.14 paragraph 3(a). They did so by contributing to the scientific review of the technical specifications for the Global Soil Organic Carbon Sequestration Potential Map⁸ and its federated interoperable national soil data platform, the Global Soil Information System (GloSIS)⁹, submitting 32 and 143 comments on the first and second order drafts, respectively;

(h) Co-organized, with the ITPS of the GSP and other partners working under the leadership of FAO, the Global Symposium on Soil Biodiversity (19–21 April 2021)¹⁰ and the Global Symposium on Salt-affected Soils (20–22 October 2021);¹¹

(i) Cooperated with the IRP on their report Building Resilient Societies after the COVID-19 Pandemic¹², and provided input to the report, Mineral Resource Governance in the 21st Century: Gearing Extractive Industries Towards Sustainable Development;¹³

¹ Decision IPBES-8/1, Annexes I and II < https://ipbes.net/sites/default/files/2021-09/ipbes_8_decision_1_en.pdf>. In January 2022, one member of the SPI was selected by IPBES to serve as a lead author of the Transformative Change Assessment and another was selected as a review editor of the Nexus Assessment.

² <https://ipbes.net/sites/default/files/2020-12/IPBES%20Workshop%20on%20Biodiversity%20and%20Pandemics%20Report_0.pdf>.

³ <<https://www.ipcc.ch/srccl/>>.

⁴ <<https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>>.

⁵ <<https://www.ipcc.ch/working-group/wg2/>>.

⁶ <<https://www.ipcc.ch/working-group/wg3/>>.

⁷ <<http://www.fao.org/documents/card/en/c/cb6386en>>.

⁸ <<http://www.fao.org/global-soil-partnership/gsocseq-map/en/>>.

⁹ <<http://54.229.242.119/GloSIS/>>.

¹⁰ <<http://www.fao.org/about/meetings/soil-biodiversity-symposium/en/>>.

¹¹ <<http://www.fao.org/events/global-symposium-on-salt-affected-soils/en/>>.

¹² <<https://www.resourcepanel.org/reports/building-resilient-societies-after-covid-19-pandemic>>.

(j) Engaged the GLII, through scientific peer review, in the UNCCD secretariat's exploration of globally relevant indicators able to contribute to the development of gender-responsive indicators for national reporting on UNCCD strategic objectives 1–5, the outcomes of which are detailed further in documents ICCD/COP(15)/CST/7–ICCD/CRIC(20)/8 and ICCD/COP (15)/17;

(k) Contributed to the ongoing work of the IDMP and its cooperating partners on (i) the creation of a common understanding of definitions and the cross-sectoral nature of drought risk management and land management (as per decision 17/COP.14, para 4), (ii) the review of the development of a report on integrated water management, and (iii) a brochure on drought and water scarcity;

(l) Assumed a primary role in the quality assurance of the second edition of the Global Land Outlook (GLO 2), which has included the service of three SPI members on the steering committee of the GLO 2, extensive scientific review of all elements and drafts of GLO 2 products by all members of SPI, and a final review of the GLO 2 for approval prior to publication;

(m) Contributed to the scientific review of GLO 2 working papers on youth engagement, gender equity and responsiveness, tenure security, urban-rural linkages, more resilient food systems, perverse incentives and the repurposing of subsidies, COVID-19 response and recovery, and ecological connectivity in the context of restoration;

(n) Also contributed to the scientific review of the report, The Global Potential for Land Restoration: Scenarios for the Global Land Outlook 2, produced by the Netherlands Environment Assessment Agency (PBL);¹⁴

(o) Undertook a scientific review of the zero, first and final drafts of the second edition of the Global Land Outlook full report and its Summary for Decision Makers and approved the final version prior to publication.

6. In accordance with decision 20/COP.14, para 8, 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. The most significant was the establishment of a new coordination activity with the IDMP.

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.14) 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:

(a) The IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems (IPCC SRCCL);¹⁵

(b) The IPCC WGI contribution Climate Change 2021: The Physical Science Basis to the Sixth Assessment Report (IPCC AR6 WGI).¹⁶

8. The SPI analysis was focused primarily on the key messages in the Summary for Policy Makers (SPM) for each report, which were approved in the respective sessions of the IPCC. The SPI also consulted the Technical Summary for each report, which are primarily

¹³ <<https://www.resourcepanel.org/reports/mineral-resource-governance-21st-century>>.

¹⁴ <<https://www.pbl.nl/sites/default/files/downloads/pbl-2021-the-global-potential-for-land-restoration-glo2-3898.pdf>>.

¹⁵ <<https://www.ipcc.ch/srccl/>>.

¹⁶ <<https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>>.

built from 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 being 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.

9. Recognizing that the language of the SPMs of IPCC reports is inter-governmentally agreed, the SPI drew directly from IPCC key messages for this document, using footnotes to provide a clear line of sight.

10. The background on the IPCC report preparation and approval with respect to these two IPCC reports is provided in annex 1 to this document.

11. The full methodology employed by the SPI to analyse these reports is provided in annex 2 to this document.

A. Special Report on Climate Change and Land¹⁷

12. The SRCCL was selected for an AR6 Special Report taking account of proposals from governments and observer organisations, including the UNCCD. As documented in its SPM,¹⁸ the SRCCL addresses greenhouse gas fluxes in land-based ecosystems, land use and sustainable land management (SLM)¹⁹ in relation to climate change adaptation and mitigation, desertification,²⁰ land degradation²¹ and food security.²²

13. The SRCCL comprehensively documents that land, including its water bodies, provides the basis for human livelihoods and well-being through primary productivity, the supply of food, freshwater, and multiple other ecosystem services, including essential, intangible benefits to humans, such as cognitive and spiritual enrichment, a sense of belonging and aesthetic and recreational values.²³ The report documents that global population growth and changes in per capita consumption of food, feed, fibre, timber and energy have caused unprecedented rates of land and freshwater use,²⁴ highlighting the finite nature of land and underscoring that more than 70 per cent of the global ice-free land surface has been affected by human use.²⁵

14. The SRCCL highlights that land and climate are interdependent. Climate change exacerbates land degradation, and, while land degradation reduces the rate of carbon uptake by the land and reduces the resilience of human and natural systems to cope with climate

¹⁷ This is the official short title of the IPCC SRCCL.

¹⁸ <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁹ The IPCC SRCCL defines sustainable land management as ‘the stewardship and use of land resources, including soils, water, animals and plants, to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions’.

²⁰ The IPCC SRCCL defines desertification as ‘land degradation in arid, semi-arid, and dry sub-humid areas resulting from many factors, including climatic variations and human activities’.

²¹ The IPCC SRCCL defines land degradation as ‘a negative trend in land condition, caused by direct or indirect human induced processes, including anthropogenic climate change, expressed as long-term reduction and as loss of at least one of the following: biological productivity; ecological integrity; or value to humans’.

²² The IPCC SRCCL defines food security as ‘a situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’.

²³ See A.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.1 (page 42) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

²⁴ The SRCCL SPM notes that this statement is based on the most comprehensive data from national statistics available within FAOSTAT, which starts in 1961. This does not imply that the changes started in 1961. Land use changes have been taking place from well before the pre-industrial period to the present. See A.1.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

²⁵ See A.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.1 (page 42) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

change,²⁶ climate change, either on its own, or interacting with human pressures, will intensify land degradation and desertification in many regions, especially in drylands,²⁷ which have expanded and currently cover about 46.2% (± 0.8 per cent) of the global land area and are home to 3 billion people.²⁸ The annual area of drylands in drought has increased, on average by slightly more than 1 per cent per year, with large inter-annual variability, and, in 2015, about 500 (380-620) million people lived in areas which had experienced desertification between the 1980s and 2000s.²⁹ The report documents that warming over land has occurred at a faster rate than the global mean and this has had observable impacts on the land system, where these warmer temperatures (with changing precipitation patterns) have altered the start and end of growing seasons, contributed to regional crop yield reductions, reduced freshwater availability, and put biodiversity under further stress and increased tree mortality.³⁰

15. The SRCCL details how the multiple socio-economic drivers of land-use change can amplify existing environmental and societal challenges, such as the conversion of natural ecosystems into managed land, rapid urbanisation, pollution from the intensification of land management and equitable access to land resources.³¹ The report projects these risks and models the implications of future socio-economic development on climate change mitigation, adaptation and land-use using a scenario analysis called shared socio-economic pathways (SSPs) and a comprehensive assessment of land-based response options.³² The report also demonstrates how urgent action to stop and reverse the over-exploitation of land resources would buffer the negative impacts of multiple pressures, including climate change, on ecosystems and society. Acting immediately and simultaneously on these drivers would enhance food, fibre and water security, alleviate desertification, and reverse land degradation, without compromising the non-material or regulating benefits from land.³³

16. The SRCCL further emphasizes that sustainable food supply and food consumption, based on nutritionally balanced and diverse diets and supported by diversification in the food system, would enhance food security under climate and socio-economic changes, presenting major opportunities for adaptation and mitigation while generating significant co-benefits in terms of human health.³⁴ This reinforces paragraph 5 of decision 20/COP.14, which included consumer behaviour and diet among the updated UNCCD list of indirect drivers of land degradation listed in UNCCD reporting templates.

17. A wide range of adaptation and mitigation responses, e.g. preserving and restoring natural ecosystems, such as peatland, coastal lands and forests, biodiversity conservation, reducing competition for land, fire management, soil management, and most risk management options (e.g. the use of local seeds, disaster risk management, risk sharing instruments) have the potential to make positive contributions to sustainable development, the enhancement of ecosystem functions and services and other societal goals.³⁵

²⁶ See A.1.5 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.4 (page 53) and TS.2 (page 50); <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

²⁷ See A.1.5 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

²⁸ See Executive Summary, Chapter 3 <https://www.ipcc.ch/site/assets/uploads/sites/4/2019/11/06_Chapter-3.pdf>.

²⁹ See A.1.5 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

³⁰ See A.2.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.1 (page 42) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

³¹ See TS.1 (page 42) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

³² See A.2.7; Box SPI.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

³³ See D.3.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.1 (page 42) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

³⁴ See B.4.2, B.6.2 B.7.3, C.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.1 (page 42) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

³⁵ See B.2.2 and Figure SPM 3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; Table TS.1, Figure TS.8 Figure TS.12, TS.7 (page 68), <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

18. Although most response options that contribute to carbon dioxide removal (CDR)³⁶ can be applied without competing for available land, all modelled global greenhouse gas emission pathways assessed by the IPCC in the SRCCL that limit warming to 1.5°C or well below 2°C require land-based mitigation and land-use change.³⁷ If applied at scales necessary to remove CO₂ from the atmosphere at the level of several GtCO₂ per year, afforestation, reforestation and the use of land to provide feedstock for bioenergy with or without carbon capture and storage, or for biochar, could greatly increase demand for land conversion.³⁸ If applied on a limited share of total land and integrated into sustainably managed landscapes, making appropriate use of degraded land, there will be fewer adverse side effects and some positive co-benefits can be realised.³⁹ The greatest co-benefits are obtained with methods that seek to restore natural ecosystems or improve soil carbon sequestration. Implementing biomass-based CDR, even at scale, does not change the basic conclusion that reaching net zero requires a substantial reduction in global CO₂ emissions in order to halt global warming.

19. Acting simultaneously with appropriate environmental and social safeguards requires a holistic and integrated approach such as policies provided under LDN, which the SRCCL documents that can also enhance food security, human wellbeing and climate change adaptation and mitigation.⁴⁰ Addressing DLDD and achieving LDN by avoiding and reducing land degradation and restoring degraded land require integrated land use planning, SLM and drought management and mitigation, all of which can be improved by increasing the availability and accessibility of data and information relating to the effectiveness, co-benefits and risks of emerging response options.⁴¹

20. Mutually supportive climate and land policies have the potential to save resources, amplify social resilience, support ecological restoration, and foster engagement and collaboration between multiple stakeholders,⁴² where a mix of policies, rather than single policy approaches, can deliver improved results in addressing the complex challenges of SLM and climate change, and strongly reduce the vulnerability and exposure of human and natural systems to climate change.⁴³

21. To address the multiple drivers that underpin land degradation, global and national processes and their country-specific interactions can be used to inform national policies to strengthen procedures that support the implementation of land-related response options that address land degradation in ways that contribute to climate change mitigation and adaptation and enhance food security.⁴⁴ Often, there are barriers to the large-scale implementation of SLM and land restoration at national levels to regulate global and national pressure on land resources. To overcome these barriers and trigger the wide-scale acceptance and successful implementation of SLM practices and land restoration, and the monitoring of their impacts, an enabling environment that integrates biophysical, socioeconomic and other enabling factors must be created at national and subnational levels.⁴⁵

³⁶ The AR6 WGI report defines carbon dioxide removal (CDR) as anthropogenic activities that deliberately remove CO₂ from the atmosphere and durably store it in geological, terrestrial or ocean reservoirs, or in products. Carbon dioxide is removed from the atmosphere by enhancing biological or geochemical carbon sinks or by direct capture of CO₂ from air.

³⁷ See B.7 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

³⁸ See B.3.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

³⁹ See B.3, B.3.1, Figure SPM.3 (Panel B best practices) <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.6 (page 61) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁴⁰ See C.1.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.3 (page 50) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁴¹ See D.1.4, C.1.2, C.1.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁴² See C.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁴³ See C.1.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>> and TS.7 (page 68) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁴⁴ See B.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁴⁵ See B.1.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

22. The SRCL emphasizes that a gender- and youth-inclusive approach offers opportunities to enhance the sustainable management of land, and that cross-scale, cross-sectoral and inclusive governance can enable coordinated policy conducive to effective adaptation and mitigation.⁴⁶ The adoption of SLM and poverty eradication can be enabled by improving access to markets, securing land tenure, factoring environmental costs into food, making payments for ecosystem services, and enhancing local and community collective action.⁴⁷ More information on UNCCD activities related to gender, youth and land tenure can be found in documents ICCD/COP(15)/17, ICCD/COP(15)/12 and ICCD/COP(15)/19, respectively.

23. The report also documents that actions can be taken in the near-term, based on existing knowledge, to address desertification, land degradation and food security while supporting longer-term responses that enable adaptation and mitigation to climate change. These include actions to build individual and institutional capacity, accelerate knowledge transfer, enhance technology transfer and deployment, enable financial mechanisms, implement early warning systems, undertake risk management and address gaps in implementation and upscaling.⁴⁸ More information on relevant capacity development as well as technology transfer activities can be found in documents ICCD/CRIC(20)/6 and ICCD/CRIC(20)/5, respectively.

B. AR6 Climate Change 2021: The Physical Science Basis⁴⁹

24. Of the three parts of the IPCC AR6, only the WGI contribution, Change 2021: The Physical Science Basis,⁵⁰ was published in time for the SPI to conduct and complete an analysis of its key messages for this document.

25. The IPCC WGI contribution to AR6 addresses the most up-to-date physical understanding of the climate system and climate change, bringing together the latest advances in climate science, and combining multiple lines of evidence from paleoclimate, observations, process understanding, and global and regional climate simulations.

26. The IPCC AR6 WGI assessment documents the current state of the climate, and that human influence has warmed the atmosphere, ocean and land, and that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.⁵¹ The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years.⁵²

27. The assessment reaffirms that human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes, such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since the AR5.⁵³

28. With further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Changes in several climatic impact-drivers would be more widespread at 2°C compared to 1.5°C global warming and even more widespread and/or pronounced for higher warming levels.⁵⁴

⁴⁶ TS.1 (page 43), TS.4 (page 53), TS.7 (page 67) <<https://www.ipcc.ch/srcl/chapter/technical-summary/>>.

⁴⁷ See C.2 <<https://www.ipcc.ch/srcl/chapter/summary-for-policy-makers/>>.

⁴⁸ See D.1 <<https://www.ipcc.ch/srcl/chapter/summary-for-policy-makers/>>.

⁴⁹ This is the official short title of the IPCC Working Group I contribution to the Sixth Assessment Report (IPCC AR6 WGI).

⁵⁰ <<https://www.ipcc.ch/assessment-report/ar6/>>.

⁵¹ See A.1 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

⁵² See A.2 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

⁵³ See A.3 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

⁵⁴ See C.2 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

29. The AR6 WGI report projects that many changes in the climate system become larger in direct relation to increasing global warming, including increases in the frequency and intensity of hot extremes, marine heatwaves, heavy precipitation, and agricultural and ecological droughts in some regions.⁵⁵ Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events.⁵⁶

30. The assessment documents that warming over land drives an increase in atmospheric evaporative demand and in the severity of drought events.⁵⁷ A warmer climate will intensify very wet and very dry weather and climate events and seasons, with implications for flooding or drought.⁵⁸

31. The AR6 WGI assessment includes updated findings on drought, noting that during the 21st century, the total land area subject to drought will increase with more frequent and severe droughts, while the land area affected by increasing drought frequency and severity will expand with increasing global warming.⁵⁹

IV. Conclusions and recommendations

32. 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 biennium. The outcomes of those assessments can be found in ICCD/COP(15)/CST/2 and ICCD/COP(15)/CST/3, respectively.

33. From the analysis completed on the key messages of the SRCCL and AR6 WGI assessment reports, the SPI drew twelve main conclusions which they found relevant to the UNCCD.

34. The conclusions drawn are focused on aspects of these reports which can support the vision of the UNCCD 2018–2030 Strategic Framework: A future that avoids, minimizes, and reverses desertification/land degradation and mitigates the effects of drought in affected areas at all levels and strive to achieve a land degradation-neutral world consistent with the 2030 Agenda for Sustainable Development, within the scope of the Convention.⁶⁰

35. The conclusions also take into consideration the United Nations General Assembly affirmation that achieving LDN has the potential to act as an accelerator and integrator for achieving the Sustainable Development Goals and respond to the overall objectives of the 2030 Agenda for Sustainable Development. They also recognize that land-based solutions, as part of nature-based solutions, constitute promising options to evaluate and consider in connection with sequestering carbon and enhancing the resilience of people and ecosystems affected by DLDD, as well as the adverse effects of climate change.⁶¹

36. While these conclusions have been refined to fit the context of the UNCCD to the greatest extent possible, the language used has been drawn directly from the key messages approved in the IPCC process. Footnotes have been provided to facilitate the line of sight to the relevant IPCC key messages behind each conclusion. These 12 conclusions reached by the SPI are:

⁵⁵ See B.2 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

⁵⁶ See B.3 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

⁵⁷ See Box TS.6 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf>.

⁵⁸ See B.3.2 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf>.

⁵⁹ See Box TS.6 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf>.

⁶⁰ <<https://www.unccd.int/official-documentscop-13-ordos-china-2017/7cop13>>.

⁶¹ See A/RES/76/206 (paragraphs 6-8); A/RES/75/218 (paragraphs 6 and 8) <<https://undocs.org/en/A/RES/75/218>> and A/RES/73/233 (paragraph 2) <<https://undocs.org/en/A/RES/73/233>>.

(a) **Conclusion 1: Land and climate are interdependent, and policies should therefore take into account that:**

(i) Climate change exacerbates land degradation,⁶² intensifies drought,⁶³ and diminishes carbon uptake by the land,⁶⁴ while land degradation reduces the resilience of human and natural systems to cope with climate change,⁶⁵ and also reinforces climate change by means of land-atmosphere feedback;⁶⁶

(ii) Climate change, either on its own⁶⁷ or interacting with human pressures,⁶⁸ will intensify land degradation and desertification in many regions, especially in tropical and subtropical drylands,⁶⁹ necessitating the need to take current and future climate into account;

(iii) Increases in global mean near-surface air temperature relative to pre-industrial levels, affect and exacerbate processes involved in desertification/land degradation (water scarcity, soil erosion, vegetation loss, wildfire, permafrost thaw, dust storms) and food security (crop yield and food supply instabilities);⁷⁰

(b) **Conclusion 2: The analysis of the risks and implications of future socio-economic development on climate change mitigation, adaptation and land-use explored by the IPCC using SSP scenario analysis and an assessment of land-based response options⁷¹ revealed that many land-related responses that contribute to climate change adaptation and mitigation have co-benefits in terms of combating desertification and land degradation, enhancing food security⁷² and contributing to halting biodiversity loss with sustainable development,⁷³ however significant gaps in knowledge exist when it comes to understanding the effectiveness of policy instruments and institutions related to land use,⁷⁴ and more inclusiveness in the measurement, reporting and verification of the performance of policy instruments can support sustainable land management;⁷⁵**

(c) **Conclusion 3: Although most response options that involve carbon dioxide removal on land can be applied without competing for available land, all modelled global greenhouse gas emission pathways assessed by the IPCC that limit warming to 1.5°C or well below 2°C require land-based mitigation that relies on additional land-use change,⁷⁶ and policies should therefore take into account that:**

(i) Significant co-benefits are obtained with land restoration or improvements in soil carbon sequestration but reaching net zero will still require substantial reductions in global CO₂ emissions in order to halt global warming;

(ii) At the deployment scale necessary to remove CO₂ at the level of several GtCO₂ per year, some carbon dioxide removal response options, including afforestation, cultivation for bioenergy with or without carbon capture and

⁶² See A.2.7 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁶³ Ibid.

⁶⁴ See TS.2 (page 46), TS.3 (page 50), TS.4 (page 53) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁶⁵ TS.3 (page 50) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁶⁶ AR6. Chapter 11: <<https://www.ipcc.ch/report/ar6/wg1/#FullReport>>.

⁶⁷ See A.2.7. <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁶⁸ See A.4.5, A.5, A.5.8. <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁶⁹ See A.5.6 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷⁰ See Box SPI.1, A.2, A.2.4, A.5.2, A5.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷¹ See A.2.7, Box SPI.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷² See B.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷³ See B.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷⁴ See TS.7 (page 70) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁷⁵ See C.4.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷⁶ See Figure SPM.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

storage, or biochar addition to soil, could lead to negative trade-offs with other land uses⁷⁷ and could have adverse side effects in terms of adaptation, desertification, land degradation and food security;⁷⁸

(iii) If applied on a limited share of total land and integrated into sustainably managed landscapes, there will be fewer adverse side effects and some positive co-benefits can be realised;⁷⁹

(d) *Conclusion 4:* Most of the land management-based climate change response options that do not increase competition for land, and almost all options based on demand and supply value chain management (e.g. dietary choices, reduced post-harvest losses, reduced food waste, sustainable sourcing, food processing and retailing) and risk management (e.g. livelihood diversification, management of urban sprawl, risk sharing instruments), can contribute to eradicating poverty and eliminating hunger while promoting good health and well-being, clean water and sanitation, climate action, and life on land;⁸⁰

(e) *Conclusion 5:* Many SLM practices are not widely adopted due to insecure land tenure, lack of access to resources, ineffective agricultural advisory services, insufficient and unequal private and public incentives, and a lack of knowledge and practical experience,⁸¹ therefore policies are needed that:

- (i) Enable and incentivise SLM for climate change adaptation and mitigation, including enhancing tenure security;
- (ii) Improve access to markets for inputs, outputs and financial services;
- (iii) Empower women and indigenous peoples;
- (iv) Enhance local and community collective action;
- (v) Reform subsidies; and
- (vi) Promote an enabling trade system;⁸²

(f) *Conclusion 6:* Policies promoting LDN can also enhance food security, human well-being and climate change adaptation and mitigation,⁸³ where land degradation can be avoided, reduced or reversed by implementing conservation, SLM, and ecological rehabilitation/restoration practices designed to simultaneously provide multiple environmental, economic and social benefits;⁸⁴

(g) *Conclusion 7:* Investments in land restoration can result in global benefits, with benefit-cost ratios in drylands of between three and six in terms of the estimated economic value of restored ecosystem services, and therefore policies should take into account that:

- (i) Land restoration and rehabilitation measures improve livelihood systems and provide both short-term positive economic returns and longer-term benefits in terms of climate change adaptation and mitigation, biodiversity and enhanced ecosystem functions and services;

⁷⁷ See B.3.1, B.3.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷⁸ See B.3. <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁷⁹ See B.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁸⁰ See B.2.3, Figure SPM 3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; Table TS.1, Figure TS.8, Figure TS.12, TS.7 (page 68), <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁸¹ See C.3.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁸² See C.2.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁸³ See B.1.3, B.4.4, C.1.1, C.1.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁸⁴ See TS.4 (page 55) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

(ii) While actions to ensure SLM may require an upfront investment, they can improve crop yields and the economic value of pasture and become profitable within three to ten years.⁸⁵

(h) *Conclusion 8:* SLM reduces land degradation and contributes to climate change mitigation and adaptation,⁸⁶ however, in scenarios with increasing CO₂ emissions, land (and ocean) carbon sinks are projected to be less effective at slowing the accumulation of CO₂ in the atmosphere,⁸⁷ and therefore policies should take into account that:

(i) Over the last six decades, land and ocean have taken up a near constant proportion (56 per cent per year) of CO₂ emissions from human activities,⁸⁸ however the proportion of emissions taken up by land and ocean is projected to decrease with increasing cumulative CO₂ emissions;⁸⁹

(ii) This trend is exacerbated by land degradation, which puts accumulated carbon in vegetation and soils (or sink reversal) at risk from future loss, triggered by disturbances such as flood, drought, fire, pest outbreaks or future poor management;⁹⁰

(i) *Conclusion 9:* Delaying climate mitigation and adaptation responses across all sectors would lead to increasingly negative impacts on land and reduce the prospect of sustainable development.⁹¹ Therefore policies should take into account that:

(i) Prompt action on climate mitigation and adaptation aligned with SLM and sustainable development could, depending on the region, reduce the risk to millions of people from climate extremes, desertification, land degradation and food and livelihood insecurity;⁹²

(ii) Failure to mitigate climate change soon will increase requirements for adaptation and may reduce the efficacy of future land-based mitigation options;⁹³

(iii) Near-term capacity building, technology transfer and deployment, and enabling financial mechanisms can strengthen adaptation and mitigation in the land sector;⁹⁴

(iv) Streamlined knowledge and technology transfer can help enhance the sustainable use of natural resources for food security under a changing climate;⁹⁵

(v) Prioritizing awareness-raising, capacity building and education about SLM practices, the strengthening of agricultural extension and advisory services, and the expansion of access to agricultural services to producers and land users can effectively address land degradation;^{96,97}

⁸⁵ See D.2.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁸⁶ See A.1.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁸⁷ See B.4 <<https://www.ipcc.ch/report/ar6/wg1/#SPM>>.

⁸⁸ See A.1.1 <<https://www.ipcc.ch/report/ar6/wg1/#SPM>>.

⁸⁹ See B.4.1 <<https://www.ipcc.ch/report/ar6/wg1/#SPM>>.

⁹⁰ See C.2.4 <<https://www.ipcc.ch/report/ar6/wg1/#SPM>> and B.1.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁹¹ See D.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁹² See D.3.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁹³ See TS.6 (page 62) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

⁹⁴ See D.1.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

⁹⁵ Ibid.

⁹⁶ Ibid.

⁹⁷ See ICCD/CRIC(20)/6 for further information on capacity building to further implementation of the Convention.

(j) **Conclusion 10:** A warmer climate will intensify very wet and very dry weather and climate events and seasons, with implications for flooding or drought.⁹⁸ The land area affected by increasing drought frequency and severity will expand with increasing global warming and be further exacerbated by poor land management,⁹⁹ which suggests policies should consider that:

(i) These effects will be felt most strongly in desert and semi-arid areas through extreme heat events,¹⁰⁰ drought¹⁰¹ and dust storms,¹⁰² with large-scale aridity trends contributing to expanding drylands and expanding affected populations in some regions;¹⁰³

(ii) These trends are projected to result in increased risk of dryland water scarcity, soil erosion, vegetation loss, wildfire damage and food supply disruptions;¹⁰⁴

(iii) All assessed future SSPs result in increases in water demand and water scarcity,¹⁰⁵ and associated risks, with impacts on multiple systems and sectors, including cascading risks, are projected to become increasingly severe with increasing temperatures, but will vary across regions;¹⁰⁶

(iv) These trends are likely to disproportionately impact those most vulnerable to climate change and desertification, including indigenous peoples and local communities, women, the young, the elderly, and the poor;¹⁰⁷

(k) **Conclusion 11:** A gender-inclusive approach to addressing the interlinked impacts of land degradation and climate change offers opportunities to enhance the sustainable management of land, and therefore policies should consider that:

(i) Women play a significant role in agriculture and rural economies globally;

(ii) In many world regions, laws, cultural restrictions, patriarchy and social structures, such as discriminatory customary laws and norms, reduce women's capacity to support the sustainable use of land resources;

(iii) Acknowledging women's land rights and bringing women's land management knowledge into land-related decision-making would support the alleviation of land degradation, and facilitate the take-up of integrated adaptation and mitigation measures;^{108,109}

(l) **Conclusion 12:** Integrated land use planning, SLM and drought management and mitigation can be improved by increasing the availability and accessibility of data and information relating to the effectiveness, co-benefits, emerging response options and increasing the efficiency of land use,¹¹⁰ and therefore policies should take into account that:

⁹⁸ See B.3.2 <<https://www.ipcc.ch/report/ar6/wg1/#SPM>>.

⁹⁹ See A.2.2, A.5.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰⁰ See A.5.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰¹ See A.2.7 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰² See A.2.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰³ See C.2.3, Figure SPM.9, <<https://www.ipcc.ch/report/ar6/wg1/#SPM>> and A.5.5

<<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰⁴ See A.5.3, A.5.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰⁵ See A.6.1 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰⁶ See A.5, A.5.3 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰⁷ See A.5.6, C.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹⁰⁸ See C.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.1 (page 42)

<<https://www.ipcc.ch/srccl/chapter/technical-summary/>>; Chapter 1 Executive Summary

<https://www.ipcc.ch/site/assets/uploads/sites/4/2019/12/04_Chapter-1.pdf>.

¹⁰⁹ See ICCD/COP(15)/17 for additional information on gender mainstreaming.

¹¹⁰ See D.1.4 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

(i) Measuring and monitoring both the anthropogenic and climate change impacts on land use change, including DLDD, can be supported by the expanded use of new information and communication technologies (cell phone-based applications, cloud-based services, ground sensors, drone imagery), climate services, and remotely sensed land and climate information on land and water resources;¹¹¹

(ii) Seasonal forecasts and early warning systems for extreme weather and climate events are critical for protecting lives and property and enhancing disaster risk reduction and management, as well as for food security (famine) and biodiversity monitoring, including pests and diseases and adaptive climate risk management;¹¹²

(iii) There are high returns on investments in human and institutional capacities, including access to observation and early warning systems, and other services derived from in-situ hydro-meteorological and remote sensing-based monitoring systems and data, field observation, inventory and survey, and expanded use of digital technologies.¹¹³

37. Parties may wish to consider these conclusions resulting from the SPI's analysis of the IPCC SRCCL and the AR6 WGI when addressing/negotiating/engaging in consultations on a draft decision for the COP based on the draft text for negotiations found in ICCD/COP(15)/CST/8, which, following decision 32/COP.14, contains all draft decisions prepared for Parties for consideration at the fifteenth session of the CST.

¹¹¹ See D.1.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>.

¹¹² See D.1.2 <<https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>>; TS.3 (page 52), TS.7 (pages 67, 68, 70) <<https://www.ipcc.ch/srccl/chapter/technical-summary/>>.

¹¹³ Ibid.

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. The IPCC also produces Special Reports on specific topics agreed by its member governments. This Annex provides important background information on how the two IPCC reports analysed by the Science-Policy Interface (SPI) in the biennium 2020-2021 were prepared by the IPCC.

A. Special Report on Climate Change and Land¹¹⁴

2. In its decision IPCC/XLI-4, the IPCC decided that it will continue to prepare every 5-7 years comprehensive Assessment Reports, including regional aspects, together with the three-stage review process, supplemented by Special Reports. Furthermore, Section 2 defines ‘Special Report’ as an assessment of a specific issue that generally follows the same structure as a volume of an Assessment Report.

3. The IPCC Special Report on Climate Change and Land¹¹⁵ (SRCCL) is the second of three Special Reports¹¹⁶ in the current Sixth Assessment Report (AR6) cycle which began in 2015 and will be completed in 2022, responding to IPCC decision IPCC/XLIII-6.

4. The SRCCL provides an updated assessment of the current state of knowledge¹¹⁷ while striving for coherence and complementarity with other recent reports, including the IPCC Special Report on Global Warming of 1.5°C, the Global Land Outlook of the United Nations Convention to Combat Desertification, and two assessments of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: the Land Degradation and Restoration and the Global Assessment Report on Biodiversity and Ecosystem Services.

5. By its decision IPCC-L-3,¹¹⁸ in accordance with Section 4.4 of Appendix A to the Principles Governing IPCC Work,¹¹⁹ the IPCC approved the Summary for Policymakers (SPM) and accepted the underlying scientific-technical assessment of the IPCC SRCCL at IPCC-50.

¹¹⁴ This is the official short title of the IPCC SRCCL.

¹¹⁵ The IPCC SRCCL defines land as “The terrestrial portion of the biosphere that comprises the natural resources (soil, near-surface air, vegetation and other biota, and water), the ecological processes, topography, and human settlements and infrastructure that operate within that system.”

¹¹⁶ The three Special reports are: *Global Warming of 1.5°C: an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*; *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*; *The Ocean and Cryosphere in a Changing Climate*.

¹¹⁷ The IPCC SRCCL assessment covers literature accepted for publication by 7th April 2019, totalling over 7,000 publications.

¹¹⁸ <https://www.ipcc.ch/site/assets/uploads/2019/06/IPCC-50_decisions-adopted-by-the-Panel.pdf>.

¹¹⁹ <<https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles.pdf>>.

6. Confidence in key findings of the SRCCL is indicated using the IPCC calibrated language; the underlying scientific basis of each key finding is indicated by references to the main report.¹²⁰

7. The Technical Summary (TS) to the IPCC SRCCL¹²¹ comprises a compilation of the chapter executive summaries of the underlying report, illustrated with figures from the report.

B. AR6 Climate Change 2021: The Physical Science Basis¹²²

8. The AR6 is being developed by the IPCC with contributions by its three Working Groups (WG), including The Physical Science Basis of Climate Change (WGI), Climate Change Impacts, Adaptation and Vulnerability (WGII) and Mitigation of Climate Change (WGIII).

9. While the work by the WGII and WGIII will continue into 2022, the IPCC finalized the first part of the AR6, Climate Change 2021: The Physical Science Basis, the WGI contribution to AR6, on 6 August 2021, during the 14th Session of WGI and 54th Session of the IPCC. By its decision IPCC-LIV- 4,¹²³ in accordance with Section 4.4 of Appendix A to the Principles Governing IPCC Work,¹²⁴ the IPCC approved the SPM and accepted the underlying scientific-technical assessment of the IPCC AR6 WGI.

10. The report builds upon the 2013 WGI contribution to the IPCC's Fifth Assessment Report (AR5)¹²⁵ and the 2018–2019 IPCC Special Reports¹²⁶ of the AR6 cycle, and incorporates subsequent new evidence from climate science.¹²⁷

11. Confidence in key findings of AR6 SPM is indicated using the IPCC calibrated language; the underlying scientific basis of each key finding is indicated by references to the main report.¹²⁸

12. The TS of the IPCC AR6 WGI¹²⁹ is designed to act as a bridge between the comprehensive assessment of the WGI chapters and its SPM. It is primarily built from the

¹²⁰ The IPCC indicates that each finding 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, for example, 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, for example, *very likely*. This is consistent with IPCC AR5.

¹²¹ <https://www.ipcc.ch/site/assets/uploads/sites/4/2020/07/03_Technical-Summary-TS_V2.pdf>.

¹²² This is the official short title of the and the IPCC Working Group I contribution to the Sixth Assessment Report (IPCC AR6 WGI).

¹²³ <https://www.ipcc.ch/site/assets/uploads/2021/09/IPCC-54_decisions_adopted_by_the_Panel.pdf>.

¹²⁴ <<https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles.pdf>>.

¹²⁵ <<https://www.ipcc.ch/report/ar5/syr/>>.

¹²⁶ The three Special reports are: *Global Warming of 1.5°C: an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*; *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*; *The Ocean and Cryosphere in a Changing Climate*.

¹²⁷ The IPCC AR6 WGI assessment covers scientific literature accepted for publication by 31 January 2021.

¹²⁸ The IPCC indicates that each finding is grounded in an evaluation of underlying evidence and agreement, using this same approach to assessing and communicating confidence that was employed with IPCC AR5 and the IPCC SRCCL, with one addition: In AR6, unless stated otherwise, square brackets [x to y] are used to provide the assessed very likely range, or 90% interval.

¹²⁹ <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf>.

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.14, during the biennium 2020–2021, the Science-Policy Interface (SPI) conducted a review and analysis of the Special Report on Climate Change and Land (SRCCL) and the Intergovernmental Panel on Climate Change (IPCC) Special Report on Climate Change and Land,¹³⁰ as well as the IPCC Working Group I contribution, Climate Change 2021: The Physical Science Basis to the Sixth Assessment Report (IPCC AR6 WGI).¹³¹
2. The United Nations Convention to Combat Desertification (UNCCD) is recognized as a key potential user of and key contributor to the SRCCL. The objective of this collaboration with the IPCC was to ensure that the SRCCL shall be of relevance to the UNCCD process and the needs of its Parties.
3. Two of the experts nominated by the secretariat to the UNCCD in consultation with the Bureau of the Committee on Science and Technology and the SPI were selected to serve as author and review editor, respectively, of the SRCCL. In addition, two SPI members and one observer to the SPI were nominated by their respective governments or organizations and formed part of the expert group which participated in the initial scoping meeting for the SRCCL held in Dublin, Ireland, in 2017, leading to the final outline approved by the IPCC at its 45th Session.
4. The SPI provided a scientific review of the SRCCL during the 2016–2017 and 2018–2019 biennia, submitting 250 and 461 comments on the first and second order drafts, respectively.
5. The secretariat to the UNCCD participated in the 50th Session of the IPCC (IPCC-50) and was invited to express its views on the relevance of the Summary for Policymakers (SPM) key messages for the implementation of the Convention.
6. The SPI analysis of the approved IPCC SRCCL summarized in this document was based on inputs by individual SPI working group members captured during a series of virtual working meetings, where the categories and primary focus of SRCCL conclusions relevant to the UNCCD were defined.
7. The SPI analysis was focused on the key messages in the SPM and also used the Technical Summary and underlying chapters to ensure the synthesis being conducted would lead to the formulation of actionable policy-oriented recommendations. The zero draft of these was refined by the entire SPI at its 13th Meeting,¹³² after which the SPI Co-Leads of this 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 policy-makers.
8. The SPI Co-Leads of the IPCC coordination activity followed a similar methodology for their analysis of IPCC AR6 WGI to that employed for the IPCC SRCCL, however the assessment was published late in the biennium, therefore the steps were accelerated and streamlined.

¹³⁰ <<https://www.ipcc.ch/srccl/>>.

¹³¹ <<https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>>.

¹³² <https://knowledge.unccd.int/sites/default/files/inline-files/13th%20SPI%20Meeting%20Report_Final.pdf>.

9. The Co-Leads integrated the IPCC SRCCL and IPCC AR6 WGI conclusions and policy-oriented recommendations prior to the 14th Meeting of the SPI.¹³³ During this meeting, the full SPI reviewed, then further refined the recommendations.

10. The Co-Leads worked to ensure the final list of conclusions and recommendations were relevant to the UNCCD, while ensuring that, where possible, the language used was drawn directly from IPCC-approved key messages. Footnotes were provided to facilitate the line of sight to the relevant IPCC key messages behind each conclusion.

11. A final review of the conclusions and recommendations open to all members of the SPI was completed in January 2022.

¹³³ <https://knowledge.unccd.int/sites/default/files/inline-files/14th%20SPI%20Meeting%20Report_final_20211202.pdf>.