GEO Work Programme 2017-2019

GEO Initiative on Land Degradation Neutrality
"GEO LDN Initiative"

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Executive Summary In order to halt and reverse the current trends in land degradation, there is an immediate need to enhance national capacities to undertake quantitative assessments and corresponding mapping of their degraded lands, as required by the Sustainable Development Goals (SDGs), the SDG indicator 15.3.1 ("proportion of land that is degraded over total land area") and by the adoption of Land Degradation Neutrality (LDN) targets under the auspices of the United Nations Convention to Combat Desertification (UNCCD).

A coordinated response from the Earth observations and geospatial community to this need would greatly assist countries and other actors involved in implementing LDN, i.e. in setting policy, planning and investment priorities among diverse land resource areas. This would help countries make progress towards multiple SDGs. SDG indicator 15.3.1, for which the UNCCD is the custodian agency, utilizes three sub-indicators (i.e., land cover, land productivity and carbon stocks) that rely, to a large extent, on Earth Observations (EO) and geospatial information.

In September 2017, the UNCCD's 13th Conference of the Parties (COP.13) adopted various decisions related to SDG indicator 15.3.1, most notably decision 9/COP.13 on "Promotion and strengthening of relationships with other relevant conventions and international organizations, institutions and agencies" which:

> *Invites the Group on Earth Observations to support the efforts of Parties to the UNCCD in implementing the Convention by providing space-based information and in situ measurements to assist countries in fulfilling the reporting requirements for Sustainable Development Goal indicator 15.3.1 and fostering data access, national data capacity-building and the development of standards and protocols;*

The Group on Earth Observations (GEO), in collaboration with the Committee on Earth Observation Satellites (CEOS), is well positioned to assist the UNCCD and its contracting parties with the provision and deployment of EO datasets, country support, capacity building and training, and EO tools and platforms so that countries can effectively monitor and report on SDG indicator 15.3.1 as well as to support longer term efforts to develop international standards and protocols on LDN and land degradation monitoring.

A GEO LDN Initiative will assist countries, regions and other stakeholders interested in addressing land degradation and achieve SDG 15, "Life on Land". The data, tools and reporting protocols developed would be accessible in the Global Earth Observation System of Systems' GEOSS Platform and useful to other GEO Initiatives, including GEOBON, GEOGLAM and the Earth Observations for Ecosystem Accounting Initiative. The space-based information and *in situ* measurements provided to countries from the GEO LDN Initiative are fundamentally linked to many other areas of the GEO work programme, its Strategic Plan 2016-2025 and global priorities on sustainable development, climate action and disaster risk reduction. While the GEO LDN Initiative will be global in scope, participants and contributors may wish to leverage their regional priorities and strengths in alignment with regional GEO initiatives, and in terms of expertise and financing. The GEO LDN Initiative will actively seek to engage regional groups of countries to assist with data collection, validation and reporting.

1. Synopsis of objectives and benefits

A GEO LDN Initiative would be a major contributing factor in successfully assisting countries, at every level of development, to create the monitoring infrastructure necessary to support efforts and policies to combat land degradation, thereby contributing directly to GEO's strategic objective 3.

The UNCCD as the custodian agency for SDG indicator 15.3.1 and its resource mobilization institution (the Global Mechanism) as the executing agency for the LDN target setting programme (LDN-TSP), are already actively involved with some GEO members and Participating Organizations (POs) in capacity building and implementation at the national level. As a result, the overarching terms of reference and good practice guidance for and the expected benefits of the GEO LDN Initiative have already been established. Given the level of ambition to monitor and report on land degradation at the national level in a manner that is timely and policy-relevant while at the same time ensuring national ownership, the GEO LDN Initiative would serve to fill critical gaps.

The assets of the GEO community would be utilized specifically to (1) leverage its convening power to turn information into knowledge and package it as user-centric tools, applications and services; (2) identify existing data and information gaps at national and project levels; (3) mobilize action to reduce these gaps by empowering countries and organizations to strengthen and develop their own capacities through the leveraging of technical assistance and increased access to EO datasets and products; and (4) link to socio-economic and other relevant data through partnerships in order to provide actionable information for decision-making.

The **strategic objectives** of the GEO LDN Initiative are to:

1) **Facilitate access to space-based information and *in-situ* measurements,** for the three sub-indicators, namely changes in land cover, land productivity and carbon stocks. Effective reporting on SDG indicator 15.3.1 will require the use of multiple types and sources of data, including those generated and used at national and sub-national (local project) levels as well as new sources of data developed outside of national statistical systems, such as global and regional geospatial data sets, including EO data sets. The complementarity, integration and harmonization of available geo-referenced data will help increase the accuracy of change detection in the sub-indicators and significantly reduce the costs of monitoring and reporting on the indicator, while at the same time increasing policy relevance.

2) **Provide expertise, tools and training to build national capacities**: This includes review and advice on selecting the appropriate data and information that is most applicable to national circumstances. It is vital that the training and technical solutions are practical and self-sustaining and that they address the size and complexity of the data selected for each country. Training on the use of available tools for accessing, processing, analyzing and interpreting data as well as validation techniques would ideally be done in collaboration with National Statistical Offices (NSOs), specialized agencies and the "main reporting entity" for the indicator. For land use and spatial planning frameworks to implement measures to acheive LDN, the curriculum will also include reference to other target systems and reporting obligations at national level to maximize

synergies and avoid duplication of efforts. Regional focus will be used where appropriate.

3) **Assist with the further development of international standards and protocols for the indicator**: As SDG indicator 15.3.1 relies largely on geospatial information and digital data from various sources, it adheres to ISO 19115-1:2014 which defines the schema required for describing geographic information and services by means of metadata. There is an existing international standard for the sub-indicator on land cover (ISO 19144-2:2012) which includes the Land Cover Meta Language (LCML): a common reference structure, used by the System of Environmental-Economic Accounting (SEEA), for the comparison and integration of data for any generic land cover classification system. The international standard for calculating NPP (gC/m²/day), the metric used for land productivity, from remotely-sensed, multi-temporal surface reflectance data, accounting for the global range of climate and vegetation types, was established in 1999 by the U.S. National Aeronautics and Space Administration (NASA) in anticipation of the launch of the Moderate Resolution Imaging Spectroradiometer (MODIS) sensor. As well as those instruments on the Sentinal satellites. For carbon stocks, IPCC (2006) contains the most relevant definitions and standards, especially with regard to reference values applicable for Tier 2 and 3 Greenhouse Gas (GHG) reporting. In this regard, the technical soil infrastructure, data transfer and provision of national reporting data is also standards-based.

The **strategic activities** of the GEO LDN Initiative will focus on:

1) **Building capacity at the country and regional level ensuring national ownership of EO and *in-situ* measurements** and will involve the preparation of curriculum and training on the use of practical tools to support countries in accessing, interpreting and validating this data for (a) UNCCD national reports, which in turn will inform reporting on SDG indicator 15.3.1 at the regional and global level (Strategic Objectives 1 and 2), and (b) land use and spatial planning frameworks to implement measures to acheive LDN. The curriculum will also include reference to other target systems and reporting obligations at national level to maximize synergies and avoid duplication of efforts.

2) **Developing international standards and protocols** will be advanced by the establishment of federated collaborative platforms with high computing capacities and big data analytics tools (e.g., EO data cubes) that would allow countries to easily select, access, process, analyze, interpret and quality control large datasets associated with EO and geospatial information, while at the same time ensuring national ownership. (Strategic Objective 3).

The ultimate goal of the GEO LDN Initiative is the delivery of information and services to users by specifically building national and sub-national capacities for capturing, uploading, archiving, sharing, accessing, processing and utilizing data and information in multiple policy contexts. In this regard, halting and reversing land degradation trends will help deliver multiple SDGs, climate action in terms of enhanced carbon sequestration and reduced emissions, and increased resilience to slow onset disasters.

2. Relationship to previous developments and results

The GEO Land Cover (LC) and Land Cover Change (LCC) task, co-led by the GOFC-GOLD/GFOI land cover at Wageningen University, works to improve the availability and quality of LC and LCC data by helping to convene and coordinate the various sectors of the LC community, including data providers and consumers. The GEOBON, GFOI and GEOGLAM initiatives are actively participating in global efforts to help classify land cover relevant to the communities served by these initiatives. The GEO LDN Initiative, with a specific policy demand-driven mandate provided by the UNCCD's governing body and the 2030 Agenda for Sustainable Development, would focus on a specific set of EO tools to facilitate assessments of land degradation with the aim of improving ecological and human well-being, thereby also contributing to the "Earth Observations in Service of the 2030 Agenda for Sustainable Development" Initiative.

The GEO LDN Initiative will not only serve for reporting (e.g. on indicator 15.3.1), but most importantly will provide countries with critical input for policies and sound decision making for upscaling sustainable land use management. Synergies with other global frameworks/reporting systems (Sendai, Aichi, Climate/AFOLU/REDD+ and other SDG indicatorswill support countries towards applying integrated cross sectoral land monitoring systems. As an integral part of this activity, GEO will seek and take advantage of synergies across its work programmes (GFOI, GEOGLAM, GEO-BON, etc.).

In 2014-2015, 14 countries participated in the UNCCD's LDN pilot project[1] to implement the target setting approach, including the use of the methodology and data options for reporting on the three sub-indicators. All of the countries established baselines based on these sub-indicators, either by using national data and/or global default data provided by the UNCCD and its partners. This pilot project demonstrated the importance of upfront technical assistance and country-tailored advisory services for overcoming data analysis challenges and barriers.

Launched in 2016, the LDN-TSP[2] is now supporting 116 participating countries and their national LDN working groups, which are comprised of representatives from key stakeholders across sectors (including ministries, civil society, research, private sector and development partners), in reviewing and validating LDN baselines and targets. While the members of these working groups are diverse in their areas of expertise, there is a need to increase representation from National Statistical Organizations (NSOs) and build more capacity for accessing, processing, interpreting and validating EO data and geospatial information as well as alternative data sources in order to establish baselines to monitor and report on the indicator. As of December 2017, over 60 of the 116 countries[3] participating in the LDN-TSP have established and validated a baseline for the indicator. A number of regional and national workshops and meetings have been conducted since 2016, including 5 regional workshops on national reporting completed in May 2018.

The UNCCD COP.13 also endorsed a LDN conceptual framework which underpins a universal methodology for estimating SDG 15.3.1 indicator.[4] At the global level, the UNCCD leads an inter-agency

[1] http://knowledge.unccd.int/knowledge-products-and-pillars/ldn-target-setting-building-blocks/lessons-learned-14-pilot-4
[2] http://www2.unccd.int/actions/ldn-target-setting-programme
[3] http://www2.unccd.int/actions/ldn-target-setting-programme
[4] http://www2.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf

advisory group[5] that has produced Good Practice Guidance[6] for (1) measuring and evaluating changes in each of the three sub-indicators, and (2) estimating and reporting on SDG indicator 15.3.1. The SDG indicator 15.3.1 and its sub-indicators are included in the UNCCD's national reporting for 2018 and every four years thereafter.[7]

As noted above, at least four GEO initiatives and other Community Activities will benefit from the strategic activities undertaken to support the monitoring of SDG indicator 15.3.1 and its sub-indicators. In addition, the SDGs have catalyzed numerous long-standing communities of experts and practitioners to reach agreement and take specific action to address the national reporting requirements for universal reporting under the SDG indicator and other frameworks. This would include close collaboration with the work being done of Systems of Environmental-Economic Accounting (SEEA) and the OECD's Green Growth Headline and Core Set of Environmental Indicators. In terms of the Paris Agreement, improving the accuracy of carbon stock estimates would allow for better monitoring of Nationally Determined Contributions (NDCs). Leadership and engagement in the GEO LDN Initiative will further reinforce GEO's role in global, regional, national and community scale monitoring and expert processes to set standards and specifications for EO land products and related natural resources observations.

3. Participants/contributors

GEO Member Countries: Australia (CSIRO), Germany (DLR, GIZ, ZFL), Sweden, USA, South Africa, Japan

International Organizations: ESA, FAO, OECD, UNCCD, CI, UNEP

Programmes: ISRIC, Global Forests Observations Initiative (GFOI) Land Cover, GOFC GOLD

Universities: United Nations University, Unversity of Bonn, Wageningen University

Anticipated Participant Contributions

(1) In-kind contributions, such as those specified in the budget allocations of participants;
(2) Initiative-specific funding, such as voluntary contributions or secondments to the GEO secretariat; or
(3) The provision of technical expertise and resource persons for

- Management and governance of the Initiative
- Data access, processing, tools, training and products
- Capacity building at the national level
- Development of standards and protocols

There are expressions of interest from:

CIAT, Rolf Sommer, Kenya, r.sommer@cgiar.org, who would like to deepen collaboration on the entire LDN baselining and monitoring work that CIAT and WLE RDL

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[5] Including the Food and Agriculture Organization of the United Nations (FAO), United Nations Statistics Division (UNSD), United Nations Environment (UNEP), United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD).
[6] http://bit.ly/2zMAvK6
[7] http://www2.unccd.int/sites/default/files/sessions/documents/2017-09/ICCD_CRIC%2816%29_L.3-1715758E.pdf

(https://wle.cgiar.org/research/themes/restoring-degraded-landscapes) are concerned with.

Andrea Catalina Fajardo, Muya/Hohenheim University, andrea@muya.co, Colombia (currently living in Germany), who offered to support with building learning capacity in Latin America and the Caribbean.

Nadinbe Laporte, Northern Arizona University (NAU), USA, nadinelaporte@gmail.com (preferred), nadine.laporte@nau.edu, who offered to contribute with Forest Landscaoe Restoration (FLR), scaling up restoration effort, and biophysical indicator monitoring (in-situ and RS)

In addition, ICRAF had expressed their interest to link their work on the Land Degradation Surveillance Framework (LDSF) with GEO-LDN.

Specific Descriptions of Intended Contributions Provided by

The German development agency (GIZ; PoC: antje.hecheltjen@giz.de) can offer within the GEO-LDN initiative:

1. Contribution to the development of curricula with focus on the use of data for land use planning and spatial planning;

2. Integration of an introductory module on economics of land degradation (ELD).

3. In addition GIZ can offer to advise 1-2 developing countries, which are showing particular commitment within the GEO-LDN initiative and which are seeking assistance for further innovative steps in the context of LDN.

4. University Bonn, Center for Remote Sensing of Land Surfaces (ZFL) (PoC: odubovyk@uni-bonn.de, cc Adrian.Strauch@uni-bonn.de) has relevant research and development projects on Land Degradation and Drought monitoring, that could be linked to the project (e.g. GlobeDrought and EVIDENZ) an generally can:

    - Provide scientific and methodological expertise and advice;
    - Align current and future ZFL research activities and projects with the implementation pland and goals of the initiative;
    - Contribute to Initiative Working groups and participate in meetings and events.

5. The United Nations University EHS in Bonn (PoC: walz@ehs.unu.edu) has several research projects that are linked to land degradation from a perspective of disaster risk assessment and management and/or adaptation. The focus is on the vulnerability of land and soil resources as well as drivers of land degradation from a social-ecological systems perspective. Major projects focusing on land degradation and drought risk at UNU-EHS involve EvIDENz, GlobeDrought, DeltAdapt, TelePAtH and WASCAL. Next to risk assessments, EHS' research focuses on soil selling for brick production and the consequences for soil fertility and long term yield and income loss on local and regional scale.

6.   The German Aerospace Center DLR (PoC: Uta.Heiden@dlr.de, Ursula.Gessner@dlr.de) works on innovative remote sensing methods for large scale landcover/landuse change, land productivity and land degradation, and can support GEO-LDN with science and technology development.

7. ISRIC supplies baseline information on soil organic carbon (SOC) to the UNCCD through the Global Soil Partnership (GSP). ISRIC could advise and develop tools for capacity building on soil organic carbon (SOC). ISRIC develops standards for SOC measurement and monitoring ISRIC - World Soil Information is the Soil Data Facility of the Global Soil Partnership (GSP). ISRIC has supported the UNCCD LDN with the supply of information on current SOC stocks at national level as a baseline for LDN. ISRIC remains committed to supply information on future SOC stocks in its capacity as Soil Data Facility of the GSP. The GSP will be an excellent mechanism to mobilize partners for the collection and generation of geospatial SOC information. In addition ISRIC has expertise in methods and approaches for measuring, archiving, mapping, analysing and reporting SOC, it is ready to facilitate and advise third parties to generate such information and organize related capacity development activities.

8. The Food and Agriculture Organization of the United Nations (PoC: Thomas.Hammond@fao.org, Marcelo.Rezende@fao.org) has a long history of technical support to member countries in their land monitoring efforts. In the context of LDN, FAO has been part of the UNCCD-lead inter-agency advisory group that has produced Good Practice Guidance. In addition, FAO is collaborating with the UNCCD in capacity development activities for improving national data in Small Island Developing States. FAO could contribute with the GEO-LDN initiative by:

-        Share lessons learned from our experience in land degradation assessments, monitoring and reporting at national, regional and global levels.

-        Support in the development of tools and methodologies to enable feasible, accurate and transparent data collection, analysis and processing to support the achievement of Sustainable Development Goals.

-        Participate in technical discussions related to land and water resources management.

Suggested Contributions provided by OECD

•   Share expertise and provide feedback from the use of LC datasets, communicate emerging demands for data and information from global land monitoring to data providers, and articulate the "user needs" for development of new data products.

•   We could also consider participating in the GEO-LDN Working Group on International Standards. Although the terms of reference of this WG remain to be fully defined, we would like to propose that they include guidance on the desired attributes and quality characteristics of LC datasets that would better meet the users' varied needs (e.g. spatial, temporal and thematic resolution and consistency of LC measurement, associated uncertainty metrics, etc).

•   Share with GEO members OECD's policy advice to address land-related challenges (including LDN) drawing on the relevant items in OECD's programme of work and promote them in OECD products and processes. The OECD could consider participating in relevant GEO workshops or meetings related to

policy applications of land cover data, and could in turn help disseminate results of the GEO-LDN Initiative via its network.

Suggested Contributions by MIT Media Lab Space Enable Program

MIT's Media Lab, Space Enabled Program will look for opportunities to engaged though contribution of staff and student time and incorporate research work germane to the Initiative in its research program and proposals when appropriate and were opportunities arise.

4. Description of activities

Capacity Building for National Reporting

Regional capacity building workshops to support UNCCD national reporting, which includes the SDG indicator and sub-indicators, have been completed in May 2018 under the auspices of the Global Support Programme ("Strengthening UNCCD reporting –enhancing implementation of the UNCCD") which is funded by the Global Environment Facility (GEF) and executed by the Global Mechanism of the UNCCD. Synergies with other global frameworks/reporting systems (Sendai, Aichi, Climate/AFOLU/REDD+ and other SDG indicators) were included as a part of the strategic context for the knowledge imparted in these workshops. The workshops will enable countries to prepare and submit UNCCD national reports by mid to late 2018, which in turn will inform SDG reporting[8] at the regional and global level in February 2019. The workshops also provided support to countries in accessing, interpreting and validating data for land use planning and spatial planning to implement measures to reach LDN. Workshop participants included UNCCD national focal points and designated representatives of national statistical offices.

While the GEO LDN Initiative is being formally established according to GEO protocols and procedures, the UNCCD will continue to collaborate informally with GEO members and POs. Once formally adopted by the GEO Plenary, there will be opportunities to follow up on these workshops and provide targeted assistance throughout 2018 as well as to advise the UNCCD secretariat in its regional and global aggregation of data for reporting to UN Secretary General in February 2019. The Implementation Committee (see below) will develop a capacity building work plan for 2019-2022 to increase the coverage and level of confidence in the indicators among national authorities.

Integration with the GEOSS Platform

As a part of the on-going efforts to integrate SDG reporting into the GEOSS Platform, Application Program Interfaces (API's) will be established with the UNCCD secretariat to ensure that reporting data can be accessed through the GEOSS Platform. The GEO and UNCCD secretariats will initiate the necessary consultations to implement this access capability.

Development of International Standards

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[8] http://www2.unccd.int/sites/default/files/sessions/documents/2017-09/ICCD_CRIC%2816%29_L.3-1715758E.pdf

The pathway for developing an international standard for monitoring and reporting on land degradation (and the sub-indicators) will be developed by the Implementation Committee in consultation with external experts. This will be a longterm strategic activity involving numerous global consultations. One possible approach would be to build upon the existing ISO standards for "Good practices framework for combatting land degradation",[9] the Land Cover Meta Language (LCML)[10] and the international standard for calculating NPP established in 1999 by the U.S. NASA.[11] For carbon stocks, IPCC (2006) contains the most relevant definitions and standards, especially with regard to reference values applicable for Tier 2 and 3 GHG reporting.[12]

In UNCCD decision 22/COP.11, soil organic carbon (SOC) stock was adopted as the metric to be used with the understanding that this metric will be replaced by total terrestrial system carbon stocks, once operational. Information on the distribution of SOC was delivered to the UNCCD by ISRIC World Soil Information as a baseline for the SDG indicator 15.3.1. The SOC product is a remote sensing product, which is derived based on remote sensing data (MODIS) used in combination with machine learning algorithms and historic SOC field observations to derive the prediction of the SOC content and stocks. Future SOC assessments could follow a similar approach based on updated MODIS data and field measurements. The Implementation Committee could decide to take up the responsibility for facilitating delivering such a product in collaboration its members and participating organizations and ISRIC World Soil Information Centre.

<u>Engagement with the Research & Development, Academic Community</u>

The GEO LDN Initiative will include actions, including active recruitment of academic, R&D partners and institutions to provide expert input. The value of general Earth science research, data and data analytic techniques will be exploited in ways to both help national governments meet their sustainable development objectives and also to demonstrate the translation of R&D into policy and ground-level applications.

<u>Engagement with the Private/Commercial Sector</u>

The GEO LDN Initiative will examine the best fit for the developing capabilities of the commercial sector for LDN reporting and policy. The Initiative will invite participation in implementation and oversight processes. Engagement will be cognizant when possible of the GEO data sharing principals, such as open by default and provision at minimal or no cost.

5. Involvement of end-users

The "community" in the GEO LDN Initiative consists primarily of national governments and their National Statistical Offices ("main reporting entity" for the SDG indicators), and any sub-national entities or specialized agencies that are validating and reporting data for the UNCCD and SDG reporting

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[9] https://www.iso.org/obp/ui/#iso:std:iso:14055:-1:ed-1:v1:en
[10] https://www.iso.org/standard/44342.html
[11] Running et al. 1999. MODIS Daily Photosynthesis (PSN) and Annual Net Primary Production (NPP) Product (MOD17): Algorithm Theoretical Basis Document https://eospso.gsfc.nasa.gov/sites/default/files/atbd/atbd_mod16.pdf
[12] IPCC. 2006. ibid

processes. Advice and expert input from private sector, academia and civil society will also inform progress and priorities. The GEO LDN Initiative will build upon the national working groups established in the framework of the LDN TSP in 116 countries and, from there, mobilize and strengthen the engagement of other countries.

Data, information, tools and trainings developed by the GEO LDN Initiative will be tailored to meet the needs of decision makers for monitoring progress towards a number of global/regional targets and initiatives to halt and reverse land degradation and restore degraded land. Starting in 2010, these include, inter alia, the Aichi Biodiversity Targets, one of which aims to restore at least 15% of degraded ecosystems; the Bonn Challenge and its regional initiatives to restore more than 150 million hectares; and most recently the SDGs.

The GEO LDN Initiative will assist with the rapid provision and deployment of EO datasets and promote in-country analysis and interpretation of those data sets, thereby ensuring national ownership.[13] The Initiative will leverage the UNCCD reporting mechanism and tools,[14] which provide a practical and harmonized approach to monitoring and reporting beginning in 2018[15] and every four years thereafter.[16] The quantitative assessments and corresponding mapping at the national level, as required by this indicator, would help countries to set policy and planning priorities among diverse land resource areas, in particular:

- to identify hotspots and plan actions of redress, including through the conservation, rehabilitation, restoration and sustainable management of land resources; and
- identify appropriate LDN interventions and assess their likely improvement of the sub-indicators;
- to address emerging pressures to help avoid future land degradation.

6. Planning, including specific milestones and deliverables

Nov 2017 – April 2018

- Drafting of Initiative Implementation Plan
- Consultation with core group of existing partners
- Recruitment of GEO members and POs
- Submission of application to the GEO Programme Board
- Formalize governance structure and establish the Interim Implementation Committee
- Coordination with the UNCCD's regional workshops to build national capacities

May 2018

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[13] United Nations General Assembly. 2015. Transforming our world: the 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015 (A/RES/70/1).
[14] http://www2.unccd.int/sites/default/files/sessions/documents/2017-08/ICCD_CRIC%2816%29_INF.1%20-advance.pdf
[15] http://www2.unccd.int/sites/default/files/sessions/documents/2017-09/ICCD_CRIC%2816%29_INF.1-1714762E.pdf
[16] http://www2.unccd.int/sites/default/files/sessions/documents/2017-09/ICCD_CRIC%2816%29_L.3-1715758E.pdf

- Draft Work Programme for the GEO LDN Initiative

Jun-Oct 2018

- First meeting of the Ad-hoc Interim Implementation Committee (back to back with the GEO Symposium in Geneva)
- Follow up to the regional workshops with targeted assistance
- Development of progress report for GEO Plenary (October 2018 in Kyoto)
- Formulate work plans for subsidiary bodies including notional deliverable schedule
- Consultations with UNCCD secretariat on APIs as well as regional and global reporting
- Public presentation of results thus far (e.g., World Data Forum, Global Landscape Forum)

Nov 2018 -Jun 2019

- First meeting of the Implementation Committee scheduled for 02 Novermber 2018
- Appoint Implementation Committee co-chairs, form Working groups, begin consultations and organize timeline of activities (two year work plan)
- Report to the UNSD database, ECOSOC and the UN Secretary General reports in early 2019, including storylines
- Interim progress report on the implementation of the GEO LDN Initiative

7. Data management & data policy

National data on the three sub-indicators is and can be collected through existing sources (e.g., databases, maps, reports), including participatory inventories on land management systems as well as remote sensing data collected at the national level. Datasets that complement and support existing national indicators, data and information are likely to come from multiple sources, including statistics and estimated data for administrative or national boundaries, ground measurements, Earth observation and geospatial information. A comprehensive inventory of all data sources available for each sub-indicator is contained in the Good Practice Guidance for SDG Indicator 15.3.1. The most accessible and widely used regional and global data sources for each of the sub-indicators are briefly described here.

1) Land cover and land cover change data are available in the:

(1) ESA-CCI-LC,[17] and Copernicus Global Services. ESA CCI-LC contains annual land cover area data for the period 1992-2015, produced by the Catholic University of Louvain Geomatics as part of the Climate Change Initiative of the European Space Agency (ESA). The Copernicus global climate and land monitoring service will expand this effort to produce annual global land cover data from 2015 onwards as part of an operational service by the European commission (JRC

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[17] https://www.esa-landcover-cci.org/

leadership) to produce sustained and stable land cover data until 2030 for SDG reporting processes.

(2) SEEA-MODIS,[18] containing annual land cover area data for the period 2001-2012, derived from the International Geosphere-Biosphere Programme (IGBP) type of the MODIS land cover dataset (MCD12Q1).

2) Land productivity data represented as vegetation indices (i.e., direct observations), and their derived products are considered the most independent and robust option for the analyses of land productivity, offering the longest consolidated time series and a broad range of operational data sets at different spatial scales. The most accurate and reliable datasets are available in the:

(1) MODIS data products,[19] averaged at 1 km pixel resolution, integrated over each calendar year since 2000; and

(2) Copernicus Global Land Service products,[20] averaged at 1 km pixel resolution and integrated over each calendar year since 1998.

3) Soil organic carbon stock data are available in the:

(1) Harmonized World Soil Database (HWSD), Version 1.2,[21] the latest update being the current de facto standard soil grid with a spatial resolution of about 1 km; and

(2)WISE30sec database, an interim update of the HWSD v1.2 product .

(3) SoilGrids250m,[22] a global 3D soil information system at 250m resolution containing spatial predictions for a selection of soil properties (at six standard depths) including SOC stock (t ha^{-1}).

(4) GSOC Map,[23] **t**he Global Soil Organic Carbon Map of the Global Soil Partnership of FAO**.**

In the absence of, to enhance, or as a complement to national data sources, good practice suggests that the data and information derived from global and regional data sets should be interpreted and validated by national authorities. The most common validation approach involves the use of national, sub-national or site-based indicators, data and information to assess the accuracy of the sub-indicators derived from these regional and global data sources. This could include a mixed-methods approach which makes use of multiple sources of information or combines quantitative and qualitative data, including the ground-truthing of remotely sensed data using Google Earth images, field surveys or a combination of both. The regular collection of in situ data is crucial for the validation of the three sub-indicators. Validation is important to allow proper assessment of the accuracy and precision of all three sub-indicators.

The GEO LDN Initiative will promote GEO principles and implementation guidelines on data sharing and

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[18] https://modis.gsfc.nasa.gov/data/dataprod/mod12.php
[19] https://modis.gsfc.nasa.gov/data/dataprod/mod13.php
[20] http://land.copernicus.eu/global/
[21] http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/
[22] https://www.soilgrids.org/
[23] http://www.fao.org/global-soil-partnership/pillars-action/4-information-and-data/global-soil-organic-carbon-gsoc-map/en/

data management. As a singular new example, this Initiative would be directly engaged and responsive to various multilateral environmental agreements and global initiatives for reporting on land degradation (and restoration). Data accessibility will be governed by GEOSS data sharing principals, including the development of formats that can be accessed by the GEOSS Platform and hence all GEOSS data users. Although an open distributed model is anticipated, the envisioned access will enhance the holdings of the GEOSS Data CORE. The GEO LDN Initiative will work with the GEO Earth Observations for the SDGs (EO4SDG) Initiative and others to reference this data in data cubes at the national level as they are developed.

8. Risk assessment

There are no substantive technical risks to implementation of this proposed Initiative recognizing that building national capacities for reporting on the indicators remains a challenge. Thus, capacity development is the key strategic objective of this proposed Initiative along with the development of international standards necessary to ensure confidence in the use of EO datasets.

9. Management and governance

The GEO LDN Initiative is expected to have the following organizational structure:

- Implementation Committee (i.e. 9 members)
- Chair and vice-chair elected every 3 years
- Possible Secondment(s) to GEO (in Geneva) to act as the secretariat for the Initiative
- Technical Advisory Group (i.e. 15 members, some from outside the GEO community)
- Working Groups (2 to start): capacity building and international standards

The Implementation Committee members will be nominated by the GEO Member Countries and POs participating and contributing to the Initiative. Once established the Implementation Committee will elect a Chair and Vice-Chair to facilitate and establish consensus on the work to be undertaken by the Initiative. Members of all bodies will be selected with due consideration of gender and geographical balance. The formal governance structure and means of communication shall be established in 2018 upon GEO Plenary approval of the Initiative, and then revised as appropriate during the consolidation phase in 2019.

10. Summary of resources and annual budget

The implementation of the GEO LDN Initiative relies significantly, though not exclusively, on in-kind contributions from existing observing capacities, networks, expertise, staff time, interoperability arrangements and standards, datasets, information systems, user services, projects and capacity building programmes. The Initiative will focus on leveraging existing capacities and streamlining existing programmes and funding schemes for EO land products, platforms and tools to take advantage of multiple, existing or upcoming capacities. These include but are not limited to:

- The Copernicus space segment including the Sentinel series of satellites which for example provide raw data to the European Space Agency's (ESA) Climate Change Initiative on Land Cover (CCI-LC), the various vegetation indices and relevant data layers used to estimate net primary production and land productivity dynamics by the Joint Research Centre of the European Commission

- Other space borne resources from national space agencies collaborating through the Committee on Earth Observation Satellites (CEOS) and other global initiatives;

- In-situ data collection and modelling resources

- Information products from the Copernicus core services for monitoring land, oceans, atmosphere, climate, for security services, emergency response and humanitarian aid;

- Additional processes and products from agencies and organizations such as the European Space Agency (ESA), Conservation International (CI), Organization for Economic Cooperation and Development (OECD), Food and Agriculture Organization of the United Nations (FAO), United Nations Statistics Division (UNSD), etc.

- Research & innovation resources and projects related to geo-spatial information and Earth sciences;

- Other resources, such as data processing capacities, specific data sources, and information technologies for validation and verification made available through the involvement of the commercial sector, such as the google.

The GEO LDN Initiative provides an opportunity to reinforce GEO engagement and commitment to supporting countries in monitoring and reporting on the multi-lateral environmental agreements and the land-based targets contained in the SDGs. The administration and management of the Initiative will rely on staff resourcing contributions (e.g., secondments based at the GEO offices) by the GEO member countries, the European Commission and GEO POs. In addition to these in-kind contributions, during the period 2018-2019, the UNCCD will spend approximately USD 2 million from GEF Global Support Programme, and approximately another 2 million from voluntary contributions on LDN monitoring and implementation.