UNEP

CBD

Convention on Biological Diversity

Distr.
GENERAL

UNEP/CBD/ID/AHTEG/2015/1/INF/5
29 July 2015

ENGLISH ONLY

AD HOC TECHNICAL EXPERT GROUP MEETING
ON INDICATORS FOR THE STRATEGIC PLAN
FOR BIODIVERSITY 2011-2020
Geneva, Switzerland, 14-17 September 2015

PROPOSAL ON JOINT INDICATOR FOR MONITORING LAND DEGRADATION

Note by the Executive Secretary

1. The Executive Secretary is circulating herewith, for the information of participants in the meeting of the Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020, a proposal on joint indicators for monitoring land degradation. The report was prepared by the Secretariat of the United Nations Convention to Combat Desertification to support the work of the Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity 2011-2020.

2. The report is being circulated in the form and language in which it was received by the Secretariat.

Proposal on joint indicator for monitoring land degradation

Note from the UNCCD secretariat to the Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity 2011 – 2020

This note represents an initial contribution from the UNCCD secretariat to the AHTEG. It suggests a practical suite of indicators within a tiered framework to simultaneously measure land degradation, monitor progress towards achieving land degradation neutrality targets in the framework of the United Nations Sustainable Development Goals (SDGs) and contribute to monitor progress towards Aichi Biodiversity Targets 15 and 7.

1. Background

Land degradation is defined in the UNCCD as "*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, including processes arising from human activities*".[1] In other words, land degradation is the reduction in the capacity of the land to perform certain functions to deliver ecosystem goods and services that support society and development (MA, 2005).

In Rio+20, Member states "recognized the need for urgent action to reverse land degradation" and committed themselves to "strive to achieve a land degradation neutral world".

Land degradation neutrality (LDN) is defined by the UNCCD Intergovernmental Working Group (IWG) on the follow-up to Rio+20 as "a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems".

A LDN target is embedded in the SDG framework under goal 15.[2] In its current formulation, target 15.3 states: "By 2020, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation-neutral world".

The UNCCD secretariat has submitted to the Committee for the Coordination of Statistical Activities (CCSA) an initial contribution on the development of an indicator for target 15.3. This proposal builds on the Convention's assets. Since 2008, the Parties to UNCCD have worked on an indicator framework to measure progress towards the strategic objectives (SOs) of the Convention.[3] These efforts culminated in 2013 with the adoption at the eleventh session of the COP of a monitoring and evaluation approach for

[1] UNCCD (United Nations Convention to Combat Desertification). 1994. Elaboration of an international convention to combat desertification in countries experiencing serious drought and/or desertification, particularly in Africa. Final text of the Convention. Available at: <http://www.unccd.int/Lists/SiteDocumentLibrary/conventionText/conv-eng.pdf>

[2] "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".

[3] UNCCD. 2013. Refinement of the set of impact indicators on strategic objectives 1, 2 and 3. Recommendations of the ad hoc advisory group of technical experts. ICCD/COP(11)/CST/2. UNCCD, Bonn. Available at: <http://www.unccd.int/Lists/OfficialDocuments/cop11/cst2eng.pdf>

land degradation consisting of: (i) a set of six progress indicators[4]; (ii) a conceptual framework that allows the integration of indicators; and (iii) indicators sourcing and management mechanisms (UNCCD, 2013b).[5] Three of the adopted indicators have been identified as particularly relevant in the framework of the SDG process to measure progress in achieving LDN targets.

It is worth noting that the indicator framework described in the next section will be used by UNCCD country Parties to set national voluntary targets on LDN and report on progress towards achieving these targets.

2. Framework for measuring trends in land degradation

It is widely acknowledged that there is no single indicator which could unambiguously address the variable pathways of land degradation driven by the complex and multiple human-ecosystem interactions involved with land use. The UNCCD secretariat proposes a practical suite of indicators within a tiered framework to measure trends in land degradation and monitor progress towards achieving LDN targets.

Indicator: Trends in land degradation (ha/km^2 or proportion of total land area)

Trends can be either negative (degradation) or positive (improvement)

Metrics:

Tier 1: Trends in land use/cover

Tier 2a: Trends in land productivity

Tier 2b: Trends in soil organic carbon stocks

Countries will develop an understanding of land degradation by considering a limited range of metrics in combination. The selected metrics are measurable and essential in capturing a minimum of land characteristics that are globally comparable.

Monitoring of trends will primarily rely on internationally-recognized data sources (i.e. remote sensing data) and methodologies. The use of readily available global data sets will ensure harmonization and comparability, limit data collection efforts at national level and puts greater emphasis on data quality improvement and interpretation. To ensure national ownership of the process, countries will be called to validate default global data with national data, if available.

[1] Progress indicators adopted by the UNCCD COP (decision 22/COP.11):

SO 1: Indicator 1.1: Trends in population living below the relative poverty line and/or income inequality in affected areas;
Indicator 1.2: Trends in access to safe drinking water in affected areas;

SO 2: Indicator 2.1: Trends in land cover;
Indicator 2.2: Trends in land productivity or functioning of the land;

SO 3: Indicator 3.1: Trends in carbon stocks above and below ground;
Indicator 3.2: Trends in abundance and distribution of selected species.

[5] UNCCD. 2013b. Decision 22/COP.11. Advice on how best to measure progress on strategic objectives 1, 2 and 3 of The Strategy. UNCCD, Bonn. Available at: <http://www.unccd.int/en/programmes/Science/Monitoring-Assessment/Documents/Decision22-COP11.pdf>

Concerns exist that these metrics do not comprehensively address all quantity and quality aspects of land degradation.[6] Therefore, the monitoring of this indicator needs to take place within the context of broader monitoring and accountability strategies. Complementary indicators at national to sub-national scale that monitor issues relevant to specific national contexts (e.g. socio-economic indicators, biodiversity related indicators) are crucial. Linking global data to (sub-) national data would blend a top-down with a bottom-up approach.

The metadata description contained in Annex 1, which was recently submitted as a contribution to the SDG process, provides more detailed information about definitions, method of computation, rationale, data sources and limitations.

3. A shared approach among the Rio conventions

As mentioned above, the proposed indicators have already been adopted at the level of the UNCCD COP to measure progress towards the UNCCD ten-year strategic plan 2008-2018. The proposed indicators are also similar to some of the headline indicators included in indicative list of indicators available for assessing progress towards the Aichi Targets in the CBD decision XI/3, for instance: trends in primary productivity; trends in area of degraded ecosystems restored or being restored; and status and trends in extent and condition of habitats that provide carbon storage.

Starting from 2016, UNCCD affected country Parties will report on these indicators, making use of available data from recognized sources. It is also expected that UNCCD Parties will use these indicators to set voluntary national LDN targets.

The UNCCD secretariat started testing this tiered framework since May 2014 within the LDN Project being implemented by 16 affected country Parties worldwide. Default data on the three core indicators have been made available to the countries for validation and this indicators framework is being tested against its relevance, methodological soundness, measurability and ease of understanding and communication. Annex 2 contains, as an example, default data on land productivity dynamics at global level and as made available to Ethiopia with the technical support of the Joint Research Centre of the European Commission. Annex 3 contains an illustrative example of how a hypothetical country could set national targets.

The tiered framework proposed to measure trends in land degradation and monitor progress towards achieving LDN targets could also contribute to monitor progress towards the Aichi targets and particularly towards Aichi target 15,[7] which calls for improving ecosystem resilience through conservation and restoration activities and for the restoration of at least 15% of the world degraded ecosystems, and Aichi target 7, which calls for sustainable land management (SLM).[8]

SLM and ecosystem restoration are in fact the two complementary pathways of action and management options identified by the IWG to reach LDN. Preventing and reversing land degradation, through SLM

[6] GLII-EEA-IASS. 2015. Outcome document expert workshop organized by the Global Land Indicators Initiative, the European Environment Agency and the Institute for Advanced Sustainability Studies on indicators for sustainable land management. Available at: <http://www.iass-potsdam.de/sites/default/files/files/land_and_soil_indicators_proposal.pdf>

[7] "By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification."

[8] "By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity."

and ecosystem restoration, can simultaneously maintain or re-establish ecosystem resilience and adaptive capacity, reduce net greenhouse gas emissions, and contribute towards the conservation of biodiversity, thereby contributing towards the goals of all three Rio conventions.

The propose indicators could help responding to questions such as:

- What areas in the country are degraded?
- What are the areas of importance for biodiversity, ecosystem services and human wellbeing that could be restored?
- What areas are important for carbon sequestration?

Despite the different approaches to reporting adopted by the UNCCD, the CBD and the UNFCCC, it is evident that the use of indicators that the three agreements have in common and their underlying datasets would contribute to enhance synergies in implementation at the national level, increase efficiency, avoid duplication of efforts as well as to foster action for scaling up ecosystem restoration and promote the role of ecosystems for climate change mitigation and adaptation.

The proposed suite of indicators is indeed cross-cutting and multi-purpose. While it is recommended to monitor progress towards achieving LDN targets and for joint use among the Conventions, it also has the potential to contribute to a large number of SDG targets (i.e. 1.5, 2.3, 2.4, 6.6, 12.2, 13.1, 14.1, 15.1, 15.2 and 15.5).

Annex 1

Indicator "Trends in land degradation": metadata[9]

I. Goal and target addressed

Goal 15: 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 2020, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation-neutral world

Indicator 15.3.1: Trends in land degradation

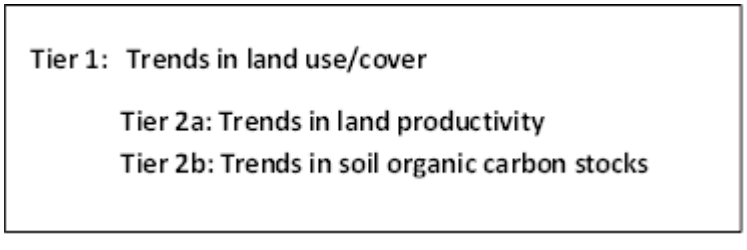
II. Definition and method of computation

Definition

The indicator provides the trend of degrading/stable/improving land at the global, regional and national levels. Change and trends would be built upon and refer to a baseline of the current areal extent of actually degrading/stable/improving land.

The measurement unit of the indicator is total spatial area (e.g. ha, km2) of land showing degrading trend/stability/improving trend per reference land unit (e.g. global land surface, continental/regional/national land surface) or the respective proportion (% of land surface of spatial reference unit). At global to national scale the minimum spatial reporting unit is 100 ha, respectively 1 km^2.

In a tiered approach the indicator derivation is based on the synoptic utilization of trends in land cover/land use (Tier 1), trends in land productivity (Tier 2a) and soil organic carbon (SOC) (Tier 2b) primarily available through widely used global data sources.



[9] As submitted to the Statistics Division of the Department of Economic and Social Affairs, United Nations, in May 2015. Unedited version.

Concept

The UNCCD definition of land degradation is "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" (UNCCD,1994). Land degradation neutrality (LDN) is defined by the Intergovernmental Working Group (IWG/LDN) of the UNCCD as "a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems".

In view of this, it is widely acknowledged that there is no single indicator which could unambiguously address the variable pathways of land degradation driven by the complex and multiple human-ecosystem interactions involved with land use (Gibbs and Salmon, 2015). Since 2008, the Parties to UNCCD have worked on an indicator framework to measure progress towards the objectives of the Convention (UNCCD, 2013a). At its latest session, the Conference of the Parties adopted an indicator framework composed of six indicators (UNCCD, 2013b). Three of these indicators have been identified as particularly relevant in the framework of the SDG process and to measure LDN targets.

The metrics selected for this tiered approach would capture those biophysical dynamics which best characterize the complex process of land degradation, employing internationally-recognized data sources and methodologies.

Method of computation

A baseline of actually degrading, stable and improving land during the first decade (2000-2010) of this millennium is defined by the following components:

- Land Cover State and Land Cover Change 2000 to 2010. The required information is available from global data sets and on-going initiatives (see section IV). Land Cover Change would be considered especially for critical transitions from semi-natural land cover classes (Forest, shrubs, grasslands and sparsely vegetated areas) to cropland and to artificial surfaces, from cropland to artificial surfaces as well as from cropland to semi-natural land cover types. The change would be expressed as area per change class in hectares/square kilometers or proportion of total land over time.

- Trend in land productivity disaggregated by land cover/land use classes. The trends are calculated on available long-term time series of land productivity measures in approximately 1 km spatial resolution and 10 days intervals, best addressed by Earth-Observation-approximated net primary productivity (NPP). Global data for reference years are readily available. Methodologies for calculation of land productivity based on remotely-sensed data are established. An exhaustive overview on the state-of-the-art methodology is given by Yengoh et. al., 2014 (See also Cherlet et al. 2014; Quang Bao Le et al., 2014).

- Trend in Soil Organic Carbon (SOC) disaggregated by land cover/land use classes. The actual state and trends of soil organic carbon content as provided from the currently available global soil information systems and from the reporting mechanisms under the UNFCCC implementation allows currently only model derived SOC trends at country level based on land use /land cover change. (IPCC, 2006). This approach is expected to be mandatory for all reporting countries from 2020. The FAO Global Soil Partnership (GSP) is currently elaboration options for future global measurement programmes that may allow the establishment of spatially distributed SOC trends in the future. In this event Soil Organic Carbon (C) could be

estimated as a stock (expressed as mass per unit area, e.g. g C per ha) or as content (e.g. % or g C/100 g soil) for a reference depth.

Up-dates of the 3 metrics every 5 years are required for establishing indicator trends.

III. Rationale and interpretation

In line with UNCCD (2004) and the Millennium Ecosystem Assessment (MEA, 2005), land degradation is primarily addressed as the persistent reduction or loss of land ecosystem services, notably the primary production service (Safriel, 2007; Vogt et al., 2011). 'Land' is understood as the terrestrial ecosystem that embraces in its entity soil resources, parent material, vegetation cover and other biota, landscape setting and provides ecosystem functions and services. The proposed indicator emphasizes the pivotal role of primary production among a wide range of land's services. The primary production is the basis of food production, regulates water, energy, and nutrient flows in land ecosystems, sequestrates carbon dioxide from the atmosphere and generally provides habitats for diverse species (MEA, 2005).

Although apparent loss of net primary productivity (NPP) is often associated with land degradation, it does not necessarily indicate land degradation (e.g. less intensive agriculture may decrease yields in the short-term, but improve environmental quality in the long-term), nor an increase in NPP always means improvement (e.g. shrub encroachment in natural grasslands). Therefore, for better accounting for the variability of impacts from human–environment interactions, it is suggested that land productivity be stratified by land cover/land use type.

Because land use/cover refers to ecosystem exploitation (Nachtergaele and Petri, 2008) and is conditioned by several anthropogenic factors that define the social and ecological contexts for interpreting causalities from statistical results, broad land-use classes have been recommended for stratifying causal analyses and interpretations of land degradation (Vlek et al., 2010; Sommer et al., 2011; Vu et al., 2014).

Proxies for net primary productivity (NPP), such as NDVI, are only accounting for the quantity of vegetative standing biomass of an ecosystem. Soil organic carbon (SOC) can provide information on other ecosystem services. SOC is one of the most important constituents of the soil due to its capacity to affect plant growth and as it plays a vital role in soil fertility maintenance as well as water flow regulation. It is therefore intrinsically connected to soil quality. Positive trends in SOC can indicate recovery of land and may be associated to sustainable land management practices. Maintaining carbon stocks in soils can also generate additional benefits pertaining to climate change mitigation and biodiversity conservation. As total soil organic carbon (SOC) stocks are strongly affected by land use and land management, it is suggested that measurements of SOC stocks be disaggregated by land use/cover.

In this hypothetical case of a country affected by both a progressive loss of productive areas (i.e. cropland) and a declining productivity of land, remedies to stop these negative trends and become land degradation neutral, as management options identified by the IWG, are (a) restoring degraded lands and increasing cropland areas; and (b) prevent, avoid or minimize land degradation, including through sustainable land management to increase land productivity.

IV. Sources and data collection

Trends in Land Cover/Land Use

There are numerous global data sets and on-going initiatives to provide harmonized global land cover and land cover change data (IPCC, 2006. See Annex 3A.1. See also European Space Agency's Climate Change Initiative Land Cover (CCI-LC): <http://www.esa-landcover-cci.org/> and FAO Global Land Cover SHARE (GLC-SHARE): <http://www.glcn.org/databases/lc_glcshare_en.jsp>). Cooperation and continuity is provided under the umbrella of the GEO and GEOSS frameworks and bilateral and multi-lateral agreements of national and regional earth observation agencies and institutions.
There are also numerous regional products working widely with harmonized standards of FAO-UNEP Land Cover Classification System (LCCS). E.g. Europe Corine Land Cover:
<http://www.eea.europa.eu/data-and-maps/data/corine-land-cover>

Trends in Land Productivity

Main data source for global land productivity are remote sensing data bases of NDVI and other Vegetation Indices/Variables derived from different platforms and sensors covering a time span from 1982 to recent, with weekly to monthly intervals and at spatial sampling between 250 m and 8 km pixel size. Same or similar global initiatives as mentioned above exist to assure harmonized products and standards.
There exist several on-going initiatives to analyse these time series and to derive Land Productivity Change.
An exhaustive overview on the current state of play is given by Yengoh et. al., 2014. Additional information on data sources and methodologies can be found at:
<http://gcmd.gsfc.nasa.gov/index.html>, <http://land.copernicus.eu/global/themes/Vegetation> and <http://wad.jrc.ec.europa.eu/>.

Trends in Soil Organic Carbon

Global estimates of soil organic carbon stocks have been produced in the past to support the calculation of potential emissions of CO2 from the soil under scenarios of change land use/cover and climatic conditions (IPCC, 2006), but very few global estimates are presented as spatial data. For global spatial layers on soil parameters, the most recent and complete dataset is available as the Harmonized World Soil Database (HWSD). The HWSD represents a step forward towards a spatially more detailed and thematically more refined set of global soil data (see <http://eusoils.jrc.ec.europa.eu/ESDB_Archive/octop/Global.html>). Currently available global spatial data sets are model derived and thus do currently not provide trends. The main dynamic component that could modulate the predictions would actually be global information on land use/land cover change which could be used to derive coarse estimates of associated change in SOC stocks using the IPCC methodology (IPCC, 2006), where main changes would be in function of change from forest cover to other land cover types. At regional levels (e.g. in Africa, Australia and Europe), initiatives exist that aim at the establishment of methodologies and protocols for regional scale SOC measurement. This type of initiatives could produce regular up-dates of spatially disaggregated SOC data for wide areas, especially of agricultural land e.g. Aynekulu et al. (2011), Lugato et al. (2014).
(see also <http://www.worldagroforestry.org/downloads/Publications/PDFS/TM11192.pdf> and <http://eusoils.jrc.ec.europa.eu/library/Themes/SOC/LUCASSOC/>)

V. Disaggregation

The indicator could be spatially disaggregated to sub-national administrative units, management relevant landscape units for instance watersheds or catchments e.g. in the context of supranational river basins.

VI. Comments and limitations

There is no single indicator which could unambiguously track land degradation trends. Countries will develop an understanding of land degradation by considering a limited range of metrics in combination. The selected metrics are measurable and essential in capturing a minimum of land characteristics that are globally comparable. These metrics have already been adopted by the UNCCD Conference of the Parties and will be used by UNCCD country Parties to set nationally voluntary targets and report on progress towards achieving these targets.

However, even combined, these metrics do not comprehensively address all quantity and quality aspects of land degradation. Therefore, the monitoring of this indicator needs to take place within the context of broader monitoring and accountability strategies. Complementary indicators at national to sub-national scale that monitor issues relevant to specific national contexts are crucial. Indicators reported under other SDG targets, for instance socio-economic indicators, can provide complementary information to interpret land degradation trends.

Required data is not systematically collected on a routine, harmonized, and comparable basis – particularly in low-income countries. Therefore, monitoring of trends will primarily rely on remote sensing, global data sets. The use of readily available global data sets will ensure harmonization and comparability, limit data collection efforts and puts greater emphasis on data quality improvement and interpretation. However, since national ownership at all levels of the SDG framework is critical, countries should validate default global data with national data, if available. Linking global data to (sub-) national data would blend a top-down with a bottom-up approach.

The indicator is unsuited to annual production. Generally, sampling intervals of 5 years are adequate for the selected metrics. Projections or extrapolations would need to be applied for annual reporting if required.

The use of remotely sensed long-term time series for extracting land productivity trends has repeatedly raised concerns of comparability and apparently diverging results of different products. Issues to be clarified here relate to agreements on the reference time series lengths, the way of aggregating the observed vegetation indices to annual productivity proxy and approaches to evaluate different time series in ensemble. Following recent workshops organized by GEF STAP in 2014 and 2015 an agreement between main actors e.g. amongst others NASA, ESA, EC Joint Research Centre has been reached to jointly address these issues in preparation to UNCCD indicator reporting.

VII. Gender equality issues

Women play an important role in regions affected by desertification and/or drought, particularly in rural areas of developing countries (UNCCD, 1994). Women are key players in both the agricultural and pastoral production processes. They are the primary natural resource managers, providers of food security, and repositories of knowledge and expertise on indigenous plants, medicines, food and water.

Among agricultural communities, men own the land and produce cash crops, and as a result can obtain credit and other facilities. Women on the other hand rarely own land and are often confined to the production of subsistence foods. Without ownership of assets such as land, women cannot access credit and extension and technological services. By contrast, in pastoral communities, assets tend to be communally owned, thus men and women generally have equal access. Yet, pastoral women may face significant barriers to accessing crucial resources, such as water points.

The restoration of degraded soil requires the supplemental use of new technologies. Such technologies are usually transferred through agricultural extension systems staffed by male officers who are more comfortable working with male producers, especially where local cultural norms make it difficult for male extension workers to interact with female producers. Consequently men obtain most of the direct benefits during the initial set-up and implementation stages of the new technology.

VIII. Data for global and regional monitoring

The United Nations Convention to Combat Desertification (UNCCD) compiles data for this indicator. This indicator will be used by UNCCD country Parties to set nationally voluntary targets and report on progress towards achieving these targets. The necessary data are obtained primarily from remote sensing data acquired and processed by various international organizations. As part of the reporting and review process, national estimates derived from global datasets are validated by UNCCD country Parties or replaced with national estimates using data sourced/computed nationally/locally.

With decision 22/COP.11 of the Conference of the Parties (COP) to the UNCCD, the Convention has established a monitoring and evaluation approach for land degradation consisting of: (i) a set of six progress indicators (including land cover, land productivity and soil organic carbon); (ii) a conceptual framework that allows the integration of indicators; and (iii) indicators sourcing and management mechanisms. Affected country Parties to the Convention are requested to report on those indicators for which standardized global datasets that can be disaggregated to the subnational level exist. The UNCCD Secretariat is requested to provide countries with national estimates of each progress indicators based on available data sources. Affected country Parties, in turn, are invited to validate these national estimates and to establish targets using the progress indicators within their National Action Programmes (NAPs).

Progress towards achieving LDN targets will be assessed by the governing bodies of the Convention, in particular the Committee for the Review of Implementation of the Convention (CRIC), against data and information contained in national reports. The CRIC reviews information on progress indicators every four years.

The UNCCD secretariat started testing this approach since May 2014 within the LDN Project being implemented by 16 affected country Parties worldwide. Data and information on the set of progress indicators are being compiled in cooperation with the European Commission's Joint Research Centre (JRC) and the indicators tested against their relevance, methodological soundness, measurability and ease of understanding and communication.

IX. Supplementary information

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X. References

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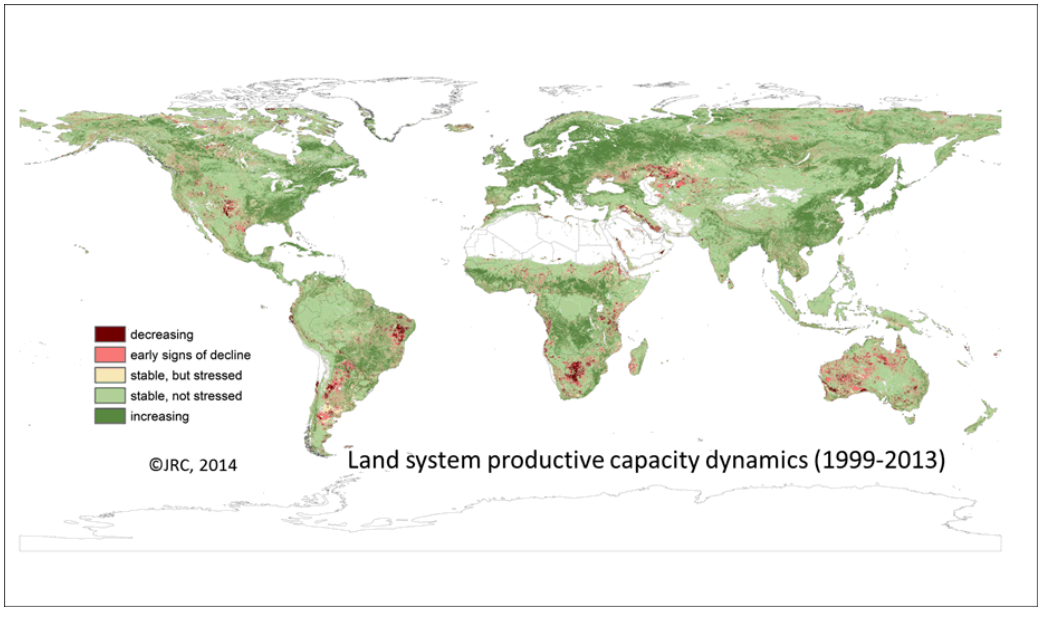
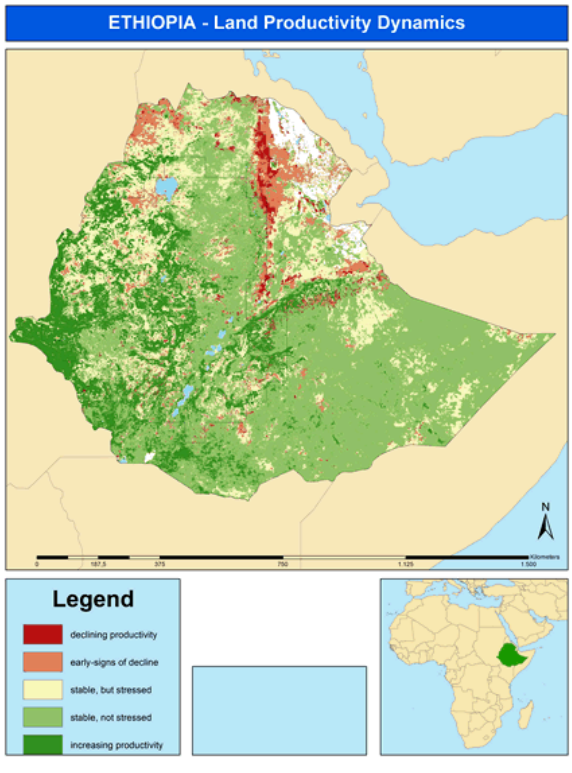
Annex 2

Example of default data: land productivity dynamics at global level and for Ethiopia



The land productive capacity dynamics map shows 5 classes indicating areas of negative or positive change or stability of land productive capacity. It can be interpreted as indicator of change or stability of the land's apparent capacity to sustain the dynamic equilibrium of primary productivity in the given 15 years observation period (1999-2013).



Example: Ethiopia
Coordinate system: GCS_WGS_1984
Cell size (X, Y): 0,0089285714, 0,0089285714 [decimal degrees]
Source: JRC, 2014
VALUES: 1-5 [1=declining productivity – 5=increasing productivity]

Annex 3

Example of how to formulate national LDN targets using the proposed tiered approach

Baseline (2005-2015 trends)

- Trends in land cover: 15 million ha of cropland lost since 2005
    - Trends in land productivity dynamics: 20% of cropland shows declining land productivity capacity
    - Trends in soil organic carbon (SOC) stock: 52 million t lost in cropland since 2005

Possible national voluntary target 2030 (aimed at keeping the amount of healthy and productive land resources stable)

- Increase of 15 million ha the cropland area (through restoration of degraded land)
    - 100% of cropland shows stable of increasing land productivity capacity
    - SOC in cropland increases of 52 million t

Possible national voluntary target 2030 (aimed at increasing the amount of healthy and productive land resources stable)

- Increase of 20 million ha the cropland area (through restoration of degraded land and cultivation of new areas)
    - 100% of cropland shows stable of increasing land productivity capacity
    - SOC in cropland increases of 75 million t

Possible national voluntary target 2030 (aimed at increasing the amount of healthy and productive land resources stable)

- Increase of 15 million ha the cropland area (through restoration of degraded land)
    - 200% of cropland shows stable of increasing land productivity capacity
    - SOC in cropland increases of 63 million t