

Supplementary Materials for the paper: “Assessing the impact of science in the implementation of the United Nations to Combat Desertification”

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List S1: List of acronyms and abbreviations used in the paper

CBD	Convention on Biological Diversity
CF for LDN	Conceptual Framework for Land Degradation Neutrality
COP	Conference of the Parties
CRIC	Convention Implementation Review Committee
CSOs	Civil Society Organisations
CST	Committee on Science and Technology
DLDD	Desertification, land degradation and drought
ELD	Economics of Land Degradation Initiative
FAO	Food and Agriculture Organization
G20	Group of Twenty: an intergovernmental forum comprising 19 countries and the European Union
GEF	Global Environment Facility
GEF-STAP	Global Environment Facility – Scientific and Technical Advisory Pan
GLII	Global Land Indicators Initiative
GM	Global Mechanism
GSP	Global Soil Partnership
IP	Impact Programs
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IRP	International Resources Panel
ITPS	Intergovernmental Technical Panel on Soils
LDN	Land Degradation Neutrality
NGO	Non-Governmental Organization
SDGs	Sustainable Development Goals
SOC	Soil organic carbon
SPI	Science-Policy Interface
TSP	Target Setting Programme
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Division
WMO	World Meteorological Organization
WP	Work Programme

Figure S1: Flow chart showing how science-based evidence provided by SPI informs the UNCCD through its structure. The blue boxes show the main actors in each specific process and indicate when the SPI is involved. Secr. = Secretariat. Source: Personal communication, UNCCD Secretariat

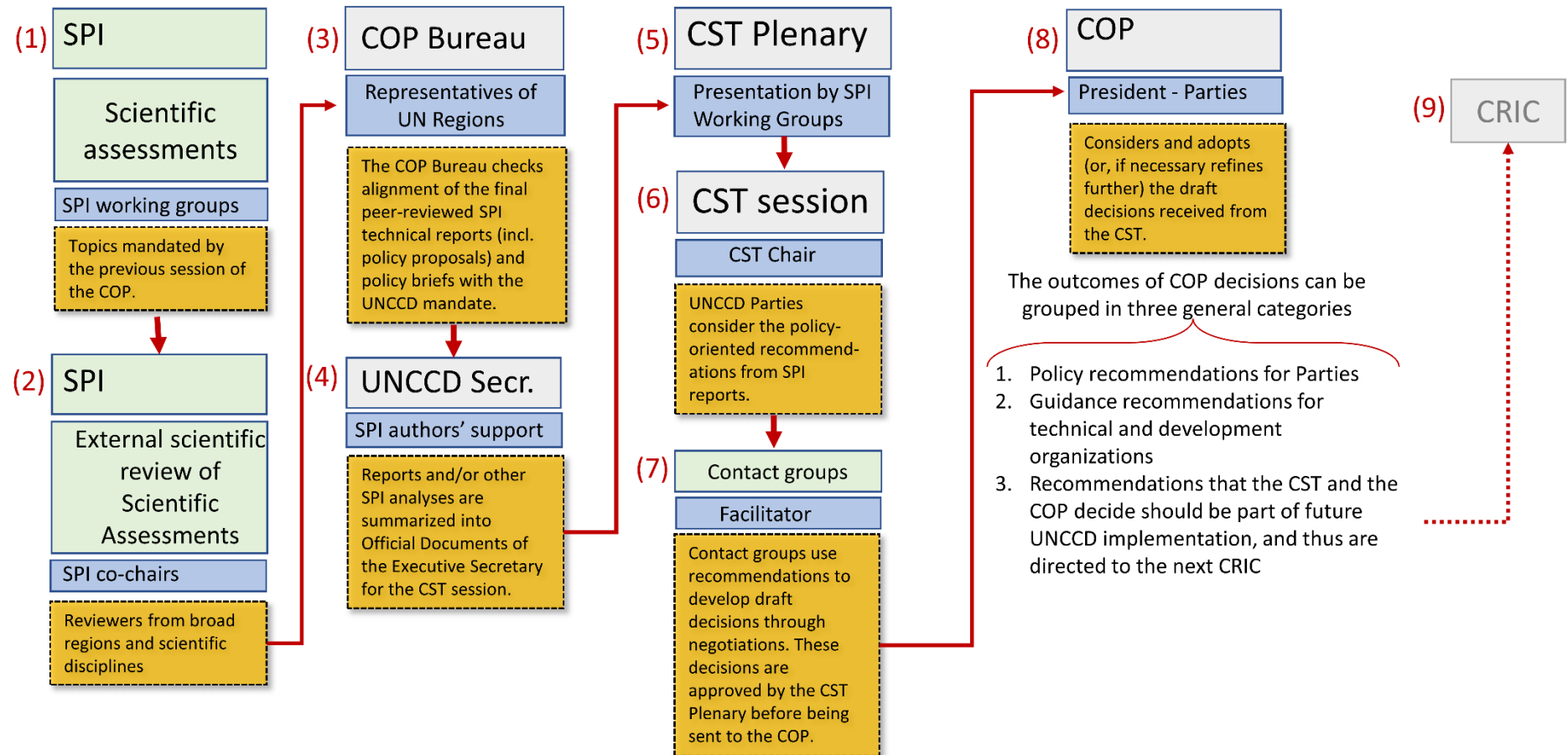


Table S1: Criteria to identify existing relevant frameworks, linked to pertinent articles of the UNCCD.

Source: The Articles of the UNCCD are available here: <https://www.unccd.int/official-documents>

Criterion	Explanation
1	Focus on policy, thus societal, relevance, within the context of the Convention (integrated strategies for improved productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions, in particular at the community level – article 2).
2	Consider the underlying participatory principle that guides the Convention (i.e. decisions on the design and implementation of activities/programs consider the participation of populations and local communities – article 3).
3	Facilitate tracing the impact of results/outputs beyond actions of the COP and its Parties (e.g. COP decisions and National Action Plans), to multiple relevant stakeholders.
4	Underpinned by an integrated and pragmatic approach (article 2 of the UNCCD) that enables collecting qualitative and quantitative evidence: on ‘information, collection, analysis and exchange’ (article 16); evidence of promotion of technical and scientific cooperation through appropriate national, sub-regional, regional and international institutions (article 17).

Table S2: Framework applied to assess SPI processes and products in the UNCCD context. The original quality indicators are highlighted in red. The framework supports the distinction between: "demonstrable output", "demonstrable use" and "demonstrable recognition" to facilitate the collection of evidence. The methodological approach for this paper included redesigning the format to emphasise the SPI's science-policy mandate, and aligned the dimensions under "societal relevance" with our research purpose, while largely retaining the original wording of the dimensions under the "scientific quality" domain. (Adapted from: Royal Netherlands Academy of Arts and Sciences, 2013)

Domain "societal relevance": It assesses the impact of SPI among policymakers, practitioners, civil society organisations (CSOs), and other strategic partners of the UNCCD. Indicators relate to the number of technical reports and policy briefs, demonstrated use of SPI products in UNCCD COP decision-making, national and international action and reporting, and demonstrated contributions on social issues.		
Assessment dimension	Quality indicator	The following methods were applied during the assessment
Demonstrable output that has entered the policy arena and national decisions and actions, including UNCCD strategic stakeholder communities.	<p><i>Sphere of direct policy guidance to support evidence-based policy:</i></p> <p>Contributions to COP decisions: Detailed description of SPI-informed decisions of the UNCCD Conference of the Parties to <i>facilitate a two-way science-policy dialogue and ensure delivery of policy-relevant information, knowledge and advice</i> to UNCCD (section 3.1, Tables S3a-c).</p>	<ol style="list-style-type: none"> Analyses of the COP requests outlined in the adopted biennial SPI work programmes for synthesising scientific knowledge and activities; Identification of key findings emerging from the corresponding SPI technical reports and associated policy briefs provided for the biennial periods (2014-2015; 2016-2017; 2017-2019) at: https://knowledge.unccd.int/science-policy-interface/spi-publications; Analyses of the consideration of scientific and technical findings from SPI technical reports in documents prepared by the Committee on Science and Technology (CST), the Committee on the Review of the Implementation of the Convention (CRIC), and the Global Mechanism (GM). The official working and information documents prepared for the COP deliberations officially available at: www.unccd.int/official-documents; Analyses of the consideration of the scientific and technical proposals in the COP decisions and their further development in successive sessions of the COP, including the evaluation of their impacts on consecutive SPI work programmes. For this reason, decisions from COP 11 (2013), COP 12 (2015), COP 13 (2017), and COP 14 (2019) were analysed.
	Demonstrable impacts of the SPI in furthering UNCCD Strategic Partnership-Building with	A hybrid approach was adopted to assess other dimensions listed in this table: (a) identify and analyse the demonstrable

	<p>international organisations, including science-policy bodies (section 3.2, Tables S4a-c).</p> <p>Demonstrable utilisation of SPI products by UNCCD Parties (politicians and policymakers) and by professionals in the UN policy arena (section 3.3, Table S5 and Table S6a).</p>	<p>impact of SPI in promoting the development of UNCCD strategic partnership with international organisations, including science-policy bodies (Tables S4a-c), (b) the demonstrable use of SPI products by UNCCD Parties and by professionals in the UN policy arena (Table S5), and (c) assess SPI's demonstrable engagement with other organisations and the utilisation of its products by professionals outside the immediate UNCCD domain (Tables S7a-c). This is because no systematic monitoring of evidence of the use of SPI products was available. Therefore, in addition to the analysis of COP decisions, CST, CRIC, GM, and SPI documents, an extensive online search of ongoing initiatives and publications of the UNCCD, its strategic partners and other organisations were conducted. This search included, in particular, activities of UNCCD-relevant partners linked to SPI's coordination activities outlined in its biennial work programmes and, in particular, the actions of those organisations, who were actively involved in the UNCCD first scientific conference in 2009.</p>
<p>Demonstrable utilisation by external target groups.</p>	<p><i>Sphere of influence, beyond the direct scope of the UNCCD:</i></p> <p>Demonstrable engagement of SPI with other organisations and the utilisation of its products by professionals beyond its coordination activities (e.g. contributions to or citations in specialist journals, development of guidelines or concepts, textbooks, keynotes, panel, organisation of workshops ...) (section 3.4 Tables S7 a-c).</p>	<p>In addition, written and oral interviews were conducted with the UNCCD Secretariat, CRIC, and GM, as well as with former and current SPI members to confirm information obtained from the online search.</p> <p>A major effort was made to review the 98 UNCCD GM national target setting reports against a set of direct and indirect criteria derived from the CF for LDN to analyse whether the scientific evidence provided by the SPI supports national target setting activities. Tables S6 a-b feature the results of this analyses.</p> <p>In addition, documents prepared for and discussions at the nineteenth session of the CRIC in March 2021 addressing the effective implementation of the Convention at national, subregional and regional levels were assessed.</p>

Table S3a: Detailed description of SPI-informed decisions of the UNCCD conference of the Parties at its 12th session (COP 12) - based on the implementation of the SPI work programme 2014-2015

Decisions requesting contribution by the SPI UNCCD COP 11, 2013. Report of the Conference of the Parties on its eleventh session (UNCCD, 2013b) ICCD/COP(11)/23/Add.1	Resulting Objectives and outputs of the SPI work programme 2014–2015	CST working documents co-developed by the Bureau of the CST in conjunction with the SPI and with technical support of the secretariat	SPI informed COP decisions UNCCD COP 12, 2015. Report of the Conference of the Parties on its twelfth session. (UNCCD, 2016) ICCD/COP(12)/20/Add.1
<p>Decision 23/COP.11 The Bureau of the CST was requested to develop and adopt the terms of reference of the SPI. This included the following aspects: The SPI will be responsible for developing the work programme for its first biennium of operation (2014–2015), and present a draft work programme for the biennium 2016–2017 to the CST for submission to the COP for approval/ endorsement.</p> <p>In its elaboration of the terms of references for the SPI, the Bureau of the CST considered following decisions:</p> <p>Decision 8/COP.11 The importance of identifying synergies to avoid duplication among the Rio conventions, other international bodies, and agencies addressing environment and development issues.</p> <p>Decision 22/COP.11 Requested advice on how best measure progress on strategic objectives 1, 2 and 3 of The Strategy Decision 11/COP.11 on collaboration with the Global Environment Facility.</p>	<p>Objective 1: Bring to the other Rio conventions the scientific evidence for the contribution of sustainable land use and management to climate change adaptation/mitigation and to safeguarding biodiversity and ecosystem services. In: ICCD/COP(12)/CST/6</p>	<p>Refinement of the UNCCD monitoring and evaluation framework in view of the post-2015 development agenda: strategic objectives 1, 2 and 3 – Note by the secretariat ICCD/COP(12)/CST/3-ICCD/CRIC(14)/7</p> <p>Monitoring the contribution of sustainable land use and management to climate change adaptation/ mitigation and to the safeguarding of biodiversity and ecosystem services – Note by the secretariat ICCD/COP(12)/CST/INF.1</p>	<p>Decision 3/COP.12 The SPI contributed to this decision through its collaboration with the Intergovernmental Working Group (IWG) established to develop a science-based definition of LDN. The definition was endorsed by the same decision.</p> <p>Decision 9/COP.12 Decision 15/COP.12: The SPI contributed to these decisions through its work on the development and refinement of indicators that should: (1) leverage synergies among the Rio conventions and promote partnerships with other international agencies and bodies, (2) Improve procedures for communication of information as well as the quality and formats of reports to be submitted to the Conference of the Parties.</p>

<p>Decision 23/COP.11</p> <p>The SPI was mandated to analyse, synthesise and translate relevant scientific findings and recommendations from desertification/land degradation and drought-related scientific conferences, including upcoming UNCCD scientific conferences, the roster of independent experts, as well as from relevant stakeholders and networks into proposals to be considered by the Committee on Science and Technology for the consideration of the Conference of the Parties.</p>	<p>Objective 2: Increase the effectiveness of the UNCCD scientific conferences in delivering policy-relevant information, knowledge and recommendations. In: ICCD/COP(12)/CST/6</p>	<p>Report of the Committee on Science and Technology on its fourth special session, held in Cancun, Mexico, from 9 to 12 March 2015 ICCD/CST(S-4)/3</p> <p>Outcomes and policy-oriented recommendations of the UNCCD 3rd Scientific Conference - Report by the Bureau of the Committee on Science and Technology:</p> <p>Improving the efficiency of the Committee on Science and Technology, including impacts from the previous conferences and recommendations for future institutional arrangements - Note by the secretariat ICCD/COP(12)/CST/4</p> <p>Science-Policy Interface: progress report and work programme 2016-2017 - Note by the secretariat ICCD/COP(12)/CST/6</p>	<p>Decision 18/COP.12</p> <p>The outcomes of the UNCCD 3rd Scientific Conference had a direct impact on the objectives and coordination activities of the SPI work programme 2016-2017.</p> <p>Decision 19/COP.12</p> <p>Decisions on improvement on the efficiency of the CST led to substantial a re-organisation of how science enters the UNCCD, and also extended SPI's mandate as contained in decision 23/COP.11, which enabled the SPI to provide the CST with thematic guidance on scientific knowledge requirements and also enabling the SPI to identify the most optimal way forward to address these knowledge requirements.</p> <p>Decision 21/COP.12</p> <p>Adoption of the SPI work programme for the biennium 2016-2017 which included three objectives as follows: (1) providing scientific guidance to the operationalisation of the voluntary land degradation neutrality (LDN) target; (2) highlighting the science-based synergistic potential of sustainable land management (SLM) practices to address DLDD, climate change mitigation and adaptation; and (3) encouraging the development and implementation of specific rehabilitation, restoration and reclamation measures and practices in degraded lands.</p> <p>Coordination activities of the SPI were extended under the work programme 2016-2017, including continuity in existing collaboration (IPBES, ITPS, GLO), and the initiation and coordination of new collaboration (IPCC).</p> <p>Decision 22/COP.12</p> <p>Roster of independent experts to act as reviewers of science-based products elaborated under the supervision of the SPI.</p> <p>Decision 23/COP.12</p>
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<p>Decision 23/COP.11 Mandate provided to the SPI to interact with existing multiple scientific mechanisms, in particular the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Intergovernmental Panel on Climate Change and Intergovernmental Technical Panel on Soil and other new and existing scientific networks and platforms; and (iv) assist the Bureau of the Committee on Science and Technology in organising the UNCCD scientific conferences and assessing their results.</p>	<p>Objective 3: Ensure that the thematic assessment on land degradation and restoration conducted by the Intergovernmental Platform on Biodiversity and Ecosystem Services is of relevance to the UNCCD and its Parties In: ICCD/COP(12)/CST/6</p>	<p>Science-Policy Interface: progress report and work programme 2016-2017 - Note by the secretariat ICCD/COP(12)/CST/6</p>	<p>Decision 21/COP.12 Collaboration with other bodies also informed the SPI work programme for the biennium 2016-2017 to ensure continuity and consolidation of these collaborations. Based on the achievements under the SPI work programme for the biennium 2014-2015, the SPI is requested to contribute to the review process of the IPBES LDRA. Furthermore, the Chair of the CST, who is co-chair of the SPI should be supported to participate as observer to the meetings of the IPBES Multidisciplinary Expert Panel.</p>
	<p>Objective 4: Cooperate with the Intergovernmental Technical Panel of Soils process in areas of relevance to the UNCCD and its Parties. In: ICCD/COP(12)/CST/6</p>	<p>Science-Policy Interface: progress report and work programme 2016-2017 - Note by the secretariat ICCD/COP(12)/CST/6</p> <p>Information on the collaboration between the Science-Policy Interface and the Intergovernmental Technical Panel on Soils – Note by the secretariat ICCD/COP(12)/CST/INF.4</p>	

Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: <https://knowledge.unccd.int/science-policy-interface/spi-publications>

Table S3b: Detailed description of SPI-informed CST recommendations which contributed to UNCCD decisions at UNCCD COP 13 - based on the implementation of the SPI work programme 2016-2017

Decisions requesting contribution by the SPI	Resulting Objectives and outputs of the SPI work programme 2016–2017	SPI-informed CST documents	SPI informed COP Decisions
<p>UNCCD COP 12, 2015. Report of the Conference of the Parties on its twelfth session (UNCCD, 2016) ICCD/COP(12)/20/Add.1</p> <p>UNCCD COP 11, 2013. Report of the Conference of the Parties on its eleventh session ICCD/COP(11)/23/Add.1</p>			<p>UNCCD COP 13, 2017.</p> <p>Report of the Conference of the Parties on its thirteenth session (UNCCD, 2017a) ICCD/COP(13)/21/Add.1</p>
<p>Decision 21/COP.12 Work programme of the Science-Policy Interface.</p> <p>Objective 1: Provide scientific guidance to the operationalisation of the voluntary land degradation neutrality (LDN) target.</p>	<p>Technical Report: LDN: Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface</p>	<p>The scientific conceptual framework for land degradation neutrality – Synthesis report by the Science-Policy Interface ICCD/COP(13)/CST/2</p>	<p>Decision 18/COP.13 The scientific conceptual framework for land degradation neutrality is endorsed. Parties pursuing land degradation neutrality are called upon to consider the guidance provided by the scientific conceptual framework.</p> <p>Decision 2/COP.13 Parties are invited to use the concept of LDN as one of the means to foster coherence among national policies, actions and commitments.</p>

<p>Decision 21/COP.12: Work programme of the Science-Policy Interface 2016-2017.</p> <p>Objective 2: Highlight the science-based synergistic potential of sustainable land management (SLM) practices to address DLDD, climate change mitigation and adaptation Full reference to the work programme</p>	<p>Technical Report: SLM: Sustainable Land Management Contribution to Successful Land-Based Climate Change Adaptation and Mitigation</p>	<p>Sustainable land management for addressing desertification/land degradation and drought, climate change mitigation and adaptation - Synthesis report by the Science-Policy Interface ICCD/COP(13)/CST/3</p>	<p>Decision 18/COP.13 Parties are invited to consider the use of locally adapted sustainable land management practices as an effective means to achieving land-based national objectives related to addressing DLDD and LDN. The SPI is requested to continue providing science-based evidence on the contribution of SLM to enhancing the livelihoods and socioeconomic conditions of people affected by DLDD as part of its work programme for 2018-2019.</p>
<p>Decision 21/COP.12 Work programme of the Science-Policy Interface. Objective 3: Encourage the development and implementation of specific rehabilitation, restoration and reclamation measures and practices in degraded lands.</p>		<p>Rehabilitation, restoration and reclamation measures and practices in degraded lands - Synthesis report by the Science-Policy Interface ICCD/COP(13)/CST/4</p>	<p>Decision 18/COP.13 The SPI is requested to further develop cooperation with the International Resource Panel of the United Nations Environment Programme on preparing a report on land restoration and the Sustainable Development Goals, with a particular focus on SDG target 15.3, and to also explore additional opportunities for cooperation that supports the needs of the UNCCD.</p>

<p>Decision 21/COP.12 Work programme of the Science-Policy Interface.</p> <p>Full reference to the work programme regarding coordination activities with IPBES, GLO, ITPS and IPCC</p>	<p>Cooperation with other scientific panels. Report by the Science-Policy Interface ICCD/COP(13)/CST/5</p>	<p>Decision 19/COP.13 Decision 22/COP.13 Within its mandate, the SPI, in close collaboration with the secretariat, was requested by above decisions to continue to contribute to and cooperate with other international scientific panels and bodies dealing with DLDD issues, in particular the IPBES, the IPCC, the ITPS, and the International Resource Panel (IRP) of the United Nations Environment Programme. Furthermore, by decision 19/COP.13 the secretariat was requested to clarify the potential benefits, costs, conditions and procedures for establishing more formal relationships between the SPI and the IPBES, IPCC, ITPS and IRP in order to develop synergies and avoid duplication of efforts. By decision 22/COP.13, the secretariat was also requested to facilitate the involvement of the SPI in steering, developing and reviewing the second edition of the GLO.</p>
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Decision 18/COP.12

Requests the SPI, subject to the availability of resources, to develop policy briefs on policy implications of the latest developments in scientific research relevant to DLDD and land-based adaptation to and mitigation of climate change.

Science-Policy**Brief 01**

(November 2015):
Pivotal Soil
Carbon

Science-Policy**Brief 02**

(September 2016):
Land in Balance

Science-Policy

Brief 03 (August
2017): Sustainable
Land
Management for
climate and
People

<p>Decision 23/COP.11 Decision 19/COP.12 Decision 21/COP.12 The SPI is requested to provide the CST with clear and well-defined thematic guidance on scientific knowledge requirements (e.g. thematic assessments, scientific studies and/or user guides) for implementing the UNCCD.</p>	<p>Work programme for the Science-Policy Interface (2018-2019) - Note by the secretariat ICCD/COP(13)/CST/7</p>	<p>Decision 1/COP.13: The SPI contributes via its work programme 2018-2019 to the UNCCD results framework for 2018-2021 (refinement of the SPI guidance on LDN implementation; preparation of a guidance on land-based interventions for drought management and mitigation; delivering on UNCCD priorities and concerns to scientific processes under other conventions).</p> <p>Decision 7/COP.13 At the request of the COP, the CST will provide, with input from the SPI, scientific advice for the assessment and implementation of the Convention and the UNCCD 2018-2030 strategic framework.</p> <p>Decision 19/COP.13 Requests the SPI to submit through the secretariat a proposal for its work programme for consideration at each regular CST session, with a focus on one or two broad, globally relevant priority topics related to DLDD.</p> <p>Decision 21/COP.13 Adoption of the SPI work programme for the biennium 2018–2019, as contained in the annex to this decision.</p>
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Decision 29/COP.13

The SPI is requested to provide technical guidance to Parties in order to support the adoption and implementation of land-based interventions for drought management and mitigation.

Decision 19/COP.12

Any scientific output prepared under the supervision of the SPI should undergo an international, independent review process; and that any output published under the name of the UNCCD should be reviewed by the Bureau of the Conference of the Parties prior to publication.

In response, the following SPI technical reports developed in the biennium 2017-2018 underwent a three-phase review process prior to their use by the CST Bureau to develop recommendations:

Technical Report:

LDN: Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface and the

Technical Report:

SLM: Sustainable Land Management Contribution to Successful Land-Based Climate Change Adaptation and Mitigation
The review process was developed and implemented by the SPI co-chairs in conjunction with the CST Bureau and with the technical support of the secretariat, and considered all aspects outlined under Decision 19/COP.12.

<p>Decision 19/COP.12 Future sessions of the CST should be organised in such a way to facilitate a dialogue between the Parties and the SPI regarding the policy implications of the scientific outputs and to enable the formulation of policy-relevant recommendations.</p>	<p>Proposals and recommendations emerging from outputs resulting from the SPI work programme for the biennium 2016–2017 were also presented at the 13th session of the CST to facilitate dialogue between the Parties and the SPI. See items 2 and 3 of the provisional Agenda and annotations (ICCD/COP(13)/CST/1)</p>	<p>Decision 35/COP.13 The Programme of work for the fourteenth session of the COP includes an item on linking scientific knowledge with decision-making to be prepared by the CST.</p>
<p>Decision 19/COP.12 CST, with the support of the SPI, should regularly monitor the short, medium and long-term impacts of the scientific work carried out for the UNCCD.</p> <p>Decision 23/COP.11 specified that SPI will function up to the end of the thirteenth session of the COP, at which point it will be reviewed.</p> <p>Decision 23/COP.12 The thirteenth session of the CST should focus, inter alia, on the review of the work conducted by the SPI during the biennium 2016–2017 and on its overall achievements since its establishment in order to decide on the future functioning of the SPI.</p>	<p>Review of the Science-Policy Interface and its achievements – Note by the secretariat ICCD/COP(13)/CST/6</p> <p>Review of the Science-Policy Interface and its achievements – Note by the secretariat, Addendum ICCD/COP(13)/CST/6/Add.1</p>	<p>Decision 19/COP.13 The good performance of the SPI in implementing its 2016–2017 work programme and the significant progress made by the SPI towards achieving the objectives that were set for it was noted with appreciation. A Decision was adopted to continue the SPI and to extend its current mandate, as defined in decisions 23/COP.11 and 19/COP.12 up to the end of the sixteenth session of the COP (2023). By the same decision, the Bureau of the CST was asked to define the staged renewal of SPI membership.</p>

Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: <https://knowledge.unccd.int/science-policy-interface/spi-publications>

Table S3c: Detailed description of SPI-informed CST Recommendations which contributed to UNCCD Decisions at UNCCD COP 14 - based on the implementation of the SPI work programme 2018-2019

Decisions requesting contribution by the SPI	Resulting SPI actions and deliverables in the biennium 2018–2019	Resulting SPI-informed CST documents	SPI informed COP decisions
UNCCD COP.13, 2017. Report of the Conference of the Parties on its thirteenth session. (UNCCD, 2017a) ICCD/COP(13)/21/Add.1			UNCCD COP.14, 2019. Report of the Conference of the Parties on its fourteenth session. (UNCCD, 2019a) ICCD/COP(14)/23/Add.1

<p>Decision 1/COP.13 Decision 7/COP.13 Decision 18/COP.13 Decision 21/COP.13 The SPI work programme 2018-2019 included:</p> <p>Objective 1: Provide refined guidance for implementation of LDN.</p> <p>1.1 Provide advice on the design and implementation of LDN-related policies and initiatives that bring about multiple environmental and development benefits and synergies with other Rio conventions, in particular for climate change adaptation and mitigation actions.</p> <p>1.2 Provide science-based evidence on the potential contribution of LDN to enhancing the well-being and livelihoods as well as the environmental conditions of people affected by desertification/land degradation and drought.</p>	<p>Technical Report: Realising the Carbon Benefits of Sustainable Land Management Practices</p> <p>Technical Report: Creating an Enabling Environment for Land Degradation Neutrality</p> <p>Policy-oriented recommendations resulting from guidance for the implementation of land degradation neutrality, under sub-objectives 1.1 and 1.2 of the Science-Policy Interface work programme for the biennium 2018–2019 – Synthesis report by the Executive Secretary ICCD/COP(14)/CST/2</p> <p>Policy-oriented recommendations resulting from guidance for the implementation of land degradation neutrality, under sub-objectives 1.1 and 1.2 of the Science-Policy Interface work programme for the biennium 2018–2019 – Synthesis report by the Executive Secretary ICCD/COP(14)/CST/2</p>	<p>Decision 3/COP.14 SPI informed efforts to integrate SDG 15 and related target 15.3 into the implementation of the UNCCD by outlining aspects relevant for the creation of an enabling environment for the achievement of LDN, including responsible governance of land and tenure security, and the engagement of stakeholders.</p> <p>Decision 13/COP.14 The SPI is requested to contribute to the synthesis report on relevant case studies on LDN implementation.</p> <p>Decision 16/COP.14 SPI's work under its objectives 1.1 and 1.2 are the basis for the invitation to Parties to work on science-policy aspects relating to the creation of an enabling environment for LDN, and leveraging sustainable land-use activities and land-use planning for enhancing soil organic carbon and increasing land productivity.</p> <p>Decision 18/COP.14 The work carried out in the biennium 2018-2019 inspired the formulation of objectives and deliverables of SPI's Work programme for the biennium 2020-2021.</p> <p>Decision 26/COP.14 Addressing land tenure, this decision welcomes specifically the technical report of the SPI on 'creating an enabling environment for LDN'.</p>
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<p>Decision 1/COP.13 Decision 7/COP.13 Decision 21/COP.13 Decision 29/COP.13 The SPI work programme 2018-2019 included: Objective 2: Based on a review of existing synthesis reports and, if necessary, referring to primary literature, provide guidance to support the adoption and implementation of land-based interventions for drought management and mitigation.</p>	<p>Technical Report: The Land-Drought Nexus</p> <p>Policy-oriented recommendations resulting from guidance for the adoption and implementation of land-based interventions for drought management and mitigation, under objective 2 of the Science-Policy Interface work programme for the biennium 2018–2019 - Synthesis report by the Executive Secretary ICCD/COP(14)/CST/3</p> <p>Outcomes of the work of the Committee on Science and Technology on a monitoring framework for the strategic objective on drought - Note by the secretariat ICCD/COP(14)/CST/7-ICCD/CRIC(18)/4</p>	<p>Decision 11/COP.14 A monitoring framework for the strategic objective on drought (strategic objective 3) is adopted. Decision 23/COP.14, encourages Parties to use the indicators for the drought strategic objectives recommended by the SPI.</p> <p>Decision 17/COP.14 Recognising the strong linkages between land use and drought and that the management of both land and drought is fundamentally connected through water use, the Parties are invited to support the adoption and implementation of land-based interventions for drought management and mitigation, by providing a broad and inclusive range of options. Furthermore, the SPI is requested to work, as appropriate, with the FAO, UNEP, WMO and other relevant organisations in the context of Integrated Drought Management Programme, and to create a common understanding e.g. of definitions.</p> <p>Decision 18/COP.14 Notably, a new coordination activity under the SPI work programme 2020-2021 has been introduced to initiate cooperation with the Integrated Drought Management Programme (IDMP), a joint initiative of the World Meteorological Organization and the Global Water Partnership on scientific issues related to drought.</p> <p>Decision 23/COP.14 Addressing policy advocacy on drought, the SPI is to become a member of the newly established intergovernmental working group on effective policy and implementation measures for addressing drought under the UNCCD.</p>
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<p>Decision 18/COP.12 Requests the SPI, subject to the availability of resources, to develop policy briefs on policy implications of the latest developments in scientific research relevant to DLDD and land-based adaptation to and mitigation of climate change; Also requests the secretariat to support the SPI by providing it with information about ongoing activities which are relevant for the development of policy briefs.</p>	<p>Science-Policy Brief 04 (September 2019): Tools for Soil Organic Carbon Estimation and Management</p> <p>Science-Policy Brief 05 (September 2019): Shaping an Enabling Environment for Land Degradation Neutrality</p> <p>Science-Policy Brief 06 (September 2019): Land Management and Drought Mitigation</p>	
<p>Decision 19/COP.13 Decision 21/COP.13 Decision 22/COP.13 The SPI work programme 2018-2019 included: Coordination activity 1: Follow up on the land degradation and restoration assessment (LDRA) conducted by the IPBES, and review the IPBES Global Assessment of Biodiversity and Ecosystem Services and its associated summary for policymakers if this report is available in time for the SPI to complete the review.</p>	<p>Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies - Report by the Executive Secretary ICCD/COP(14)/CST/4</p>	<p>Decision 11/COP.14 The SPI is encouraged, in its review of the IPBES Land Degradation and Restoration Assessment, to update the CST on direct and indirect drivers of land degradation and compare this review with the information reported by country Parties.</p> <p>Decision 18/COP.14 Work programme of the Science-Policy Interface for the biennium 2020-2021.</p> <p>Decision 19/COP.14 Continuation of collaboration under the SPI work programme for the biennium 2020-2021, in accordance with the procedures established by IPBES.</p> <p>Decision 20/COP.14 This decision also requested the secretariat to clarify the potential benefits, costs, conditions and procedures for establishing more formal relationships between the SPI and the IPBES, IPCC, ITPS and IRP in order to develop synergies and avoid duplication of efforts.</p>

Decision 19/COP.13 Decision 21/COP.13 Decision 22/COP.13 The SPI work programme 2018-2019 included: Coordination activity 2: Strengthen cooperation with the IPCC within the framework of its Agenda, particularly regarding its special report on climate change and land (SRCCL) and its Sixth Assessment Report (AR6).	Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies - Report by the Executive Secretary ICCD/COP(14)/CST/4	Decision 18/COP.14 Work programme of the Science-Policy Interface for the biennium 2020-2021. Decision 19/COP.14 Continuation of collaboration under the SPI work programme for the biennium 2020-2021.
Decision 19/COP.13 Decision 21/COP.13 Decision 22/COP.13 The SPI work programme 2018-2019 included: Coordination activity 3: Follow up on current cooperation and explore future means and topics for cooperation with the ITPS.	Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies - Report by the Executive Secretary ICCD/COP(14)/CST/4	Decision 16/COP.14 Technical partners specialising in SLM, in collaboration with relevant scientific and technical bodies (e.g. ITPS) and in conjunction with the SPI, are invited to design a framework for the management of soil organic carbon for LDN to support investment decisions. Relevant technical partners are also invited to develop/refine soil organic carbon estimation tools/models for application in LDN assessments on sites where detailed measurements of soil organic carbon are not available or not cost-effective. Decision 18/COP.14 Work programme of the Science-Policy Interface for the biennium 2020-2021 Decision 19/COP.14 Continuation of collaboration under the SPI work programme for the biennium 2020-2021
Decision 19/COP.13 Decision 18/COP.13 Decision 21/COP.13 The SPI work programme 2018-2019 included: Coordination activity 4: Cooperate with the IRP / UNEP on preparing a report on land restoration and the SDGs.	Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies - Report by the Executive Secretary ICCD/COP(14)/CST/4	Decision 18/COP.14 Work programme of the Science-Policy Interface for the biennium 2020-2021. Decision 19/COP.14 Continuation of collaboration under the SPI work programme for the biennium 2020-2021.

<p>Decision 21/COP.13 Decision 22/COP.13 The SPI work programme 2018-2019 included: Coordination activity 5: Contribute to the possible development of a second edition of the Global Land Outlook (GLO 2) and other UNCCD science-based communications, as appropriate.</p>		<p>Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies - Report by the Executive Secretary ICCD/COP(14)/CST/4</p>	<p>Decision 18/COP.14 Continuation of collaboration under the SPI work programme for the biennium 2020-2021.</p>
<p>Decision 21/COP.13 The SPI work programme 2018-2019 included: Coordination activity 6: Cooperate with the Global Land Indicators Initiative (GLII) of the United Nations Human Settlements Programme to ensure the harmonisation of land indicators developed by the GLII to measure tenure security, with land indicators used for measuring progress towards LDN.</p>		<p>Policy-oriented recommendations resulting from the cooperation with other intergovernmental scientific panels and bodies - Report by the Executive Secretary ICCD/COP(14)/CST/4</p>	<p>Decision 18/COP.14 Work programme of the Science-Policy Interface for the biennium 2020-2021.</p> <p>Decision 19/COP.14 Continuation of collaboration under the SPI work programme for the biennium 2020-2021.</p>
<p>Decision 23/COP.13 The Programme of work for the fourteenth session of the CST is organised in such a way to facilitate a thematic dialogue between the Parties and the SPI regarding the policy implications of the scientific outputs, and to enable the formulation of policy-relevant recommendations.</p>		<p>Proposals and recommendations emerging from outputs of the SPI work programme for the biennium 2018–2019, were also presented orally at the fourteenth session of the CST to facilitate dialogue between the Parties and the SPI. See items 2 and 3 of the provisional Agenda and annotations ICCD/COP(14)/CST/1</p>	<p>Decision 21/COP.14 The fifteenth session of the CST should be organised in such a way as to facilitate a thematic dialogue between the Parties and the SPI regarding the policy implications of the scientific outputs, and to enable the formulation of concise policy-relevant recommendations.</p>
<p>Decision 31/COP.13 The SPI is invited, subject to the availability of resources, to consider the issue of sand and dust storms as part of its work programme and contribute to the review and, as appropriate, the development of a UNCCD science-based communication on sand and dust storms.</p>			<p>Decision 1/COP.14 Main outputs 2020-2021 under the multi-year workplan for the Convention institutions (2020-2023) includes an item on supporting the SPI in providing guidance for assessing and monitoring the resilience of vulnerable populations and ecosystems to drought.</p>

<p>Decision 23/COP.11 Decision 19/COP.12 Decision 21/COP.12 Decision 19/COP.13</p> <p>The SPI was invited to provide the CST with clear and well-defined thematic guidance on scientific knowledge requirements (e.g. thematic assessments, scientific studies and/or user guides) for implementing the UNCCD.</p>	<p>Work programme of the Science-Policy Interface (2020–2021) - Note by the secretariat ICCD/COP(14)/CST/6</p>	<p>Decision 1/COP.14 Main outputs in 2020-2021, under the multi-year workplan for the Convention institutions (2020-2023), include support for the SPI in delivering UNCCD priorities and concerns to scientific processes and other conventions, specifically on:</p> <ol style="list-style-type: none"> (1) Support for the SPI in providing further guidance on LDN implementation; (2) Support for the SPI in providing guidance for assessing and monitoring the resilience of vulnerable populations and ecosystems to drought. <p>Decision 18/COP.14 The SPI work programme for the biennium 2020-2021 includes objectives that provide scientific evidence of the potential contribution of integrated land use planning and integrated land scape management to transformative change to achieve LDN, and science-based evidence on the resilience of vulnerable populations and ecosystems to drought, also considering climate change.</p> <p>Decision 21/COP.14 The fifteenth session of the CST should focus, inter alia, on the objectives and coordination activities identified in the work programme of the SPI for the biennium 2020-2021.</p>
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<p>Decision 19/COP.13 The COP.13 decided to extend the mandate of the SPI up to the end of the sixteenth session of the COP. The Bureau of the CST was asked to define the staged renewal of SPI membership.</p>	<p>The Science-Policy Interface, the UNCCD Knowledge Hub, and the analysis, dissemination and accessibility of best practices. ICCD/COP(14)/CST/5</p>	<p>Decision 19/COP.14 The “good performance of the SPI” was noted with appreciation, and the Bureau of the CST was requested to refine the SPI renewal procedures. By the same decision, the secretariat was requested to continue the mobilisation of resources for the effective functioning of the SPI.</p> <p>Decision 24/COP.14 The SPI was also requested to continue supporting the UNCCD country Parties on gender mainstreaming and the implementation of the Gender Action Plan.</p>
<p>Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: https://knowledge.unccd.int/science-policy-interface/spi-publications</p>		

Table S4a: Demonstrable impacts of the SPI in furthering UNCCD Strategic Partnership-Building with international organisations, including science-policy bodies under its Coordination Activities 2014 – 2015

Biennium 2014-2015	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership- Building with International Organizations, including science-policy bodies under its Coordination Activities	Source
1. Ensuring that the thematic assessment on land degradation and restoration conducted by the IPBES is of relevance to the UNCCD and its Parties (Objective 3)	1.1	IPBES invited the Chair of the CST Bureau, who is also co-chair of the SPI to attend the joint meetings of the IPBES Bureau and the Multidisciplinary Expert Panel during the biennium 2014-2015.	ICCD/COP(12)/CST/6 Information provided by the UNCCD Secretariat and the SPI
	1.2	The Bureau of the CST, with support of the SPI, prepared an input document for the Land Degradation and Restoration Assessment (LDRA) in response to decision 23/COP.11 which requested the SPI to ensure that the thematic assessment on land degradation and restoration conducted by IPBES is relevant to the UNCCD and its Parties.	
	1.3	In preparation for the third IPBES plenary, the Bureau of the CST, supported by the SPI, developed an analysis of the LDRA process, including recommendations relevant for future UNCCD–IPBES interactions.	
	1.4	In consultation with the SPI Co-Chairs and the Bureau of the CST, the UNCCD secretariat responded to the IPBES call in February 2015 for experts for the LDRA by encouraging experts who also had experience on desertification to submit their application as experts nominated by the UNCCD.	
	1.5	The SPI - under the guidance of the CST - proposed further contributions to the LDRA under the second SPI work programme. This proposal was considered by decision 21/COP.12.	
2. Cooperating with the ITPS in areas of	2.1	At its founding meeting, the SPI started discussing options for	ICCD/COP(12)/CST/6

Biennium 2014-2015	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership- Building with International Organizations, including science-policy bodies under its Coordination Activities	Source
relevance to the UNCCD and its Parties (Objective 4)		collaboration between SPI and ITPS, leading to immediate discussions with the Chair of the ITPS on means to (a) warrant regular exchange of information, (b) avoid duplications of efforts, and (c) support synergies in action for the benefit of both science advisory bodies.	ICCD/COP(12)/CST/INF.4 ICCD/CRIC(14)/3 Information provided by the UNCCD Secretariat and the SPI
	2.2	The SPI delivered an initial message to the 2 nd Plenary Assembly (21-24 July, 2014) of the Global Soil Partnership (GSP).	
	2.3	The first joint SPI-ITPS meeting took place at the margins of the 3 rd Global Soil Week (20-23 April 2015 with the support of the Institute for Advanced Sustainability Studies (IASS) to discuss future collaboration mechanisms and topics against the background of the mandates of both bodies. Three major topics for collaboration were identified: (a) SDG 15.3, (b) indicators addressing soil and land issues to support the implementation of the three Rio conventions, and (c) soil organic carbon.	
	2.4	Collaboration between SPI and ITPS under the first work programme initiated the SPI - under the guidance of the CST - to propose exploring further means of collaboration with the Intergovernmental Technical Panel on Soils (ITPS) under the second SPI work programme in the biennium 2016-2017. This proposal was considered by decision 21/COP.12.	Information provided by the UNCCD Secretariat and the SPI
3. Identifying collaboration pathways with the Intergovernmental Panel on Climate Change (IPCC) in	3.1	The SPI, in conjunction with the CST Bureau provided scientific input to the development of a UNCCD proposal to the Intergovernmental Panel on Climate Change for a Special Report on Climate Change and Land	ICCD/COP(12)/CST/6 ICCD/COP(12)/CST/2 ICCD/CRIC(14)/3

Biennium 2014-2015	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership- Building with International Organizations, including science-policy bodies under its Coordination Activities	Source
areas related to climate change and desertification		Degradation. At the request of the secretariat and the CST Bureau, the discussions of the IPCC at its 41st Session (February 2015) on the possibilities of developing a special report on 'climate change and desertification' were evaluated by the SPI. Decision 21/COP.12 requested the SPI - under the guidance of the CST – to initiate and coordinate interactions between UNCCD and the IPCC to address the linkages between climate change and land degradation as part of the second SPI work programme in the 2016-2017 biennium. Decision 21/COP.12 was also informed by the outcomes and policy-oriented recommendations of the UNCCD 3rd Scientific Conference in 2015, and an Impulse Report designed to inform the deliberations of that conference.	Reed, M. S.; Stringer, L. C. (2015). Impulse Report – Climate change and desertification: Anticipating, assessing & adapting to future change in drylands Information provided by the UNCCD Secretariat and the SPI

Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: <https://knowledge.unccd.int/science-policy-interface/spi-publications>

Table S4b: Major aspects on demonstrable impacts of the SPI in furthering UNCCD Strategic Partnership- Building with international organisations, including science-policy bodies under its Coordination Activities 2016 – 2017

Biennium 2016-2017	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership-Building with International Organisations, including science-policy bodies under its Coordination Activities	Source
1. Ensuring that the thematic assessment on land degradation and restoration conducted by the IPBES is of relevance to the UNCCD and its Parties.	1.1	Following the IPBES call for nominations, two SPI members and one observer to the SPI were nominated by their respective governments or organisations and were part of the IPBES expert group that developed the LDRA.	ICCD/COP(13)/CST/5 ICCD/COP(13)/CST/INF.1 Information provided by the UNCCD Secretariat and the SPI
	1.2	The Chair of the CST and SPI provided collective input to the First Order Draft of the LDRA (10 May – 18 July 2016, including a summary of the views to ensure that the LDRA will be of relevance to the UNCCD process and the needs of Parties.	
	1.3	The SPI and the CST submitted comments on the Second Order Draft of the LDRA (1 May – 26 June 2017).	
2. Cooperating with the ITPS in areas of relevance to the UNCCD and its Parties.	2.1	In March 2016, the Chair of the CST and Co-chair of the SPI participated in the fifth working session of the ITPS. At this meeting the ITPS, SPI and IPCC agreed on a common interest in organising a scientific event on soil organic carbon (SOC).	ICCD/COP(13)/CST/5 Information provided by the UNCCD Secretariat and the SPI
	2.2	The Global Symposium on Soil Organic Carbon was held from 21 -23 March 2017 in Rome, Italy (Organisers: The Food and Agriculture Organization of the United Nations (FAO, the ITPS/GSP, the IPCC, the SPI and the World Meteorological Organization (WMO). Overall aim of the symposium: Role of soils and SOC in the context of climate change, sustainable development and LDN. The results of the symposium were to provide evidence for IPCC assessments	

Biennium 2016-2017	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership-Building with International Organisations, including science-policy bodies under its Coordination Activities	Source
		(e.g. 6 th assessment cycle, reporting to the UNFCCC, the UNCCD and SDGs. SPI contributed to the symposium report entitled “Unlocking the potential of soil organic carbon”.	
3. Identifying collaboration pathways with the Intergovernmental Panel on Climate Change (IPCC) in areas related to climate change and desertification.	3.1	At its 43 rd session, in April 2016, the IPCC decided to prepare a Special Report on Climate Change, Desertification, Land Degradation, SLM, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems (SRCCL). Against this background, the SPI contributed to the answering of an IPCC questionnaire that was also sent to the UNCCD by the IPCC, as well as to a conference call on 13 th January 2017 in advance of the IPCC scoping meeting for the report to obtain input on the structure and content of the report to ensure that it would be relevant to the UNCCD and its Parties.	ICCD/COP(13)/CST/5 Information provided by the UNCCD Secretariat and the SPI
	3.2	Members of the SPI were invited in their individual capacities to the scoping meeting for the IPCC SRCC (13-16 February 2017, Dublin, Ireland).	
	3.3	SPI participated in the expert meeting on climate change, land use and food security (23-25 January 2017 in Rome, Italy), co-organised by FAO and IPCC to provide technical support to the scoping meeting for the SRCCL. SPI's roles included keynote talks, session moderation and participation in panels.	
	3.4	Together with a representative of the UNCCD secretariat, the SPI contributed to the scoping meeting for the SRCCL, which took place in Dublin, Ireland, from 13 to 16 February 2017. The resulting draft scoping paper was approved at the 45 th Session of the	

Biennium 2016-2017	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership-Building with International Organisations, including science-policy bodies under its Coordination Activities	Source
		IPCC in Guadalajara, Mexico (28-31 March 2017).	
	3.5	In April 2017, the IPCC issued a call for nominations experts to serve as authors and review editors of the SRCCL. The SPI supported the CST Bureau in nominating five SPI members and observers and five independent experts.	ICCD/COP(13)/CST/5 Information provided by the UNCCD Secretariat and the SPI

Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: <https://knowledge.unccd.int/science-policy-interface/spi-publications>

Table S4c: Major aspects on demonstrable impacts of the SPI in furthering UNCCD Strategic Partnership-Building with international organisations, including science-policy bodies under its Coordination Activities 2018 – 2019

Biennium 2018-2019	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership-Building with International Organisations, including science-policy bodies under its Coordination Activities	Source
1. Follow up on the land degradation and restoration assessment (LDRA) conducted by the Intergovernmental Science–Policy Platform on Biodiversity and Ecosystems Services (IPBES), and review the IPBES Global Assessment of Biodiversity and Ecosystem Services and its associated summary for policymakers if this report is available in time for the Science-Policy Interface (SPI) to complete the review.	1.1	The scientific review of the IPBES Assessment Report on Land Degradation and Restoration, and the analyses of the key messages ensured that the assessment was relevant to the UNCCD and contributed to IPBES' understanding of the CF for LDN.	ICCD/COP(14)/CST/4 Information provided by the UNCCD Secretariat and the SPI
	1.2	Scientific review of the IPBES Global Assessment Report on Biodiversity and Ecosystem Services and the associated Summary for Policymakers (SPM) ensured that the assessment was relevant to the UNCCD and contributed to IPBES' insight into the CF for LDN beyond the DLDD scientific community	
	1.3	Scientific and technical support to the UNCCD Secretariat in the preparation of a UNCCD and IPBES <i>memorandum of cooperation</i> that was signed by the executive secretaries of both bodies (18 th January 2019)	
2. Strengthen cooperation with the Intergovernmental Panel on Climate Change (IPCC) within the framework of its Agenda, particularly regarding its special report on climate change and land (SRCCL) and its Sixth Assessment Report (AR6).	2.1	Scientific review of the first and second order drafts of the IPCC Special Report on Climate Change and Land (SRCCL) to ensure that the IPCC Special Report is relevant to the UNCCD, and it contributes to IPCC's insight into the CF for LDN and the SLM concept.	ICCD/COP(14)/CST/4 Information provided by the UNCCD Secretariat and the SPI
	2.2	Development of a plan for the review of the IPCC Sixth Assessment Report, in particular the working group II assessments of impacts, adaptation and vulnerability and the working group III assessment of mitigation of climate in	

Biennium 2018-2019	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership-Building with International Organisations, including science-policy bodies under its Coordination Activities	Source
		accordance with the rules, procedures and timelines of the IPCC.	
3. Follow up on current cooperation and explore future means and topics for cooperation with the Intergovernmental Technical Panel on Soils (ITPS).	3.1	Review of the FAO/ITPS zero-order draft of the International Code of Conduct for the Use and Management of Fertilizers.	ICCD/COP(14)/CST/4 Information provided by the UNCCD Secretariat and the SPI
	3.2	Under the leadership of FAO, co-organisation of the Global Symposium on Soil Erosion (15-17 May 2019, Rome, Italy) with the ITPS, the Global Soil Partnership (GSP and the International Atomic Energy Agency - Establishment of a common platform to present and discuss the latest information on the status of interventions and innovations in the field of soil erosion and related land management.	
4. Cooperate with the International Resources Panel (IRP) of the United Nations Environment Programme on preparing a report on land restoration and the Sustainable Development Goals (SDGs).	4.1	Contribution to the development of the IRP think piece 'Land Restoration for Achieving the SDGs' by drafting chapter 3.7 "Land Restoration for Achieving SDG 7" and Chapter 3.15 on "Land Restoration for Achieving SDG 15".	ICCD/COP(14)/CST/4 Information provided by the UNCCD Secretariat and the SPI
5. Contribute to the possible development of a second edition of the Global Land Outlook (GLO 2) and other UNCCD science-based communications, as appropriate.	5.1	SPI was invited to take a primary role in quality assurance for the second edition of the GLO, and to participate in its scientific review and serve on its steering committee.	ICCD/COP(14)/CST/4 Decision 18/COP.14 Information provided by the UNCCD Secretariat and the SPI
6. Cooperate with the Global Land	6.1	SPI initiated collaboration with the GLII to ensure harmonisation of land	ICCD/COP(14)/CST/4

Biennium 2018-2019	Action	Demonstrable Impact of the SPI in furthering UNCCD Strategic Partnership-Building with International Organisations, including science-policy bodies under its Coordination Activities	Source
Indicators Initiative (GLII) of the United Nations Human Settlements Programme to ensure the harmonisation of land indicators developed by the GLII to measure tenure security, with land indicators used for measuring progress towards LDN.	6.2	indicators to measure tenure security, using land indicators to measure progress towards land degradation neutrality (LDN). The SPI and the GLII identified and agreed on a broad range of entry points for future collaboration relevant to the UNCCD and for GLII (formally signed by both sides and the UNCCD secretariat in August 2018), to inform future collaboration under the SPI work programme 2020-2021.	Information provided by the UNCCD Secretariat and the SPI Decision 18/COP.14 ICCD/COP(14)/23/Add.1 Information provided by the UNCCD Secretariat and the SPI

Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: <https://knowledge.unccd.int/science-policy-interface/spi-publications>

Table S5: Demonstrable utilisation of SPI products by UNCCD Parties and by professionals in the UN policy arena. Products are numbered under each biennium. Numbers do not relate to specific types of product.

Biennium	Product number	Indicator: Demonstrable utilisation of SPI products by UNCCD Parties (Source: Information provided by the UNCCD Secretariat and the SPI)
1. Biennium 2014-2015	1.1	Apart from the impact that the SPI had on UNCCD decisions under its first work programme in 2014-2015, it may have been too early in the process to achieve other demonstrable use of its products by Member Countries.
2. Biennium 2016-2017 and Biennium 2018-2019	2.1	The endorsement of the Conceptual Framework for Land degradation Neutrality, CF for LDN (decision 7/COP.13) developed by the SPI during its work programme 2016-2017 is used by the Global Mechanism to put this concept into action through the UNCCD Parties' voluntary Land Degradation Neutrality Target Setting projects.
	2.2	The SPI CF for LDN informed the goals and commitments for the Decade of Restoration that started in 2021.
	2.3	In collaboration with the GM, the SPI contributed to and coordinated the development of a Checklist for Land Degradation Neutrality Transformative Projects and Programmes (LDN TPP). This tool is meant to assist project developers at country level and their technical and financial partners in designing effective LDN transformative projects and programmes. FAO, a GEF implementing Agency, has directly incorporated this checklist into the design of their recently launched Dryland Restoration Initiative Platform.
	2.4	Contributions to the development of the SDG Indicator 15.3.1: Proportion of land that is degraded over total land area. Conservation International's Trends.Earth, the GEF-funded Tools4LDN project, and the project compliance methodology developed by IDH, the sustainable trade initiative, for the LDN Fund use the SPI's work to measure and track progress on LDN impacts (Information provided in a written [response/interview] by Barron Orr, UNCCD Lead Scientist, on 17 th August 2021). SPI's work on the SDG indicator 15.3.1 was decisive for the international technology innovation competition of the GEO-LDN Initiative to support land use planning through space-based information and in-situ measurements to improve land management. SPI members were part of the steering committee that selected the team to develop software analytics solutions for informed land use decisions at local to national levels.

Table S6a: Results of the review of the UNCCD GM national target setting reports against direct and indirect criteria derived from the CF for LDN to analyse whether the scientific evidence provided by the SPI supports the national targets (the asterisk indicates that additional information is included in Table S6b on particular coding used in the indirect criteria section)

Direct criteria						Indirect criteria			
National LDN Target setting report:	Conceptual Framework for LDN (modular approach)	Response hierarchy			No net loss (neutrality)	Counter-balancing anticipated losses (off-setting; Like-for-like approach)	Rehabilitation / restoration	Integrated land use planning (landscape level)	SLM
		Avoid	Reduce	Reverse					
Egypt	no	yes	no	yes	yes	yes	yes	(yes)	yes
Eritrea	yes	yes	yes	yes	yes	no	yes	no	yes
Kingdom of Eswatini	no	yes	yes	yes	yes	yes	yes	no	yes
Ethiopia	no	yes	yes	yes	no	no	yes	no	yes
Gambia	no	yes	yes	yes	yes	no	no	no	yes
Ghana	no	yes	yes	yes	yes	no	yes	yes	yes
Kenya	no	yes	yes	yes	yes	no	yes	no	yes
Lesotho	no	yes	yes	yes	yes	no	no	no	no
Liberia	yes	yes	yes	yes	yes	no	no (only restore)	no	yes
Malawi	no	yes	yes	yes	yes	no	yes	yes	yes

Mauritius	no	yes	no	yes	no	no	yes	no	yes
Namibia	no	yes	yes	yes	no	no	yes	yes	yes
Nigeria	no	yes	yes	yes	yes	no	yes	yes	yes
Rwanda	no	yes	yes	yes	yes	no	yes	yes	yes
Sierra Leone	no	yes	yes	no	no	no	yes	no	yes
Seychelles	yes	yes	yes	yes	yes	yes	yes	yes	yes
Somalia	no	yes	yes	yes	yes	no	yes	yes	yes
South Africa	yes	yes	yes	yes	yes	no	yes	yes	yes
South Sudan (Republic of)	no	yes	yes	yes	yes	no	yes	Yes	yes
Sudan	no	no	yes	no	yes	no	yes	yes	yes
Tanzania	no	yes	yes	yes	yes	no	no	no	yes
Uganda	yes	yes	yes	yes	yes	no	yes	yes	yes
Zambia	no	yes	yes	yes	yes	no	yes	yes	yes
Zimbabwe	no	yes	yes	yes	yes	no	yes	yes	yes
Bangladesh	yes	yes	yes	yes	yes	no	yes	yes	yes
Bhutan	yes	yes	yes	yes	no	no	yes	no	yes
Cambodia	somewhat	yes	yes	yes	yes	somewhat	yes	not directly*	yes
China	somewhat	yes	yes	yes	no	yes	yes	yes	yes
Indonesia	somewhat	yes	yes	yes	no	yes	yes	yes	yes
Iraq	somewhat	yes	yes	yes	no	no	yes	no	yes
Jordan	somewhat	yes	yes	yes	no	yes	yes	no	yes
Lao PDR	somewhat	yes	yes	yes	yes	yes	yes	yes	

									partly*
Lebanon	yes	yes	yes	yes	yes	yes		yes	yes
Mongolia	yes	yes	yes	yes	yes	yes	yes	yes	yes
Nepal	yes	yes	yes	yes	yes	no	yes	yes	yes
Papua New Guinea	yes	yes	yes	yes	yes	no	yes	no	yes
Philippines	no	yes	no	yes	yes	no	yes	Yes	yes
Sri Lanka	no	yes	yes	yes	yes	no	yes	no	yes
Syrian Arab Republic	no	yes	yes	yes	yes	no	yes	yes	yes
Timor-Leste	no	yes	Yes	no	yes	no	yes	no	yes
Uzbekistan	no	no	yes	no	yes	no	yes	no	yes
Viet Nam	no	yes	yes	yes	yes	no	yes	no	yes
Antigua and Barbuda	yes	yes	yes	yes	yes	yes	yes	yes	yes
Belize	no	yes	yes	yes	yes	yes	yes	yes	yes
Guyana	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grenada	no	yes	no	yes	yes	no	yes	no	yes
Jamaica	yes	yes	yes	yes	yes	yes	yes	yes	yes
St. Kitts and Nevis	yes	yes	yes	yes	yes	yes	yes	no	yes
St. Lucia	no	yes	yes	yes	yes	yes	yes	yes	yes
Suriname	yes	yes	yes	yes	yes	yes	yes	no	yes
Armenia	no	yes	yes	no	no	no	yes	no	no
Belarus	no	yes	no	yes	yes	no	yes	no	yes

Bosnia and Herzegovina	yes	yes	yes	yes	yes	yes	yes	no	yes
Georgia	no	yes	yes	yes	yes	no	yes	yes	yes
Italy	no	no	yes	no	yes	no	yes	no	yes
Montenegro	yes	yes	yes	no	yes	no	yes	yes	yes
Republic of Moldova	yes	yes	yes	yes	yes	no	yes	yes	yes
Serbia	yes	yes	yes	yes	yes	no	yes	no	yes
Turkey	no	yes	yes	no	yes	no	yes	no	yes
Ukraine	no	yes	yes	no	yes	no	yes	no	no
Algeria	somewhat	n.d.							
Benin	yes	no	yes	yes	no	no			
Burkina Faso	yes	no	yes	yes	no	no			
Burundi	yes	no	no	no	no	no			
Cameroon	yes	no	yes	yes	no	yes			
Chad	yes	no	yes	yes	yes				
Central African Republic	yes	no	yes	yes	no				
Côte d'Ivoire	yes	no	yes	yes	yes				
Comoros	yes	no	yes	yes	yes				
Democratic Republic of the Congo	yes	no	yes	yes	no				
Gabon	yes	no	yes	yes	no				
Guinea	yes	no	yes	yes	no				

Madagascar	yes	no	yes	yes	yes				
Mali	yes	no	yes	yes	no				
Niger	yes	no	yes	yes	yes				
Republic of the Congo	yes	no	yes	Yes	no				
Senegal	somewhat	n.d.							
Togo	yes	no	yes	yes	no				
Equatorial Guinea	yes	yes	yes	yes	yes	yes	yes	yes	yes
Argentina	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bolivia (Plurinational State of)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Chile	yes	yes	yes	yes	yes	yes	yes	no	yes
Colombia	somewhat	yes	yes	Yes	yes	yes	yes	yes	yes
Costa Rica	somewhat	no	no	no	yes	no	no	yes	yes
Cuba	somewhat	yes	yes	yes	yes	no	yes	no	yes
Dominican Republic	somewhat	yes	yes	yes	no	no	yes	somewhat*	yes
Nicaragua	somewhat	yes	yes	yes	yes	no	yes	yes*	yes
Paraguay	somewhat	yes	yes	yes	yes	no	yes	yes	yes
Peru	somewhat	yes	yes	yes	yes	yes	yes	Yes	yes
Republic of Panama	no	yes	yes	yes	yes	no	yes	yes	yes

Venezuela (Bolivarian Republic of)	no	yes	yes	yes	yes	no	yes	partly*	yes
Kazakhstan	yes	yes	yes	yes	yes	yes	yes	partly*	yes
Kyrgyzstan	no	yes	yes	yes	somewhat	somewhat	no*	no	probably*
Russian Federation	yes	yes	yes	yes	yes	yes	yes	partly*	partly*
Angola	no	yes	no	no	yes	no	yes	no	yes
Cape Verde	no	yes	yes	no	yes	no	no	no	no
Guinea-Bissau	no	yes	no	no	yes	no	no	no	yes
Sao Tome and Principe	no	yes	yes	no	yes	no	yes	no	no

Source: the 98 country reports are available at: <https://www.unccd.int/actions/ldn-target-setting-programme> A technical guide which was prepared by the GM and the UNCCD Secretariat was used to ensure alignment in the use of terminology across the English, French, Spanish, Russian, Arabic and Portuguese reports.

Table S6b: Coding assigned to the three indirect criteria in Table S6a

Indirect criteria	Explanation of the coding used in Table S6a
Sustainable Land Management	<i>Lao PDR</i> : partly: in terms of sustainable use of natural resources and sustainable environmental quality in urban and rural areas, as well as dissemination of good practices
	<i>Kyrgyzstan</i> : probably "yes" if it is mentioned that SLM practices are introduced at 100,000 hectares. But this is the only note on SLM in the report
	<i>Russian Federation</i> : Partly used in terms of the needs for dissemination of the SLM good practices and development of the SLM methodology
Integrated Land Use Plans (ILUP)	<i>Cambodia</i> : not directly but through reforestation activities
	<i>Indonesia</i> : implicitly, through intentions to "improve land use systems" in forestry and agriculture
	<i>Dominican Republic</i> : Landscape level is equated to 'watershed scale'. Analysis conducted at national level using the 'catchments' as the landscape unit of prioritisation.
	<i>Nicaragua</i> : yes, though in several of the planned interventions the actions appear to be directed to the 'basin' scale' (cuenca).
	<i>Republic of Panama</i> : Landscape level equates to 'watersheds'. Analysis undertaken at national level.
	<i>Venezuela (Bolivarian Republic of)</i> : landscape level equates 'basins', the analysis using the 3 indicators was done at national level, but the interventions were designed at 'basin level' (conservacion de cuencas).
	<i>Kazakhstan</i> : for specified lands such as irrigated lands, subjected to afforestation, rehabilitating pastures, etc.
	<i>Russian Federation</i> : partly used in terms of landscape-adaptive agriculture and afforestation
Rehabilitation / Restoration	<i>Kyrgyzstan</i> : no, except a couple of notes on the need for pasture and forest rehabilitation

Table S7a: This table features SPI's demonstrable engagement with other organisations and the utilisation of its products by professionals *beyond* its coordination activities that supported the visibility of UNCCD as an authority on science on DLDD in the biennium 2014-2015 (observer at meetings; keynote, presentations, reviews, panels, juries, ...)

SPI contribution	Event	Demonstrable contribution	Source
1. Science-Policy interfaces	1.1	Launch of the SPI science-policy brief titled "Pivotal Soil Carbon" at the side event of the UNFCCC-21 titled Gestion durable des terres et séquestration du carbone en Afrique Sub-Saharienne" organised by IRD (December 2015, Paris, France).	InforMEA
	1.2	Keynote talks, presentations, panel, working groups: First joint meeting of the ITPS and the SPI, Berlin Germany, (20 April 2015) and the Global Soil Week, (Berlin, Germany, 18 - 22 April 2015).	ICCD/COP(12)/CST/INF.4 Web portal of the Global Soil Week 2015
2. Other strategic partners	2.1	Key message to the United Nations High-Level Political Forum on Sustainable Development (HLPF), 20 June – 9 July 2014, New York, USA. The UNCCD, the CST, and the newly created SPI shared a key message on achieving sustainable development by combating land degradation and desertification, both in drylands and all other areas where they occur, emphasising the role of science-based evidence in this effort.	Information provided by the UNCCD Secretariat and the SPI
	2.2	Panel, review: SPI contributions to the development of the Global Land Outlook (GLO). Considering that The Global Land Outlook (GLO) is planned to be the UNCCD's new flagship publication on the status of land and its use and is intended to be published at regular intervals, the SPI proposed to UNCCD COP.12 to allow SPI members to continue to participate in the development and review process. Decision 21/COP.12 requested the SPI to engage with the steering committee and review process of the GLO.	Decision 21/COP.12 GLO: See steering committee members and external reviewers
	2.3	Panel, review: SPI was invited to assess the outcomes of the workshop on agroecosystem resilience organised by Global Environment Facility – Scientific and Technical Advisory Panel (GEF-STAP) – by March 2015 in order to feed the scientific evidence on the contribution of sustainable land use and management to	Information provided by the UNCCD Secretariat and the SPI

SPI contribution	Event	Demonstrable contribution	Source
		climate change adaptation/mitigation and to safeguarding biodiversity and ecosystem services into other Rio Conventions.	
	2.4	Key note, panel, review for the development of sustainable land management indicators using the land-degradation-neutrality approach at the Global Land Indicators Initiative workshop on 'Possibilities for indicators on sustainable land management for the Global Land Indicators Initiative' (EEA, Copenhagen, Denmark, 5-6 February 2015).	Information provided by the UNCCD Secretariat and the SPI
	2.5	Presentation at the side event of the Scientific Knowledge Brokering Portal (SKBP) at the CST special session in Cancun and the 3 rd UNCCD Scientific Conference (Cancun, Mexico, 12 March 2015).	Information provided by the UNCCD Secretariat and the SPI
3. Scientific conferences	3.1	Workshop, presentation, concluding statement: 5 th International Conference on Dryland Deserts and Desertification (DDD) (17-20 November 2014, Sede Boqer, Israel). SPI contributed specifically to the topic: "Contribution of sustainable land use and management to climate change adaptation". The SPI concluding statement was endorsed at the concluding plenary session of the conference.	Information provided by the UNCCD Secretariat and the SPI
	3.2	EGU2015: SS2.15 – Organization of an oral session with associated posters organised by SPI members in collaboration with external experts (15 th April 2015, Vienna, Austria).	Information provided by the UNCCD Secretariat and the SPI
	3.3	Invitation to the SPI to participate in the LDN session at the Congress of the European Confederation of Soil Science Societies in Istanbul, Turkey (17-22 July 2016).	Information provided by the UNCCD Secretariat and the SPI
	3.4	Participation at the 37 th International Symposium on Remote Sensing of Environment – ISRSE (8 – 12 May 2017, Tshwane, South Africa).	Information provided by the UNCCD Secretariat and the SPI
	3.5	UNCCD first Scientific Conference prepared by the SPI with technical support of the UNCCD Secretariat.	Information provided by the UNCCD Secretariat and the SPI

Source: Official UNCCD documents are available at: www.unccd.int/official-documents

Table S7b: SPI's demonstrable engagement with other organisations and the utilisation of its products by professionals *beyond* its coordination activities that supported the visibility of UNCCD as an authority on science on DLDD in the biennium 2016-2017 (observer at meetings; keynote, presentations, reviews, panels, juries, ...)

SPI contribution	Event	Demonstrable contribution	Source
1. Science-Policy interfaces	1.1	Invitation to participate in the side event of the NGO CARI.Drynet at UNFCCC COP 22 (8 November 2016) with a presentation on land and water losses in a globally warming world: how will land degradation neutrality be implemented?	Information provided by the UNCCD Secretariat and the SPI
	1.2	Organisation of a land and climate related side event at the UNFCCC COP 23 in 2017 entitled: "Soil carbon stocks and climate change: How to reduce uncertainties to assess land management impact?" (SPI, UNCCD). Science-Policy Brief 01 (November 2015): Pivotal Soil Carbon	Information provided by the UNCCD Secretariat and the SPI UNCCD web portal
	1.3	Invitation to the Working Group Meeting on Land Restoration of the International Resource Panel at UNEP (10-11 March, 2017, Addis Ababa, Ethiopia)	Information provided by the UNCCD Secretariat and the SPI
2. Other strategic partners	2.1	Checklist for Land Degradation Neutrality Transformative Projects and Programmes (LDN TPP). The checklist is used by the GEF.	UNCCD web portal
	2.2	Scientific Support to the UNCCD Secretariat for exploring collaboration with the GIZ and TMG on setting a policy agenda on Land Governance and Land Degradation Neutrality at the global level (e.g., HLPF 2018, UNCCD COP 14 and the Global Landscapes Forums 2017 and 2019, and other relevant regional and global for initiatives).	Information provided by the UNCCD Secretariat and the SPI
3. Scientific conferences	3.1	Addressing key aspects regarding the scientific framing of LDN, challenges and opportunities in creating an enabling policy environment for implementing LDN and assisting countries in setting targets to the 6th International Conference on Drylands, Deserts & Desertification (6-9 November 2017 in Sede Boqer, Israel).	Information provided by the UNCCD Secretariat and the SPI
	3.2	Contributions to the development of the concept for the Symposium on Soil Organic Carbon (FAO-IPCC expert meeting on climate change, land use, and food security) (March 2017, Rome, Italy).	Information provided by the UNCCD Secretariat and the SPI

SPI contribution	Event	Demonstrable contribution	Source
	3.3	International Conference on Combating Sand and Dust Storms (3-5 July, 2017, Tehran, Iran).	Information provided by the UNCCD Secretariat and the SPI
	3.4	International Conference on Sustainability Sciences Conference (ICSS), 24-26 August, 2017, Stockholm, Sweden, through the Future Earth Knowledge Action Networks.	Information provided by the UNCCD secretariat and the SPI
4. Reviews	4.1	Review of the draft on International Standards for the Practice of Ecological Restoration – including Principles and Key Concepts developed by the Society for Ecological Restoration in collaboration with SER Australasia (October-November 2016).	Information provided by the UNCCD Secretariat and the SPI
	4.2	Invitation to participate in the Expert Group Meeting of the Global Land Indicators Initiative (GLII) (13-14 January 2017, Cape Town, South Africa).	Information provided by the UNCCD Secretariat and the SPI

Table S7c: SPI's demonstrable engagement with other organisations and the utilisation of its products by professionals *beyond* its coordination activities that supported the visibility of UNCCD as an authority on science on DLDD in the biennium 2018-2019 (observer at meetings; keynote, presentations, reviews, panels, juries, ...)

SPI contribution	Event	Demonstrable contribution	Source
1. Science-Policy interfaces	1.1	SPI organised the first UNCCD Science Day, which took place back-to-back with UNCCD COP.14 in New Delhi, India and provided extensive exchange of views on the science behind the LDN Conceptual Framework, its up-take by different organisations, and further development of UNCCD-relevant science-policy partnerships.	UNCCD web portal Information provided by the UNCCD Secretariat and the SPI
	2.1	SPI explored future collaboration with the Integrated Drought Management Programme (IDMP), a joint initiative of the World Meteorological Organization and the Global Water Partnership. These efforts initialised a new coordination activity in the SPI work programme 2020-2021 (see Decision 18/COP.14 in ICCD/COP(14)/23/Add.1)	Information provided by the UNCCD Secretariat and the SPI
	2.2	SPI fostered cooperation potentials with UNCCD-accredited intergovernmental organizations to support country efforts to achieve LDN (e.g. African Union, World Agroforestry, and the International Crops Research Institute for the Semi-Arid Tropics).	Information provided by the UNCCD Secretariat and the SPI
	2.3	SPI attended the Global LDN Forum (2-5 July 2018, Seoul, Korea).	Information provided by the UNCCD Secretariat and the SPI
3. Scientific conferences	3.1	Organization of a session at the United Nations Framework Convention on Climate Change (UNFCCC), titled "Synergy between the UNFCCC and UNCCD: Achieving the Co-benefits of Climate Change Adaptation and Land Degradation Neutrality (UNCCD) " with the support of the UNCCD secretariat and in cooperation with several UNCCD-accredited Civil Society Organizations (CSOs).	Information provided by the UNCCD Secretariat and the SPI
	3.2	SPI was invited by the Global Land Tool Network (GLTN) and the International Fund for Agricultural Development (IFAD) to participate in a one-day training on impact evaluation of land tenure and governance interventions (24 March 2019, Washington DC, USA).	Information provided by the UNCCD Secretariat and the SPI
	3.3	SPI was invited to contribute to the media workshop and the plenary to celebrate the World Day to combat Desertification Day in Ankara, Turkey (16 – 17 June 2019).	Information provided by the UNCCD

SPI contribution	Event	Demonstrable contribution	Source
			Secretariat and the SPI
4. Reviews	4.1	SPI was invited by the Society for Ecological Restoration to the UNCCD to review of version 2 of the international principles and standards for the practice of ecological restoration, 2 nd edition.	Information provided by the UNCCD Secretariat and the SPI
	4.2	SPI was a jury member for the 2019 Land for Life Award of the UNCCD (May-June 2019).	Information provided by the UNCCD Secretariat and the SPI

Table S8: Evaluating SPI's contribution to the achievement of the objectives of the Convention outlined in Articles 16 and 17 – including our analyses of limitations in current SPI contributions, processes or structures (in grey)

Article 16: National measures to integrate and coordinate the collection, analysis and exchange of relevant short term and long term data and information to ensure systematic observation of land degradation in affected areas and to understand better and assess the processes and effects of drought and desertification	
Clauses under Article 16	SPI contribution/s via its technical reports
(a) Facilitate and strengthen the functioning of the global network of institutions and facilities for the collection, analyses and exchange of information, as well as for systematic observation at all levels.	<p>The CF LDN defines principles for systematic observation through the use of the three land-based indicators and associated metrics as a minimum set of globally agreed indicators/metrics to harmonise monitoring methods across countries. These principles also provide details on what quantitative data and information are required at which geographic scales, and how to address knowledge and data gaps (for details see box 6, in Orr et al., 2017: 96)</p> <p>The SPI report on SLM provides practical guidance to scientists, policymakers, landowners, community stakeholders and enterprises on how to select practices that help address DLDD, climate change adaptation and mitigation. The report provides information in a user-oriented format on existing databases worldwide that provide recommendations and examples of SLM practices (Sanz et al., 2017).</p> <p>The SPI report on realising the carbon benefits of SLM practices (Chotte et al., 2019) provides guidelines on estimating of soil organic carbon (SOC) in LDN planning and monitoring. The report also provides decision trees to assess issues such as where to invest in monitoring or how to select sampling approaches.</p> <p>The SPI land-drought nexus report (Reichhuber et al., 2019: 38) examines the impacts of SLM technologies on drought risk mitigation to systematically assess whether the <i>“impacts on drought resilience are realized more easily or systematically for specific (combinations of) land use types and categories of SLM innovations.”</i> The report synthesises measures for drought-smart land management, including impacts, costs and benefits, synergies, trade-offs and constraints, to strengthen the role of land-based interventions in decision-making on drought mitigation and risk management measures. The information is organised into 14 groups covering different types of strategies and interventions for four land use types (crop, grazing, forests and woodlands).</p> <p>The SPI report on creating an enabling environment for LDN and its potential contribution to enhancing well-being, livelihoods and the environment (Verburg et al., 2019) identified 15 criteria in four dimensions of the enabling environment to systematise the review of LDN Target Setting Programme country reports (LDN TSP) country reports to assess whether national LDN measures were (a) off track, (2) advancing in certain areas, (3) on track or (4) completed/achieved.</p>

<p>(b) Ensure that the collection, analysis and exchange of information address the needs of local communities and those of decision makers, with a view to resolving specific problems, and that local communities are involved in these activities.</p>	<p>The Conference of the Parties decides on the deliverables and coordination activities contained in SPI work programmes. This ensures that SPI products directly address the needs of policy and decision-makers. The contextual basis for the implementation of the CF for LDN at local level requires the engagement and participation of all local stakeholders (including e.g., local communities, indigenous peoples, farmers, individual land owners).</p> <p>The SPI reports (Orr et al., 2017, Verburg et al., 2019) consider the principles of good governance and highlight in particular that the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGTs; FAO, 2012) are central to pursuing LDN without unintended trade-offs arising from insecure land tenure, land appropriation and land conflicts. The nomination of representatives from the non-governmental organisations (NGOs), UN and other UNCCD-relevant organisations support the consideration of the needs of local communities in the two-year assessment phase on each deliverable and coordination activity.</p> <p>The SPI report on realising the carbon benefits of SLM practices (Chotte et al., 2019) provides guidance on identifying suitable locally relevant approaches to maintain or enhance SOC stocks. The decision trees included in this report also offer policy-oriented proposals on sharing guidance, monitoring change, designing planning frameworks and addressing the significant, yet underestimated, role that gender inequality plays in land degradation. The report also provides a comparison of existing tools for assessing and monitoring SOC used by different organisations.</p> <p>SPI's report on SLM (Sanz et al., 2017) provides practical guidance for the selection and large-scale implementation of effective, locally adapted SLM.</p> <p>The SPI report on the land-drought nexus highlights the need for improved incorporation of traditional or local community knowledge about ecosystem functioning into assessments and decision making (Reichhuber et al., 2019).</p>
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<p>(c) Support and further develop bilateral and multilateral programmes and projects aimed at defining, conducting, assessing and financing the collection, analysis and exchange of data and information, including, inter alia, integrated sets of physical, biological, social and economic indicators.</p>	<p>The objectives of LDN seek synergies between different disciplines, as it includes social, economic and environmental objectives and emphasises the needs to develop, strengthen and maintain “<i>inclusive governance of land</i>” (Orr et al., 2017: 3, Sanz et al., 2017, Verburg et al., 2019).</p> <p>The SPI emphasises that the achievement of LDN and SLM depends on sustained financing and addresses aspects related to financing (Orr et al., 2017, Sanz et al., 2017).</p> <p>Addressing potential procedural and structural constraints in the current SPI:</p> <p>A screening of the list of former and current scientists working in the SPI shows a strong representation of natural scientists. Greater integration of social sciences into the SPI is needed. The need for transformative change in society and the economy to achieve LDN may also require consideration of knowledge from the humanities and stronger involvement of practitioners, private sector representatives and indigenous and local knowledge holders in the implementation of an SPI work programme. The provision of credible and impartial knowledge could also be enhanced through greater collaboration with existing science and research networks and organisations, which has been considered an important element of the modular mechanism alongside the SPI to operationalise the seamless communication of scientific knowledge on DLDD to the UNCCD through the SPI (UNCCDa, 2013, Akhtar-Schuster et al., 2016).</p>
<p>(d) Make full use of the expertise of competent intergovernmental and non-governmental organizations, particularly to disseminate relevant information and experiences among target groups in different regions.</p>	<p>In developing SPI technical reports, expertise is drawn from available resources, including intergovernmental and non-governmental organisations, peer-review papers, technical reports and other grey literature from trusted sources. For example, the SPI has systematically reviewed the LDN TSP country reports that include an assessment of national progress and challenges in creating an effective enabling environment for operationalising LDN, and approaches for addressing multiple benefits.</p> <p>Addressing potential procedural and structural constraints in the current SPI:</p> <p>Another interesting aspect is that the products of the SPI inspire the UNCCD strategic partners and other professionals and are progressively being adapted to the needs of these bodies. Unfortunately, the systematic monitoring and recording of the SPI's contributions beyond reporting to the UNCCD on the objectives and coordination activities under its work programmes are not documented to allow a full assessment of the SPI's impact on other organisations. The demonstrable impacts of the SPI on the promotion of UNCCD's strategic partnership building, presented in Tables S4a-c, and Tables S7a-c, only list those activities that can be formally tracked. However, as these activities appear to have been instrumental in raising the profile of the UNCCD as the scientific authority in the field of DLDD and may have initiated the further development of strategic</p>

	<p>partnerships, it is recommended that resources be allocated to enable continuous documentation of the use of SPI products by UNCCD strategic partners.</p>
<p>(e) Give full weight to the collection, analysis and exchange of socio-economic data, and their integration with physical and biological data.</p>	<p>All SPI reports point to the importance of considering and integrating socio-economic data with physical and biological data. However, this aspect needs to be further developed, and may require a specific methodological assessment that examines what socio-economic information is required, how the humanities can be integrated in the context of transformative change, and how quantitative data and qualitative information can be assessed and linked.</p> <p>Addressing procedural constraints potentially affecting SPI contributions: The business sector is currently not adequately addressed in SPI work programmes, possibly due to the fact that UNCCD Parties have not yet asked the SPI to conduct an in-depth analysis on the linkages between economic activities and DLDD. We suggest that this gap could first be addressed by analysing the work of the ELD and could also benefit from the planned IPBES business and biodiversity assessment.</p>
<p>(f) Exchange and make fully, openly and promptly available information from all publicly available sources relevant to combating desertification and mitigating the effects of drought.</p>	<p>The SPI technical reports and related policy briefs are available online at: https://knowledge.unccd.int/science-policy-interface/spi-publications</p> <p>Addressing structural constraints in the current media coverage of SPI reports: Media outreach to monitor the outcomes of SPI work needs to be improved by, for instance, institutionalising it within the UNCCD secretariat to further raise the profile of the UNCCD as a scientific authority. Although the UNCCD communication measures are active in attracting the media to the SPI (see media engagement at the first UNCCD Science Day in 2019 (Table S7c)), developing an SPI specific media outreach will require additional efforts. Based on further analyses of the IPCC and IPBES systematic approaches, an UNCCD SPI-specific communication mechanism should be developed well in advance of the publication of an SPI report and thus be an element of the approval phase of an SPI work programme. We propose an analysis of the media processes developed for IPBES and IPCC reports, including pre-approval briefings, media training for SPI members, and media and outreach activities after the release of an SPI report.</p>
<p>(g) Exchange information on local and traditional knowledge.</p>	<p>The CF of LDN emphasises that <i>“Planning and implementation of LDN involves well-designed participatory processes that include stakeholders, especially land users, in designing, implementing and monitoring interventions to achieve LDN. Processes should consider local, traditional and scientific knowledge, applying a mechanism such as multi-stakeholder platforms to ensure these inputs are included in the decision-making process. The process should be sensitive to gender, and imbalances in power and information access.”</i> (Orr et al., 2017: 62).</p> <p>The SPI report on SLM emphasises the need to incorporate traditional values or land use rights and presents traditional land management systems that qualify as SLM measures (Sanz et al., 2017).</p>

	<p>Decision trees in the SPI report on realising the carbon benefits of SLM practices (Chotte et al., 2019) point to the importance of local expertise and traditional knowledge in providing guidance for SOC assessment and monitoring, and in maintaining and improving land productivity.</p> <p>The SPI report on an enabling environment for LDN (Verburg et al., 2019) specifically highlights the relationship between land governance and local land management and shows the need for inclusive policies and regulations, sustainable institutions, access to finance and an effective science-policy interface, which can be achieved through improved vertical and horizon integration of institutions and governance mechanisms to achieve and sustain LDN.</p>
Article 17: National measures to promote technical and scientific cooperation in the fields of combating desertification and mitigating the effects of drought through appropriate national, subregional, regional and international institutions	
Clauses under Article 17	SPI contribution/s via its technical reports
(a) Contribute to increased knowledge of the processes leading to desertification and drought and the impact of, and distinction between, causal factors, both natural and human, with a view to combating desertification and mitigating the effects of drought, and achieving improved productivity as well as sustainable use and management of resources.	<p>The SPI report on the land-drought nexus (Reichhuber et al., 2019) highlights the potential of land-based interventions – including in the context of LDN - to mitigate the effects of drought by (a) increasing ecosystem resilience and socioeconomic well-being of populations, and (b) providing guidance to support the adoption and implementation of land-based interventions. The report presents a new concept of drought-smart land management (D-SLM) and practical guidance for scaling up D-SLM. Decision 23/COP.14 encourages Parties to use the indicators recommended by the SPI for drought strategic objectives.</p> <p>The SPI report on realising the carbon benefits of SLM practices (Chotte et al., 2019) highlights the need to ensure women’s representation in SLM and DLDD policy-making and financing strategies.</p>

<p>(b) Respond to well defined objectives, address the specific needs of local populations and lead to the identification and implementation of solutions that improve the living standards of people in affected areas.</p>	<p>See point (g) under article 16</p>
<p>(c) Protect, integrate, enhance and validate traditional and local knowledge, know-how and practices, ensuring, subject to their respective national legislation and/or policies, that the owners of that knowledge will directly benefit on an equitable basis and on mutually agreed terms from any commercial utilisation of it or from any technological development derived</p>	<p>All SPI reports emphasise the importance of taking traditional and local knowledge into account for achieving LDN. Verburg et al. (2019) describe, among other things, the importance of customary land governance, where authority lies primarily with traditional institutions and includes indigenous land rights for achieving and maintaining LDN.</p>

from that knowledge.	
(d) Develop and strengthen national, subregional and regional research capabilities in affected developing country Parties, particularly in Africa, including the development of local skills and the strengthening of appropriate capacities, especially in countries with a weak research base, giving particular attention to multidisciplinary and participative socio-economic research.	<p>The CF LDN addresses the need to involve international organisations, national bodies, spaces agencies and research institutions to facilitate access to satellite, airborne and in situ, data, including citizen science data (Orr et al., 2017).</p> <p>The SPI report on realising the carbon benefits of SLM practices (Chotte et al., 2019) highlights the need of participatory research for establishing relationship between SLM and SOC.</p> <p>Addressing constraints in the current SPI contributions: Unlike the recent IPBES summaries for policymakers, the SPI does not provide a table in its technical reports that systematically lists knowledge gaps identified during its assessments under the different objectives of its work programme. We propose that such lists be included in future SPI technical reports to strengthen UNCCD-relevant research on DLDD that targets and engages national, subregional and regional research capacities, including strengthening UNCCD-relevant regional scientific and technical capacities and networks.</p> <p>It is also proposed to analyse the three units of the modular mechanism developed in 2013 to provide scientific advice to the UNCCD (2013a) and Akhtar-Schuster et al. (2016), which led to the establishment of the SPI as one unit of the module, but also included a module that recommended the establishment of <i>regional science and technology hubs</i> that would bring together existing scientific networks in each UNCCD region to collect and synthesize regional knowledge on DLDD and interact with the SPI. These hubs could also stimulate the growth of DLDD research in their region and improve its coordination.</p>
(e) Take into account, where relevant, the relationship between poverty, migration caused by environmental	<p>The SPI reports on CF for LDN (Orr et al., 2017), SLM (Sanz et al., 2017), the land-drought nexus (Reichhuber et al. 2019) and the enabling environment for LDN (Verburg et al., 2019) refer to varying degrees to the state of land and the potential of DLDD to cause social and political instability that can exacerbate poverty, conflict and migration. These aspects are least discussed in the SPI report on realising the carbon benefits of SLM practices (Chotte et al., 2019).</p>

factors, and desertification.	
(f) Promote the conduct of joint research programmes between national, subregional, regional and international research organisations, in both the public and private sectors, for the development of improved, affordable and accessible technologies for sustainable development through effective participation of local populations and communities.	<p>See point (c) under article 16.</p> <p>Addressing constraints in the current SPI contributions: In order to overcome the constraints of the SPI in addressing relevant integrated and participatory-based research, especially at national, subregional, and regional research levels, it is suggested to analyse the modular mechanism for UNCCD scientific advice proposed at UNCCD COP.11 as it proposes the establishment of regional science and technology centres that would bring together existing scientific networks in each UNCCD region to collect and synthesise regional knowledge on DLDD (see also decision 23/COP.11).</p>
(g) Enhance the availability of water resources in affected areas.	<p>SPI reports (Orr et al., 2017; Sanz et al., 2017; Chotte et al., 2019, Verburg et al., 2019, and Reichhuber et al., 2019) address water management in varying details, with Reichhuber et al. (2019) also providing systematic guidance on land-based techniques that can improve both water availability and quality of life for those who depend on it.</p> <p>Addressing constraints in the current SPI contributions: The growing complexity of this issue due to increasing water use and its interlinkages with, inter alia, the increasing impacts of climate change may require a specific focus on future SPI work programmes on water, including in particular technological and governance aspects related to ensuring and improving water</p>

	resource availability whilst operationalising LDN. This aspect could be assessed jointly with the IPCC, and can certainly benefit from the analyses of traditional water management systems in drylands in different UN regions.
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Source: Official UNCCD documents are available at: www.unccd.int/official-documents; SPI technical reports and policy briefs are available at: <https://knowledge.unccd.int/science-policy-interface/spi-publications>