

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

From UNCCD:

Definition

This indicator is defined as the amount of land area that is degraded. The measurement unit for indicator 15.3.1 is the spatial extent (hectares or km²) expressed as the proportion (percentage) of land that is degraded over total land area.

Concepts

The following definitions, adopted by the United Nations Convention to Combat Desertification (UNCCD), are considered generic and well-accepted globally:

Land degradation is the reduction or loss of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes arising from human activities.¹

Land degradation neutrality is 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.²

Method of computation

The indicator 15.3.1 is derived by summing all those areas subject to change, whose conditions are considered negative by national authorities (i.e., land degradation) while using “good practice guidance” in the measurement and evaluation of changes to each of the following three sub-indicators:

- i) land cover and land cover change,
- ii) land productivity, and
- iii) carbon stocks above and below ground

The most common method involves the use of site-based data to assess the accuracy of the sub-indicators derived from Earth observation and geo-spatial information. Another approach uses site-based data to calibrate and validate Earth observation indices and measures where the remote sensing variable is used to predict the same biophysical variable on the ground. A mix-methods approach, which makes use of multiple sources of information and combines quantitative and qualitative data, will likely be used to:

- i) **Set Baselines** to determine the initial status of the sub-indicators in absolute values. This would include: 1) the preparation of base land cover information which builds on standard land cover ontology (e.g., LCCS/LCML); 2) the establishment of a baseline for land productivity (e.g., NPP/NDVI); and 3) the establishment of a baseline for carbon stocks, above and below ground, with an emphasis on soil organic carbon below ground and building on the IPCC’s work on carbon above ground.
- ii) **Detect Change** in each of the sub-indicators, including the identification of areas subject to change and their validation or evaluation by a participatory national inventory of land degradation, particularly where change in two or three of the sub-indicators coincide or overlap spatially. When contextualized with information at the national and sub-national levels, areas with declining productivity and carbon stocks may be considered degraded while areas with increasing productivity and carbon stocks may be considered improving. The definition of adverse or desirable land cover changes is highly contextual and

¹ <http://www.unccd.int/Lists/SiteDocumentLibrary/conventionText/conv-eng.pdf>

² Decision 3/COP12 <http://www.unccd.int/Lists/OfficialDocuments/cop12/20add1eng.pdf>

needs to take into account local ecological and socio-economic circumstances which require in-situ validation.

iii) **Derive the Indicator** by summing all those areas subject to change, whose conditions are considered negative by national authorities (i.e., land degradation) while using “good practice guidance” in their measurement and evaluation of changes within each sub-indicator and their combination.

Rationale and interpretation

Leveraging the existing reporting mechanisms of the UNCCD for these sub-indicators and those of other organizations and agencies would provide a practical approach to monitoring and reporting progress towards SDG target 15.3. **Land cover and land cover change** has multiple applications for evaluating progress towards various SDG targets and gives a first indication of land degradation. **Land productivity** points to long-term changes in the health and productive capacity of the land. On seasonal to decadal timescales, **carbon stocks** of natural and managed systems may be explained largely by changes in plant biomass (“fast variable”) but, on longer time scales, soil organic carbon stocks (“slow variable”) become a more relevant indicator of the functioning of the system, its adaptive capacity and resilience to perturbations (e.g., floods, drought), and thus its capacity to provide ecosystem services in a sustainable manner over the long term.

Data for global, regional and national monitoring

For land cover and land cover change, most countries have quantitative data and mapping capacities which are derived primarily from Earth observation. For carbon stocks, countries regularly report to the UNFCCC according to a tiered approach. For land productivity, data for large geographical areas can be derived using Earth observation. Following the 2006 IPCC Guidelines³ with regards to estimation methods at three levels of detail, from tier 1 (the default method) to tier 3 (the most detailed method), the following approach for indicator 15.3.1 is proposed:

Tier 1: Earth observation, geospatial information and modelling

Tier 2: Statistics based on estimated data for administrative or natural boundaries

Tier 3: Surveys, assessments and ground measurements

Each of the tiers may have a unique approach as to how driver (land management/use) and state (land resources) variables interact in a land degradation assessment⁴ which depends primarily on the data and upscaling methods available. This approach would allow national authorities to use methods consistent with their capacities and resources. A decision tree would guide the selection of which tier to use for estimating the sub-indicators according to national circumstances, including the interpretation and availability of data. For Tier 1, global and regional data sets are available from a number of reliable sources.

Disaggregation

This indicator can be mapped and disaggregated by land cover type or other policy-relevant units, such as agro-ecological, bio-cultural or administrative. Land cover is a revealing metric and a disaggregation or stratification tool which provides a spatially explicit information layer for the sub-indicators on land productivity and carbon stocks as well as other SDG indicators.

Comments and limitations

As the sub-indicators will never fully capture the complexity of land degradation processes, there will always be a need for other relevant national or sub-national indicators, data and assessments to account

³ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/0_Overview/V0_1_Overview.pdf

⁴ <http://www.fao.org/nr/lada/>

for national circumstances and contexts. Ultimately, the expectation is that national capacities will be sufficiently increased so that each country can independently report on this indicator, as was envisioned in the UNCCD's Land Degradation Neutrality project.⁵

In the absence of national data, Earth observation and geospatial information represents the next best way to measure land degradation over large geographical areas even though it is clear that significant challenges remain. The production of comparative quantitative assessments and corresponding mapping over large geographical zones would help many countries to set policy priorities among diverse land resource areas as well as compare and transfer their experiences.

In order to operationalize this global indicator, further work is needed to provide a standardized approach and "good practice guidance" to derive the sub-indicators and help build monitoring and reporting capacities at the national, regional and global levels. Significant work is underway to develop a global partnership to train and build capacity at the national level, which for many countries can be achieved in a relatively short time frame.

The UNCCD, in close collaboration with the FAO and other relevant partners, would take the lead in compiling data for global reporting because i) the sub-indicators are already part of the UNCCD country reporting mechanism and ii) the UNCCD, with a number of funding and implementing agencies, is now building capacity in 60+ countries for implementing and monitoring SDG target 15.3. This will include the development of "good practice guidance" for indicator 15.3.1 with well-defined methodologies and decision trees using a tiered approach to data use and validation.

Linkages within the SDG indicator framework

The sub-indicators are based on generally agreed upon definitions and methodologies that facilitate interoperability with other quantitative and qualitative indicators, including the SEEA. By using these sub-indicators to derive SDG indicator 15.3.1, countries would be able to complement and validate progress towards other SDG targets. In this regard, the UNCCD is supporting the FAO in its efforts to refine and operationalize the indicators for:

- SDG target 2.4 which aims to "progressively improve land and soil productivity" using the indicator 2.4.1 "Proportion of land under productive and sustainable agriculture", and
- SDG target 15.2 which aims to "restore degraded forests and substantially increase afforestation and reforestation globally" using the indicator 15.2.1 "Progress towards sustainable forest management".

⁵ <http://www.unccd.int/en/programmes/RioConventions/RioPlus20/Pages/LDN-Project-Country-Reports.aspx>