Desertification, Land Degradation and Drought in Perspective

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Dünya çölleşmeyi Ankara’da konuşacak!
Transforming our world: the 2030 Agenda for Sustainable Development

The SDGs of Agenda 2030 are laudable goals
Barriers to achieving Agenda 2030:

• **Land is finite** in quantity. Competing demands for its goods and services are increasing pressures on land resources in virtually every country.

• **Over 1.3 billion people trapped** on degrading agricultural land

• **Land transformation in rural areas** is **unprecedented** in terms of both speed and scale

• **70 per cent of agricultural land** is now used to grow **feed crops and livestock production**

• **Consumption** of natural resources **doubled in 30 years**

• **3 planets to meet 2050 natural resource demands**

https://www.unccd.int/actions/global-land-outlook-glo
Barriers to achieving Agenda 2030:

• Between 1998-2013, 20-30 per cent of Earth’s vegetated land surface showed persistent declining trends in productivity: 20% of cropland, 16% forest land, 19% grassland, and 27% rangeland.

• In 2000, a projected 2% (30 million ha) of croplands globally were in areas that would be urbanized by 2030.

• Some old some new drivers of land degradation at a global scale. Urbanization, climate change and dietary changes, which will exacerbate the demand for land and natural resources are part of these underlying trends.

https://wad.jrc.ec.europa.eu/
Barriers to achieving Agenda 2030:

- Wellbeing of over **3.2 billion people undermined** by land degradation
- **Biodiversity loss** to reach **38–46%** by 2050. **Leading causes** are habitat transformation (i.e., conversions, to farmland and settlements) and habitat **degradation**.
- **Land restoration and rehabilitation** can have **significant co-benefits** for all SDGs
- There is a **difference in the co-benefits** of the **restoration process** and of the **restored land**.
- A **landscape approach**, which includes targeting investments, **is the key** to increasing the total return on land restoration investments.

https://www.ipbes.net/deliverables/3bi-land-degradation
Barriers to achieving Agenda 2030:

• **1 million species** are threatened by extinction largely because **75% of the land surface has been altered**

• These *(negative)* **transformational changes** are creating the conditions for a biological evolution **so rapid**, it is visible just over a few years.

• The **conversion of land** for agriculture is the leading driver of land-use change, with **meeting the demand for food, feed, fibre and bioenergy production** in the lead. **Forests, wetlands and grasslands and savannas** are **paying the price**.

Land and synergies: Land is clearly central to the achievement of all SDGs
SDG 15.3 is the land target

By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.
Land can accelerate many SDGs...

...but SDGs compete for the same land resources.
Synergies also mean trade-offs

Observed synergies and trade-offs between the SDGs.

Shares of synergies (green) and trade-offs (orange).

Source: Figure 2 doi:10.1002/2017EF000632
The top synergies among SDGs are not surprising

Pradhan et al. (2017)

Source: Figure 3 doi:10.1002/2017EF000632
...and the top trade-offs should not be surprising either

Pradhan et al. (2017)
Goal 12: Ensure sustainable consumption and production patterns

Consumption and production tend to be measured in flows – but now also in terms of material footprint...

But where do those flows originate from and where do they end up?
Total land displaced through export production

The thickness of the arrows and numbers next to the arrows represent the amount of land (in Mha) used as inputs for the production of imported and exported goods.

Source: Yang Yu et al. 2013
How can navigate the inevitable SDG trade-offs?
On one side of the equation: Decoupling natural resource use and environmental impacts from economic growth

Here decoupling means using less resources per unit of economic output and reducing the environmental impact of any resources that are used or economic activities that are undertaken.
Is decoupling possible?

If the flows of consumption and production can be linked to land, policies to minimize impact are much more feasible.

Trase.Earth seeks to transform our understanding of commodity supply chains by increasing transparency, revealing the links to environmental and social risks, and creating opportunities to improve the sustainability of how these commodities are produced, traded and consumed.
On the other side of the equation

A balanced approach is needed.

• One that **anticipates new degradation** even as we plan to reverse past degradation
• One that **considers tradeoffs** among competing interests across the landscape

**LDN** provides the framework for this.
Land Degradation Neutrality (LDN)

“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
Land Degradation Neutrality

- LDN seeks to **maintain natural capital** and the **ecosystem services** that flow from it
- LDN is about keeping **land in balance**
- Keeping land in balance provides the basis for **keeping food, carbon and biodiversity in balance** as well.
- LDN is about achieving **multiple benefits**
- LDN provides a framework with **multiple entry points** which facilitate **optimizing the synergies** among the Rio Conventions (Climate Change, Biodiversity, Land Degradation)

The Vision of LDN

Human wellbeing
Food security
Healthy ecosystems

The goal of LDN is maintaining or enhancing the land resource base - in other words, the stocks of natural capital associated with land resources and the ecosystem services that flow from them.
Neutrality = *no net loss* compared to the reference state (baseline)

Baseline is NOW (current condition)

**Counterbalancing** future land degradation (anticipated *losses*) through planned measures to achieve equivalent *gains* elsewhere within the same *land type*

“like for like”
Integrated land use planning

LDN planning (which begins with target setting) involves anticipating where degradation is likely so that the optimal mix of interventions across the landscape to achieve neutrality can be pursued.

- Occurs at multiple levels
- Leverages existing land use planning
Optimizing land use planning and management decisions across the landscape

A Map of Land Types
[Land Type “A” = Grassland]

Context*

Preparation for Integrated Land Use and Management Planning (t0)

Decisions

Anticipated Change In Metrics (t1)

Projected Gains vs. Losses (t1 - t0)

Legend

- All metrics are anticipated to remain stable
- Positive change anticipated (in at least one metric, others stable)
- Negative change anticipated (in at least one metric)
- Stable (no change)
- Degraded land or anticipated negative change
- Not degraded land or anticipated positive change

Land Degradation Neutrality Status
Anticipated Net Gain: 5,000 ha
Prevention is better than cure

Response Hierarchy

Avoid: Land degradation can be avoided by addressing drivers of degradation and through proactive measures to prevent adverse change in land quality of non-degraded land and confer resilience, via appropriate regulation, planning and management practices.

Reduce: Land degradation can be reduced or mitigated on agricultural and forest land through application of sustainable management practices (sustainable land management, sustainable forest management).

Reverse: Where feasible, some (but rarely all) of the productive potential and ecological services of degraded land can be restored or rehabilitated through actively assisting the recovery of ecosystem functions.
Integrated land use planning is the key to achieving LDN

Using the best information available

- Land degradation status
- Land potential
- Resilience
- Socio-economic data
- Gender considerations

In order to

- Optimize the spatial mix of possible interventions
- Navigate trade-offs
It is about having the right information...
...to do the right thing in the right place at the right scale
The SLM cornerstone of LDN

Sustainable Land Management can be defined as 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.

Source: WOCAT
Pivotal soil carbon

- Stores atmospheric C
  - Cost effective climate mitigation measure
- Improved water holding capacity
  - Buffer against drought
- Improved soil fertility
  - Nutrient store and supply
  - Improved productivity / yields
- Improved soil structure
  - Improved workability
- Improved soil habitat soil organizations
  - Improved biodiversity

What should we measure?

For harmonization of LDN monitoring, 3 essential variables are measured in all countries.

Countries also measure any other relevant indicators.
Monitoring and learning

- Global indicators: Land cover, land productivity and soil organic carbon
- “One out, all out”, area basis
- Complemented by:
  - Locally-relevant indicators
  - Process indicators
  - Outcome indicators
- Verified using local knowledge (multi-stakeholder platforms nested across scales)
The framework does not prescribe how to measure the indicators. It recommends effort to achieve consensus on common criteria and standards to harmonize application.

Monitor indicators relative to the baseline.
Default Land Cover data
Default land productivity dynamics data
Default global soil organic carbon data
The combination = SDG indicator 15.3.1

SDG Target 15.3:
“By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world”

SDG Indicator 15.3.1:
Proportion of land that is degraded over total land area.
What was the outcome for SDG 15.3.1 reported by countries in 2019?

The proportion of degraded land for all land reported by country Parties is 20%, which amounts to over 18 million km².
Submission 2019 Report for 15.3.1 (163 countries)

Land area in millions of km²

<table>
<thead>
<tr>
<th>Region</th>
<th>Degraded land area (% of total land area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>20.0%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>22.4%</td>
</tr>
<tr>
<td>Northern Africa and Western Asia</td>
<td>6.9%</td>
</tr>
<tr>
<td>Northern Africa</td>
<td>5.0%</td>
</tr>
<tr>
<td>Western Asia</td>
<td>9.3%</td>
</tr>
<tr>
<td>Central and Southern Asia</td>
<td>27.9%</td>
</tr>
<tr>
<td>Central Asia</td>
<td>35.1%</td>
</tr>
<tr>
<td>Southern Asia</td>
<td>23.7%</td>
</tr>
<tr>
<td>Eastern and South-Eastern Asia</td>
<td>24.4%</td>
</tr>
<tr>
<td>Eastern Asia</td>
<td>24.6%</td>
</tr>
<tr>
<td>South-Eastern Asia</td>
<td>23.9%</td>
</tr>
<tr>
<td>Latin America and the Caribbean (1)</td>
<td>26.5%</td>
</tr>
<tr>
<td>Oceania (2)</td>
<td>35.5%</td>
</tr>
<tr>
<td>Europe and Northern America (3)</td>
<td>10.0%</td>
</tr>
<tr>
<td>Landlocked developing countries</td>
<td>22.9%</td>
</tr>
<tr>
<td>Least developed countries</td>
<td>17.0%</td>
</tr>
</tbody>
</table>
Guiding principles

Principles are provided to govern application of the framework and to help prevent unintended outcomes during implementation and monitoring of LDN.

These principles are central to how LDN can encourage responsible governance and help safeguard land tenure.
Guiding Principles (1)

Principles govern application of the framework, and prevent unintended outcomes during implementation of LDN

1. Maintain or enhance land-based natural capital.
2. Protect the rights of land users.
3. Respect national sovereignty.
4. For neutrality, the LDN target equals (is the same as) the baseline.
5. Neutrality is the minimum objective: countries may be more ambitious.
6. Integrate planning and implementation of LDN into existing land use planning processes.
7. Counterbalance anticipated losses in land-based natural capital with interventions to reverse degradation, to achieve neutrality.
8. Manage counterbalancing at the same scale as land use planning.
9. Counterbalance “like for like” (within the same land type). Not between conservation and production areas.
10. Balance economic, social and environmental sustainability.
Guiding Principles (2)

11. Base land use decisions on multi-variable assessments, considering land potential, land condition, resilience, social, cultural and economic factors.

12. Apply the response hierarchy: Avoid > Reduce > Reverse.

13. Apply a participatory process including stakeholders in designing, implementing and monitoring LDN.

14. Reinforce responsible governance: protect human rights, including tenure; ensure accountability and transparency.

15. Monitor using the three UNCCD land-based global indicators: land cover, land productivity and carbon stocks.

16. Use “one-out, all-out” to interpret the three global indicators.

17. Use national and sub-national indicators to aid interpretation and fill gaps.

18. Apply local knowledge to verify and interpret monitoring data.

19. Apply a continuous learning approach: anticipate, plan, track, interpret, review, adjust, create the next plan.
The UNCCD Drought Initiative

- national drought preparedness plans
- regional efforts to reduce drought vulnerability and risk, and
- toolbox to boost the resilience of people and ecosystems to drought
The Three key pillars

SO 1: Improve the condition of affected ecosystems, combat desertification/land degradation, promote SLM & contribute to LDN

SO 2: Improve the living conditions of affected populations

SO 3: To mitigate, adapt to, & manage effects of drought in order to enhance resilience of vulnerable populations & ecosystems

✓ Expected impact 3.1: Ecosystems’ vulnerability to drought is reduced, including through sustainable land & water management practices.
✓ Expected impact 3.2: Communities’ resilience to drought is increased.

SO 4: Generate global environmental benefits through effective implementation of the UNCCD

SO 5: Mobilize substantial, additional financial & non-financial resources to support the implementation of the Convention by building effective partnerships at global & national level.
The Three key pillars

- Monitoring & Early Warning Systems
- Vulnerability & Risk Assessment
- Risk Mitigation Measures
Planning early is key to achieving drought resilience

**Proactive**
Preparing for drought

- Risk mitigation measures
- Vulnerability assessment
- Monitoring & early warning

**Reactive**
Responding to drought

- Emergency relief
- Impact assessment
- Recovery
- Restoration

**Non-drought period**
**Drought period**

- Households
- Livelihoods
- Food security
Three dimensions of drought impact & vulnerability

1. Agriculture & ecosystems
2. Water demand/availability
3. Economy & livelihoods

People-centred: livelihoods, economies, resilience

Hydrological: water demand vs availability

Land/(agro) ecosystem-based

(Meteorological Hazard)

Source: Caroline King-Okumu, 2019
The Drought Toolbox is currently being developed as part of the Drought Initiative by the close partnership collaboration of the UNCCD, WMO, FAO, GWP, National Drought Mitigation Center (NDMC) of the University of Nebraska, and UNEP-DHI.
Drought monitoring and early warning tools

Data Portal with freely available data for floods and drought assessments. Data updated in near real time, read more in the user guide.
Interaction visualization tools for assessing drought
...involving drought-relevant data sets

Example: Tropical Rainfall Measuring Mission (TRMM) data
Time for a quiz!

Can drought occur even when rainfall levels are stable?
Time for a quiz!

Can drought* occur even when rainfall levels are stable?

*water scarcity would be the more accurate term
Time for a quiz!

Can land cause water scarcity?
Time for a quiz!

Can land cause water scarcity?

...or better stated, **how we use and manage land** can cause water scarcity.
Generally speaking…

There are three main contributors to drought:

- Land and sea surface temperatures
- Atmospheric circulation patterns
- Soil moisture

Each of these physical parameters is linked to the others intricately; changing any one of them significantly will typically set up a chain of events that causes the other parameters to change.

https://earthobservatory.nasa.gov/features/NAMerDrought/NAMer_drought_2.php
Image credit: Susan Byrne, NASA GSFC
Anything which reduces the water holding capacity of soil...

Anything which consumes more soil moisture...

...contributes to water scarcity.
In current policy and practice in your country, what factors trigger a response to drought?

Credit: Matthew T Rader @matthew_t_rader https://unsplash.com/photos/2nAWr7kVspY
How large is the problem? Very large.

Global map of drought vulnerability

Fig. 6. Global map of drought vulnerability.
Which is why policies focus on the land-drought nexus are so important.
Thank you!

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