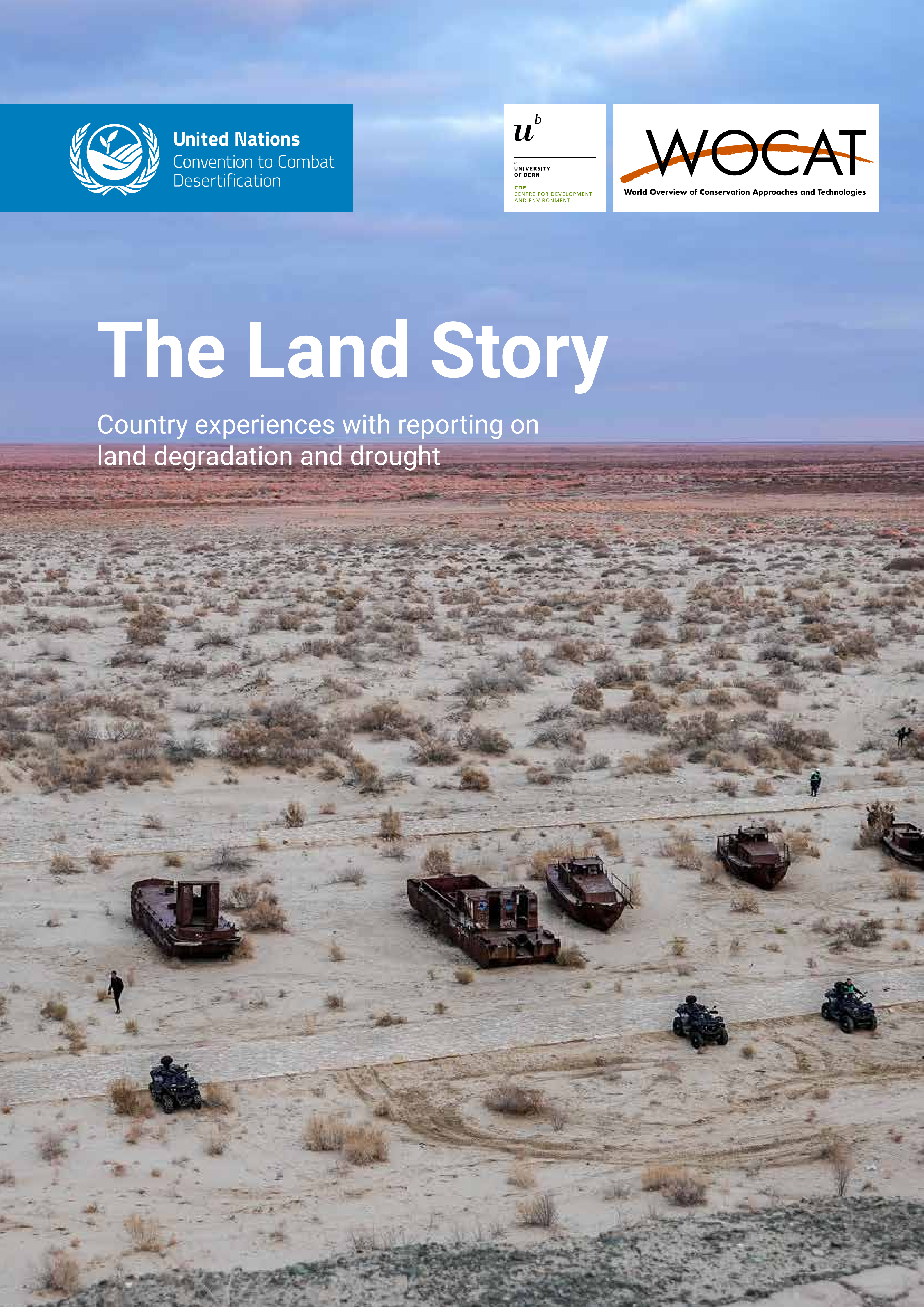
United Nations
Convention to Combat
Desertification

UNIVERSITY OF BERN
CDE
CENTRE FOR DEVELOPMENT AND ENVIRONMENT

WOCAT
World Overview of Conservation Approaches and Technologies

The Land Story

Country experiences with reporting on land degradation and drought



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Cover photograph: The photo shows a dried-up part of the Aral Sea in Uzbekistan (2023). Once the fourth largest freshwater lake in the world shared by Kazakhstan and Uzbekistan, the Aral Sea has lost about 90% of its original size to date since the 1960s. © Papa Mamadou Camara / UNCCD

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INVESTING IN OUR PLANET

Cooperación Española

The Land Story

Country experiences with reporting on land degradation and drought

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Iran, © UNCCD / Afshin Azarian

Foreword

In the haunting expanse that was once the flourishing Aral Sea, formerly the fourth largest freshwater lake in the world shared by Kazakhstan and Uzbekistan, I heard first-hand the harrowing story of one of the gravest environmental disasters on a global scale.

Despite this bleak outlook, pockets of hope are appearing in the region that is now known as Aralkum, or Aral Desert. Millions of hectares of sturdy saxaul shrubs are being planted as the first line of defence against desertification and sand and dust storms originating from the dried-up Aral seabed.

The poignant story of the Aral Sea is among those submitted to the United Nations Convention to Combat Desertification (UNCCD) as part of the 2022 reporting process. The UNCCD secretariat collected, analyzed—and, for the first time, publicly disseminated—the latest data on land degradation and drought from 126 countries. The resulting UNCCD Data Dashboard offers an eye-opening insight into rapid loss of healthy and productive land around the world.

Every year, at least 100 million hectares of land are becoming degraded through urbanization, deforestation and overexploitation, among other things. These alarming trends are exacerbated by climate change, which is also making droughts more frequent, severe and pervasive. Already, one in four people around the world is exposed to drought, and nearly half of the global population is affected by land degradation, with dire consequences for our ecosystems, economies and livelihoods.

While sobering, such data is nonetheless essential for informed decision-making. It enables countries to move to action: pinpoint areas that are most affected by land degradation and drought, design more targeted measures and interventions, and mobilize funding to implement concrete solutions. This work is crucial in altering the undesired trajectory and reaching the target of land degradation neutrality by 2030, thereby contributing to the achievement of Sustainable Development Goals and the vision of the United Nations Decade on Ecosystem Restoration 2021–2030.

It is through these national reports that we hear the “Land Story”, as told by the countries themselves. This publication therefore aims to tell those stories in a simple and insightful way.

This publication showcases experiences from some 30 countries during the 2022 reporting process on the status and trends in land degradation and drought. While far from being exhaustive, it provides an insight to the range of approaches countries have taken to overcome challenges related to data availability, reliability, analysis and upload, digital and geospatial literacy, as well as sufficient and timely financial resources. It demonstrates the commitment, efforts and creativity many countries in-

It is through the national reports that we hear the "Land Story", as told by the countries themselves. This publication aims to tell those stories in a simple and insightful way.

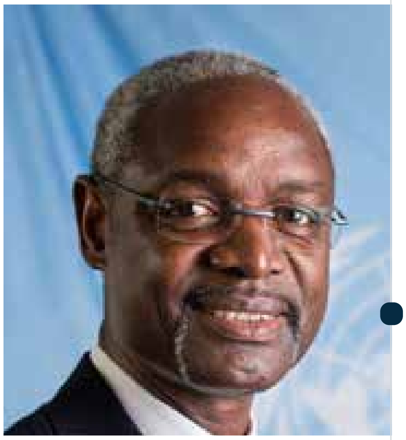
vested to fine-tune both the data and methods to ensure the information provided is as representative as possible of their national situations.

This publication also has some good news to tell: It shows that there has been a significant advance in land degradation monitoring and reporting, largely due to improved open access to satellite Earth observation data and geospatial tools. It tells us that taking an inclusive and participatory approach to the reporting challenge, building on inter-institutional knowledge and fostering interinstitutional collaboration and partnerships, can lead to more representative results, higher quality national reports and increased ownership from governments.

The publication also provides examples of practical implementation actions taken by countries to avoid, reduce and reverse land degradation, mitigate drought and its associated impacts on people and the environment, and promote gender inclusivity. These success stories demonstrate that the implementation of low-cost and effective traditional practices, such as agroforestry and assisted natural regeneration, coupled with a holistic and sustainable land management approach, can make a difference on the ground and lead to the achievement of multiple co-benefits.

I hope the experience and lessons learned captured in this publication will act as an inspiration to all countries and provide practical ideas on how they can improve their own reporting in future.

My thanks go to all countries that submitted their national reports during the 2022 reporting process, which represents a huge effort and demonstrates the commitment of Parties to the Convention. Lessons learned from this process and feedback received from countries will also help us improve reporting modalities and digital tools for the future. Let's work together to write a new, sustainable chapter in the story of our land.



Ibrahim Thiaw
Executive Secretary
United Nations Convention
to Combat Desertification

Acronyms

CORINE	Coordination of Information on the Environment
DLDD	Desertification/land degradation and drought
DSS	Decision support system
EO	Earth observation
ESA-CCI	European Space Agency Climate Change Initiative
FAO	Food and Agriculture Organization of the United Nations
GEE	Google Earth Engine
GEF	Global Environment Facility
GGWI	Great Green Wall Initiative
GIS	Geographical information system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LDN	Land degradation neutrality
LPD	Land productivity dynamics
MODIS	Moderate Resolution Imaging Spectroradiometer
NDVI	Normalized Difference Vegetation Index
RLI	Red List Index
SDG	Sustainable Development Goal
SIDS	Small island developing States
SLM	Sustainable land management
SOC	Soil organic carbon
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WOCAT	World Overview of Conservation Approaches and Technologies

Glossary

Baseline period: The time period during which baseline conditions should be calculated is the 16 years from 1 January 2000 to 31 December 2015. This period was selected because of the improvements in the availability of high frequency, moderate resolution global Earth observation data in the year 2000 (from the Moderate Resolution Imaging Spectroradiometer (MODIS) satellites) and because a period of about 15 years is typically sufficient to encounter most of the variability in natural systems. Subsets of the baseline period may be used depending on the availability of data, the statistical requirements of the sub-indicator or metric, and the perception by countries of the representativeness of conditions during this period as a benchmark for comparison of future changes. The extent of degraded land measured in the baseline period provides the benchmark against which change in the extent of degraded land is compared in subsequent reporting periods. The baseline is necessary to assess progress towards achieving Sustainable Development Goal (SDG) target 15.3 and land degradation neutrality (LDN). The baseline year is 2015, which was the year that the United Nations Convention to Combat Desertification (UNCCD) made the decision to pursue LDN, and when the 2030 Agenda for Sustainable Development (the SDGs) was adopted by all United Nations Member States.

Land degradation: The reduction or loss of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices.

Land degradation neutrality: A state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems (see decision 3/COP.12).

Nature-based solutions: Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, fresh water, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing benefits to human well-being, ecosystem services, resilience and biodiversity.

Reporting period: The time period over which the sub-indicator is measured and quantified for the reporting period using the same methods employed for the baseline period. The UNCCD has approved a four-year reporting frequency and therefore a four-year reporting period. However, reporting every four years may not be practical or offer a reliable detection of change for many practices for slow changing variables, such as soil organic carbon stocks.

Sustainable land management: The use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions.

Introduction

Introduction

Land degradation and drought – impacting people and ecosystems

Terrestrial ecosystems are vital for sustaining human life; they contribute to over half of global gross domestic product and encompass diverse cultural, spiritual and economic values. Nonetheless, forest loss is continuing, land is degrading, and many species of both flora and fauna are declining or becoming extinct. A formal definition of land degradation is the reduction or loss of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, rangeland, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices (United Nations Convention to Combat Desertification (UNCCD), 1994).[1] Land degradation can be exacerbated by drought. Drought is a natural hazard that occurs from time to time across all climate zones and has severe socioeconomic and environmental impacts on people and places where drought resilience is low. In many areas of the world, drought is projected to increase in frequency and intensify under climate change (Intergovernmental Panel on Climate Change (IPCC), 2022).[2] Sustainable Development Goal (SDG) 15 aims to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". Land degradation not only impacts natural systems; it also aggravates poverty, impacts human health, exacerbates food insecurity, reduces resilience to climate change and forces migration of affected populations. To ascertain if progress is being made towards reducing land degradation and managing droughts and as part of its UNCCD 2018–2030 Strategic Framework, the UNCCD defined five strategic objectives (see box 1) that are supported by 17 indicators (see box 2) that Parties to the Convention report on every four years (UNCCD, 2018).[3]

Gathering information and putting it to use

Reporting by Parties (of which there are now 197) to the Convention started in 1999 and was compiled in a narrative form every two years until 2008. With the adoption of the first 10-year strategic plan and framework to enhance the implementation of the Convention (2008–2018) (The Strategy), an indicator-based system was put in place. This evolved from an initial set of performance indicators to the inclusion of impact indicators. Nonetheless, due to limitations in coverage and comparability of the reported information, it was challenging to draw clear conclusions on the status of land. The adoption of SDG 15 in 2015 and the subsequent publication of the UNCCD 2018–2030 Strategic Framework provided the impetus for the adoption of an internationally agreed methodology to assess land degradation, and of a more coherent and structured approach to reporting, which now occurs every four years. In 2022, the information provided by the 126 countries that reported was provided in a standardized format and includes both quantitative and narrative information. Quantitative indicators are used to measure progress towards the strategic objectives. The narrative information complements these quantitative values, allowing countries to provide context and tell the stories of how land degradation and drought affects them and what actions are being taken to address it. For example, structured narrative sections are used to capture information on approaches to mobilizing financial and non-financial resources, how policy and implementing frameworks have evolved, examples of implemented actions on the ground, and issues related to the inclusion of women and youth in sustainable land management (SLM) and drought risk management practices.

Information reported by Parties under the Convention is used in several ways. It is employed to monitor progress towards

1 UNCCD. 1994. Article 1 of the Convention Text. [online]. Available at: https://www.unccd.int/sites/default/files/2022-02/UNCCD_Convention_ENG_0_0.pdf

2 IPCC. 2022. Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge, UK and New York, USA, Cambridge University Press. doi:10.1017/9781009325844.

3 UNCCD. 2018. Strategic Framework 2018-2030. [online]. Bonn, Germany, United Nations Convention to Combat Desertification. [Cited 14 August 2024]. Available at: https://www.unccd.int/convention/governance/strategic-framework-2018-2030

BOX 1 **UNCCD strategic objectives**

Strategic objective 1

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

Strategic objective 2

To improve the living conditions of affected populations

Strategic objective 3

To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems

Strategic objective 4

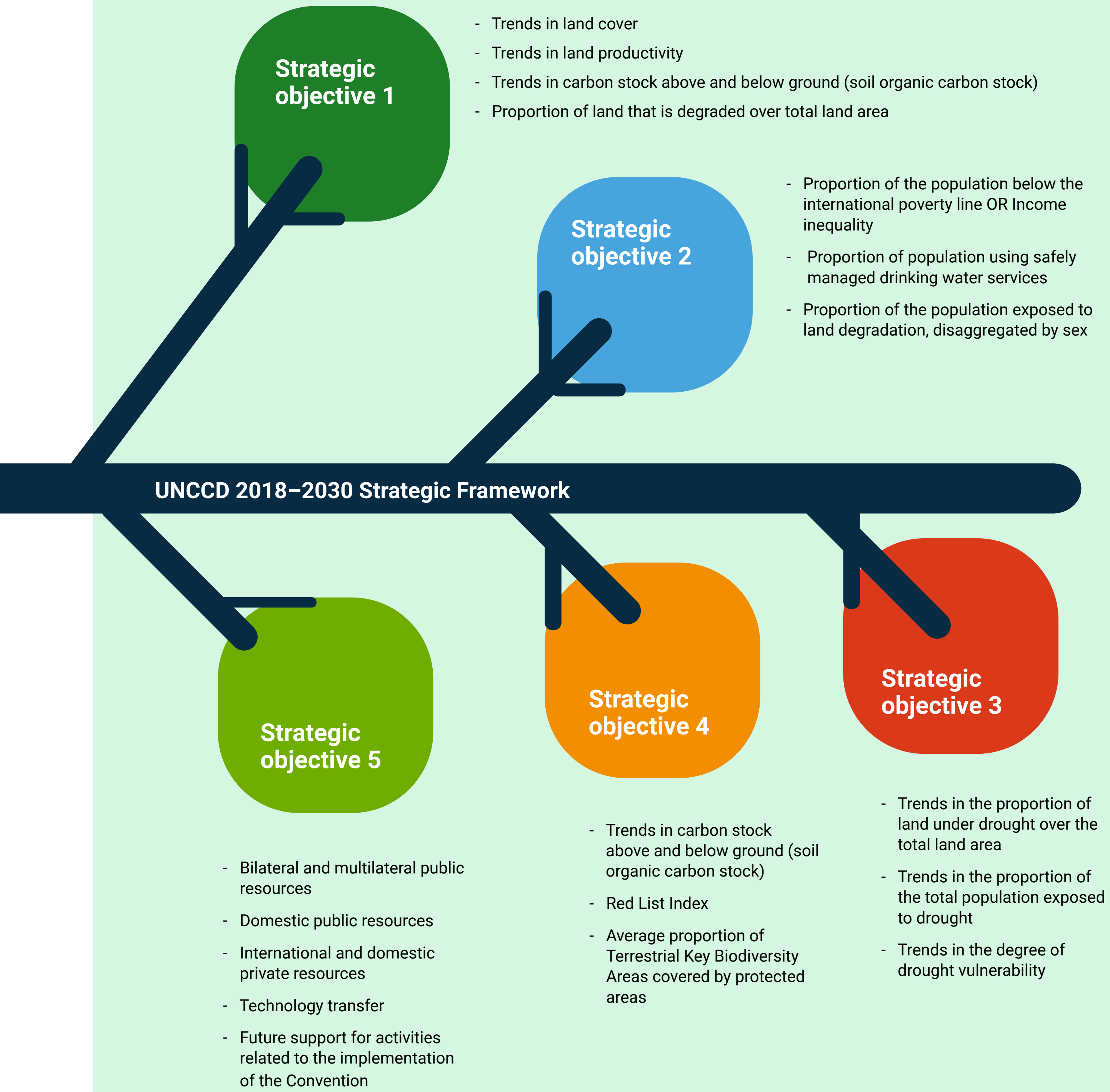
To generate global environmental benefits through effective implementation of the UNCCD

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

BOX 2 **UNCCD indicators**

National reports submitted to the UNCCD include information on 17 indicators aligned with the 5 strategic objectives identified in the UNCCD 2018–2030 Strategic Framework.



achieving SDG 15 and to help guide policy formulation at the national and international level to combat desertification/land degradation and drought (DLDD). The information helps policymakers to better understand the geographical areas that are most affected in their countries and allows more targeted measures and interventions to be designed and implemented. A number of countries have leveraged the data and information provided in the latest round of reporting to produce national action plans to address land degradation or used some of the material as part of project proposals to seek national and international funding to implement concrete actions on the ground (see box 2). Finally, the reported information plays an important role in raising awareness of the importance of SLM and advocating for land restoration initiatives that can help combat DLDD and their impacts on populations. In a nutshell, national reporting puts data and information on land to good use.

> National reporting puts data and information on land to good use.

2022 reporting process: What's new? – A data and technology revolution

In line with the increasing and pervasive digitalization of society and improved open access to satellite Earth observation (EO) data and derived products, over 70 spatially explicit data sets, most of them based on satellite EO data, were provided to country Parties to support the calculation of the quantitative indicators reported in 2022. These include: a time series of annual, consistently produced global land cover maps, global maps of land productivity dynamics, global predictions of soil organic carbon, global population data sets disaggregated by sex, and global gridded precipitation data used to calculate drought incidence, all from the year 2000 to the most recent available year (generally 2019). This represents a significant advance in terms of data availability and quality compared to previous reporting rounds, when many quantitative measures depended exclusively on statistical data. In this respect, UNCCD is the first Rio Convention to provide comprehensive geospatial data to reporting Parties, thereby embracing the United Nations' desire to transform and modernize its data and information systems, consistent with the vision of a "UN 2.0",[4] while allowing Parties flexibility to replace the data sets with their own or modify them as necessary. The provision of coherent and standardized global data sets streamlined reporting and was of particular value to those countries that did not have access to alternatives.

To work with these data sets, several data exploration, analysis and visualization tools were developed and provided by the UNCCD secretariat and its partners. Geospatial tools within the reporting platform itself allowed countries to create maps using the above-mentioned data sets and other geographical information to modify the provided data and enrich the national reports. Inbuilt tools permitted countries to completely replace the provided data with alternative or national data sets, where these were deemed to be of a higher quality or more representative of the known situation within a country. The associated and recently launched UNCCD Data Dashboard provides the general public with an overview of the reported data in a series of charts, maps and graphs, painting a clear picture of the worsening land degradation trends.[5]

Additional geospatial analysis tools were also provided. The Trends.Earth software[6]

4 UN. 2024. Official Website. [online]. [Cited 14 August 2024]. Available at: https://www.un.org/two-zero/en
5 UNCCD. n.d. Data Dashboard. [online]. [Cited 14 August 2024]. Available at: https://data.unccd.int/
6 Conservation International. n.d. Trends.Earth Documentation. [online]. [Cited 14 August 2024]. Available at: https://docs.trends.earth/en/latest/index.html

Countries brought national perspectives and new ideas that will help to improve the reporting process further.

was updated and enhanced by partners at Conservation International. This helped countries in integrating global and national data sets as well as customizing analysis methods to account for local conditions before the upload of the final data sets to the reporting platform. Earth Engine Apps were developed by the World Overview of Conservation Approaches and Technologies (WOCAT) and the Food and Agriculture Organization of the United Nations (FAO) to allow easy access to geospatial information by non-geographical information system (GIS) experts so that they could explore, compare and validate alternative maps to make evidence-based decisions and select the most relevant data sets for reporting. The flexibility offered by these tools was appreciated by countries, and they will be developed further for the next reporting cycle.

Not always plain sailing: Challenges and gaps in reporting

Despite the provision of standardized global data sets and various information technology (IT) tools for data exploration and analysis, the reporting process was not without its challenges and limitations. Some countries experience difficulties with Internet access and reliability and/or have limited access to digital resources (including a lack of robust IT support structures) to seamlessly use an online reporting system. Moreover, some reporting Parties struggled with the theoretical and methodological basis for the indicator calculations. Technical difficulties were encountered by many countries when attempting to integrate national data and local knowledge in the calculation of the area of land degraded or improved. For those countries that relied on the data sets provided, the estimations and spatial distribution of degraded, stable or improved areas were not always representative of the reality in that country, and oftentimes there was an underestimation of the proportion of land degraded. Sometimes this was related to the lack of detail in the underlying geospatial products, which were unable to capture the heterogeneity of land use, especially in countries with many small adjacent parcels of land with diverse usage, including small island developing states (SIDS). Also, the reliability of the data was reduced in hyperarid areas, and sometimes short-term variability in vegetation dynamics, for example due to seasonal droughts or rapid growth of pioneer species after fire, was confused with more long-term change.

Reporting countries wanted to ensure that the maps and estimations of land degradation and other indicators were consistent with national circumstances and expert-knowledge. To achieve this, in many cases participatory processes were established that involved a range of relevant stakeholders who could bring their knowledge and experience to the reporting process, including verification of the maps produced with the aid of the IT systems. This helped build trust in the reporting and ensured ownership and agreement in relation to the information reported. Nonetheless, many countries did not have enough time or sufficient and timely financial resources to implement comprehensive inter-institutional participatory processes, therefore compromising the reliability of the information reported.

Diversity and creativity in reporting

There has been a variety of approaches to the reporting process. Many countries relied on the data sets provided for quantitative estimates, supplemented with a narrative to provide context on the land degradation and drought situation in their countries. Others modified or fine-tuned some of the data sets provided to help align them better with the realities in their countries. Several replaced some of these data sets with alternatives or nationally generated data sets, oftentimes with more detail, thereby managing to track processes at a more granular scale. Some countries adapted the calculation methodologies, where appropriate, while ensuring alignment with the UNCCD's methodological framework as described in the Good Practice Guidance for SDG indicator 15.3.1.[7] Several organized inclusive, multi-stakeholder participatory processes to help guide and provide feedback on the reporting process. These have been effective in ensuring that a national consensus was achieved in relation to the reporting and in generating ownership of the results.

National experts during participatory workshop in Bhutan. (Credit: Tashi Wangdi)

This publication has been inspired by the variety of approaches as well as the resourcefulness and huge effort shown by Parties toward the reporting process. Countries brought national perspectives and new ideas that will help to improve the process further. The many good examples of how countries responded to the reporting challenges that are presented in this report may act as an inspiration to countries on how they can improve their own reporting, not least by pooling national knowledge and know-how and taking an inclusive and participatory approach to the reporting challenge.

Outline of this report

The next section of this report presents several case studies on how countries reported on a number of the different indicators under the strategic objectives, with a focus on those that are core to the UNCCD mission and mandate. Each case study describes the challenge faced by the countries, how they addressed this challenge and what actions they took and processes they put in place to present the most reliable information possible. The broader lessons learned are highlighted for each case study.

The section titled "Making a difference on the ground" presents different case studies, describing practical implementation actions taken by countries to halt and reverse land degradation. These success stories demonstrate that carefully designed and implemented actions have the capacity to support countries in reaching their land degradation neutrality (LDN) goals. In addition, this section provides examples of how some countries are progressing with implementation of UNCCD's Gender Action Plan.

The final section of the report draws conclusions and presents a set of key lessons learned from the 2022 reporting process that can help inform the next reporting cycle in 2026.

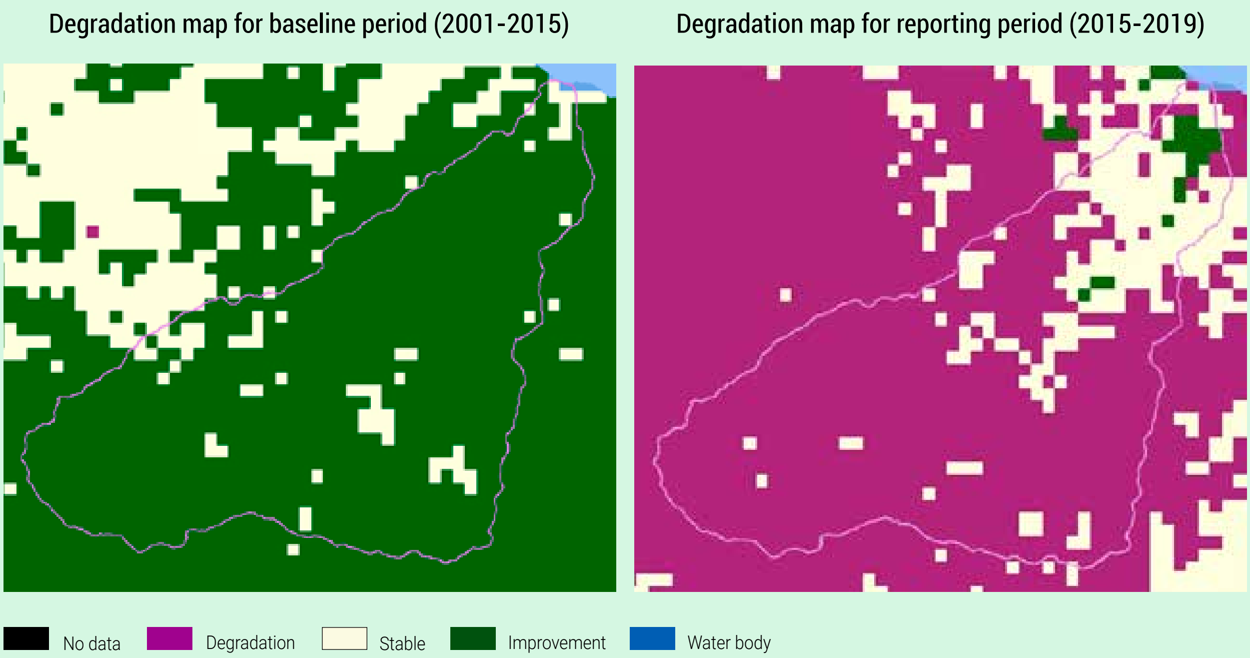
There were many excellent reports among the 126 submissions to the Convention. This publication can only highlight some examples. Nevertheless, we hope that they give an impression of the breadth of approaches taken in reporting and provide practical ideas to Parties on how they may be able to improve their reporting in the future.

7 UNCCD, 2019. Good Practice Guidance for SDG Indicator 15.3.1: Proportion of land that is degraded over total land area. [online]. Bonn, Germany. [Cited 14 August 2024]. Available at: https://www.unccd.int/resources/manuals-and-guides/good-practice-guidance-sdg-indicator-1531-proportion-land-degraded
UNCCD, 2021. Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3. [online]. Bonn, Germany. [Cited 14 August 2024]. Available at: https://www.unccd.int/sites/default/files/documents/2021-09/UNCCD_GPG_Strategic-Objective-3_2021.pdf

BOX 3 How countries can use the reported information

How can countries use the information provided in the UNCCD national reports to prioritize areas for different investments?

The Global Environment Facility (GEF) is the financial mechanism of the UNCCD. The GEF Land Degradation Focal Area provides the opportunity for eligible countries to access resources to implement the Convention and its UNCCD 2018–2030 Strategic Framework with a focus on production landscapes where agricultural and rangeland management practices underpin the livelihoods of poor rural farmers and pastoralists. As part of the design of such projects, countries need to select and identify the landscapes in which SLM practices and other project activities will be implemented. Different criteria should be used for this process, including the evaluation of land conditions. The UNCCD national reports provide crucial information for prioritizing these investments, as they allow for the identification of areas that are undergoing recent or persistent degradation. For example, Cabo Verde, as part of its national LDN monitoring efforts, calculated the proportion of degraded land and mapped its location following the Good Practice Guidance for SDG indicator 15.3.1. The results were used as a criterion to prioritize specific river basins during its design of the GEF-funded project Towards Land Degradation Neutrality for Improved Equity, Sustainability, and Resilience.



Land degradation maps of the Ribeira Seca basin (outlined in purple), one of the prioritized river basins for the LDN project in Cabo Verde. The maps show degraded and improved areas for the baseline period (2001–2015) (left) and the reporting period (2015–2019) (right), calculated using UNCCD Good Practice Guidance for SDG Indicator 15.3.1 (Source: GEF).

UNCCD is the first Rio Convention to provide comprehensive geospatial data to reporting Parties.

Mexico, © Earth Science and Remote Sensing Unit, NASA Johnson Space Center, NASA Photo ID: ISS062-E-151785

Overcoming reporting challenges

Colombia, © Hanspeter Liniger

Trends in land cover

Land cover refers to what is physically present on the Earth's surface. It includes, for example, grassland, forest, wetlands, crops and the built environment. Land cover is fundamental to all life on Earth as it influences climate, biodiversity, food security, resource availability and quality of life. Knowledge of land cover and its changes over time is important as it helps achieve understanding of the natural and built environments, thereby supporting better management of natural resources, environmental protection, food security, disaster risk reduction, and mitigation and adaptation to climate change, among other things. Changes in land use and land cover driven by the growing demands of humankind have a considerable effect on ecosystem services and functions. Processes such as deforestation or urban expansion, which are usually caused by land use management decisions and practices, generally lead to land degradation, whereas afforestation or an increase in wetland area is generally considered as an improvement.

To determine trends in land cover, a country needs to choose a land cover map time series with which to work. This may be the standardized global map series provided by the UNCCD secretariat or an alternative if the country believes it represents its national situation better. An appropriate land cover legend has to be assigned that best captures changes in land cover and associated key degradation processes. This should be aligned insofar as possible with the seven categories proposed by the UNCCD, but modifications or addition of classes may be made to better reflect nationally important land cover. The main land degradation processes relevant to the country need to be specified, and what they represent in terms of changes from one cover type to another (e.g. cropland to grassland, wetland to artificial surface) need to be defined. All possible land cover transitions are then interpreted as to whether they represent land degradation, improvement or stability. The area (in square kilometres (km^2)) and the proportion of land represented by each of these three categories, with respect to the total land area in that country, is then reported.

STORIES >

Adapting the provided land cover maps with expert knowledge better reflects national land cover classes.

Challenge

The standardized global land cover maps provided by the UNCCD secretariat use a legend comprising seven broad land cover classes for aggregate reporting. This legend was reclassified from one provided along with the European Space Agency Climate Change Initiative (ESA-CCI) land cover map that comprises 36 classes. In some cases, the default legend may not adequately capture specific types of land cover in a country that are deemed important in terms of land degradation processes. The challenge lies in how to choose an appropriate legend based on the supplied map data that reflects national land cover and allows the main land degradation processes to be captured.

Lesson

Even when national land cover data sets are not available, the default land cover legend associated with the land cover maps provided by UNCCD may be modified to better reflect national land cover classes deemed important in relation to land degradation.

Response

A set of standardized global land cover maps is provided in the UNCCD reporting system.[8] Countries may work with these if they do not have access to nationally generated land cover maps or may do so in preference to a nationally generated map set. The default land cover map set is that of the ESA-CCI, which is provided at a spatial resolution of 300m on an annual basis since 2000. For reporting purposes, the 36 ESA-CCI land cover classes are by default aggregated into seven land cover classes (see table on page 23).

Bosnia and Herzegovina, a country in south-eastern Europe, organized a participatory workshop, which brought together stakeholders from ministries, universities and professional institutions from the Republic of Srpska, the Federation of Bosnia and Herzegovina and Brčko district to evaluate the default land cover maps as well as other available maps, such as the Coordination of Information on the Environment (CORINE)[9] Land Cover, to determine the most appropriate maps for their purposes.

By using the Land Cover Transition Comparison Tool[10], developed with the support of FAO and GEF and available within a Google Earth Engine environment, the workshop participants were able to qualitatively and quantitatively compare and evaluate both sets of maps. This resulted in the ESA-CCI map being identified as the most appropriate one. Nevertheless, based on the stakeholders' discussions and considerations, a category related to shrublands, which had been originally classed as part of grasslands, was added to the default seven land cover classes proposed by the UNCCD. This was achieved by modifying the land cover legend using an independent software tool, although the Trends. Earth tool provided by Conservation International may also be used for this task. In the case of Bosnia and Herzegovina, the shrubland in question is called maquis and is found mainly in the southern part of the country. Maquis exists across the Mediterranean basin, but is highly heterogenous in structure and species distribution. In the case of Bosnia and Herzegovina, maquis areas are protected. This additional shrubland class was also included in the land cover transitions matrix, thereby allowing for a more accurate and realistic mapping of land cover changes across the country.

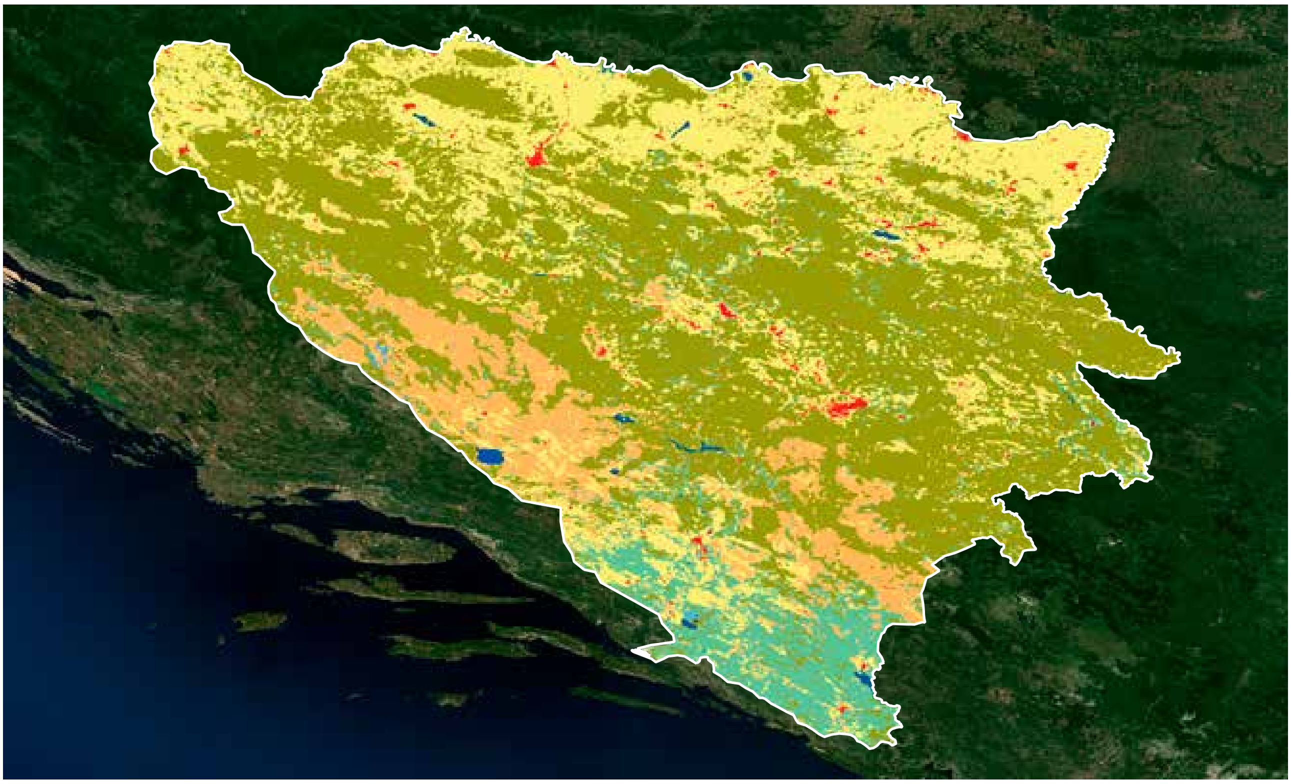
8 UNCCD, n.d. PRAIS4 Reporting Platform. [online]. [Cited 14 August 2024]. Available at: https://www.unccd.int/resources/prais4-reporting-platform

9 CORINE, 2020. CORINE Land Cover Maps.[online]. [Cited 14 August 2024]. Available at: https://land.copernicus.eu/pan-european/corine-land-cover

10 FAO, n.d. Land Degradation Neutrality (LDN) Map for Bosnia and Herzegovina. [online]. [Cited 14 August 2024]. Available at: https://projectgeffao.users.earthengine.app/view/ldn-bih-landcover

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
	Tree cover, broadleaved, deciduous, closed to open (>15%)		Forest
	Tree cover, broadleaved, deciduous, closed (>40%)		Forest
	Tree cover, broadleaved, deciduous, open (1540%)		Forest
	Tree cover, needleleaved, evergreen, closed to open (>15%)		Forest
	Tree cover, needleleaved, evergreen, closed (>40%)		Forest
	Tree cover, needleleaved, evergreen, open (1540%)		Forest
	Tree cover, needleleaved, deciduous, closed to open (>15%)		Forest
	Tree cover, needleleaved, deciduous, closed (>40%)		Forest
	Tree cover, needleleaved, deciduous, open (1540%)		Forest
	Tree cover, mixed leaf type (broadleaved and needleleaved)		Forest
	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)		Shrubland
	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)	Grassland	Grassland
	Shrubland		Shrubland
	Evergreen shrubland		Shrubland
	Deciduous shrubland		Shrubland
	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		

The original European Space Agency Climate Change Initiative (ESA-CCI) land cover map contains 36 classes. For the purposes of reporting on land degradation, the UNCCD has reclassified this map into seven broad land cover classes for aggregate reporting. In the case of Bosnia and Herzegovina, a category related to shrublands, which had been originally classed as part of grasslands, was added to the default seven land cover classes proposed by the UNCCD.



Forest
Cropland
Bare land
Shrubland
Wetland
Water body
Grassland
Artificial

The national border displayed on this map was provided by the Government of Bosnia and Herzegovina

Using the standardized, global land cover maps provided by the UNCCD, the government of Bosnia and Herzegovina added one class to the default legend. This is the maquis, a shrubland biome typical of the Mediterranean region, which is found mainly in the southern part of the country.

Bosnia and Herzegovina © iStock.com / Kizaru

Nationally generated land cover data may capture national land degradation processes better compared with the standardized global land cover maps and therefore improve the confidence in the results achieved.

Nationally generated land cover maps with country relevant land cover classes can improve reliability of land degradation estimates.

Challenge

Countries with their own nationally generated land cover maps often prefer to use these rather than the standardized global ones provided by the UNCCD. These need to be reclassified to a set of land cover classes that allow land cover degradation or improvement processes to be captured and are in line with the reporting requirements. The challenge is to determine a set of classes that is compatible with the seven default land cover classes proposed by the UNCCD but that also represent land cover specificities within the country that are relevant for capturing land degradation processes.

Lesson

Nationally generated land cover data, with an appropriate legend, may capture national land degradation processes better compared with the standardized global land cover maps provided and therefore improve the confidence in the results achieved.

Response

Panama, a country in central America, brought together in a workshop over 30 stakeholders with different professional backgrounds related to land degradation to discuss how best to provide information on land cover. Panama used its own nationally generated land cover maps for 2000, 2012 and 2021 for reporting in preference to the global, standardized data provided via the UNCCD platform. Following a review by the experts, the seven default land cover classes proposed to capture the degradation processes were determined to be insufficient for identifying the main degradation processes due to land cover change in Panama. Therefore, mangroves, which were originally classified as part of the forest class, were added as an additional class. Mangroves are 10 times more effective at sequestering carbon than boreal, temperate or tropical forest per unit area per year[11] and play a critical role in achieving LDN. Moreover, they are important in the recovery of degraded land and help in maintaining vegetation cover along coastlines, as well as having their own intrinsic biological value. In addition, a class of thicket, originally part of the grassland class, was defined. Thicket is relevant because it represents an intermediate transition between degraded land and mature forest. Also, it has a much higher biological and carbon fixation value than grassland, from which it is derived. The national land cover maps used and the modified legend were determined by the expert group to be more aligned with the reality on the ground in Panama than the standardized, global data provided.

Small working groups identified their own shortlist of known degradation processes. Through subsequent discussions with all participants, a consolidated list of degradation processes was agreed, which, in the case of Panama, were habitat loss, changes in vegetation cover, water erosion, and detrimental effects of fire. Based on this agreed list and the previously identified land cover classes, it was then possible to identify the different types of degradation transitions, for example forests to artificial surfaces or wetlands to agricultural use, which have occurred in Panama.

The degradation transitions, combined with the spatially explicit land cover maps, allowed for the areas of the various land cover changes to be determined, and hence both the area and the locations of degraded, stable and improved land could be identified and mapped. The maps are available to be consulted in the national LDN decision support system[12].

11 Wylie, L., Sutton-Grier, A.E. & Moore, A. 2016. Keys to successful blue carbon projects: Lessons learned from global case studies. Marine Policy, 65, pp. 76-84. doi:10.1016/j.marpol.2015.12.020

12 FAO, n.d. Land Degradation Neutrality (LDN) Map for Panama. [online]. [Cited 14 August 2024]. Available at: https://wocatapps.users.earthengine.app/view/ldn-panama

Using a national land cover map series, Panama added two additional classes (mangrove and thicket) to the default legend that are important to capture information on national land degradation processes.

The national border displayed on this map was provided by the Government of Panama

Original/Final	Forest	Mangrove	Thicket	Grassland	Cropland	Wetland	Artificial	Other land	Water body
Forest	0	0	–	–	–	–	–	–	–
Mangrove	0	0	–	–	–	–	–	–	–
Thicket	+	+	0	–	–	–	–	–	–
Grassland	+	+	+	0	0	0	–	–	–
Cropland	+	+	+	0	0	0	–	–	–
Wetland	+	+	+	0	0	0	–	–	–
Artificial	+	+	+	+	+	+	0	0	0
Other land	+	+	+	+	+	+	+	0	0
Water body	–	–	–	–	–	–	–	–	0

–	+	0
Degradation	Improvement	Stable

Panama added two additional classes (mangrove and thicket) to the default legend. Stakeholders then identified the transitions that represented land degradation, improvement or stability.

Synergies in reporting to different United Nations conventions are achieved through usage of the same nationally generated land cover maps.

Challenge

Countries are often tasked with reporting to several United Nations conventions, which requires the investment of significant resources. Alignment and reuse of underlying data sets and approaches can lead to synergies, which reduce the burden of reporting. In the case of land cover, the challenge is to ensure that when nationally generated maps developed in the context of reporting on other issues are used in preference to those provided in the UNCCD platform, they are appropriate to track the key land degradation processes defined in the national report.

Lesson

Countries have the option to work with nationally generated data sets, or may adapt UNCCD provided standardized global maps and legends, where appropriate, to reflect national practice. This allows synergies as the same data and approaches may be used to report to different United Nations conventions.

Response

The standardized global land cover maps provided by the UNCCD secretariat are based on the ESA-CCI land cover products. In the case of Spain, a country in western Europe, a series of nationally generated land cover and land cover change maps covering the period 2000 to 2018 were chosen over the standardized UNCCD maps. This map series is used for reporting on greenhouse gas emissions and sequestrations in the land use, land-use change and forestry (LULUCF) sector as part of the country's obligations to the United Nations Framework Convention on Climate Change and furthermore forms the basis for reporting to the Convention on Biological Diversity. This usage exploits synergies in using the same underlying map series for reporting in relation to different United Nations conventions.

A variety of national sources were used to generate the map series ranging from specific forest cover maps at a scale of 1:50,000 to rocky areas extracted from an analysis of Landsat and Sentinel satellite images. Base topographic maps from the national mapping authority were also used to identify different types of transport infrastructure. These and data from other sources were standardized, homogenized and mapped at a grid spacing of 25m using the six LULUCF classes defined by the IPCC, providing a set of maps for a number of specific years in the period 2000 to 2018. As part of this process, the default UNCCD land cover legend was modified. The wetland class and water bodies class were combined into one water bodies class in accordance with national practice and the IPCC land-use category definitions.

In the case of Spain, urban expansion, primarily with the conversion of croplands, grasslands and tree-covered areas to artificial surfaces, was identified as the key degradation process. Deforestation via the conversion of tree-covered areas and grasslands to croplands was also identified as a degradation process, although it showed a downward trend between periods. Based on this, and using the nationally generated map series, it was then possible to map the transitions which occurred in the baseline and reporting periods to identify the area and proportion of land that had degraded or improved across the country.

Tree-covered
Cropland
Water bodies
Grassland
Artificial
Other land

The nationally generated land cover map for Spain in 2018. The landcover classes are aligned with the IPCC land-use category definitions and are also used as a basis for reporting to the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity.

The national border displayed on this map was provided by the Government of Spain

Ecuador. © Ministerio del Ambiente, Agua y Transición Ecológica, Ecuador

Trends in land productivity

Land is the principal source of the food, fibre and fuel that sustains life, and land productivity is a measure of its biological productive capacity. It should not be confused with agricultural productivity, which is a measure of agricultural production with respect to the resources required as inputs. Rather, land productivity helps to identify long-term changes in the health and productive capacity of the land and reflects the net effects of changes in ecosystem functioning on plant and biomass growth. Land productivity can vary in space and in time because it is strongly influenced by local to regional climatic conditions and land management practices. Monitoring of land productivity is important for early warning of areas with persistent and active declines, which may indicate land degradation and thereby allow, where possible, for interventions that could slow down or reverse the decline.

Using satellite-derived EO data, land productivity is generally calculated using the Normalized Difference Vegetation Index (NDVI), or another equivalent vegetation index, which are proxies for the amount of green biomass on the land surface. By analysing spatially explicit time series of vegetation index data, both the level of land productivity and its trend over time can be captured and mapped. Countries report on the land area (in square kilometres) and the proportion of land with respect to the total land area in that country that has improved, degraded and remained stable in terms of land productivity.

Reliable ground information allied with expert knowledge allows for the selection of the most representative land productivity map.

Challenge

Maps of land productivity dynamics (LPD) are derived from the analysis of spatially explicit vegetation index time series calculated using remotely sensed satellite data. There are various algorithmic methods available to characterize the dynamics. The challenge faced is that of choosing an analysis approach that generates an LPD map that is a realistic representation of national land productivity and its changes, which can be confirmed with validation data or expert knowledge.

Lesson

Different algorithmic approaches in relation to calculating LPD lead to differing outputs in the maps generated. Both expert and ground knowledge need to be taken into account to ensure that the map selected is representative of actual land degradation or land improvement in the country.

Response

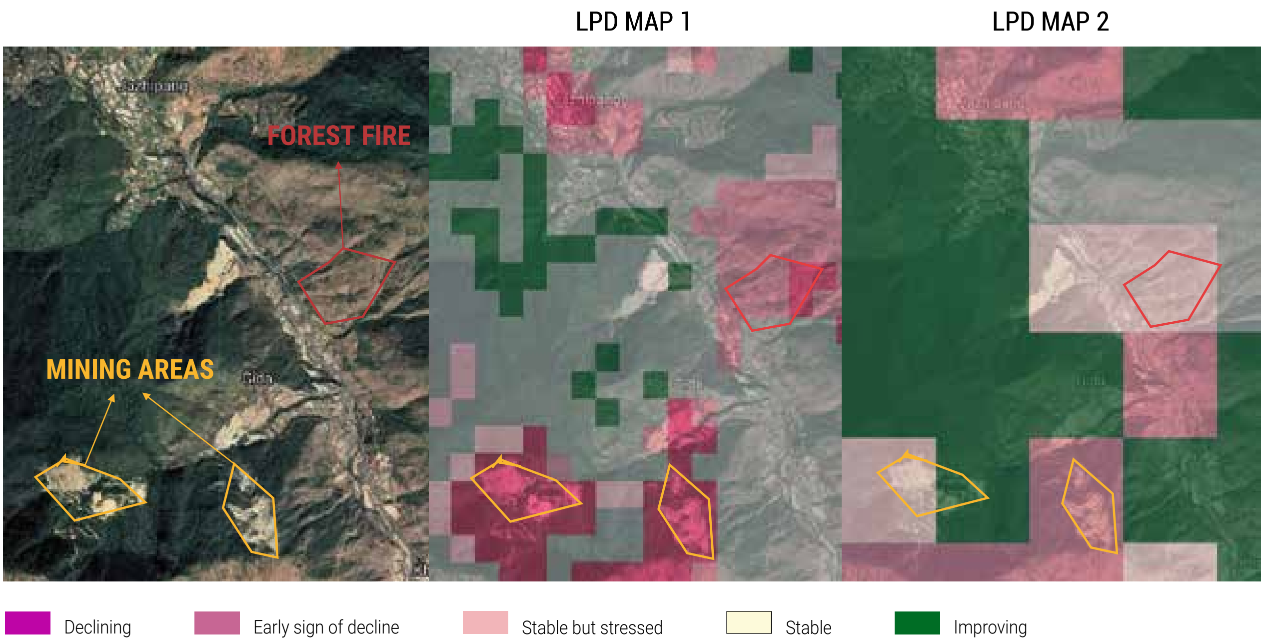
A series of five land productivity maps was analysed by a group of experts from a number of government institutions representing different sectors during a participatory workshop held in Punakha, Bhutan, a landlocked country in southern Asia. In line with the UNCCD Good Practice Guidance for ADG indicator 15.3.1, each map was generated using EO data, but differing algorithms and parameterizations were used to calculate and characterize the land productivity trends. The map set included the standardized global maps available in the UNCCD platform and four additional maps generated specifically for evaluation during the workshop. The maps were given random labels for identification to avoid any bias in the evaluation process based on prior knowledge of the algorithm used. Each map used the standard LPD legend that encompassed five categories representing areas of decline, areas of moderate decline, stressed areas, stable areas, or areas with increasing land productivity.

A tool deployed in the Google Earth Engine (GEE) environment[13], and specially developed with the support of WOCAT, allowed for maps to be compared visually using an easy-to-use slider bar. In addition, the workshop participants were able to check statistics at national and district level, as well as vegetation index changes over time at specific locations by clicking in the map. In addition to their own specialist knowledge, the participants had brought a series of maps with them, identifying areas in the country (i) which had been affected by forest fires and infestations of bark beetles; (ii) where timber extraction had occurred; (iii) where settlements had developed or expanded; (iv) mining sites; and (v) areas under SLM. This expert knowledge of local areas and specific processes proved to be invaluable in the map selection process.

The land productivity map selected was by FAO-WOCAT,[14] which was assessed as aligning most closely with the known situation in the country based on the analysis of the complementary data provided by the experts as well as their own local knowledge of the reality on the ground.

13 FAO, n.d. Land Productivity Dynamics (LPD) Map for Bhutan. [online]. [Cited 14 August 2024]. Available at: https://wocatapps.users.earthengine.app/view/dss-bhutan-lpd
14 Garcia, C.L. & Teich, I. 2022. FAO-WOCAT Land Productivity Dynamics Indicator. [online]. Zenodo. [Cited 14 August 2024]. doi:10.5281/zenodo.10849368

The LPD map tool explorer developed with the support of WOCAT and deployed in a GEE environment proved invaluable in viewing and analysing the five LPD maps provided and helped experts select the most representative map for Bhutan.



By using maps delineating areas of known land degradation and improvement, allied with expert knowledge, workshop participants were able to select the LPD map that best represented the known situation on the ground. The map on the left shows known areas of forest fires and mining, both of which represent areas of land degradation. The maps in the centre and right are two LPD maps from the map set. The centre map aligns best with the situation shown in the ground data (left map).

> Both expert and ground knowledge need to be taken into account to ensure that the map selected is representative of actual land degradation or land improvement in the country.

Madagascar, © Gregoire Dubois

Accounting for inter-annual variability in precipitation in areas affected by irregular climate phenomena like El Niño-Southern Oscillation improves accuracy of estimates of LPD.

Challenge

Land degradation is driven by a combination of climate factors and land management. Water availability has a key role in vegetation growth and hence land productivity. Climate phenomena, such as the El Niño-Southern Oscillation, can greatly affect precipitation patterns and hence water availability. This can lead to temporary stress in vegetation growth. The challenge is to decouple these temporary, weather-driven stresses from long-term land degradation by factoring in the inter-annual precipitation variability in the calculation of LPD.

Lesson

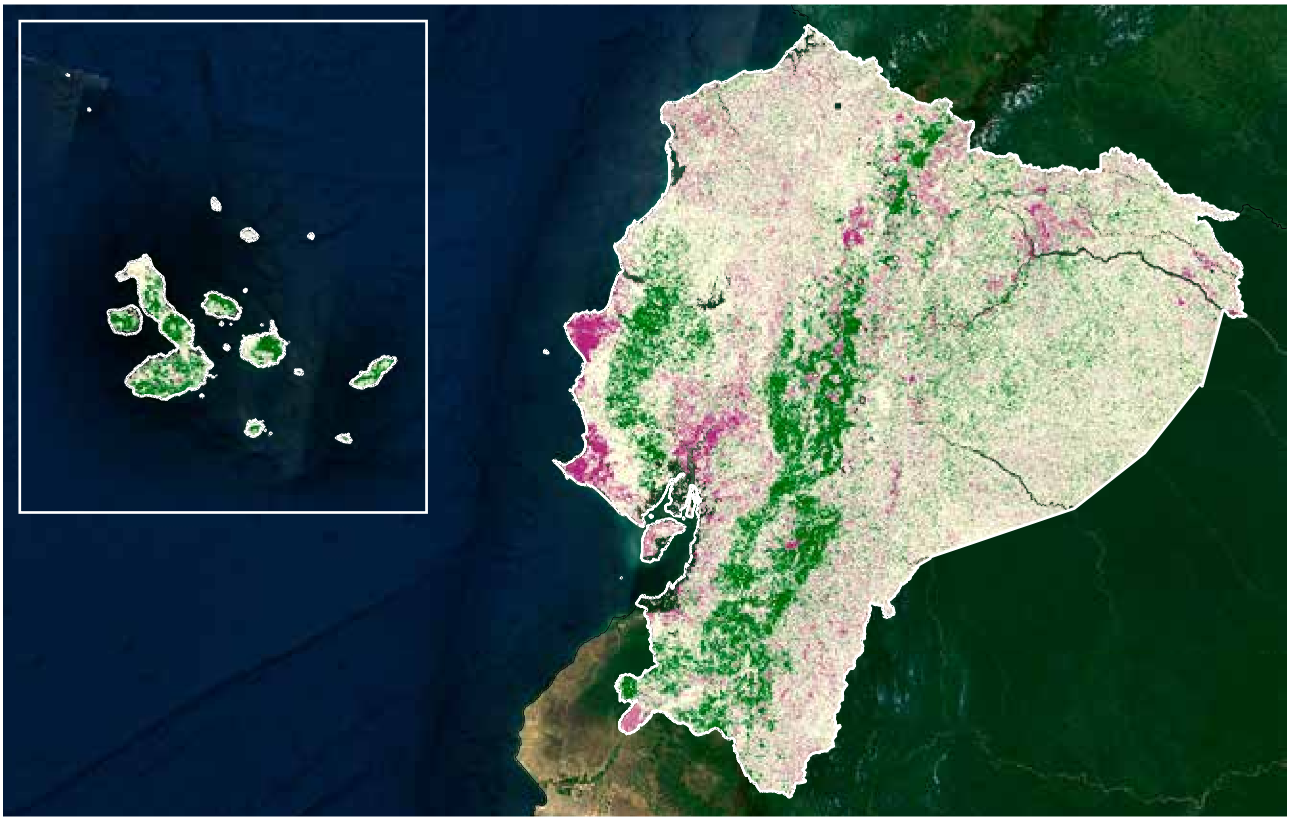
Climate phenomena that are cyclic in nature can lead to short-term variability in vegetation growth and hence inferred LPD. In these cases, the inclusion of climatic correction factors in the calculation of LPD leads to more robust estimates of long-term land degradation.

Response

Vegetation growth and hence land productivity is affected by climatic factors, such as rainfall amounts as well as land use and management practices. Areas that experience large variability in rainfall amounts over time or are subject to significant climate cycles may see large variations in land productivity. Land productivity and its changes are calculated using a vegetation index (in this case the NDVI) as a proxy, therefore if information on rainfall variability can be factored into the land productivity calculation, it can help in identifying short-term productivity variations that are not necessarily associated with long-term land degradation.

This issue was of particular concern to Ecuador, a country in South America, as it is strongly affected by the impacts of the El Niño-Southern Oscillation on precipitation and temperature and hence water availability. As part of a participatory process involving specialists from national and international institutions, it was decided not to use the standardized global LPD values provided through the UNCCD platform. Instead, the specialists took advantage of the option in the Trends.Earth software to apply climate corrections in the calculation of the LPD indicator. They used a global, satellite-derived precipitation data set (Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks – Climate Data Record (PERSIANN-CDR)) and, by applying the Residual Trend Analysis approach available in the software, predicted the NDVI and its changes over time for a given rainfall amount across the country. This was then compared with the NDVI, calculated using only satellite data from the MODIS sensor. An analysis of the difference between the two sets of NDVI values allowed for the calculation of a more realistic estimate of the LPD across the different land cover classes.

The results of this method are very sensitive to the specific precipitation data set adopted and also the model used to apply the climate correction. In the light of this, Ecuador is continuing to research ways to improve the models used to apply the climate corrections to support more accurate estimates of its LPD in the future.



Ecuador used the Trends.Earth tool to incorporate climate corrections in the calculation of the LPD which is shown for the baseline period 2001 to 2015.

The national border displayed on this map was provided by the Government of Ecuador

In countries with a heterogenous landscape and many small land-use parcels, such as small island developing States (SIDS), high resolution data sets improve the accuracy of LPD estimates.

Challenge

The default LPD estimates are based on an analysis of trends in vegetation index data calculated over large grid cell areas. In the case of countries with very heterogenous land use in small parcels, this leads to grid cell vegetation index values averaged over numerous land cover types. This can mask trends in LPD and hence land degradation or improvement. The challenge faced is to access and evaluate higher resolution data sets to help improve the reliability of the estimates of LPD.

Lesson

In many countries, including SIDS the landscape is often a heterogenous mosaic with numerous small land use parcels. Such countries need to strive to seek data that best represents on-the-ground situations, not only in terms of spatial resolution but also in terms of representativeness. Such data offer the potential for improved estimations of land degradation.

Response

Land cover in Haiti, a country in the Caribbean, is heterogenous in nature, with many small land parcels having different uses adjacent to each other. Approximately 12 per cent of Haiti is forest,[15] although almost all of this is successional forest. There are also numerous areas of scrubland, much of which forms after the abandonment of agricultural land, which has seen reductions in agricultural productivity often due to soil degradation and the decreasing size of plots of arable land. Nonetheless, the majority of Haiti's population is dependent on agricultural production, with the World Bank estimating that 80 per cent of rural households rely on agriculture.[16]

The standardized, global land productivity maps provided in the UNCCD platform estimates land productivity over areas of 1 km by 1 km (100 hectares (ha)). Typically, average farm sizes in Haiti are from 1 to 3 ha, and therefore an individual cell in an LPD map may cover a mix of land cover and use types. Following analysis of the default LPD estimates, they were found not to be representative of the reality in Haiti. Therefore, the Trends.Earth tool was used to explore alternatives. The team selected the FAO-WOCAT map with grid cells of 250 metres (m) x 250 m (6.25 ha) as being somewhat more representative of the actual situation with respect to land productivity in Haiti. Nonetheless, the team has highlighted the need for much higher resolution products such as those that could be derived from Landsat (30m) or Sentinel (10m) satellite sensors. Haiti is a member state of the Partnership Initiative for Sustainable Land Management (PISLM), which supports Caribbean SIDS in using evidence-based strategic land-use planning and policymaking to achieve LDN. PISLM is working towards the establishment of a strategic unit for the forthcoming SIDS forum to make sure that the higher resolution data sets currently being produced by different initiatives are available and relevant to SIDS for reporting to the UNCCD.[17]

15 FAO, 2020. Forest Resources Assessment 2020. [online]. Rome. [Cited 14 August 2024]. Available at: https://www.fao.org/forest-resources-assessment/2020/en/
16 Singh, R.J. & Barton-Dock, M.A. 2015. *Haiti - Toward a New Narrative: Systematic Country Diagnostic*. Washington, D.C., World Bank Group.
17 Some of these initiatives include Sentinels for Land Degradation Neutrality Monitoring, led by the European Space Agency, the production of higher resolution LPD data sets by the International Research Center of Big Data for Sustainable Development Goals, or new projects led by Conservation International.

Declining | Early signs of decline | Stable but stressed | Stable | Increasing | No data

The Trends.Earth tool allows for the exploration of different LPD maps. Maps for the reporting period are shown. The FAO-WOCAT map (right) at a spatial resolution of 250m was chosen as more representative of the reality in Haiti in preference to the standardized, global LPD map (left) at a spatial resolution of 1 km.


Ecuador, © Josshua Jaramillo

Trends in carbon stocks above and below ground

Well-functioning terrestrial ecosystems can absorb and store large amounts of carbon in living plants, including their leaves, stems and roots; in plant litter and dead wood; in live biomass below ground; and in the soil itself. More than 80 per cent of total terrestrial carbon is in the soil, but it can vary widely by ecosystem type. Of that, over 50 per cent is soil organic carbon (SOC),[18] which is a measurable part of soil organic matter. This organic matter is important as it contributes to nutrient retention and turnover, soil structure, moisture retention and availability, degradation of pollutants, as well as carbon sequestration. SOC stock depends on soil type, land use, and land management practices, among other things.

SOC is therefore an indicator of overall soil quality, and countries report on its changes over the reporting period. Estimates are made of the SOC stock in the topsoil for each of the six land cover types. These estimates are based on globally provided soil maps or on nationally generated data if it is available. Changes in SOC over time due to land conversion from one type to another are determined at the national level. It is important to note that significant changes in SOC are difficult to monitor as it generally changes quite slowly. In addition, the current implemented approach to estimating SOC changes is based on predictions using computer models rather than direct measurements. Once SOC change estimates are calculated, the extent (in km^2) and the proportion of land with respect to the total land area of a country with improved, degraded and stable SOC are calculated and reported.

18 SOC stock is the metric currently used to assess carbon stocks. It is a temporary metric to be used until a more comprehensive data set on total terrestrial carbon stock is available globally.

Estimates of SOC stocks and their changes can be improved by modifying the default land cover maps or using country-specific maps.

Challenge

The default values of SOC stocks and their changes over time as provided by the UNCCD are inferred by combining global information on land cover, soils, land use and land management. The challenge faced by countries is to identify those elements which may be complemented or replaced with national or alternative data and then source or produce them to improve the estimates of SOC and its changes.

Lesson

Estimates of SOC stocks and their changes over time can be improved compared to the UNCCD provided standardized global values by adopting a custom national land cover legend using national land cover data sets, customized SOC change factors, or a combination of all three. In the case of Botswana, while the country has not defined country-specific change factors for the observed SOC stock changes, they have generated national land cover data sets and defined comprehensive land cover changes over time, which have improved the estimates and relevance of the SOC stocks and the changes reported.

Response

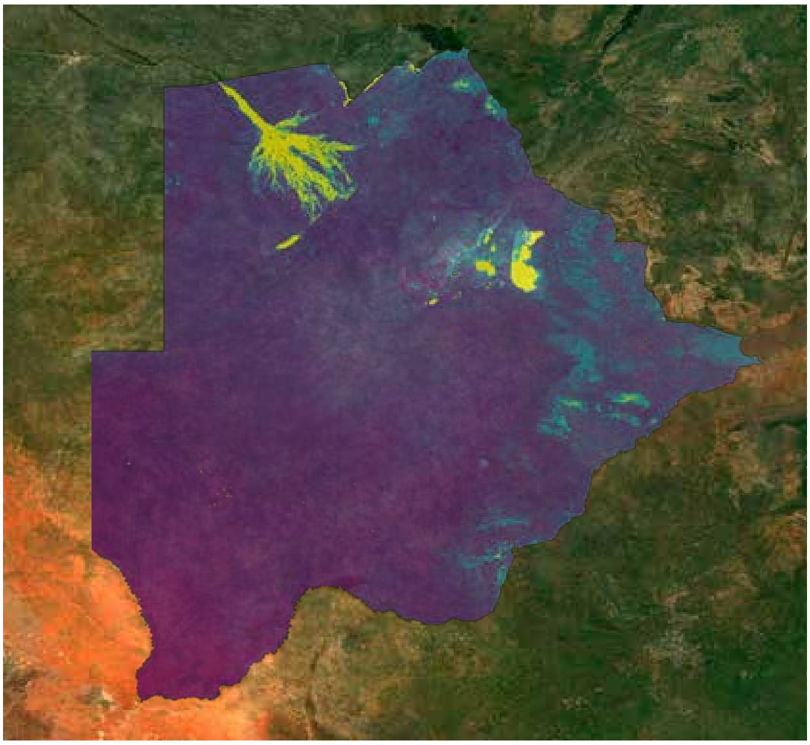
Botswana, a country in southern Africa, is implementing a project with the support of FAO to address land degradation in a holistic and realistic manner. As part of this, it has set itself a target to increase soil fertility and improve SOC stocks across all land types by 2030.

SOC stocks are estimated per category of land cover, and changes in stocks are calculated using carbon conversion coefficients applied to changes in land cover from one category to another. Hence, accurate and reliable land cover maps are vital for the estimations. Botswana generated a land cover map for 2000 by taking the original data from the ESA-CCI land cover database at 300m spatial resolution and, with reference to information from the Regional Centre for Mapping of Resources for Development,[19] resolved confusion between certain classes. The country generated its own detailed land cover maps at 30m spatial resolution for 2015 and 2018 using satellite images from Landsat 8 and Sentinel-1. Post-processing and validation with external information, including field data, were carried out to improve accuracy.

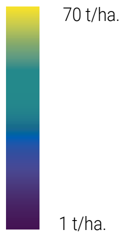
A total of 17 and 12 different land conversions were defined for the baseline period and reporting periods, respectively. The net area changes were calculated using the land cover maps generated. The default SOC conversion coefficients for a dry tropical climate were applied, and this allowed for the calculation of SOC stock changes for the reported land conversions over both periods. The adjusted land cover map for 2000 and the higher resolution maps from 2015 and 2018 permitted more detailed calculations of the areas involved in land cover transitions and therefore related SOC changes.

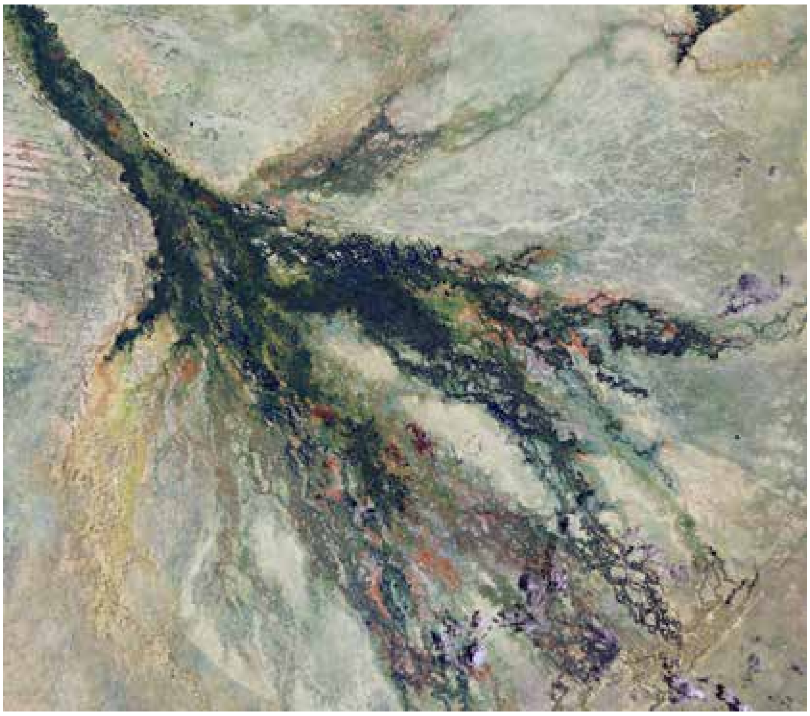
Botswana is home to extensive wetlands, such as the Okavango Delta, which is a designated United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage site. Such wetlands are important carbon sinks. Botswana estimates that an area of approximately 27 km^2 of wetlands in different locations were converted to other land cover types in the period 2015 to 2019, thereby causing a decrease in SOC of approximately 32,000 tonnes. This compares with an area of 239 km^2 which was converted from tree cover to other land cover types, representing a net SOC loss of 160,000 tonnes. However, wetland conversion in the country leads to almost twice as much SOC loss per km^2 compared to the conversion of tree-covered areas. Botswana hopes to develop a national carbon stock database with a view to improving its SOC estimates further.

19 RCMRD, n.d. Regional Centre for Mapping of Resources for Development (RCMRD). [online]. [Cited 14 August 2024]. Available at: https://rcmrd.org/en/



Some of the highest SOC stock in Botswana (2019) is seen in the wetland area of the Okavango Delta to the north of the country and around the salt pans in the Makgadikgadi Basin to the east.





The Okavango Delta, a designated UNESCO world heritage site, as seen in this Sentinel-2 satellite image from 02/02/2017, comprises marshlands and seasonally flooded plains and covers an area of 15,000 km^2 at its fully flooded extent.


Botswana © Gregoire Dubois

Maps of soil threats support the calculation of changes in SOC stocks.

Challenge

The SOC estimates provided in the UNCCD reporting platform are based on the SoilGrids250 data set. This predicts soil properties using globally fitted models, and it therefore may have limited accuracy at local level. Moreover, SOC changes because of land conversion from one cover type to another are modelled using a set of empirical SOC change coefficients. The challenge here was to identify national data sets which could provide more accurate measures of SOC stocks and also to determine robust approaches to calculating SOC changes.

Lesson

The integration of SOC sequestration potential maps with ancillary data on soil characteristics can contribute to more accurate estimates of SOC stocks and their changes than those calculated using the UNCCD provided, standardized global data.

Response

A three-day workshop took place in Colombia in South America, which brought together over 20 stakeholders with a mix of local and national knowledge in relation to land degradation. Part of this workshop focused on determining trends in SOC stocks. SOC stock estimates for 2000 were derived from the default SoilGrids250m data set provided by the International Soil Reference and Information Centre. Annual SOC stock changes due to land conversions from one cover type to another were calculated for the period 2000 to 2019 using a set of empirical conversion factors. Following the consideration of the default maps and SOC stock changes, workshop participants concluded that both were unsatisfactory, so alternatives were sought based on national data and information.

Colombia has a national map of SOC stocks published in 2017, which is derived from a series of ground observation made in preceding years. Based on this and by adopting the widely used RothC modelling approach,[20] it was possible to create a map of SOC sequestration potential in 2040. In addition, there are national maps showing the magnitude of erosion from 2011 and the magnitude of salinization from 2017.

For the baseline period, areas undergoing reductions in SOC stocks were identified as those subject to severe and very severe erosion or very severe salinization. These areas were considered in the calculations of SOC changes for the reporting period only. Areas were highlighted as undergoing a reduction in SOC if there was a loss of more than 5 per cent in SOC between the baseline period map and the 2040 soil carbon sequestration potential map. In an analogous way, areas where there was a 5 per cent increase or greater noted between the two maps were highlighted as having increasing SOC. Even though the 2040 map represents a modelled future situation, it is based on simulations starting with known conditions, and therefore it highlights areas which are currently undergoing SOC changes. The results calculated using the national data sets showed the area with SOC degradation to be almost 10 times greater for the baseline period and approximately 90 times greater for the reporting period, compared with those generated using the UNCCD provided standardized global data.

20 Coleman, K. & Jenkinson, D.S. 1996. RothC-26.3 – A model for the turnover of carbon in soil. In: Powlson, D.S., Smith, P. & Smith, J.U. (eds). Evaluation of Soil Organic Matter Models. pp. 237-246. Berlin, Springer-Verlag.

Erosion degree (2011)

Extreme | Severe | Moderate | Light | No erosion | No soil

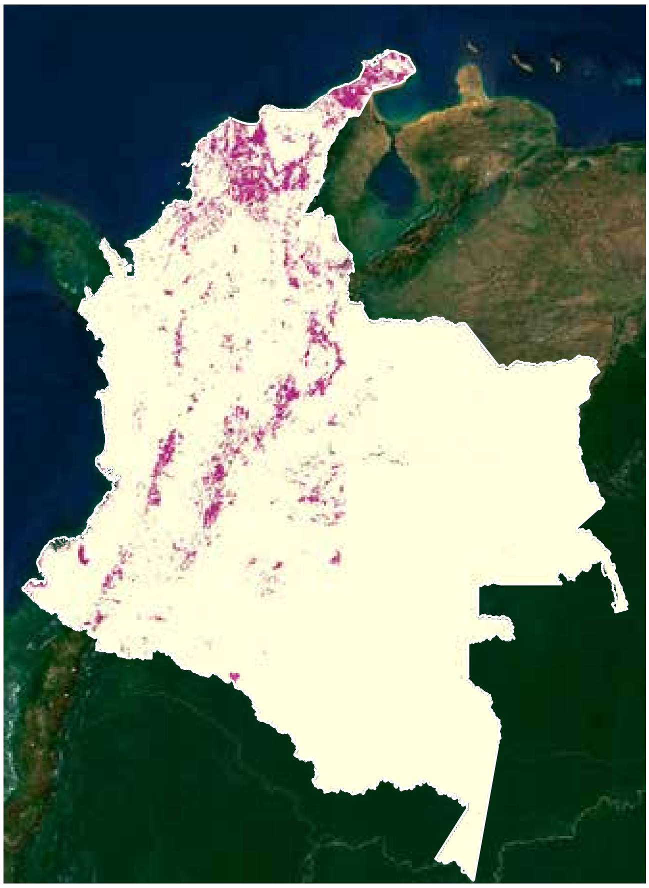
Scale 1:100,000. Subdirectorate of Ecosystems and Environmental Information - IDEAM, Soil and Land Group, 2015.

Salinization susceptibility (2017)

Very severe | Severe | Moderate | Light | Very light | No soil

Scale 1:100,000, version 1. Subdirectorate of Ecosystems and Environmental Information - IDEAM, Soil and Land Group, 2016.

SOC Degradation (reporting period)



Degraded | Stable | Improving

Nationally available maps of degree of soil erosion and salinization susceptibility (left) were used to identify areas in continental Colombia undergoing SOC changes (right), which were then estimated with the help of SOC sequestration potential maps.

The national border displayed on these maps was provided by the Government of Colombia

Estimates of SOC stocks and their changes over time can be improved by adopting a custom national land cover legend, using national land cover data sets, customizing SOC change factors, or a combination of all three.

Colombia, © Gregoire Dubois

Nationally derived conversion factors improve estimates of SOC stock changes.

Challenge

The current implemented approach to estimate trends in SOC is based on the analysis of land cover changes, and the estimation of SOC stock changes uses conversion factors associated with each type of land cover transition. However, the extent and rates of SOC sequestration under different land use and management practices can vary greatly depending on soil characteristics, topography and climate. The standardized global conversion factors provided by the UNCCD secretariat may not be appropriate in all situations. The challenge faced here was to determine a set of national conversion factors that provided realistic estimates of changes in SOC for different land cover transitions.

Lesson

National expert knowledge, in addition to modelling and the inclusion of nationally representative information in the determination of realistic and robust SOC conversion factors for different land cover transitions, can provide improved estimates of SOC changes.

Response

Türkiye, a country located predominately in western Asia, implemented one of the first LDN projects funded by the GEF in 2019, together with FAO. As part of that project, the country reviewed and integrated national data sets to better estimate the LDN indicators, including trends in SOC. Since the set of conversion factors that is provided by the UNCCD is standard for the whole world and based on literature review, Türkiye sought to determine more nationally applicable coefficients using national data sets. For this, Türkiye used a nationally developed SOC map[21] in combination with the CORINE land cover map, reclassified into the seven UNCCD land cover categories. These maps were combined in order to determine the average SOC stocks in different land cover classes across the country. Change coefficients were then estimated and used to determine changes in SOC stocks due to land cover changes between the baseline and the reporting period. The approach to estimating the conversion factors involved calculation of the ratio between the SOC stock of the target land cover and that of the original land cover. This provided a set of 42 conversion factors covering all potential transitions. National experts analysed and compared the results country-wide with the default conversion factors, and a final set for national use was determined. Compared to the default set of values, the main differences are that there are higher value conversion factors in a number of cases. The most significant one to highlight is a large increase in the conversion factor for artificial surfaces to tree-covered areas; increases with respect to the provided global values are also seen in conversions from croplands to tree cover or grasslands and from grasslands to tree-covered area. A decrease with respect to global values is noted in the conversion factor for both tree cover and grasslands to croplands.

Further work is required to refine this initial set of conversion factors. For example, a shortcoming of the approach taken is that the same set of factors was used across the whole country, without considering different soil and climatic conditions. Nonetheless, these factors were used successfully to determine the changes in SOC stocks across Türkiye between the baseline and the reporting periods and improved on the estimations made using provided global data sets and conversion factors.

21 The National Soil Organic Carbon Model and Mapping Project was jointly developed by the General Directorate of Combating Desertification and Erosion (ÇEM), General Directorate of Agricultural Research and Policies (TAGEM), the General Directorate of Forestry and the General Directorate of State Hydraulic Works.

		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

For Türkiye, conversion factors for SOC stock were derived for each of the possible land cover transitions. This allowed for a more realistic estimation of SOC stock changes than the usage of the standard values provided by the UNCCD.

Türkiye, © Hanspeter Liniger

Land degradation

SDG indicator 15.3.1 (Proportion of degraded land over total area) is the sole indicator used to track progress towards SDG target 15.3. This indicator has reached the highest Tier[22] in the SDG indicator framework since 2019, indicating its maturity in terms of methodological approach and data availability. It is calculated using the three sub-indicators previously described, namely trends in land cover, trends in land productivity and trends in carbon stocks. In an approach known as the one-out-all-out method, a significant reduction or negative change in any one of these sub-indicators is considered to represent land degradation. The reporting process involves estimation of the proportion of degraded land and the identification of areas that may have been classified incorrectly as either degraded or improved, known as "false negative" and "false positive", respectively.

For the purposes of SDG indicator 15.3.1, the indicator is reported as a binary quantification (i.e. degraded/not degraded) in both area (km^2) and degraded area as a proportion of total land area (%). However, for tracking progress towards LDN and for LDN target-setting, countries can disaggregate the "not degraded" class into "stable" and "improved" classes for further decision-making.

22 Tier 1: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 per cent of countries and of the population in every region where the indicator is relevant.

Tailoring of default data sets and co-decision approaches improve estimates of the proportion of degraded land.

Challenge

Estimation of land degradation requires information on land cover, land productivity and SOC, and their changes over time. Despite the provision of standardized global data sets, countries face challenges related to the availability of robust, reliable and nationally applicable measures for each of these data sets, without which the levels of confidence in the overall estimation of degraded land may be compromised.

Lesson

There is no one-size-fits-all in relation to the determination of countries' land degradation status. Each country needs to use the best available information and expert and local knowledge to modify and improve on the standardized global data sets provided in the UNCCD reporting platform. This can raise the level of confidence in the outputs and estimates generated.

Response

The countries discussed in the previous case studies used all three sub-indicators to estimate land degradation. All countries indicated a medium level of confidence in the assessment as they identified shortcomings in some of the data or approaches used in the calculation. Robust and reliable land cover maps underpin the calculations. For example, both Colombia and Spain used highly reliable nationally generated land cover maps, whereas in the case of Bhutan and Panama, the default land cover map was used, but they made some modification to the legend to include important national land cover classes. This helped to improve the reliability of the maps used.

Expert input, including local knowledge and co-decision-making processes, were vital in the selection of an optimal land productivity model from the default set available in the case of many countries including Bhutan, Panama and Türkiye. Ecuador applied climate corrections in their calculations to account for the El Niño-Southern Oscillation-driven cycles in precipitation, which resulted in more realistic values compared to the default values.

Several countries used nationally available maps of SOC stocks. This was the case in Bhutan, however they highlighted the need to improve the model for estimating SOC stock changes. Colombia incorporated information on soil erosion and salinization, combined with a map of SOC sequestration potential, which greatly improved the confidence in the reliability of the SOC stock change estimates. Türkiye used a national SOC stock map and derived its own change conversion factors. Nevertheless, further work is required to improve the reliability of these factors. Some countries, such as Bosnia and Herzegovina, have highlighted the need to develop their own soils database.

Türkiye map of land degradation for the baseline period (2001-2015) that integrates the results of the participatory assessment of the 3 sub-indicators.

Expert and local knowledge helps to identify areas that have been incorrectly classified in the default estimates of degraded or improved land and can lead to more accurate reporting on land degradation.

Madagascar, © Gregoire Dubois

Expert analysis and local knowledge help to fine-tune the information identifying areas reported as degraded or improved.

Challenge

The area of degraded, stable and improved land is calculated automatically based on the analysis of the spatial information provided on land cover changes, LPD and changes in SOC. However, some areas identified as belonging to one class or another may be incorrect. The challenge is to identify clearly, comprehensively and accurately areas that may have been incorrectly labelled and provide this information as part of the report.

Lesson

Expert and local knowledge, allied with nationally published information, helps to identify areas that have been incorrectly classified in the default estimates of degraded or improved land and can lead to more accurate reporting on land degradation.

Response

The one-out-all-out approach is a precautionary one, which means that if any one of the three previously mentioned indicators show degradation, then those land areas are classified as degraded. The approach taken means that some areas are identified incorrectly as degraded or improved. In reporting the overall figures on the proportion of degraded land, countries have the option to highlight those areas which have been incorrectly classified and can provide spatially explicit information delineating them.

If the data identifies an area as improved when in fact it is degraded, this is known as a false positive. For example, if there is a woody weed invasion of a grassland, it may lead to an increase in land productivity, which is calculated using satellite-derived vegetation index data, as previously explained. This could be then interpreted as an improvement in the area, when in fact it represents degraded land. In an analogous way, during the automated calculation an area may be identified as degraded, when in reality the land has improved. This is known as a false negative. An example is when an invasive woody species is cleared from a woodland, it may reduce the overall productivity of an area, but in reality the removal of the invasive species represents an improvement of the land.

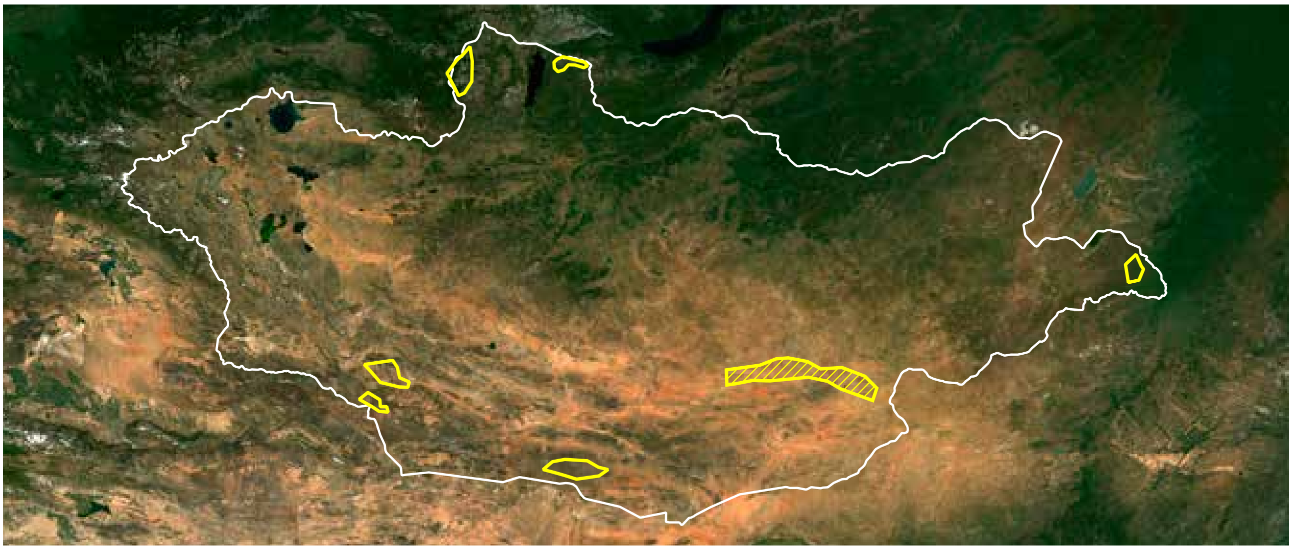
Countries have identified false positives and negatives using local knowledge of the relevant areas and also through participatory processes involving analysis by experts. In addition, other published material may be used to provide evidence that supports the identification process.

In South America, Chile identified many areas of various extents as false positives. These areas may have seen regrowth of vegetation after a megafire in 2017, which burned almost 580,000 ha across the country. This regrowth was captured as a positive change in the calculation of land productivity, but in fact the fires had led to longer term land degradation.

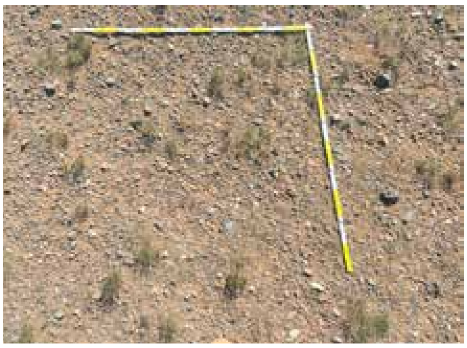
Costa Rica, a Central American country, used a nationally produced land cover map and the default land productivity and SOC maps provided. It identified several areas of varying extents as being either false positives or negatives, based on local knowledge of the areas. In some cases areas classified as degraded were in fact stable as they were areas of conservation. In others, areas classified as improved were in reality degraded due to human activities.

In Mongolia, in eastern Asia, areas of false positives and false negatives were identified as part of a consultative process with national experts. One area which had been classified as improved was recoded as degraded because of sand encroachment and vegetation loss, which was confirmed locally. Another area which had been encoded as degraded was recoded as stable, as it represented a high mountain outcrop with mixed taiga forest, and this was also confirmed locally.

For Türkiye, located predominantly in western Asia, in some cases where areas had been originally coded as improved, they were recoded to degraded as they had in fact been converted to artificial surfaces. Some false negative areas were highlighted as they had been marked as degraded, when in reality the land was improved due to afforestation. Türkiye's land degradation analysis was based on a set of nationally generated data sets, and the analysis of false positives and negatives was carried out in a workshop where participants were able to use a decision support system to aid the analysis. Ultimately, discussions and interpretation made among the experts led to the results presented.



In Mongolia, national experts identified and delineated seven areas (yellow polygons above) which had been incorrectly classified as degraded or improved. For example, the area of Tsogt-Ovoo-Saikhandulaan (yellow hatched, above), covering an area over 15,300 km², was changed, in the report, from improved to degraded, due to known sand encroachment and vegetation loss (right). (Photos- Credit: Mandakh Nyamtseren)



Botswana, © Hanspeter Liniger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National voluntary targets

Countries are invited to provide information on their ambitions and activities to avoid, reduce or reverse land degradation in accordance with specific national circumstances and development priorities. These voluntary commitments or targets should, insofar as possible, be specific, quantitative, geographically explicit, time-bound, policy-coherent, gender-responsive and adequately integrated into land use planning frameworks. In an initial phase, targets might not be linked to specific land areas because they are focused on developing processes that strengthen the enabling environment, such as improving intersectoral cooperation, monitoring systems, capacity development, or policy coherence, among other things. When linking targets to specific geographical areas, it is crucial to involve relevant stakeholders to identify feasibility and commitment, thereby increasing the chances of success.

When reporting on voluntary commitments in relation to land degradation, countries should clearly describe each target by providing information on the expected year of achievement, the location and the extent of the target area, the targeted actions, and the context in which targets have been set. In addition, and if available, countries should report on actions already implemented to achieve the targets declared, supplementing this information where possible with spatially explicit data on areas where on-the-ground activities have been taking place. This allows for progress to be evaluated and can also highlight gaps between targets and implemented actions, thereby facilitating the development of plans to address these gaps.

STORIES >

Conversion of LDN targets into action on the ground allows measurable progress to be monitored.

Challenge

Once a set of focused time-bound targets have been established for the achievement of LDN, the challenge is to implement actions in clearly defined geographical areas and ensure that monitoring is put in place to evaluate and report on progress and outcomes on a regular basis.

Response

Bhutan, a country in Central Asia, has set several LDN targets that aim at restoring land, improving pastures, reforesting land with native species, and maintaining good levels of SOC, among other things. One of the targets aims at implementing SLM in 35 km^2, and these areas have been explicitly identified on a map with delineated boundaries uploaded to the UNCCD platform. Bhutan has also set itself a target of implementing the Ramsar Framework for wetland inventory to protect wetland areas by 2040 and is in the process of identifying potential sites. Bhutan has already successfully implemented several actions, including the restoration of mining sites and the reduction of soil erosion by planting hedgerows and building contour stone bunds and bench terracing in different parts of the country covering more than 280km^2.

Türkiye, located predominantly in western Asia, has also established a number of clearly defined targets to be achieved by 2030. These include increasing the areas of forest, restoring and improving soil fertility and carbon stocks, rehabilitating mining sites and reducing the number of vegetation fires. An LDN decision support system (DSS) has been established, which allows for the identification of hotspots of degradation, facilitates planning discussions, and enables participatory and data-driven assessments of land degradation across scales, integrating socioeconomic, soil, biodiversity, and climate data. For example, many croplands in the Upper Sakarya basin in the north-west of the country showed declining land productivity trends. In some of these areas, SLM approaches such as crop rotation with certified chickpeas and wheat has been established, thereby stabilizing and potentially increasing the land productivity. The country used the LDN DSS to identify the most appropriate areas for different types of interventions according to the LDN response hierarchy (i.e. areas for conservation (avoid land degradation), sustainable management (reduce land degradation) and restoration (reverse land degradation)). These results were then applied to develop a National LDN Action Plan for each province, which shows the usefulness of an improved set of LDN indicators in policy development.

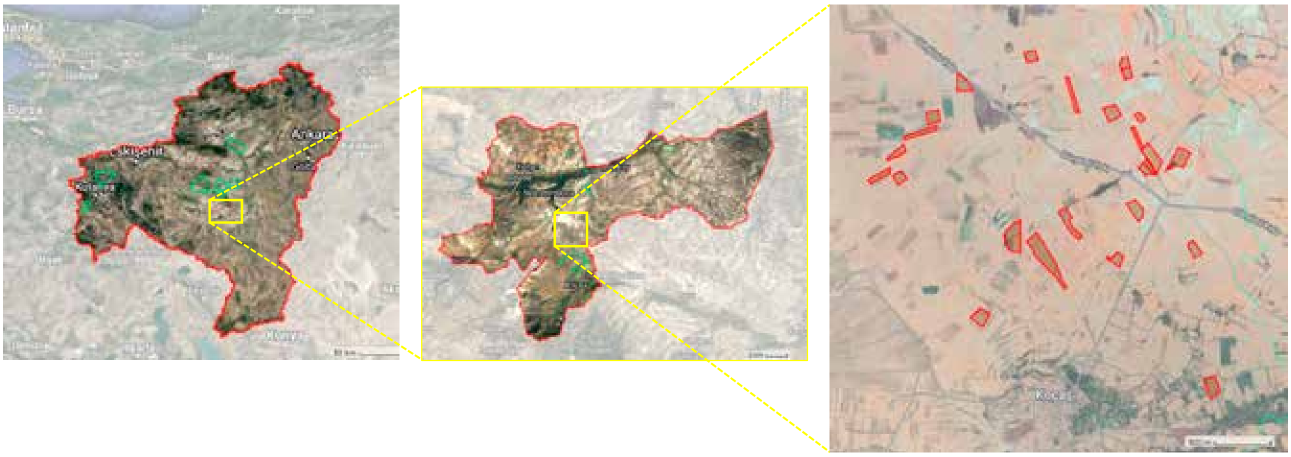
In Liberia, a West African country, increasing the extent of tree-covered area by 2030 is a national target. There are also several regionally specified targets in relation to restoring and improving croplands and grasslands, restoring and improving protected areas, and identifying the need to increase soil fertility and carbon stocks and reduce soil erosion. Through a United Nations Development

Lesson

Focused, geographically explicit, quantitative, time-bound and resourced actions agreed and implemented through collaborative stakeholder participation help ensure that voluntary targets towards LDN have a more realistic possibility of being achieved.

Programme–GEF-funded project titled Good Growth Partnership,[23] among other achievements, Liberia has adopted a national strategy and action plan for sustainable palm oil through a collaborative, multi-stakeholder process and has also protected 5,000 ha of high conservation value forest. Moreover, through a World Bank-funded project, Liberia has been improving its land use planning, investing in sustainable agriculture to reduce deforestation pressure and establishing forest protected areas.

UPPER SAKARYA BASIN: 4,920,00 ha MICROBASIN: 28,380 ha SLM implementation (crop rotation): 44 ha



The Upper Sakarya Basin in Türkiye, which covers almost 5 million ha, is one of the areas that the country prioritized to achieve LDN (left). Through a multisectoral process, different microbasins were selected to develop integrated land use plans. One of these microbasins is Nasrettin Hoca, where the main land use is cropland (centre). In this microbasin, 34 per cent of the croplands show degradation. To address this, different cropland parcels were prioritized to implement SLM practices. For example, crop rotation with certified chickpeas and wheat was introduced in 44 ha (right).

23 United Nations Development Programme (UNDP), n.d. Good Growth Partnership. [Cited August 14, 2024]. https://www.undp.org/facs/good-growth-partnership.

Cabo Verde, © Ingrid Teich

Drought hazard, exposure and vulnerability

The World Meteorological Organization defines drought as a period of dry weather long enough to cause a serious hydrological imbalance. Drought is characterized by rainfall amounts which are significantly below average for a particular location and is a normal part of the climate that can occur in any climate regime. Drought can have major impacts on the environment and economic and social systems, affecting land resources, food security and population health, among other things.

Countries report on the land area under drought annually from 2000 to the current reporting year. Drought is determined by use of a precipitation index, calculated using either global or locally available data sets, and areas are categorized as subject to non-drought or mild, moderate, severe or extreme drought.

Exposure to drought refers to the elements of a system located in areas that could be adversely affected by drought, and for this indicator, it is the total population, as well as subpopulations of males and females exposed, that is measured. The percentage of a population exposed to drought is determined by calculating the number of people exposed within each drought category, using global or national spatially explicit population statistics, and calculating the exposed populations as a proportion of the total reported population. Total population exposure is calculated by adding the number of females and males exposed in each category.

Vulnerability is the set of conditions determined by social, economic, environmental and infrastructural factors that increase the susceptibility of an individual, community, assets or systems to the impacts of drought. The lack of an ability to cope or adapt is central to determining vulnerability. Vulnerability is difficult to measure quantitatively due to its multidimensional nature. Therefore, a range of social, economic and infrastructural factors are taken into account when such data are available. These include measures of literacy rate, life expectancy, poverty levels, energy consumption, and access to safe drinking water services, among other things. Data on these are combined to calculate a Drought Vulnerability Index (DVI), as described in the Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3.[24]

24 Barker, L.J., Rickards, N.J., Sarkar, S., Hannaford, J., King-Okumu, C., & Rees, G. 2021. 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. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany.

Subnational disaggregated information aids the understanding of the underlying drivers of drought vulnerability.

Challenge

Although populations in different parts of a country may be exposed to drought at the same or different times, not all may be equally vulnerable. The challenge faced is to determine the factors driving vulnerability to drought in different regions and how their relative importance may vary regionally.

Lesson

Access to data on a combination of social, economic and infrastructural vulnerability factors at the subnational level provides a deeper understanding of the drivers of drought vulnerability across different regions and can facilitate the development of targeted national and local drought preparedness and resilience plans.

Response

Information on drought hazard over time may be reported using the global Standardized Precipitation Index (SPI) data provided or calculated using national data on precipitation. Similarly, the calculation of exposure of the population to drought hazard may use the provided population WorldPop data set or national spatially disaggregated population data when available. However, even if an area is experiencing drought and people are exposed, they may not be vulnerable to its impact. This is why determining drought vulnerability is of vital importance in determining drought risk, which describes how likely an area and its people are to being negatively impacted by drought.

The DVI incorporates three components (social, economic and infrastructural) to estimate the vulnerability of populations to drought. Each one of these components contains a number of explanatory factors, currently totalling 14. The more factors that are used in the calculation of DVI, the better the understanding of the drivers of drought vulnerability.

South Africa had access to sex-disaggregated data on six factors at subnational level, which, when combined with an additional factor at national level, allowed trends in DVI since 2014 to be determined. This shows that drought vulnerability has been declining slowly over this period.

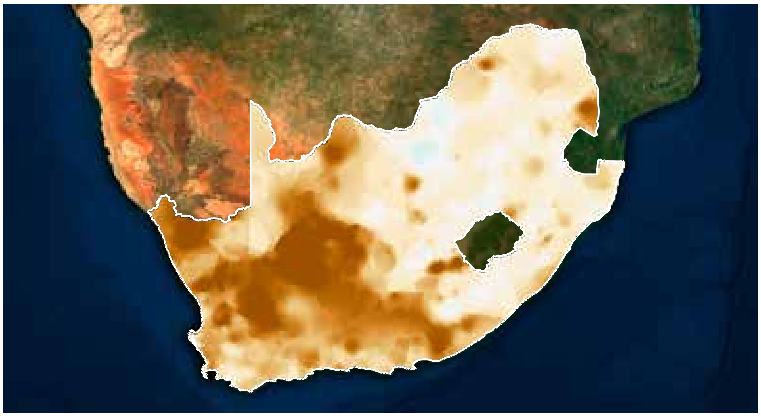
Mexico was able to use 10 factors, calculated using sex-disaggregated subnational data along with one additional factor at national level. Again, a slow decrease in drought vulnerability was noted, which was attributed to improved safe drinking water infrastructure, better availability of water for irrigation in cultivated areas, and improved literacy rates.

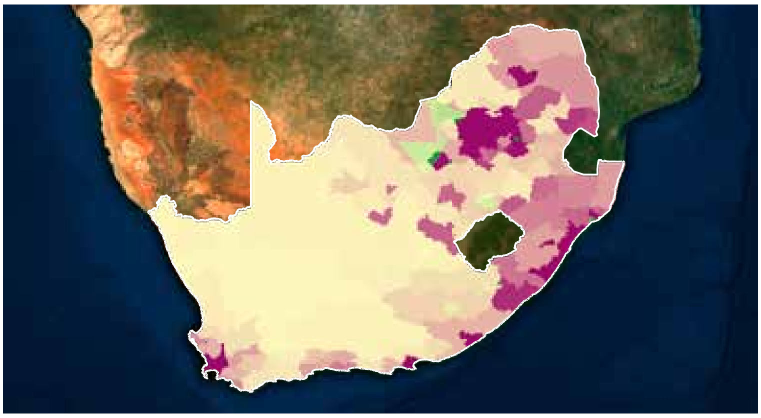
In the case of Lebanon, only one factor from each of the three categories was used. Nonetheless, this highlighted interesting regional differences within the country and suggested that access to financial resources and basic water infrastructure were stronger drivers of drought vulnerability than levels of illiteracy. These insights allow the country to develop more targeted drought preparedness plans.

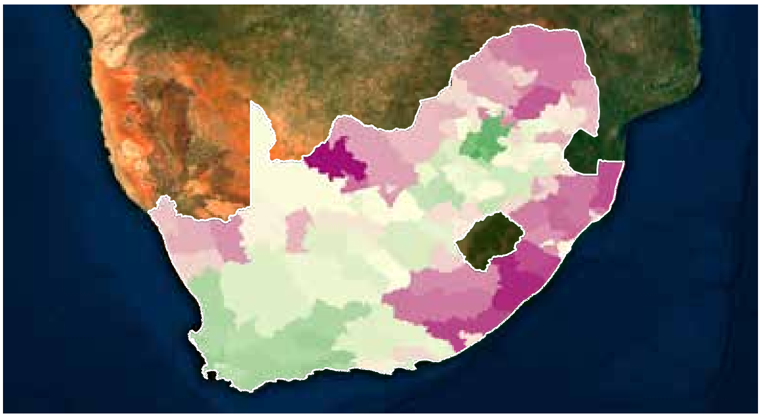
Factors	South Africa	Mexico	Lebanon
Social			
Literacy rate (% of people aged 15+)	✓	✓	✓
Rural population (%)	✓		
Life expectancy at birth (in years)	✓*	✓	
Population aged 15–64 (%)	✓	✓	
Government effectiveness		✓	
Refugee population (%)			
Economic			
Proportion of population below the international poverty line		✓	✓
Gross domestic product (GDP) per capita	✓	✓	
Agriculture % of GDP	✓	✓	
Energy consumption per capita		✓*	
Infrastructural			
Proportion of population using safely managed drinking water services	✓	✓	✓
Total renewable water resources per capita		✓	
Cultivated area equipped for irrigation (%)		✓	

* Factor used only at national level.

A range of social, economic and infrastructural factors are recommended to calculate the DVI. Based on available data, Lebanon, Mexico and South Africa used one or more of the factors from each category to estimate their DVI.

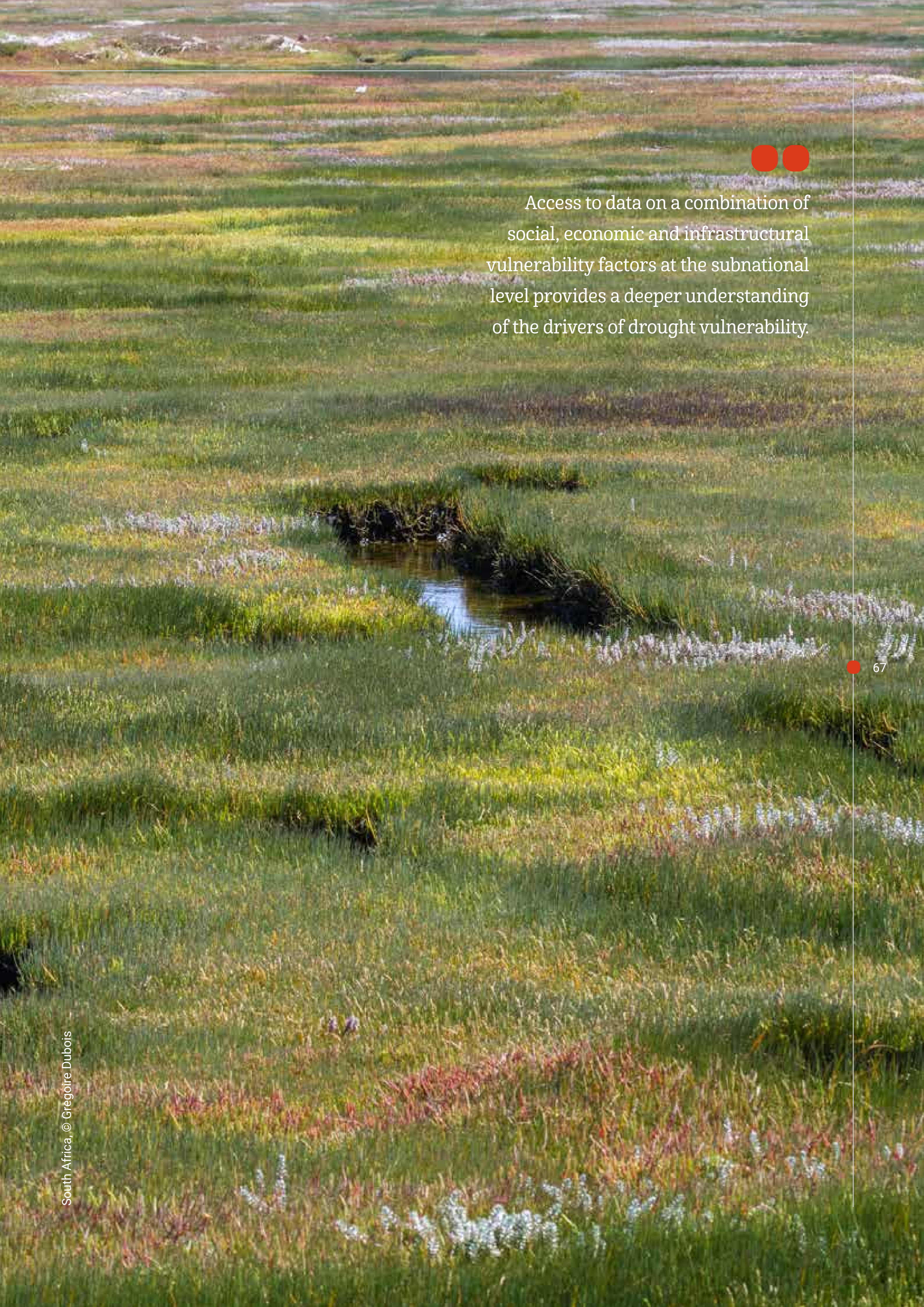






This example from South Africa shows how spatially disaggregated data allows variability in drought vulnerability to be captured. The SPI, based on data collected by weather stations managed by the South Africa Weather Service, was used as an indicator of drought hazard (top). There are large numbers of people exposed to drought in the Gauteng province, which includes the urban centre of Johannesburg, and around Cape Town in the Eastern Cape Province (centre). A combination of seven social, economic and infrastructural factors were included in the calculation of the DVI (bottom). Higher vulnerability levels are seen to the east and north of the country.

The national border displayed on this map was provided by the Government of South Africa



South Africa, © Gregoire Dubois

Access to data on a combination of social, economic and infrastructural vulnerability factors at the subnational level provides a deeper understanding of the drivers of drought vulnerability.


Chile. © Gregoire Dubois

Species abundance and key biodiversity areas

The world's plant and animal species are impacted by numerous threats to their survival. These include habitat destruction and degradation, overexploitation, invasive alien species, human disturbance, pollution and climate change. Land conservation and restoration actions associated with appropriate management have the potential to mitigate some or all of these threats and reduce species extinction risk.

Countries provide information indicative of the status of their biodiversity and the initiatives and actions being taken to reduce biodiversity loss. Two metrics are reported: one on the aggregate species extinction risk and the other on mean percentage of each terrestrial Key Biodiversity Area (KBA) covered by protected areas and/or Other Effective Area-based Conservation Measures.

The Red List Index (RLI) of the International Union for Conservation of Nature (IUCN) is used as a metric to estimate trends in the overall extinction risk of major species groups. This includes birds, mammals, amphibians, cycads (woody seed-producing plants with no flowers or fruit) and warm-water reef-forming corals. The RLI is based on changes in the number of species in each category of extinction risk on the IUCN Red List of Threatened Species. The RLI value ranges from 1 (i.e. 'Least Concern') to 0 (i.e. 'Extinct'), indicating how far species have moved overall towards extinction and allowing comparisons of species groups regarding the level of extinction risk (i.e. how threatened they are on average) and in the rate at which this risk changes over time. The RLI is also the SDG indicator 15.5.1.

Protected areas are important for halting the decline in biodiversity and ensuring the long-term and sustainable use of terrestrial natural resources. The indicator used here measures progress towards the conservation, restoration and sustainable use of terrestrial ecosystems and their services. Countries report on the average proportion of terrestrial KBAs covered by protected areas and its trend over time. KBAs are "sites that contribute significantly to the global persistence of biodiversity and are identified through a set of global criteria applied at national level". This indicator is also SDG indicator 15.1.2.

STORIES >

Multilateral cooperation and accession to international agreements can drive the designation of new protected areas and thereby maintain and improve biodiversity.

Challenge

As the IUCN RLI aggregates data globally for different species, it may not always be the most appropriate representation of species extinction risk in a specific country. The challenge countries face in reporting on the status of biodiversity via this indicator is related to their knowledge of the key species that should be present nationally. Such knowledge facilitates the tailoring of the global data sets and the inclusion of national data sets when available. The designation of protected areas, especially in areas of importance for biodiversity, is fundamental to help safeguard the most critical sites in the world for plant and animal species and their habitats. The challenges countries face are related to the establishment of appropriate enabling environments for the designation process and, once designated, the successful management of the protected areas.

Response

The default data set used to report on trends in abundance and distribution of selected species is the RLI from the IUCN. This is a global aggregate species extinction risk index based on a limited number of taxa whose species groups have been comprehensively assessed. Therefore, it may not reflect all species groups present in a country. South Africa, for instance, has carried out regular national biological assessments, the most recent one being in 2018. This assessment includes eight taxonomic groups which better represent the country's climate and diversity. The taxa include birds, mammals, amphibians, a sample of 900 randomly selected plant species, reptiles, freshwater fish, butterflies and dragonflies. The RLI values determined from this national data were more representative of the national situation than the default values. Italy, a country in southern Europe, customized the RLI computed using the IUCN Red Data List by disaggregating the data to incorporate information on more than 470 species of nationally relevant mammals, birds, amphibians and corals. Thailand, in south-eastern Asia, improved its reporting by including information on invertebrates in addition to vertebrates in its most recent assessments. In some cases, the aggregate RLI value may mask achievements in stabilizing or reversing the trends in extinction risk for specific species. Mongolia, in eastern Asia, reported how targeted species management activities had resulted in a positive change for the argali (wild sheep) and ibex (wild goat), two ungulate species found in the country.

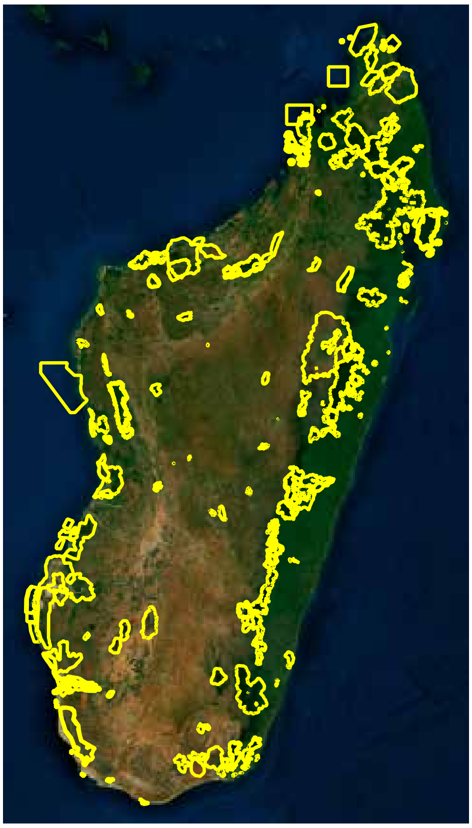
Multilateral cooperation and accession to international agreements can drive the designation of new protected areas. Madagascar, an island country in the eastern Africa region, has seen an increase in the number of its protected areas in the period 2003 to 2016, and hence more of its key biodiversity is now protected. This was facilitated by the country having joined the Ramsar Convention on Wetlands in 1998, and then subscribing to a number of initiatives that emerged from the IUCN World Parks Congresses,[25] including the "Durban Vision" of 2003 and the "Promise of Sydney" in 2014. Malta, an island in southern Europe, highlights an increase in its protected area coverage over the last 20 years. It attributes this to the country adopting the European Union Habitats and Birds Directives[26] after the country joined the European Union in 2003. Moreover, it has noted a reversal in the previous decreasing trend in its RLI, which it also attributes to its adoption of

25 World Parks Congress. 2023. History of the World Parks Congress. Available at: https://www.worldparkscongress.org/about/history (accessed on 14 August 2024).
26 European Union, 2015. The EU Birds and Habitats Directive. Available at: https://op.europa.eu/en/publication-detail/-/publication/7230759d-f136-44ae-9715-1eac-c26a11af (accessed on 14 August 2024).

Lesson

Multilateral cooperation and accession to international agreements can drive the designation of new protected areas, which may help to halt or reverse terrestrial and freshwater biodiversity loss, especially in KBAs. Moreover, data provided within the IUCN's RLI database can be customized to provide more nationally appropriate estimates of species extinction risk compared to the global aggregate values.

these Directives. Serbia, in southern Europe, highlights its implementation of several international agreements which have promoted biodiversity conservation, among which are the Convention on Biological Diversity, the Convention on the Conservation of Migratory Species of Wild Animals and the Carpathian Convention.It also notes the recent development of a protected area network across the country. Its establishment was facilitated through the ongoing European Union accession process, which will ultimately see the country adopting the European Union Habitats and Birds Directives.



Madagascar is classified among the world's 10 hotspots for biodiversity. It currently has designated more than 147 protected areas (yellow polygons), covering 44,000 km^2 of terrestrial and inland waters and representing over 7 per cent of the country. Credit: UNEP-WCMC (2024). Protected Area Profile for Madagascar from the World Database on Protected Areas, July 2024. Available at: www.protectedplanet.net

Andringitra National Park is a 311 km^2 UNESCO World Heritage Site in south-eastern Madagascar. It is one of the most biologically diverse places in the country and is home to over 50 species of mammal, including 13 species of lemur (for example, the *Eulemur Fulvus*). © James Mc Kinnon

Focused, geographically explicit, quantitative, time-bound and resourced actions agreed and implemented through collaborative stakeholder participation help ensure that voluntary targets towards LDN have a more realistic possibility of being achieved.


Central African Republic. © Gregoire Dubois

Haiti © UN Photo/Logan Abassi

Financial resources

Financial resources are vital to fund activities, projects and initiatives aimed at reducing, reversing or halting desertification and land degradation. Resources can come from a variety of sources, both private and public, domestic and international. International funds may be bilateral or multilateral in nature. Countries may be both recipients and providers of funds in relation to supporting the objectives of the Convention. Partnering through blended finance and public–private partnerships, in which funders at the international and national level come together to address agreed objectives, can be an effective way of ensuring the optimum and most effective use of funds allocated.

Where possible, countries reported quantitative and descriptive information in relation to international public resources they provided or received over the period 2016 to 2019 to support implementation of the Convention. In addition, they reported on DLDD-related domestic public expenditures and revenues and any international or domestic private resources mobilized. Irrespective of the financing source, countries reported on how the funds were employed to address relevant actions.

Leveraging of national and international financial resources for on the ground action helps achieve the targets of the Convention.

Challenge

Financial resources to achieve the ambitious targets set to address land degradation may come from various sources, including national public funds, bilateral and multilateral funds, and international and domestic private resources. Challenges faced by countries include being aware of and mobilizing resources from a suite of sources and leveraging the appropriate levels of financial investments necessary to successfully progress and achieve the overarching objectives of the Convention. Moreover, there are challenges in ensuring appropriate legal, administrative and implementation structures are in place and that sufficient domestic financial and human resources are available to deploy the financial resources and implement the agreed actions.

Response

The funding of actions required to implement the Convention may come from a variety and combination of domestic and international sources. In many cases there is a mix of public and private contributions. Some countries have found it difficult to report exactly how much is targeted at land degradation, as funds may be provided to address a range of interrelated issues concerning climate change, biodiversity, and sustainable agriculture in addition to land degradation.

Armenia, a country in western Asia, highlighted that more than 40 projects, totalling over USD 100 million, were financed to support the implementation of the Convention with the benefit of bilateral and multilateral funding during the period 2016 to 2019. For example, the country has successfully taken advantage of the Global Environmental Facility Trust Fund to co-finance a project implemented by the World Bank to support community agricultural resource management. Among the objectives of the project has been the improvement of pastures and public awareness-raising in relation to SLM. Moreover, the country has secured multi-year funds via the Caucasus Nature Fund[27] (CNF) to maintain and introduce innovative approaches to the management of a number of specially protected nature areas. CNF is an international public–private conservation trust fund created to safeguard the Caucasus ecoregion. It is funded by a mix of international organizations, national government bodies and private donors. Support available through CNF include financial, technical and knowledge services. In addition, Armenia has deployed a series of environmental taxes (e.g. for emissions of hazardous substances, industrial waste disposal) as well as payments for the use of natural resources (e.g. water use, extracted salt reserves) by organizations. The income from these has increased by 33 per cent in the period 2016 to 2019, while government expenditure on environmental protection measures increased by over 12 per cent in the same period.

Guinea, located in western Africa, has taken steps to create an enabling environment for a coordinated approach to combating climate change, land degradation and biodiversity preservation. It has put in place mechanisms and structures to allow it to take advantage of a range of international funding mechanisms and ensure good communication between the Guinean state and the relevant national and international funding and enabling organizations. For example, it has leveraged combined national and bilateral multi-year funding of more than

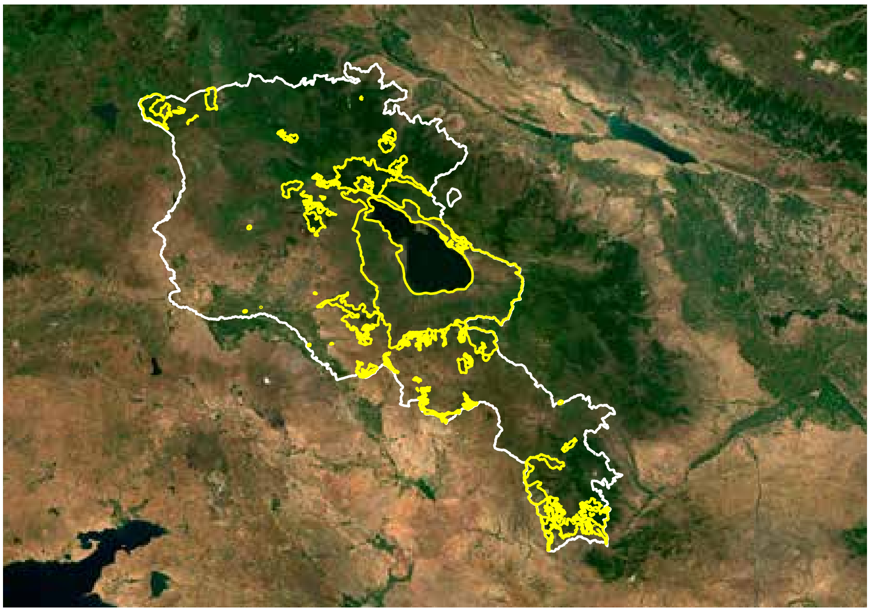
27 Caucasus Nature Fund, 2023. Caucasus Nature Fund. Available at: https://www.caucasus-naturefund.org/ (accessed on 14 August 2024).

Lesson

Significant financial investment from multiple sources is required to address land degradation. Countries are better placed to leverage bilateral and multi-lateral funding in addition to national funds to address relevant issues when an appropriate enabling environment and robust institutional structures are in place.

USD 23 million to support the preservation and resilience of vulnerable mangrove systems, while improving food security and incomes through sustainable rice farming in the mangrove areas. Coastal rice farming is very important in Guinea and accounts for 23 per cent of national rice production, providing livelihoods for more than 50,000 rice farmers, the majority of whom are women.

The Central African Republic has instituted a number of domestic taxes that raise revenues, which can then be invested in restoration activities for degraded landscapes. For example, taxes are levied on logging companies as part of a forest management policy. An escrow fund[28] has been set up, which is financed via taxes levied on mining companies. Monies from this fund are then used in the restoration of mining sites after their exploitation. An agropastoral activities development fund has also been established. Part of these funds are used to organize the marking of transhumance corridors with the aim of helping to reduce conflicts between farmers and herders related to access to agropastoral land. This can support better land management and therefore help reduce and halt land degradation.

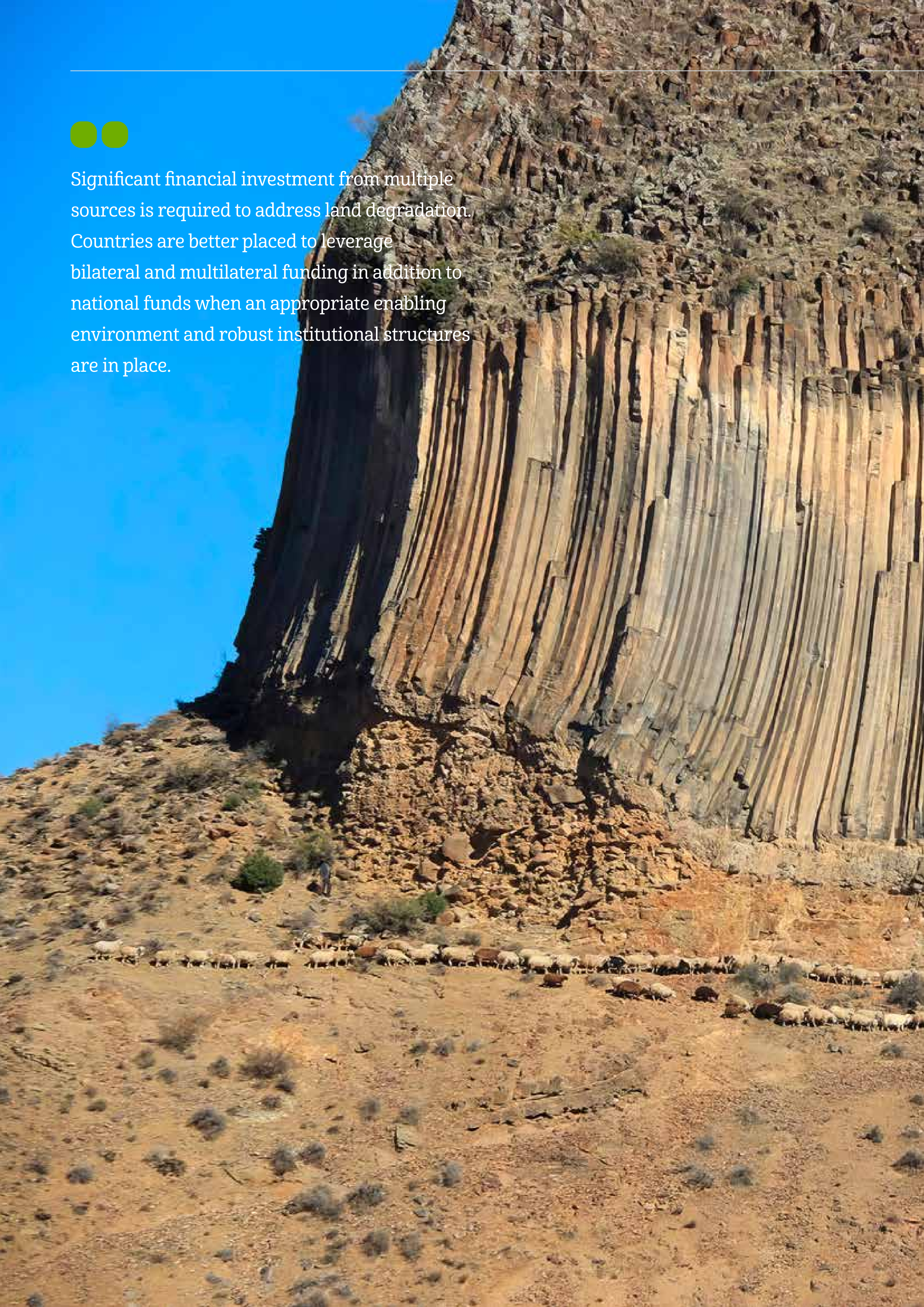


Armenia has taken advantage of CNF to attract resources to maintain and introduce innovative approaches to the management and conservation of several of its specially protected nature areas (yellow polygons). Credit: UNEP-WCMC (2024). Protected Area Profile for Armenia from the World Database on Protected Areas, July 2024. Available at: www.protectedplanet.net.

The national border displayed on this map was provided by the Government of Armenia

28 Escrow is a legal concept describing a financial agreement whereby an asset or money is held by a third party on behalf of two other parties that are in the process of completing a transaction.

Significant financial investment from multiple sources is required to address land degradation. Countries are better placed to leverage bilateral and multilateral funding in addition to national funds when an appropriate enabling environment and robust institutional structures are in place.



Armenia, @ Narine Hakobyan

Making a difference on the ground

Making a difference on the ground

Land restoration brings clean water and a better quality of life to a Caribbean nation.

Reforested hillsides, numerous new ecological water treatment plants, improved waste management, more sustainable farming practices and improved livelihoods are just some of the benefits of Plan Yaque (Northern Yaque River Basin Development Plan), which has been in operation since 2009 in the Dominican Republic, a country in the Caribbean. The Yaque del Norte River is the longest in the country, and its basin covers an area of approximately 7,000 km^2 and is home to more than 1.8 million people. It saw progressive deforestation and non-sustainable land use practices over many decades, which had led to biodiversity loss, soil degradation, increased erosion, very erratic water supply, polluted rivers, increased flood risk and falling agricultural productivity. The production of agricultural crops is one of the main economic activities in the river basin, however these have led to negative impacts on the soil, including erosion and contamination of water in the basin. Various soil conservation practices had been promoted, including the use of living barriers around plots, but their use had been limited and in some cases, after being established, there was insufficient maintenance of the measures put in place.

By focusing on practical nature-based solutions to address irregular access to water for farmers, Plan Yaque was born. The initiative brings together over 30 organizations from state and civil society, and with a combination of domestic

The Yaque del Norte River is the longest in the Dominican Republic and its basin (green polygon) covers an area of approximately 7,000km^2.

La Pelada within the river basin area has been reforested under Plan Yaque (Credit: EL PAÍS-América Futura/ Nayeli Cruz).

and international public and private funding, it has addressed a range of problems that were faced in the river basin. Reforestation to stabilize land and help with water retention and hence water management is one of the key activities. However, a more holistic management of the river basin is the overarching ambition of the plan. Therefore, there has been a focus not only on reforestation but also on improving water supply and wastewater treatment, more sustainable land use practices, better management of solid waste and supports for small agribusiness development to provide economic opportunities for rural communities. There have also been benefits for biodiversity with the return of numerous bird, mammal and reptile species to the reforested areas.

Working hand-in-hand with local farmers, communities, and public and private organizations has proved fundamental to ensuring the success of interventions, projects and initiatives associated with improving the environmental, social and economic aspects in the river basin. Farmers who have become involved with the plan and have benefited from its success act as ambassadors encouraging others to join. This is underpinned by a robust national land tenure and legal framework associated with integrated land use planning.

The success of Plan Yaque has resulted in national and international interest in learning best practices in land restoration, and the organization is part of national and international networks such as the Latin-American Model Forest Network[29] and Partners of the Americas Foundation.[30] Despite its successes, Plan Yaque still has challenges to face, including the maintenance of the vision for the whole river basin, finding and expanding markets for the commercialization of forest products and by-products, and increasing participation in the various activities of Plan Yaque.

This is just one of a number of initiatives being undertaken in the Dominican Republic to reverse land degradation, and it has allowed the country to report a decrease of 18 per cent in the amount of degraded land in the period 2015 to 2019.

29 IMFN. 2024. Ibero-American Model Forest Network. [online]. [Cited 24 August 2024]. Available at: https://imfn.net/about/regional-networks/ibero-american-model-forest-network/.

30 Partners of the Americas. 2024. Partners of the Americas. [online]. [Cited 24 August 2024]. Available at: https://www.partners.net/.

The Great Green Wall Initiative – Reaping the benefits in Niger

Niger, a landlocked country in western Africa, has been quietly taking measures to reverse land degradation over recent decades. In its latest submission to the UNCCD, it reported an almost 5 million ha reduction in the area degraded between 2015 and 2019. This reduction is linked to efforts taken by the national government working with national and international partners on land restoration. Given that agriculture is the main source of employment in the country, there has been a focus on improving both pasture and croplands. Some of the measures taken include the implementation of low-cost and effective traditional practices, such as agroforestry and farmer-managed assisted natural vegetation regeneration. In addition, conventional rainwater harvesting techniques and the creation of irrigated areas in small communities have helped to retain rainwater, reduce run-off and regenerate soils, thereby improving agricultural productivity.

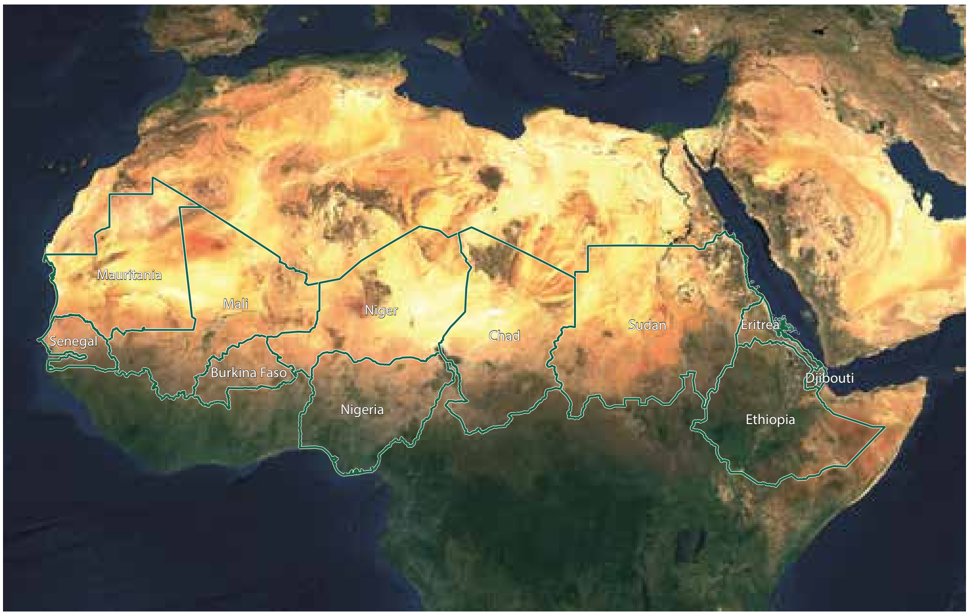
A key activity in helping to reduce and halt land degradation in Niger has been the country's active participation in the Great Green Wall Initiative (GGWI).[31] This initiative was formally adopted by the African Union in 2007 with the participation of 11 countries in the Sahel region of Africa. The original goal of the initiative was to create a 7,000 km wall of trees south of the Sahara Desert to help halt land degradation. However, over the years the ambition has grown. Now it does not focus on tree planting alone; its aim expanded to include comprehensive rural development, including the improvement of soils, the setting up of community gardens and protection of existing forests, as well as building climate resilience. In Niger, it is estimated that over 800, 000 ha of land have been restored as part of the initiative.[32] For example, as part of a rural development project co-funded by the European Union called Jeunesse Sahélienne pour l'Action Climatique (JESAC),[33] youth and women have restored almost 100 ha of land using agroforestry techniques. The goal is to use this planted land for carbon credits and carbon dioxide offsetting, thereby generating income for local communities while also reversing land degradation. Farmers have seen the success of the various projects, which have had a

In Niger, agroforestry techniques such as those shown here where onion crops are grown within tree covered areas, have helped in restoring land and providing economic opportunities for rural communities. (Credit: Christoph Studer).

31 UNCCD. 2024. Great Green Wall Initiative. [online]. [Cited 14 August 2024]. Available at: https://www.unccd.int/our-work/ggwi.

32 UNCCD. 2024. Great Green Wall Accelerator: Review Final Report. [online]. [Cited 14 August 2024]. Available at: https://www.unccd.int/sites/default/files/inline-files/GGWA%20review%20final%20report%20formatted.pdf.

33 JESAC Project. 2024. JESAC Project. [online]. [Cited 14 August 2024]. Available at: https://www.jesac-project.com/.



Eleven countries in the Sahel region of Africa participate in the Great Green Wall Initiative.

International boundaries: United Nations Map 0 geodata.

direct positive economic impact on their lives. Soil health has visibly improved, thereby supporting the production of crops such as millet, peanuts, beans and sesame. In addition, over 20,000 jobs have been created and more than 1,200 people have been trained in agroforestry techniques and sustainable land and water management practices.

The Land of Opportunity Global Mechanism (LOGMe) project,[34] funded by the Government of Italy and led by IUCN, operates under the umbrella of the GGWI. This project has seen interventions in Burkina Faso and Ghana as well as Niger. One key output of the project has been to support the development of economic opportunities for those working on improving soil fertility, agricultural productivity, riverbank protection and landscape restoration. It has seen the involvement of almost 100,000 people in Niger, including women and young people. The project has addressed energy supply by supporting the installation of solar panels to generate electricity and reduce the reliance on firewood, which is a driver of deforestation. Practical benefits for rural communities include the delivery of higher quality crop seeds adapted for rain-fed or irrigated situations and increases in the supply of livestock feed, thereby improving livestock production systems. Better livestock maintenance has also led to increased production of manure, which helps improve soil quality in fields.

Pastoralism still employs millions of people across the Sahel region. However as more and more land once used for grazing is transformed into cropland and land degradation leads to less pasture area, this puts pressure on a traditional way of life and also leads to conflict between herders and farmers. In Niger a number of projects[35] have supported the reduction of such conflict. To avoid the destruction of crops and damage to important ecosystems by grazing cattle, pastoral corridors have been introduced and clearly delineated with the agreement of both herders and farmers. An added benefit of the grazing corridors is that it provides manure, which can then be used by the farmers on their crops.

With the GGWI's twentieth birthday on the horizon, the GGW Accelerator was established in 2021 to improve the coordination, monitoring and measuring of the impact of the various actions taken. It is hoped that the impetus given by the Accelerator programme will help in achieving the ambitions of the initiative by 2030 to have restored 100 million hectares of degraded land, sequestered 250 million tonnes of carbon and created 10 million green jobs in rural areas across the Sahel.

34 UNCCD. 2024. Global Land Restoration Projects: Creating Lands of Opportunity. [online]. [Cited 14 August 2024]. Available at: https://www.unccd.int/our-work-impact/global-land-restoration-footprint/global-land-restoration-projects#creating-lands-opportunity.

35 Winrock International. 2021. TEV Livestock Corridors. [online]. [Cited 14 August 2024]. Available at: https://winrock.org/wp-content/uploads/2021/06/TEV-Livestock-Corridors.pdf.

Turning the tide on desertification – Lessons from the Aral Sea in Uzbekistan.

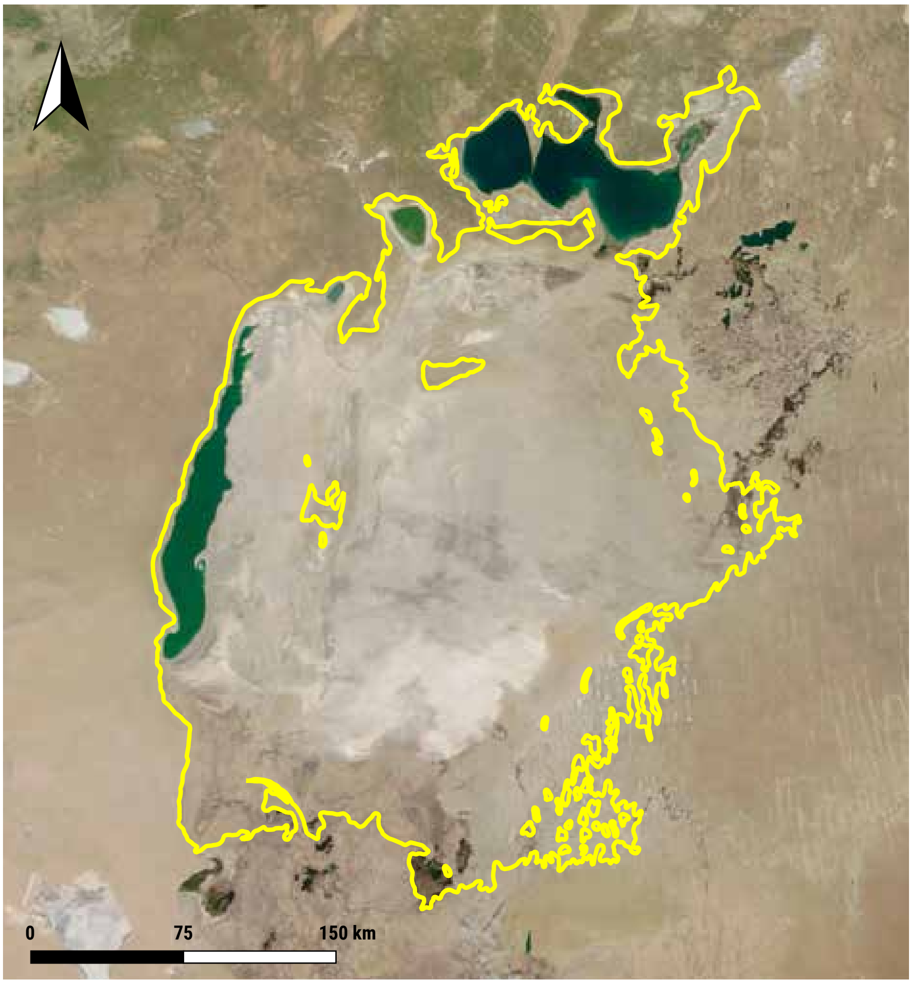
The unimposing black saxaul (*Haloxylon ammodendron*) shrub has taken a key role in slowing land degradation in the Central Asian country of Uzbekistan. Since 2018 more than 1.7 million hectares of the former Aral Sea, now the Aralkum Desert, has been planted with this resilient, drought-resistant shrub, each of which is able to stabilize up to two tonnes of sand once it reaches 10 years of age.

Up until the 1960s, the Aral Sea was the fourth largest inland salty sea in the world, covering an area of 68,000 km^2 (about the size of the country of Sri Lanka). It was the largest fishery in Central Asia, providing economic well-being to the communities which lived on its shores, and had a high diversity of flora and fauna. A combination of natural factors – high air temperatures, high evaporation and low precipitation – but mainly human development, has caused the lake to shrink to just one tenth of its original size. Water from the rivers that fed the sea were diverted to drive hydropower development and agricultural expansion projects in the former Soviet Union, and subsequently independent Uzbekistan. Irrigated crops include cotton, which requires huge volumes of water for its cultivation and processing. Moreover, the intensive use of artificial fertilizers and pesticides created run-off from fields into the shrinking sea. As the sea has continued to dry up, a new desert has formed, known as the Aralkum Desert. Given the arid climate and regular winds in the area, huge amounts of salts and toxic dust are spread over long distances by sand and dust storms, contaminating water supplies, crops and soils and causing health problems for many people. Moreover, the water in the remaining sea is highly saline and therefore can no longer sustain fish.

The stabilization and rehabilitation of this arid landscape is a priority of the Government of Uzbekistan. This is made possible with the support of national and international public and private funds, including those delivered through the United Nations Multi-Partner Human Security Trust Fund for the Aral Sea Region in Uzbekistan. A range of shrubs, including black saxaul, have been planted by ground-based mechanical and aerial

Black saxaul shrubs, which grow to an average height of 1.5 metres, stabilize soils and reduce the amount of windblown salt and toxic dust from the Aralkum Desert, formerly the Aral Sea. (Credit: Papa Mamadou Camara / UNCCD) technologies, and on average over 60 per cent of the shrubs have survived. In addition, in parts of the area almost 400,000 ha of vegetation has grown naturally, thereby reducing the investment required for reforestation. After only six years since the first saxaul shrubs were planted, there are already signs of hope that the planting strategy is working. As the shrubs grow, their roots stabilize the sand, and it has been noted that the surface wind speed across the area has dropped significantly, thereby drastically reducing the amount of windborne dusts and salts from the planted areas. In terms of degraded land, Uzbekistan reported the highest proportion in the Central Asia region; nevertheless, it also saw the largest decrease: from 30 per cent in 2015 to 26 per cent in 2019. Another positive development has been the designation of more than 280,000 ha as the Sudochye-Aktepki state nature sanctuary, an important nesting place for thousands of pink flamingos. The designation of further protected areas is planned.

Uzbekistan's experience in creating protected forest plantations on the drained bottom of the Aral Sea has led to similar interventions in Kazakhstan. Following visits to the area by experts and government representatives of both countries, it was agreed that cooperation should be strengthened to help solve the problems of restoration of the Aral Sea and protection of its ecosystems.



This satellite image from 20 April 2024 shows that the Aral Sea is now only approximately one tenth of its original size in the 1960s (yellow polygon). (image from Terra MODIS, courtesy of the Worldview service of the National Aeronautics and Space Administration of the United States of America).

Rural livelihoods are improved through gender equality.

In land-dependent communities of the world, women rely on land resources more than men to provide their households with food, water and energy. Therefore, women are more severely affected when land becomes degraded or is threatened by desertification. Often, they have weaker legal protections and social status than men and are excluded from decision-making, access to credit, and land ownership. These issues lead to marginalization and increase their and their families' exposure to poverty.

To provide a framework for addressing gender inequalities in DLDD, Parties to the Convention adopted a Gender Action Plan (GAP)[36] in 2017. It identifies four priorities for action:

- Participation of women in decisions taken during the design, planning, implementation and evaluation of initiatives to implement the Convention;
- Integrating women's economic empowerment in UNCCD implementation activities in order to eradicate extreme poverty;
- Enhancing women's access to improved knowledge and technologies;
- Strengthening women's land rights and access to resources.

This 2022 reporting process has provided an occasion for countries to report on progress made in implementing the Gender Action Plan in relation to these priorities. Some examples of actions countries are taking are presented below.

In terms of access to financial resources, South Africa has legislated for gender parity in relation to payments for work. It has also prioritized 65 per cent female participation in projects and programmes focusing specifically on addressing drought, the water crisis, biodiversity loss and wetlands conservation. In addition, it supports women-owned businesses and provides focused capacity-building for entrepreneurship for women. Many of these activities are supported by the Expanded Public Works Programme,[37] established in 2004, which has as two of its objectives the provision of decent employment and the reduction of poverty. Women have also been beneficiaries of the government-established Green Fund, which aims to drive investment in green initiatives to support poverty reduction and job creation. For example, rural women are pioneering the commercial production of selected traditional Indigenous medicinal plants, with the sale of herbal products through fully established business enterprises.

In India, in southern Asia, as part of its national policy for the empowerment of women, there have been moves to involve women in the planning, implementation and maintenance of watershed interventions. In areas where this has been implemented, positive outcomes include equal wages for both men and women based on payments according to output rather than gender. Successful watershed interventions have also improved access to water and fuel, thereby reducing the time spent by women in water and fuel collection. Women's organizations such as self-help groups have also been instrumental in helping to raise finance through loans and in capacity-building on a range of issues from sanitation to poverty alleviation and economic empowerment. Such self-help groups have supported the development of self-confidence and independence among rural women, which in turn improves the livelihoods of rural communities.

In Lesotho, a landlocked country in southern Africa, the Land Act 2010 aims to improve women's access to land distribution as well as their ability to secure tenure, however implementation has been challenging. Nonetheless, women are now taking leadership roles in land management platforms. One integrated catchment management project called ReNOKA,[38] financed nationally and with the support of the European Union and the German Government, includes agricultural producers in its target groups. The project has set a gender-sensitive, climate-resilient policy framework at its centre and is ensuring that there is equitable representation of women and youth in its management bodies. Indigenous knowledge is also being integrated into approaches to reduce and halt land degradation. Moreover, as part of the project at least 2000 women are benefiting directly from access to improved economic activities.

The German Government, through the development agency GIZ has supported many partner countries in developing, implementing and improving policies as well as enabling environments in the context of the UNCCD. Through almost all of it initiatives, it strives to improve, secure, or legally protect access to land for specific groups, particularly women. For

36 UNCCD. 2024. Gender Action Plan. [online]. [Cited 14 August 2024]. Available at: https://www.unccd.int/resources/publications/gender-action-plan.
37 EPWP. 2024. Expanded Public Works Programme. [online]. [Cited 14 August 2024]. Available at: http://www.epwp.gov.za/.
38 Renoka. 2024. Renoka – Let's Restore Lesotho. [online]. [Cited 14 August 2024]. Available at: https://renoka.org/.

example, through the Global Programme Responsible Land Policy,[39] which is being implemented in countries in Africa and South America, the land rights of over 166,000 people were strengthened and more than 60,000 engaged households registered their land rights in the name of the woman or jointly as couples. In another GIZ supported project implemented in Burundi, a successful outcome was the four-fold increase (from around 1,100 to over 4,100) in the number of women having decision-making power over the household's income.

These examples demonstrate how women can participate at all levels and in all activities in land resource management, thereby contributing to the development and protection of the environment and its natural resources. Nonetheless, there is still significant work to be done to ensure widespread implementation of the priority action areas identified in the GAP.

The Maldhari Rural Action Group (MARAG) in India is a grassroots organisation working for the education, organisation and empowerment of the communities that rely on common property resources. It promotes and utilises the knowledge of rural people who possess a great understanding and innate knowledge of their ecosystems. (Credit: MARAG)

39 Land Portal. 2024. Global Programme Responsible Land Policy. [online]. [Cited 14 August 2024]. Available at: https://landportal.org/community/programmes/global-programme-responsible-land-policy.

Conclusions

Niger, © The World Bank | Great Green Wall Niger

Conclusions

The case studies presented here exhibit best practices in national reporting and demonstrate principles which can be replicated by other countries in future reporting processes. It was not possible to summarize the vast amount of information contained in the 126 national reports submitted to the Convention. The collation, analysis, verification and organization of the data and information for reporting represents a huge global effort by teams and groups around the world and demonstrates the commitment to the process. These case studies demonstrate a wide variety and range of approaches to reporting and show that countries, while following the Good Practice Guidance for SDG Indicator 15.3.1 reporting, can nonetheless be resourceful and can fine-tune both the data and methods to ensure the information provided is as representative as possible of the situations in their countries.

Many of the case studies presented employed interdisciplinary, inter-institutional stakeholder workshops and processes as a fundamental element in developing the reports. This co-creation was crucial to establishing confidence and trust, building commitment and ensuring that the reports contained information verified with local and expert knowledge. Such approaches can be resource-heavy and time-consuming, but they can lead to better quality and more inclusive reporting.

A significant quantity of geospatial data was provided to countries to support this reporting process. The comprehensive use of geospatial data is a leap forward in relation to national reporting to a United Nations convention. This freely accessible and regularly updated global data derived from satellite sensors was invaluable to countries which lack national data sets or which have challenges in accessing relevant geospatial information, especially historical data sets. Nonetheless, such global-scale, default data should not be seen as a replacement for high-quality national data sets that have been developed considering national and regional realities and conditions. However, as global data collection, analysis and production methods continue to develop, it is expected that more detailed and higher quality global data sets will become available for certain aspects of reporting in the future.

A fully online digital reporting system has its challenges for many countries. Digital literacy varies across regions and countries; easy, reliable and fast Internet access is not always a given, and digital data curation and issues of digital security and credential management can be demanding. In addition, use of the analysis tools and systems made available through the UNCCD secretariat required significant technical skills and experience, and some countries encountered difficulties in data exploration, analysis and upload. Furthermore, the COVID-19 pandemic prevented face-to-face training that would support countries in these new reporting modalities. All in all, it was a challenging reporting process. Nevertheless, feedback from countries will be taken into account to help streamline and improve digital tools and reporting processes for the future.

This report highlights the multiple good practices adopted and used in reporting. These may provide ideas and inspiration to countries on how to address some of the challenges encountered in reporting. While the approach to reporting in itself is important, it is imperative to highlight actions on the ground. Countries are encouraged to report on successes and activities that halt or reverse land degradation through the narrative sections of the report. Several case studies present successful practical responses that have been taken by countries to implement measures that avoid, reduce and reverse land degradation and mitigate drought and their related impacts on people and the environment. These various success stories show that implementation of the UNCCD can lead to the achievement of multiple co-benefits.

Based on this analysis of the national reports and the case studies presented here, a number of overarching lessons can be highlighted:

Lesson 1: Collaborative, multi-stakeholder reporting processes lead to higher quality national reports.

A multidisciplinary team with clear leadership, goals and adequate resources is required to ensure production of a timely and complete national report. Several countries brought together relevant stakeholders from international, national and local organizations to co-design content and responses for reporting. In most cases this also involved selection and verification of data and maps that informed the quantitative indicators. This led to more reliable and representative results, which had the confidence of the country.

Lesson 2: Countries should strive to use the best available data and maps that are representative of their on-the-ground realities.

Default data and maps are provided by the secretariat to enable countries to report on as many of the indicators as possible. However, these should be used in the absence of better quality inputs as they are not necessarily immune from errors. UNCCD reporting is a country-owned and country-led process. Most countries adapted or replaced the default information with national data to align better with national situations. The indicators thereby produced were deemed to be more in line with and representative of the real situation in their respective countries.

Lesson 3: Geospatial data allow more nuanced reporting, but require significant digital literacy.

Of the 17 indicators of the UNCCD 2018–2030 Strategic Framework, seven are based on geospatial information, which is a significant advance in United Nations convention reporting. Many of the case studies presented highlight how these have led to valuable insights on where and when land degradation and drought occur and where populations are most exposed. Nonetheless, working with geospatial data and the related information systems requires significant digital skills and infrastructure to enable countries to take full advantage of the technological advances. As the use of geospatial information grows across all sectors of society, we can expect to see its role in the UNCCD reporting process reinforced. Capacity-building will continue to be an important element of support offered through the UNCCD secretariat to ensure that no country is left behind due to lack of the relevant digital skills.

Lesson 4: Robust governance and implementation structures, backed by appropriate legislative frameworks and agreements, lead to better outcomes.

Several countries have established appropriate legislation to address issues related to DLDD. Moreover, many have made significant efforts to enhance multilateral cooperation and accede to international agreements relating to SLM. A well-functioning governance and implementation structure is also effective for leveraging national and international funds. Combined, these steps streamline progress towards achieving LDN.

Lesson 5: Incorporation of gender issues in response to land degradation and drought is essential.

Land degradation and drought impacts men and women in different ways. Countries which have recognized the inequalities that exist and have put gender-sensitive responses in place have seen positive outcomes in relation to land and drought management and reduction of poverty in local communities.

Lesson 6: Innovation and resourcefulness in approaches to reporting while adhering to UNCCD guidance leads to more reliable and actionable information.

The case studies demonstrate a variety of innovative and resourceful approaches taken to addressing the many challenges faced in reporting. Nonetheless, reporting was implemented within the framework of the best practice guidance, thereby making global and regional assessments of status and trends in the reported indicators possible. Moreover, some countries have leveraged their reported information to seek additional funds to support LDN actions, while successful approaches to combating DLDD have been highlighted in international media.

What's next for DLDD reporting?

The adoption of LDN as a target for sustainable development has acted as a catalyst for enhancements and innovation towards reporting and monitoring of the implementation of the UNCCD. As the United Nations embraces broad digital transformation as part of improved support to Member States in order to achieve greater SDG impact, the UNCCD reporting process will continue to leverage digital infrastructure and technological advances while increasing usage of geospatial data where relevant.

The UNCCD secretariat will continue to build data-driven partnerships at the international level to achieve its vision of an open access ecosystem of data and tools for reporting. In parallel, at the national level, it is expected that activities to support improved reporting will continue. These include the enhancement of policy coherence across government entities and the building of data partnerships with a wide range of stakeholders including academia, the private sector and civil society organizations.

Technical support is essential to respond to the challenges of digital reporting, including the different levels of digital and geospatial literacy across regions and countries. The UNCCD, with its financial and technical partners, will step up efforts towards capacity development through blended in-person and virtual learning.

> The UNCCD reporting process will continue to leverage digital infrastructure and technological advances while increasing usage of geospatial data where relevant.

By highlighting not only good practice but also innovative approaches in national reporting, this publication represents a step in this direction. It is a key contribution to peer-to-peer learning and knowledge-sharing aimed at inspiring countries to overcome data challenges and enhance their capacity for developing impactful national reports.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United Nations
Convention to Combat
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