

Sustainable land management for food security and sustainable agriculture through LDN response actions

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United Nations
Convention to Combat
Desertification

SB-Koronivia Joint Work on Agriculture

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1st June 2021

Virtual meeting

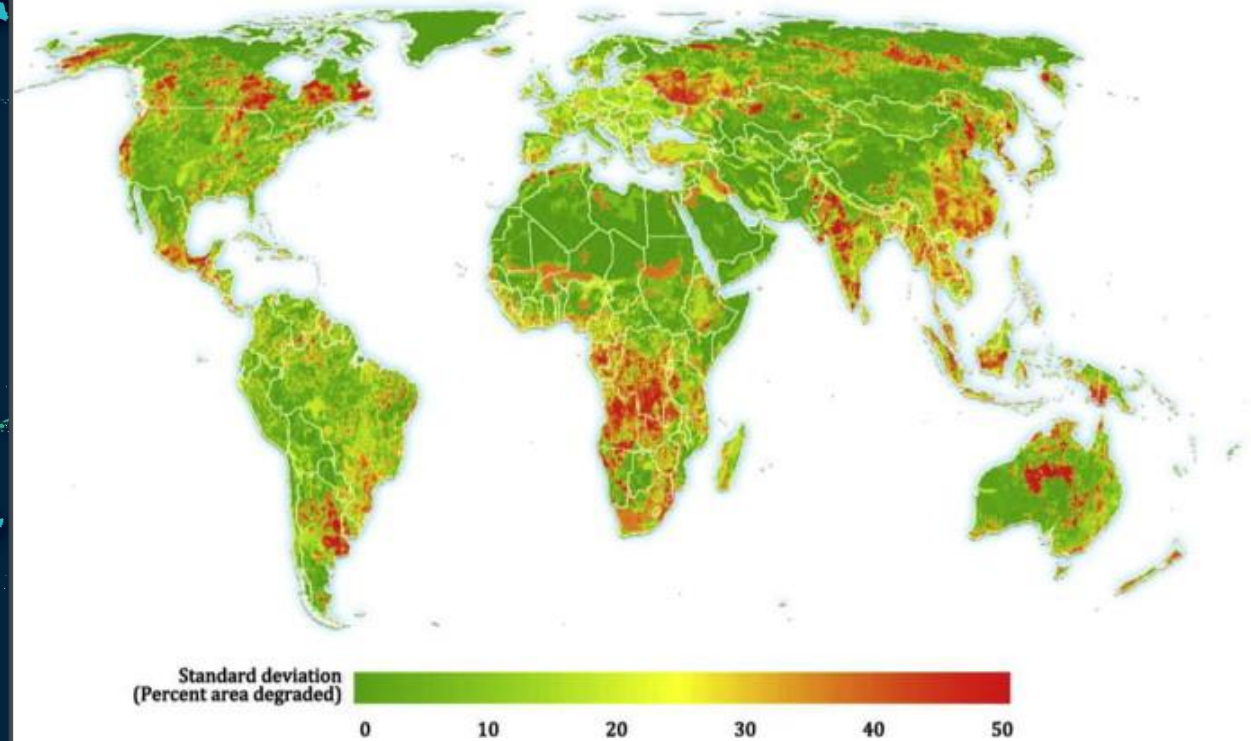
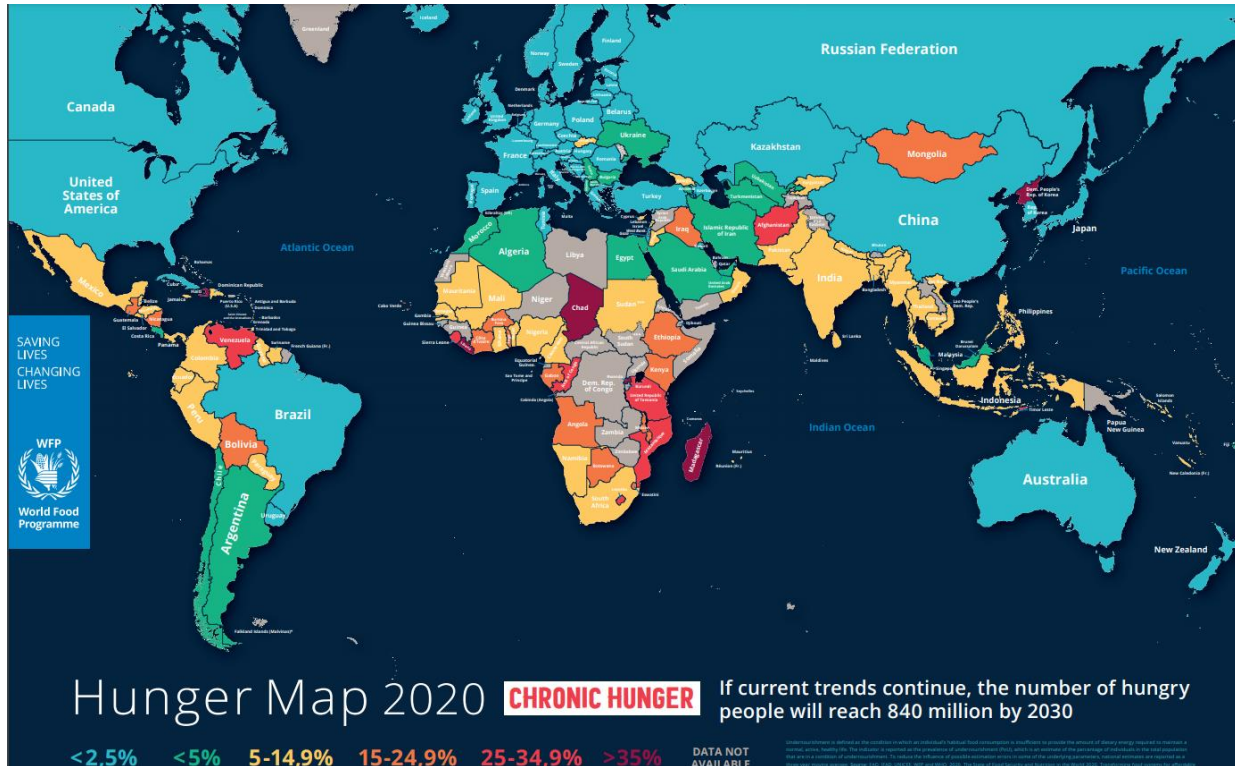
The geography of hunger and poverty coincides with that of degraded lands



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The poorest people live in areas affected by land degradation, desertification and drought.

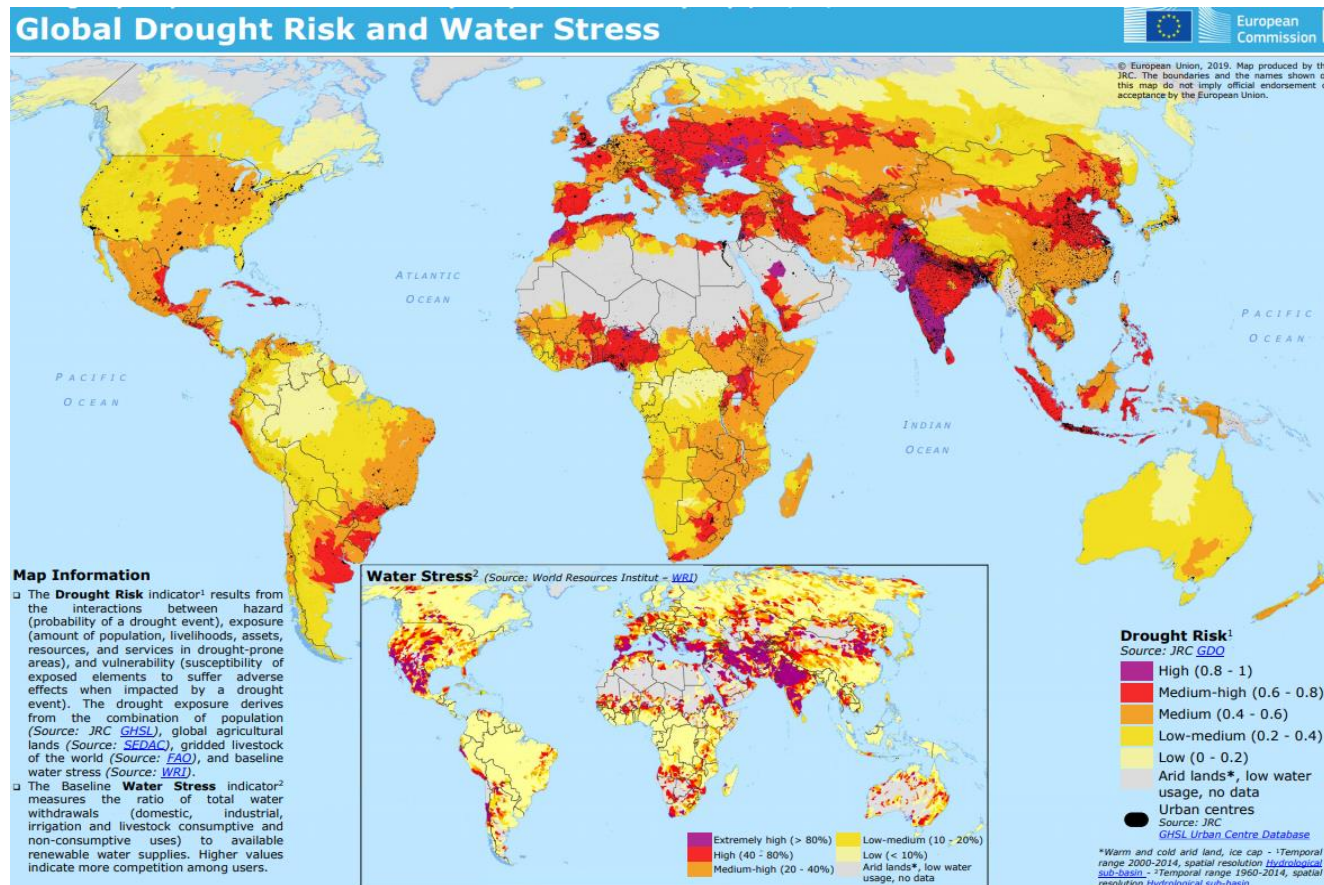
The most food insecure people live in degraded lands. Achieving land degradation neutrality will increase food production in that land will be restored and managed sustainably.



Source: [H.K.Gibbs^{ab}J.M.Salmon^b](#) Mapping the world's degraded lands; <https://doi.org/10.1016/j.apgeog.2014.11.024>

Land degradation and drought are closely linked

- Healthy land has a natural capacity to hold, store and filter water.
- Land degradation and land cover change disrupt the water cycle and hydrological functions.



- Worldwide, the agricultural sector, which accounts for two-thirds of global water withdrawals, is the most sensitive to water scarcity and droughts,
- Drought — was one of the leading culprits of loss from agriculture,
- 83% all drought-caused economic losses documented by FAO's study were absorbed by agriculture, with a price tag of \$29 billion.

LAND DEGRADATION IN FOOD SYSTEMS

75% of the Earth's ice-free terrestrial ecosystems have been transformed from their natural state by humans

1 IN 5 hectares experiencing persistent declines in health and productivity over the last **15 years**

Consumption patterns – the food we eat, the clothes we wear – are by far the most significant driver of land use change and land degradation. Our dietary choices surge down the supply chain and govern where and how these land-intensive goods are produced.

Modern intensive agriculture and resulting soil degradation also reduces the nutritional value of food through lower concentrations of vitamins and micronutrients which is especially detrimental to children.

BIOPHYSICAL

- **Climate change** impacts such as reduced crop yields and increased soil erosion; **flooding and prolonged droughts** worse hydrological condition,
- **Conversion of natural ecosystems** to agricultural land, exposing soils to erosion and oxidation of soil organic carbon stores;
- **Loss of biodiversity and diverse landscapes** degrading ecosystem services and crop/livestock productivity due to increased pests and diseases

INSTITUTIONAL

- **Lack of tenure security and access to resources**, particularly for women and marginalized groups;
- **Incentives and investment** driving unsustainable intensification of food production and resource use inefficiencies;
- **Inadequate policies and legislation**, and effective regulation and enforcement to safeguard environmental and social outcomes;
- **Land grabbing and leases to foreign entities**, often with water rights, undermining national efforts to ensure food and nutritional security;
- **Global telecoupling** with distant effects, including land degradation through export-oriented food and feed production.

SOCIO-ECONOMIC

- **Shifts in dietary trends** towards land-, water-, and carbon-intensive foods, such as meat and dairy;
- **Food loss and waste** intensifying pressures that drive agricultural expansion and harmful intensification;
- **Poor management practices** resulting in resource use in-efficiencies, yield gaps, and on- and off-farm pollution and biodiversity loss;
- **Competing societal demands for land** from the agricultural, urban, transport, mining, industrial, nature and energy sectors.

Source: UNCCD Publication 2021: LDN for Food security and sustainable agriculture

- **Loss of arable land** in amount and productivity through degradation/desertification and climate change
- **Limited land for agricultural** use under land use competitions
- **Increased flooding and prolonged droughts** worse hydrological condition, due to climate change.
- **Rural poverty** and lack of investment
- Increase of **food production demand** due to raising of population and change of consumption patterns.

A long-term strategy is working from both supply and demand sides:

Supply side/ production :

-Optimize land use through integrated planning to balance land use for food security, water security and other ecosystems services.

-enhancing integrated land and water management to

- *increase the productivity and efficiency of land and water,*
- *to make sustainable agriculture a priority taking nature-positive approaches to reduce vulnerability and improve resilience*
- *with increase investment in agriculture*

Demand side/ consumption:

-reducing food waste

-changing consumption patterns

United Nations Convention to Combat Desertification (UNCCD)



A global framework to support the development and implementation of national and regional policies, programmes and measures **to prevent, control and reverse desertification / land degradation and mitigate the effects of drought** through

- scientific and technological excellence,
- raising public awareness,
- standard-setting monitoring and assessment,
- advocacy and resource mobilization partnership building.

The UNCCD Strategic Framework 20018-2030

Vision: A future strive to achieve Land Degradation Neutrality in line with SDG 15.3



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SO1. To improve ecosystems, promote SLM, LDN

Expected impacts

1.1 Land productivity and related ecosystems services maintained or enhanced;

1.2 Ecosystem vulnerability is reduced, and resilience is increased

1.3 LDN targets are set, measures identified and implemented, and necessary monitoring system are established

1.4 Measures for SLM are shared, promoted and implemented



SO2. To improve livelihoods of populations

Expected impacts

2.1 Food security and adequate access to water are improved

2.2 The livelihoods are improved and diversified.

2.3 Local people, especially women and youth, are empowered and participate in decision-making processes in combating DLDD.

2.4 Migration forced by desertification and land degradation is substantially reduced.



SO3. To mitigate, adapt to and manage the effects of drought to enhance resilience of vulnerable population

Expected impacts

3.1 Ecosystems' vulnerability to drought is reduced, including through sustainable land and water management practices.

3.2 Communities' resilience to drought is increased.



SO4. To generate global environmental benefits

Expected Impacts

4.1 SLM and combating DLDD contribute to conservation and sustainable use of biodiversity and addressing climate change.

4.2 Synergies with other multilateral environmental agreements and processes are enhanced.

SO5 To mobilize resources to support implementation through building effective partnerships at global and national level

What is 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” *UNCCD COP12 October 2015*



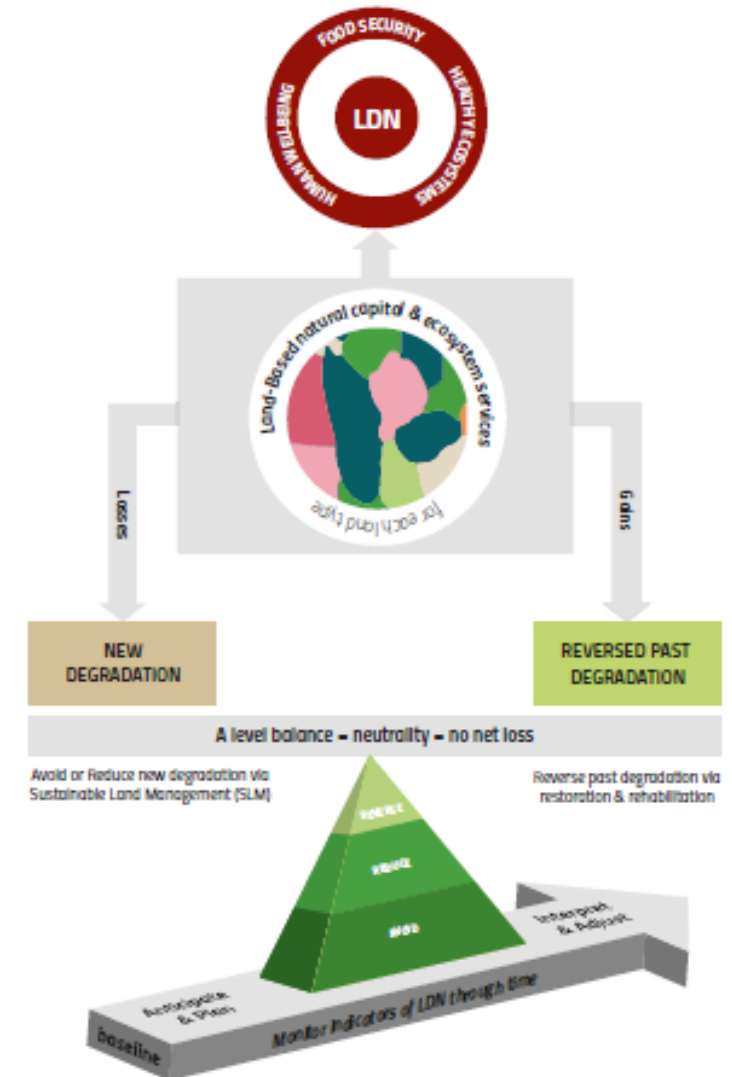
A Target of SDG: In 2015, the UNCCD adopted Sustainable Development Goal (SDG) target 15.3 which aims to combat desertification, restore degraded land and soil, including land affected by desertification, drought, and floods, and strive to achieve a land degradation neutral world by 2030.

This SDG target is recognized as the central vehicle to drive implementation of the UNCCD as well as accelerate progress towards numerous other SDGs

Land Degradation Neutrality an integrated approach to achieve no net loss of healthy and productive land

A framework encourages a broad range of measures to avoid or reduce land degradation, and to reverse past degradation,

- **appropriate Integrated land use planning**, as the key to keep land in balance for food, water, energy security and other ecosystem service, to do right things in right place at time,
- **effective land governance** as a critical enabler to provide incentives and set regulations,
- **sustainable land management practices** as the cornerstones to localize land conservation, restoration and rehabilitation adapting to local settings.,
- **monitoring and assessment** for target setting and informative decision making .



The importance of SLM for soil organic carbon/ fertility of land

SOC is an important component of the global carbon cycle and is a major constituent of soil organic matter (SOM), which plays a critical role in soil productivity and a wide array of ecosystem services.

Beneficial impacts of SOC/SOM on soil health and functionality

Constraint	Impact of increasing SOC through SLM
Soil fertility	Nutrient retention and availability; reduced losses by leaching, volatilization, and erosion; high nutrient use efficiency
Soil health	Disease-suppressive soils, high soil biodiversity, improved plant growth and vigour, soil resilience
Soil tilth	Low risks of crusting and compaction; better soil aeration, water infiltration and plant germination due to favourable bulk density and pore size distribution
Production	Sustainable agronomic production, increased yield, better nutritional quality, improved resilience.

SLM is important for water management

<i>SLM practices</i>	<i>Impact on Water</i>
1 Bund	Increases water retention and infiltration
2 Terrace	Improves soil moisture holding capacity, water infiltration and reduces runoff
3 Mulching	Improves soil water retention and transmission, reduces drought stress
4 Cover crops	Improves soil water retention and transmission, reduces drought stress
5 Vegetative strips	Reduces soil erosion and enhances soil water retention, improves water quality, often also serves as bio-drainage
6 No-till, reduced tillage	Increases infiltration, reduces water loss, increases water availability for plants
7 Laser land levelling	Reduces water runoff, improves water use efficiency
8 Biochar soil amendment	Improves soil water transmission
9 Compost soil amendment	Improves soil water holding capacity
10 Water harvesting technologies	Improves soil water availability and retention, increases groundwater recharge
11 Improved irrigation technologies	Increases water use efficiency in crop production
12 Integrated watershed management	Conserves water, improves groundwater levels
13 Rotational Grazing	Helps to cope with rainfall variability, improves infiltration rates and runoff in rangelands
14 Afforestation	Improves water conservation and regulation, decreases water availability for other vegetation in some arid areas

Selected and localized SLM practices show obvious impacts on water in soil, runoff and surface/ground water, and have potential to improve agriculture ecosystems resilience to drought.

UNCDD-SPI 2019 Land-Drought Nexus

Sustainable land management contribute to climate change mitigation



Land and Sustainable Development Goals

Land-based solutions are key to addressing climate change.

Land restoration can provide 1/3 of cost-effective climate mitigation.

#UNCCDCOP14 #DrawLife2Land

13 CLIMATE ACTION



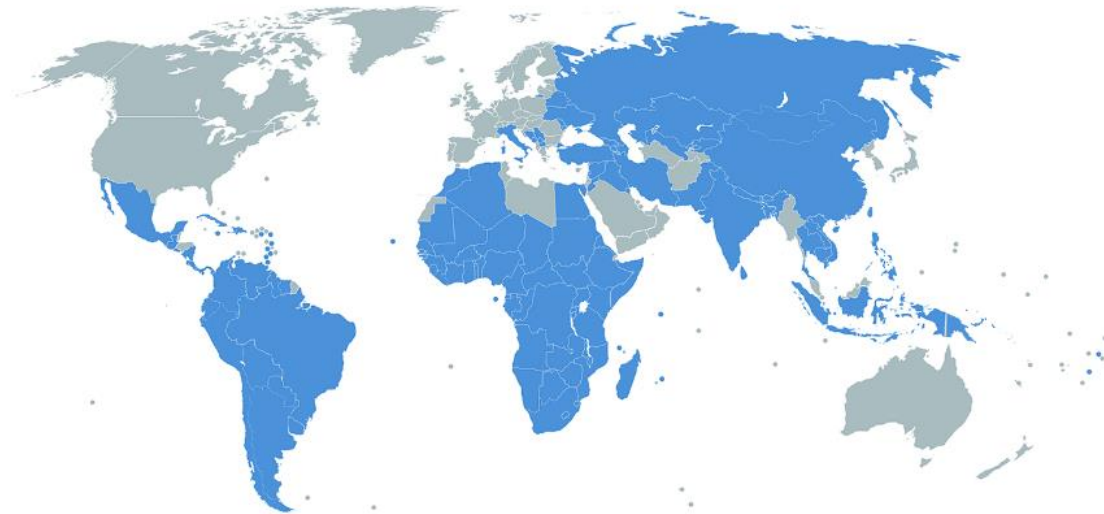
Nature-based solutions can provide 37% of cost-effective CO₂ mitigation needed by 2030 to limit global warming. By restoring landscapes and investing in sustainable land management we can harness the power of healthy land to act as a carbon sink and protect the atmosphere. 12

Who is actively pursuing LDN?

127 countries have committed to set LDN targets so far

86 countries have officially validated their targets and response actions

The UNCCD helps countries assess the current state of their land, identify the drivers of degradation, and make integrated land use planning, and formulate the most appropriate response actions.



■ Countries setting LDN targets

Disclaimer: Country names or borders shown on the map do not necessarily represent the UNCCD's official position. The map shown is simply for display purposes. It does not work to imply views or opinions of the UNCCD, regarding the legal status of any territory or country.

Land Degradation Neutrality

LDN
Target Setting

LDN
Transformative
Projects and
Programmes

LDN
Monitoring

About LDN

- Conceptual framework
- Principles

LDN Knowledge Products

- Biodiversity
- Water
- Climate
- Poverty
- Etc.

LDN Tools

- ELD
- LDRA
- Land in NDCs
- Nature based Solutions

LDN response actions for SDGs



- The UN General Assembly reaffirmed that achieving LDN has the potential to act as an accelerator and integrator for achieving the SDGs and as a catalyst for attracting sustainable development and climate finance in 2018.
- LDN response actions formulated by countries also offer tangible co-benefits for achieving multiple SDGs, most notably SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 8 (Decent Work), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).
- The UN Secretary-General will convene the Food Systems Summit 2021 to launch bold new actions to transform the way the world produces and consumes food, delivering progress on all 17 Sustainable Development Goals.

INTEGRATED LDN RESPONSE ACTIONS

LDN is driving the integrated approach needed to halt the loss of healthy and productive land, and sustainably manage agroecosystems for present and future generations

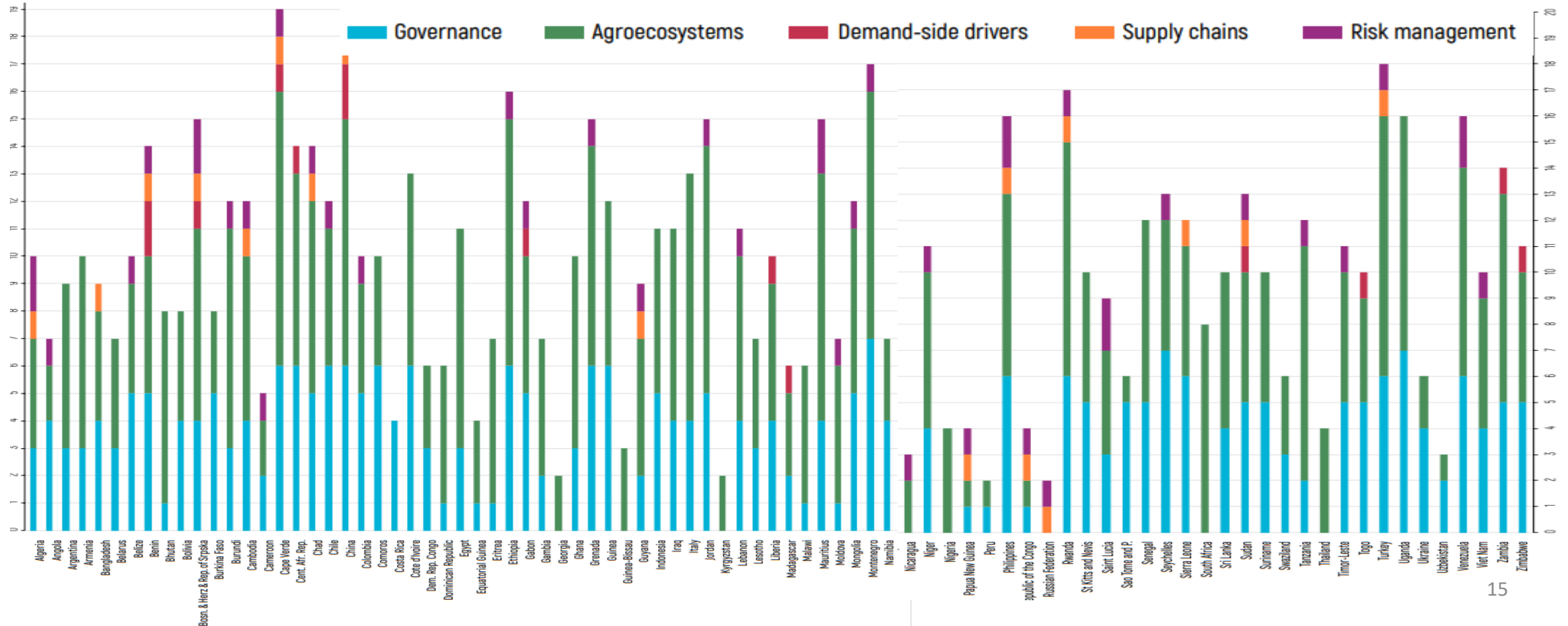
This analysis of national LDN reports identified a total of

842
Response Actions

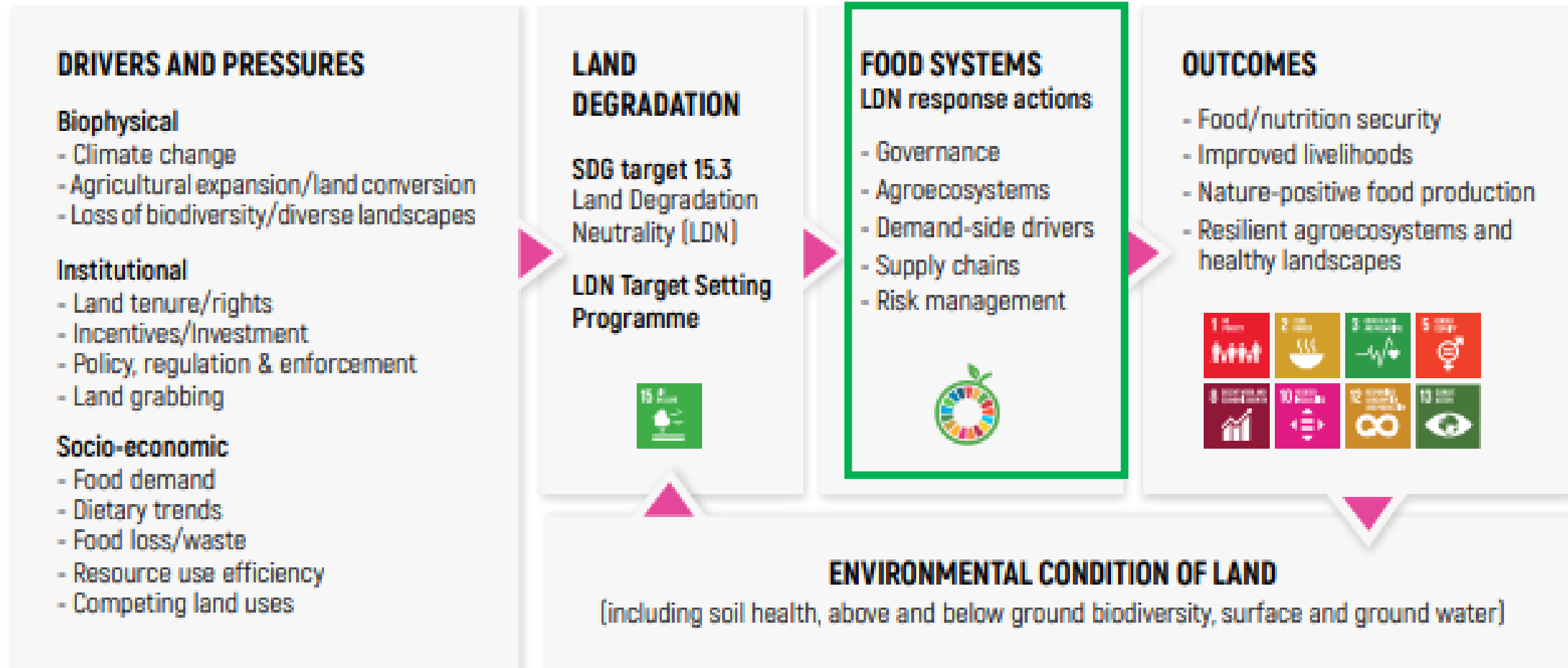


in

86
Countries



LDN response actions for food security and sustainable agriculture



Integrated LDN response actions for food security and sustainable agriculture

1 LDN RESPONSE ACTIONS AIMED AT IMPROVING GOVERNANCE:

- **Strengthening land tenure rights and security** - crucial for promoting long-term investments in sustainable agriculture, particularly for vulnerable rural communities, smallholders, indigenous peoples, and women.
- **Promoting multi-stakeholder participation** - active involvement of stakeholders creates the necessary enabling environment and motivation for transforming food systems.
- **Building human, financial, and technical capacity** essential for supporting effective responses at the local level to land management challenges.
- **Raising awareness** - increases and promotes actions for boosting nature-positive food production, promoting healthy and diverse diets, and reducing food loss and waste.

2 LDN RESPONSE ACTIONS AIMED AT BUILDING RESILIENT AGROECOSYSTEMS:

- **Increased food productivity** – enables more food to be grown with fewer inputs, on the same area of land, thereby reducing agricultural expansion.
- **Improved crop and livestock management** – all of which provide the potential to increase productivity and food production and reduce adverse environmental impacts.
- **Agroforestry and silvopasture** – well-planned, tree-based systems can enhance productivity and provide benefits to soil health and carbon stores.
- **Agricultural diversification** – supports the ecological functioning of soils, reduces erosion, provides the potential for nutritionally diverse diets, and creates more biologically diverse and locally adapted agroecosystems.
- **Integrated water management** – enables resource use efficiency, improved soil function, and enables more to be produced from less.
- **Increased soil fertility and organic matter, and reduced soil erosion** – improved management of soils offers potential increases in soil organic carbon, yields and enhanced food production as well as reducing off-site pollution.

3 LDN RESPONSE ACTIONS AIMED AT MANAGING DEMAND-SIDE DRIVERS:

- **Dietary change** – shifting to low-resource input foods (plant-based proteins) offers potential to decrease competition for land and agricultural expansion into natural ecosystems.
- **Reduced post-harvest losses** – productivity gains need to be protected by reducing food wasted through post-harvest activities and supply chains.
- **Reduced food waste** – encouraging consumers and retailers to reduce the global average of food waste to 30% will protect productivity gains.

4 LDN RESPONSE ACTIONS RELATED TO MORE EFFICIENT AND EQUITABLE SUPPLY CHAINS:

- **Development of alternative food sources and production technologies** – local or regional food systems offer the potential to provide food access to urban dwellers and shorten supply chains.
- **Use of local seeds and traditional practices** – conserves biodiversity and strengthens local and regional food systems, diverse and healthy diets and food sovereignty networks.

5 LDN RESPONSE ACTIONS RELATED TO MORE EFFECTIVE MANAGEMENT OF RISK:

- **Resilient livelihoods** – building skills and technologies helps farmers and land managers increase their resilience and capacity to adapt to shocks and stresses from markets, weather and climate change.
- **Navigating supply chain and market uncertainty** – technologies (e.g. mobile phones and apps distributed to women) offer small-scale food processors and traders opportunities to more effectively anticipate and manage fluctuations in prices, commodity supplies and market demands.



LDN response actions for climate change adaptation and mitigation

Climate change mitigation and adaptation (CCMA) response options based on land		Mitigation	Adaptation	Percentage of countries whose LDN commitments give support to land-based-CCMA response options (%)
Agriculture	Increased food productivity	L	L	73%
	Improved cropland management	M	L	73%
	Agroforestry	L	L	62%
	Improved grazing land management	M	M	52%
	Improved livestock management	M	M	31%
	Agricultural diversification	S	L	20%
	Reduced grassland conversion to cropland	M	NI	65%
	Integrated water management	M	L	60%

Magnitude of impacts on climate change mitigation and adaptation (middle columns) based on IPCC (2019) assessment: L: Large positive; M: Moderate positive; S: Small positive; NA: Not Applicable; NI: No information. Analysis by UNCCD-GM (2020)

LDN response actions for climate change mitigation and adaptation

Climate change mitigation and adaptation (CCMA) response options based on land		Mitigation	Adaptation	Percentage of countries whose LDN commitments give support to land-based-CCMA response options (%)
Forestry	Forest management	M	L	92%
	Reduced deforestation and forest degradation	L	M	94%
	Reforestation and forest restoration	L	L	97%
	Afforestation	L	L	86%
Soil based	Reduced soil erosion	NA	L	35%
	Reduced soil salinization	NI	M	14%
all/other ecosystems	Fire management	L	M	37%
	Reduced landslides and natural hazards	S	L	13%
	Biodiversity conservation	M	M	88%

Magnitude of impacts on climate change mitigation and adaptation (middle columns) based on IPCC (2019) assessment: L: Large positive; M: Moderate positive; S: Small positive; NA: Not Applicable; NI: No information. Analysis by UNCCD-GM (2020)

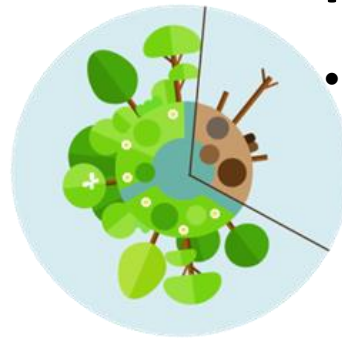
Strengthening science and data-base to support informative decision making

Monitors the progress of the Parties in its implementation of the UNCCD strategic Framework through regularly collecting information on SDG indicator 15.3.1 and drought vulnerability/ resilience,

through its **national reporting and review process** beginning in 2018, **four years cycle, afterward.**

Indicators for reporting

Indicator 15.3.1
Proportion of land that is degraded over total land area



- Three sub-indicators for SDG 15.3.1:
 - Land Cover (land cover change)
 - Land Productivity (land productivity dynamics)
 - Carbon Stocks (soil organic carbon stocks)
- Quantifying the indicator is based on the evaluation of changes in the sub-indicators in order to determine the extent of land that is degraded over total land area.

Sub -Indicators
UNCCD (CBD, UNFCCC)
Reporting Mechanisms



Data from multiple sources
FAO, GEF and other
Reporting Mechanisms

Official Statistics
and Earth Observation



Land Use and
Management Practices



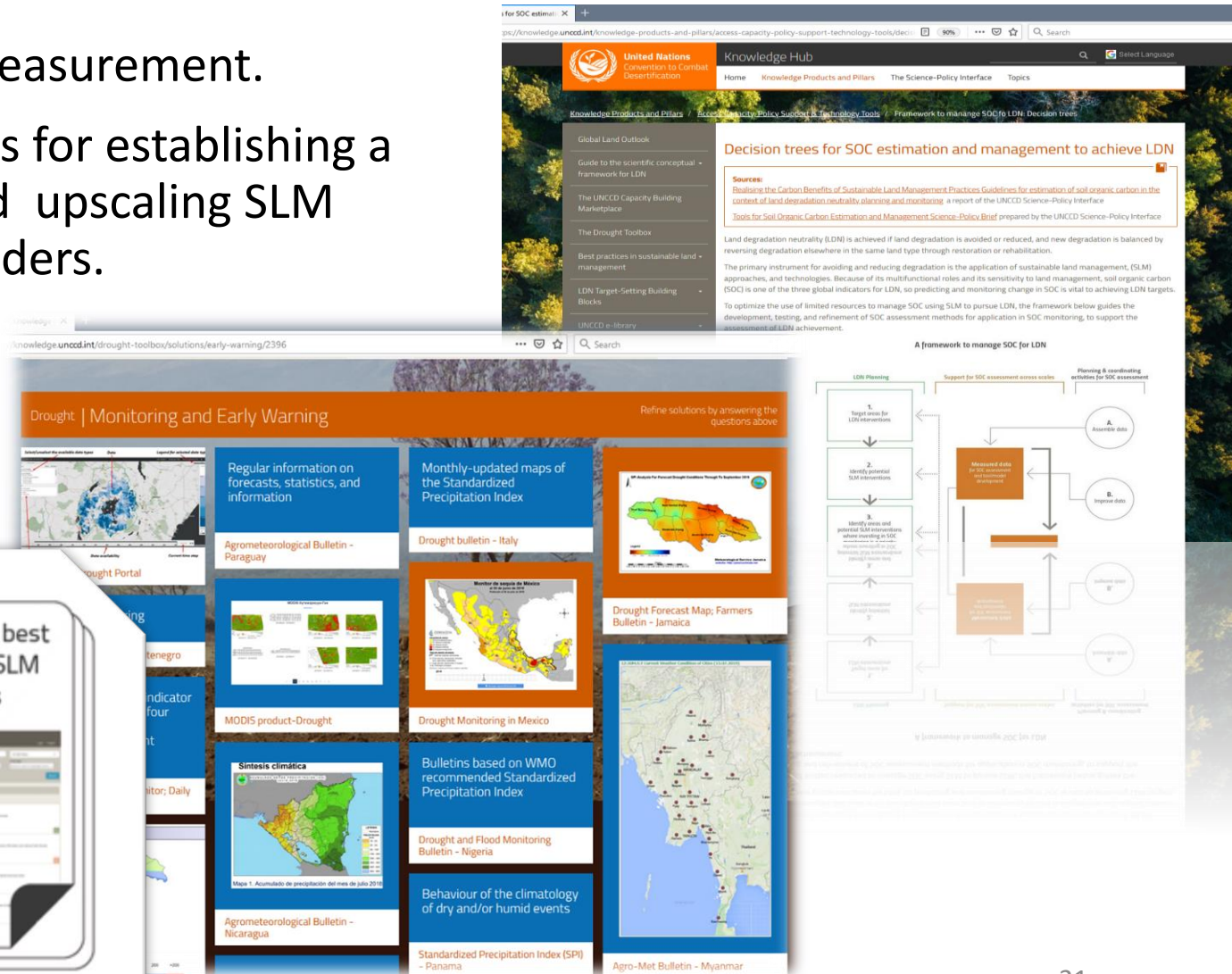
Surveys, Sampling and
Citizen Sourcing



<https://knowledge.unccd.int/topics/sustainable-development-goals-sdgs/sdg-indicator-1531>

Upscaling SLM Best Practices

- UNCCD-SPI Technical Guidance on SOC measurement.
- UNCCD supports WOCAT 2020+ Initiatives for establishing a leading platform to share, promotion and upscaling SLM best practices guided by UNCCD stakeholders.
- A project to analyse and identify the gender-responsiveness of SLM technologies and approaches.



Decision trees for SOC estimation and management to achieve LDN

Drought | Monitoring and Early Warning

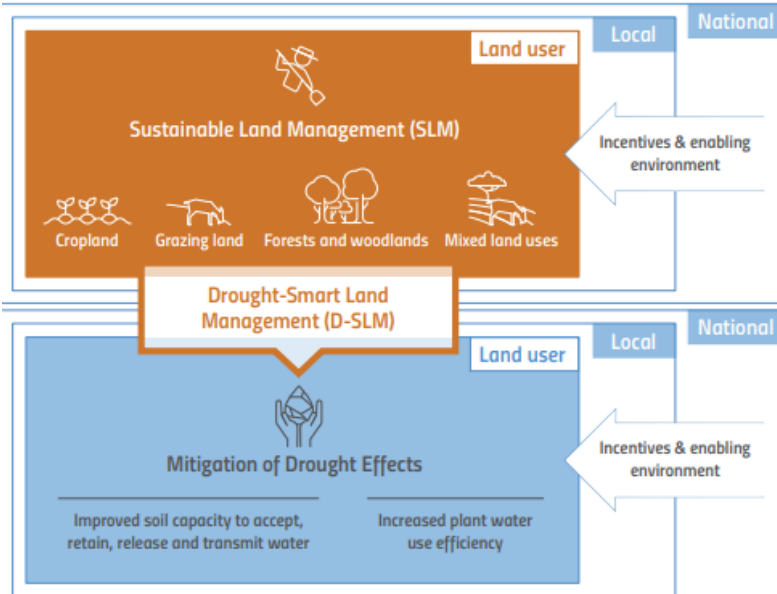
A framework to manage SOC for LDN

Tools supporting sustainable land management from land-drought nexus angles

SPI Publication LAND-DROUGHT NEXUS

Improving ecosystems resilience to drought through SLM

Land Use	D-SLM Category	LDN Category	Upfront Costs	DROUGHT TOOLBOX		
				Net Economic Returns	Food Security and Poverty Reduction	Trade-Offs and Constraints
Croplands	Controlling soil erosion			Neutral and negative in the short term*, positive in the long-term	○	Labor availability could be a constraint
	Minimizing soil disturbance			Often, but not always, positive already in the short-term	+	Competition between uses of plant residues for mulching or for livestock feeding
	Integrated soil fertility management			Usually already positive in the short-term	++	Competition between uses of livestock manure as soil amendment and energy source.
	Improved water			Usually already positive in the short-term, especially in arid environments or where water is priced.	+	Lack of water markets and pricing can limit incentives for their adoption
Vegetation	vegetation			Usually already positive in the short-term	+	May require technical capacities for their adoption by farmers
	pressure			Usually already positive in the short-term	+	In some areas competes with expanding crop production
	management			Limited evidence	○	Limited evidence
	n			Usually already positive in the short-term	+	Limited evidence
	le forest			Neutral and negative in the short term, positive in the long-term	+	Limited evidence
	erent, ion, and of leforestation			Neutral and negative in the short term, positive in the long-term	+	Takes relatively long time for implementation
	agro-forestry			Neutral and negative in the short term, positive in the long-term	+	Takes relatively long time for implementation
	pastoralism			Usually already positive in the short-term	○	Lack of water markets and pricing can limit incentives for their adoption
	management			Usually already positive in the short-term	○	Lack of water markets and pricing can limit incentives for their adoption
	l watershed			Positive in the long-term	○	Takes relatively long time for implementation
ent			Positive	○	Requires considerable technical capacities for planning and implemen-	
ture						



The UNCCD Drought Toolbox

DROUGHT Monitoring and Early Warning

Explore tools and data

DROUGHT Vulnerability and Risk Assessment

Explore tools and maps

DROUGHT Risk Mitigation Measures

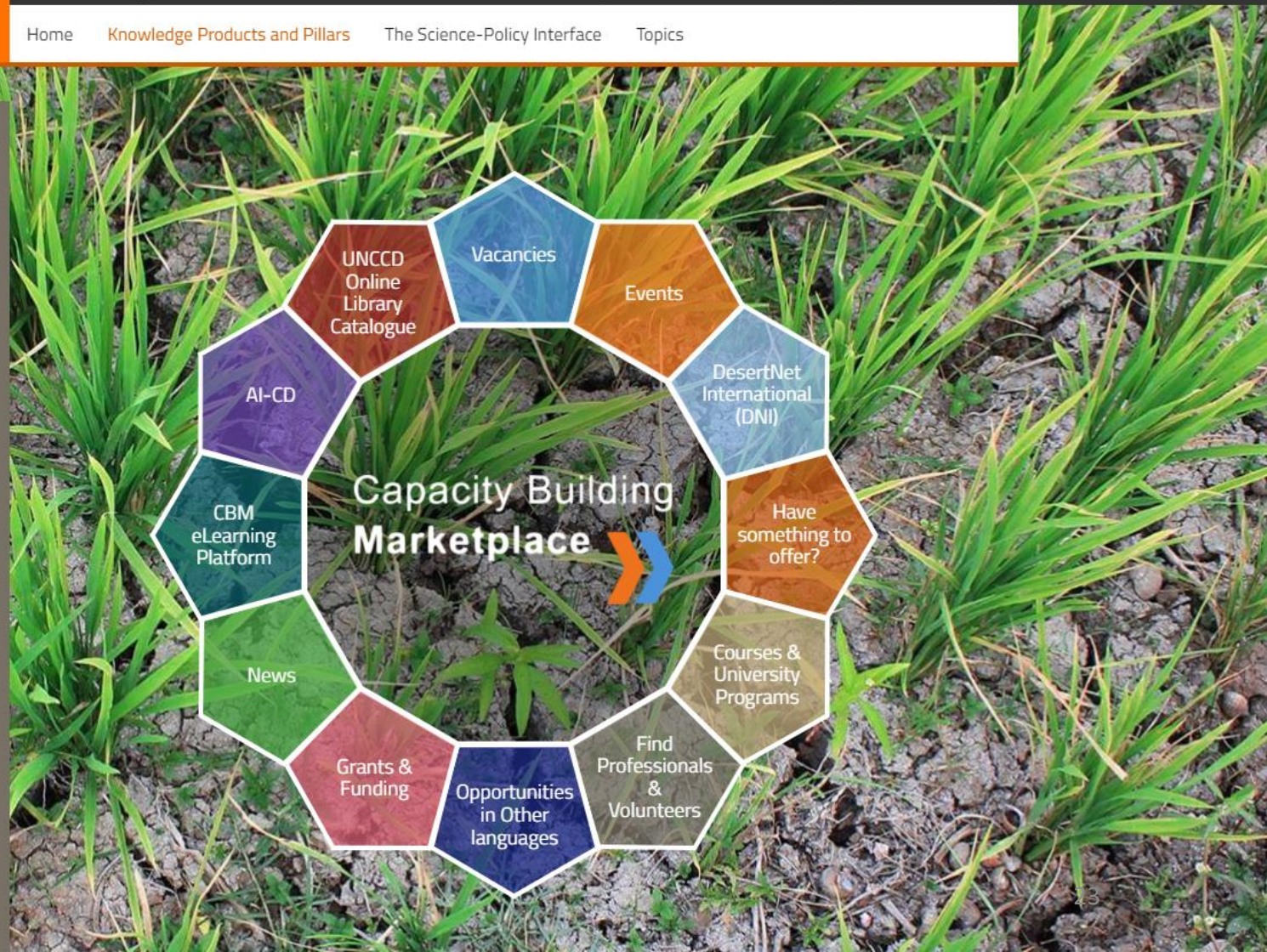
Find tools and solutions



Culture



Capacity Building Marketplace bridging needs and solutions



- Connects capacity related needs and solutions.
- Helps individuals and organizations find and offer current learning, funding, and job opportunities in one place.
- Invites stakeholders to contribute relevant content to network with interested parties.



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