PRAIS4 Reporting Manual

UNCCD

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Introduction

Background

By its decision 7/COP.13, the Conference of the Parties (COP) to the United Nations Convention to Combat Desertification (UNCCD) adopted the UNCCD 2018–2030 Strategic Framework, containing five strategic objectives (SOs) and an implementation framework. The SOs are:

- SO 1: To improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to land degradation neutrality;
- SO 2: To improve the living conditions of affected populations;
- SO 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems;
- SO 4: To generate global environmental benefits through effective implementation of the UNCCD; and
- SO 5: To mobilize substantial and additional financial and non-financial resources to support the implementation of the Convention by building effective partnerships at global and national level.

The implementation framework defines the roles and responsibilities of Parties and Convention institutions in meeting the SOs. For Parties, the implementation framework sets specific aims under three broad headings: (a) financial and non-financial resources; (b) policy and planning; and © actions on the ground.

Progress made in the implementation of the UNCCD 2018–2030 Strategic Framework has been regularly reviewed through the national reporting process since 2018. The reporting procedures, as well as the role and responsibilities of the Committee for the Review of the Implementation of the Convention (CRIC) in reviewing the reports, are spelled out in decisions 13/COP.13 and 15/COP.13.

Purpose of national reporting

Up-to-date information on measures taken, results achieved and challenges faced by country Parties is of critical importance for the COP to be able to adopt targeted decisions and guidance aimed at supporting the effective achievement of the SOs. The information communicated by Parties through reporting is valuable also for other stakeholders that work on the implementation of the UNCCD at national and local levels. From these viewpoints, national reporting is an indispensable tool to bringing forward effective planning and implementation of the Convention and the achievement of the SOs at global and national level.

Since 2018, the UNCCD reporting process has also contributed to the follow-up of progress in implementing the 2030 Agenda for Sustainable Development. As the custodian agency for Sustainable Development Goal (SDG) indicator 15.3.1 “Proportion of land that is degraded over total land area”, the UNCCD secretariat is requested

to use relevant information submitted in the national reports as a contribution to the overall follow-up and review by the High-level Political Forum on Sustainable Development.

Indicator and monitoring framework

The UNCCD indicator and monitoring framework has a hierarchical structure that makes it possible to distinguish what to measure (progress indicators) and how it should be measured (metrics/proxies).

Indicators used for reporting on progress towards the SOs are those adopted by Parties in decision 7/COP.13, 9/COP.13 and 11/COP.14. In addition to the indicators adopted by the COP, five newly proposed indicators (i.e. SO 2-3, SO 4-3, SO 5-3, SO 5-4 and SO 5-5) will be tested during the 2022 reporting process. All newly proposed indicators will be considered optional in reporting until the COP takes a decision on whether to formally adopt them. Integrating them in the forthcoming reporting process will enable Parties to assess the suitability of the indicators for measuring progress towards the SOs and take an informed decision at the twentieth session of the CRIC held in conjunction with the COP. Table 1 through table 5 below contain an overview of the indicators, their related metrics/proxies and their statuses (i.e. whether the indicator is officially adopted, and if so, when it was adopted; or whether it is newly proposed and will be tested in the forthcoming reporting process). The tables also provide information on the reporting attributions.

Reporting on the implementation framework will be done through qualitative information, largely by narratives on national experiences, and on a voluntary basis.

***Table 1**. Strategic objective (SO) 1 indicators and reporting attribution*

Indicator code	Indicator name	Metrics / proxies	Adopted / proposed	Reporting attribution	
				Affected country Parties	Developed country Parties
SO 1-1	Trends in land cover	Land cover change	Indicator adopted in decision 7/COP.13	X	*[1]
SO 1-2	Trends in land productivity or functioning of the land	Land productivity dynamics	Indicator adopted in decision 7/COP.13	X	
SO 1-3	Trends in carbon stocks above and below ground	Soil organic carbon stock	Indicator adopted in decision 7/COP.13	X	
SO 1-4	Proportion of land that is degraded over total land area	—	Background for indicator adopted in decision 9/COP.13	X	

***Table 2**. Strategic objective (SO) 2 indicators and reporting attributions*

[1] Indicators under SO 1 and SDG indicator 15.3.1 are optional for reporting by developed country Parties. Developed country Parties may wish to submit information on these indicators on a voluntary basis for the purpose of reporting on progress towards the SDGs.

Indicator code	Indicator name	Metrics / proxies	Adopted / proposed	Reporting attribution	
				Affected country Parties	Developed country Parties
SO 2-1	Trends in population living below the relative poverty line and/or income inequality in affected areas	Proportion of the population below the international poverty line OR Income inequality	Indicator adopted in decision 7/COP.13	X	—
SO 2-2	Trends in access to safe drinking water in affected areas	Proportion of population using safely managed drinking water services	Indicator adopted in decision 7/COP.13	X	—
SO 2-3	Trends in the proportion of the population exposed to land degradation, disaggregated by sex	Proportion of the population exposed to land degradation, disaggregated by sex	Indicator proposed in response to decision 11/COP.14, which requested the Secretariat to align reporting for SOs 1–5 with gender-responsive indicators	Optional	—

Table 3. *Strategic objective (SO) 3 indicators and reporting attributions*

Indicator code	Indicator name	Metrics / proxies	Adopted / proposed	Reporting attribution	
				Affected country Parties	Developed country Parties
SO 3-1	Trends in the proportion of land under drought over the total land area	Proportion of land in each drought intensity class as defined by the Standardized Precipitation Index	Indicator adopted in decision 7/COP.14	X	—
SO 3-2	Trends in the proportion of the total population exposed to drought	Proportion of the population exposed to drought, disaggregated by sex	Indicator adopted in decision 7/COP.14	X	—
SO 3-3	Trends in the degree of drought vulnerability	Drought Vulnerability Index	Indicator adopted in decision 7/COP.14	X	—

***Table 4**. Strategic objective (SO) 4 indicators and reporting attributions*

Indicator code	Indicator name	Metrics / proxies	Adopted / proposed	Reporting attribution	
				Affected country Parties	**Developed country Parties**
SO 4-1	Trends in carbon stocks above and below ground	Trends in carbon stocks above and below ground is a multipurpose indicator used to measure progress towards both strategic objectives 1 and 4. See progress indicator SO 1-3.			
SO 4-2	Trends in abundance and distribution of selected species	Red List Index	Indicator adopted in decision 7/COP.13	X	—
SO 4-3	Trends in protected area coverage of important biodiversity areas	Average proportion of Terrestrial Key Biodiversity Areas covered by protected areas	Complementary indicator and corresponding metric proposed in response to CRIC 17 recommendations and decision 7/COP.13.	Optional	—

***Table 5**. Strategic objective (SO) 5 indicators and reporting attributions*

Indicator code	Indicator name	Metrics / proxies	Adopted / proposed	Reporting attribution	
				Affected country Parties	Developed country Parties
SO 5-1	Bilateral and multilateral public resources	—	Indicator adopted in decision 7/COP.13 as 'Trends in international bilateral and multilateral official development assistance'	X	X
SO 5-2	Domestic public resources	—	Indicator adopted in decision 7/COP.13 as 'Trends in domestic public resources'	X	X
SO 5-3	International and domestic private resources	—	Indicators proposed in response to decision 11/COP.14, which requested the Global Mechanism to include additional quantitative data in the reporting template for SO 5 and provide information before the start of the next reporting process on the possible development of progress indicators on technology transfer under SO 5	Optional	Optional
SO 5-4	Technology transfer	—		Optional	Optional
SO 5-5	Future support for activities related to the implementation of the Convention	—		Optional	Optional

Reporting tools

Since the 2018 reporting process, the performance review and assessment of implementation system (PRAIS) has been upgraded to bring it into line with modern systems architecture and the requests made by Parties at the fourteenth session of the COP. PRAIS 4 will offer the following improvements over PRAIS 3, among other things:

- A more user-friendly interface, including web-based reporting forms pre-filled with default data derived from global data sources. Information entered in the forms will be summarized in standalone country reports, downloadable and sharable outside the system. The system will also include additional data fields specific to affected areas for SOs 1 to 4;
- A centralized database to securely store and manage country-submitted data;
- New functionality to ingest and manage large geospatial datasets; this will permit the user to define, for instance, the location and boundaries of land degradation hotspots or zones of voluntary land degradation neutrality targets;
- Analytical, synthesis and visualization functions for the submitted data[2].

The following reporting tools will be made available to country Parties in the six official United Nations languages:

[2] Delivery of analytical, synthesis and visualization functions expected in September - December 2022.

- The PRAIS 4 user manual, which provides step-by-step procedures for system access and use;
- This reporting manual, which provides step-by-step methodological guidance for the preparation of national reports;
- An updated glossary of reporting terms and definitions.

In addition, Parties can also refer to the following methodological reference documents (in English only):

- Version 2 of the Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area;
- Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3.

Data analytics tools

In line with decision 11/COP.14, Conservation International has further enhanced and expanded Trends.Earth to support the preparation and analysis of data for UNCCD national reporting in a format that can be automatically transferred to PRAIS.

Trends.Earth is a free and open-source tool for monitoring indicators of land change. More specifically, Trends.Earth supports:

- The calculation of the SO 1 indicators, including SDG Indicator 15.3.1, following version 2 of the Good Practice Guidance for SDG Indicator 15.3.1;
- The recalculation of SDG indicator 15.3.1, accounting for any reported false positive and false negative degradation processes;
- The calculation of indicator SO 2-3: Trends in the proportion of population exposed to land degradation, disaggregated by sex;
- The calculation of the SO 3 indicators following the Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3;
- Access to global data sources, including default data sources for national reporting;
- Integration of nationally or locally available data and nationally determined assumptions;
- Data transfer to PRAIS.

Default data

With a view to reducing the reporting burden and in accordance with the procedure established in decision 22/COP.11, the PRAIS 4 forms will be pre-filled with default national estimates based on available global data sources. Country Parties will have the possibility to verify or replace these national estimates using data sourced/computed nationally/locally.

In order to provide national-level extracts of the global data sources for national reporting, the United Nations Geospatial Hub (hereinafter referred to as UN Map Data) was used, which is a worldwide geospatial database consisting of country and geographic name information and a coherent alignment of national boundaries for consistent representation on a global scale. UN Map Data includes geospatial web services, which aim to provide a contextual global webservices background to the international community. The current flagship United Nations

geospatial service is entitled Clear Map[3] (hereinafter referred to as UN Clear Map). UN Clear Map was originally designed and created for the use of the United Nations Secretariat and system for their website and related web products, but is now a publicly available resource subject to the terms of use. The UN Clear Map service is available in PRAIS 4 in different cartographic styles and web canvases to give countries context for the geospatial reporting data. However, the UN Clear Map has scale constraints, as it cannot be used beyond a map scale of 1:4.5 million. As the PRAIS 4 map view is fixed to the extent of the country boundaries, countries which are fixed at scales finer than this will not be able to use UN Clear Map. Alternative web map services are provided for context at finer scales to compensate for the scale constraints of UN Clear Map.

The UN Map Data has been prepared by the United Nations Geospatial Information Section (formerly Cartographic Section) in New York. The designations employed and the presentation of material contained in the UN Map Data do not imply the expression of any opinion whatsoever on the part of the UNCCD concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Countries wishing to replace the default national estimates using nationally or locally available data are advised and encouraged to use Trends.Earth for the preparation, analysis and transfer of their data into PRAIS. This includes the use of a national border which differs from the UN Map Data used for the preparation of the default datasets described above. Careful consideration should be given to the use of an alternative national border in that it must be consistent with the total land area reported under SO 1-1. Otherwise, discrepancies may arise in the reporting data derived from geospatial analysis using that border.

Open data sharing

By its decision 16/COP.11, the COP requested the secretariat to ensure that data and information from the reporting process are available and accessible to all, especially at the national and local levels.

When uploading data to PRAIS, particularly spatial data and associated attribute data, country Parties will be prompted to choose whether to: (i) use an existing Creative Commons licence; or (ii) use an existing licence of their own.

These options aim to empower country Parties reporting through PRAIS to set the terms of use of the national data uploaded or created as part of the reporting process. Country Parties are free to choose a licence that meets their requirements. However, most of the default data provided to Parties through PRAIS and Trends.Earth is already in the public domain as described here, while other default datasets have been licenced by their respective data providers, namely the European Space Agency Climate Change Initiative Land Cover and the International Soil Reference and Information Centre SoilGrids, under an Attribution-ShareAlike licence. Thus, these datasets are subject to the terms of the Attribution-ShareAlike license. Users of these datasets, such as the UNCCD and its Parties, must reshare the data on the same terms granted by the licensor and with proper attribution to them. For more information on the issue of data sharing, see Annex I of this reporting manual.

[3] https://geoportal.un.org/arcgis/home/item.html?id=541557fd0d4d42efb24449be614e6887.

Reporting frequency

By its decision 15/COP. 13, the COP approved a four-year frequency for national reporting. During the first reporting process under the UNCCD 2018–2030 Strategic Framework in 2018, Parties reported data and information for the baseline period 2000–2015. From the 2022 reporting process onward, Parties will quantify the indicators and report national estimates for four-year reporting periods as indicated in table 6 below.

***Table 6**. UNCCD reporting process and corresponding reporting periods (current reporting process and period in bold)*

UNCCD Reporting Process	**UNCCD Reporting Periods**
2018	Baseline 2000-2015
2022	**2016-2019**
2026	2020-2023
2030	2024-2027
2034	2028-2031

Recalculations and time series consistency

Advances in methodologies and data availability may require periodic recalculations of previously submitted national estimates. While recalculations may require refinements in terms of target-setting, they ensure the consistency of the time series and the comparability between the baseline and future monitoring data.

In this reporting process, the key reasons for recalculation, accompanied by explanatory information (including the quantitative impact of the recalculation on (i) the baseline estimates compared with the baseline reported in 2018; and (ii) previously submitted national targets), should be reported. A separate reporting form has been created in PRAIS 4 for this purpose.

For instance, given the evolution of the calculation methods presented in version 2 of the Good Practice Guidance for SDG Indicator 15.3.1, it is recommended that previously submitted baseline estimates of all SO 1 indicators, including SDG Indicator 15.3.1, be recalculated and included in the national report to be submitted in 2022. Default national estimates provided through the PRAIS forms have already been recalculated for country Parties using the new calculation methods. Therefore, recalculation methods should only be reported if opting to use national datasets.

For a broader discussion on the issue of recalculations, see chapter 6 of version 2 of the Good Practice Guidance for SDG Indicator 15.3.1.

Process and schedule for the 2022 reporting process

The 2022 reporting process is expected to commence in November 2021, contingent on the timing of the PRAIS 4 launch. If reporting commences at the beginning of November 2021, the deadline for submission of national reports could be May 2022, still pending a final decision by the Executive Secretary and the CRIC Bureau, who will assess progress made in reporting by Parties early next year.

Various measures will be taken to support Parties in preparing the national reports and providing high quality information:

- Capacity development activities will be organized starting in November 2021. Due to COVID-19 and related travel restrictions, those capacity development activities will have to be designed as online tuition and webinars aimed at introducing national focal points and assigned reporting officers to the new reporting requirements, methodologies, data and tools;
- The secretariat and the Global Mechanism, with the assistance of consultants, will provide technical backstopping throughout the reporting process;
- An online helpdesk facility will be available via PRAIS 4 to respond to queries from Parties;
- National reports will undergo a quality assurance procedure prior to final submission to ensure the provision of consistent, transparent, comparable, accurate and complete information.

At its twenty-first session, the CRIC will review and analyse the information submitted during the 2022 reporting process.

1. Strategic objective 1: To improve the condition of affected ecosystems, combat desertification/ land degradation, promote sustainable land management and contribute to land degradation neutrality

1.1. SO 1-1 –Trends in land cover

1.1.1. Introduction

Land cover refers to the observed (bio)physical cover on the Earth’ s surface.

The United Nations Convention to Combat Desertification (UNCCD) methodology for estimating the proportion of land that is degraded over total land area (i.e. Sustainable Development Goal (SDG) indicator 15.3.1) uses land cover change as an indicator of altered ecosystem dynamics resulting from natural and/or artificial drivers and factors.

The main output of the reporting process for indicator SO1-1 is a set of officially verified estimates of the extent of land cover classes, their changes at national level and their significance in terms of land degradation.

National reporting is facilitated though the provision of: (i) default data derived from available global data sources, namely the European Space Agency Climate Change Initiative Land Cover (ESA CCI-LC) products; and (ii) guidance on how to interpret transitions across land cover classes as processes that are likely to reduce the biological or economic productivity and complexity of the land (degradation), improve it, or result in no change (stable).

1.1.2. Prerequisites for reporting

- An in-depth reading of chapter 3 of the Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area (version 2), which provides an overview of the land cover indicator, its definition and classifications, and the recommended methodology to assess land cover degradation;
- Data complying with the minimum standards listed in table 10 below;
- A pool of national experts officially nominated by the national authorities to verify the reliability of the identified land cover changes and their links with the main land degradation processes. This may involve ground-truthing surveys and/or organizing interviews with local communities and key informants. Key institutions might include a country’ s national statistical office, ministry of environment, ministry of agriculture, ministry of water resources, meteorological department, remote-sensing centre, food security and nutrition department, as well as universities and research centres.

1.1.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following. If Parties decide to use the default data, steps 3, 4, 5 and 6 are unnecessary.

Step 1: Report on land area

Note: Related areas in the PRAIS 4 platform: table SO1-1.T1

Information on the total land area, area covered by water bodies, and total country area is required to calculate the proportion of land that is degraded over total land area (SDG indicator 15.3.1), but also to calculate indicators to track progress towards other SOs (e.g. SO 3-1: Trends in the proportion of land under drought over the total land area). This information is also useful to investigate possible climate impacts, which could potentially be identified by the reduction in size or disappearance of permanent water bodies and the loss of coastline.

Total land area, total water bodies area and total country area require respective estimates to be reported in square kilometres (km2) every five years from 2000 to 2015, and then for the most recent reported year. Land area data is pre-filled in the reporting table SO1-1.T1. Estimates are based on the default land cover data and, as such, they could differ from official national statistics. The pre-filled data is editable and thus can be adjusted. However, it is important to ensure consistency with the land cover data and the SDG indicator 15.3.1 estimates. Any changes are to be justified in the ‘Comments’ column.

Step 2: Identify key degradation processes

Note: Related areas in the PRAIS 4 platform: table SO1-1.T2

Parties are invited to list the most relevant land cover change processes that are likely to result in a depletion of land resources. Key processes might include deforestation, urban expansion or vegetation loss. Some of these processes may be detectable through the image analysis of land cover change, while others may only be evident with field observations. Table 7 shows examples of processes likely to cause land degradation and which are listed as options in the drop-down menu in table SO1-1.T2 of the PRAIS 4 platform. Other processes not covered in the menu can be reported on by selecting the ‘Other’ option.

Table 7*. Example of degradation processes that may be identified by a country and the corresponding land cover transitions*

Degradation process	Starting land cover state	Ending land cover state
Urban expansion	Grassland, cropland, other land	Settlements
Deforestation	Forest land	Grassland, cropland, settlements
Vegetation loss (other)	Forest land, grassland, cropland	Other land
Inundation	Vegetated, settlements, bare soil	Wetland
Woody encroachment	Wetland, grassland	Forest land
Wetland drainage	Wetland	Grassland, cropland, settlements, other land

***Note**: These are simplistic examples and attributing a change in state to degradation requires careful assessment at the national level.*

Step 3: Select a land cover legend

Note: Related areas in the PRAIS 4 platform: table SO1-1.T3

Land cover information should be classified using either the default UNCCD legend comprising seven broad land cover classes for aggregate reporting, or a national land cover legend that allows key country-specific degradation processes to be monitored and which can be harmonized with the seven UNCCD land cover classes.

The default UNCCD land cover legend includes the following seven classes: tree-covered areas, grassland, cropland, wetland, artificial surfaces, other land, and water bodies[1].

It is important to highlight that the objective of SO 1-1 reporting is to capture and document past and ongoing key land cover changes causing land degradation, not to report a fully comprehensive national land cover legend which lists all possible land cover classes occurring within a country. Accordingly, national land cover legends should be customized to only include the minimum number of classes needed to capture and monitor land degradation processes reported on in Step 2.

If a country opts to use a national land cover legend, they should fill in table SO1-1.T3 with national land cover classes showing how they map to the default seven UNCCD land cover classes. Countries are strongly encouraged to build the legend with a limited number of relevant classes. This will make reporting more manageable and would reduce the transitions to be described and reported in Step 4. With reference to the Good Practice Guidance for SDG Indicator 15.3.1, the legend should be:

- *Competent*, for capturing the degradation transitions identified as significant;
- *Usable*, such that available observational data can distinguish between the classes in the legend; and
- *Exhaustive*, such that the entire land area of the country can be attributed to classes from the legend and monitored through time.

Wherever possible, UNCCD encourages Parties to use the Land Cover Meta Language (LCML) of the Food and Agriculture Organization of the United Nations (FAO), which provides a structured approach to land cover definition and interpretation. The LCML is the conceptual and structural backbone of various land cover classifications, including the land cover legend used by the ESA CCI-LC products.

Table 8 shows the conversion between the default UNCCD legend and the ESA CCI-LC legend.

[1] The default UNCCD land cover legend for aggregate reporting is a modified version of the Intergovernmental Panel on Climate Change land use categories, where ‘water bodies’ are separated from ‘wetlands’ and grouped in a seventh class including: lakes, rivers and streams (natural/artificial, standing/flowing, inland/sea), artificial reservoirs, coastal lagoons, and estuaries.

***Table 8**. Default reclassification of the European Space Agency Climate Change Initiative Land Cover legend against the seven land cover classes needed for reporting to the UNCCD*

UNCCD		**European Space Agency Climate Change Initiative Land Cover**	
Code	**Label**	**Code**	**Label**
1	Tree-covered areas	50	Tree cover, broadleaved, evergreen, closed to open (>15%)
		60	Tree cover, broadleaved, deciduous, closed to open (>15%)
		61	Tree cover, broadleaved, deciduous, closed (>40%)
		62	Tree cover, broadleaved, deciduous, open (15–40%)
		70	Tree cover, needle leaved, evergreen, closed to open (>15%)
		71	Tree cover, needle leaved, evergreen, closed (>40%)
		72	Tree cover, needle leaved, evergreen, open (15–40%)
		80	Tree cover, needle leaved, deciduous, closed to open (>15%)
		81	Tree cover, needle leaved, deciduous, closed (> 40%)
		82	Tree cover, needle leaved, deciduous, open (15–40%)
		90	Tree cover, mixed leaf type (broadleaved and needle leaved)
		100	Mosaic tree and shrub (>50%)/herbaceous cover (< 50%)
2	Grassland	110	Mosaic herbaceous cover (>50%)/tree and shrub (<50%)
		120	Shrubland
		121	Shrubland evergreen
		122	Shrubland deciduous
		130	Grassland
		140	Lichen and mosses
		151	Sparse trees (<15%)
		152	Sparse shrub (<15%)
		153	Sparse herbaceous cover (<15%)
3	Cropland	10	Cropland, rainfed
		11	Herbaceous cover
		12	Tree or shrub cover
		20	Cropland, irrigated or post-flooding
		30	Mosaic cropland (>50%)/natural vegetation (tree, shrub, herbaceous cover) (<50%)
		40	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%)/cropland (< 50%)
4	Wetland	160	Tree cover, aquatic or regularly flooded in fresh or brackish water
		170	Tree cover, aquatic, regularly flooded in salt or brackish water, mangroves
		180	Shrub or herbaceous cover, flooded, fresh/brackish water
5	Artificial surfaces	190	Urban areas
6	Other land	200	Bare areas
		201	Consolidated bare areas
		202	Unconsolidated bare areas
		220	Permanent snow and ice

continues on next page

Table 8 – continued from previous page

UNCCD		European Space Agency Climate Change Initiative Land Cover	
Code	**Label**	**Code**	**Label**
7	Water bodies	210	Water bodies

Step 4: Generate a transition matrix

Note: Related areas in the PRAIS 4 platform: tables SO1-1.T4a and SO1-1.T4b

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Land degradation is context-specific and tightly dependent on the characteristics of the environment. Land degradation processes are not independent, and mitigating one may lead to an increase in another form of degradation. By defining a transition matrix, Parties must decide which land cover changes and processes are expected to cause land degradation, improvement or no change.

Table 9 presents an example of a transition matrix for the default UNCCD land cover classes. The matrix shows suggested interpretations of changes in land cover that may result in land degradation or improvement. Parties might use this matrix as a preliminary framework to be evaluated and adjusted through a multi-stakeholder participatory process and in consideration of the national and local conditions.

For completeness, water bodies are also included in the matrix, although the focus of reporting is on total land area for the purpose of calculating SDG indicator 15.3.1. All water body-related transitions are set as 'stable' by default, but Parties may alter these values if changes in the extent of water bodies during the baseline or the reporting period had a significant impact on land cover. It should be noted that any change in the extent of inland water bodies affects the total land area, which needs to be adjusted accordingly.

***Table 9**. Example of a land cover transition matrix using the seven UNCCD land cover classes*

	FINAL CLASS						
	Tree-covered areas	**Grassland**	**Cropland**	**Wetland**	**Artificial surfaces**	**Other land**	**Water bodies**
ORIGINAL CLASS							
Tree-covered areas	Stable	Vegetation loss	Deforestation	Innundation	Deforestation	Vegetation loss	Stable
Grassland	Afforestation	Stable	Agricultural expansion	Inundation	Urban expansion	Vegetation loss	Stable
Cropland	Afforestation	Withdrawal of agriculture	Stable	Inundation	Urban expansion	Vegetation loss	Stable
Wetland	Woody encroachment	Wetland drainage	Wetland drainage	Stable	Wetland drainage	Wetland drainage	Stable
Artificial surfaces	Afforestation	Vegetation establishment	Agricultural expansion	Wetland establishment	Stable	Withdrawal of settlements	Stable
Other land	Afforestation	Vegetation establishment	Agricultural expansion	Wetland establishment	Urban expansion	Stable	Stable
Water bodies	Stable	Stable	Stable	Stable	Stable	Stable	Stable

Note: Land cover change processes are color coded as improvement (green), stable (yellow) or degradation (red). Unlikely transitions are written in red. Note that this is an example of a transition matrix and should not be interpreted as appropriate for countries to adopt without consideration of local conditions and key degradation processes.

Depending on the land cover legend selected in Step 3, Parties will need to provide their interpretation of land cover transitions using tables SO1-1.T4a or SO1-1.T4b for (i) UNCCD default land cover classes; (ii) or national land cover classes, respectively.

The PRAIS 4 platform includes functions to modify the default transition matrix data and assign a '–' or '+' sign to each transition depending on whether it causes a degradation or improvement of the land according to national circumstances. However, if opting to modify the default transition matrix (i.e. table SO1-1.T4a), the transition matrix should first be edited in Trends.Earth so that the reported transitions can be integrated into the calculations of the SO 1-1 outputs and SDG indicator 15.3.1. Editing the transition matrix in PRAIS 4 alone will not result in a recalculation of the spatial data for SO 1-1.

Step 5: Assess available data

UNCCD provides prefilled default data in the PRAIS 4 platform derived from the latest ESA CCI-LC dataset to lighten the reporting burden. However, Parties may report their estimates using national land cover data if they meet the specifications listed in table 10.

***Table 10**. Data specifications for SO 1-1 indicator*

Item	**Specifications**	
	Default data (European Space Agency Climate Change Initiative Land Cover (ESA CCI-LC) product)	**National data**
Type of data	Based on AVHRR, SPOT, PROBA-V and Sentinel-3 satellite imagery	Satellite images of finer resolution from national and international sources, airborne imagery and/or field observation and national/provincial statistics
Classification	36 land cover classes based on the Food and Agriculture Organization of the United Nations (FAO) Land Cover Classification System (LCCS). For reporting purposes, the 36 ESA CCI-LC classes are aggregated to the seven UNCCD classes (see table 8 of this document for aggregation rules).	A land cover classification compatible with the seven UNCCD default classes described in step 2. Ideally, the legend is based on the FAO LCCS/Land Cover Meta Language (LCML) methodology. However, the legend should be concise and only include land cover classes of relevance to the reported land degradation processes.
Temporal coverage	Annual data from the year 2000 onward	Annual data from the year 2000 onward would be the best option. However, the bare minimum would be data for the years 2000 and 2015 (for the baseline) and the latest available year for the reporting period.
Spatial resolution	300 metres (m)	The desired spatial resolution is 100m or finer. If such data is not available, it is recommended to use the default data or data with a resolution higher than that of the default data (300m).
Accuracy	74%	To conform with the data quality of the default land cover product, it is recommended to ensure an overall mapping accuracy of at least 74%.
Metadata	Metadata information is automatically generated with the default data in Trends.Earth.	A list of minimum metadata information is listed in Annex II to this document.

Step 6: Determine the baseline extent of land cover degradation

Note: Related areas in the PRAIS 4 platform: tables SO1-1.T5, SO1-1.T6 and SO1-1.T8

The baseline sets the benchmark against which change in the extent of land cover degradation is compared in subsequent reporting periods. Determining the baseline extent consists of comparing the land cover in the final year of the baseline period (the baseline year, i.e. 2015) with that of the initial year (2000) to estimate what changed (in terms of land cover transitions), calculate the net area change per land cover class and infer the land degradation status based on the transition matrix. Using a consistent baseline is extremely important since it affects the results of change calculations between the baseline and the reporting periods. These changes are used to monitor Parties' progress on SO 1-1.

Default national estimates of land cover change and land cover degradation for the baseline period are made available in tables SO1-1.T6 and SO1-1.T8 of PRAIS 4, respectively. These estimates can be accepted, adjusted or replaced using national data, as appropriate. Supporting comments should be entered into in the comments box provided to justify the modification or replacement of default data. Countries opting to use national data are encouraged to use Trends.Earth for the preparation, analysis and transfer of their data to PRAIS 4. Trends.Earth includes tools to automatically estimate land cover changes and land cover degradation.

Step 7: Estimate land cover degradation

Note: Related areas in the PRAIS 4 platform: tables SO1-1.T1, SO1-1.T5, SO1-1.T7 and SO1-1.T9

Default national estimates of land cover change and land cover degradation for the reporting period are made available in tables SO1-1.T5 and SO1-1.T7, respectively. These estimates are calculated by comparing the land cover in the most recent available year of the reporting period (i.e. 2019 for the default data) with that of the initial year of the reporting period (2016). These estimates can be accepted, adjusted or replaced using national data, as appropriate.

Using the selected data, legend and transition matrix, Parties may produce national estimates of (i) land cover change; (ii) land cover degradation; (iii) land cover improvement; and (iv) no change for the reporting period through Trends.Earth and import the results to the PRAIS 4 platform, where the relevant maps can be created.

Step 8: Verify the results

The remote-sensing interpretation of land cover changes varies greatly across the globe, strongly influenced by the prevailing climatic conditions and land management practices. This may affect the reliability of applying estimates from global data sources to local areas and require inputs from national experts to identify and highlight situations where the confidence level of the obtained results might be low. This input would contribute to a qualitative assessment of the reliability of the estimates.

Step 9: Generate reports

The PRAIS 4 platform enables the reporting of quantitative information on land cover, land cover changes and land cover degradation. In the absence of more accurate and detailed data at the national level, Parties may officially submit to UNCCD the default estimates. For estimates generated using national data, Parties should provide:

- A description of the legend and transition matrix;
- National land cover datasets for the baseline and the reporting period;
- Land cover change information, including a land cover area change matrix and a spatial dataset that shows the areas subject to degradation, improvement or no change based on land cover data.

Information on land cover, land cover changes and land cover degradation should be reported in km2 for the entire country. Reporting on affected areas only should be done via a separate set of forms on the PRAIS 4 platform.

If the default datasets have been replaced with national land cover data, countries are encouraged to upload the relevant geospatial data to PRAIS. Any spatial data uploaded to the system must be supported by appropriate metadata describing the spatial data, as indicated in the metadata upload form.

Default maps or maps generated in Trends.Earth using national data representing land cover, land cover change and land cover degradation for the baseline/reporting period are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- Land cover map of the initial year of the baseline period (2000)
- Land cover map of the final year of the baseline period year (2015)
- Land cover map of the latest reporting year
- Land cover change in the baseline period
- Land cover change in the reporting period
- Land cover degradation in the baseline period
- Land cover degradation in the reporting period.

Parties are also invited to submit narratives on methods and process used and to report on special cases and issues using the ‘General Comment’ field.

1.1.4. Dependencies

Land cover data is used not only to report on SO 1-1, but also to stratify the indicators on land productivity and soil organic carbon (SOC) (SO 1-2 and SO 1-3) and as one of the sub-indicators to calculate the proportion of land that is degraded over total land area (SO 1-4).

The total land area declared under table SO1-1.T1 drives the calculation of subsequent reporting elements across the SOs, which will be listed as dependent on table SO1-1.T1 in the respective section of the reporting manual.

1.1.5. Challenges

Data availability and quality

- Spatial resolution of default data might not always be suitable to accurately represent land cover and its changes at national level, especially for small island developing States (SIDS) or mountainous countries, which need the highest spatial resolution data. Complementing/refining international data analysis with local-scale data, if available, can help improve the quality and reliability of the results.
- For analysis and reporting of change in land cover, it is essential to have consistent data (i.e. data derived from the same data source using the same processing technique) over a long period of time; this is often a challenge at both the national and global levels.
- The validation of national land cover information may need to be cross-checked in the field, also in consultation with local experts. This might be a time consuming and expensive activity to undertake. Validation carried out using different methods and techniques (e.g. samples of field work with existing aerial photography, free high-resolution images available in Google Earth) could considerably reduce costs and resource allocation.

Land cover classification

- National land cover legends and transition matrices may be more accurate in capturing local degradation processes and land cover transitions, but might increase the number of possible land cover transitions to be described to an unmanageable amount. While it is important to include the key land cover transitions in a country, a balance between precision and manageability of the information should be considered.
- Existing national land cover maps and data need to be converted to the seven UNCCD classes. The required aggregation of land cover classes to the seven UNCCD classes can partly degrade the quality of the original data. Documenting the uncertainties and generalizations applied to harmonize data with international standards may inform the conversion process and the accuracy of the outputs.
- Land cover information provided to UNCCD should be consistent over time; changes in the land cover classification methodology require recalculations of previously submitted national estimates.

1.1.6. Summary (main actions)

Key actions for reporting on land cover changes are as follows:

1. **Report on land area**: Information on total land area, the area covered by water bodies and total country area is to be reported in table SO1-1.T1.
2. **Identify the key land degradation processes** through the appropriate consultative process and insert the results in table SO1-1.T2.
3. **Select a land cover legend**, ensuring compatibility with the UNCCD default legend. Insert the legend in table SO1-1.T3 if different from the UNCCD default legend.
4. **Generate a transition matrix**. For each land cover transition, indicate whether it is likely to lead to degradation, improvement or stable conditions. Enter this information in table SO1-1.T4a if the UNCCD land cover legend is used; otherwise use table SO1-1.T4b for national legends.

5. **Select data to be used**; ensure compliance with the minimum specifications listed in table 10.
6. **Determine the baseline extent of land cover degradation** using the selected data, legend and transition matrix for the baseline period 2000–2015. If national land cover data is used, run the calculations in Trends.Earth and enter this information in tables SO1-1.T5, SO1-1.T6 and SO1-1.T8.
7. **Estimate land cover degradation** using the selected data, legend and transition matrix for the reporting period and based on an assessment of change from the baseline. If national land cover data is used, run the calculations in Trends.Earth and enter this information in tables SO1-1.T5, SO1-1.T7 and SO1-1.T9.
8. **Verify the results**: It is recommended that land cover and related land degradation estimates are verified by the concerned national authorities to assess the accuracy of the results and identify any false positive and negative situations which can be reported on in the SO 1-4 forms (SDG indicator 15.3.1).
9. **Generate reports**: Verify the accuracy of the quantitative information entered in the report and include the narrative information on methods and process used.

1.1.7. Further reading

- Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area (version 2). Chapter 3: Land cover and land cover change (https://www.unccd.int/publications/good-practice-guidance-sdg-indicator-1531-proportion-land-degraded-over-total-land).
- Di Gregorio, A., & Jansen, L.J.M. (2000). Land cover classification system (LCCS). Classification concepts and user manual for software version 1.0. Rome: FAO (http://www.fao.org/3/y7220e/y7220e00.htm).

1.2. SO 1-2 –Trends in land productivity

1.2.1. Introduction

Land productivity is the biological productive capacity of the land: the principal source of the food, fiber and fuel that sustains humans. The UNCCD methodology for estimating the proportion of land that is degraded over total land area (i.e. SDG indicator 15.3.1) uses changes in land productivity as an indicator of long-term variations in the health and productive capacity of the land. Land productivity reflects the net effects of changes in ecosystem functioning on plant and biomass growth.

Land productivity is calculated from Earth observation data representing net primary productivity (NPP). Vegetation indices, such as the Normalized Difference Vegetation Index (NDVI) or the Enhanced Vegetation Index (EVI), are often used as proxies for NPP.

The main output of the reporting process for indicator SO 1-2 is a set of officially verified estimates of the extent of five classes of persistent land productivity trajectories within each land cover type, their changes at national-level and their significance in terms of land degradation.

National reporting is facilitated though the provision of default data derived from available global data sources, namely the Land Productivity Dynamics (LPD) dataset of the Joint Research Centre (JRC) of the European Commission.

1.2.2. Prerequisites for reporting

- An in-depth reading of chapter 4 of the Good Practice Guidance for SDG Indicator 15.3.1 providing an overview on land productivity and detailing the methodology used to estimate land productivity changes;
- Data complying with the specifications listed in table 11 below;
- A pool of national experts officially nominated by the national authorities to verify the consistency of the land productivity default data against the situation in the field, or to develop and implement a custom methodology to estimate the three land productivity metrics if national data are preferred to the defaults. Key institutions might include a country's national statistical office, ministry of environment, ministry of agriculture, remote-sensing centre as well as universities and research centres.

1.2.3. Reporting process and step-by-step procedure

Estimating land productivity degradation entails:

1. Producing a land productivity degradation map as a binary representation of degraded/not degraded land in the baseline period;
2. Mapping land productivity dynamics in the reporting period, indicating areas that have degraded, improved or remained stable compared to the baseline.

The step-by-step procedure for reporting is described in the following. If the default data is used, steps 2 to 6 are unnecessary.

Step 1: Select Earth observation dataset

UNCCD provides default data from the LPD dataset of the JRC. The LPD dataset represents five classes of land productivity dynamics from 2000 to 2019. This dataset has a spatial resolution of 1 kilometre, and it is derived from algorithms that combine NDVI time series data from various satellite sensors.

An alternative global dataset is Trends.Earth Land Productivity, derived from the Moderate Resolution Imaging Spectrometer (MODIS) data, which integrates NDVI observations at 250 metre (m) pixel resolution over 16-day periods between 18 February 2000 to now.

Both datasets are available in Trends.Earth.

Parties may evaluate and use these or other datasets, provided they meet the specifications listed in table 11 below.

Parties may also generate their own vegetation index time series directly from the satellite imagery assuming that those images have at least one red and one near infrared band with which to calculate the vegetation index. Depending on the vegetation index chosen, other spectral bands may also be needed.

***Table 11**. Data specifications for SO 1-2 indicator*

Item	**Specifications**	
	Default data (Land Productivity Dynamics (LPD) dataset produced by the Joint Research Centre (JRC) of the European Commission)	**National data**
Input data (Data needed to generate land productivity estimates based on the three metrics described in Steps 2 and 3)	Time series of daily SPOT VGT Normalized Difference Vegetation Index (NDVI) satellite images composited for observation every 10 days (needed to generate the LPD-JRC data)	Time series of appropriate vegetation index derived from satellite images with at least one red and one near infrared spectral band, e.g. Trends.Earth Land Productivity (250m); Sentinel 3 (300m); or Sentinel 2 (10m, 20m and 60m).
Output data (Gridded products resulting from the analysis and combination of the three metrics described in Step 3)	Five classes of persistent land productivity trajectories and land productivity degradation gridded data for the baseline period (2000–2015) and the reporting period (2004–2019)*****	Five classes of persistent land productivity trajectories and land productivity degradation gridded data for the baseline period (2000–2015) and the reporting period (2004–2019)*****
Classification	Five classes of persistent land productivity trajectories and one class for areas without valid land productivity data: 1. Declining 2. Moderate decline 3. Stressed 4. Stable 5. Increasing 6. No data	Six classes compatible with those used by the LPD-JRC: 1. Declining 2. Moderate decline 3. Stressed 4. Stable 5. Increasing 6. No data
Spatial resolution	1 km	The Trends.Earth Land Productivity data at 250m spatial resolution is recommended if data at a finer resolution is not available.
Quality	Specified in the metadata of the dataset. Overall, the assessed accuracy of the dataset is >80%.	To conform with the data quality of the default dataset, it is recommended to ensure an overall mapping accuracy of at least 80%.
Metadata	Metadata information is automatically generated with the default data.	Minimum metadata content as per the mandatory fields are listed in Annex II.

***** *Version 2 of the Good Practice Guidance for SDG Indicator 15.3.1 recommends that productivity Trend is assessed*

over a period of 16 years for both the baseline and reporting periods. This provides a more consistent basis for the assessment of changes in the productivity Trend.

Step 2: Select a productivity index

The NDVI is recommended as the default index for countries to use in the absence of evidence to indicate that an alternative index is better suited to their landscape. Although NDVI is the most widely used and well-known vegetation index, its main limitations are that it can be sensitive to variations in soil background conditions and that it tends to saturate at high vegetation cover and biomass levels. This can reduce the accuracy of NPP, biomass and green cover models in tropical rainforest or arid regions.

Other indices, such as the EVI, may also be suitable. Although some of these indices may perform better than NDVI under some specific vegetation conditions, they may require additional adjustment when applied to vast areas and different land cover types. Consequently, despite its limitations, NDVI is currently considered the universal option for regional- and national-level land productivity calculation, considering that extensive research has demonstrated the strong relationship between NDVI and primary productivity.

Step 3: Estimate annual productivity

The estimation of annual productivity should take into consideration that, due to the natural cycles of growth and senescence of vegetation, NPP is best represented by a time series of observations captured during the full growing season. Therefore, for each pixel location, the annual productivity will be the integral of values from the start to the end of the growing season of the selected productivity index. Areas with increasing NPP should be interpreted as improving, unless assessed otherwise at country level.

Further indications on options to estimate the start and length of the growing season are given in section 4.2.4.1 of the Good Practice Guidance for SDG Indicator 15.3.1.

Step 4: Calculate land productivity metrics

Estimating changes in productivity over time is based on the multi-temporal analysis of the annual productivity using three metrics:

1. **Trend**: measures the trajectory of change in annual productivity over the long term per pixel;
2. **State**: compares the current to historical annual productivity per pixel;
3. **Performance**: indicates the level of local annual productivity over an area compared with other areas with a similar land productivity potential.

The changes observed in each of the three metrics are combined to determine persistent land productivity trajectories represented in five classes comparable with the default dataset provided by JRC (see table 13 below). They are also used to determine whether a pixel is degraded or not degraded in the baseline period and whether a pixel is degrading, improving or stable in the reporting period (see Step 5).

Productivity Trend

To calculate the productivity Trend, Parties should determine the trajectory of change in productivity over a 16-year time interval on a pixel level. The Trend metric is calculated over an interval of 16 years for both the baseline (2000–2015) and the reporting period (i.e. a 16-year period ending in the last year of data being reported (i.e. 2004–2019).

The Trend metric is calculated by fitting a linear regression model to the time series and determining the significance of the trend slope by calculating its z-score. Positive z-scores indicate a trend of increasing productivity, while negative scores indicate decreasing productivity. Z-scores reflect the magnitude of the slope, with scores of higher magnitude indicating greater strength of the ongoing process.

Box 1. What is a z-score

A z-score measures how many standard deviations above or below the mean a data point is. The formula for calculating a z-score is reported below, where ‘z’ is the z-score:

$z = \frac{data\ point–mean}{standard\ deviation}$

Important facts about z-scores:

- A positive z-score indicates that the data point is above average.
- A negative z-score indicates that the data point is below average.
- A z-score close to 0 indicates that the data point is close to average.
- A data point can be considered unusual if its z-score is above or below 3.

As recommended in the Good Practice Guidance for SDG Indicator 15.3.1, z-score intervals may be set as follows:

- z-score < –1.96 = degrading
- z-score < –1.28 AND ≥ –1.96 = potentially degrading
- z-score ≥ –1.28 AND ≤ 1.28 = no significant change
- z-score > 1.28 AND ≤ 1.96 = potentially improving
- z-score > 1.96 = improving

However, for the purposes of UNCCD reporting, the five classes above are simplified into the following three classes:

- z-score < –1.28 = degrading
- z-score ≥ -1.28 AND ≤ 1.28
- z-score > 1.28 = improving

The pixels with the lowest negative z-score level (< –1.28) are considered degraded and other areas are considered not degraded.

Productivity State

Productivity State is determined by comparing the mean annual NPP of the three most recent years to the distribution of annual NPP values observed in the preceding 13 years. More specifically, this entails comparing values for the years 2013–2015 with the years 2000–2012 for the baseline, and the 3 most recent years with the preceding 13 years for the reporting period.

Parties should make the following calculations:

Baseline	**Reporting period**
A = Mean annual NPP 2013–2015	A = Mean annual NPP of the 3 most recent years
B = Mean annual NPP 2000–2012	B = Mean annual NPP of the 13 preceding years
C = Standard deviation 2000–2012	C = Standard deviation of the 13 preceding years
z-score = (A –B) / C	z-score = (A –B) / C

Class definitions for the Z scores are as follows:

- z-score < –1.96 = degraded
- z-score < –1.28 AND ≥ –1.96 = at risk of degrading
- z-score ≥ –1.28 AND ≤ 1.28 = no significant change
- z-score > 1.28 AND ≤ 1.96 = potentially improving
- z-score > 1.96 = improving

Similar to the productivity Trend, the above-mentioned five classes are reduced to three when reporting data to UNCCD:

- z-score < –1.28 = degrading
- z-score ≥ -1.28 AND ≤ 1.28
- z-score > 1.28 = improving

For the purposes of calculating the land productivity sub-indicator, UNCCD recommends considering only the area of the lowest negative z-score level (< –1.96) as degraded. Areas in other z-score classes should be considered as not degraded.

Productivity Performance

In contrast to Trend and State, which are temporal metrics, productivity Performance is a spatial metric involving benchmarking the level of local plant productivity relative to other land units (i.e. other pixels) within the same Land Cover/Ecosystem Functional Unit (LCEU)[2].

Productivity Performance is calculated by comparing the mean annual productivity value per pixel with the maximum productivity index value observed within the same LCEU for a given assessment period. Pixels are considered degraded when their productivity potential is less than a half of the maximum value observed in a

[2] The calculation of productivity Performance is strongly dependent on the definition of the LCEU. Unlike the Trend and State metrics, which assess changes over time, Performance is a spatial comparison, and the results may change if the extent over which the analysis is conducted changes.

given LCEU. The maximum value is in turn defined as the 90th percentile of pixel values in the LCEU (NPP_{max})[3]. Therefore, productivity Performance values close to 1 represent pixels in which productivity is close to the highest level for that land unit in that period.

The resulting dataset would then include only two classes:

- z-score < 0.5 NPP_{max} = degrading
- z-score ≥ 0.5 NPP_{max} = improving

The productivity Performance in the reporting periods should be calculated from the mean of the annual productivity assessments over the years between the previous (or baseline) assessment up to the current year.

Step 5: Combine productivity metrics to assess land productivity degradation in the baseline period

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Note: Related areas in the PRAIS 4 platform: table SO1-2.T5

The outputs obtained from the three metrics are used to estimate the extent of the degraded land in the baseline period.

Table 12 below shows how to transform the outputs of the three metrics into two classes (degraded land/not degraded land) to assess the land productivity degradation status in the baseline period. In the table, ‘Y’ indicates degraded land and ‘N’ indicates land that is not degraded.

Table 12. Combination of productivity metrics to determine whether a pixel is degraded or not degraded

Class combination	Trend	State	Performance	Degraded
1	Y	Y	Y	Y
2	Y	Y	N	Y
3	Y	N	Y	Y
4	Y	N	N	Y
5	N	Y	Y	Y
6	N	Y	N	N
7	N	N	Y	N
8	N	N	N	N

Note: Lookup table indicating combinations of productivity metrics to determine whether a pixel is degraded (‘Y’) or not degraded (‘N’): classes 1 to 5 show degradation. This table complies with the definition of land degradation adopted by the UNCCD, which includes a reduction of biological productivity (i.e. a significantly negative Trend constitutes degradation regardless of the State or Performance metrics).

An alternative approach, suggesting a variant of the above metric combinations, is described in section 4.2.5 and table 4-5 of the Good Practice Guidance for SDG Indicator 15.3.1 for country Parties’ consideration.

[3] To avoid possible overestimation of the maximum value due to the presence of outliers, it is recommended to use the 90th percentile of the productivity values within the land unit as the actual maximum vegetation index value (NPPmax).

The total area of land productivity degradation in the baseline period should be reported in table SO1-2.T5 of the PRAIS 4 platform.

Step 6: Combine productivity metrics to assess land productivity degradation in the reporting period

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Note: Related areas in the PRAIS 4 platform: tables SO1-2.T1, SO1-2.T2, SO1-2.T3, SO1-2.T4 and SO1-2.T6

The outputs obtained from the three metrics are used to estimate the extent of the degraded land in the reporting period. This process is entirely separate from the ‘One Out, All Out’ principle used to estimate SDG indicator 15.3.1.

Table 13 summarizes the combinations of productivity metrics to determine the land productivity dynamics and the land productivity degradation status of each pixel and their relationships. The metrics can be combined into five classes of persistent land productivity trajectories and three classes of land productivity degradation in the reporting period (i.e. ‘improving’, ‘stable’, ‘degrading’).

Parties may use this table to combine custom Trend, State and Performance results derived from national data to estimate land productivity dynamics and degradation.

***Table 13**. Combination of productivity metrics to determine five classes of land productivity dynamics and three classes of land productivity degradation per pixel in the reporting period*

	Changes observed in the three input productivity metrics			**Land productivity dynamics and land productivity degradation status derived from the combination of the three productivity metrics**	
Class combination	**Trend**	**State**	**Performance**	**Land productivity dynamics (5 classes)**	**Land productivity degradation status (3 classes)**
1	Improving	Improving	Stable	Improving	Improving
2	Improving	Improving	Degraded	Improving	Improving
3	Improving	Stable	Stable	Improving	Improving
4	Improving	Stable	Degraded	Improving	Improving
5	Improving	Degrading	Stable	Improving	Improving
6	Improving	Degrading	Degraded	Moderate decline	Degrading
7	Stable	Improving	Stable	Stable	Stable
8	Stable	Improving	Degraded	Stable	Stable
9	Stable	Stable	Stable	Stable	Stable
10	Stable	Stable	Degraded	Stressed	Stable
11	Stable	Degrading	Stable	Moderate decline	Degrading
12	Stable	Degrading	Degraded	Degrading	Degrading
13	Degrading	Improving	Stable	Degrading	Degrading
14	Degrading	Improving	Degraded	Degrading	Degrading
15	Degrading	Stable	Stable	Degrading	Degrading
16	Degrading	Stable	Degraded	Degrading	Degrading
17	Degrading	Degrading	Stable	Degrading	Degrading
18	Degrading	Degrading	Degraded	Degrading	Degrading

Note: The last column illustrates how a pixel' s land productivity degradation status can be inferred from the class of land productivity dynamics obtained from the combination of the three input productivity metrics.

National estimates of land productivity dynamics by land cover type should be reported using tables SO1-2.T1 and SO1-2.T2 of the PRAIS 4 platform for the baseline and reporting periods, respectively. Additionally, national estimates of changes in land productivity dynamics for the main land cover transitions (by area) should be reported in tables SO1-2.T3 and SO1-2.T4 for the baseline and reporting periods, respectively. Land productivity degradation (i.e. derived from the three-class in the last column of table 13) in the reporting period should be reported in table SO1-2.T6.

Step 7: Verify the results

The seasonal dynamics of productivity vary greatly across the globe, strongly influenced by the prevailing climatic conditions and land management practices. This may affect the reliability of applying estimates of land productivity from global data sources to local areas and require inputs from national experts to detect and highlight situations where the confidence level of the obtained results might be low. This input would contribute to a qualitative assessment of the reliability of the estimates.

Step 8: Generate reports

Once verified by the Parties, the estimates of land productivity dynamics and land degradation for the reporting and baseline periods should be officially submitted to UNCCD. Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy in case the estimates are derived from national data. It would also be beneficial to report on special cases and issues, describing any deviation from the default method and providing the rationale to adopt a different methodology. A general comment field is provided at the end of the reporting form in the PRAIS 4 platform for this purpose.

Information on land productivity dynamics and land productivity degradation should be reported in km2 for the entire country.

If the default datasets are replaced with national land cover data, countries are encouraged to make the relevant geospatial data and relevant metadata available in the PRAIS 4 platform.

Maps generated with default or national data on land productivity dynamics and land productivity degradation for the baseline and the reporting period will be created on the PRAIS 4 platform. These maps will include:

- Land productivity dynamics in the baseline period
- Land productivity dynamics in the reporting period
- Land productivity degradation in the baseline period
- Land productivity degradation in the reporting period.

1.2.4. Dependencies

Land productivity data relies on the land cover data reported under SO 1-1 to disaggregate land productivity classes by the seven UNCCD land cover classes. The ‘per cent of total land area’ field in reporting tables SO1-2.T5 and SO1-2.T6 is dependent on the total land area reported in table SO1-1.T1.

1.2.5. Challenges

Data availability and quality

- Spatial resolution of international data might not always be suitable to produce a sufficiently detailed representation of the land productivity dynamics at the national level, especially for SIDS or mountainous countries;
- Land productivity in certain climatic zones where the annual growing season is highly variable or erratic, or where there is sparse or no vegetation, is difficult to accurately measure, resulting in no data for these areas.

Areas of dense vegetation and year-round growth, as in the humid tropics, can also show little variation in productivity, making data unreliable.

Analytical approach

- It is important to consider that applying a 16-year window for the reporting period of land productivity versus a 4-year window for land cover and SOC stock changes will likely increase the impact of productivity (compared to the other indicators) when they are combined to derive the SDG indicator 15.3.1.

1.2.6. Summary (main actions)

Key actions for reporting on land productivity dynamics are as follows:

1. Select image dataset: UNCCD makes available default data, which may be verified and officially accepted. If Parties decide to use alternative data sources, they should verify the compliance with the minimum requirements listed table 11 and follow steps 2 to 6 below;
2. Select a productivity index: NDVI is recommended as the default index; however, countries may choose alternative indexes that are better suited to their local land productivity dynamics;
3. Estimate annual productivity: For each pixel, estimate the annual productivity as the integral of values from the start to the end of the growing season of the selected productivity index;
4. Calculate land productivity metrics: For each pixel, estimate Trend, State and Performance metrics;
5. Combine productivity metrics to assess land productivity degradation in the baseline period: Using table 12 as a guide, combine the metrics to assess whether a pixel is degraded or not degraded in the baseline period;
6. Combine productivity metrics to assess land productivity degradation in the reporting period: Using table 13 as a guide, combine the metrics to determine the land productivity dynamics (five classes of persistent land productivity trajectories) and the land productivity degradation status in the reporting period (three classes of degradation status). If national land productivity data is used, run the calculations in Trends.Earth and enter this information in tables SO1-2.T1 to SO1-2.T6;
7. Verify the results: It is recommended that land productivity and related land degradation estimates are verified by the concerned national authorities to assess the accuracy of the results and to identify any false positive and negative situations which can be reported on in the SO 1-4 forms (SDG indicator 15.3.1);
8. Generate reports: Once verified by the Parties, the data and supporting narrative for the reporting and baseline periods should be officially submitted to UNCCD.

1.2.7. Further reading

- Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area (version 2). Chapter 4: Land productivity (https://www.unccd.int/publications/good-practice-guidance-sdg-indicator-1531-proportion-land-degraded-over-total-land).
- Cherlet, M., Hutchinson, C., Reynolds, J., Hill, J., Sommer, S., von Maltitz, G. (Eds.), World Atlas of Desertification, Publication Office of the European Union, Luxembourg, 2018.
- Trend.Earth website documentation (https://trends.earth/docs/en/).

1.3. SO 1-3 –Trends in carbon stocks above and below ground

1.3.1. Introduction

Carbon stocks reflect the integration of multiple processes affecting plant growth as well as decomposition, which together control the gains and losses from terrestrial organic matter pools. They are elementary to a wide range of ecosystem services, and their levels and dynamics are reflective of soil type, land use and management practices.

As outlined in the UNCCD decision 22/COP.11, soil organic carbon (SOC) stock is the metric currently used to assess carbon stocks and will be replaced by total terrestrial system carbon stock once operational.

The UNCCD methodology for estimating the proportion of land that is degraded over total land area (i.e. SDG indicator 15.3.1) uses SOC stock as an indicator of overall soil quality associated with soil nutrient cycling, soil aggregate stability and soil structure, with direct implications for water infiltration, vulnerability to erosion, and ultimately the productivity of vegetation, and in agricultural contexts, yields.

The main output of the reporting process for SO 1-3 is a set of officially verified estimates of SOC stock in the top 30 centimetres (cm) of soil (in tonnes per hectare) for each of the seven UNCCD land cover classes and land cover transitions, and their significance in terms of land degradation.

National reporting is facilitated though the provision of default baseline data derived from the International Soil Reference and Information Centre (ISRIC) SoilGrids250m dataset, and default estimates of SOC stock changes are derived using a modified Tier 1 Intergovernmental Panel on Climate Change (IPCC) methodology for compiling national greenhouse gas inventories for mineral soils.

Parties may complement/replace these data with national data (Tier 2 method), determining SOC stocks from high spatial resolution digital soil maps or from field measurements. Parties competent in more complex methods of reporting SOC stocks involving ground measurements and modelling can adopt the Tier 3 method.

1.3.2. Prerequisites for reporting

- An in-depth reading of chapter 5 of the Good Practice Guidance for SDG Indicator 15.3.1, which provides basic information on the processes regulating the formation and release of SOC stocks and detailing the methodology used to estimate SOC changes;
- Data complying with the minimum standards listed in table 14 below;
- A pool of national experts officially nominated by the national authorities to verify the results of the SOC analysis or develop and implement a custom methodology if national data is used instead of the defaults. Key institutions might include a country’ s national statistical office, ministry of environment, ministry of agriculture (especially the soil department), remote-sensing centre, as well as universities and research centers;
- An understanding of the Tier levels of reporting and a decision on what Tier level is appropriate for the country before attempting the reporting process.

1.3.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following. If Parties decide to use the default data (i.e. adopt the Tier 1 method), steps 2, 3 and 4 are unnecessary.

Step 1: Select the estimation method

Parties may use three methods to determine baseline SOC stocks and estimate changes in SOC stocks. These methods are consistent with the IPCC guidelines[4] and include datasets and processing options with increasing levels of accuracy and complexity.

- The **Tier 1 method** uses broad methods with default data, and it is valuable where country-specific data and capacities are scarce or unavailable. SOC stock change estimates are informed by the equations in the IPCC guidelines, which are summarized in chapter 5 of the Good Practice Guidance for SDG Indicator 15.3.1.

  The Tier 1 method assumes that following land use/management changes, carbon stock changes occur over a 20-year period, after which a new equilibrium stock is reached. The Tier 1 method uses information on land cover change, along with stock change factors (i.e. a land use factor, a management factor and an input factor, where available) to estimate changes in carbon stock. The SOC stock baseline is based on reference SOC stocks under natural vegetation, stratified by climate/soil type. As an alternative to IPCC default values, reference stocks can be determined from global digital maps of SOC.

  For change factors, the Tier 1 method is strongly reliant on land cover change and/or land management change to estimate changes in SOC stocks as well as the delineation of wetland areas as a proxy for organic soils.

  The influence of land use and management on SOC is different in mineral versus organic soil types. Carbon stocks in organic soils are not explicitly computed using the Tier 1 method, which estimates only annual carbon flux from organic soils. For organic soils, the method uses an annual emission factor to estimate the losses of carbon following drainage and/or fire. Losses from organic soils are estimated using an adaptation of Equation 2.2 from chapter 2 of the IPCC Wetlands Supplement.

  A detailed description of the Tier 1 method is provided in section 5.2.6.1 of the Good Practice Guidance for SDG Indicator 15.3.1.

- The **Tier 2 method** makes use of additional country-specific data to complement default values, such as country-specific change factors, reference SOC stocks, climate regions, soil types, and/or land management classification systems. Country-specific values may be derived for all of these components, or any subset which would then be combined with default values. Reference SOC stocks can be determined from national digital soil maps or from measurements taken from national soil surveys.

  A detailed description of the Tier 2 method is provided in section 5.2.6.2 of the Good Practice Guidance for SDG Indicator 15.3.1.

- The **Tier 3 method** is the most complex, involving ground measurements and modelling, and it is only recommended for countries with adequate technical capacity and data. It incorporates more advanced methods which better capture annual variability in fluxes, such as country-specific digital soil mapping

[4] 2006 IPCC Guidelines for National Greenhouse Gas Inventories and its 2019 Refinement, as well as the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands.

and time-series spatial land use/management and climate data, combined with calibrated and validated process-based models and/or a measurement-based inventory with a monitoring network.

Step 2: Assess available data

UNCCD provides prefilled data in the PRAIS 4 platform. The ISRIC SoilGrids250m dataset is used to obtain a default SOC stock baseline. Default estimates of SOC stock changes are based on a modified Tier 1 method for mineral soils[5]. Since there are currently no known global data at a sufficient resolution to obtain information for the management and input change factors, the dynamic component informing SOC trends is land cover used as a proxy for land-use change.

However, Parties may report their estimates using national SOC stock data (adopting the Tier 2 or Tier 3 approach) if they meet the specifications listed in table 14.

[5] For more information see: ‘Default data: methods and interpretation. A guidance document for 2018 UNCCD reporting’ available at: https://prais.unccd.int/sites/default/files/helper_documents/3-DD_Guidance_EN_1.pdf.”).

***Table 14**. Data specifications for SO 1-3 indicator*

Item	Specifications	
	Default data	**National data**
Input data (to generate the soil organic carbon (SOC) stock estimates)	International Soil Reference and Information Centre (ISRIC) SoilGrids250m dataset	Ground observations and measurements
Output data (Gridded products of SOC stock estimates)	Annual gridded products of SOC stocks for the baseline and reporting periods	Gridded products of SOC stocks for the baseline and reporting periods, with as close to annual data as possible
Classification	Continuous values of SOC content (tonnes) in the first 30 cm of soil. An arbitrary >10% net reduction in SOC stocks in the first 30 cm of soil in 20 years is used as the threshold to determine degradation.	An arbitrary >10% net reduction in SOC stock in the first 30 cm of soil between the baseline and the reporting period is suggested as a threshold to determine degradation.
Spatial resolution	250m	The desired spatial resolution is 100m or finer.
Quality	Accuracy of ISRIC’ s SoilGrids250m dataset between 30% and 70%	Not less than the default data
Metadata	Metadata information is provided with default data in Trends.Earth.	Minimum metadata content as per the mandatory fields are listed in Annex II.

Parties that are members of the Global Soil Partnership and are opting to use the Tier 2 method may also consider the Global Soil Organic Carbon Map (GSOCmap) as an alternative to the default SOC stock baseline data.

Other relevant data sources are listed in Appendix C of the Good Practice Guidance for SDG Indicator 15.3.1.

Step 3: Determine the baseline soil organic carbon stock and degradation status

Estimating change in the extent of SOC degradation over time requires calculating the extent of SOC degradation in the baseline period. This involves comparing estimated SOC stocks in the year 2015 (the baseline year) with one other previous year (usually the year 2000) to measure change in SOC stocks for each land cover type. The absolute numerical value of the SOC stocks for each land cover class in the baseline period is quantified by averaging annual values across an extended (10–15 year) period prior to the year 2015 (t0). The availability of annual land cover products allows for the extrapolation of a trend fitted to historical SOC data.

For example, in the default dataset provided for the baseline period, SOC changes were obtained from a combination of the SoilGrids250m data and the ESA CCI-LC annual data, and estimated using the IPCC change factors averaged over 20 years and then applied on an annual basis within the 2000–2015 period.

The Good Practice Guidance for SDG Indicator 15.3.1 includes the following two options for estimating the initial baseline status (t0) at differing temporal scales for the SOC stocks metric:

1. Set a benchmark of SOC stocks with which to compare change, in other words, assess whether the average

SOC stocks in the baseline period are low, high or average relative to some potential value for a given climate or soil type and determine the degradation status (i.e. degraded/not degraded). The updated IPCC reference (from the 2019 Refinement of the IPCC guidelines) for SOC stocks under native vegetation, reflecting default climate regions and soil types, could be considered a benchmark, but ideally, national benchmarks (e.g. derived from largely undisturbed systems) would be used. The determination of the initial baseline status would then be estimated by comparing the observed average value with the benchmark using defined upper and lower bounds. If the estimated SOC stocks are below the lower bound of the benchmark, the area is considered degraded. This option is affected by the accuracy of the updated 2019 IPCC defaults for SOC reference stocks, which, although they improve upon the 2006 IPCC default values, in some cases still carry significant errors.

2. Use the change/status over the baseline period (2000–2015) to set the initial baseline degradation status of each pixel (a similar approach to the one used for land productivity). Because SOC stocks are likely to change over longer (multi-annual to decadal) timeframes, the recommendation is to use 'epochs' (e.g. comparing 2013–2015 SOC stock with 2000–2002 SOC stock) rather than single year values to determine 'trajectory' and relative change. The two epochs are then compared to determine changes within the baseline period. Negative changes, with an arbitrary >10% decline in SOC, constitute SOC degradation.

At higher tiers, the assessment of SOC stock change for the baseline period may rely on the integration of geospatial data with diverse sources, such as field experiments, paired sites, monitoring sites, scientific studies, and land management surveys. In this context, baselines could be derived in two distinct ways:

- As estimates of total SOC stocks for a particular land use/management stratification, which could be derived from global datasets by applying default values to the land cover data, or using a national approach where countries use national data and methods yielding results comparable to the ones generated by default methods;
- As spatially explicit baselines, where the appropriate resolution would need to be defined (the suggested spatial resolution is 100m). The PRAIS 4 platform includes prefilled baseline SOC data per land cover class, but also allows Parties to enter their own SOC data in the reporting tables.

The PRAIS 4 platform includes prefilled baseline SOC data per land cover class, but also allows Parties to enter their own SOC data in the reporting tables.

Step 4: Estimate change in soil organic carbon stock

Note: Related areas in the PRAIS 4 platform: tables SO1-3.T1, SO1-3.T2, SO1-3.T3 and SO1-3.T5

The recommended method to estimate SOC stock changes uses the trend (or the direction of change) of SOC stocks observed within the reporting period as well as the magnitude of the relative change in SOC stocks between the baseline and the reporting period. This approach only assesses whether there has been a (significant) negative change between the baseline and the reporting period and makes no assumptions about the initial status of SOC stocks.

Once the baseline SOC stocks (SOC_{t0}) and the SOC stocks at the end of the reporting period (SOC_{tn}) for a given reporting unit have been consistently estimated (using any of the Tier 1–3 methods), the relative percentage change in SOC stocks is calculated as follows:

$T_{SOC} = ((SOC_{tn} - SOC_{t0})/ SOC_{t0}) \times 100$

Where:

T_{SOC} = relative change in soil organic carbon for reporting unit (%)

SOC_{t0} = baseline soil organic carbon stock for reporting unit (tons of carbon per hectare)

SOC_{tn} = soil organic carbon stock for final reporting period for reporting unit (tons of carbon per hectare).

For assessing changes in SOC stocks, UNCCD suggests two alternative approaches:

1. The first method is based on tests for statistical significance and compares the average SOC stock with the upper and lower bounds of the average baseline SOC for the same unit of land. If the average for the same unit of land falls:
    - a) Outside the lower bounds of the 95 per cent confidence interval (measured as twice the standard deviation), the area would be considered degraded (significant decline in SOC);
    - b) Outside the upper bounds of the 95 per cent confidence interval (measured as twice the standard deviation), the area would be considered improved (significant increase in SOC);
    - c) Within the 95 per cent confidence interval, the area would be considered stable (no transition).

    An alternative statistical approach would be to assess the 95 per cent confidence interval of the difference in SOC stocks between the baseline and the reporting period for each unit of land by combining uncertainties as described above. If the 95 per cent confidence interval of the difference does not cover zero, then the change is significant.

    Given the high spatial variability of the data for SOC stocks, it may happen that confidence intervals are large, and thus the two statistical approaches described above may not detect significant change even if degradation is occurring.
2. The second method is to assess both the direction of change and magnitude of the relative percentage change in SOC stocks, relative to some defined threshold, between the baseline and reporting period. Then, for SOC stocks, the method of determining the status of change will be defined as:
    - a) Degraded: Reporting units with more than, for example, a 10 per cent average net reduction in SOC stocks between baseline and current observations;
    - b) Not degraded: Reporting units with less than, for example, a 10 per cent average net reduction, no change or an average net increase in SOC stocks between baseline and current observations.

As a starting point, an arbitrary >10 per cent change threshold is suggested. Subsequent refinement and justification of this threshold value will be needed.

Parties may decide to use a different threshold than 10 per cent based on their knowledge of the country and the analysis of national data.

The PRAIS 4 platform includes prefilled data for the reporting period derived from the default data to be accepted by the Parties or replaced with national data. Parties opting to use their own SOC data are encouraged to use Trends.Earth to (i) estimate changes in SOC; and (ii) identify potentially degraded areas.

Step 5: Verify the results

The default method draws on data generated from the assessment of land cover change in combination with reference and emission factors obtained from the IPCC default tables corresponding to broad continental land cover types and management regimes. As such, derived estimates provide limited resolution of how carbon stocks vary subnationally and have great uncertainty. This may affect the reliability of the estimates of SOC changes when applied to local areas. Therefore, inputs from national experts are necessary to detect and highlight situations where the confidence level of the obtained results might be low. This input would contribute to a qualitative assessment of the reliability of the estimates.

Step 6: Generate reports

Parties adopting the Tier 1 approach may officially submit the default data made available in the PRAIS 4 platform. Table SO1-3.T1 of the PRAIS 4 platform displays pre-calculated estimates of SOC stocks in the topsoil (to 30 cm depth) per land cover class at national level expressed in tonnes/hectare. This default data should be verified by the Parties before submission, or replaced with alternative national data sources if opting for the Tier 2 or Tier 3 approach.

Changes in SOC stocks for each land cover change (calculated by Trends.Earth) are reported in tables SO1-3.T2 and SO1-3.T3. Data includes the net area change in km2 and the initial, final and change in SOC stocks both for the baseline and reporting periods. The results of the SOC degradation analysis based on SOC stock changes is reported in tables SO1-3.T4 and SO1-3.T5.

Maps with default or national data representing SOC stocks, SOC stock changes and SOC degradation for the baseline and the reporting period are accessible via the PRAIS 4 platform. These include:

- SOC stock in the initial year of the baseline period (2000)
- SOC stock in the baseline year (2015)
- SOC stock in the latest reporting year
- Change in SOC stock in the baseline period
- Change in SOC stock in the reporting period
- SOC degradation in the baseline period
- SOC degradation in the reporting period.

For estimates derived from national data, Parties may also provide a description of the methodology used to estimate SOC stocks, SOC stock changes and the relative SOC degradation using the ‘General Comment’ field.

1.3.4. Dependencies

Estimates of SOC stock changes are dependent on the land cover data reported under SO 1-1 and the total land area reported in table SO1-1.T1.

1.3.5. Challenges

Data availability

- Detailed data on SOC stock are generally unavailable both at global and national levels. Current data are derived from a combination of contemporary and legacy data and are not fully integrated and consistent over time. Future data improvements must include standardization, accessibility, higher spatial resolution and improved uncertainty estimates;
- SOC stock changes are primarily computed from land cover changes, while management and input factors are often not included because of lack of data. Usable methods to consistently collect and process relevant data to include management factors in the estimations of SOC should be considered for future reporting.

Unresolved issues

- There is a challenge associated with drylands which lack topsoil. There is a need to update the methodology to take such special cases into full consideration and adjust the calculations accordingly;
- Soil erosion and/or deposition may have significant effects on measured SOC stocks, but their effects on stock changes are included in the estimates of land-use and land-cover changes. Parties may consider including soil erosion and/or deposition as parameters for the implementation of the Tier 3 method.

1.3.6. Summary (main actions)

Key actions for reporting on SOC changes are as follows:

1. **Select the estimation method:** Parties may opt for one of the three proposed Tier methods to report national data to UNCCD, depending on their technical capacity to estimate SOC stock changes and on the availability of national data;
2. **Assess available data:** Based on the Tier level deemed most appropriate for reporting in the respective country, evaluate the suitability of the default data. If unsuitable, select alternative data sources and ensure compliance with the minimum specifications listed in table 14 above;
3. **Determine the baseline SOC stock and degradation status:** Estimate the average SOC stock in the topsoil (0–30 cm) for each land cover class and infer the initial degradation status within the baseline period (t0) using one of the two options presented in Step 2. By default, the relative SOC change in the baseline period (2000–2015) will be used to determine the baseline degradation status;
4. **Estimate change in SOC stocks:** For the major land cover transitions, report the net change in SOC. Indicate whether there has been SOC degradation, improvement or no significant change (stable) based on the estimated SOC stock changes between the baseline and the reporting period. A statistical approach based on the significance of change or a relative approach based on the percentage change can be adopted.

By default, land units with relative declines of >10 per cent in SOC stock between the baseline and reporting periods are considered degraded;

5. **Verify the results:** It is recommended that SOC changes and related land degradation estimates are verified by the concerned national authorities to assess the accuracy of the results and identify any false positive and negative situations which can be reported on in the SO 1-4 forms (SDG indicator 15.3.1);
6. **Generate reports:** Verify the default data provided in the PRAIS 4 platform (for the Tier 1 approach) or replace it with national data (for the Tier 2 or Tier 3 approaches). Include the narrative required to describe the national context of land degradation based on SOC changes.

1.3.7. Further reading

- Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area (version 2). Chapter 5: Carbon Stock, Above and Below Ground (https://www.unccd.int/publications/good-practice-guidance-sdg-indicator-1531-proportion-land-degraded-over-total-land).
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- ‘Default data: methods and interpretation. A guidance document for 2018 UNCCD reporting’ (https://prais.unccd.int/sites/default/files/helper_documents/3-DD_Guidance_EN_1.pdf).

1.4. SO 1-4 –Proportion of land that is degraded over total land area (Sustainable Development Goal indicator 15.3.1)

1.4.1. Introduction

Land degradation is defined as ‘the reduction or loss of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices[7]’.

Using the three indicators SO 1-1, SO 1-2 and SO 1-3 (hereinafter referred to as subindicators), UNCCD reporting will estimate the proportion of land that is degraded over total land area, which is also SDG indicator 15.3.1 and the only indicator used to track progress towards target 15.3: ‘By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world’. In line with decision 15/COP.13, the information compiled in national reports will be used by the secretariat, in its capacity as the custodian agency for SDG indicator 15.3.1, to contribute to the overall follow-up and review by the High-level Political Forum on Sustainable Development.

[7] Article 1 of the United Nations Convention to Combat Desertification.

Knowing the extent and location of degraded land is instrumental to achieving land degradation neutrality (LDN) at national level and supporting Parties in setting national voluntary targets.

SDG indicator 15.3.1 is reported as a single figure expressed in km2 quantifying the area of land that is degraded as a proportion of total land area, which is defined as the total surface area of a country excluding the area covered by inland waters, like major rivers and lakes.

UNCCD facilitates reporting on SDG indicator 15.3.1 by providing pre-filled data in the PRAIS 4 platform with values derived from default datasets.

Parties have the option to identify areas of ‘false negative’ or of ‘false positive’ errors in the identification of degradation. The reporting form in the PRAIS 4 platform allows for a full description of these sites, including their geographical locations, the delineation of their extents and the processes driving the false negative/false positive interpretations.

Parties are also encouraged to identify ‘hotspots’ and ‘brightspots’ as areas experiencing the most evident and dramatic changes in (i) land degradation; and (ii) improvement, respectively.

1.4.2. Prerequisites for reporting

- An in-depth reading of chapter 2 of the Good Practice Guidance for SDG Indicator 15.3.1;
- A pool of national experts officially nominated by the national authorities to verify the reliability of the land degradation estimates. Key institutions might include a country’s national statistical office, ministry of environment, ministry of agriculture, ministry of water resources, remote-sensing centre, as well as universities and research centers. Consultation with the national statistics office is particularly important given its responsibility to review and validate national estimates of SDG indicator 15.3.1 prior to the final submission to the United Nations Statistics Division for inclusion in the Sustainable Development Goals Report and the Global SDG Indicators Database.

1.4.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following. If Parties decide to use the default data, step 1 is unnecessary.

Step 1. Calculate Sustainable Development Goal indicator 15.3.1

Note: Related areas in the PRAIS 4 platform: table SO1-4.T1

In order to calculate SDG indicator 15.3.1, the results of the degradation analysis for each of the subindicators are integrated using a One-Out All-Out (1OAO) method in which a significant reduction or negative change in any one of the three subindicators is considered to comprise land degradation. The result is a binary assessment where a land unit (pixel) is either degraded or not degraded.

The analysis of change in degradation involves first establishing a baseline of land degradation. The baseline sets the benchmark extent of land degradation against which progress towards achieving SDG target 15.3 and LDN is

assessed in the reporting period. In practical terms, for the purposes of calculating SDG indicator 15.3.1, tracking change in the extent of degraded land is a three-step process:

1. Calculate the extent of degradation in the baseline period (t0) from 1 January 2000 to 31 December 2015 to set the benchmark for measuring progress towards achieving SDG target 15.3;
2. Calculate the extent of degradation in the reporting period (tn) by summing (i) areas of land where changes in the subindicators are considered to indicate new degradation; and (ii) areas of land that have persisted in a degraded state since the baseline period (i.e. have not improved to a non-degraded state);
3. Calculate the change in extent of degradation between the baseline and reporting periods.

The total area of degraded land for the baseline, the reporting period and the change of the area between the two periods should be reported in table SO1-4.T1. In addition, Parties can report additional information on the method used, for example if different from the 1OAO approach, as well as indicate the level of confidence of the estimates (high, medium or low).

Step 2. Identify false positives and false negatives

Note: Related areas in the PRAIS 4 platform: : table SO1-4.T3

Parties have the option to identify areas of:

- ‘False positive’ degradation, where the 1OAO process has incorrectly indicated that an area is not degraded even though the change in land condition is considered sufficiently negative to qualify as degraded in the context of SDG indicator 15.3.1; and
- ‘False negative’ degradation, in which the outcome of the 1OAO process has incorrectly resulted in an area being identified as degraded.

What are false positives?

An example is a woody weed invasion of a grassland, which may raise the apparent plant productivity even though the outcome in terms of the change in land condition would normally be negative. This is a false ‘positive’ or apparent improvement in land condition. In the 1OAO process, the area undergoing woody encroachment would be incorrectly indicated as not degraded even though the change in land condition is considered to be sufficiently negative to qualify as degraded in the context of SDG indicator 15.3.1. A similar outcome arises in lands invaded by alien plant species.

What are false negatives?

An example is the inverse of the above problem where woody weeds (or invasive plant species) are removed as part of a remediation process, causing a reduction in apparent productivity. This would normally lead to an indication of degradation even though the intention is to restore degraded lands. In the 1OAO process, the remediated area would be incorrectly labelled as being degraded.

In areas where a false positive or false negative degradation outcome is identified, Parties can use the PRAIS 4 spatial data viewer to provide further spatial detail in addition to the reporting fields in table SO1-4.T3. Spatial delineation of false positive and negative areas should only be carried out where countries are confident that they know the timing, location and extent of these counterintuitive processes. However, in reporting spatially, Parties

can then opt to recalculate the outcomes of the 1OAO process through Trends.Earth and import the recalculated results. Without spatial delineation of the false positive and/or negative area, there will be no material impact on the reporting data.

Reporting on false positive and negative extents using the PRAIS 4 platform requires filling in table SO1-4.T3. The PRAIS 4 spatial data viewer supports the filling in of this table with spatial information (in vector format). However, it remains an optional element and the table can still be filled in without the provision of spatial data. Information about the location of the sites, the areal extent of the site (auto-filled by the PRAIS 4 spatial data viewer, if used), the processes behind the false positive/false negative outcome and the basis for their judgement should be reported in addition to the period when the false negative or false positive process started. For those Parties using the PRAIS 4 spatial data viewer to delineate the extents, an informative graphic can be used to interpret the percentage of the total area delineated that is degraded or improved per subindicator. This graphic chart should be used as a guide to understand what subindicator is driving the false positive or negative process being reported within the polygon extent provided.

Step 3. Assess hotspots and brightspots

Note: Related areas in the PRAIS 4 platform: tables SO1-4.T4 and SO1-4.T5

UNCCD encourages Parties to signal areas experiencing the most evident and dramatic change. These are defined as:

- Hotspots: areas that are highly vulnerable to degradation in the absence of urgent remediation activities;
- Brightspots: areas that do not exhibit any signs of degradation, or which have been remediated from a degraded state by implementing appropriate remediation activities or through land planning processes to prevent degradation.

Knowledge about location and type of hotspots/brightspots may facilitate the development of plans of action to redress degradation, including through the conservation, rehabilitation, restoration and sustainable management of land resources.

Hotspots and brightspots are reported in tables SO1-1.T4 and SO1-1.T5 of the PRAIS 4 platform, respectively. Parties are invited to enter relevant information such as location, area, the adopted assessment process, the drivers/processes determining the status of the land, and remediation actions taken and planned. These are spatial tables and therefore should be completed with the support of the geographic information system tools available in the PRAIS 4 spatial data viewer. This is an additional and optional element, but such location-based information can strengthen spatial approaches to sustainable land management and help integrate responses to land degradation at the landscape scale. In addition, UNCCD can use these spatial data to create improved information products to demonstrate the impact of the Convention.

Step 4. Generate reports

Once verified by the Parties, the estimates of land degradation data for the reporting and baseline periods should be officially submitted to UNCCD. Special or anomalous situations and noticeable issues related to the data interpretation that may affect the reliability of the reported values should be described in the narrative. A 'General Comment' field is provided at the end of the reporting form of the PRAIS 4 platform for this purpose.

Information on land degradation should be reported in km2 for the entire country.

Default maps or maps generated in Trends.Earth using national data representing land degradation for the baseline/reporting period are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- Proportion of land that is degraded over total land area (SDG indicator 15.3.1) in the baseline period
- Proportion of land that is degraded over total land area (SDG indicator 15.3.1) in the reporting period
- Degradation hotspots (for countries that provide spatial data in the PRAIS 4 platform)
- Improvement brightspots (for countries that provide spatial data in the PRAIS 4 platform).

1.4.4. Dependencies

SDG indicator 15.3.1 relies on the total land area reported in table SO1-1.T1. Modifying that number will therefore alter the indicator's value.

The 'Area' fields of the spatial tables SO1-4.T3, SO1-4.T4 and SO1-4.T5 have a dependency on spatial data created by countries using the PRAIS 4 spatial data viewer. However, they can also be filled in manually without providing supporting spatial data.

1.4.5. Summary (main actions)

Key actions for reporting on the SDG indicator 15.3.1 are as follows:

1. **Calculate the proportion of land that is degraded over total land area (SDG indicator 15.3.1)**: Using the 1OAO approach to combine the three subindicators, calculate the extent of degradation in the baseline period and in the reporting period. The extent of degradation in the reporting period is calculated by summing (i) areas of land where changes in the subindicators are considered to indicate new degradation; and (ii) areas of land that have persisted in a degraded state since the baseline period (i.e. have not improved to a non-degraded state).
2. **Identify false positive and false negative processes** and provide the relevant justification to support their assessment. Where countries are confident in reporting the location and extent of these processes and in recalculating the 1OAO process for SDG indicator 15.3.1 with the identified areas accounted for, they should use the PRAIS 4 spatial data viewer to do so (table SO1-4.T3).
3. **Assess hotspots of land degradation and brightspots of land improvement**, indicating their locations, extents, and actions taken and/or planned to manage them and ensure the sustainable development of the areas (tables SO1-4.T4 and SO1-4.T5). Countries are encouraged to report on hotspots and brightspots using the PRAIS 4 spatial data viewer.

1.4.6. Further reading

- Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area (version 2). Chapter 2: SDG Indicator 15.3.1: Proportion of land that is degraded over total land area (https://www.unccd.int/publications/good-practice-guidance-sdg-indicator-1531-proportion-land-degraded-over-total-land).
- Scientific Conceptual Framework for Land Degradation Neutrality (https://knowledge.unccd.int/publication/ldn-scientific-conceptual-framework-land-degradation-neutrality-report-science-policy).

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2. Strategic objective 2: To improve the living conditions of affected populations

2.1. SO 2-1 –Trends in population living below the relative poverty line and/or income inequality in affected areas

2.1.1. Introduction

Indicator SO 2-1 estimates the well-being of populations in monetary terms.

Two metrics are used for this purpose and Parties should specify which metrics they would like to use:

- Proportion of the population below the international poverty line, or
- Income inequality.

These metrics can be used interchangeably according to country-specific conditions.

The proportion of the population below the international poverty line is generally considered relevant to less developed countries, where extreme poverty and destitution are core development challenges. The international poverty line is currently set at USD 1.90 a day, based on 2011 purchasing power parity. Therefore, the proportion of the population below the international poverty line is defined as the percentage of the population living on less than USD 1.90 a day at 2011 international prices.

Income inequality is a useful metric for both low-income and middle-income countries as it estimates the extent of wealth distribution in a region. It is estimated through the Gini index. The Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

National reporting is facilitated though the provision of default data. As the proportion of population below the international poverty line by sex, age, employment status and geographical location (urban/rural) is also a Sustainable Development Goal (SDG) indicator (SDG indicator 1.1.1), default data is pre-filled from the SDG database. For income inequality (i.e., the Gini index), default data is pre-filled from the World Bank database[1].

[1] https://data.worldbank.org/indicator/SI.POV.GINI?end=2015&start=1979&view=map

2.1.2. Prerequisites for reporting

- An in-depth reading of SDG indicator 1.1.1 metadata and Gini index metadata (see section 2.1.7).
- Data complying with the specifications listed in table 15.
- A pool of national experts officially nominated by the national authorities to verify the suitability and consistency of the default data against the situation in their country, or to identify and compile data using national sources for the three metrics. Key institutions might include a country's national statistical office and the ministry of finance, as well as universities and research centres.

2.1.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following.

Step 1: Choose the most suitable metric

Parties are invited to choose the most suitable metric to represent the well-being of the population in their countries.

Step 2: Identify the relevant dataset

The proportion of population below the international poverty line data is pre-filled from the SDG database, while income inequality (Gini index) data is pre-filled from the World Bank database.

Parties may also use national data, provided it complies with the data specifications listed in table 15.

Table 15*. Data specifications for SO 2-1 Indicator*

Item	**Specifications**	
	Default data (Sustainable Development Goal indicator 1.1.1 data and Gini index World Bank data)	**National data**
Data type	Annual data on one of the two metrics for the period 2000–2019.	Annual data on one of the two metrics for the period from 2000 to the latest available year for the reporting period.
Spatial resolution	Country level	Country or sub-national levels
Quality	Specified in the datasets' metadata.	To be indicated in the dataset metadata.
Metadata	Metadata information is provided with default data.	Minimum metadata content as per the mandatory fields listed in Annex II.

Step 3: Report national annual values of the chosen metric and interpret the data

Note: Related areas in the PRAIS 4 platform: tables SO2-1.T1, SO2-1.T2 and SO2-1.T3

Parties opting to use an alternative source of national data may enter the relevant national annual values in tables SO2-1.T1 or SO2-1.T2, according to the chosen metric.

To assist in the data interpretation, countries are encouraged to visualize their respective metrics by means of a graph (graphs for each country are available on the World Bank website). While it may be difficult to attribute specific causal factors to changes in the metrics, countries may indicate which direct and/or indirect drivers are presumably behind the observed changes and report this information in the Qualitative Assessment table (i.e., Table SO2-1.T3).

Step 4: Verify the results

The reliability of the estimates from global data sources requires inputs from national experts to detect and highlight situations where the confidence level of the obtained results might be low. This input would contribute to a qualitative assessment of the reliability of the estimates.

Step 5: Generate reports

Once verified by the Parties, the estimates of the proportion of population below the international poverty line, or income inequality should be officially submitted to the United Nations Convention to Combat Desertification (UNCCD). Observed changes and their interpretation may be described in the "Qualitative Assessment" table of the PRAIS 4 platform.

Optionally, Parties may include additional information in the General Comment field to describe specific country situations. Sub-national disaggregated data (e.g., per administrative division, urban vs rural, affected areas or other socio-economic strata, e.g., sex-disaggregated data) may be useful to identify where the most significant poverty/income inequality hotspots/brightspots are located.

Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy in the event that the estimates are derived from national data. It would also be beneficial to report on special cases and issues, describing any deviation from the default method and providing the rationale to adopt a different methodology.

2.1.4. Dependencies

Indicator SO 2-1 has no dependencies from other SO, however it could be used in the calculation of the Drought Vulnerability Index (DVI) for indicator SO 3-3.

2.1.5. Challenges

Data availability and quality

- International global data only generically describes the well-being of the population in a country and might not capture specific situations in need of consideration. More detailed sub-national data might be needed to represent the economic situation at the local level.

2.1.6. Summary (main actions)

Key actions for reporting on indicator SO 2-1 are as follows:

1. **Choose the most suitable metric**: Parties are encouraged to choose the most suitable metric to represent the well-being of the population in their countries.
2. **Identify the relevant dataset**: Parties may decide to use the default data or alternative national sources.
3. **Report national annual values of the chosen metric and interpret the data**: Parties are invited to report, visualize and interpret the national annual data.
4. **Verify the results**: the reliability of the estimates from global data sources requires inputs from national experts to qualitatively assess the reliability of the estimates based on expert knowledge.
5. **Generate reports**: once verified by the Parties, the data and supporting narrative should be officially submitted to the UNCCD.

2.1.7. Further reading

- SDG indicator 1.1.1 metadata (https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf)
- Gini index metadata (https://databank.worldbank.org/metadataglossary/world-development-indicators/series/SI.POV.GINI)

2.2. SO 2-2 –Trends in access to safe drinking water in affected areas

2.2.1. Introduction

Having access to water is a key determinant of child survival, maternal and child health, family well-being and economic productivity. Accordingly, an increasing trend in access to safe drinking water would help improve the living conditions of affected populations.

In order to quantify safely managed drinking water, the proportion of population using improved drinking water services is determined. This is currently being measured by the proportion of population using an improved basic drinking water source. ‘Improved’ drinking water sources are defined as piped (into dwellings, yards or plots; public taps or standpipes) and non-piped (boreholes or tube wells; protected dug wells; protected springs; rainwater; packaged or delivered water) sources which are located on the premises, available when needed, and free from fecal and priority chemical contamination.

National reporting is facilitated through the provision of default data derived from the SDG database. The proportion of population using safely managed drinking water services is SDG indicator 6.1.1. The indicator is

disaggregated by urban and rural populations, and expressed as a percentage. Custodian agencies for this indicator are the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) which, through the Joint Monitoring Programme (JMP) for Water, Sanitation and Hygiene (WASH), have produced regular estimates of national, regional and global progress on drinking water, sanitation and hygiene since 1990.

2.2.2. Prerequisites for reporting

- An in-depth reading of the SDG indicator 6.1.1 metadata (see section 2.2.7).
- Data complying with the specifications listed in table 16.
- A pool of national experts officially nominated by the national authorities to verify the suitability and consistency of the default data against the situation in their country, or to identify and compile data using national sources for the three metrics. Key institutions might include a country's national statistical office, ministry of health and ministry of water resources, as well as universities and research centres.

2.2.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following.

Step 1: Identify the relevant dataset

Default data for this indicator is pre-filled from the SDG database (SDG indicator 6.1.1); estimates of the proportion of population using improved drinking water services are regularly produced by the WHO/UNICEF JMP.

Parties may also use national data, provided it complies with the data specifications listed in table 16.

***Table 16**. Data specifications for SO 2-2 Indicator*

Item	**Specifications**	
	Default data (Sustainable Development Goal indicator 6.1.1 / World Health Organization / United Nations Children's Fund Joint Monitoring Programme)	**National data**
Type of data	Annual data on the total, urban and rural population using safely managed drinking water services (% of population) for the period 2000–2020.	Annual data on the total, urban and rural population using safely managed drinking water services (% of population) for the period from 2000 to the latest available year for the reporting period.
Spatial resolution	Country level	Country or sub-national levels
Quality	Specified in the datasets' metadata.	To be indicated in the dataset metadata.
Metadata	Metadata information is provided with default data.	Minimum metadata content as per the mandatory fields listed in Annex II.

Step 2: Report national annual values and interpret the data

Note: Related areas in the PRAIS 4 platform: tables SO2-2.T1 and SO2-2.T2

Parties opting to use an alternative source of national data may enter the relevant data in table SO2-2.T1. Parties may also provide information on the dominant change in the metric using the "Qualitative Assessment" table SO2-2.T2.

To assist in the data interpretation, countries are encouraged to visualize their respective SDG Indicator 6.1.1 by means of a graph (graphs for each country, representing each disaggregation, i.e., % rural population, % urban population, % total population, are available to view and download from the JMP and World Bank websites)[2]. While it may be difficult to attribute specific causal factors to changes in the metrics, countries may indicate which direct and/or indirect drivers are presumably behind the observed changes and report this information in the Qualitative Assessment table.

Step 3: Verify the results

The reliability of the estimates from global data sources requires inputs from national experts to detect and highlight situations where the confidence level of the obtained results might be low. This input would contribute to a qualitative assessment of the reliability of the estimates.

Step 4: Generate reports

Once verified by the Parties, the estimates of the proportion of population using safely managed drinking water services should be officially submitted to the UNCCD.

Disaggregated data for this metric (e.g., per administrative division, urban vs rural, affected areas or other socio-economic strata, e.g., sex-disaggregated data) may be useful to identify where the most significant hotspots/brightspots are located. Optionally, Parties may include additional information to describe specific country situations and provide more details on data interpretation.

Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy in the event that the estimates are derived from national data. It would also be beneficial to report on special cases and issues, describing any deviation from the default method and providing the rationale to adopt a different methodology. A General Comment field is provided in the PRAIS 4 platform for this purpose.

[2] https://washdata.org/data/household and https://datatopics.worldbank.org/sdgs/index.html

2.2.4. Dependencies

Indicator SO 2-2 has no dependencies from other SOs. However, it could be used in the calculation of the Drought Vulnerability Index (DVI) for indicator SO 3-3.

2.2.5. Challenges

Data availability and quality

- International global data only generically describes the well-being of the population in a country and might not capture specific situations in need of consideration. More detailed sub-national data might be needed to represent the economic situation at the local level.

2.2.6. Summary (main actions)

Key actions for reporting on indicator SO 2-2 are as follows:

1. **Identify the relevant dataset**: Parties may decide to use the recommended default international data or alternative national sources.
2. **Report national annual values and interpret the data**: Parties are invited to report, visualize and interpret the national annual data.
3. **Verify the results**: the reliability of the estimates from global data sources requires inputs from national experts to qualitatively assess the reliability of the estimates based on expert knowledge.
4. **Generate reports**: once verified by the Parties, the data and supporting narrative should be officially submitted to the UNCCD.

2.2.7. Further reading

- SDG indicator 6.1.1 metadata (https://unstats.un.org/sdgs/metadata/files/Metadata-06-01-01.pdf)

2.3. SO 2-3 –Trends in Population Exposure to Land Degradation Disaggregated by Sex

2.3.1. Introduction

Indicator SO 3-2 was developed in response to decision 11/COP.14 to align the reporting process for SO 1 to 5 with gender-responsive indicators and guidelines and ensure that the gender dimensions of land degradation are captured.

The indicator estimates the proportion of populations exposed to land degradation, disaggregated by sex, as a first step towards addressing the gender data gap on land degradation within the UNCCD reporting framework. The methodology uses the spatial distribution of the population or sub-population group (i.e., by sex) to establish its exposure to land degradation, as determined by indicator SO 1-4 (i.e., SDG Indicator 15.3.1).

The indicator trends in the proportion of population exposed to land degradation, disaggregated by sex, uses the following metrics:

- Percentage of the female population exposed to land degradation
- Percentage of the male population exposed to land degradation
- Percentage of the total (female and male) population exposed to land degradation

National reporting is facilitated though the provision of default data derived from the Worldpop global dataset on population distributions, demographics and dynamics and the default indicator SO 1-4 estimates.

2.3.2. Prerequisites for reporting

- An in-depth reading of the methodological note for indicator SO 3-2 (see section 2.3.7).
- Population data complying with the specifications listed in table 17.
- A pool of national experts officially nominated by the national authorities to verify the suitability and consistency of the default data against the situation in their country, or to identify and compile data using national sources for the three metrics. Key institutions might include a country's national statistical office, ministry of environment and ministry of agriculture, as well as universities and research centres.

2.3.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following. If Parties decide to use the default data, steps 2 and 3 are unnecessary.

Step 1: Select the population dataset

Suitable data for the calculation of indicator SO 2-3 is a sex-disaggregated gridded count of the human population, or a georeferenced set of sub-national data that covers the full extent of the country. It must represent the number of male and female individuals per grid cell, ideally annually, in the time period in question (i.e., the date timestamp should be at least one of the years within the baseline and reporting period).

Among the publicly available population datasets at the global scale, the WorldPop dataset is used by default by the UNCCD for calculating indicator SO2-3 and provided to Parties in Trends.Earth.

An alternative dataset is the Gridded Population of the World, version 4 (GPWv4).

Parties may also use national data, provided it complies with the data specifications listed in table 17.

***Table 17**. Data specifications for SO 2-3 Indicator*

Item	Specifications	
	Default data	**National data**
Input data (Data needed to estimate the population exposed to land degradation)	WorldPop data disaggregated by sex for the baseline year (2015) and the latest available year of the reporting period (2019). Gridded data on land degradation as determined by indicator SO 1-4 for the baseline and reporting periods.	Gridded population products derived from national official statistics, disaggregated by sex for the baseline year (ideally the year 2015) and the latest available year of the reporting period (e.g., 2019). Gridded data on land degradation as determined by indicator SO 1-4 for the baseline and reporting periods.
Output data (Gridded products resulting from the analysis of the three metrics)	Gridded products of the female, male and total population exposed to land degradation in the baseline and reporting periods.	Gridded products of the female, male and total population exposed to land degradation in the baseline and reporting periods.
Spatial resolution	WorldPop data: 3-arc seconds (~100 m)	Assessed by national authorities based on available data.
Quality	Specified in the datasets' metadata.	To be indicated in the dataset metadata.
Metadata	Metadata information is provided with default data.	Minimum metadata content as per the mandatory fields listed in Annex II.

Step 2: Standardize the selected datasets

The population and the land degradation datasets must be harmonized to the same grid cell size. For example, the WorldPop dataset and the SO 1-4 land degradation default dataset have resolutions of 100 and 300 metres, respectively and should be resampled to a common grid cell size. For the default data, the grid cell size for the analysis is fixed at the 300 metre resolution of the land degradation dataset to which the population data is resampled. Countries using national datasets should assess them in terms of projection and resolution and standardize them through a resampling process in order to be able to combine them in the analysis of population exposure to land degradation.

The resampling should take into consideration that, for datasets representing population counts, changes in cell size implies changes in the number of people in each cell; a resampling method that ensures the integrity of the continuous data should be used, such as bilinear interpolation (avoid nearest neighbour techniques).

Step 3: Estimate the female, male and total population count and percentage exposed to land degradation

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Note: Related areas in the PRAIS 4 platform: tables SO2-3.T1 and SO2-3.T2

The female and male population grids for the baseline and reporting periods are intersected with the respective land degradation grids. The values of the cells falling on degraded land are then combined to derive the female and male population exposed to land degradation. The total population exposed to land degradation is obtained by combining the obtained female and male population values.

This analysis should be carried out over two time periods (i.e., the baseline and reporting period) in order to measure changes over time and report the observed change in table SO2-3.T2. However, it should be noted that the land degradation spatial dataset (i.e., the SO1-4 output) captures temporal trends in the three subindicators (land cover, land productivity and soil organic carbon (SOC)) over a certain number of years, whereas population data reflects the populations in specific years (e.g., 2015 and 2019). To increase accuracy in capturing the number of people exposed to land degradation in the two reference years (i.e., 2015 for the baseline and 2019 for reporting period), it is recommended that the population gird closest to the above-mentioned years be used.

To calculate the percentage of female, male and total population exposed to land degradation, the respective populations exposed to land degradation are divided by the total populations of the corresponding sex types, multiplied by 100.

Step 4: Qualitatively assess the results

Note: Related areas in the PRAIS 4 platform: table SO2-3.T3

Observed changes in the indicator and their interpretation may be described in the "Qualitative Assessment" table of the PRAIS 4 platform (table SO2-3.T3).

It is important to note that changes in the proportion of population exposure to land degradation may not only be due to the expansion of land degradation but also to population growth, among other factors.

Step 5: Verify the results

The reliability of the estimates from global data sources requires inputs from national experts to identify and highlight situations where the confidence level of the obtained results might be low.

Step 6: Generate reports

Once verified by the Parties, the estimates of the female, male and total population exposed to land degradation should be officially submitted to the UNCCD.

Default maps or maps generated in Trends.Earth using national data representing population exposure to land degradation by sex are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- Total population exposed to land degradation
- Female population exposed to land degradation
- Male population exposed to land degradation

Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy in the event that the estimates are derived from national data. It would also be beneficial to report on special cases and issues, describing any deviation from the default method and providing the rationale to adopt a different methodology. A "General comment" field is provided in the PRAIS 4 platform for this purpose.

2.3.4. Dependencies

Indicator SO 2-3 relies on the SO 4 indicator spatial datasets, both for the baseline and reporting periods, as a basis to identify degraded areas.

2.3.5. Challenges

Data availability and quality

- Spatial resolution of international data might not always be suitable to produce a sufficiently detailed representation of the population exposed to land degradation and its changes. More detailed sub-national data might be needed to represent local situations with a higher degree of accuracy. However, this will require downscaling of existing gridded population datasets to a finer resolution which might incur further errors. Capacity in performing downscaling processes is therefore required.
- The WorldPop sex-disaggregated national datasets are presented as several individual rasters, each representing an age/sex class per year. This amounts to a large volume of spatial data in Geotiff format. Capacity in raster data processing and access to appropriate computing power, e.g., a cloud service, is required to store and process the data, especially for large countries. The UNCCD is developing a procedure for the bulk preprocessing of raster data, which will eventually make sex-disaggregated data available on the PRAIS 4 platform as default data. Parties will be notified when the challenge is solved and the forms pre-filled with the default data.

Limitation of the analytical approach

- Sex-disaggregated data alone might not be sufficient to represent the gender dynamics and related issues in a specific region. Further socio-economic and demographic indicators are required to conduct gender analysis in order to better understand how and why specific populations are affected by land degradation.
- On-site exposed populations to land degradation may produce lower-bound estimates of the exposure of populations to land degradation. In fact, land degradation in a specific area affects not only populations residing on degraded land, but also –through environmental, economic and social linkages –populations elsewhere. In addition, further disaggregation of data in urban and rural populations could be useful to improve the indicator.
- There are two challenges related to the temporality of the analysis: i) the land degradation spatial dataset (i.e., the SO1-4 output) captures temporal trends over a certain number of years, whereas population data reflects the populations in specific years; ii) changes in the proportion of population exposure to land degradation over time may not only be due to the expansion of land degradation but also to population growth, among other factors.

2.3.6. Summary (main actions)

Key actions for reporting on population exposure to land degradation are as follows:

1. **Select the population dataset**: Parties may decide to use the default data or alternative national sources, provided they comply with the data specifications listed in table 17.
2. **Standardize the selected datasets**: the land degradation datasets must be harmonized to the same grid cell size as the population gridded data (assuming it is the finer resolution) in order to combine them in the analysis of population exposure to land degradation.
3. **Estimate the number and percentage of the female, male and total population exposed to land degradation**: the male and female population grids are intersected with the land degradation grid to derive the total, male and female population exposed to land degradation and the percentage of the total population. Data should be entered in tables SO2-3.T1.
4. **Qualitatively assess the results**: changes in the proportion of populations exposed to land degradation as well as their direct or indirect drivers should be described in table SO2-3.T3.
5. **Verify the results**: the reliability of the estimates from global data sources should be assessed in consultation with national experts.
6. **Generate reports**: once verified by the Parties, the data and supporting narrative should be officially submitted to the UNCCD.

2.3.7. Further reading

- Methodological note on trends in population exposure to land degradation (https://www.unccd.int/sites/default/files/inline-files/MethodologicalNote_PopExposureToLD.pdf)

3. Strategic objective 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems

3.1. SO 3-1 –Trends in the proportion of land under drought over the total land area

3.1.1. Introduction

Drought is defined as a period of dry weather long enough to cause a serious hydrological imbalance (World Meteorological Organization (WMO), 1992). The United Nations Convention to Combat Desertification (UNCCD) defines drought as the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems[1].

Indicator SO 3-1 specifically describes the status of meteorological drought hazards that occurred during the baseline and reporting periods within a country.

There are several drought indices that might be used to estimate national drought hazard. The UNCCD methodology to estimate indicator SO 3-1 recommends using a globally accepted drought index, the Standardized Precipitation Index (SPI), to characterize the meteorological drought hazard. However, Parties may report using other indices if already in use at national level. For example, the Standardized Precipitation Evapotranspiration Index (SPEI) may represent an alternative index, readily comparable to the SPI, that provides more reliable signals of drought in arid areas. Parties using the SPEI can apply the same methods recommended in this manual and in the "Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3" to report indicator SO 3-1. For other indices currently in use, Parties may need to ensure statistical consistency with the SPI drought intensity classes described in table 19[2].

The overall objective is for Parties to assess drought hazard and identify areas exposed to extreme drought in order to prioritize mitigation efforts in conjunction with assessments of drought exposure (SO 3-2) and vulnerability (SO 3-3). National reporting is facilitated though the provision of default data.

[1] "UNCCD. 1994. Article 1 of the Convention Text: http://www2.unccd.int/sites/default/files/relevant-links/2017-01/UNCCD_Convention_ENG_0.pdf "

[2] "The Global Drought Classification System (GDCS, formerly the Global Drought Indicator or GDI), currently under development by WMO through the Global Multi-Hazard Alert System (GMAS) framework, will provide methods on how a multitude of drought indices can be translated onto a harmonized legend of drought classes."

3.1.2. Prerequisites for reporting

- An in-depth reading of chapter 1 of the "Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems" detailing the methodology used to estimate drought hazards and the changes over time.
- Data complying with the specifications listed in figure 1 and table 18.
- A pool of national experts officially nominated by the national authorities to verify the consistency of the results of the reporting process with the situation in the field, or to develop and implement a custom methodology to estimate indicator SO 3-1 where national data are preferred to the default data. Key institutions might include a country's national meteorological and hydrological service (NMHS), ministry of environment, ministry of agriculture, remote sensing centre and national statistical office, as well as relevant universities and research centres.

3.1.3. Reporting process and step-by-step procedure

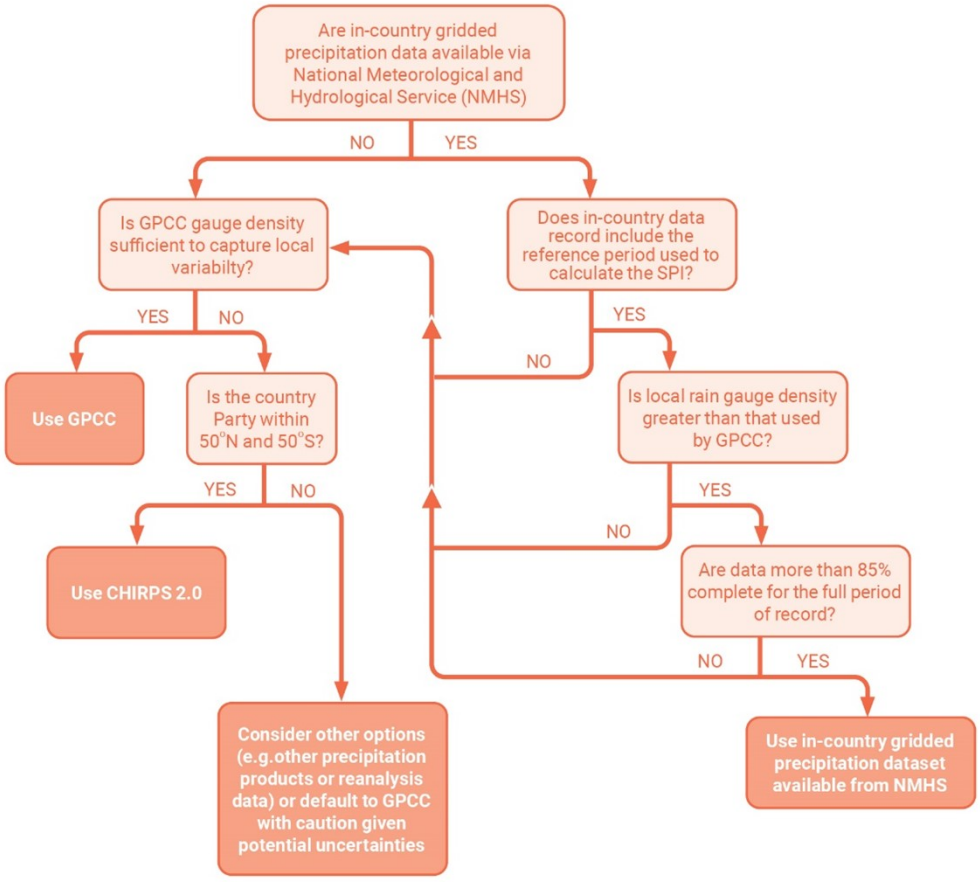
The step-by-step procedure for reporting is described in the following. If the default data is used, steps 2 to 5 are unnecessary.

Step 1: Select precipitation dataset

The UNCCD provides default data from the Global Precipitation Climatology Centre (GPCC) Monitoring Product, a gridded precipitation product derived from rain gauge data. Parties have the option to use an alternative default dataset in Trends.Earth: the Climate Hazards Group InfraRed Precipitation with Stations (CHIRPS), which produces high-resolution estimates based on satellite observations and gauged station data. While the higher spatial resolution of CHIRPS and slightly longer recording period are advantageous when deriving the SPI, it has a 'quasi-global' coverage that spans 50°S to 50°N. Therefore, Parties with country boundaries exceeding this range will not be able to use the CHRIPS dataset. In contrast, the GPCC precipitation data has global coverage.

Parties wishing to use in-country data provided by the NMHS or regional, rather than global, precipitation products can use the decision tree in figure 1 to assess whether the in-country (or regional) precipitation data is more appropriate to derive indicator SO 3-1 over the globally available datasets.

Figure 1. Decision tree to help Parties chose the best precipitation data source to derive indicator SO 3-1



GPCC: Global Precipitation Climatology Centre

SPI: Standardized Precipitation Index

CHIRPS: Climate Hazards Group InfraRed Precipitation with Stations

This decision-making process should help Parties identify data that meets the specifications summarized in table 18.

***Table 18**. Data specifications for SO 3-1 Indicator*

Item	Specifications	
	Default data	**National data**
Input data (Data needed to generate drought hazard estimates based on the Standardized Precipitation Index (SPI) calculations described in Step 2)	Global Precipitation Climatology Centre (GPCC) monthly precipitation products,1982–present.	Gridded products of monthly precipitation derived from national gauge networks. The dataset should ideally have a continuous record of at least 30 years, covering the period 1981–2010. For countries in the 50°S to 50°N range: Climate Hazards Group InfraRed Precipitation with Stations (CHIRPS) monthly precipitation products, 1981–present, can be accessed in Trends.Earth*.
Output data (Intermediate and final gridded products resulting from the analysis described in Steps 2 to 4)	Annual December SPI-12 grids classified into four SPI drought intensity classes for the baseline and reporting periods*. Total land area for each drought intensity class as well as proportion of total land area under drought. Gridded spatial summary in four-year epochs.	Annual December SPI-12 grids classified into four SPI drought intensity classes for the baseline and reporting periods*. Total land area for each drought intensity class as well as proportion of total land area under drought. Gridded spatial summary in four-year epochs.
Classification	Four SPI drought intensity classes as per table 19.	Four SPI drought intensity classes as per table 19.
Spatial resolution	GPCC: 1.0° x 1.0° (~111 km)	CHIRPS: 0.05° x 0.05° (~5.55 km) or otherwise assessed by national authorities based on available data
Quality	Specified in the datasets' metadata.	Data should be continuous where possible; where data completeness is less than 85%, Parties may consider filling data gaps in accordance with guidance from the World Meteorological Organization.
Metadata	Metadata information is provided with default data.	Minimum metadata content as per the mandatory fields listed in Annex II.

* *As stated in Step 3, the December SPI-12 values represent the precipitation deficits (or excesses) over the Gregorian (January–December) calendar year.*

Step 2: Calculate the Standardized Precipitation Index

Monthly time series of the SPI are based on the selected gridded precipitation data and calculated using the SPI-12 method, which provides an annual summary of precipitation deficits for each month using a 12-month accumulation method. For example, the 12-month precipitation accumulation for April 2019 is the total monthly precipitation for May 2018 to April 2019.

In order to normalize the 12-month precipitation accumulation data distributions, the WMO climatological standard normal period of 1981–2010 is used as a reference period. The normalization method is based on a Gamma probability distribution function fitted to the 12-month precipitation accumulations in this reference period. Thus calculated, these probability distribution parameters are then applied to any time series of monthly 12-month precipitation accumulations to produce the normalized monthly SPI-12 time series for each grid cell for the entire recording period. However, a change in the standard climate normal period necessitates a recalculation of the SPI for the baseline and all historic reporting periods. As such, it is recommended that the reference period used to calculate the SPI be clearly stated in national reports of indicator SO 3-1 to the UNCCD.

Default SPI data is available in Trends.Earth for the purposes of SO3 monitoring. However, there are various open access tools that can be used to derive the SPI, a selection of which is listed in table 3 of the Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3.

Step 3: Identify the drought intensity class of each grid cell based on the calculated Standardized Precipitation Index value

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Note: Related areas in the PRAIS 4 platform: table SO3-1.T1

To assess the SPI time series for the baseline and reporting periods, the December SPI-12 values for each year should be extracted. The December SPI-12 values represent the precipitation deficits (or excesses) over the Gregorian (January–December) calendar year.

For each of the December SPI-12 grids, the number of cells belonging to each of the SPI drought intensity classes listed in table 19 should be counted. Positive SPI values are discarded, since they indicate that there was no drought in the given period.

Table 19*. Standardized Precipitation Index (SPI) drought intensity classes*

SPI values	Drought intensity class
0 to -0.99	Mild drought
-1.0 to -1.49	Moderate drought
-1.5 to -1.99	Severe drought
-2 and less	Extreme drought

The total area under each drought intensity class should be derived in a two-step process:

(i) Project the drought intensity class grid into a suitable equal area projection (e.g., Mollweide) to obtain the cells' area in km^2.

(ii) Combine all cells' area in a given drought class to get the total area under each drought intensity class.

Step 4: Calculate proportion of land under drought

Note: Related areas in the PRAIS 4 platform: table SO3-1.T2

The proportion of land in each drought intensity class is calculated for each reporting year as a percentage of the total land area.

For each of the SPI-12 grids in the baseline and reporting period, the number of cells falling under each of the SPI drought intensity classes is counted (cellCount). Then, for each reporting year, the percentage of the total land area in each drought intensity class is calculated. The formula is as follows:

$$P_{ij} = \frac{cellCount_{ij}}{Total\ number\ of\ cells} \times 100$$

Where:

- "P_{ij}" is the proportion of land under the drought intensity class *i* in the reporting year *j*
- "$cellCount_{ij}$" is the number of pixels under the drought intensity class *i* in the reporting year *j*
- "Total number of cells'" is all the grid cells within the country Party's land area.

The total area falling under each of the drought intensity classes in each year is calculated by multiplying cellCount by the area of the cells (a constant value, since the drought intensity class grid was previously converted to an equal-area projection).

Step 5: Create a gridded spatial summary for the baseline and reporting periods

In addition to the tabular reports described above, indicator SO 1-3 should also be summarized spatially to map the most extreme conditions that occurred in the baseline and reporting periods.

To summarize the reporting period spatially, the most extreme drought intensity class should be identified for each grid cell for each reporting year within the reporting period.

Data for the baseline period should be summarized spatially using the gridded SPI-12 data in four-year intervals (2000–2003, 2004–2007, 2008–2011 and 2012–2015), reflecting the reporting periods used for SO3 monitoring. In this case, the most extreme drought intensity class should be reported for each grid cell for each four-year period within the baseline.

Step 6: Verify the results

Parties should be aware of the limitations related to the use of SPI as a single drought indicator and critically review the default data vis-à-vis the national rain gauge data and other meteorological sources before submitting the reports to the UNCCD.

Step 7: Generate reports

Once verified by the Parties, the estimated drought hazard values for the reporting and baseline periods should be officially submitted to the UNCCD. Observed changes and their interpretation may be described in the "Qualitative Assessment" field of the PRAIS 4 platform.

Default maps or maps generated in Trends.Earth using national data representing drought hazard for the baseline/reporting period are made available in the PRAIS 4 platform. More specifically, the following maps will be available:

- Drought hazard in first epoch of baseline period (2000–2003)
- Drought hazard in second epoch of baseline period (2004–2007)
- Drought hazard in third epoch of baseline period (2008–2011)
- Drought hazard in fourth epoch of baseline period (2012–2015)
- Drought hazard in the reporting period (2016–2019)

These maps represent the most extreme conditions that occurred in each epoch, as explained in Step 5. Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy in the event that the estimates are derived from national data using the "General Comment" field. It would also be beneficial to report on special cases and issues, describing situations where SPI values might be less reliable and providing the rationale to adopt a different methodology.

3.1.4. Dependencies

Drought hazard data relies on the total land area reported in table SO1-1.T1 to calculate the proportion of total land area under drought. SO 3-1 outputs are also used as an input for calculating indicator SO 3-2.

3.1.5. Challenges

Data availability and quality

- Internationally available precipitation data might not be sufficiently accurate to estimate the intensity of drought hazard at national level. The use of national data is recommended because it is assumed to be more precise and reliable. However, national precipitation data might not be readily available in digital form and/or might be affected by gaps in the time series.

Limitations of the SPI-based estimates

- While the SPI is recommended as a well-established, flexible and robust drought index to quantify drought hazard on a global scale, it only quantifies the meteorological deficits, since it is solely based on precipitation, and other types of drought (e.g., hydrological, agricultural) may not be well captured. Moreover, in regions with very low and/or a high proportion of months with zero precipitation, the SPI values should be used and interpreted with caution; the application of the SPEI might be more appropriate in such regions. Being aware of this limitation, the national expert may highlight areas where estimates based on the SPI may not produce sufficiently accurate results and may base the estimates on alternative indexes.

- Because of the natural climate variability, any observed changes or trends in the proportion of land under drought over the short baseline and reporting time frames should be interpreted with caution. Anomalies and uncertainties in the estimates should be described in the "Qualitative Assessment" field.
- The adopted timescale, based on the 12-month cycle, might not always be suitable for characterizing drought impacts in some environments where other aggregation periods, e.g., 24 months, might be more appropriate.

3.1.6. Summary (main actions)

Key actions for reporting drought hazard intensity values are as follows:

1. **Select precipitation dataset**: Parties may decide to use the default data or alternative national sources, provided they comply with the data specifications listed in table 18. If Parties decide to use alternative data sources, they should follow Steps 2 to 5 below:
2. **Calculate the SPI**: the SPI should be derived for all months in the full available time series; however, Parties may choose alternative indexes better suited to their local environmental conditions.
3. **Identify the drought intensity class of each grid cell**: based on the SPI calculation, the number of cells belonging to each of the SPI drought intensity classes should be counted and converted to areas by projecting the drought intensity class grids into a suitable equal area projection, and calculating the total areas under each drought intensity class in km2. Data is then reported in table SO3-1.T1.
4. **Calculate proportion of land under drought**: the proportion of land in each drought intensity class and the overall proportion of land under drought over the total land area are calculated for each reporting year and reported in tables SO3-1.T1 and SO3-1.T2.
5. **Create a gridded spatial summary for the baseline and reporting periods**: data for the entire time series from 2000 to 2019 should be summarized spatially using the gridded SPI-12 data in four-year intervals (2000–2003, 2004–2007, 2008–2011, 2012–2015 and 2016–2019) to map the most extreme conditions in each period.
6. **Verify the results**: aware of the limitations related to the adoption of the SPI for estimating drought intensity, Parties may verify the suitability of such an index to describe drought occurrence and intensity in their countries before officially submitting estimates for UNCCD reporting.
7. **Generate reports**: once verified by the Parties, the data and supporting narrative for the reporting and baseline periods should be officially submitted to the UNCCD.

3.1.7. Further reading

- Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3. Chapter 1. Level 1 Indicator (https://www.unccd.int/publications/good-practice-guidance-national-reporting-unccd-strategic-objective-3-mitigate-adapt)

3.2. SO 3-2 –Trends in the proportion of the total population exposed to drought

3.2.1. Introduction

Indicator SO 3-2 defines the exposure of the population to drought hazard (identified by indicator SO 3-1) as the total count of people exposed as well as the percentage of the total population exposed. This indicator may be further disaggregated by sex if data is available.

The method of computation uses the spatial distribution of the population or sub-population group (i.e., by sex) to establish its exposure to drought, based on the location and extent of the drought intensity classes as determined by indicator SO 3-1. Using this information, the percentage of the total population located within each drought intensity class, as well as the percentage of the total population exposed to drought (i.e., to all drought intensity classes), is calculated and reported. National reporting is facilitated though the provision of default data.

3.2.2. Prerequisites for reporting

- An in-depth reading of chapter 2 of the "Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems" detailing the methodology used to estimate drought exposure.
- Data complying with the specifications listed in figure 2 and table 20.
- A pool of national experts officially nominated by the national authorities to verify the consistency of the results of the reporting process against the situation in the field, or to develop and implement a custom methodology to estimate indicator SO 3-2 where national data is preferred to default data. The key institution in this case is a country's national statistical office, however universities and research centres may also provide valuable inputs.

3.2.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following. If the default data is used, Steps 2 to 4 are unnecessary.

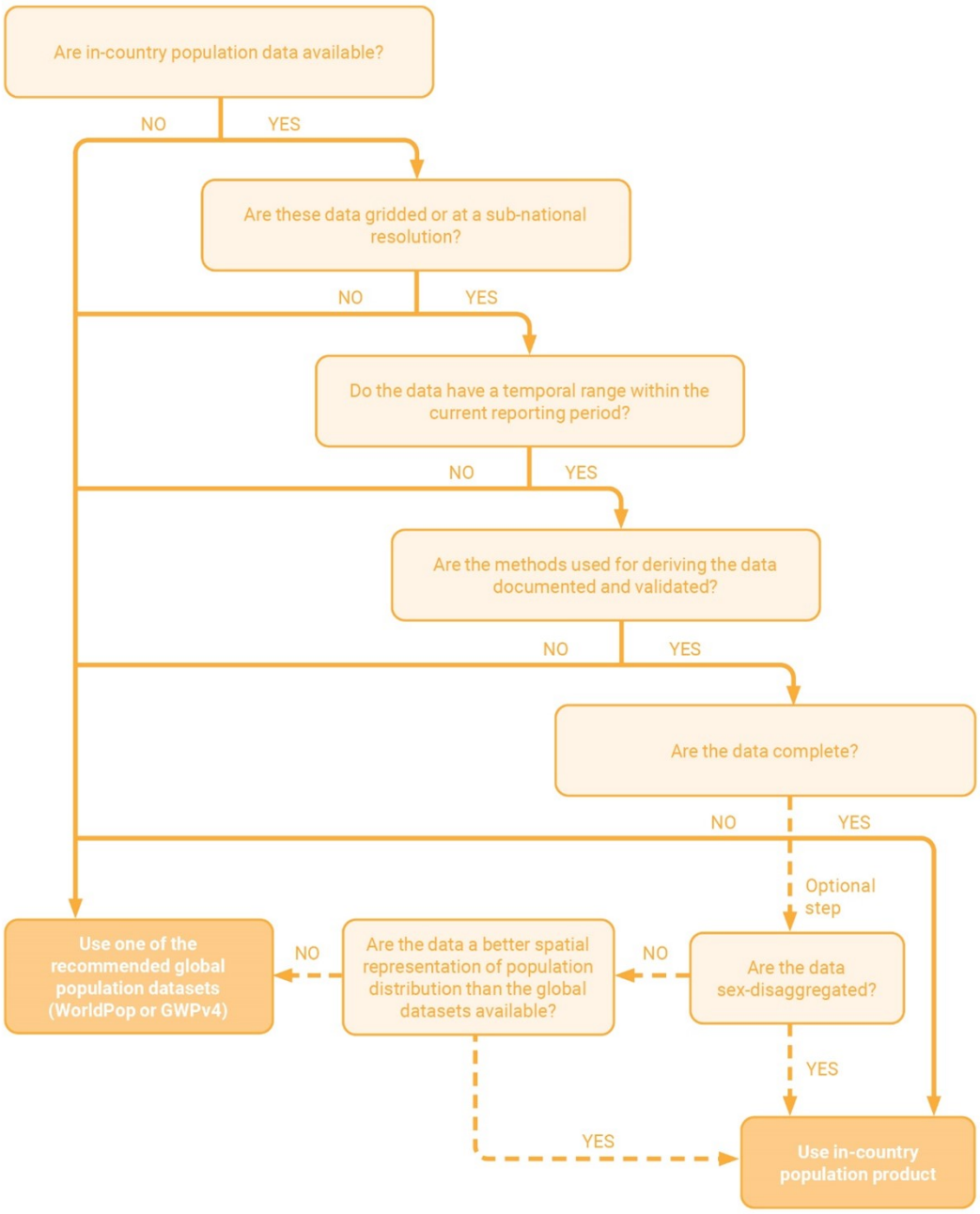
Step 1: Select the population dataset

Suitable data for the calculation of indicator SO 3-2 is a spatially gridded population product, or a georeferenced set of sub-national population data that covers the full extent of the country. It must represent the number of people living in each location (grid cell), ideally annually, within the baseline and reporting periods. Where possible, data should be disaggregated by sex.

There are various publicly available, fine-resolution population datasets available at the global scale and two of these, WorldPop and Gridded Population of the World, version 4 (GPWv4), are recommended by the UNCCD for deriving indicator SO 3-2. However, WorldPop is provided to country Parties by default.

Parties wishing to use in-country or regional datasets can use the decision tree in figure 2 to assess whether the in-country (or regional) population data is more appropriate to derive indicator SO 3-2 over the globally available datasets.

Figure 2. Decision tree to help Parties choose the best population data source to derive indicator SO 3-2



This decision-making process should help Parties identify data that meets the specifications summarized in table 20.

***Table 20**. Data specifications for SO 3-2 Indicator*

Item	Specifications	
	Default data	**National data**
Input data (Data needed to generate indicator SO 3-2, as described in Steps 2 to 4)	WorldPop data for the period 2000–2020, disaggregated by sex. Drought intensity class data as determined by indicator SO 3-1.	Gridded population products derived from national official statistics from the year 2000 to the reporting year, ideally annual and, if available, disaggregated by sex. Drought intensity class data as determined by indicator SO 3-1.
Output data (Gridded products resulting from the analysis described in Steps 2 to 4)	Annual gridded products of total, female and male population exposed to the four drought intensity classes from the year 2000 to the reporting year. Count and percentage of total, female and male population exposed to drought and to each drought intensity class. Gridded spatial summary in four-year epochs.	Annual gridded product of population exposed to the four drought intensity classes from the year 2000 to the reporting year. Count and percentage of total, female and male population exposed to drought and to each drought intensity class. Gridded spatial summary in four-year epochs.
Spatial resolution	Worldpop: 3-arc seconds (~100 m)	Assessed by national authorities based on available data.
Quality	Specified in the datasets' metadata.	To be indicated in the dataset metadata.
Metadata	Metadata information is provided with default data.	Minimum metadata content as per the mandatory fields listed in Annex II.

Step 2: Overlay gridded population data with indicator SO 3-1 spatial output

Indicator SO 3-2 is calculated by overlaying the population data on the hazard intensity spatial data for each year. Gap years should be filled with the closest available population data. For example, if the 2019 data is missing, it should be replaced by the 2020 data (or the closest available year), then 2020 data would be used for both 2019 and 2020. In addition to the total population, sex-disaggregated population data grids, if available, should be used in the overlay process to generate sex-disaggregated drought exposure values.

Population and drought hazard intensity data should have the same coordinate reference system and projection, which should be consistent across the reporting periods.

Step 3: Calculate the total population and the number and percentage of people within each drought intensity class

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Note: Related areas in the PRAIS 4 platform: tables SO3-2.T1, SO3-2.T2 and SO3-2.T3

The yearly total population is obtained by adding the population residing in each land unit (e.g., grid cell) of a country area for each year within the baseline and the reporting periods (i.e., from 2000 to the reporting year).

Using the outputs of Step 2, the number of people falling within each of the four drought intensity classes, as well as the total number of people exposed to drought (i.e., to all drought intensity classes), can be estimated for each year. The respective percentages are then calculated out of the total population.

Similarly, if sex disaggregated data is used, the number of males and females that lie within each drought intensity class, as well as the total number of males and females exposed to drought, can also be calculated. The percentage share between female and male is then calculated out of the total number of people exposed to each drought intensity class and to drought overall for each year. Note that the share within each drought intensity class should equal to 100 per cent.

Step 4: Create a gridded spatial summary in four-year epochs

In addition to the annual values of indicator SO 3-2, a gridded spatial summary for the entire reporting period is also produced. This gridded spatial summary output gives an indication of the number of people exposed to the most extreme drought intensity class over the four-year reporting period for each grid cell.

To summarize the reporting period spatially, the most recent population dataset from the current reporting period is overlaid on the output generated for indicator SO 3-1 in Step 5, which represents the most extreme drought intensity class for each year within the reporting period.

Similarly, baseline exposure summary spatial data products are generated for each of the four-year baseline periods (i.e., 2000–2003, 2004–2007, 2008–2011 and 2012–2015) by overlaying the most recent population data of each group of years on the output generated for indicator SO 3-1 in Step 5.

These gridded spatial summaries give an indication of the number of people exposed to the most extreme drought intensity class in four-year epochs.

Step 5: Verify the results

The methodology only considers population density and distribution and does not cover ecosystem exposure to drought. A more comprehensive measure of drought exposure may take into account other physical entities at risk, such as agricultural yields, livestock counts, sectoral water and certain types of vegetation. In addition, being exposed to drought does not equate to drought vulnerability.

Parties should be aware of these limitations and critically review the results before submitting the reports to the UNCCD.

Step 6: Generate reports

Once verified by the Parties, the estimated population exposure to drought hazard values for the reporting and baseline periods should be officially submitted to the UNCCD. Observed changes and their interpretation may be described in the "Qualitative Assessment" field of the PRAIS 4 platform.

Default maps or maps generated in Trends.Earth using national data representing population exposed to drought for the baseline/reporting period are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- Total population exposed to drought in first epoch of baseline period (2000–2003)
- Total population exposed to drought in second epoch of baseline period (2004–2007)

- Total population exposed to drought in third epoch of baseline period (2008–2011)
- Total population exposed to drought in fourth epoch of baseline period (2012–2015)
- Total population exposed to drought in the reporting period (2016–2019)

These maps show the most extreme drought intensity class a population was exposed to within each epoch, as explained in Step 4.

Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy in the event that the estimates are derived from national data using the "General Comment" field. It would also be beneficial to report on special cases and issues, describing situations where values might be less reliable and providing the rationale to adopt a different methodology.

3.2.4. Dependencies

Drought exposure data relies on the SO 3-1 spatial outputs.

3.2.5. Challenges

Data availability and quality

- The WorldPop sex-disaggregated national datasets are offered as several individual rasters, each representing an age/sex class per year. This amounts to a large volume of spatial data in Geotiff format. Capacity in raster data processing and access to appropriate computing power, e.g., a cloud service, is required to store and process the data, especially for large countries. The UNCCD is developing a procedure for the bulk pre-processing of raster data, which will eventually make sex-disaggregated data available on the PRAIS 4 platform as default data. Parties will be notified when the challenge is solved and the forms pre-filled with the default data.
- Global data quality and resolution might not be sufficiently accurate for national population estimates. The integration of global and national data might improve the quality and accuracy of the results but will require additional processing capacity and technical skills.

3.2.6. Summary (main actions)

Key actions for reporting population exposure to drought hazard are as follows:

1. **Select the population dataset**: Parties may decide to use the default data or alternative national sources, provided they comply with the data specifications listed in table 20. If Parties decide to use alternative data sources, they should follow Steps 2 to 4 below:
2. **Overlay population data on indicator SO 3-1 spatial output**: indicator SO 3-2 is calculated by overlaying the yearly population data on yearly hazard intensity data derived from the SO 3-1 analysis.
3. **Calculate the total population as well as the number and percentage of people within each drought intensity class**: the entire population exposed to drought and the population exposed to each of the drought intensity classes are estimated and reported as a population count and percentage of the total population.
4. **Create a gridded spatial summary of indicator SO 3-2 in four-year epochs**: the gridded spatial summary for each four-year epoch provides information on the number of people exposed to the most

extreme drought intensity class over each four-year epoch, from 2000 to the reporting year, at the scale of the grid cell. These four-year periods should be consistent with the gridded spatial summaries reported at SO 3-1.

5. **Verify the results**: aware of the limitations of the estimated values of drought exposure, Parties may verify the accuracy and reliability of such an indicator in their countries before officially submitting estimates for UNCCD reporting.
6. **Generate reports**: once verified by the Parties, the data and supporting narrative should be officially submitted to the UNCCD.

3.2.7. Further reading

- Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3. Chapter 2. Level 2 Indicator (https://www.unccd.int/publications/good-practice-guidance-national-reporting-unccd-strategic-objective-3-mitigate-adapt)

3.3. SO 3-3 –Trends in the degree of drought vulnerability

3.3.1. Introduction

The UNCCD approach to assessing drought vulnerability is based on a composite index, the Drought Vulnerability Index (DVI), which incorporates three components to reflect the vulnerability of the population of an individual country to drought: i) social, ii) economic and iii) infrastructural. The DVI does not, at present, address ecological or ecosystem vulnerability.

The DVI may be derived through three alternative processes, corresponding to three increasing levels of computational complexity:

- Tier 1 Vulnerability Assessment (VA) –uses at least one factor per vulnerability component, represented by country-level metrics.
- Tier 2 VA –uses more than one factor per vulnerability component, where the factors are represented by country-level metrics, with the inclusion of sex-disaggregated data (where applicable).
- Tier 3 VA –uses more than one factor per vulnerability component, where factors are represented by sub-national metrics (which may be gridded or disaggregated by administrative regions), with the inclusion of sex-disaggregated data (where applicable).

Parties may opt for the approach best suited to their current capacity to collect and process data, subject to data availability.

The UNCCD provides Parties with default data derived from the global DVI dataset of the European Commission Joint Research Centre (JRC) to facilitate the reporting process. This data is based on globally available datasets and should be used in the absence of more accurate data at national level.

3.3.2. Prerequisites for reporting

- An in-depth reading of chapter 3 of the "Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems" detailing the methodology used to estimate drought vulnerability.
- Data complying with the specifications listed in table 21.
- A pool of national experts officially nominated by the national authorities to verify the consistency of the results of the reporting process against the situation in the field, or to develop and implement a custom methodology to estimate indicator SO 3-3 where national data is preferred to the default data. The key institution in this case is a country's national statistical office, however universities and research centres may also provide valuable inputs.

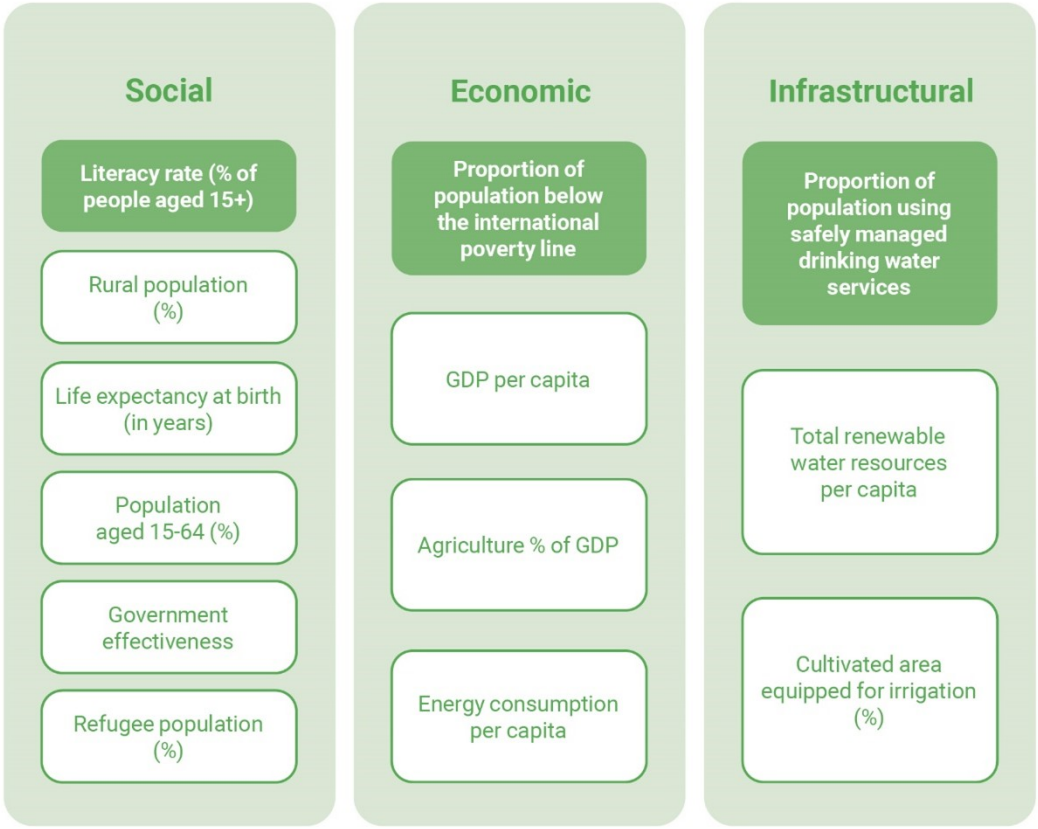
3.3.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is described in the following and applies to both the baseline and reporting periods. If the default data is used, Steps 2 to 4 are unnecessary.

Step 1: Select tier of vulnerability assessment based on data availability

The vulnerability factors recommended by the UNCCD to derive the DVI (listed in figure 3) provides a snapshot of a Party's socio-economic vulnerability to drought. The three core factors that have been recommended for the minimum Tier 1 VA – 'Literacy rate (% of people aged 15 and above)', 'Proportion of population below the international poverty line' and the 'Proportion of population using safely managed drinking water services' –were selected because they were identified by experts as critical to understanding vulnerability and due to their use for other reporting requirements such as SO 2 and the Sustainable Development Goals.

Figure 3. Social, economic, and infrastructural components and their associated factors recommended for calculating the Drought Vulnerability Index

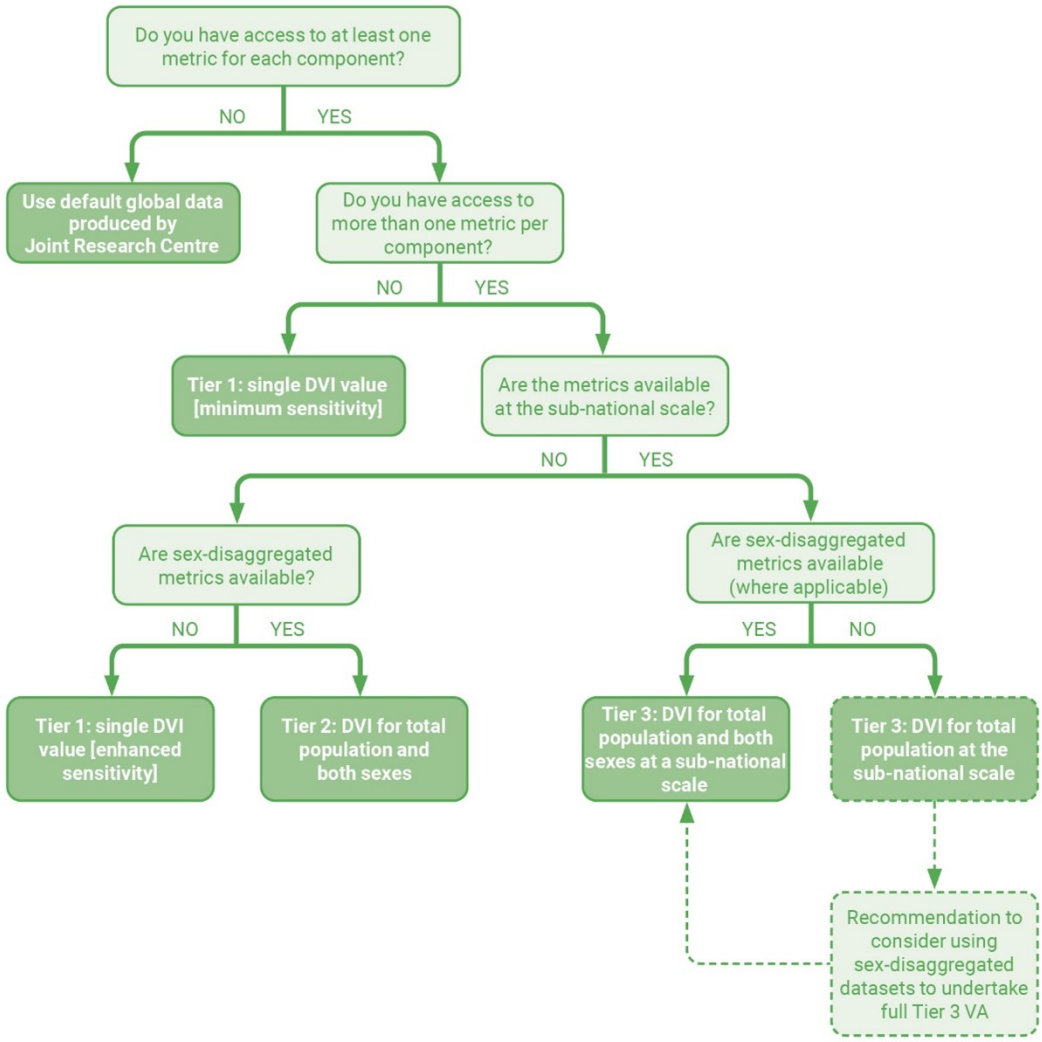


The UNCCD provides default data from the global DVI dataset of the JRC. The method used to derive the default DVI is similar to the one presented in this manual and in the "Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3", but presents some key differences in terms of the normalization method (see Step 2) and number of factors included. Two additional factors are used in the default DVI: "Disaster Prevention and Preparedness (US$/Year/Capital)" and "Global map of Accessibility: Travel time to major cities". The default DVI value represents the median DVI across the country for the period 2000–2018.

Country Parties that do not have data available to calculate the minimum Tier 1 VA can report using the default DVI data. However, it is recommended that efforts are made over successive reporting cycles to move up the tiers of VA in order to increase the sensitivity of the DVI and improve the granularity of the assessment. The decision tree in figure 4 helps Parties select the tier of VA based on data availability.

National/regional data products used to calculate the DVI should conform with the specifications listed in table 21.

Figure 4. Decision tree to help Parties choose the best tier of vulnerability assessment for the SO 3-3 Indicator reporting according to data availability



DVI: Drought Vulnerability Index

VA: Vulnerability Assessment

***Table 21**. Data specifications for SO 3-3 Indicator*

Item	**Specifications**	
	Default data (Drought Vulnerability Index dataset produced by the Joint Research Centre)	**National data**
Input data (Data needed to generate indicator SO 3-3 as described in Steps 2 to 4)	Input data used to calculate the default Drought Vulnerability Index (DVI) is drawn from various sources such as World Bank, Organisation for Economic Cooperation and Development, Food and Agriculture Organization of the United Nations, and Joint Research Centre.	Freely available datasets for the calculation of the factors needed to derive the DVI are listed in table 14 of the "Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3". Alternatively, if available, in-country datasets with higher spatial resolution and fewer gaps over the baseline and reporting period.
Output data (DVI indicator resulting from the analysis described in Steps 2 to 4)	2018 DVI for the baseline and the reporting period. Regions where droughts could be meaningless, such as deserts and cold areas, are masked.	Annual or near-annual DVI for the baseline and reporting periods.
Classification	Continuous, fractional scale from 0 to 1 but classification based on quantiles to group the vulnerability classes.	Continuous scale from 0 to 1.
Spatial resolution	Country level	National and/or sub-national levels
Quality	Specified in the datasets' metadata.	To be indicated in the dataset metadata.
Metadata	Metadata information is provided with default data.	Minimum metadata content as per the mandatory fields listed in Annex II.

Step 2: Factor normalization

In all tiers of VA, factors should be normalized before they can be compared and aggregated, as the vulnerability factors used are all measured using different units.

The UNCCD recommends normalizing factors using the maximum and minimum values within the country using all historic data up to, and including, the reporting period. This provides the largest range possible, ensuring that the maximum and minimum values are representative for the country.

Each time the DVI is calculated to report indicator SO 3-3, the factor range (i.e., the minimum and maximum values) should be recalculated, and if values on the reporting periods fall out outside the range, the factor should be re-normalized using the new range.

Where there is a positive correlation/relationship between vulnerability and the factor[3] (i.e., if the factor value increases, vulnerability also increases), the data should be normalized using the equation below:

$$Factor = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

Where:

- X_i is the value of the considered factor in the year "i"
- X_{min} is the minimum value of the considered factor observed in the entire time series
- X_{max} is the maximum value of the considered factor observed in the entire time series

In case of negative correlation/relationship between vulnerability and the factor, the equation is:

$$Factor = 1 - \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

After normalization, all factors have a value of between zero and one, relative to the historical maximum and minimum of the country.

Normalization of sex-disaggregated data for Tier 1 and 2 VA uses the same formulas described above, applied once for each piece of sex-related data.

For sub-national level data (Tier 3 VA), the calculation should be applied to the data from all spatial units (e.g., administrative units) combined, and the factor range should reflect the minimum and maximum values of the whole country.

For the default DVI, each factor was normalized using the global maximum and minimum values, rather than historical ranges for the given country. Normalization at the global scale means the resulting vulnerability assessment is less sensitive to the local/in-country situation than when the national range is used.

Step 3: Derive the Drought Vulnerability Index components

This step aims to derive aggregated values for each of the three DVI components. For Parties adopting the Tier 1 VA approach, the values of the factor normalized in Step 2 are also representative of the corresponding component. Instead, Tier 2 and Tier 3 VAs require the calculation of the arithmetic mean of the normalized factors to derive the aggregated value of each component.

The result of this step is a single value for each component and each geographic unit of the country. If sex-disaggregated data is used, separate values for male and female are produced for each component.

Parties may assign weights to the vulnerability factors if their relative importance and relevance is known. It is recommended to apply the weights to the vulnerability factors and not to the three components.

[3] See Table 13 of the Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3 indicating relationship of the 13 recommended factors with vulnerability

Step 4: Calculate the Drought Vulnerability Index

Note: Related areas in the PRAIS 4 platform: table SO3-3.T1

In all tiers of VA, the three components (C_{social}, $C_{economic}$ and $C_{infrastructural}$) derived in the previous steps are used to produce the DVI by calculating their mean value.

$$DVI = \frac{C_{social}+C_{economic}+C_{infrastructural}}{3}$$

The DVI ranges from 0 to 1, with 1 being the most vulnerable.

A Tier 1 VA would result in one DVI at country-level for each reporting period. For Tier 2 and 3 VAs, where sex-disaggregated factors are used, it is recommended that sex-specific DVIs are also calculated, in addition to the country-level DVI. Hence, a Party would report at least three DVI values for each reporting period, i.e., for the total, female and male populations. For sub-national or gridded components under Tier 3 VA, the DVI is to be calculated for the smallest spatial unit separately for males, females and total populations.

Step 5: Verify the results

The DVI method has not yet been validated at the local or national scale and, as such, may not accurately characterize vulnerability at these scales, either in terms of the factors most relevant to each country or the most effective factor weighting scheme. Therefore, Parties may verify the appropriateness of the default factors and add relevant ones as needed. The weighting scheme should also be thoroughly considered to improve results at national and subnational level.

Moreover, the most vulnerable populations and underrepresented groups should be involved in the determination of the factors to be used to calculate the components, in order to develop a country-specific and more effective index.

Step 6: Generate reports

Once verified by the Parties, the estimated vulnerability values for the reporting and baseline periods should be officially submitted to the UNCCD. Information on the method used (selected tier and factors per component) should be reported using the dedicated "Method" field in the PRAIS 4 platform. Observed changes and their interpretation may be described in the "Qualitative Assessment" table of the PRAIS 4 platform (table SO3-3.T2).

Maps generated in Trends.Earth using national data under Tier 3 VA and representing vulnerability to drought for the baseline/reporting period can be uploaded to the PRAIS 4 platform. More specifically, it is recommended to upload the following maps:

- Drought Vulnerability in the baseline period (2000–2015)
- Drought Vulnerability in the reporting period (2016–2019)

Information on data sources, data accuracy and any weighting scheme applied to the vulnerability factors can be submitted using the "General Comment" field. It would also be beneficial to report on special cases and issues, describing situations where values might be less reliable and providing the rationale to include different factors.

3.3.4. Dependencies

SO 2-1 and SO 2-2 can be used for the calculation of SO 3-3.

3.3.5. Challenges

Data availability and quality

- The availability of data for the considered factors varies substantially from country to country and the complete set of recommended data might not be accessible everywhere.

Methodological approach

- The reliability of the DVI method at national and sub-national levels is still to be verified.
- Due to the methods used for factor normalization (i.e., using in-country historic data), DVI values should not be compared between countries.
- Assuming a consistent methodology has been used over time, changes in the DVI may reflect the efficacy of drought mitigation and adaptation policies, but they may also reveal the impacts of social and economic changes disconnected from drought management measures.

3.3.6. Summary (main actions)

Key actions for reporting population vulnerable to drought hazard are as follows:

1. **Select tier of vulnerability assessment based on data availability**: Parties are encouraged to opt for one of the three Tiers of VA based on data availability. In the absence of data to calculate the minimum Tier 1 VA, Parties may use the default data. National/regional data products used to calculate the DVI should comply with the specifications listed in table 21. If Parties use national/regional data products, they should follow Steps 2 to 4 below:
2. **Factor normalization**: factors for each vulnerability component should be normalized before they can be compared and aggregated, as the vulnerability factors used are all measured using different units.
3. **Derive the DVI components**: the aggregated values for each of the three DVI components are calculated as the arithmetic mean of the normalized factors.
4. **Calculate the DVI**: the three components –social, economic and infrastructural –derived in the previous steps are used to produce the DVI by calculating their mean value.
5. **Verify the results**: aware of the fact that the DVI method has not yet been validated at the local or national scale, Parties may verify the appropriateness of the default factors and add relevant ones as needed before officially submitting estimates for UNCCD reporting.
6. **Generate reports**: once verified by the Parties, the data and supporting narrative for the reporting and baseline periods should be officially submitted to the UNCCD.

3.3.7. Further reading

- Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3. Chapter 3. Level 3 Indicator (https://www.unccd.int/sites/default/files/documents/2021-09/UNCCD_GPG_Strategic-Objective-3_2021.pdf).

4. Strategic objective 4: To generate global environmental benefits through effective implementation of the United Nations Convention to Combat Desertification

4.1. SO 4-1 –Trends in carbon stocks above and below ground

Trends in carbon stocks above and below ground is a multipurpose indicator used to measure progress towards strategic objectives (SOs) 1 and 4. Quantitative data and a qualitative assessment of trends in this indicator are reported under SO 1 (progress indicator SO 1-3).

4.2. SO 4-2 –Trends in abundance and distribution of selected species

4.2.1. Introduction

The world’s species are impacted by several threatening processes, including habitat destruction and degradation, overexploitation, invasive alien species, human disturbance, pollution and climate change. On-ground land restoration actions under the implementation of the United Nations Convention to Combat Desertification (UNCCD) can mitigate threatening processes and reduce species extinction risk. The Red List Index (RLI) can be used to assess overall changes in the extinction risk of groups of species because of these threats and the extent to which threats are being mitigated. The RLI is also Sustainable Development Goal (SDG) indicator 15.5.1[1]. The RLI estimates trends in the overall extinction risk of sets of species to determine trends in biodiversity status. It is based on changes in the number of species in each category of extinction risk on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species[2].

The RLI value ranges from 1 (all species are categorized as ‘Least Concern’) to 0 (all species are categorized as ‘Extinct’), and so indicates how far the set of species has moved overall towards extinction. Thus, the RLI allows comparisons between sets of species in both their overall level of extinction risk (i.e. how threatened they are on average) and in the rate at which this risk changes over time. A downward trend in the RLI over time means that the expected rate of future species extinctions is worsening (i.e. the rate of biodiversity loss is increasing). An upward trend means that the expected rate of species extinctions is declining (i.e. the rate of biodiversity loss is decreasing), and a horizontal line means that the expected rate of species extinctions is remaining the same, although in each of these cases it does not mean that biodiversity loss has stopped. Currently, the RLI is available for five taxonomic groups: birds, mammals, amphibians, cycads and warm-water reef-forming corals. It has also been aggregated into a single index for these five groups[3].

[1] https://sdg.tracking-progress.org/indicator/15-5-1-red-list-index/.

[2] IUCN 2021. The IUCN Red List of Threatened Species. Version 2021-1. https://www.iucnredlist.org.

[3] For methodology see: Butchart et al (2010) Global Biodiversity: Indicators of Recent Declines, Science, 328 (5982), pp. 1164–1168. https://science.sciencemag.org/content/328/5982/1164.

The main output of the reporting process for SO 4-2 is a set of officially verified annual estimates of RLI values for 2000–2020. National reporting is facilitated through the provision of default data pre-filled from the SDG database for indicator 15.5.1.

4.2.2. Prerequisites for reporting

- An in-depth reading of SDG indicator 15.5.1 metadata document;
- Consultation with national experts on biodiversity, species extinction risk, and land management and conservation; Convention on Biological Diversity (CBD) national focal points; national statistical offices and IUCN State Members;
- Familiarity with the ‘Advanced Search’ function on the IUCN Red List website to enable customized calculation of the RLI: https://www.iucnredlist.org/search.

4.2.3. Reporting process and step-by-step procedures

The step-by-step procedure for reporting is described in the following.

Step 1: Report Red List Index data

Note: Related areas in the PRAIS 4 platform: table SO4-2.T1

The RLI is SDG indicator 15.5.1. Therefore, the RLI data are pre-filled from the SDG database, including the national-level index value as well as the upper and lower bounds of uncertainty around the national estimate. No further action is required if Parties choose to use the default data.

Parties may decide to customize/complement the values to be reported in table SO4-2.T1. Customised RLI values can be produced from the Red List website[4]. The RLI can be disaggregated to produce RLIs for different subsets of species with different policy relevance (e.g. migratory species, etc.) or for all species showing trends driven by different threatening processes (e.g. invasive alien species, biological resource use, etc.). At present, disaggregated RLI data is only available at subregional, regional or global scales and it is not available for single countries.

Parties may want to report on regional-scale subsets of species that are more relevant to the implementation of the UNCCD. National experts on biodiversity, species extinction risk, and land management and land conservation actions implemented to mitigate extinction risk should be involved here to decide what disaggregation to use to complete the report.

Details on the customization of the RLI values should be reported in the ‘General Comments’ section provided in the PRAIS 4 platform.

[4] https://www.iucnredlist.org/search.

Step 2: Qualitatively assess the Red List Index data

Note: Related areas in the PRAIS 4 platform: table SO4-2.T2

Countries are encouraged to identify and then rank which drivers directly or indirectly cause negative changes or downward trends. Countries are also encouraged to comment on the policy responses or levers that have caused positive changes, upward trends or reversal of negative trends in the RLI[5].

Step 3: Verify the results

The reliability of the default RLI data needs to be verified by national experts to detect and highlight situations where the confidence level of the obtained results might be low. This would qualitatively assess the reliability of the estimates based on expert knowledge and on a correct interpretation of the data.

Step 4: Generate reports

Once verified by the Parties, the estimates of the RLI indicator as well as the qualitative assessment should be officially submitted to UNCCD.

Parties have the option to use the ‘General Comment’ field to add any relevant information, or to report on specific country or regional situations.

4.2.4. Dependencies

The SO 4-2 indicator has no interdependencies with other SOs.

4.2.5. Challenges

Data interpretation

- The main challenge is the interpretation of changes in the indicator and specifically understanding the drivers of trends in the indicator. The RLI is an aggregate indicator across a small number of taxa and therefore does not include all species in a country. National experts on biodiversity, species extinction risk, and land management and land conservation actions implemented to mitigate extinction risk will be crucial for correct interpretation.
- There are also several sources of uncertainty in the RLI values and trends pertaining to lack of knowledge about species extinction risk, poor data on species, and delays in learning about changes to species extinction risk. The RLI metadata for SDG indicator 15.5.1 should be consulted for more information.

[5] The direct and indirect drivers available for selection in the table and the levers which can reverse negative trends are summarized from the Intergovernmental Science-Policy Platform on Biodiversity (IPBES) (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. Available at: https://ipbes.net/global-assessment.

4.2.6. Summary

Key actions for reporting on RLI are as follows:

1. **Report RLI data**: Parties can use the default data or can choose to report using customized RLI values.
2. **Qualitatively assess the RLI data**: Parties can report on the direct and indirect drivers of trends in the RLI and any levers used to bring about positive and transformative change.
3. **Verify the results**: Aware of the limitations of the RLI values, Parties may verify the accuracy and reliability of such indicators in their countries before officially submitting estimates for UNCCD reporting.
4. **Generate reports**: Once verified by the Parties, the data and supporting narrative should be officially submitted to UNCCD.

4.2.7. Further reading

- SDG indicator 15.5.1 metadata document (https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf).
- Butchart et al. (2006) Biodiversity indicators based on trends in conservation status: strengths of the IUCN Red List Index. Conservation Biology 20: 579–581 (http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2006.00410.x/abstract).
- Butchart et al (2010) Global Biodiversity: Indicators of Recent Declines, Science, 328 (5982), pp. 1164–1168 (https://science.sciencemag.org/content/328/5982/1164).

4.3. SO 4-3 Trends in protected area coverage of important biodiversity areas

4.3.1. Introduction

Protecting important sites for biodiversity is critical to halting the decline in biodiversity and ensuring the long-term and sustainable use of terrestrial natural resources. Establishing protected areas is an important mechanism for achieving this aim, and this indicator measures progress toward the conservation, restoration and sustainable use of terrestrial ecosystems and their services.

Protected areas as defined by the IUCN[6] are clearly defined geographical spaces, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. A variety of specific management objectives and levels of access are recognized within this definition, spanning conservation, restoration and sustainable use.

In addition to protecting biodiversity, protected areas have high social and economic value because they support local livelihoods, protect watersheds from erosion, contain a wealth of genetic resources, support recreation and tourism industries, provide for science, research and education, and contain many cultural and other non-material values.

The metric average proportion of terrestrial Key Biodiversity Areas (KBAs) covered by protected areas, which is SDG indicator 15.1.2b, shows temporal trends in the mean percentage of each important site for terrestrial

[6] For an explanation of categories, see: https://www.iucn.org/theme/protected-areas/about/protected-area-categories.

biodiversity (i.e. those that contribute significantly to the global persistence of biodiversity) that is covered by designated protected areas.

The metadata for SDG indicator 15.1.2 includes other effective area-based conservation measures (OECMs) in addition to protected areas. OECMs are defined as ‘a geographically defined area other than a protected area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values’.

KBAs are sites that contribute significantly to the global persistence of biodiversity and are identified following global criteria[7] applied at national levels. The KBAs include:

- Important bird and biodiversity areas, which are sites that contribute significantly to the global persistence of biodiversity, identified using data on birds, of which >13,000 sites in total have been identified from all of the world’s countries;
- Alliance for Zero Extinction sites, which are sites holding effectively the entire population of at least one species assessed as critically endangered or endangered on the IUCN Red List of Threatened Species. 853 sites have been identified for 1,483 species of mammals, birds, amphibians, reptiles, freshwater crustaceans, reef-building corals, conifers, cycads and other taxa; and
- KBAs identified using an earlier version of the KBA criteria, including those identified in ecosystem hotspot profiles developed with the support of the Critical Ecosystem Partnership Fund.

Data on protected areas are managed in the World Database on Protected Areas by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)[8].

Data on OECMs are managed in the World Database on OECMs by the UNEP-WCMC[9].

Data on KBAs are managed in the World Database of Key Biodiversity Areas by BirdLife International on behalf of the Key Biodiversity Areas Partnership[10].

The main output of the reporting process for SO 4-3 is a set of officially verified annual estimates of the values of average proportion of terrestrial KBAs covered by protected areas for 2000–2020. National reporting is facilitated through the provision of default data pre-filled from the SDG database for indicator 15.1.2b.

4.3.2. Prerequisites for reporting

- An in-depth reading of the SDG indicator 15.1.2 metadata document;
- Consultation with national experts on KBA and protected areas, CBD national focal points, national statistical offices, IUCN State Members and KBA regional focal points.

[7] For a detailed methodology, see: A Global Standard for the Identification of Key Biodiversity Areas (IUCN 2016). https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf.

[8] See https://www.protectedplanet.net/en/thematic-areas/wdpa?tab=WDPA.

[9] www.protectedplanet.net/en/thematic-areas/oecms.

[10] www.keybiodiversityareas.org/kba-data.

4.3.3. Reporting process and step-by-step procedures

The step-by-step procedure for reporting is described in the following.

Step 1: Report indicator data

Note: Related areas in the PRAIS 4 platform: table SO4-3.T1

Default data for this indicator is pre-filled in table SO4-3.T1 from the SDG database (SDG indicator 15.1.2b), including the national-level value as well as the upper and lower bounds of uncertainty around the national estimate[11]. For data specifications for the SO 4-3 indicator, see the official metadata for SDG indicator 15.1.2.

A Party may choose to report using the default data or alternative national data sources, if available. Any deviation from the guidance provided should be reported and justified in the ‘Comment’ column of the reporting table.

Step 2: Qualitatively assess the results

Note: Related areas in the PRAIS 4 platform: table SO4-3.T2

Parties are encouraged to provide comments on the interpretation of the indicator, including the direction of indicator change. While it may be difficult to attribute specific causal factors to changes in the indicator, countries are encouraged to indicate which direct and/or indirect drivers are presumably behind the observed changes using the comment box in table SO4-3.T2 in the PRAIS 4 platform.

Step 3: Verify the results

The reliability of the default SO 4-3 indicator data needs to be verified by national experts to detect and highlight situations where the confidence level of the obtained results might be low. This would qualitatively assess the reliability of the estimates based on expert knowledge and on a correct interpretation of the data.

Step 4: Generate reports

Once verified by the Parties, the estimates of the SO 4-3 indicator as well as the qualitative assessment should be officially submitted to UNCCD.

Parties have the option to include additional information in the ‘General Comments’ field to add any relevant information or to report on specific country or regional situations.

[11] SDG indicator 15.1.2b data is updated each November/December using the latest versions of the datasets on protected areas, OECMs and KBAs.

4.3.4. Dependencies

The SO 4-3 indicator has no interdependencies with other SOs.

4.3.5. Challenges

Data availability and quality

- KBAs focus mainly on subsets of biodiversity such as birds and highly threatened species. There are plans to improve KBAs with wider taxonomic coverage.

Data interpretation

- This indicator and metric are very intuitive and only minor challenges exist. The reporting Party should understand where and why there are KBAs in their country, otherwise the metric will have less meaning.
- Data on KBAs and protected areas is generally widely available; however, challenges exist at the national level in ensuring the designated protected areas are effective at reducing biodiversity loss.

4.3.6. Summary

Key actions for reporting on RLI are as follows:

1. **Report indicator data**: Parties can use the default data or can choose to report using national data.
2. **Qualitatively assess the results**: Changes in the indicator should be described in table SO4-3.T2.
3. **Verify the results**: Aware of the limitations of the SO 4-3 indicator values, Parties may verify the accuracy and reliability of such indicator in their countries before officially submitting estimates for UNCCD reporting.
4. **Generate reports**: Once verified by the Parties, the data and supporting narrative should be officially submitted to UNCCD.

4.3.7. Further reading

- SDG indicator 15.1.2 metadata document (https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf).
- Butchart, S. H. M. et al. (2012). Protecting important sites for biodiversity contributes to meeting global conservation targets. PLoS One 7(3): e32529 (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0032529).
- Eken, G. et al. (2004). Key biodiversity areas as site conservation targets. BioScience 54: 1110–1118 (http://bioscience.oxfordjournals.org/content/54/12/1110.short).
- IUCN (2016). A Global Standard for the Identification of Key Biodiversity Areas. International Union for Conservation of Nature, Gland, Switzerland (https://portals.iucn.org/library/node/46259).
- Donald, P. et al. (2018) Important Bird and Biodiversity Areas (IBAs): the development and characteristics of a global inventory of key sites for biodiversity. Bird Conservation International. 29:177–198.

- Ricketts, T. H. et al. (2005). Pinpointing and preventing imminent extinctions. Proceedings of the National Academy of Sciences of the U.S.A. 102: 18497–18501 (http://www.pnas.org/content/102/51/18497.short).
- Langhammer, P. F. et al. (2007). Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems. IUCN World Commission on Protected Areas Best Practice Protected Area Guidelines Series No. 15. IUCN, Gland, Switzerland (https://portals.iucn.org/library/node/9055).

5. Strategic objective 5: To mobilize substantial and additional financial and non-financial resources to support the implementation of the Convention by building effective partnerships at global and national level

Introduction

The strategic objective (SO) 5 indicator framework aims to enable Parties to report quantitative and qualitative information on financial and non-financial resources dedicated to supporting the implementation of the Convention. The set of indicators aims at comprehensive reporting.

This section of the manual addresses the issues related to the identification of resources specific to desertification/land degradation and drought (DLDD) and the structure of the indicator framework. It also explains the Tier approach used.

Identification of resources specific to DLDD or tracking resources for the implementation of the Convention concerns accounting for (i) the financial and non-financial resources employed by activities that avoid, reduce, and reverse the effects of land degradation and desertification; and (ii) the preparedness for, mitigation of and response to drought at different scales. The most relevant challenge lies in the identification of DLDD-specific resources among a range of those allocated for other purposes.

This section of the user manual does not provide a prescriptive definition of which activities can be accounted for as being DLDD-relevant, nor does it exclude any; however, it includes activities, examples, and options as well as a non-exhaustive list of DLDD activities, which might be useful references for the identification of relevant activities. It is up to the reporting Party to provide insights on how those activities are chosen as relevant and explain the methodology used.

Structure and aim of the SO 5 indicator framework

The indicator framework considers the current reporting experiences under the other Rio conventions. It has been revised taking into account the measurement, reporting and verification system under the United Nations Framework Convention on Climate Change (UNFCCC) (with its current Biennial Update Reports), the National Communications templates, and the most recent updates regarding the enhanced transparency framework under the Paris Agreement and the financial reporting framework under the Convention on Biological Diversity (CBD), with the aim of increasing synergies in data collection and reporting.

Tier approach for SO 5

The SO 5 indicator framework offers flexibility by introducing Tiers, facilitating the reporting for those Parties that lack quantitative and/or detailed data.

Tier 1 reporting includes descriptive and qualitative information relevant to the indicator, as well as information on trends. Descriptions can include quantitative information at a level of detail which is too low to be reported in the Tier 2 tabular format. It should also include all information that cannot be reported in tabular format, such as descriptions of projects, programmes, instruments, and policies, as well as case studies, experiences, and best practices.

Tier 2 reporting is additional to Tier 1 reporting and provides a tabular format to be filled in along 16 parameters included in the columns. Tier 2 aims to collect more detailed quantitative and descriptive information at the highest disaggregation level available. The table should be complemented by information on definitions and methodologies used for the relevant parameters to be included in the documentation box. Relevant resources and databases should be included in each indicator, providing references for data sources, definitions, and methodologies in support of the reporting.

5.1. SO 5-1 –Bilateral and multilateral public resources

5.1.1. Introduction

This indicator aims to capture information on international resources provided and received through bilateral and multilateral channels. The indicator envisages reporting of information on the trends over the four -year period (Tier 1) and additional quantitative data at disaggregated level in tabular format (Tier 2). Default data will be provided based on the desertification Rio Marker of the OECD, when available[1].

5.1.2. Prerequisites for reporting

Institutional arrangements to collect data on international financial and non-financial resources provided and received through bilateral and multilateral channels for the implementation of the Convention. Data on international support provided to and received by third countries are often collected by a country’s ministry of foreign affairs, development agencies or national statistical offices. Countries reporting according to the OECD DAC Creditor Reporting System (CRS) count on a relevant source of data. If information on the relevance of resources provided and received specific for DLDD is not available, the country is encouraged to set up relevant institutional arrangements to start collecting this information.

[1] For methodological information see Methodological Note.

5.1.3. Reporting process and step-by-step procedure

If the default data is used, Parties are encouraged to verify the information and amend as necessary, or complement the default data with additional information. Further rows can be added.

The reporting steps are described in the following sections.

Step 1: Identification of relevant data

If your country is both a provider and a recipient of international public bilateral and/or multilateral resources, you are encouraged to provide information on both.

Flows

To report against the SO 5-1 indicator, Parties should look at official public flows from international sources. This category tracks primarily resource flows between countries in the form of ‘official development assistance’ (ODA) and ‘other official flows’ (OOF). Both providers and recipients of international public support draw upon the OECD DAC system as a dataset that can be consulted from both the provider and recipient perspectives.

Official transactions are those undertaken by central, state, or local government agencies at their own risk and responsibility. In case an activity or project is funded by different sources of funding –for example, through both public and private resources –it is recommended to report the amount of public resources under the SO 5-1 indicator and the amount of private resources under the SO 5-3 indicator. This would lead to double reporting (the Party would replicate some information related to the relevant project in two separate tables) but would avoid the double-counting of amounts.

Examples

For providers:

- Public financial contributions provided to developing countries’ governments and implementing agencies.
- Quantified in-kind contributions provided to projects in developing countries.
- Public financial resources for technical assistance.
- Support to projects including a component of technology development and transfer in developing countries.
- Contributions to United Nations agencies.

For recipients:

- International financial contributions received by central or local governments and implementing agencies.
- Financial contributions received from third countries’ governments or multilateral organizations, funds, or United Nations agencies.

Relevance to desertification/land degradation and drought

The OECD DAC CRS collects activity-level data on activities targeting the environmental objectives of the three Rio conventions (CBD, UNCCD and UNFCCC) through Rio Markers for biodiversity, climate change adaptation, climate change mitigation and desertification. This category can be measured using the Rio Marker for Desertification marker to report on ODA and, where available, on OOF. The OECD Total Official Support for Sustainable Development (TOSSD) dataset include information on support provided by developing countries. Relevant activities can be identified through SDG field (SDG 15.3).

The methodology used to identify DLDD-relevant activities and the classification method used should be clearly explained in the narrative parts of the indicator's framework and/or in the documentation boxes.

Step 2: Estimate trends in bilateral and multilateral public resources

Tier 1 involves reporting trends in the progress indicator in qualitative terms (increasing, stable or declining trends) based on the expert opinion of the reporting Party. Choose the option representing the trend in the international public resources provided and received during the four-year period for activities relevant to the implementation of the Convention in the relevant table. Indicate the general trend within that period, for both tables if your country is both a provider and a recipient. Otherwise, indicate the trend for either one. Select only one option for each table.

Step 3: Reporting in narrative format

SO5-1 requests descriptive and qualitative information relevant to the international public resources provided and received through bilateral and multilateral channels. The descriptive section may include all information that cannot be reported in tabular format and provide general information on resources provided and received for the implementation of the Convention.

Examples

International resources provided: [⋯The countries where most projects under the Convention are carried out are Burkina Faso, Ethiopia, Ghana, Mali, Morocco, Mozambique, Niger, Peru, Rwanda, Senegal, and the United Republic of Tanzania.]

International resources received: Trinational project 'Sustainable Forest Management in the Transboundary Gran Chaco American Ecosystem (Global Environment Facility (GEF)–Gran Chaco)'–Project ID 2505 GEF of GEF-4 –has a GEF grant of USD 2,663,018 for Argentina, plus 60 % of the regional cost of USD 1,290,909 (approximately USD 774,545).⋯.]

Step 4: Compiling the table

Tier 2 involves reporting trends in the progress indicators in a quantitative manner. Under this Tier, country Parties are encouraged to report by recording data about individual projects specific to DLDD. Please compile the table with data at the highest level of disaggregation available. Parties are encouraged to provide activity-level data.

Default data are derived from information reported to the OECD DAC by OECD members based on the desertification Rio Marker[2]; default data can be amended by the reporting Party as appropriate.

Tier 2 reporting includes:

- Detailed information at projects programmes and/or countries/regions, including amounts.
- Aggregate amounts of resources provided and/or received, by year and/or over the four-year period.

Parameters

The table for SO 5-1 provides space to report activities or projects relevant to combating DLDD. While the methodological approach to be chosen by the reporting Party accommodates definitions and methodologies in use, the reporting manual suggests some approaches and definitions for each parameter.

- Provided/received: Indicate ‘provided’ if, for the reported activity, the reporting country is the provider of the resources; indicate ‘received’ if your country is the recipient of the resources.
- Year: Indicate the year relevant to the reported activity. Explain in the documentation box whether the year refers to the commitment or disbursement year, and if the fiscal or calendar year is used.
- Recipient/provider: Indicate the name of the recipient if the reporting country is the provider of resources; indicate the name of the provider if your country is the recipient of resources. This could include the name of the country or the region; be listed as ‘global’ (bilateral flows); or include the name of the institution and/or entity (multilateral flows).
- Title of project, programme, activity or other: In cases of contributions to multilateral development banks/multilateral funds or participation in replenishments of funds, etc.
- Total amount in USD: The amounts should be reported in USD; if the reporting country decides otherwise, the approach should be explained clearly in the methodology. This implies the application of an exchange rate to the different domestic currencies. The OECD DAC CRS includes amounts in thousands of USD. The World Bank annual average exchange rate is suggested; please indicate if (and how) a different exchange rate is used. It is possible to report both amounts committed and disbursed for each activity. Committed and disbursed figures cannot be summed up; all reporting shall avoid double-counting across years. From the recipient perspective, the column “committed” can remain empty.
- Sector: Four macro sectors are suggested in the table. Crosscutting refers to activities that are addressed to more than one sector. The reporting country has the possibility to indicate other sectors, accommodating possible different reporting standards and practices. The indication of ‘other’ is optional; only the name of the sector is to be included.

[2] Default data are included in each provider and recipient country tables. Reported activities are identified based on the OECD DAC Rio Marker for desertification. All activities marked with the marker ‘principal’ and ‘significant’ are included in the tables, and respective amounts are reported at 100 %.

- Capacity-building: For each activity and to the extent possible, please indicate whether it includes a capacity-building component; if the activity aims, among other things, to build the capacities of the recipient country; and/or if at least part of the budget of the project has been dedicated to capacity-building to address DLDD.
- Technology transfer: For each activity and to the extent possible, please indicate whether it includes a technology transfer component; if the activity aims to transfer and develop technologies in the recipient country; and/or if at least part of the budget has been dedicated to transferring technologies to address DLDD.
- Gender equality: For each activity and to the extent possible, indicate whether it targets gender equality. The OECD DAC CRS system includes a gender equality policy marker, which could be a useful indicator to compile this column, as available.
- Channel: Please indicate whether the amounts to be considered are bilateral (country to country), multi-bilateral (a multilateral entity managing a project on behalf of a country providing earmarked funds for that activity), or multilateral. Type of flow: Indicate whether the flow is ODA or OOF. Other categories should be included if a different classification method is employed.
- Financial instrument: Please indicate the financial instrument channelling the public resources reported.
- Type of support: Indicate whether the activity is directly or indirectly related to the objectives of the Convention. Reporting this information could be based on the use of principal and significant Rio Markers as in the OECD DAC CRS system, where available.
- Amount mobilized through public interventions: Indicator SO 5-1 provides the space to include information on amounts mobilized from the private sector by official development finance interventions. In this regard, the OECD DAC offers an instrument-specific approach covering all private finance leveraged by public interventions with a direct causality link between flows. A dedicated column in the proposed tabular format is added to facilitate harmonization with the OECD DAC CRS reporting.
- Use, impact, (estimated) results: The table provides the space to include additional project-level information about the use of resources, the impact with respect to the objectives of the Convention, and results (estimated if the project did not conclude before the end of the reporting period).
- Additional information: please include any other activity-level information that you deem relevant.

Table 22 below is compiled with some examples:

Table 22. *Resources provided and received for Bilateral and Multilateral Public Resources*

P/R[1]	Year[2]	Recipient or provider[3]	Title[4]	Total amount USD		Sector[5]	Capacity building[6]	Technology transfer[6]	Gender equality[6]	Channel[7]	Type of flow[8]	Financial instrument[9]	Type of support[10]	Amount mobilized through public interventions	Use, impact, (estimated) results	Additional information
				Committed	Disbursed or received											
P	19	Ethiopia	UNEP Conservation of Biodiversity	1,400,000	800,000	Other (environmental protection)	Yes	No	No	Multi -bilateral	ODA	Loan	Indirectly	-	-	-
P	20	Ethiopia	UNEP Conservation of Biodiversity		600,000	Other (environmental protection)	Yes	No	No	Multi -bilateral	ODA	Loan	Indirectly	-	-	-
R	17 - 20	GEF	Revision and Alignment of the NAP with the UNCCD Strategic Plan	150,000	150,000	Biosphere protection	Yes	No	Yes	Multilateral	ODA	Grant	Directly	-	Description	Description
R	17	GEF	Revision and Alignment of the NAP with the UNCCD Strategic Plan	150,000												
R	17	GEF	Revision and Alignment of the NAP with the UNCCD Strategic Plan		150,000											
P	18	Ghana	Land Management	325,000	325,000	Other (Biosphere protection)	Yes	No	Yes	Bilateral	ODA	Grant	Directly	120,000	The project led to concrete results…	The project objectives and structure involved…
Total 2016[11]				xxx	xxx											
Total 2017[11]				xxx	xxx											
Total 2018[11]				xxx	xxx											
Total 2019[11]				xxx	xxx											
Total resources provided[11]				Σ	Σ											
Total resources received[11]				Σ	Σ											

[1] Provided/Received

[2] 20XX

[3] Recipient/provider country, region, global recipient/provider institution, entity

[4] Title of project, programme, activity or other

[5] Agriculture, forestry, water and sanitation, cross-cutting, other (specify)

[6] Yes / No

[7] Bilateral, multilateral (core contribution) multilateral (DLDD-specific) multi-bilateral, other (specify)

[8] ODA, OOF other (specify)

[9] Grant, concessional loan, non-concessional loan, equity guarantee/insurance, other (specify)

[10] Directly or indirectly related to DLDD

[11] If disaggregated information is not available, the Party can report only the total amount or the total amounts per year.

Aggregating the information

The aggregation of figures should include all quantified resources reported in tabular format. It is possible to aggregate figures by status (committed and disbursed) and by year. It is recommended to then aggregate figures for the four-year period to generate a total figure for international resources.

Aggregation of figures must avoid double-counting across the table and the other indicators.

Step 5: Use of documentation box

The aim of the documentation box is to provide space to report necessary definitions and methodologies employed for each parameter compiled in the table and included in the description, as relevant. When an internationally agreed standard is used, it is possible to provide the relevant reference.

5.2. SO5-2 –Domestic public resources

5.2.1. Introduction

Domestic resources are at the core of the implementation of the Convention. This indicator aims at creating an overview of the resources available at national level by measuring the effort that the national public sector is undertaking in increasing resources for the implementation of the Convention.

This progress indicator is concerned with domestic resources mobilized and spent by government agencies at different levels (e.g., central, state, and local governments) on activities, projects, policies, and measures to pursue the objectives of the Convention.

The indicator also aims to collect information on public revenues, such as environmental taxes on land-degrading activities and resources collected through mechanisms to influence the behavior of the various entities in the economy regarding DLDD (i.e., incentives).

Reporting countries can choose to take advantage of the Tier approach, in line with the capacities and data availability in the reporting country. It will be possible to compile only Tier 1 (including the narrative description and the indication of trends) or both Tier 1 and Tier 2 (including the compilation of the table with more detailed quantitative data).

Tier 1 involves reporting trends in this progress indicator in qualitative terms (i.e., increasing, stable or declining trends).Tier 2 aims to collect information at the highest disaggregation level available. Countries are encouraged to report using Tier 2.

5.2.2. Reporting process and step-by-step procedure

Step 1: Identification of relevant data

Data relevant to this indicator are usually collected at central government level, often from the ministries of economy and finance, ministries of environment and ministries of agriculture and forestry, as well as Environmental Agencies.

Government budgets do not often include clear information on resources specific to land degradation. Moreover, resources indirectly allocated to activities that promote land rehabilitation could be integrated in sectoral policies. Thus, an inventory approach could be taken in accordance with the agreed definition of DLDD. More broadly, further insights on relevant measures and actions are provided by the Convention, in particular Articles 10.3 and 10.4. Significant international references are the UN SEEA, the CEPA classification system and the IMF GFS database.

The indicator also aims at collecting information on domestic public revenues collected through measures and actions aimed at incentivizing behavior consistent with combating land degradation. Those may include environment-related tax revenues on natural resources, environmental taxes etc.

The reference data sources are central government administrations and national statistical offices. A significant international reference data source is the OECD Policy Instruments for the Environment database[3].

Step 2: Estimate trends in domestic public resources

Tier 1 involves reporting trends in the progress indicator in qualitative terms (i.e., increasing, stable or declining trends) based on the expert opinion of the reporting Party. Choose the option representing the trend for the entire reporting period in the relevant table. Indicate the trend in both tables if your country provides information on both expenditures and revenues. Otherwise, indicate the trend for either one. Select only one option for each table.

Step 3: Reporting in narrative format

The aim of this section is to provide Parties the space to report on information on the context and complement the reporting against Tier 1 (trends) or Tier 2 (table).

Examples

- "Public expenditures related to sustainable agriculture in year 2018 increased to USD 168 million."
- "National resources allocated to protection and ecosystem restoration are mainly channeled through the Ministry of Agriculture."

[3] The database is freely accessible at www.oecd.org/env/policies/database

- "The budget allocation of the National Directorate for Planning and Environmental Land Management, which carries out the NAP, is included in the National Budget Programme No. 60 for the years 2012, 2013 and 2014.
- "Data was retrieved directly from published sources of federal, provincial and territorial governments; official data was retrieved from the statistical office."

Step 4: Compiling the table

Tier 2 involves reporting against the progress indicators in a quantitative manner. Parties are encouraged to provide data on individual policies, measures or activities combating DLDD, as well as government budgetary lines and programmes. In this sense, it is recommended to use a bottom-up, inventory approach for collecting data on DLDD-related projects, programmes, measures, or budget lines supported by domestic public resources.

Parameters

The table for SO 5-2 provides space to report those actions that are considered relevant to combating DLDD. The reporting Party can choose the methodology to accommodate definitions and approaches in use, but the reporting manual suggests some approaches and definitions for each parameter.

- Year: Indicate the year relevant to the reported activity. Explain in the documentation box whether the year refers to the commitment or disbursement year, and if the fiscal or calendar year is used. It is possible to indicate the timeframe rather than a specific year, but this should fall within the reporting period.
- Amount in USD: The amounts should be reported in USD. If the reporting country decides otherwise, the approach should be explained clearly in the methodology. This implies the application of an exchange rate to the respective domestic currencies. The World Bank annual average exchange rate is suggested; please indicate if (and how) a different exchange rate is used.
- Additional information: Please include any other activity-level information that you deem relevant, including the title of the measure, budget lines or activity funded.

Table 23 below is populated with some examples (further rows can be added):

Table 23*. Resources provided received, and required for domestic public resources*

	Year	Amount in USD	Additional information
Government expenditures			
Directly related to combating DLDD	2017	USD 163,000	Design phase to support the incorporation of the Indigenous Desert Alliance as a legal entity. Secondment of an executive staff member for six months
	2017–2020	USD 118,000	In-kind contribution to the GEF project 5018 "Revision and Alignment of National Action Program with UNCCD 10 Years Strategic Plan and Framework"
	2018	USD 3,400,000	PPP DLDD –public contribution to the PPP**. Grant funding
Indirectly related to combating DLDD	2018	USD 8,959,024	Co-financing of the GEF project "Incentives for the Conservation of Ecosystem Services of Global Significance"
Subsidies			
Subsidies related to combating DLDD	2020	USD 12,500,000	Government subsidy for agricultural land restoration –land conservation
	2018-2020	USD 5,600,000	Property tax exemption for private land
Other transfers			
Total expenditures/total expenditures per year			
Government revenues			
Environmental taxes for the conservation of land resources and taxes related to combating DLDD	2019	USD 150,000,000	Tax increase on royalties in the mining sector. Indirectly related to DLDD
Other transfers			
Total revenues/total revenues per year			

** The private contribution to this PPP is reported under SO 5-3.

Aggregating the information

A total figure for **government expenditures, including subsidies and other transfers**, will be computed automatically. Thus, avoiding any double counting between these categories is recommended. A separate total figure for **government revenues and other transfers** will be automatically calculated. Subtotal figures by year are also envisaged for this reporting table.

Step 5: Use of documentation box

The aim of the documentation box is to provide space to report the necessary definitions and methodologies employed for each relevant parameter included in the table and the description, as relevant. When an international agreed standard is used, it is possible to provide the relevant reference.

Step 6: Qualitative question

The reporting Party is invited to share information on whether it set a **target for domestic resource mobilization**. If yes, provide further details on the features of this target, the timing, and the progress monitoring process.

5.3. SO5-3 –International and domestic private resources

5.3.1. Introduction

The indicator aims at monitoring private resources mobilized by the private sector of the reporting Party for activities and investments ‘at home’ (domestic) and in third countries (international). The scope of this indicator encompasses financing by all private sector organizations including corporations (e.g., private sector funds), households and non-profit organizations (e.g., philanthropic foundations) from domestic and international sources. Such private sources of financing provide resources in the form of concessional and non-concessional resources to implement the Convention.

The indicator allows for reporting on innovative sources of finance and the number of co-financing partners, for those related to the private sector. Further information related to co-financing and innovative sources of finance in the public sector could be reported under the previous two indicators.

The reporting country should select the most relevant Tier approach based on the capacities and data available.

5.3.2. Prerequisites for reporting

- Institutional arrangements in place for the collection of financial data on private resources allocated to combat DLDD.
- Capacity to access commercial databases to analyse private sector reports and dedicated case studies.
- Mechanisms to involve private actors in the compilation of the information.

5.3.3. Reporting process and step-by-step procedure

The UNCCD offers the option to report on SO 5-3 both in qualitative and quantitative terms, subject to data availability. No default data will be provided against this indicator.

Step 1: Identification of relevant data

Data relevant to this indicator are usually collected at central government level (in turn also from local authorities). Parties are encouraged to make their best efforts to provide information at the highest disaggregation level available.

Relevance to desertification/land degradation and drought

The relevance of funded activities, projects or investments of the private sector should be consistent with the DLDD-relevance criteria employed to report against the other indicators for monitoring domestic and international resource flows.

Flows

OECD statistics on development finance (from the CRS) include activity-level data on funds from around 40 of the largest philanthropic foundations, many of which provide finance for environmental objectives[4]. The OECD statistics on the amounts mobilized from the private sector also provide insights on international private sector contributions for development, including for SDG 14 and 15[5].

Step 2: Estimate trends in international and domestic private resources

Tier 1 involves reporting trends in the progress indicator in qualitative terms (i.e., increasing, stable or declining trends) based on the expert opinion of the reporting Party. Choose the option representing the trend in the international private resources and domestic private resources for activities relevant to the implementation of the Convention in the relevant table for the four-year period. Select only one option for each table.

Step 3: Reporting in narrative format

SO5-3 requests the provision of relevant descriptive and qualitative information. The aim of this section is to provide Parties the space to report on information on the context and complement the reporting against Tier 1 (trends) or Tier 2 (table).

Examples

"The reporting country undertook important public–private partnerships with [the recipient country] and [the third country's] private companies. These have been mobilizing XY euros to pursue…"

[4] See https://www.oecd.org/development/financing-sustainable-development/development-finance-standards/beyond-oda-foundations.htm.

[5] See https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/mobilisation.htm.

"Non-governmental organizations (NGOs) are funded at 80% by public sources and they need to co-finance 20% of each project/programme (own contribution). This means that besides the development cooperation budget, the NGOs are the most important co-financing partners for activities relevant to the implementation of the Convention. These contributions come from the private sector, private donations, other donors and the European Union."

Step 4: Compiling the table

Parameters

The table for SO 5-3 provides space to report at project level (or at the highest level of disaggregation available) on actions, investments or programmes that are considered relevant to combating desertification. The reporting Party can choose the methodology to accommodate definitions in use, but the reporting manual suggests some approaches for each parameter. Reporting countries are encouraged to clearly explain the definitions used.

- Year: Indicate the year relevant to the reported activity. Explain whether the fiscal or calendar year is used.
- Title of project, programme, activity or other: This field includes the title of the project or activity, as well as the type of investment and initiative.
- Total amount in USD: The amounts should be reported in USD; if the reporting country decides otherwise, the approach should be explained clearly in the methodology. This implies the application of an exchange rate to the different domestic currencies. The World Bank annual average exchange rate is suggested; please indicate if (and how) a different exchange rate is used.
- Financial instrument: Please indicate the financial instrument channelling the private resources reported.
- Type of institution: Indicate which private entity is extending the resources relevant to DLDD.
- Recipient/domestic: Indicate the recipient's name if the reporting country's private sector contribution is addressed to a recipient third country; indicate 'domestic' if the private sector of the reporting country provides contributions to activities in the reporting country itself.
- Additional information: Please include any other activity-level information that you deem relevant, including the name of the private sector entity, details on the recipient and the description of the activity.

Table 24 below is populated with some examples (further rows can be added):

***Table 24**. Resources provided and received for International and Domestic private resources*

Year	Title of project, programme, activity or other	Total amount in USD	Financial instrument[1]	Type of institution[2]	Recipient/ domestic [3]	Additional information
2018	PPP[4]	2,500,000	Commercial loan	Private corporation	Domestic mobilization	Private loan blended with public grant funding
2018–2020	Risk mitigation instrument for land restoration	3,000,000	Private equity	Pension fund	Latin America	The Risk Mitigation Instrument for Land Restoration project combines a grant of USD X million with USD 3 million in private equity to deploy innovative risk mitigation instruments to restore degraded lands in Latin America.
2019	Desertification and Sandstorm Disaster Prevention and Control Project in the Western Region	1,400,000	Commercial loan	Private corporation	Domestic mobilization	Executing agency: XY Ecology Technology Co. Ltd.
Total international		xxx				
Total domestic						
Total per year		yyy				

[1] Charitable grant, commercial loans, private export credit, private equities, private insurance, other (specify)

[2] Philanthropic foundation, non-profit institution, pension fund, private corporation, other (specify)

[3] Recipient country/region domestic mobilization

[4] The public contribution to the PPP is reported under SO 5-2.

Aggregating the information

Figures will be aggregated as totals by geography (one figure for domestic private resources, one figure for international private resources) and subtotals per year. Aggregation by financial instrument could also be meaningful information to gather, considering the wide range of instruments and their role within the DLDD financing landscape at domestic and international level.

Aggregation of figures must avoid double-counting across the table and the other indicators.

Step 5: Reporting methodological information

Unlike indicators SO 5-1 and SO 5-2 (which include a documentation box), the SO 5-3 indicator includes a separate question for the methodological information. This different approach leaves further flexibility for reporting countries regarding the requisite information and how to structure and elaborate on it, considering that reporting on domestic and international private resources may vary significantly from country to country.

5.4. SO5-4 –Technology transfer

5.4.1. Introduction

The Convention explicitly requires Parties to promote, finance and facilitate the financing of the transfer, acquisition, adaptation and development of environmentally sound, economically viable and socially acceptable technologies relevant to combating desertification and/or mitigating the effects of drought; and encourages the facilitation of technology cooperation among affected country Parties through financial assistance or other appropriate means, and through international cooperation (Article 20).

This indicator aims at collecting information from Parties on resources allocated to the transfer of technologies to implement the Convention, both provided to and received from other countries. Moreover, it provides the space to report on technology transfer requirements, both in a qualitative and quantitative manner.

5.4.2. Prerequisites for reporting

- Access to databases which allow for the identification of DLDD-related projects or activities that include a technology transfer component.
- Capacity to undertake an inventory or a case-by-case approach if available data do identify technology transfer projects that address DLDD.
- Capacity to select the most significant projects and activities focusing on technology transfer or including a technology transfer component and provide information on those selected projects.

5.4.3. Reporting process and step-by-step procedure

The UNCCD offers the option to report on SO 5-4 both in qualitative and quantitative terms, subject to data availability. No default data will be provided against this indicator.

Step 1: Identification of relevant data

There is currently no defined methodology for identifying DLDD-relevant activities that include a technology transfer component or are specifically aimed at transferring or developing technologies to combat DLDD; however, the template may accommodate different approaches.

The suggested approach is to draw upon the OECD DAC CRS database for ODA flows, OOF, and Private development finance and the Rio Marker for desertification, and select projects specifically aimed at transferring or developing technologies to combat DLDD or with a relevant component. It is possible to consider resources extended to teaching institutions, research institutes and similar agencies. There are potential interlinkages with projects dealing with technologies for climate adaptation, for which taxonomies and classifications are available[6], which could serve as a reference for the identification of relevant technologies.

Step 2: Estimate trends in technology transfer resources provided and received

Choose the option representing the trend in the international resources provided and received for technology transfer activities for the implementation of the Convention in the relevant table for the four-year period. Indicate the general trend within this period, for both tables if your country is both a provider and a recipient. Otherwise, indicate the trend for either one. Select only one option for each table.

Step 3: Reporting in narrative format

The aim of this section is to provide Parties the space to report information on context and complement the reporting against Tier 1 (trends) or Tier 2 (table).

The description may include:

- Strategies employed to support technology development and transfer, including case studies.
- Support for the development and enhancement of in-country capacities and technologies.
- Resources provided, received, and required for the use and dissemination of modern technology for the collection, transmission, and assessment of data on land degradation.
- Measures to facilitate the adaptation of technology, knowledge, know-how and practices to wide use and integration with modern technology.
- How Parties cooperate internationally in the fields of technology transfer as well as scientific research and development.
- Efforts to encourage private sector activities related to technology development and transfer and how such efforts support developing country Parties.

Step 4: Compiling the table

Under Tier 2, country Parties are encouraged to report by recording data about individual projects aimed at transferring technologies to combat DLDD. The table is to be compiled either seeking to provide a complete picture on technology transfer activities; or with selected projects and measures for which more detailed information is available. In fact, it is possible to use the SO 5-1 technology transfer parameter to aggregate total amounts related to technology transfer. Reporting countries should clearly explain the approach to the compilation of the table, and with respect to the use of the SO 5-1 parameter.

[6] https://tech-action.unepdtu.org/wp-content/uploads/sites/2/2021/04/report-on-taxonomy-of-climate-change-adaptation-technology-including-factsheets-finalb pdf.

Parameters

The reporting Party can choose the methodology to accommodate definitions is use, but the reporting manual suggests some approaches for each parameter included in the table.

- Provided/received/required: Indicate ‘provided’ if for the reported activity the reporting country is the provider of the technology transferred; indicate ‘received’ if the reporting country is the recipient of the technology transferred; indicate ‘required’ if the reported activity is the technology transferred required by the reporting country.
- Year: Indicate the year relevant to the reported activity. Explain whether fiscal or calendar year is used. It is possible to indicate a timeframe rather than a specific year if it falls within the reporting period.
- Title of project, programme, activity or other.
- Total amount in USD: The amounts should be reported in USD. If the reporting country decides otherwise, the approach should be explained clearly in the methodology. This implies the application of an exchange rate to the different domestic currencies. The World Bank annual average exchange rate is suggested; please indicate if (and how) a different exchange rate is used. It is possible to report on either amount committed or disbursed; the approach used should be explained and double counting should be avoided.
- Recipient/provider: Indicate the name of the recipient if your country is the provider of resources; indicate the name of provider if your country is the recipient of resources. It could include the name of the country/region or be listed as ‘global’ (bilateral flows); or include the name of the institution and/or entity (multi-bilateral flows). If information on domestic transfer of technologies is included, indicate ‘domestic’ and provide further information on the providers and recipients of resources in the initiative.
- Description and objectives: Include information on the objective of the technology transferred in the new context.
- Sector: Indicate the sector according to the classification system used in other indicators.
- Type of technology: Indicate the technology/ies being transferred. Explain the definition and categorization used for DLDD-relevant technologies in the methodological information.
- Activities undertaken by the private sector, public sector of both.
- Status of measure of activity: Indicate whether the activity is planned, ongoing or completed at the time of the last reporting year.
- Timeframe of measure or activity: It is possible to indicate the timeframe covered by the implementation of the project, or the year of commitment or disbursement of amounts.
- Use, impact and (estimated) results: include additional project-level information about the use of resources, the impact with respect to the objectives of the Convention, and results (estimated if the project did not conclude before the end of the reporting period).
- Additional information: Please include any other activity-level information that you deem relevant, including, for example, information on co-financing arrangements and the respective role of the public and/or private sector.

Table 25 below is populated with some examples (further rows can be added):

Table 25. *Resources provided, received, and required for technology transfer measures or activities*

Provided/ received/ required	Year	Title[1]	Amount USD	Recipient or provider[2]	Description and objectives	Sector	Type of technology	Activities undertaken by[3]	Status of measure or activity[4]	Timeframe of measure or activity	Use, impact, and estimated results	Additional information
Provided	17	Land degradation neutrality	45,000	Democratic Republic of the Congo	…	Bioshpere protection	Geospatial Technologies for Land Degradation Assessment and Management	Public and private sector	Ongoing	2018–2020		
Received	18	Soil management		China		Environmental protection	Technologies of sandy desertification control	Private	Completed	2019		
Required		Regenerative agriculture	60,000	Domestic		Agriculture	Planting local flora to stabilize the soil	Public	Planned	2021-2023	…	
Totals												
Totals per year												

[1] Title of project, programme, activity or other

[2] Recipient entity, country, region, global

[3] Public sector, public and/or private sector; private sector

[4] Planned/ongoing/completed

Step 5: Reporting methodological information

The SO 5-4 indicator includes a separate question for the methodological information, providing the space to report any relevant approaches and definition used in the reporting.

5.5. SO5-5 –Future support for activities related to the implementation of the Convention

5.5.1. Introduction

SO5-5 is a qualitative indicator with three questions that encourage country Parties to reflect on future resources to be targeted at implementing the Convention.

In particular, the indicator allows country Parties to provide descriptive information on planned domestic resources, both public and private. It also provides a space to report on the planned provision and mobilization of international public and private resources. The third question aims to facilitate sharing of information on resources needed by Parties for the implementation of the Convention.

5.5.2. Prerequisites for reporting

- Access to provisional budgets of central administrations for both domestic and international resource allocation, and the capacity to distinguish DLDD-related funds.
- Adoption of a consistent and clear methodology to estimate the quantitative amounts of resources needed to implement the Convention.

5.5.3. Reporting process and step-by-step procedure

The indicator offers the option to report on three different aspects of future support through SO 5-5 in qualitative terms. No default data will be provided against this indicator.

At national level, information can be found in the relevant sections of public provisional budgets, as well as in environment-related financial pledges and planned policies and measures related to DLDD. It is possible to use a case-by-case approach for the domestic private sector, as well as available data from research, case studies and dedicated datasets.

SO5-5.1: Planned provision and mobilization of domestic public and private resources

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Examples

- "The reporting country will continue to provide public support to address land degradation and drought to developing countries and affected country Parties through bilateral and multilateral channels for rehabilitation and soil improvement, combating soil erosion and desertification, and sustainable agriculture."
- "The national system allows for the tracking of future resources aimed at pursuing Sustainable Development Goal (SDG) 15, thanks to the recently established strategic committee on SDG implementation in partner countries, managed by the Ministry of Foreign Affairs. Thus, the estimated amounts reported will be dedicated to the achievement of SDG 15."

SO5-5.2: Planned provision and mobilization of international public and private resources

Examples

- "In the reporting county, a programme on improving food security and enhancing farmers' initiatives is being implemented. It is aimed at sustainably increasing production and fostering jobs for women and youth by adopting resilient agro-farming practices, restoring degraded lands, and improving natural resources management. A budget of USD 15 million (XYZ domestic currency) has been allocated to this measure for the triennium 2021–2023."
- "The central government budget line dedicated to sustainable land management (see SO 5-2) for the years 2022–2024 is endowed with USD 14 million across the triennium. In accordance with the recently adopted "Programming document for national land management", this budget line will likely be entirely dedicated to activities pursuing the implementation of strategic objectives included in the aforementioned programming document

SO5-5.3: Resources needed

Examples

- "Based on the results of the assessment conducted in 2019, the reporting country aims at developing a land degradation neutrality (LDN) targets implementation plan. The most promising and feasible measures will be identified, as well as related budget, capacity-building and technology transfer needs."
- "Regions in the country most affected by DLDD are …. Those regions need significant investments to reduce vulnerabilities caused by land degradation. Following a case study survey among the local population, projects on the ground need to target local communities and indigenous peoples in sustainable land use with the aim of creating synergies with local practices and knowledge."
- "The reported estimate of USD 16.96 million is based on a study conducted on the basis on the Biodiversity Finance Initiative (BIOFIN) methodology, with further internal developments to adapt it to the objectives of the national LDN targets.

Aggregating the information

Aggregation of figures for this indicator is not envisaged. Aggregated figures could be included by reporting countries. In this case, reporting country should clearly explain how information is aggregated within the three sub-indicators. Figures across the three indicators cannot be aggregated, as different in nature and domain. Aggregation of figures must avoid double counting across years.

6. Strategic objective 1 to 4: voluntary targets, additional indicators and affected areas

6.1. Voluntary targets for strategic objective 1

6.1.1. Introduction

Parties may wish to set national voluntary targets that contribute to strategic objective 1 (SO 1) and therefore "to improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to Land Degradation Neutrality (LDN)".

This includes, but is not limited to, the formulation of LDN voluntary targets in accordance with Parties' specific national circumstances and development priorities. LDN voluntary targets reflect Parties' ambitions in achieving no net loss of (and thus neutrality), or gains in, healthy and productive land when compared to the baseline.

The definition of voluntary targets should be based on best available data and knowledge. The assessment of land degradation and its drivers plays a key role in informing the decision-making process. Relevant stakeholders must be involved in the voluntary target definition process to ensure ownership and that the achievement of LDN does not come at the expense of adverse social and ecosystem impacts.

Targets need to be measurable to monitor progress. Parties are invited to formulate quantifiable, geographically explicit and time-bound voluntary targets aiming at achieving a neutral (no net loss) or improved (net gain) state of the land, and defining interventions that contribute to avoiding, reducing and reversing land degradation, in line with the LDN response hierarchy (see figure 5).

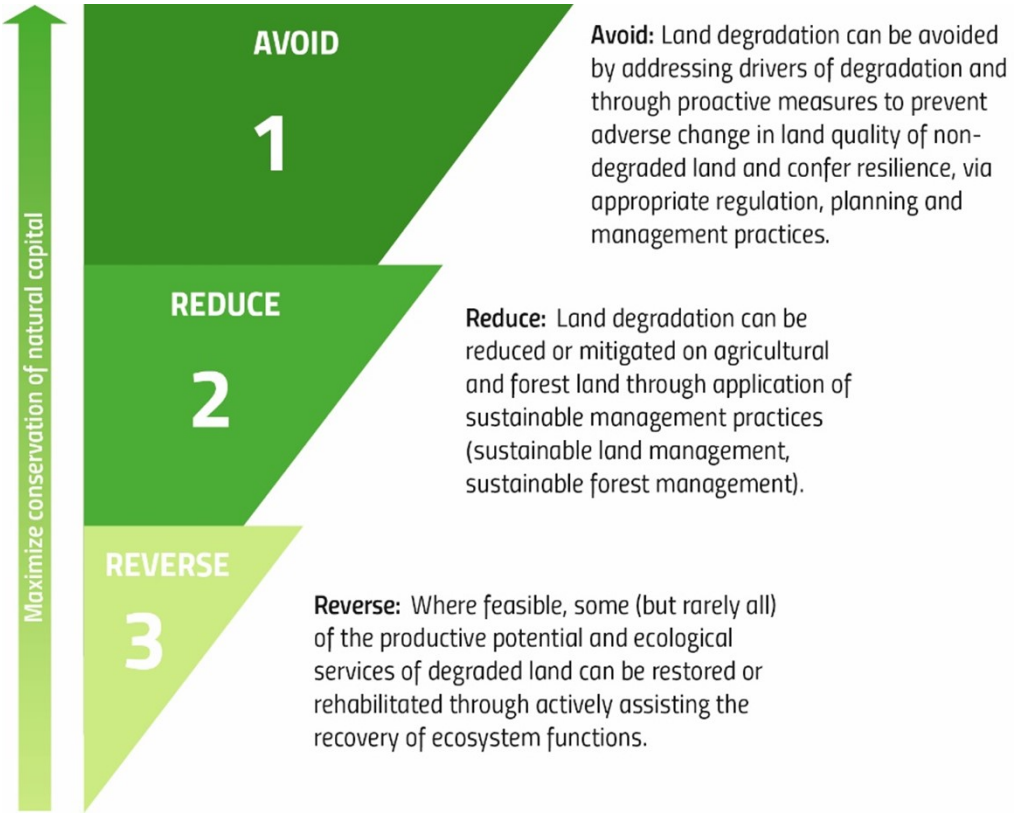

Figure 5. Land Degradation Neutrality response hierarchy

Geographic specificity helps define realistic targets. Geographically explicit targets with distinct locations, ecosystem types and maps can provide increased focus on critical hotspot areas, aid prioritization and help create realistic and purposeful sub-national commitments and plans.

An example of a time-bound, measurable and geographically explicit LDN voluntary target set by Colombia is: "By 2030, the productivity of at least 2,000 ha of soils with crops and/or pastures will be improved, with agroforestry production systems in the Caribbean and Andean regions (Sucre, Santander and Boyacá departments)".

LDN is intended to be achieved at the national level. Countries typically aim to achieve this through the definition of a combination of national target(s) and complementary targets at the sub-national level for a specific indicator and/or a specific geographic area (i.e., a particular ecosystem, natural area, watershed or subnational administrative jurisdiction), which together contribute to realizing Parties' ambitions in achieving or exceeding LDN at the national level. Generic examples of LDN targets at different levels of application are presented in table 26 below.

***Table 26**. Generic examples of Land Degradation Neutrality targets at different levels of application*

Level of application	Example
National level (no net loss)	“Achieve Land Degradation Neutrality (LDN) by 2030 compared to the 2015 baseline”
National level (net gain)	“Achieve LDN by 2030 compared to the 2015 baseline, plus an additional 10% of the national territory has improved”
Sub-national level (no net loss)	“Achieve LDN in the Western province of country X by 2030 compared to the 2015 baseline”
Sub-national level (net gain)	“Achieve LDN in the Southern province of country X by 2030 compared to the 2015 baseline, plus an additional 25% of the province territory has improved”
Specific target (to avoid land degradation)	“Halt the conversion of forests and wetlands to other land cover classes by 2020”
Specific target (to reduce land degradation)	“Reduce the rate of soil sealing (conversion to artificial land cover) by 50% by 2030 compared to the 2015 baseline”
Specific target (to reverse land degradation)	“Improve productivity and Soil Organic Carbon stocks in cropland and grasslands by 2030 compared to the 2015 baseline” “Rehabilitate X million hectares of degraded and abandoned land for crop production by 2030” “Increase forest cover by 20% by 2030 compared to the 2015 baseline”

Voluntary targets and actions undertaken to address land degradation can simultaneously contribute to climate change mitigation and adaptation, biodiversity conservation and multiple Sustainable Development Goals (SDGs). Thus, there is considerable potential for synergies and it is very important that LDN targets ensure policy coherence and alignment with other national commitments made under different Conventions and related initiatives (i.e., Nationally Determined Contributions, National Adaptation Plans, National Biodiversity Strategies and Action Plans, land restoration commitments). In this context, LDN targets should be seen as an effective means of complementing and strengthening other country commitments and avoiding duplication of efforts.

6.1.2. Prerequisites for reporting

- An in-depth reading of the LDN Target Setting technical guide.
- A pool of national experts that report across various Conventions and related initiatives to ensure alignment and coherence between LDN-relevant national commitments.
- A spatial data file of the target areas or a good understanding of the location and extent of the targets, allowing them to be reported on in a spatially explicit manner using the PRAIS 4 spatial data viewer.

6.1.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is as follows.

Step 1. Declare national voluntary targets

National voluntary targets are reported in table SO1-VT.T1 of the PRAIS 4 platform. Parties are invited to articulate, in quantifiable and time-bound terms, voluntary targets that contribute to LDN and/or SO 1 and to include information on the expected year of target achievement, location and total target area, type of LDN intervention (i.e., relevance of the target to the LDN response hierarchy), planned or ongoing measures to achieve the target, and the status of target achievement. Since targets set under the United Nations Convention to Combat Desertification (UNCCD) can also address commitments made under other Rio Conventions and associated initiatives, Parties may also indicate other existing goals of relevance for their LDN targets.

Table SO1-VT.T1 is a spatial table and therefore should ideally be completed with the support of the Geographic Information System (GIS) tools available in PRAIS 4. The PRAIS 4 spatial data viewer enables Parties to delineate the location and extent of their targets, thereby making them geographically explicit, or to upload an existing spatial file (in vector format) of the target areas. This is an additional and optional element, but such location-based information can strengthen spatial approaches to sustainable land management and help integrate responses to land degradation at the landscape scale.

Additional information not included in the table may be reported in the "General Comment" field.

Step 2. Describe implemented actions relevant to the targets

Areas of implemented action (projects and initiatives on the ground) related to the targets can be reported on in table SO1.IA.T1. As for Step 1, areas of implemented action should ideally be delineated in the PRAIS 4 spatial data viewer.

Delineating voluntary targets and related actions currently under implementation can help track progress towards achieving LDN in a country by 2030, support the quantification of any remaining gaps and develop scenarios for closing those gaps. In addition, the UNCCD can use this spatial data to create information products to demonstrate the impact of the Convention and global progress towards LDN.

6.1.4. Dependencies

Although there is no direct dependency between the voluntary targets and SO 1 indicators, it is expected that the results of the geospatial analyses for the estimation of the proportion of degraded land will inform the definition and spatial delineation of the voluntary targets and related projects and initiatives on the ground.

There is a dependency between the targets set in table SO1-VT.T1 and the implemented actions reported in SO1.IA.T1; each reported action in table SO1.IA.T1 should correspond to one or more targets reported on in SO1-VT.T1.

6.1.5. Challenges

National coordination

- With respect to the various plans and commitments formulated under the Rio Conventions and/or other related initiatives, there is the risk of lack of coherence, overlap and duplication of efforts. There is scope for better alignment on restoration in national plans between the three Rio Conventions, which could enhance planning and implementation.
- National voluntary targets need to be well-defined, measurable and time-bound to monitor progress. The availability of GIS tools in PRAIS 4 may support the definition of more accurate and realistic targets in defined locations.

6.1.6. Further reading

- LDN Target Setting –A technical guide (https://knowledge.unccd.int/publication/ldn-target-setting-technical-guide)
- Achieving Land Degradation Neutrality at the Country Level: Building Blocks for LDN Target Setting (https://www.unccd.int/publications/achieving-land-degradation-neutrality-country-level-building-blocks-ldn-target-setting)
- Goals and Commitments for the Restoration Decade. A global overview of countries' restoration commitments under the Rio Conventions and other pledges. © PBL Netherlands Environmental Assessment Agency, The Hague, 2020, PBL publication number: 3906 (https://www.pbl.nl/sites/default/files/downloads/pbl-2020-goals-and-commitments-for-the-restoration-decade-3906.pdf)

6.2. Voluntary targets for strategic objectives 2, 3 and 4

6.2.1. Introduction

Parties may wish to set national voluntary targets that contribute to the achievement of SOs 2, 3 and 4:

- SO 2: to improve the living conditions of affected populations;
- SO 3: to mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems;
- SO 4: to generate global environmental benefits through effective implementation of the UNCCD.

The definition of voluntary targets should be based on best available data and knowledge. The assessment and estimation of the related indicators can play a key role in informing the decision-making process.

Targets need to be measurable to monitor progress. Parties are invited to formulate quantifiable, time-bound and, where relevant, geographically explicit targets.

Voluntary targets and actions undertaken to achieve the UNCCD SOs can simultaneously contribute to climate change mitigation and adaptation, biodiversity conservation and multiple SDGs. Thus, there is considerable potential for synergies and it is very important that targets set under the UNCCD ensure policy coherence and alignment with other national commitments made under the SDGs, different Conventions and related initiatives.

6.2.2. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is as follows.

Step 1. Declare national voluntary targets

Parties are invited to articulate, in quantifiable and time-bound terms, voluntary targets that contribute to the achievement of SOs 2, 3 and 4, and to include information on the expected year of achievement or actual year (if already achieved), the level of application (e.g., national, sub-national) and the implementation status (achieved, not achieved, ongoing, extended or postponed, partially achieved).

Delineating the SO 2, 3 and 4 target areas in PRAIS 4 is not requested at this stage. However, geographically explicit targets with distinct locations can help create realistic and purposeful sub-national commitments and plans.

Step 2. Provide any complementary information

Complementary information may be reported in the "General Comments" field. This may include whether the targets have been adopted or officially endorsed and if so, by which body (institution, government agency, regulation). Implemented action, such as target-related projects and initiatives on the ground can also be described.

Furthermore, Parties are encouraged to outline the linkages with the SDGs, indicate opportunities to create leverage and synergies with their countries' socio-economic, infrastructural and biodiversity agendas, and collaborate with other multilateral environmental agreements.

6.3. Additional Indicators

6.3.1. Introduction

Additional indicators at the national and sub-national levels can assist in both interpreting and understanding the common global indicators associated with each strategic objective, and address locally-relevant issues.

6.3.2. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is as follows.

Step 1. Report any national additional indicators

Countries are encouraged to identify complementary indicators for SOs 1 to 4 to better address national and sub-national specificities. These can be additional progress indicators or process indicators to monitor whether actions are being implemented as planned. Additional indicators can be quantitative and qualitative.

While sex-disaggregated data related to exposure of population to land degradation and drought are now collected through indicators SO 2-3 and SO 3-2, Parties are encouraged to identify further gender-responsive socio-economic and demographic indicators that may provide a better understanding of how and why specific populations are affected by land degradation and drought.

Additional indicators can be added on the PRAIS 4 platform via a dedicated form (referred to as AI for brevity in PRAIS 4). Parties may specify the name of the indicators, the associated SOs and their direction of change. A brief description of the indicators and other relevant information may be reported in the "Comment" field.

6.4. Affected Areas

6.4.1. Introduction

By its decision 11/COP.14, the Conference of the Parties requested the secretariat to further facilitate reporting on SOs 1, 2, 3 and 4 by, inter alia, including additional data fields specific to affected areas in the reporting system.

Therefore, PRAIS 4 facilitates countries that wish to report on affected areas as an additional and optional item to national reporting. Parties have the option to report on affected areas using a specific set of forms for SOs 1, 2, 3 and 4. The process, forms and tables to report on affected areas are the same as those used for national reporting. No default data is made available for affected area reporting.

6.4.2. Pre-requisite for reporting

- Sub-national data specific to affected areas.

6.4.3. Reporting process and step-by-step procedure

The step-by-step procedure for reporting is as follows.

Step 1: Define affected areas

Parties wishing to report on affected areas are invited to specify the affected area definition in use in their country. In PRAIS 4, Parties may opt to use the definition of the affected areas contained in Article 1 of the Convention[1], or to provide the operational definition of affected area in use in their country.

Once this part of the form has been completed and saved, the reporting forms for SOs 1 to 4 specific to affected areas (referred to as AA for brevity in the reporting forms) will open. These forms will not contain pre-filled default data as provided for national reporting. Therefore, Parties will be required to produce the data specific to affected areas and report it in the forms as explained in Steps 2–4.

Step 2: Delineate affected areas

Parties will be required to spatially delineate the area that corresponds to the definition provided in Step 1 above. Digitization tools in any GIS software (e.g., ArcGIS, QGIS) could be used for this purpose or Parties may have an existing spatial file of the affected area available (e.g., ESRI shapefile, GeoJSON or any widely accepted file format).

Step 3: Calculation of affected area estimates for all indicators

Using the shapefile of the affected area produced in Step 2, Parties should calculate affected area estimates of all indicators for SOs 1 to 4.

Trends.Earth can be used to run these calculations on any area of interest. When calculating the indicators in Trends.Earth, Parties should upload the shapefile of the affected area produced in Step 2 and use it as the area of analysis. Parties should refer to the Trends.Earth documentation for further information on how to use their own area file in the calculations. Once the processing is complete, Parties will be required to upload their results to the PRAIS 4 platform and/or manually fill in the affected area forms with the required information.

For non-geospatial indicators (e.g., SO2-1, SO2-2, SO4-2 andSO 4-3), Parties may wish to assess the availability of sub-national information specific to the affected areas defined in Step 1, and report it in the forms provided.

Step 4: Generate reports

All forms and tables on the PRAIS 4 platform for reporting the affected areas should be filled in and supporting data and information provided, if desired, through the upload tools in PRAIS.

Once completed and verified by the Parties, the indicators' estimates for the reporting and baseline periods should be officially submitted to the UNCCD. Parties are also encouraged to submit narratives on the methodology, data sources and data accuracy.

[1] Article 1 of the Convention defines as "affected areas" arid, semi-arid and/or dry sub-humid areas affected or threatened by desertification

6.4.4. Challenges

Data availability and quality

- Depending on the extent of the affected areas, spatial resolution of global default datasets available in Trends.Earth might not always be suitable to calculate indicators with enough sensitivity to spatial variation at sub-national level. Although higher spatial resolution data might be needed, Parties might be challenged by access to commercial satellite imagery, for example, where costs might be prohibitive.

Methodological approach

- Affected area definitions may vary across countries, limiting the comparability of results across regions and/or globally.

6.4.5. Summary (main actions)

Key actions for reporting on affected areas are as follows:

1. **Define affected areas**: Parties should specify the affected area definition in use in their country.
2. **Delineate affected areas**: Parties should spatially delineate the area that corresponds to the definition provided in Step 1.
3. **Calculation of affected area estimates for all indicators**: using the shapefile of the affected area produced in Step 2, Parties should calculate affected area estimates for all indicators.
4. **Generate reports**: Parties should fill in the reporting forms for SOs 1 to 4 specific to affected areas.

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7. Implementation framework: financial and non-financial resources, policy and planning, and action on the ground

7.1. About the implementation framework

7.1.1. Introduction

The implementation framework describes the approach adopted to support and implement the strategic objectives and furthermore provides Parties with an opportunity to share their knowledge and experiences. It focuses on three broad areas:

(a) Financial and non-financial resources

Sharing experiences in (i) successfully mobilized financial and non-financial resources; (ii) uses of land degradation neutrality (LDN) as a catalyst for leveraging investments; and (iii) improved use of existing and/or innovative financial processes and institutions.

(b) Policy and planning

Sharing experiences in (i) the development, implementation and monitoring of national, subregional and regional action programmes and/or plans for UNCCD implementation; (ii) the establishment of policies and enabling environments; (iii) leveraging of synergies; (iv) mainstreaming of desertification/land degradation and drought (DLDD); and (v) improvements in drought preparedness and management.

(c) Actions on the ground

Sharing experience in (i) successful implementation practices used to achieve sustainable land management; (ii) increasing restoration efforts and/or rehabilitating ecosystems; (iii) drought risk management and early warning systems; (iv) alternative livelihoods; and (v) the establishment of effective systems for sharing information and knowledge.

7.1.2. Approach to reporting and structure of the reporting template

Reporting on the implementation framework is qualitative and voluntary.

The reporting template of the PRAIS 4 platform includes a section for each of the above-mentioned areas ((a), (b) and (c)), organized as follows:

- The title and a brief description of each topic;
- The key question(s) related to the topics;
- Complementary information on the topics (countries' experiences as narrative).

Many questions in the reporting template of the implementation framework are self-explanatory, and guidance is provided only for selected terminology that may need explanation.

'Yes' responses to questions enable fields where Parties may provide details on the topic. These fields may change from topic to topic, although a few of them are recurrent, such as:

- Use this space to describe the experience.
- What were the challenges faced, if any?
- What do you consider to be the lessons learned?
- How did you engage women and youth in X?

The narrative nature of the reporting process gives Parties an opportunity to provide and share information on experiences and challenges. Parties are also encouraged to add one or more examples in support of the stated experiences, including the approach/procedure that was used, how the reported examples were successful and what factors contributed to the success. Each experience and example should be provided as text and should not exceed 1,000 words (approximately two pages of normal text in font size 12).

Some sections in the implementation framework include questions about the support provided to other Parties for implementing the Convention with details on modalities and contexts. Those questions are addressed in principle to those Parties to the Convention which may not suffer from DLDD, but which support those that do. However, it may also address those Parties that engage in South–South cooperation as part of the implementation of this Convention.

7.1.3. Review

The information provided through reporting on the implementation framework will be used, inter alia, for the official sessions of the Committee for the Review of the Implementation of the Convention to showcase experiences gained in the implementation of the Convention. The reporting manual provides advice on the specific content and type of information that is required in the narratives concerning each area/aim, and hence contributes to focused reporting on current UNCCD priorities and enables a lively, targeted exchange during sessions.

7.2. Financial and non-financial resources

Parties are encouraged to answer questions related to the following three main topics.

7.2.1. Increasing the mobilization of resources

This section relates to strategies and actions aimed at increasing the mobilization of financial and non-financial resources for the implementation of the Convention from international and domestic, public and private sources as well as from local communities, including non-traditional funding sources and climate finance.

Examples of financial resources are funding from grants or credit, non-financial resources (e.g. goods, materials, capacity-building and volunteer time) and non-traditional funding sources (e.g. private investments and public–private partnerships, remittances, solidarity taxes, risk guarantees and insurances). International multilateral finance refers to the Adaptation Fund, Green Climate Fund, and the Global Environment Facility (GEF) land degradation focal area and its special funds focusing on climate, dedicated multilateral and bilateral funds, and carbon markets.

The narrative preferably should include information on the type of resources that were mobilized, the source of funding, the purpose of funding (brief description of the project/activity) and the approach/procedure that was used to mobilize resources. Parties may also explain how this experience represents an increase in resource mobilization (i.e. what is different about it) and the main challenges, main factors of success, and lessons learned.

The narrative may also describe a country's support to the mobilization of financial and non-financial resources for the implementation of the Convention in another country, including information on the partner that was supported, the type of resources mobilized, the source of funding, the purpose of funding (brief description of the project/activity), the approach/procedure used to mobilize resources, lessons learned, challenges and the main factors of success.

7.2.2. Using land degradation neutrality as a framework to increase investment

This relates to strategies and actions for taking advantage of the opportunity to use LDN as a framework to enhance the coherence, effectiveness and multiple benefits of investments. Parties are encouraged to clarify how the implementation of the LDN concept has influenced/is influencing investments. In particular, the aim is to find out whether the implementation of the LDN concept has facilitated support to land activities from different funding sources and assisted in bringing together different types of investors.

Experience(s) and examples to be reported should focus on Parties that use or have used LDN as a framework to enhance the coherence, effectiveness and multiple benefits of investments. Such experiences may include supporting land activities through investments targeting climate action, biodiversity, forests, water and similar; or engaging a variety of funding sources (governments, financial institutions, private sector and others) in land activities. Information about the size of the investment, its use (brief description of the project/activity), challenges faced, lessons learned and the partners involved should also be reported.

7.2.3. Improving existing and/or innovative financial processes and institutions

Parties are encouraged to report on their approach to improve the use of existing and/or innovative financial processes and institutions, such as the GEF or other newer funds. Existing financial processes refer to national budgets, bilateral development cooperation and multilateral development banks, while innovative financial processes are climate finance (e.g. Adaptation Fund, Green Climate Fund, dedicated multilateral and bilateral climate funds other than those of the GEF, and carbon markets), private investments and public–private partnerships, remittances, solidarity taxes, risk guarantees, insurances or similar.

Parties may report experiences in improving climate investments (policies, regulations or approaches that facilitate investments in UNCCD implementation); increasing coherence among commitments (integration of LDN or land activities to financial considerations of other priorities and sectors); or improving capacity for the preparation of high-quality project proposals.

In the description of each experience, Parties may include information on the type(s) of financial processes that were addressed (existing, innovative, GEF or other) and the measures that were taken to improve the use of the financial process concerned. The narrative should explain how the measures worked, the way they improved the use of the financial process, the challenges faced, lessons learned, and the main factors of success.

Parties are encouraged to provide one or more examples of support provided in another country to improve the use of existing and/or innovative financial processes and institutions. In the description, it is recommended to include examples of support that was provided, information on the type(s) of financial processes that were addressed (existing, innovative, GEF or other) and measures that were taken to improve the use of the financial process concerned. The description of the outcome may include information on how the measures worked, the way they improved the use of the financial process and the specific challenges, lessons learned and main factors of success.

7.3. Policy and planning

Parties are encouraged to answer questions related to the following five main topics.

7.3.1. Action programmes

This relates to the development, implementation, revision and monitoring of national, subregional and regional action programmes and/or plans as effective tools for UNCCD implementation, such as the national action programmes (NAPs). NAPs are developed through participatory approaches involving various stakeholders at national, subregional and regional levels, and they encompass practical steps and measures that contribute to combating land degradation/desertification and mitigating the effects of drought.

The narrative should report experience(s) in developing, implementing, revising and/or regularly monitoring national, subregional or regional action programmes and include information on the types of action programmes, the main measures taken in developing, implementing, revising or monitoring them, and the current status/results achieved. The narrative should also explain how the adopted measures were effective for UNCCD implementation and the main factors of success.

7.3.2. Policies and enabling environment

This section focuses on establishing policies and legislative measures to ensure an enabling environment for promoting and implementing solutions to combat desertification/land degradation and mitigate the effects of drought.

DLDD approaches can be designed to deliver other social, economic and environmental benefits, including climate change mitigation and adaptation, biodiversity conservation and disaster risk reduction, among other things. Noting the link between gender equality and land degradation, DLDD approaches can also be developed with a clear gender dimension in implementation design.

Experience(s) and examples to be reported (including those from the LDN Target-Setting Programme, where applicable) may focus on the setting of policy and legislative measures to minimize drought risks, including regulations limiting deforestation or managing grazing, the establishment of protected areas, regulations prohibiting the use of certain chemicals or practices, and policies related to land-use planning, water harvesting or crop insurance, etc. More generally, the narrative may report on regulations and policies that cover all agricultural practices and land use at national level, and even subregional level (transboundary agreements ensuring the mobility of pastoralists, etc.), including information on the area covered by the policy or legislative measure (national/local/subregional), the targeted audience, main provisions, and institution(s) adopting the measure, as well as information on how the measure has succeeded in meeting its aim and the main factors of success.

Experience in setting up policy measures to mainstream gender in the implementation of the UNCCD should also be reported. Such experiences may involve, for example, enhancing women's participation in decision-making concerning land, improving women's land rights and access to related resources, or building women's capacity for effective UNCCD implementation.

Parties are encouraged to provide one or more examples of support provided in the setting of policy and legislative measures in another country, including those related to mainstreaming gender in the implementation of the UNCCD. The brief description of the policy or legislative measure should include information on the area covered (national/local), targeted audience, main provisions, institutions adopting the measure, and main factors of success.

7.3.3. Synergies

This refers to strategies and actions aimed at leveraging synergies in DLDD-related activities and integrating DLDD in planning and implementation to generate simultaneous benefits and added value for other multilateral environmental agreements or international commitments.

DLDD processes can contribute to greenhouse gas emissions, habitat loss and decline in biodiversity. As a result, United Nations Framework Convention on Climate Change nationally determined contributions and national adaptation plans and the Convention on Biological Diversity National Biodiversity Strategies and Action Plans may contribute to meeting targets under one or more of the Rio convention mechanisms mentioned as well as under the UNCCD, NAPs and/or LDN targets. Land-based interventions can help integrate and accelerate progress against the Sustainable Development Goals (SDGs), many

of which compete for limited land resources. Implementation measures may include the adoption of conservation measures, sustainable land management (SLM) practices and/or ecological rehabilitation/restoration of past land degradation, and may be pursued in ecosystem-based approaches such as ecosystem-based adaptation, ecosystem-based disaster risk reduction and any other nature-based solution that involves land. Thus, the implementation of actions to address DLDD can be pursued in a holistic approach to achieve the objectives of the three Rio conventions as well as relevant targets under all 17 SDGs, in particular SDG target 15.3.

Parties may provide information on relevant activities or plans (LDN targets, climate or biodiversity commitments or plans, SDGs, NAPs or similar) and include information on their linkages, including with regard to synergies generated and the main factors of success.

7.3.4. Mainstreaming desertification/land degradation and drought

Parties are encouraged to report on their approach to mainstreaming DLDD in economic, environmental and social policies, with a view to increasing the impact and effectiveness of the implementation of the Convention.

The responses should provide information on experience gained in mainstreaming DLDD in economic, environmental and social policies (including experience gained from the LDN Target-Setting Programme), such as adopting SLM in policies for income generation/poverty reduction, gender equality, unemployment, migration, disaster preparedness, energy efficiency or wildlife conservation, among other things.

Parties may include the rationale behind the mainstreaming of DLDD in policies, information on coverage/users of the policy, and details of the process for preparing and deciding on the methods for DLDD mainstreaming. A description on how DLDD mainstreaming in policies increases the impact and effectiveness of the implementation of the Convention and generates added value for the policy should also be included, as well as the main factors of success.

7.3.5. Drought-related policies

Parties are encouraged to describe experiences in establishing national policies, measures and governance for drought preparedness and management, including drought contingency plans at national or subnational levels that outline modalities to manage drought, possibilities for drought to happen, expected impacts and measures to be taken to minimize impacts.

Such experiences may include, for example, establishment of a multi-stakeholder coordination mechanism (body) on drought preparedness, establishment and maintenance of a drought monitoring and early warning system, drought vulnerability and impact assessments at various levels (sector wide, regional or national), and/or implementation of practical drought risk mitigation measures (such as water harvesting, crop insurance and/or irrigation practices). They may also be about gender-responsive drought management, preparedness and resilience-building. In this regard, of special interest would be a description of the approach/procedure used to develop drought preparedness and/or contingency plans.

Parties may include information on the coverage (national/local) of the drought policy/measure and list the authorities and other main stakeholders involved in the implementation. They may also include the main aims and activities of the drought policy/measure, the action taken and the results achieved so far, including the main factors of success. Experiences from the LDN Target-Setting Programme should be reported, when applicable.

Parties may provide examples on the support provided in establishing national policies, measures and governance for drought preparedness and management in another country. The description may include information on the coverage (national/local) of the drought policy/measure, a list of the authorities and other main stakeholders involved in the implementation, as well as the main aims and activities of the drought policy/measure, the action taken, and the results achieved so far, including the main factors of success.

7.4. Action on the ground

Parties are encouraged to answer questions related to the following five main topics.

7.4.1. Sustainable land management practices

Parties may provide a summary of one or more successful SLM practices based on the list developed using the World Overview of Conservation Approaches and Technologies (WOCAT) Global SLM Database and included in the PRAIS 4 platform[1].

The description of the practice may include information on the type of practice, main activities, main stakeholders involved, resources used, reasons for its success in avoiding or reducing land degradation in the long term, and main factors of success. When applicable, experiences from the LDN Target-Setting Programme should also be reported.

Additionally, a full description of the best practice can also be submitted through the WOCAT system to the dedicated knowledge base. Detailed information on how to submit to the WOCAT system can be found at this link: http://knowledge.unccd.int/WOCAT-SLM.

Parties are encouraged to provide one or more examples of support provided to another country to implement successful SLM practices. In the description, it is recommended to include information on the type of practice, main activities, main stakeholders involved, duration, and resources used. The reasons for the successful implementation of this practice, how it has avoided or reduced land degradation in the long term, and the main factors of success should also be reported.

If the practice is already included in the WOCAT system or another similar online database, a link to these systems should be included.

7.4.2. Restoration and rehabilitation

Parties are encouraged to describe their experience in implementing restoration and rehabilitation practices to (i) reverse land degradation and improve land-based natural capital; (ii) assist in the recovery of a degraded ecosystem by re-establishing the pre-existing ecological structure and function; or (iii) reinstate ecosystem functionality, with a focus on the provision of goods and services. Such practices may include, for example, soil nutrient replenishment through organic amendment, water harvesting, counter-erosion measures and reforestation.

In the description, Parties may include information on the type of practice, main activities, the ecosystem in question, main stakeholders involved and resources used. The narrative should also describe the main reasons for success, what support was provided for the recovery of ecosystem functions and services in the long term, and the main factors of success. If the restoration and rehabilitation refer to cases/examples that were mentioned in the question on SLM under the ‘Action on the ground’ section of the reporting form, Parties may refer to them or elaborate more specifically on one or more. Experiences from the LDN Target-Setting Programme should be reported when applicable.

Parties are encouraged to provide one or more examples of the support provided to another country to implement restoration and rehabilitation practices, including information of the type of practice, main activities, areas/ecosystems restored and rehabilitated, main stakeholders involved, and resources used. The narrative should also describe the main reasons for success, what support was provided to the recovery of ecosystem functions and services in the long term, and the main factors of success.

[1] https://www.wocat.net/en/global-slm-database/slm-practices-technologies-and-approaches/classifications-technologies.

7.4.3. Drought risk management and early warning systems

Parties are encouraged to describe their experience in developing and operationalizing drought risk management, monitoring, and early warning systems and safety net programmes. Such experiences may include, for example, capacity-building and extension services, national strategies in place that cover drought risk management, and ways to monitor the early warning systems. The information may address questions relating to:

- What are the current procedures/challenges relating to early warning systems in your country?
- What mechanisms are in place for fostering the liaison and communication of drought monitoring and early warning information between national institutions in your country?
- What are the causes of/reasons for vulnerability to drought in your country?
- What criteria are used to prioritize vulnerability?
- What are general challenges in developing a national drought policy in your country?
- What steps have been taken for establishing a drought policy in your country?

In the description, Parties may include information on the type of activities, people involved, aim of the activities, and action taken. The narrative should also describe the outcomes of the activities and the main factors of success. Experiences from the LDN Target-Setting Programme should be reported, when applicable.

Parties may provide a summary of one or more examples of support provided in another country to develop and operationalize drought risk management, monitoring and early warning systems and safety net programmes. In the description, it is recommended to include information of the type of practice, main activities, main stakeholders involved, duration, and resources used. The reasons for the successful implementation of this practice, how it has avoided or reduced land degradation in the long term, and the main factors of success should also be reported.

7.4.4. Alternative livelihoods

Parties are encouraged to describe their experience in promoting alternative livelihoods, so as to ensure subsistence and generate income using natural resources in a (new) manner that prevents or reduces land degradation. This may include, for example, crop diversification, agroforestry practices, rotational grazing, or rain-fed and irrigated agricultural systems. It could also include income generation activities that are not directly dependent on natural resources, such as production of artisanal goods, renewable energy generation, eco-tourism, production of medicinal and aromatic plants, and aquaculture using recycled wastewater. The reported experiences may include capacity-building and extension services, provision of incentives, infrastructure improvements (roads, telecommunication) or support to product processing and/or marketing.

In the description, Parties may provide a brief description of the area/people that were involved, the aim of the activities, action that was taken, role of women and youth, and measures taken to encourage their participation in the activities. The narrative should also describe the outcomes of the activities and the main factors of success. Experiences from the LDN Target-Setting Programme should be reported, when applicable.

7.4.5. Establishing knowledge-sharing systems

Parties are encouraged to describe their experience in establishing systems for sharing information and knowledge and facilitating networking on best practices and approaches to drought management. Such systems cover a large selection, ranging from community-level farmers' networks to national databanks and multi-country peer learning networks. They have a variety of functions, such as facilitating communication and alerts on drought, the sharing of experiences, information and technologies, institutional coordination, provision of scientific data and information, and promotion of the upscaling of good practices. The description may also include information on experiences in promoting women's access to knowledge and technology.

When available, a list of the national or subnational information/knowledge-sharing systems and networks on drought preparedness should be included, together with a list of subregional, regional and international systems and networks on drought preparedness in which the country takes part. If possible, a link to each system/network website should be added. The list, together with the links, will be made available on the UNCCD Knowledge Hub.

In the description of each experience, Parties are encouraged to include information of the purpose and coverage (area/population) of the information/knowledge system or network, its specific focus/topic if any, the language(s) the information is available in, and a brief description of the main activities. They may also explain how the system/network has been used/useful so far, and the main factors of success.

Annex I: User-specific license options for national data uploaded to the UNCCD Performance Review and Assessment of Implementation System (PRAIS)

1. UNCCD Mandate

Decision 16/COP.11 para. 9 requests the secretariat to ensure that data and information from the reporting process are available and accessible to all, especially at the national and local levels.

Decision 17/COP.11 para. 14 requests the secretariat to develop a policy to access data and information provided by Parties and other reporting entities, including through the Performance Review and Assessment of Implementation System (PRAIS), building on the practices and policies of other conventions and multilateral bodies, and to utilize intellectual property provisions to protect innovations submitted as best practices while implementing this data access policy.

2. Introduction

Licensing of national datasets aims to empower country Parties reporting through PRAIS to set the terms of use of their national data uploaded or created as part of the reporting process by creating a User-Specific Licence (USL). The default licence for PRAIS data can be seen in the "Terms of Use" section of the site. Parties uploading national datasets to the system have the option to edit the default licence in the Spatial Layers list by clicking on the form provided per uploaded layer. However, while Parties are free to set their terms of use for their national datasets, the default data provided to Parties through PRAIS and Trends.Earth is already in the public domain as described here, and therefore cannot be licensed separately by Parties. For example, the European Space Agency Climate Change Initiative Land Cover and the International Soil Reference and Information Centre Soil Grids data has been released under an "Attribution-Share Alike" licence. Thus, the use of these datasets is subject to the terms of this licence.

By choosing a USL, the user consents to the chosen licence. It is understood that the following terms and conditions are agreed to:

- Nothing in or relating to this USL shall be deemed a waiver, express or implied, of any of the privileges and immunities of the United Nations Convention to Combat Desertification (UNCCD) or the United Nations, including its subsidiary organs.
- The name and emblem of the UNCCD is the property of the UNCCD, which owns all rights to its use. The logo can only be used to identify events and activities related to the UNCCD.
- The UNCCD shall not be held responsible for any use of information beyond that stipulated in this USL, where prior authorization was not sought and granted in accordance with the conditions expressed and communicated by the UNCCD.

3. Submitting national datasets to PRAIS

There are three mechanisms to share non-default reporting datasets in PRAIS:

1. Uploading data directly to PRAIS and supplying metadata (information about the dataset) on the form provided.
2. Via data transfer from Trends.Earth (when using national data for calculating UNCCD indicators in Trends.Earth).
3. Creating spatial reporting data on the Spatial Data Viewer in PRAIS.

4. Licence Instructions

For every uploaded or created dataset in PRAIS, you may choose to:

1. Accept the default Creative Commons (CC) licence.
2. Choose an alternative CC licence which applies additional restrictions on the use of the data, or use an existing licence of your own.

The data licence will determine the level of public user access to national datasets hosted on PRAIS and managed by the UNCCD secretariat for the purposes of reporting. For the purposes of this agreement, the "Data" comprises any national data, with particular recognition of spatial data and associated attribute data provided by the country Party in the reporting process to the UNCCD through its creation on the PRAIS Spatial Data Viewer, using the PRAIS upload tool or via Trends.Earth. The Data may be provided to other PRAIS users on the understanding that they read it and consent to be bound by the terms and conditions of use set out in the USL (if the data is not already in the public domain).

Therefore, country Parties should familiarize themselves with the following options and select the one(s) best suited to their requirements for their Data:

4.1. Creative Commons Licences

There are three regularly used CC licences by which you can license your dataset. However, the UNCCD has an open data commitment and intends to share data provided by Parties with as few constraints and restrictions on its use as possible. Therefore, the data shared by country Parties will be licensed according to the CC Attribution-NonCommercial 2.0 Generic (CC BY-NC 2.0) licence which means users of the data are free to:

- Share —Copy and redistribute the material in any medium or format.
- Adapt —Remix, transform, and build upon the material.

However, in return for using the data, users must respect the following terms:

- Attribution —You must give appropriate credit, provide a link to the licence and indicate if changes were made. You may do so in any reasonable manner, but not in any way which suggests that the licensor endorses you or your use.
- NonCommercial —You may not use the material for commercial purposes.

To find out more about this licence (translated into all United Nations languages), please visit this link.

Alternatively, two other CC licences are offered to Parties, which impose additional restrictions on the use of the data:

Attribution-NonCommercial-ShareAlike (CC BY-NC-SA)

This licence allows others to remix, adapt and build upon your work non-commercially, as long as they credit you and license their new creations under identical terms.

Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)

This licence is the most restrictive of the licences, only allowing others to download the data and share it with others as long as they credit you. However, they are not authorized to change it in any way or use it commercially.

4.2. Existing licences

Country Parties may upload or create spatial datasets with an existing data licence which may impose additional restrictions on the use of the data which are not covered in the above options. We invite country Parties to describe the licence and the permissions of use using the form provided.

Annex II: Metadata

1. Introduction

This annex details the structure of the metadata used by the Performance Review and Assessment of the Implementation System (PRAIS) 4 platform.

Metadata is information about data, the primary instrument to provide data users with a comprehensive description of the data, including its accuracy and quality, and provides key information to appropriately use data for decision-making. Without metadata, the user is extremely limited in interpreting and understanding the data.

Therefore, the availability of metadata increases the data's value because it provides information on the data's origin, its reliability and trustworthiness. Metadata is an inseparable component that makes data usable in Geographic Information System applications and other geospatial contexts. For several data exchange platforms, metadata provides the required information and structure for discovering and accessing data for different types of uses. In this context, the compliancy of metadata information with well-known standards is important in order to implement methods and tools enabling semantic searches and ensuring interoperability between systems. Accordingly, the PRAIS 4 platform metadata aims to maintain compatibility with one of the most used international metadata standards (ISO 19115, developed by the Technical Committee ISO/TC 211, Geographic information/Geomatics), which is specifically designed to describe geospatial data.

2. Metadata structure and content

The current version of the PRAIS 4 metadata is organized in a single form containing three types of information:

- Data content: a description of the essential characteristics of the data and its categorization;
- Contact point: details on the person or entity to be contacted in order to request information about the data;
- Geographic location: expressed as coordinates of the bounding box or as a placename.

The specific list of fields is described below.

Data content

- Title: the textual label used to identify the data (data type: free text);
- Abstract: an overview of the main characteristics of the data and a summary of the information it contains in an easily understandable manner for technical and non-technical users (data type: free text);
- Date: the date of data creation (data type: date);
- Topics: the formalized list of words used to describe the data (data type: list);
- Character set encoding: the name of the character coding standard used by the data (data type: list).

Contact point

- Name: the name of the person or entity authorized to provide information about the data (data type: free text);
- Role: the function performed by the data contact point, such as the owner, distributor or custodian (data type: list);
- Organization: the name of the responsible organization (data type: free text);
- Email: the email address of the organization or individual (data type: free text);
- Phone: the telephone number of the organization or individual (data type: free text);
- Address: the physical address at which the organization or individual may be contacted (data type: free text).

Geographic location

- Auto-detect bounding box: option to request the platform to derive the coordinates of a box, including the data;
- Specify a placename: option to specify the name of the location that fully includes the data.