Land degradation neutrality: The science-policy interface from the UNCCD to national implementation

Anna Luise
ISPRA - Italian National Institute for Environmental Protection and Research
anna.luise@isprambiente.it
UNCCD Scientific & Technical Correspondant/
Vice-chair of the UNCCD Committee on Science and Technology - CST
Soil degradation is a global phenomenon ...

Many pressure factors will drive local effects, due their specific combinations:

- Climate change, with reduced rainfall, rising temperature, insufficient (or differently distributed) water availability for soil, effects of quantity and quality of drought events, changes on vegetation and productive activity, ...

- Erosion: soil disintegration and removal due to rain and/or wind action

- Anthropogenic factors related to the management of natural resources (water, soil and vegetation) such as:
  - Non-sustainable use, contamination and over-exploitation of soils, surface water and groundwater
  - Loss of biodiversity, with the dismantling of plants and animal communities
  - Adverse effects on physical and chemical soil properties due to fires
  - Unsustainable agricultural practices such as steep slopes, excessive use of agricultural machinery, fertilizers and pesticides
  - Sealing and consumption of fertile soil
  - Competition for the use of natural resources, especially for water resources, but also for the soil itself
Land Degradation: a silent threat to humanity

The land degradation (and the desertification that represents its extreme level) is the consequence of the long term unsustainable soil management along with the negative impacts of climate change.  

It's the straw that breaks the Camel's back...

LD as gradual and unclear process with catastrophic consequences if ignored for too long....

Land degradation is not taken into account until a crisis occurs, a catastrophic event appears.

And even though technical and scientific knowledge is potentially available for prevention and restoration interventions, the main challenge is institutional and political
Established in 1994, the United Nations Convention to Combat Desertification - UNCCD is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018) that was adopted in 2007, Parties to the Convention further specified their goals:

"to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability"
Desertification: the agreed definition

The land degradation in arid, semi-arid and dry sub-humid areas, caused primarily by human activities and climatic variations.

- Does not refer to the expansion of existing deserts. It occurs in those land extremely vulnerable to over-exploitation and inappropriate land use.

- Over 250 million people are directly affected by desertification, and about one billion people in over one hundred countries are at risk. These people include many of the world’s poorest, most marginalized and politically weak citizens.

- Desertification menace also many developed countries were the land degradation is reaching its ultimate level.

Countries affected by desertification should develop and carry out National Action Programmes.

Developed countries are expected to encourage the mobilization of substantial funding for these action programmes.

(adapted from UNCCD Explanatory Leaflet Text)
The UNCCD Science-Policy Interface (SPI) was established in 2013 (at UNCCD COP 11, Windhoeck, Namibia) as a temporary body. The aim was to promote dialogue between scientists and policy makers on desertification, land degradation and drought (DLDD). The SPI provides the Committee on Science and Technology (CST) a strong thematic guidance translating available scientific knowledge into policy options, helping to ensure a strong scientific foundation to the policy decisions.

Composition of the SPI:
• 10 globally selected independent scientists
• 5 regionally nominated independent scientists
• 5 elected CST Bureau members (science-focused policy makers)
• 5 observer organization representatives (such as IUCN, UN Environment, FAO, WMO, CSO)
UNCCD SPI Activities

- Production of peer-reviewed technical reports as well as science-policy briefs
- Peer-reviews of other scientific assessments and science-based communications
- Interlingages with the larger scientific community, encouraging relevant and salient research
- Collaborations with other scientific panels and bodies, among all IPBES, IPCC, GSP-ITPS, etc.

Last reports:
- [Creating an Enabling Environment for Land Degradation Neutrality and its Potential Contribution to Enhancing Well-being, Livelihoods and the Environment](#)
- [The Land-Drought Nexus: Enhancing the Role of Land-based Interventions in Drought Mitigation and Risk Management](#)
The objective of preventing, avoiding and restoring degraded soils and combating desertification and the effects of drought has been included in the UN Agenda 2030, the action plan for people, the planet and prosperity.

The Agenda 2030 was adopted by the UN General Assembly and signed in September 2015 by Governments of the 193 UN Member States.

The main element are the 17 Sustainable Development Goals - SDGs.
17 Goals
160 associate Targets
Around 200 indicators (UN Statistical Commission)
“Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”

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

UNCCD is considered its CUSTODIAN ORGANIZATION

LDN is the focus of the 2018 – 2030 Framework Strategy
...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 COP 12, 2015)

This definition is intended to apply to affected areas as defined in the text of the Convention.

LDN is conceived as an objective to be implemented through the adoption of measures at all level (strategies, plans, programs, actions, ...) to avoid or reduce degradation of land, combined with measures to reverse degradation of already degraded land, such that losses are balanced by gains, in order to achieve no net loss of healthy and productive land.
LDN Conceptual Framework

- Maintain or improve ecosystem services
- Maintain or improve productivity, in order to enhance food security
- Increase resilience of the land and populations dependent on the land
- Seek synergies with other environmental objectives
- Reinforce responsible governance of land tenure
Multiple benefits of LDN

... for poverty, food security, environmental protection and sustainable use of natural resources
Implementation of activities aiming to:

• maintain and, where possible,
• enhance the stocks of natural capital associated with land resources and the ecosystem service furnished, with a special reference to livelihood (food production).

The logical chain:

Avoid > Reduce > Reverse land degradation
LDN as a concept of equilibrium

Neutrality means no net degradation, compared with this baseline.

Monitoring achievement of neutrality is based on:

- quantifying the baseline and
- assessing the balance between:
  - area of “gains” (significant positive changes/improvements)
  - area of “losses” (significant negative changes/degradation)

relative to an specific baseline, within each land type, at the target date.
UN Statistical Commission/UNCCD:

• Indicator 15.3.1 “Proportion of land that is degraded over total land area”

• Sub-indicators:
  – Land cover
  – Land productivity
  – Soil Organic Carbon

Among UNCCD Progress indicators
After last IAEG-SDGs - Inter-agency and Expert Group on SDG Indicators, the indicator 15.3.1 is classified at **Tier 2:**

*Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.*

https://unstats.un.org/sdgs/iaeg-sdgs/
If any of the three indicators/metrics shows significant negative change, it is considered a loss. Conversely, if at least one indicator/metric shows a significant positive change and none shows a significant negative change it is considered a gain.
The UNCCD LDN Target Setting Programme

122 participating countries

Multi-partner initiative established

Financial support by France, Germany, the Republic of Korea, Luxembourg, Spain, Turkey, Trinidad and Tobago, GEF/IUCN, GEF/UNEP, UNDP

Wide range of technical partners (e.g. ESA, JRC, ISRIC)

Key documents/frameworks prepared (e.g. draft technical guide, leverage plan, monitoring & evaluation system)

4 regional inception workshops for enabling countries to establish national LDN targets were organized for Regional Implementation Annexes I, II, III, IV and V to:

- Familiarize participating countries with the LDN target setting process
- Identify opportunities for leverage
- Create a mutual understanding of the LDN target setting process
LDN TS Project: additional opportunities

- To foster coherence of national policies, actions and commitments – from agriculture policy to climate action and restoration commitments
- To move from pilots to scale, from small scale, sometimes fragmented projects, to large scale, transformative projects
- To create blended finance packages to finance the transition towards LDN, combining public/private, national/international, climate and development resources
Building blocks for LDN target setting

1. LEVERAGING LDN
   • Engage decision makers and stakeholders involved in land management

2. ASSESSING LDN
   • Making informed decisions on what action to take by assessing the current state of land and its drivers of degradation

3. SETTING LDN TARGETS & MEASURES
   • Define country’s ambitions in terms of combatting land degradation by defining LDN targets and measures

4. ACHIEVING LDN
   • Create an enabling environment by integrating LDN into national policies and identifying transformative LDN programmes and projects
Create synergies with global/regional commitments

- SDG process
- Aichi Biodiversity Targets of the CBD
- Bonn Challenge on Forest and Landscape Restoration (FLR)
- 4 per 1000 Initiative
- 20x20 Initiative for Latin America and the Caribbean
- African Forest Landscape Restoration Initiative (AFR100)
- NDCs and National Adaptation Plans under the UNFCCC
2. Assessing LDN

**STEPS:**

- Establish LDN baseline
- Analyse LDN legal and institutional environment
- Map out LDN trends and drivers
3. Setting LDN targets and measures

- Establish LDN targets
- Identify key policy/technical measures to achieve LDN targets
- Facilitate political endorsement of measures to avoid, reduce and reverse land degradation

→ **LDN at national scale** (e.g. by 2030 as compared to 2015)
→ **LDN at sub-national scale** (e.g. LDN is achieved in the western province of country X by 2030 as compared to 2015)
→ **Specific targets to avoid, reduce and reverse land degradation** (e.g. improve productivity and SOC stocks in cropland and grasslands by 2030 as compared to 2015)
4. Achieving LDN

• Integrate LDN in selected national policies and commitments
• Map out transformative LDN projects/programmes and innovative finance

ENVIRONMENTAL, SOCIAL and ECONOMIC BENEFITS

- Ensuring food security
- Reducing social instability, conflicts, migrations
- Reducing poverty
- Mitigating climate change
The project was performed by a Working Group of experts from the main national research Institutions under the technical responsibility of the Ministry of Environment and the guidance of the UNCCD Focal Point of the Ministry of Foreign Affairs.

- The WG followed ToRs and guidelines delivered by UNCCD.
- Data utilized: partners’ data base.
- Costs: partners’ resources.

WG components:
ISPRA: Anna Luise, Marco Di Legnino, Michele Munafò, Fiorenzo Fumanti, Carlo Jacomini, Marina Vitullo; ENEA: Maurizio Sciortino; CREA: Guido Bonati, Filiberto Altobelli, Flavio Lupia; CNR: Mauro Centritto
Land Cover/Land Use Change: Data and maps were elaborated in the CORINE Land Cover Project of the European Environmental Agency. Land use changes were assessed at regional level and adapted to the IPCC categories, settling the areas (e.g., cropland, grassland, etc.) where a significant change had been recorded in critical categories with potential effects on land productivity.

Land Productivity Status and Trends: NDVI data, based on NASA MODIS TERRA and AQUA satellites, were used as proxy to assess land productivity status and trends.

Soil Organic Carbon Status and Trends: The IPCC methodology was followed to assess the carbon stock and the carbon stock changes related to the areas in conversion to different land use. Soil Organic Content (SOC) was used to infer the carbon stock changes for the different categories and for the land converted to other land uses.

UNCCD indicators
+

synergies between UNFCCC and UNCCD reporting
IT LDN project: land cover/land use change map (CLC 2012 synthesis)

- Settlemements: 5.3%
- Agricultural land: 52.2%
- Forest and semi-natural area: 41.3%
- Body of water: 1.0%
- Wetland: 0.2%

CORINE Land Cover 2012

- Superfici artificiali
- Superfici agricole utilizzate
- Territori boscati e ambienti semi-naturali
- Zone umide e corpi idrici
NDVI data from NASA MODIS TERRA and AQUA satellites with:
- Spatial resolution: 250 x 250 m
- Temporal resolution: 16 days (Maximum Value Composite images), from February 2000, freely available from NASA web site (https://ladsweb.nascom.nasa.gov)

NDVI data have been used as proxy to assess land productivity status and trends over the Italian territory for the years 2000-2015. Positive and negative LP trends are associated to changes of vegetation cover, to the quantity of biomass and to the quantity of carbon stored in the vegetation.
IT LDN project: Land Productivity changes 2000 -2016

Source: ENEA
Carbon stock and carbon stock changes related to the area in conversion to another land use were assessed using the IPCC methodology (according to UNFCCC and related Kyoto Protocol reporting) taking into account the nature of initial and final land use category (2000-2012).
The LDN project highlights a number of national priorities, with different target year, to be considered in national plans and programmes:

- improvement of understanding of ongoing land degradation processes and validation of Land Productivity Dynamics monitoring
- identification of targets and action/measures in pilot areas with stakeholders
- implementation of measures in pilot areas.
- improvement of awareness of land degradation causes and impacts among policy makers at national and local level
- mitigation of pressures on 12,200 sq km of degrading forest areas with SLM measures
- mitigation of pressures on degrading agricultural areas with SLM measures
In the Report on Land Consumption 2019, a new specific chapter concerning the “soil degradation” is included. The three indicators analyzed in the LDN project (land cover, land productivity and organic carbon content) have been integrated with other indices / indicators considered particularly important in the Italian context and mostly related to the problem of soil sealing:

- Loss of habitat quality
- Soil erosion
- Areas covered by fire
- Index of fragmentation
- Areas of potential impact
- Density of artificial coverings
Trends Earth model, a Qgis plugin that allows processing of time series of indices and variables from satellite images, allowed to generate an overall cartography of soil and land degradation, assessing its extension in the 2012-2018 interval as well as the number of causes (1-2-> 3).

<table>
<thead>
<tr>
<th>Cause di degrado</th>
<th>km²</th>
<th>% del terr. naz.</th>
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<tbody>
<tr>
<td>1</td>
<td>69.323</td>
<td>22,96</td>
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<tr>
<td>2</td>
<td>9.961</td>
<td>3,30</td>
</tr>
<tr>
<td>≥ 3</td>
<td>796</td>
<td>0,26</td>
</tr>
<tr>
<td>Totale</td>
<td>80.079</td>
<td>26,53</td>
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IT LDN Project: Some First Good Signals

- Land degradation & desertification were included the National Strategy for Climate Change Adaptation (Report by Ministry of Environment);

- Land degradation & desertification issues have been addressed in the National Action Plan for Climate Change Adaptation (report under public hearings);

- SDG Target 15.3 is included in the target that Italy is willing to adopt in the Strategy for Sustainable Development;

- Italy Government: Agriculture for development in the Mediterranean basin.
IT LDN PROJECT, NEXT STEPS: WHERE WE ARE

Step 1: Government leadership stakeholder engagement
(Already done for the assessment phase, started for the political adoption phase)

Step 2: Setting the LDN baseline
Done, to be reviewed

Step 3: Assessing land degradation trends
Done

to be reviewed

Step 4: Identifying drivers of land degradation
Done

to be reviewed

Step 5: Defining national voluntary LDN targets
Only at national level, to be reviewed and verified in pilot areas, already identified

Step 6: Mainstreaming LDN in land use planning sustainable development planning
Process started for non legally binding instruments (strategies)

Step 7: Identifying measures to achieve LDN
Process started (based on measures already identified for PNAC)

Step 8: Facilitating action towards LDN
To be done

Step 9: Monitoring progress towards LDN
To be done

Step 10: Reporting on LDN
Specific guidelines to adapt the general framework model for LDN activities to the national specific conditions should be developed.

Policy of degradation/restoration activities, loss and gains: national vs. local situation.

Time period for meeting the targets is rather short: land and soil degradation phenomena are slow as well as the results of restoring activities of past degradation. A long-term strategy for phasing out target achievement could be better.
Methodologies based on global databases is the first step to policy relevant information on ecosystem conditions, where local peculiarities are relevant.

Global databases are not enough, necessity to utilise/develop national/local data; harmonisation with other parallel system (LULUCF, etc).

Global databases must be integrated with national/local data:
- to validate data and information
- to increase spatial and temporal resolution of national scale analyses in order to develop national LDN strategies

A benchmark system for each indicator should be built.

Integration with other indicators and especially with climate change impact and adaptation is possible and could support effective synergies.

The methodologies utilised do not directly consider indicators for restoring activities.
• Understanding driving forces behind degradation process is needed for the identification of policies and actions

• Stakeholder involvement is necessary to validate assessment

• Other parallel SDG indicators should be integrated/taken into account to build an effective evaluation of LD able to support policy actions (through target setting process)
All land components should be taken into consideration at decision making & operational level as well as all related factors (climatic state and trends, pressure factors, etc.).

Among them, build manufactures, infrastructures, cultural heritage, etc. should be included and trying to keep their individual values.

Land and soil are cross-cutting issues for:

- ecosystem dynamics
- socio-economic activities

LD understanding (indicators) is a common component of land and soil as well as climate change mitigation and adaptation policies.

Land degradation is a complex phenomena that could’nt understood without considering the relations between each component, overcoming a simple PSR framework: from linear to complex

At national level, climate-related as and land/soil policies are still fragmentary and often in competition where not contradictory
Land-use change and land degradation affect climate change. Significant changes in the land surface resulting from human activities include:

- tropical deforestation, which changes evapo-transpiration rates
- land-use changes that implies land degradation and desertification have a strong increase of surface albedo
- general effects of soil moisture characteristic on agriculture sector

Viceversa, healthy land could:

- contribute to mitigation of climate change through improving the carbon sequestration in soils
- control albedo increase
- maintain local evapo-transpiration rates
The LDN 2030 target is an opportunity to improve not only soil conditions but also its productivity as well as economic and social conditions of rural communities by supporting local and family farming as well as promoting new jobs for restoring

Avoiding land degradation contribute to minimizing climate change, enhancing carbon sinks on soil and avoiding biodiversity loss

The implementation (as well as the reporting…) of the three Rio Convention UNCBD, UNFCCC, UNCCD is facilitate throughg a sinergistic approach
Policy makers have to formulate and adopt principles, rules, and guidelines to influence decisions and actions at various scales for balancing anticipated new losses with gains, and to consider principles for limiting unintended outcomes.

Implementing LDN needs:
• A firm grounding of the ‘neutrality’ concept in national policies and policy procedures;
• Associated policy procedures in day-today operations in place to enforce, monitor, and verify the impacts of national and local policies and actions

An enabling policy environment for achieving LDN should be in place.
From a policy point of views:

• The LDN 2030 target is an opportunity to improve not only soil conditions but also its productivity as well as economic and social conditions of rural communities by supporting local and family farming as well as promoting new jobs for restoring

• Avoiding land degradation contribute to minimizing climate change, enhancing carbon sinks on soil and avoiding biodiversity loss

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