CRIC23
PANAMÁ
DICIEMBRE 1-5

United Nations Convention to Combat Desertification

Advancing methodologies and high-resolution data for SDG Indicator 15.3.1

Leveraging Data, Tools, and Regional Expertise for the 2026 UNCCD Reporting Process

Ingrid Teich
Senior Research Scientist
WOCAT- CDE

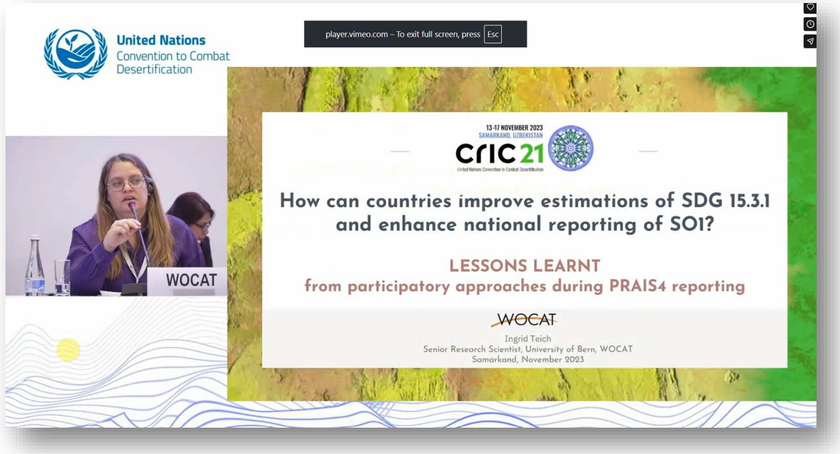
United Nations
Convention to Combat Desertification

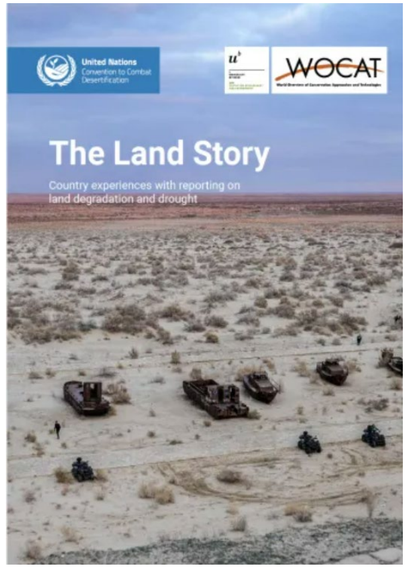
United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

Building on lessons learnt and addressing specific challenges

13-17 NOVEMBER 2023
SAMARKAND, UZBEKISTAN
CRIC 21
United Nations Convention to Combat Desertification





UNCCD
COP16
Riyadh | 2024

Decision 4/COP.16 - Improving the procedures for the communication of information as well as the quality and formats of reports to be submitted to the Conference of the Parties

The Conference of the Parties [...] Acknowledging with appreciation the support provided by technical partners[2] to national reporting under the United Nations Convention to Combat Desertification through the provision of a growing array of data and analytical tools that can support (i) land degradation and drought monitoring; as well as (ii) decision-making to achieve land degradation neutrality,

[2] Technical partners include, inter alia: Centre for Development and Environment – University of Bern, Conservation International, Committee on Earth Observation Satellites, European Space Agency, Food and Agriculture Organization of the United Nations, Group on Earth Observations Land Degradation Neutrality Flagship initiative, International Research Center of Big Data for Sustainable Development Goals, International Soil Reference and Information Centre, Joint Research Center of the European Commission , Open Geospatial Consortium, OpenGeoHub Foundation, School of Geography and Environmental Sciences of University of Southampton, United Nations Environment Programme, University of Maryland, ***World Overview of Conservation Approaches and Technologies****, World Resources Institute.*

2023, Samarkand

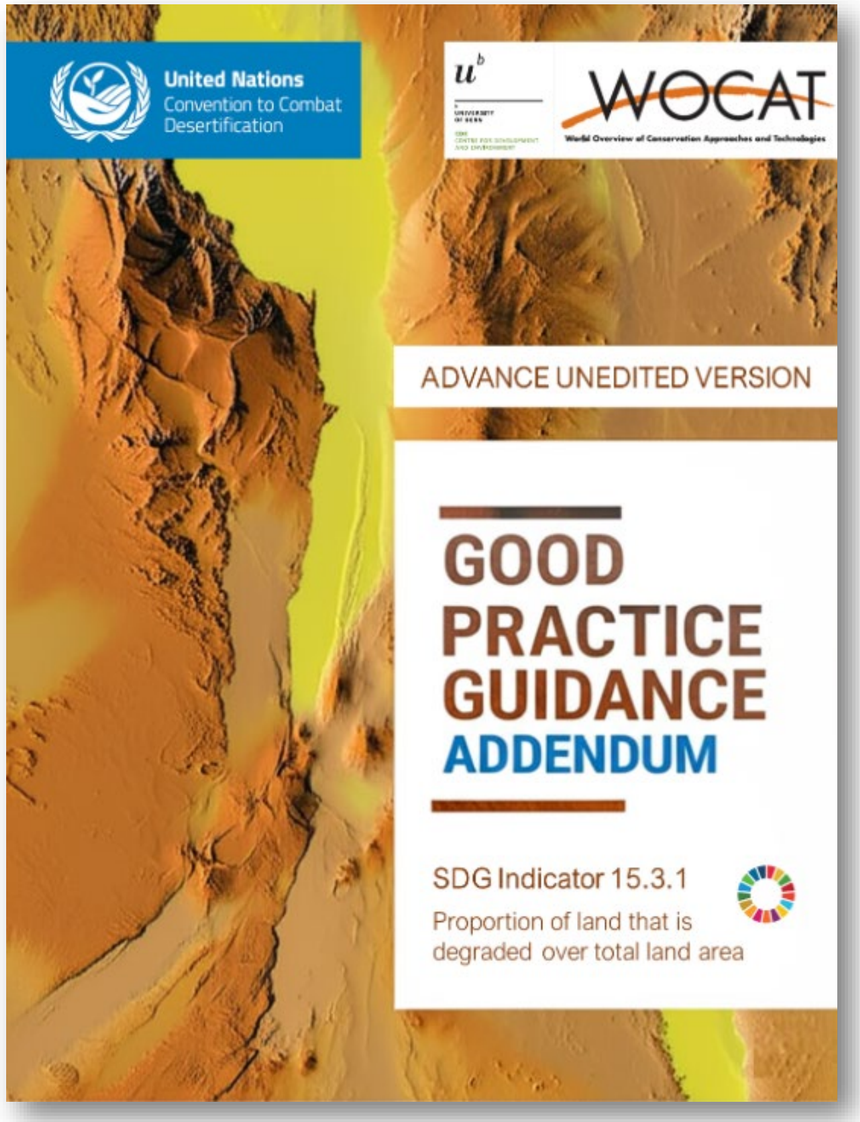
Colombia, Panama, BiH, Bhutan, Ecuador, Turkiye

2024, Riyadh

Haiti, Spain, Botswana, Mongolia, South Africa, Colombia, Panama, BiH, Bhutan, Ecuador, Turkiye and others

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification



The GPG Addendum – SDG Indicator 15.3.1

A Collaborative Approach

- Definition of the Periods and data used for each indicator and metric in each period
- Clarification and explicit methodology to compare baseline and period assessments
- Counterbalancing and LDN
- High resolution datasets
- **Workflows and Tools co-produced with countries and end - users**

UNIVERSITY OF BERN
CDE CENTRE FOR DEVELOPMENT AND ENVIRONMENT
WOCAT World Overview of Conservation Approaches and Technologies

CONSERVATION INTERNATIONAL

JRC EUROPEAN COMMISSION

APACHETA SOLUTIONS FOR A HEALTHY ENVIRONMENT

Food and Agriculture Organization of the United Nations

CBAS

United Nations Convention to Combat Desertification

PI-LAC Partnership Initiative for Sustainable Land Management

OBSERVATOIRE DU SAHARA ET DU SAHEL

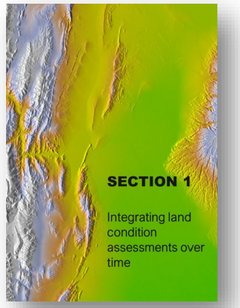
prais4

TRENDS.EARTH tracking land change from Conservation International

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

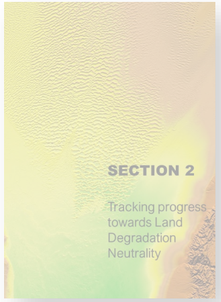
The GPG Addendum – SDG Indicator 15.3.1



Section 1

INTEGRATING LAND CONDITION ASSESSMENTS OVER TIME

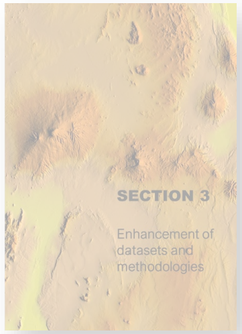
Focusses on the timeframe of the data used to assess land condition in each reporting period, on how to integrate the period assessment with the baseline, as well as providing additional guidelines on how to interpret and visualize changes over



Section 2

TRACKING PROGRESS TOWARDS LDN

This section responds to the need for guidance on incorporating the improved land component and the neutrality mechanism into target setting, LDN intervention planning, prioritizing areas for investment, and tracking progress towards LDN.



Section 3

ENHANCEMENT OF DATASETS AND METHODOLOGIES

Introduces new datasets related to land cover, land productivity, and soil organic carbon (SOC), and discusses various methods and experiences in comparing and selecting the most representative datasets for different contexts.

1.1 PERIOD assessment

After the baseline period (2000–2015), the first reporting period (Period 1) covers January 1, 2016, to December 31, 2019. Subsequent reporting processes follow every four years, with periods increasing their duration by four years: Period 2 spanning 2016–2023, Period 3 covering 2016–2027, and Period 4 assessing changes from 2016 to 2031. Each reporting period evaluates changes in land condition through the three sub-indicators.

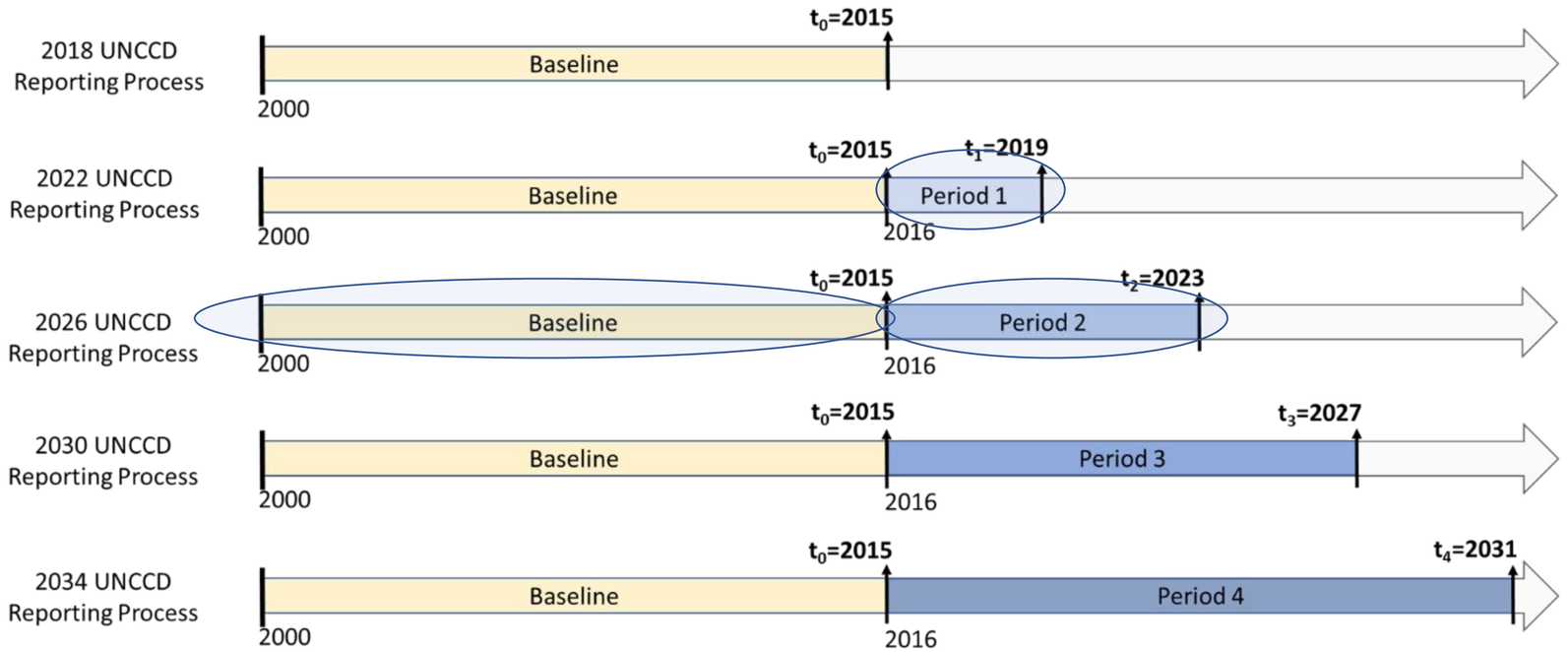


Figure 1: Timeline illustrating the four-year UNCCD reporting frequency for SDG 15.3.1.

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

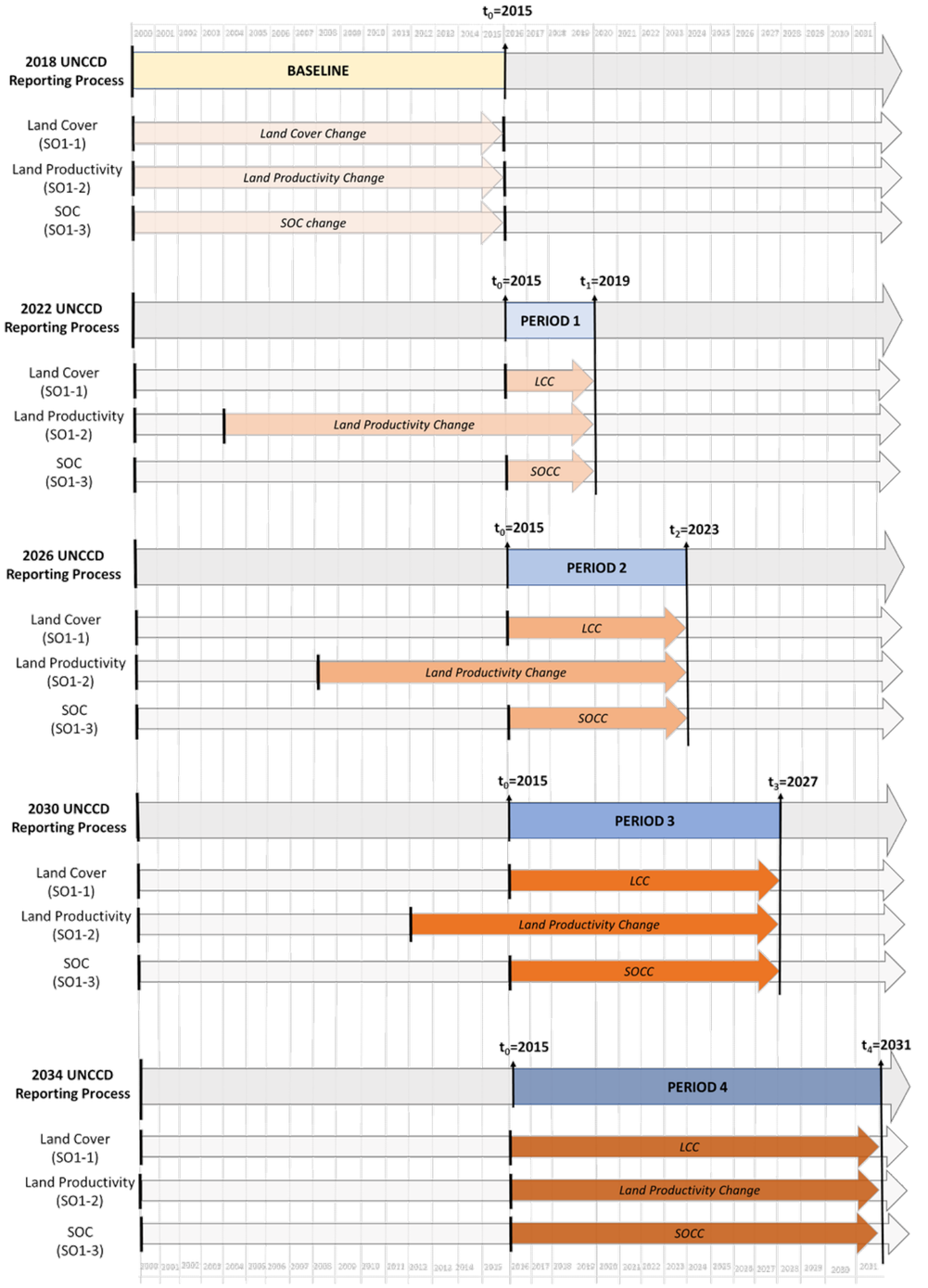
1.1 PERIOD assessment

Further clarification on the timeframes of the datasets used for Sub Indicator is included in the Addendum.

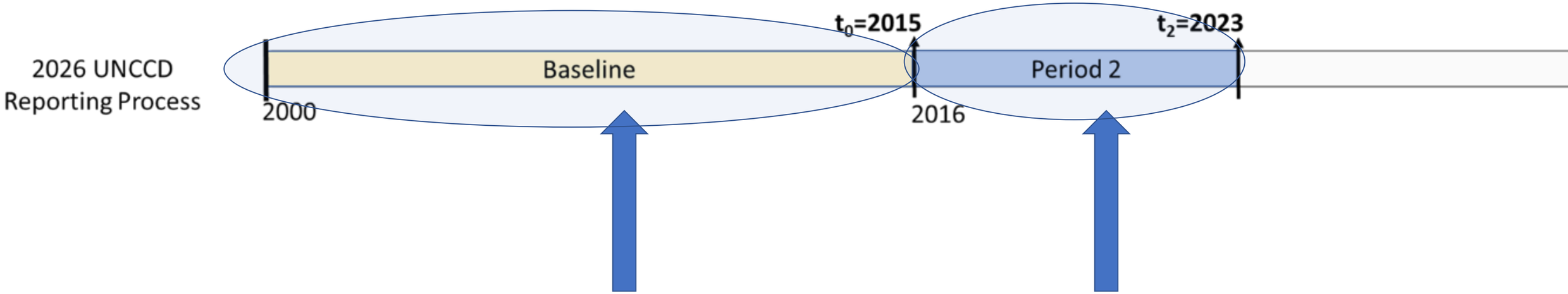
Period	Trends in Land cover	
	Initial Land Cover Year	*Final Land Cover Year*
Baseline: 2000-2015	2000	2015
Period 1: 2016-2019	2015	2019
Period 2: 2016-2023	2015	2023
Pe		
Pe		

Period	Trends in Land Productivity	
	Initial Year	*Final Year*
Baseline: 2000-2015	2000	2015
Period 1: 2016-2019	2004	2019
Period 2: 2016-2023	2008	2023
Period 3: 2016-2027	2012	2027
Period		

Period	Trends in Carbon Stocks	
	Initial Year	*Final Year*
Baseline: 2000-2015	2000	2015
Period 1: 2016-2019	2015	2019
Period 2: 2016-2023	2015	2023
Period 3: 2016-2027	2015	2027
Period 4: 2016-2031	2015	2031

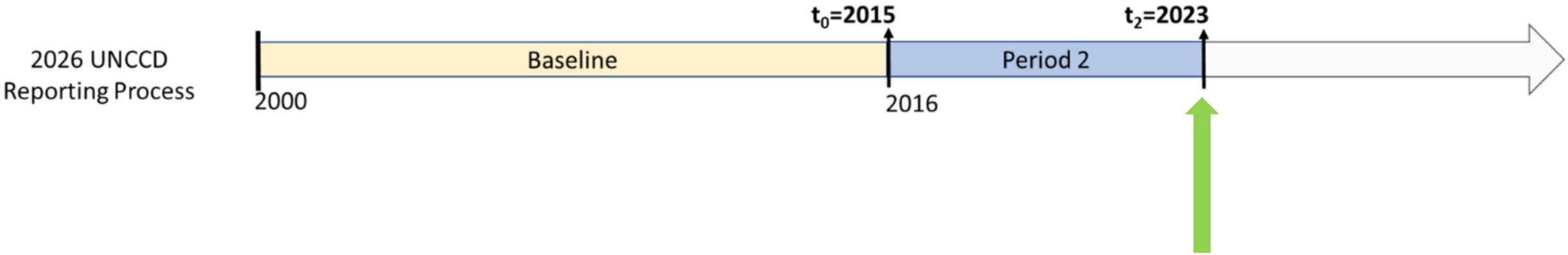


2026 Reporting process: periods for SO1-1, SO1-2 and SO1-3



	Baseline period View raster		Reporting period View raster	
	Area (km²)	Percent of total country area (%)	Area (km²)	Percent of total country area (%)
Land area with improved land cover ⓘ	1335.24	1.77 %	143.27	0.19 %
Land area with stable land cover ⓘ	73091.67	97.11 %	74354.74	98.79 %
Land area with degraded land cover ⓘ	837.59	1.11 %	766.48	1.02 %
Land area with no land cover data ⓘ	0	0 %	0	0 %

Proportion of degraded land in 2023

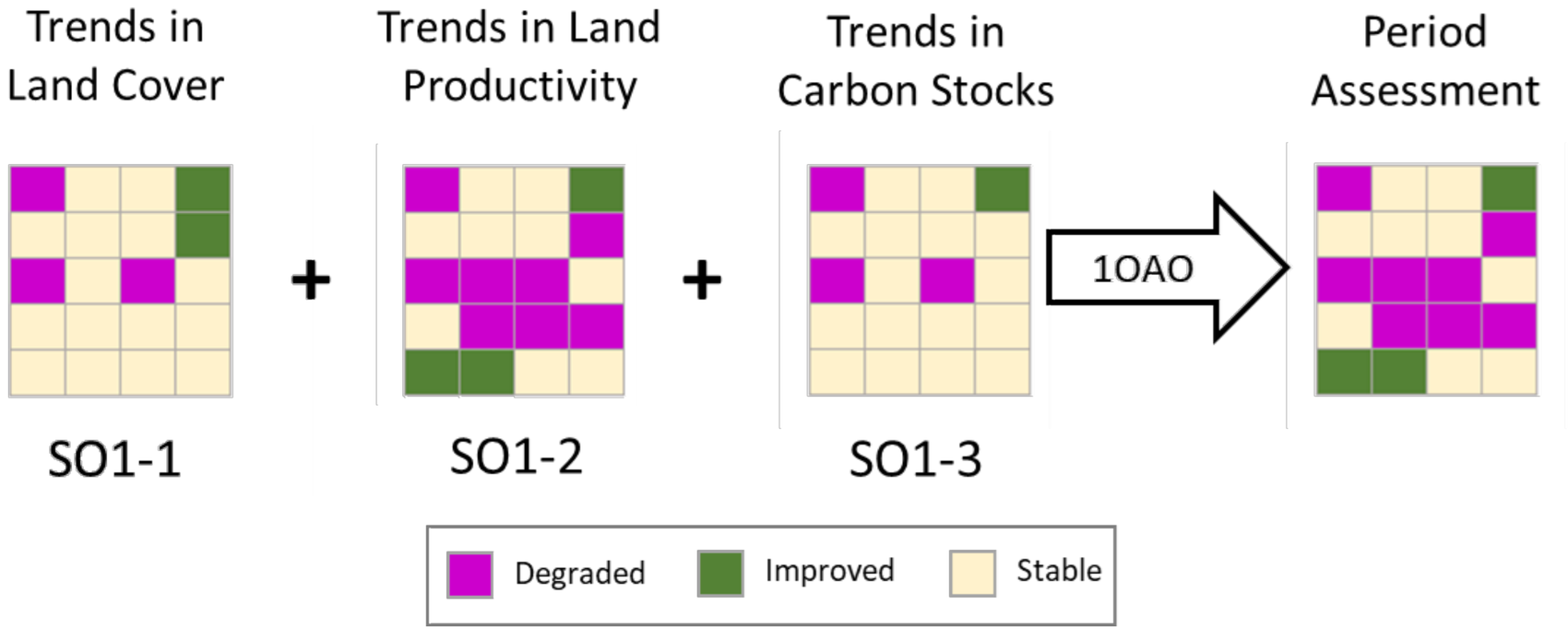


STATUS

The Status is determined by combining the results of the current period assessment with the baseline assessment

1.1 PERIOD assessment

For each reporting period a final map that shows the results of the period assessment is obtained. The “Period Assessment” is the result of the evaluation of land condition for a specific reporting period, based on the combination of the three sub-indicators (Trends in Land Cover, Trends in Land Productivity, and Trends in Carbon Stocks) by applying the one-out, all-out principle. The period assessment does not capture the degradation or improvement that occurred during the baseline period and therefore it cannot be used to estimate SDG indicator 15.3.1 on its own.



United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

1.2 STATUS MATRIX

The “Status Matrix” allows a **systematic comparison of the period assessment with the baseline** to determine the status of land condition at pixel level.

		PERIOD ASSESSMENT		
		DEGRADED	**STABLE***	**IMPROVED***
BASELINE	**DEGRADED**	Degraded	Degraded	Improved
	STABLE*	Degraded	Stable	Improved
	IMPROVED*	Degraded	Improved	Improved

* Not Degraded areas.

The “Status Matrix” is a 3 x 3 matrix to assess Status by comparing the reporting period assessment (columns) and the baseline (rows).

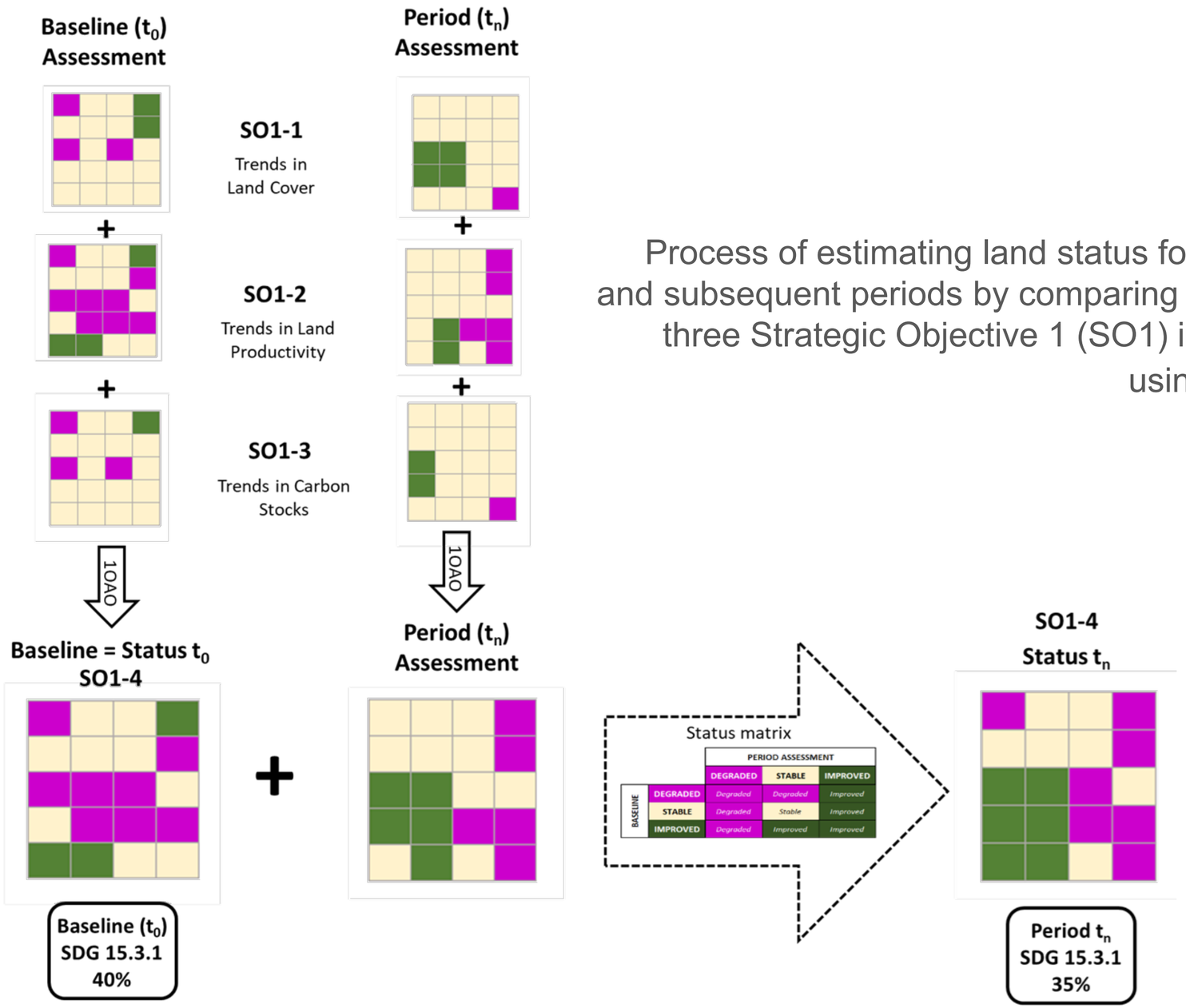
The resulting map, called the **Status Map**, integrates the assessment of changes that occurred during the reporting period with the previous status of land condition (baseline). This approach ensures that the map **reflects both past and recent changes**, offering a more accurate overall assessment of land degradation and improvement over time.

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

1.2 STATUS

Process of estimating land status for the baseline (2000-2015) and subsequent periods by comparing period assessments of the three Strategic Objective 1 (SO1) indicators with the baseline using the 3 x 3 Status matrix.



United Nations
Convention to Combat Desertification

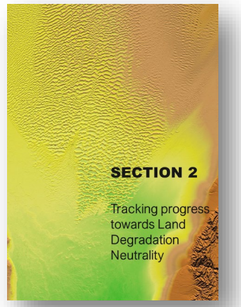
CRIC23
United Nations Convention to Combat Desertification

The GPG Addendum – SDG Indicator 15.3.1

Section 1

INTEGRATING LAND CONDITION ASSESSMENTS OVER TIME

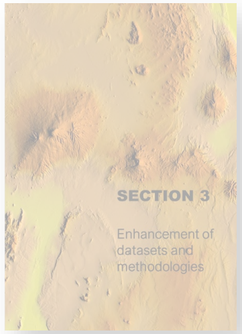
Focusses on the timeframe of the data used to assess land condition in each reporting period, on how to integrate the period assessment with the baseline, as well as providing additional guidelines on how to interpret and visualize changes over



Section 2

TRACKING PROGRESS TOWARDS LDN

This section responds to the need for guidance on incorporating the improved land component and the neutrality mechanism into target setting, LDN intervention planning, prioritizing areas for investment, and tracking progress towards LDN.



Section 3

ENHANCEMENT OF DATASETS AND METHODOLOGIES

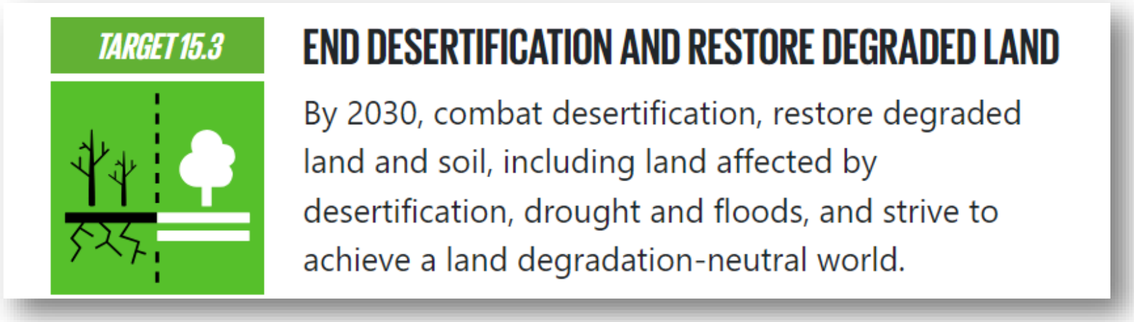
Introduces new datasets related to land cover, land productivity, and soil organic carbon (SOC), and discusses various methods and experiences in comparing and selecting the most representative datasets for different contexts.

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

LDN

SDG target 15.3



SDG 15.3.1:
Proportion of degraded land

2.1 FURTHER CHARACTERIZATION

Even though the status maps categorize land condition into three broad categories (Degraded, Stable, and Improved), the underlying dynamics that lead to this final status can be more complex. Specifically, there are nine different types of changes from the baseline relative to any subsequent time period that can result in the final status, as illustrated in the 3 x 3 matrix of changes.

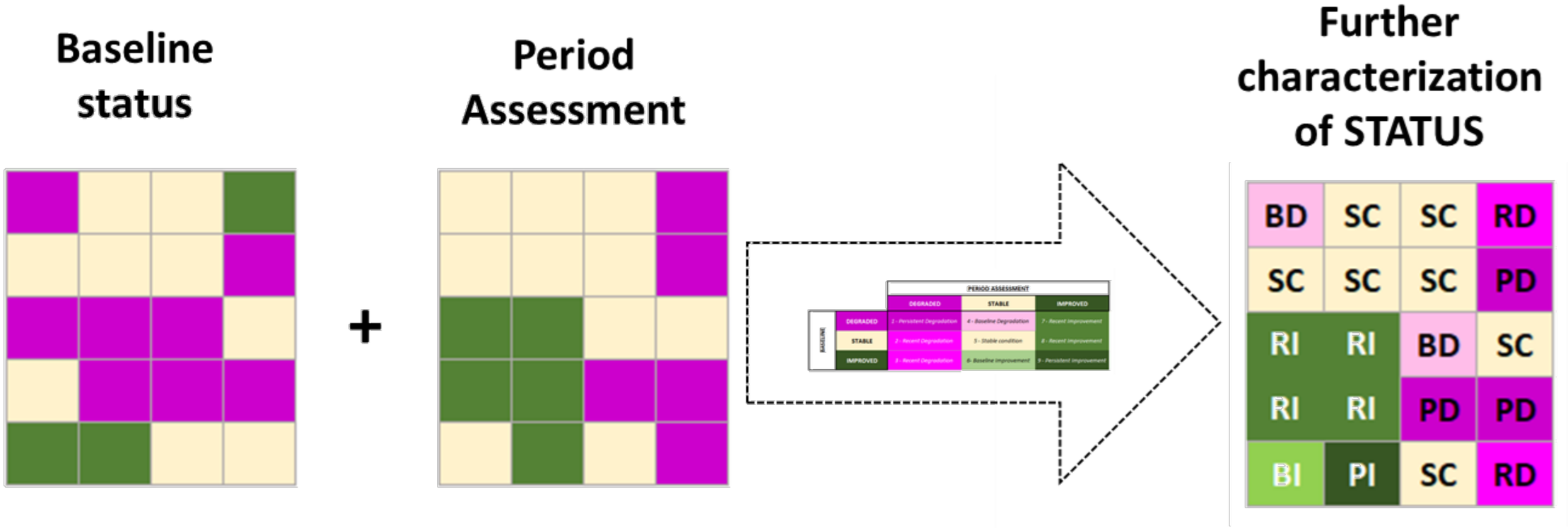
		PERIOD ASSESSMENT		
		DEGRADED	STABLE	IMPROVED
BASELINE	DEGRADED	*1 - Persistent Degradation*	*4 - Baseline Degradation*	*7 - Recent Improvement*
	STABLE	*2 - Recent Degradation*	*5 - Stable condition*	*8 - Recent Improvement*
	IMPROVED	*3 - Recent Degradation*	*6- Baseline Improvement*	*9 - Persistent Improvement*

Expanded version of the "Status Matrix" showing land condition that results from the comparison of the baseline (rows) and the period assessment (columns)

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

2.1 Further Characterization

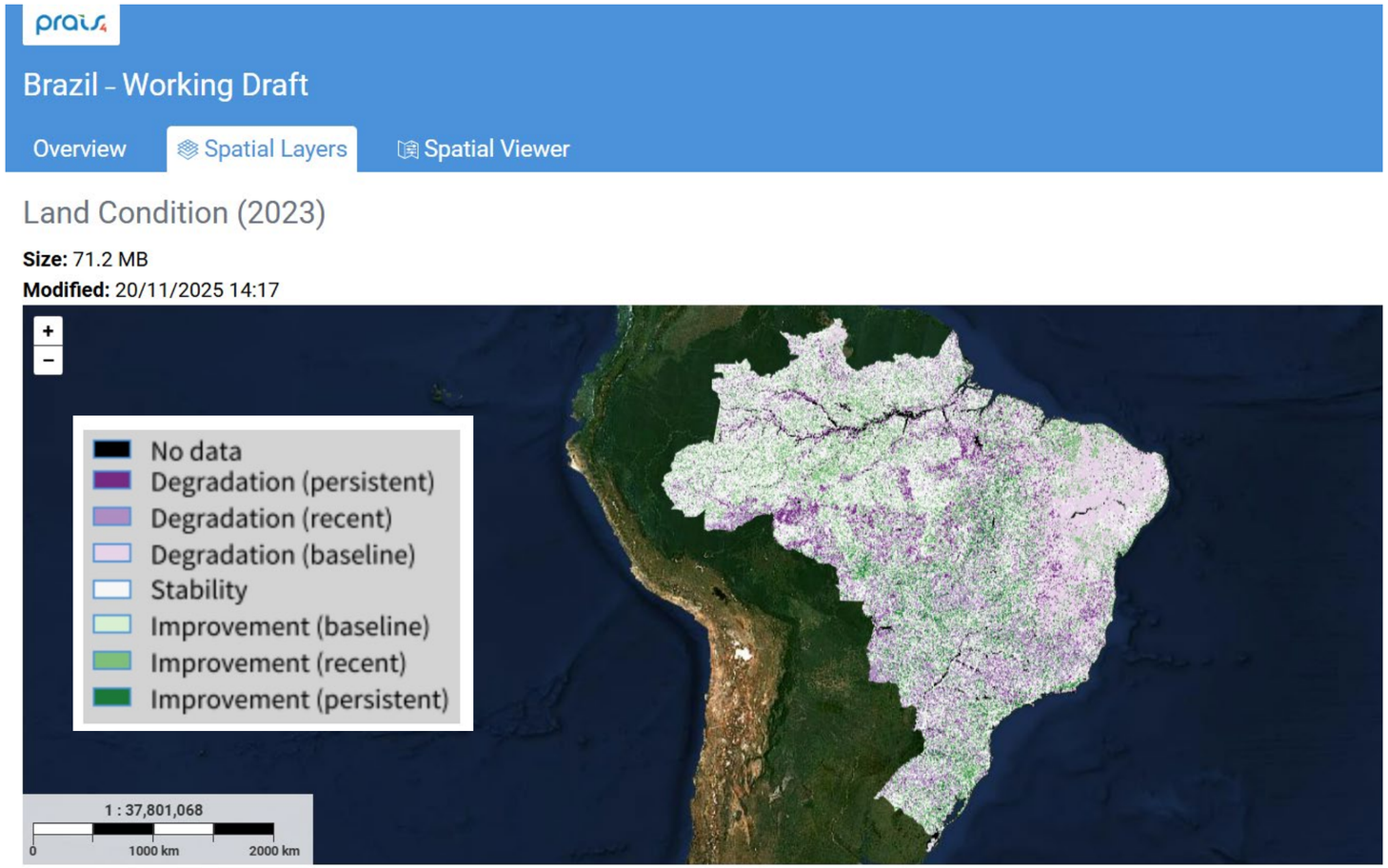


Example of further characterization of land degradation and land improvement, which allows detection of areas with persistent degradation (PD), recent degradation (RD) and baseline degradation (BD) and areas with persistent improvement (PI), recent improvement (RI) and baseline improvement (BI)

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

2.1 Further Characterization



TRENDS.EARTH
tracking land change
from Conservation International

prais4

2.2 Counterbalancing

Category	Reported in SDG Indicator 15.3.1 as	Used in LDN counterbalancing mechanism
PD	Degraded	✓ (LOSS)
RD	Degraded	✓ (LOSS)
BD	Degraded	x
PI	Not-degraded	✓ (GAIN)
RI	Not-degraded	✓ (GAIN)
BI	Not-degraded	x
PS	Not-degraded	x

Categories of land condition according to the expanded status characterization and their usage for estimation of SDG indicator 15.3.1 and for counterbalancing

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

Mapping improvement

Key Numbers

- 2497 SLM Practices published from 137 countries by 510 users.
  - 1482 SLM Technologies
  - 564 SLM Approaches
  - 442 UNCCD PRAIS Practices
- 15 new practices published in the past 90 days.

FRAMEWORK FOR ECOSYSTEM RESTORATION MONITORING

UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030

United Nations
Convention to Combat Desertification

Convention on Biological Diversity

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

The GPG Addendum – SDG Indicator 15.3.1

Section 1

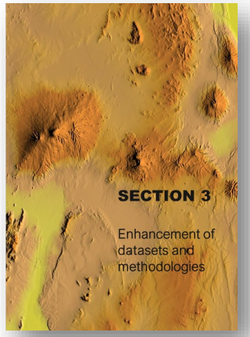
INTEGRATING LAND CONDITION ASSESSMENTS OVER TIME

Focusses on the timeframe of the data used to assess land condition in each reporting period, on how to integrate the period assessment with the baseline, as well as providing additional guidelines on how to interpret and visualize changes over

Section 2

TRACKING PROGRESS TOWARDS LDN

This section responds to the need for guidance on incorporating the improved land component and the neutrality mechanism into target setting, LDN intervention planning, prioritizing areas for investment, and tracking progress towards LDN.



Section 3

ENHANCEMENT OF DATASETS AND METHODOLOGIES

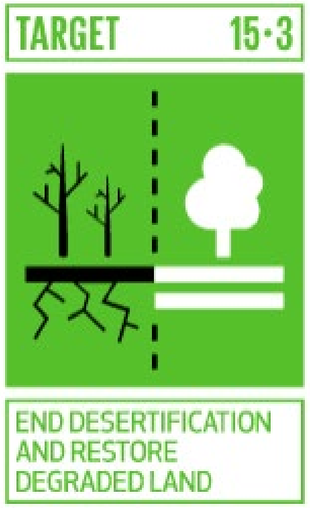
Introduces new datasets related to land cover, land productivity, and soil organic carbon (SOC), and discusses various methods and experiences in comparing and selecting the most representative datasets for different contexts.

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

SDG 15.3.1

PROPORTION OF LAND THAT IS DEGRADED



TRENDS IN LAND COVER

"transformational" variable

TRENDS IN LAND PRODUCTIVITY

"fast" ecological variable

TRENDS IN CARBON STOCKS

"slow" ecological variable

"While it is difficult for a single indicator to fully capture the state or condition of the land, the sub-indicators are proxies to monitor the essential variables that reflect the capacity of the land to deliver ecosystem services"

Enhancements for Assessing Trends in Land Cover

01 Identification of the best available land cover dataset

Figure 3.1: Panama Land Cover Map used for the 2022 Reporting Cycle with a 9 classes legend. Source: Panama 2022 National Report to the UNCCD, licenced under CC BY-NC 2.0.

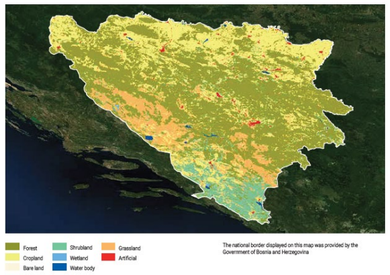
Product	Source	Measurement method	Extent	Spatial resolution	Thematic resolution	Temporal coverage
ESA-CCI	ESA CCI	Based on AVHRR, SPOT, PROBA-V, and Sentinel-3 satellite imagery	Global	300 m	36 classes	Every year from 1992 to 2022
MODIS Land Cover (MCD12Q1 v061)	NASA	MODIS sensor onboard the Terra and Aqua satellites	Global	500m	17 classes	Every year from 2001 to 2021
Global Land Analysis and Discovery	University of Maryland	Landsat 5, 7, and 8 scenes	Global	30 m	11 classes	2000, 2005, 2010, 2015 and 2020
(GLAD) Land Cover						
GLC_FCS30D	Aerospace Information Research Institute, Chinese Academy of Sciences	Landsat 5, 7, 8, 9 scenes	Global	30 m	35 classes	1985, 1990, 1995, 2000 and annually up to 2022

Table 3.1: Characteristics of global land cover datasets available to monitor land cover change

Enhancements for Assessing Trends in Land Cover

02

Selecting a land cover legend for monitoring key degradation processes



ESA CCI Color	ESA CCI Classes	UNCCD Classes	Bosnia and Herzegovina Classes
	No Data		
	Cropland, rainfed	Cropland	Cropland
	Herbaceous cover		Cropland
	Tree or shrub cover		Shrubland
	Cropland, irrigated or postflooding		Cropland
	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)		Cropland
	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)		Shrubland
	Tree cover, broadleaved, evergreen, closed to open (>15%)	Tree-Covered areas	Forest
	s, closed to open (>15%)		Forest
	s, closed (>40%)		Forest
	s, open (1540%)		Forest
	n, closed to open (>15%)		Forest
	n, closed (>40%)		Forest
	n, open (1540%)		Forest
	is, closed to open (>15%)		Forest
	is, closed (>40%)		Forest
	is, open (1540%)		Forest
	eaved and needleleaved)		Forest
	rbaceous cover (<50%)		Shrubland
	/ tree and shrub (<50%)	Grassland	Grassland
			Shrubland
			Shrubland
			Shrubland
	Deciduous shrubland		Grassland
	Grassland		Grassland
	Lichens and mosses		Grassland
	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)		Grassland
	Sparse shrub (<15%)		Grassland
	Sparse herbaceous cover (<15%)		Grassland
	Tree cover, flooded, fresh or brakish water	Wetland	Wetland
	Tree cover, flooded, saline water		Wetland
	Shrub or herbaceous cover, flooded, fresh/saline/brakish water		Wetland
	Urban areas	Artificial surfaces	Artificial
	Bare areas	Other land	Bare land
	Consolidated bare areas		Bare land
	Unconsolidated bare areas		Bare land
	Water bodies	Waterbodies	Waterbody
	Permanent snow and ice		

Table 3.3: Bosnia and Herzegovina's reclassifications of ESA CCI Land Cover classes to differentiate maquis (shrublands) and its correspondence to UNCCD 7 default classes. Source: The Land Story. Country experiences with reporting on land degradation and drought (UNCCD and WOCAT, 2024).

ID Original	Original	Color	ID Default	Default Category	ID BTN	BTN Category	ID Workshop	BTN Workshop
0	No Data		0					
10	Cropland, rainfed		3	Cropland	4	Cropland	4	Cropland
11	Herbaceous cover		3	Cropland	4	Cropland	4	Cropland
12	Tree or shrub cover		3	Cropland	2	Shrubland	2	Shrubland
20	Cropland, irrigated or post-flooding		3	Cropland	4	Cropland	4	Cropland
30	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)		3	Cropland	4	Cropland	4	Cropla
40	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)		3	Cropland	2	Shrubland	2	Shru
50	Tree cover, broadleaved, evergreen, closed to open (>15%)		1	Forest	1	Forest	1	
60	Tree cover, broadleaved, deciduous, closed to open (>15%)		1	Forest	1	Forest	1	
61	Tree cover, broadleaved, deciduous, closed (>40%)		1	Forest	1	Forest		
62	Tree cover, broadleaved, deciduous, open (15-40%)		1	Forest	1	Forest		
70	Tree cover, needleleaved, evergreen, closed to open (>15%)		1	Forest	1	Forest		
71	Tree cover, needleleaved, evergreen, closed (>40%)		1	Forest	1	Forest		
72	Tree cover, needleleaved, evergreen, open (15-40%)		1	Forest	1	Forest		
80	Tree cover, needleleaved, deciduous, closed to open (>15%)		1	Forest	1	Forest		
81	Tree cover, needleleaved, deciduous, closed (>40%)		1	Forest	1	Forest		
82	Tree cover, needleleaved, deciduous, open (15-40%)		1	Forest	1	Forest		
90	Tree cover, mixed leaf type (broadleaved and needleleaved)		1	Forest	1	Forest		
100	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)		1	Forest	2	Shrubland	2	Shrubland
110	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)		2	Grassland	3	Grassland	3	Grassland
120	Shrubland		2	Grassland	2	Shrubland	2	Shrubland
121	Evergreen shrubland		2	Grassland	2	Shrubland	2	Shrubland
122	Deciduous shrubland		2	Grassland	2	Shrubland	2	Shrubland
130	Grassland		2	Grassland	3	Grassland	3	Grassland
140	Lichens and mosses		2	Grassland	3	Grassland	3	Grassland
150	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)		2	Grassland	3	Grassland	3	Grassland
152	Sparse shrub (<15%)		2	Grassland	3	Grassland	3	Grassland
153	Sparse herbaceous cover (<15%)		2	Grassland	3	Grassland	3	Grassland
160	Tree cover, flooded, fresh or brakish water		4	Wetland	5	Wetland	7	WaterBody
170	Tree cover, flooded, saline water		4	Wetland	5	Wetland	7	WaterBody
180	Shrub or herbaceous cover, flooded, fresh/saline/brakish water		4	Wetland	5	Wetland	7	WaterBody
190	Urban areas		5	Artificial	6	Artificial	5	Artificial
200	Bare areas		6	BareLand	7	BareLand	6	BareLand
201	Consolidated bare areas		6	BareLand	7	BareLand	6	BareLand
202	Unconsolidated bare areas		6	BareLand	7	BareLand	6	BareLand
210	Water bodies		7	WaterBody	8	WaterBody	7	WaterBody
220	Permanent snow and ice		6	BareLand	7	BareLand	6	BareLand

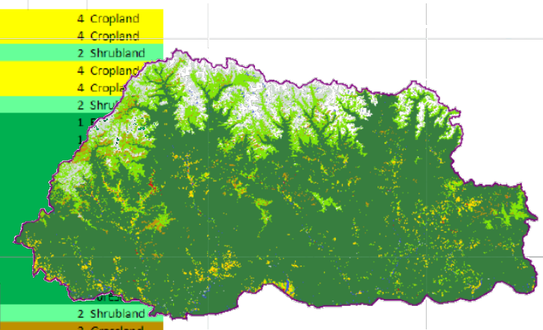
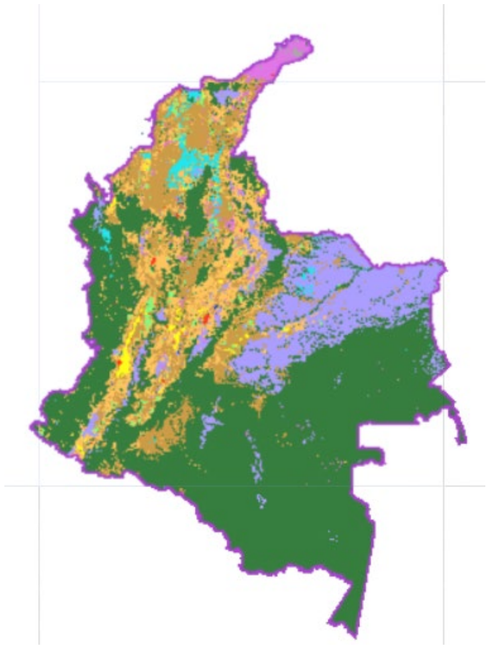


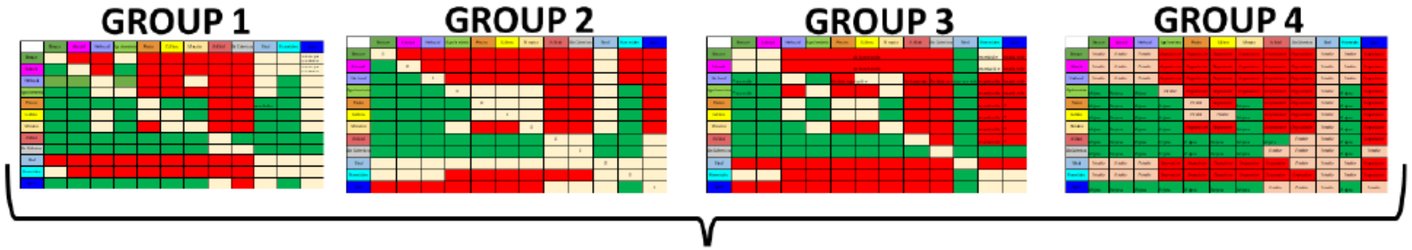
Table 3.2: Bhutan´s reclassifications of ESA CCI Land Cover classes. 3 alternative re-classifications are shown: (1) Default reclassification into 7 UNCCD classes, (2) are classification into 8 classes, differentiating shrublands, and (3) a 7-classes re-classification including shrublands but merging wetlands with water bodies, which was regarded as the best during the participatory workshop. Source: FAO E-learning course: Using land cover information to monitor progress on SDG 15 (UNCCD and FAO, 2024).

Enhancements for Assessing Trends in Land Cover

03

Defining the land cover transition matrix





	Forests	Shrublands	Grasslands	Agroforestry	Pastures	Cropland	Productive Mosaics	Artificial	Bareland	Snow and glaciers	Wetlands	Water
Forests	4n	2-2n	2n2-	3-1n	4-	4-	4-	4-	4-	3n1+	3n1-	3-1n
Shrublands	1+3n	4n	2-2n	3-1+	4-	4-	4-	4-	4-	3n1+	3n1-	3-1n
Grasslands	2+2n	2n2+	4n	1+3-	4-	3-1n	2n2-	4-	4-	3n1+	2-1n1+	3-1n
Agroforestry	4+	4+	2+1n1-	4n	3-1n	3-1n	2n2-	4-	4-	4n	3+1-	3-1n
Pastures	4+	4+	3+1n	4+	4n	1+1-2n	3+1n	4-	4-	4n	3+1-	3-1n
Cropland	4+	4+	2+2n	4+	4n	4n	3+1n	4-	4-	4n	3+1-	3-1n
Productive Mosaics	4+	4+	3+1n	2+2n	4-	3-1n	4n	4-	4-	4n	3+1-	3-1n
Artificial	4+	4+	4+	4+	4+	4+	4+	4n	2n1-1+	4n	3+1-	3-1n
Bareland	4+	4+	4+	4+	4+	4+	4+	3n1+	4n	4n	4+	2-2n
Snow and glaciers	2n2-	2n2-	2n2-	3-1n	3-1n	3-1n	3-1n	3-1n	3-1n	4n	3n1-	2-2n
Wetlands	4+	3n1-	2n2-	4-	4-	4-	4-	4-	4-	4n	4n	4n
Water	4+	2-2+	2-2+	2-2+	2-2+	2-2+	2-2+	3n1-	3n1-	4n	3+1-	4n

n NEUTRAL + POSITIVE - NEGATIVE

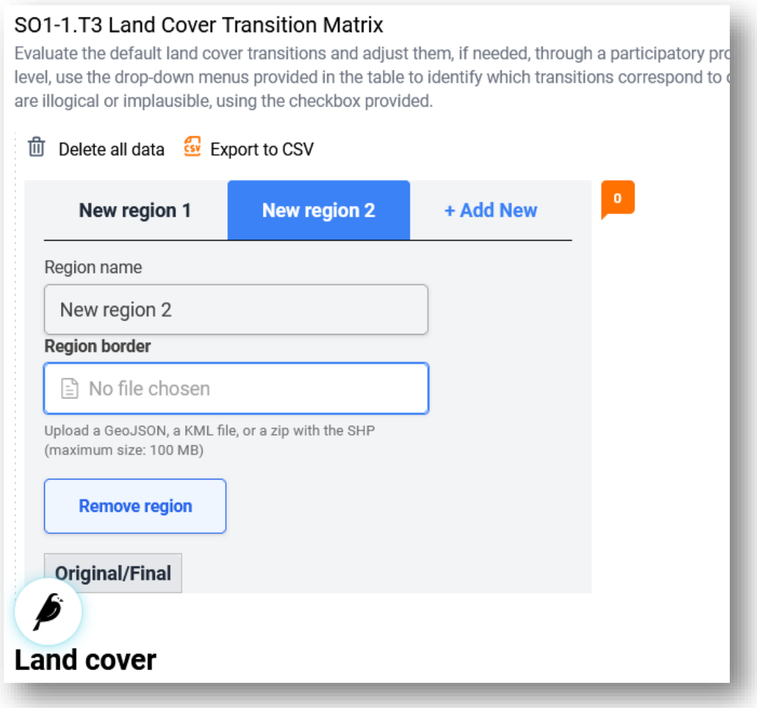
Figure 3.3: Colombia's land cover transition matrix: the results of each group are shown above, while the final matrix is shown below. The number of neutral (n), positive (+) and negative (-) votes is shown in the final matrix. Colors indicate the final decision made after discussions. Source: FAO E-learning course: Using land cover information to monitor progress on SDG 15 (UNCCD and FAO, 2024).

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

Enhancements for Assessing Trends in Land Cover

03 Defining the land cover transition matrix



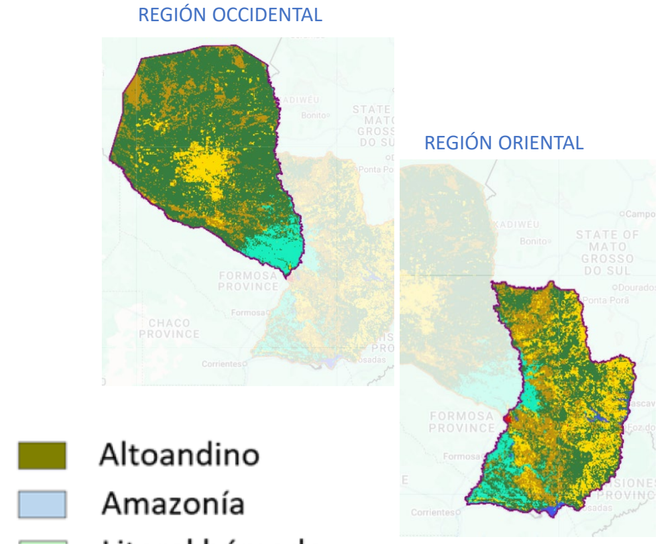


Figure 3.4: Ecuador's subnational stratification for the estimation of SDG indicator 15.3.1. Source: CONDESAN and WOCAT, 2025.

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

Enhancements for Assessing Trends in Land Productivity

01

The LPD Input Dataset

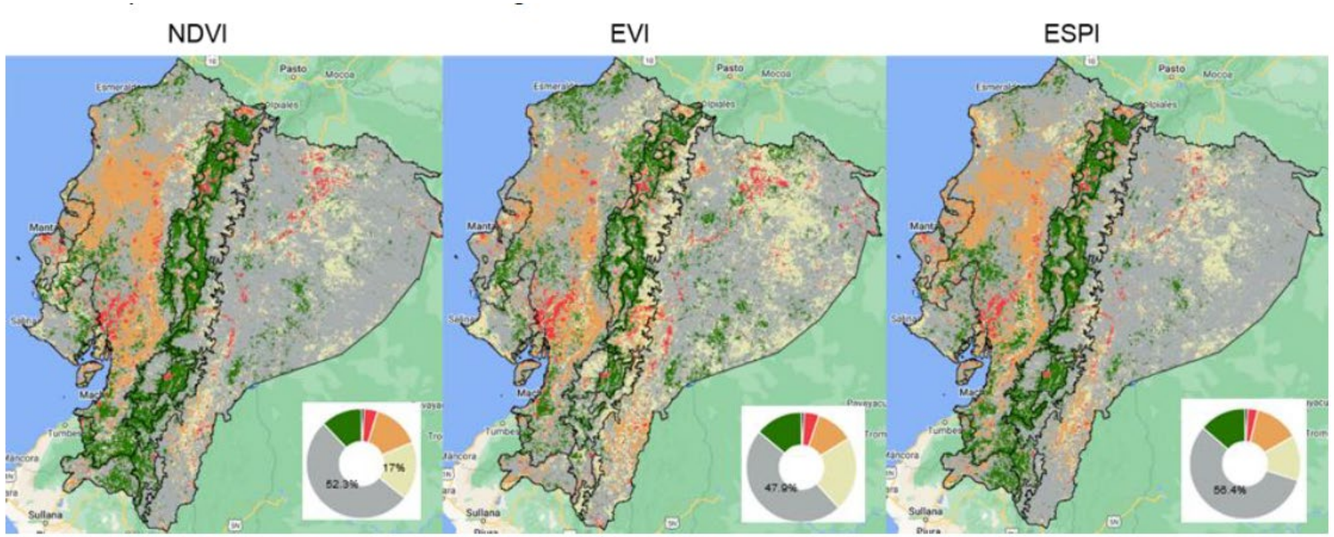


Figure 3.7: LPD Maps for the period 2000-2024 using different input LPD datasets (NDVI Annual Means, EVI, and ESPI).
Source: WOCAT and CONDESAN 2025, licensed CC by 4.0 by WOCAT and CONDESAN.

Name	Source	VI	Spatial Resolution	Temporal Coverage	Temporal Frequency
Landsat 32-Day EVI Composite	NASA-USGS-GEE	EVI	30 m	Jan 1, 1984–Present	32-day Composite
Landsat 8-Day EVI Composite	NASA-USGS-GEE	EVI	30 m	Jan 1, 1984–Present	8-day Composite
Landsat Annual EVI Composite	NASA-USGS-GEE	EVI	30 m	Jan 1, 1984–Present	Annually
Landsat 32-Day NDVI Composite	NASA-USGS-GEE	NDVI	30 m	Jan 1, 1984–Present	32-day Composite
Landsat 8-Day NDVI Composite	NASA-USGS-GEE	NDVI	30 m	Jan 1, 1984–Present	8-day Composite
Landsat Annual NDVI Composite	NASA-USGS-GEE	NDVI	30 m	Jan 1, 1984–Present	Annually
MODIS Terra MOD13Q1 v006	NASA-USGS	NDVI & EVI	250 m	Feb 18, 2000 - Present	16-Day Composite

United Nations
Convention to Combat Desertification

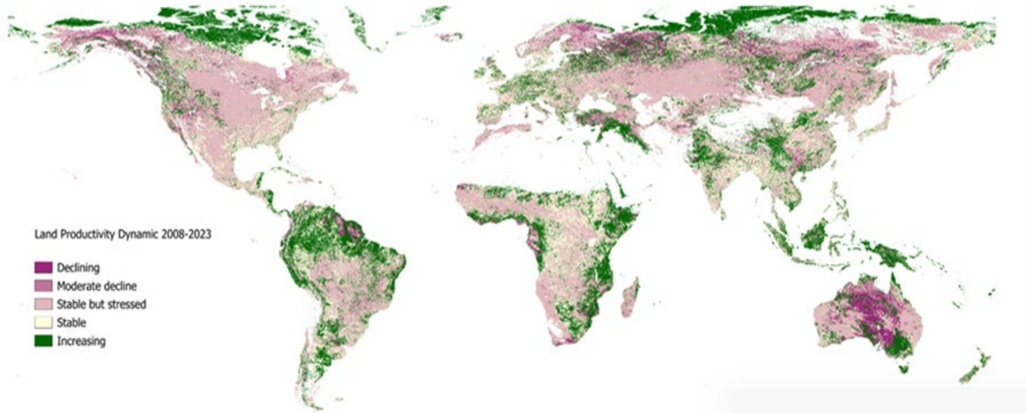
CRIC23
United Nations Convention to Combat Desertification

Enhancements for Assessing Trends in Land Productivity

02

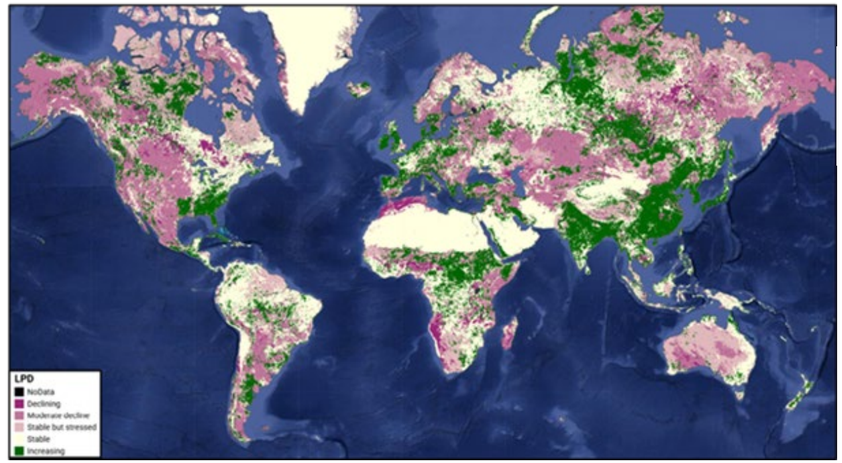
The LPD Algorithms

JRC LPD 2008-2023



JRC
EUROPEAN COMMISSION

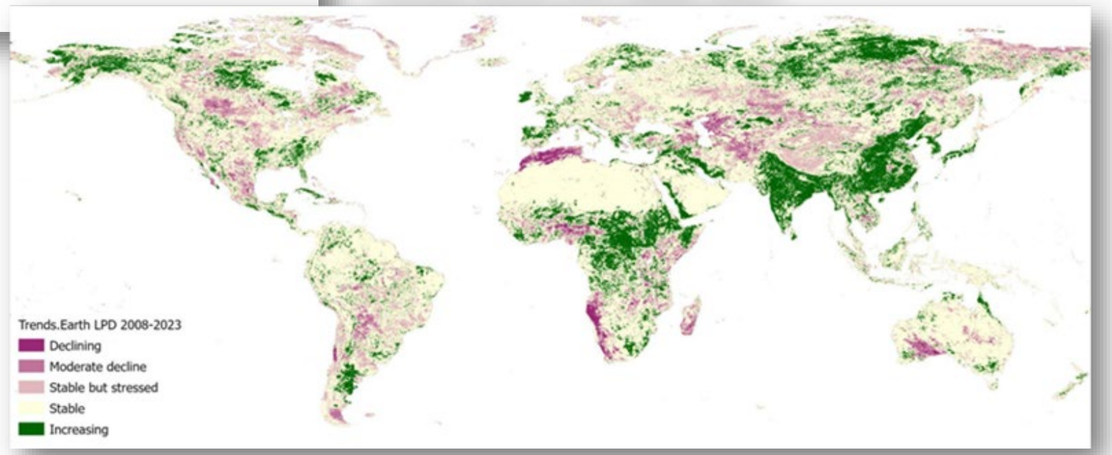
FAO WOCAT LPD 2008-2023



Food and Agriculture Organization of the United Nations

WOCAT

Trends.Earth LPD 2008-2023



CONSERVATION INTERNATIONAL

United Nations
Convention to Combat Desertification

CRIC23
United Nations Convention to Combat Desertification

Enhancements for Assessing Trends in Land Productivity

03

Workflow for selecting the most representative LPD Map

Figure 3.12: Participatory assessment of LPD maps for the estimation of SDG indicator 15.3.1 in different countries (Kenya, Turkiye, Bhutan, Panama)

Step 1: Establishing a Multidisciplinary Group of Experts

Step 2: Training and Capacity Building

Step 3: Determining the Need for a Subnational Analysis

Step 4: Exploring Alternative LPD Datasets

Step 5: Identifying Verification Data and Expert Knowledge

Step 6: Comparing the Performance of Alternative LPD Maps

Step 7: Selecting the Most Representative LPD Map

Enhancements for Assessing Trends in Carbon Stocks

01

Combined Land Cover / SOC method (Tier 1 and 2 met

		Target Landcover						
		Tree-covered	Grassland	Cropland	Wetland	Artificial	Other land	Water body
Original Landcover	Tree-Covered	1	0,9	0,6	1	0,1	0,2	1
	Grassland	1,1	1	0,7	1	0,1	0,2	1
	Cropland	1,4	1,3	1	1,4	0,1	0,2	1
	Wetland	1	1	0,7	1	0,1	0,2	1
	Artificial	3	2,5	2	2	1	1	1
	Other land	2	2	2	2,3	1	1	1
	Water body	1	1	1	1	1	1	1

Table 3.7: Land Use Conversion Factors for Soil Organic Carbon (SOC) Stock Changes estimated by Turkiye for the 2022 UNCCD Reporting process. Source: The Land Story. Country experiences with reporting on land degradation and drought (UNCCD and WOCAT, 2024).

Why the Reference SOC Map does not affect the classification of trends in SOC

When applying the Tier 1 method to determine whether an area has experienced a significant change in SOC stocks, a threshold-based approach is applied. Areas where SOC has decreased by 10% or more are classified as potentially degraded, while areas with an increase of 10% or more are classified as potentially improved. This classification depends on the land cover transition, the associated conversion factor, and the number of years since the change occurred. **Notably, the absolute initial SOC stock does not influence this determination because it cancels out in the calculation of SOC change as a proportion of the initial value.** This means that the classification of degradation or improvement is driven entirely by the relative impact of land cover transitions and the duration of the reporting period rather than the original SOC stock itself. The following explanation provides the mathematical basis for this.

Given equation:

$$\left(\frac{(SOC_{initial} \times CF) - SOC_{initial}}{20}\right) \times T \leq SOC_{initial} \times 0.1$$

Left side of the equation shows:

- $SOC_{initial} \times CF$ represents the SOC stock **after 20 years** (where CF is the conversion factor).
- The difference $(SOC_{initial} \times CF) - SOC_{initial}$ represents the **total SOC change over 20 years.**
- Dividing by 20 gives the **annual rate of SOC change.**
- Multiplying by t (the number of years since the land cover change) gives the **SOC change over t years.**

Thus, the left-hand side represents the total SOC change over the reporting period.

Right side of the equation shows:

- $SOC_{initial} \times 0.1$ represents a **10% change** in the initial SOC stock, which serves as the threshold to determine whether an area has undergone significant SOC loss or gain.

Factor Out SOC initial

Rewriting the left-hand side:

$$\left(\frac{SOC_{initial} \times (CF - 1)}{20}\right) \times T$$

Since $SOC_{initial}$ is **present in both terms**, we see that it cancels out when we compare with the threshold:

$$\frac{(CF - 1) \times T}{20} \leq 0.1$$

This shows that whether an area is classified as **degraded or improved depends only on**:

1. The **conversion factor (CF)** associated with the land cover transition.
2. The **number of years (T)** since the land cover change.

Conclusion

- The initial SOC stock does not influence whether an area is classified as degraded or improved.
- The key drivers are the **land cover transition (which determines CF) and the duration of change.**
- If $((CF-1) \times T) / 20$ is **less than -0.1**, then the area is degraded.
- If $((CF-1) \times T) / 20$ is **greater than 0.1**, then the area is improving.

This reinforces the importance of **accurate conversion factors and appropriate timeframes** in estimating SOC trends.

Enhancements for Assessing Trends in Carbon Stocks

02

Alternative methods to estimate changes in SOC

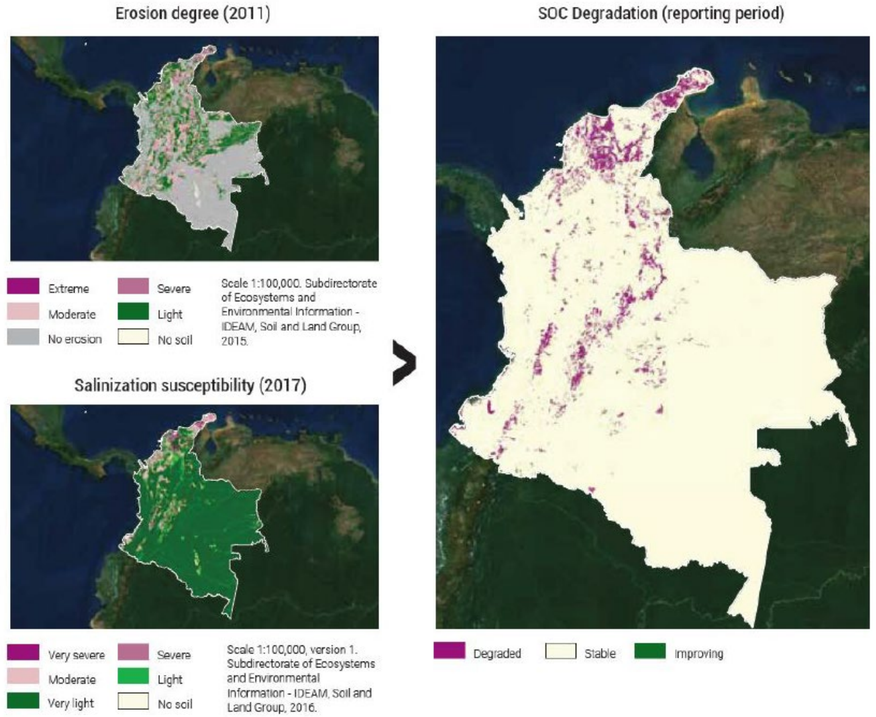


Figure 3.15: National maps showing the degree of soil erosion and salinization susceptibility (left) were used to identify areas in continental Colombia experiencing SOC changes (right). These changes were then estimated using SOC sequestration potential maps. Source: Thee Land Story. Country experiences with reporting on land degradation and drought (UNCCD and WOCAT, 2024).

United Nations
Convention to Combat Desertification

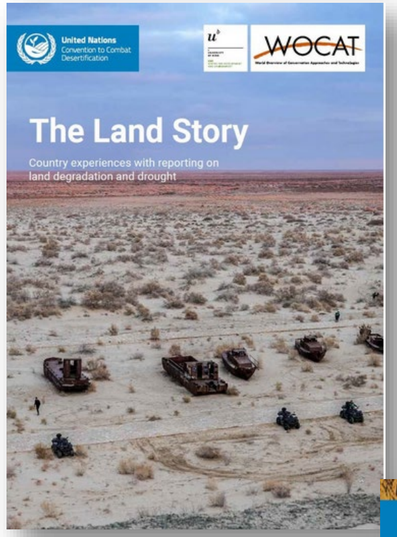
CRIC23
United Nations Convention to Combat Desertification

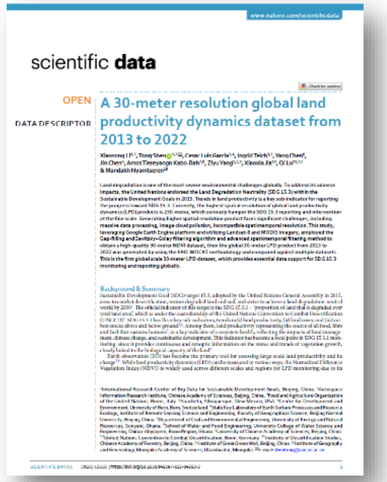
A step further towards achieving LDN

FROM THEORY TO ACTION

New technologies and data + **People-centered processes**

fostering co-creation, discussion, analysis, and prioritization to ensure context-driven and actionable solutions





United Nations
Convention to Combat
Desertification

CRIC23
United Nations Convention to Combat Desertification

Thank you