WORKING GROUP ON DATA INTEGRATION

The integration of geospatial data and statistics to compute SDG indicators: requirements and practices

UN-GGIM: EUROPE

UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

Guidelines for SDG Indicator Calculation

15 LIFE ON LAND

15.3.1 Proportion of land that is degraded over total land area

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15.3.1 Proportion of land that is degraded over total land area

A. INDICATOR CALCULATION AND DISCUSSION

1. DEFINITION

This indicator is used to monitor the progress towards SDG 15 on protecting, restoring, and promoting sustainable use of land. This includes combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

For this indicator the global metadata presents the following definitions:

- Land degradation is "the reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices" (UNCCD 1994, Article 1).
- Total land area is "the total surface area of a country excluding the area covered by inland waters, like major rivers and lakes" (FAO).

The measurement unit for this indicator is the spatial extent expressed as the proportion percentage of land that is degraded over total land area.

This indicator can be mapped and disaggregated by land cover type or other policy relevant unit, such as administrative units.

2. METHODOLOGY

The indicator 15.3.1[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 the UNCCD "good practice guidance"[2] in the measurement and evaluation of changes to each of the following three sub-indicators:

- land cover and land cover change
- land productivity
- carbon stocks above and below ground

The method of computation for this indicator follows the *One Out, All Out* statistical principle and is based on the baseline assessment and evaluation of change in three sub-indicators to determine the extent of land that is degraded over total land area:

- Trend in land cover
- Trend in land productivity
- Trend in carbon stock above and below ground, currently represented by soil organic carbon (SOC) stocks

Each trend can be:

- positive or improving
- negative or declining
- stable or unchanging

According to the *One Out, All Out* statistical principle, if one of the sub-indicators is negative (or stable when degraded in the baseline or previous monitoring year) for a particular land unit, then this is considered as degraded.

[1] UN-Habitat Updated Metadata on SDG Indicador 11.3.1
[2] UNCCD Good Practice Guidance. SDG Indicator 15.3.1, Proportion of Land That Is Degraded Over Total Land Area. Version 2.0

Each country can select the most appropriate datasets for the sub-indicators and determine national methods for estimating the indicator

Baseline year is 2015 (year in which UNCCD decided for targeting Land Degradation Neutrality and UN 2030 Agenda has been adopted), starting values of trend are computed in the baseline period 2000-2015.

Therefore, for each reporting, the following steps must be performed for the computation of the indicator:

- Calculate degradation in the baseline period
- Calculate degradation in the reporting period
- Calculate change in degradation between baseline and reporting period

With regard to the sub-indicators:

- land cover trend indicates degradation when there is a loss in productivity in terms of ecosystems services considered desirable in a local or national context
- land productivity trend indicates degradation when there is a decrease in the biomass accumulation
- carbon stock trend indicates degradation when there is a release of carbon (considering above and below ground biomass, dead organic matter, and soil organic carbon)

Data are collected at country level by UNCCD since 2018.

In EU, a customized SDG indicator set relevant to the EU has been adopted with the purpose of monitoring the progress towards the goals in the context of long-term EU policies. It is aligned as far as appropriate with the UN list of global indicators, but it is not completely identical. This allows the EU SDG indicators to focus on monitoring EU policies and on phenomena particularly relevant in a European context. The 15.3.1 SDG indicator, at EU level, is computed as Soil sealing index (as defined by EEA) and, for this indicator, baseline is year 2006.

3. DATA SOURCES

It is possible to use different data sources, with different level of detail depending on data availability over a single country. For this indicator, both global datasets, available on a worldwide basis, or local datasets, available at regional or national scale, for each sub-indicator, can be used.

Land cover - At global level, by considering the first sub-indicator on land cover change, the following geospatial data sources can be used

Table 1 Geospatial data sources on a global level for land cover trend

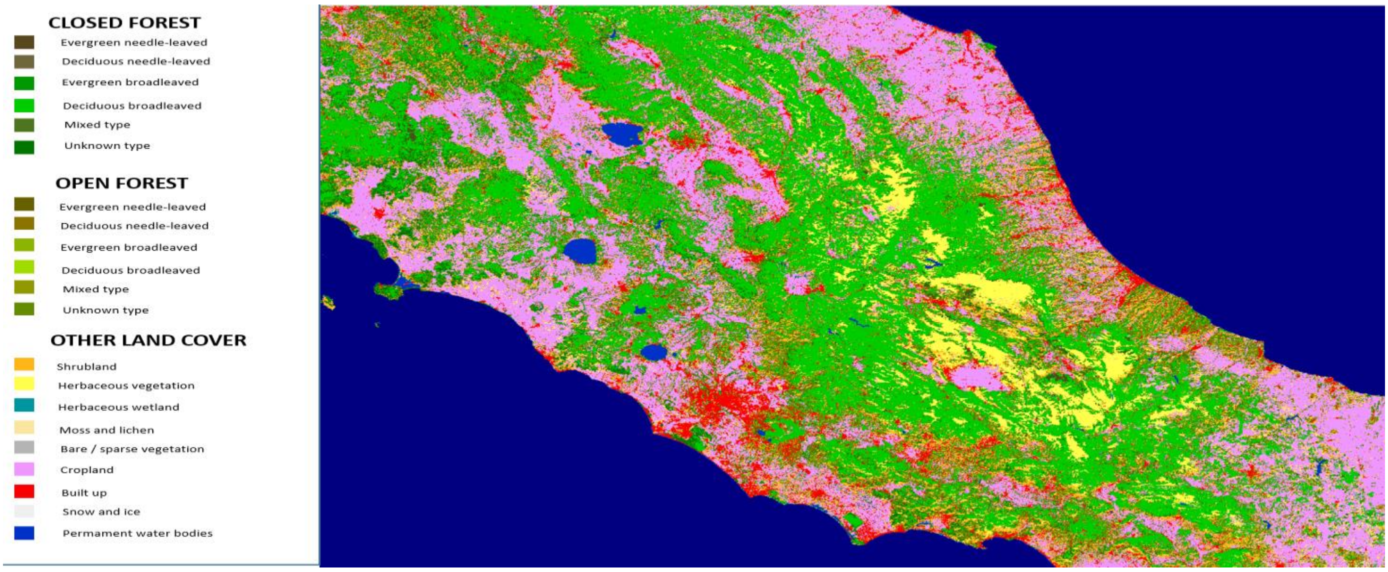
Name	Source	Periods of reference available	Frequency	Spatial Resolution	MMU	INSPIRE Data Theme	Core data theme
ESA-CCI Land Cover	MR Satellite	1992 - 2019	1 year	300 m	9 ha	Land cover	Land cover
MODIS Global Land Cover	MR Satellite	2001-2019	1 year	500 m	25 ha	Land cover	Land cover
Copernicus Global Land Cover	MR Satellite	2015-Today	1 year	100 m	1 ha	Land cover	Land cover

Each dataset has the advantage to be available on a global basis, to be computed with a standard methodology and with an updating policy. Due to the resolution of the data, the information provided can be coarse considering observed phenomena, when dealing at national level and needing disaggregated information for more focused action. Furthermore, the accuracy in the land cover classification can be lower depending on the class definition and on the products. Nevertheless, from these global land cover data, relevant information on national trend for land cover change can be computed.

ESA CCI (Climate Change Initiative) has produced land cover maps on a yearly basis from 1992 to 2019 from Medium Resolution satellite. Presently, it is working to increase product resolution, working with Sentinel-2 data.

Since 2015, the Copernicus Global Land Cover Maps are also available on a yearly basis. Available global annual maps are based on a discrete classification with 23 classes, following UN-FAO's Land Cover Classification System (LCCS).

Figure 1 Land cover from Copernicus Global Land Service- Year 2019



Source: Copernicus Global Land Service – Land Cover – © Copernicus Service Information 2021

The MODIS land cover (MCD12Q1) is also available, providing 500-meter products since 2001 and adopting the IGBP classification system

Land Productivity - The productivity is mainly derived by measures of NDVI (Normalized Difference Vegetation Index) collected from MODIS satellites since 2000, providing a very powerful and consistent dataset for analysing land productivity over a wide range of years.

Also, Copernicus Global Land Service provides a sound computation on a regular temporal basis of the NDVI on a global basis, but starting from 2014

Table 2 Geospatial data sources on a global level for productivity

Name	Source	Periods of reference available	Frequency	Spatial Resolution	MMU	INSPIRE Data Theme	Core data theme
MODIS MOD/MYD13Q1	MR Satellite	2000-Today	16 days	250 m	6 ha	Not selected	Not selected
Copernicus NDVI	MR Satellite	2014-Today	10 days	300 m	9 ha	Not selected	Not selected

Carbon stock -Soil Grids provide at global level relevant information on estimated soil organic carbon stock. Another source for soil organic carbon is the GSOC (Global Soil Organic Carbon) map published by FAO

Table 3 Geospatial data sources on a global level for carbon stock (derived by soil)

name	source	Periods of reference available	Frequency	Spatial Resolution	MMU	INSPIRE DATA THEME	CORE DATA THEME
SoilGrids	Surveys			250 m	6 ha	Soil	Not selected
FAO GSOC	Various			1000 m	100 ha	Soil	Not selected

EU/national datasets - At EU level more detailed geospatial datasets can be adopted. More detailed dataset can also be available at country level, depending on the country.

Table 4 Geospatial data sources for land cover at European level

Name	Source	Periods of reference available	Frequency	Spatial Resolution	MMU	INSPIRE Data Theme	Core data theme
Corine Land Cover	HR Satellite	1990 - 2018	6 years	100 m	25 ha	Land cover	Land cover
National Land Cover	HR-VHR Satellite - Aerial	Depending on country	Depending on country	Depending on country	Depending on country	Land cover	Land cover
National orthoimages	VHR Satellite - Aerial	Depending on country	Depending on country	0.2 – 1m	Depending on country	Orthoimagery	Orthoimagery
Copernicus Imperviousness HRL	HR Satellite			20/10 m	0.04 ha		

At EU level, Corine Land Cover is a good coverage for analysing land cover changes, but on a six-years basis. Even if the native minimum mapping size is 25 ha, small-scale changes at polygon borders (even if it is not taking into account all possible small-scale changes since the changes within a polygon are not considered) can be detected. In addition, changes in Land Cover having a minimum mapping unit of 5 ha are included in the Corine Land Cover Change - CHA (6-years change mapping).

Therefore, by using EU geospatial data, the indicator could be fully computed only on 6 years basis.

Also to be considered, are the Copernicus HRLs (High Resolution Layers) for the collection of information on a more detailed level, but for a few types of land cover, in particular forestry and soil sealing. Nevertheless, the increase spatial resolution on Copernicus products for 2018 onwards may result in time series breaks for indicators computation, thus hindering monitoring and comparability over time.

At national level, data availability can be much more interesting and technically performing. Several countries generate orthophoto with resolution below 0.5 meters with frequency of three years or more, from which some countries generate a regular land cover map. Switzerland, for example, generate a 0.10 – 0.25 meters orthophoto (depending on area) from which national land cover statistics are generated. In Germany the digital land cover model LBM-DE could be used for calculation with a three-year release and based on satellite images (RapidEye/Sentinel-2). Italy generates, with the same temporal frequency, only a very detailed orthophoto (20 cm resolution from aerial data), that is only partially used for the purpose.

For what concerns productivity, estimations from NDVI computation, new Pan-European High-Resolution Vegetation Phenology and Productivity products (HR-VPP) from Copernicus can strongly improve the detail in productivity computation. HR-VPP products are provided starting from January 1, 2017, on a 5-day basis at a high spatial resolution (10 m x 10 m), derived from the Sentinel-2 constellation. One of generated HR-VPP is the NDVI.

Table 5 Geospatial data sources for productivity at European level

Name	Source	Periods of reference available	Frequency	Spatial Resolution	MMU	INSPIRE Data Theme	Core data theme
Copernicus NDVI	HR Satellite	2017-Today	5 days	10 m	0,01 ha	Land cover	Land cover

For soil organic carbon stock estimation, at EU level data from European Soil Data Centre (ESDAC) is available and LUCAS soil samples can also be use. At national level, data from local products can be used. In Italy, for example, the SOC map realized over the country in the context of FAO Global Soil Organic Carbon Map is used. This assessment considers data from 6.748 soil profiles collected between 1990 and 2013 and spatialized through concepts and techniques of Digital Soil Mapping.

4. COMPUTATION

A – COMPUTATION WITH GENERAL METHODOLOGY

It is possible to use a more general methodology, that can be applied everywhere, and can provide a fair measure of land degradation. To be taken into consideration that the general methodology relies on data sets collected on a global base with coarse geometrical resolution, and on a general definition of land degradation based on changes of the three main parameters involved, but it is also possible to compute the indicator in a more detailed way by using more detailed datasets and introducing additional parameters impacting on the definition of land degradation.

From a global point of view, over each country, it is possible to assess land degradation by using *Trends.Earth*, that addresses each of the three components of the indicator 15.3.1 by using global datasets, and then combining the output of the analysis of the three components: *Land cover, Land productivity, SOC.* More in detail:

1) Land cover computation

The method approached at national level considers Land Cover dataset for cropland, natural and forest areas, and wetland. According to IPPC legend, input raster data can be reclassified into seven classes: *Cropland, Forest, Grassland, Artificial area, Wetlands, Water bodies, Bare land.*

Trends.Earth adopts the land cover product generated by ESA (European Space Agency), with 300 meters spacing in the framework of the ESA CCI (ESA Climate Change Initiative). The computation is based on the transition of the land cover versus a defined baseline. The detected transition of the land cover, if any, can be considered a land degradation or improvement according to a pre-defined transition matrix, that can be found in *Trends.Earth* documentation. The matrix identifies, for the transition from one land dover to another, if this transition is related to land degradation or improvement

2) Productivity computation

The assessment of land productivity considers three metrics:

- *trend* (i.e., rate of change in primary production over time)
- *state* (i.e., detection of changes in primary productivity as compared to a baseline period)
- *performance* (i.e., local productivity relative to other areas that share a similar land cover type over the dedicated region).

The *trend* (or trajectory) is calculated through linear regression in each pixel to identify positive or negative trend across the considered time. *Trends.Earth* can use different methods for assessing the productivity trajectory.

The *state* is estimated by using NDVI time series and comparing their values with a baseline (years 2001-2012 based on MODIS data). The methodology is based on the evaluation of 10 percentiles classes in the annual distribution of NDVI values in the baseline and in the actual situation. Variations exceeding 1 percentile class between the baseline and the actual are related to degradation (percentile class decrease) or improvement (percentile class increase)

The *performance* evaluates local productivity versus similar vegetation or bioclimatic regions, based on soil taxonomy (usage of SoilGrids at 250m resolution) and land cover (ESA CCI land cover at 300m resolution). For each pixel, the frequency distribution is computed of MODIS NDVI values during the analysis period, and if the NDVI is lower than 50% of the maximum productivity for similar units, the pixel will be considered as degraded.

The three metrics are then assembled for the evaluation of the degradation according to a look-up table (see *Trends.Earth* documentation for details) that, according to the possible values (improvement, stable, degradation) of *trend*, *state* and *performance* computes productivity (improvement, stable, degradation).

3) Soil Organic Carbon computation

The third sub-indicator is not generated using EO data. To estimate changes in SOC, the proposed methodology by *Trends.Earth* is to use a combination of land cover changes and SOC. As reference for the latter, *Trends.Earth* adopts the SoilGrids produced by ISRIC (International Soil Reference Information Centre) and it uses the change factor recommended by UNCCD in SDG 15.3.1 Good Practice Guidelines and by the IPCC (Intergovernmental Panel on Climate Change) in 2006 Guidelines for National Greenhouse Gas Inventories. The indicator is computed as follows:

- Determine the SOC reference values. *Trends.Earth* uses SoilGrids 250m carbon stocks for the first 30 cm of the soil profile as the reference values for calculation. This measure takes into consideration information collected from a variety of data sources.
- Reclassify land cover maps to seven land cover classes needed for reporting. This must be done at least for the first and the last year of the analysis.
- Estimate the changes incarbon stocks for the reporting period. Carbon conversion coefficients for changes in land use (using land cover as a proxy for land use) are recommended by the IPCC and UNCCD. The coefficients to be used are reported in a table (refer to *Trends.Earth* documentation) and ranges between 0.1 and 2 depending on the starting/ending class of the land use transition. For what concerns agriculture, coefficients are also related to the different climate region, considering different coefficients for:
    a. Temperate Dry
    b. Temperate Moist
    c. Tropical Dry
    d. Tropical Moist
    e. Tropical Montane
- Compute relative difference in SOC between the baseline and the target period. A decrease in SOC of 10% or more will be considered as degradation, while an increase of 10% or more is considered an improvement

4) Merging the components

The integration of the three previous components is carried out by using the *one-out all-out* rule, that is if only one of the three indicators shows degradation, the result is degradation. The table for degradation computation starting from the three components is available in *Trends.Earth* documentation. The rule applied to this table can be changed for specific combinations of the three components depending on local country requirements

B - ALTERNATIVE COMPUTATION

As anticipated, the indicator can be computed in different ways according to:

- adopted data sources, by using national or other global/regional datasets having better resolution and higher thematic accuracy
- the definition of land degradation, that can be simplified or more complex
- Country/Region requirements

Adopted data sources

In terms of adopted data sources, an alternative solution could be envisaged for EU Countries.

Land cover

In European Countries, the Corine Land Cover can be used, providing a homogeneous wall-to-wall reference data for land cover, also subject to regular updates. If more detail is required, several countries can also adopt national land cover maps, if they have a regular update policy in line with the indicator requirements. In Germany, for example the national digital land cover model LBM-DE could be used, derived from remote sensing images with legend assessment.

Additional information could be provided with the usage of Copernicus High Resolution Layers, in particular the Imperviousness Layer, that is based on the integrated usage of Sentinel-1 and Sentinel-2 satellites for the generation of an imperviousness layer with 10 meters resolution, therefore able to match also very small features, in particular linear features, providing a very accurate representation of sealed area that can be degraded with respect to the past. It is anyway still to be clearly assessed how to perform the comparison of this specific layer with a past reference situation based on coarser data. Therefore, the full usage of this layer for land cover changes computation is not yet fully mature unless similar detailed data are also available for the baseline period. The number of aggregated land cover classes, instead of recommended seven, can also be larger if more appropriate for describing local degradation

Land productivity

In the second half of 2021, the Copernicus pan-European High-Resolution Vegetation Phenology and Productivity products (HR-VPP), which include both the Normalized Difference Vegetation Index (NDVI) and Seasonal Trajectories every 10 days based on yearly time-series of the raw Plant Phenology Index (PPI), have been released.

In the meantime, global NDVI dataset collected since 2016 by Sentinel-3 or Proba–V satellite data are available.

In both cases, reference historical dataset can be provided by MODIS satellite data at 250/500/1000 meters resolution. For the computation of the land productivity, specific workflow must be designed, also taking into account differences in data resolution before 2017 for the baseline period.

Soil Organic Carbon

A more detailed land use, like Corine Land Cover or National Land Cover, when available and with appropriate detail and updating frequency, can be a better aid in evaluating SOC. Of course, in-situ measures can provide an additional way for a more accurate estimation.

Land degradation definition

The concept of degraded land can be tuned on a country basis. Other indicators that could be considered in the computation are, for example (evaluated by Italy during a reference time frame of several years):

- Loss of habitat quality: based for example on the InVEST model for habitat quality.
- Burnt areas
- Fragmentation Index: 10 meshes/1000 km^2 can be considered land degradation, or increasing of mesh density
- Areas of potential impact: 60 meters buffer around soil sealed area
- Density of artificial land cover: the increasing of urban and suburban areas, as defined in the target 11.7 of SDGs, are considered degraded areas
- Increase of small natural patches < 1000 m^2.
- Soil erosion change depending on land use change (factor C considered in Rusle model)

Country/Region requirements

At EU level, Eurostat reports on Soil sealing index (sdg_15_41) with source EEA. Land cover classes classified as sealed include:

- Housing areas (even with scattered houses)
- Traffic areas (airports, harbours, railway yards, parking lots)
- Roads
- Railway tracks associated to other impervious surfaces (i.e., inside built-up area)
- Industrial, commercial areas, factories, energy production and distribution facilities
- Sealed surfaces, which are part of categories, such as e.g., allotment gardens, cemeteries, sport and recreation areas, camp sites, excluding green areas associated with them
- Artificial grass-covered sport pitches
- Construction sites with discernible evolving built-up structures.
- Single (farm) houses (where possible to identify from satellite imagery)
- Paved borders of water edges
- Greenhouses
- Permanent plastic covered soil
- Solar panel parks

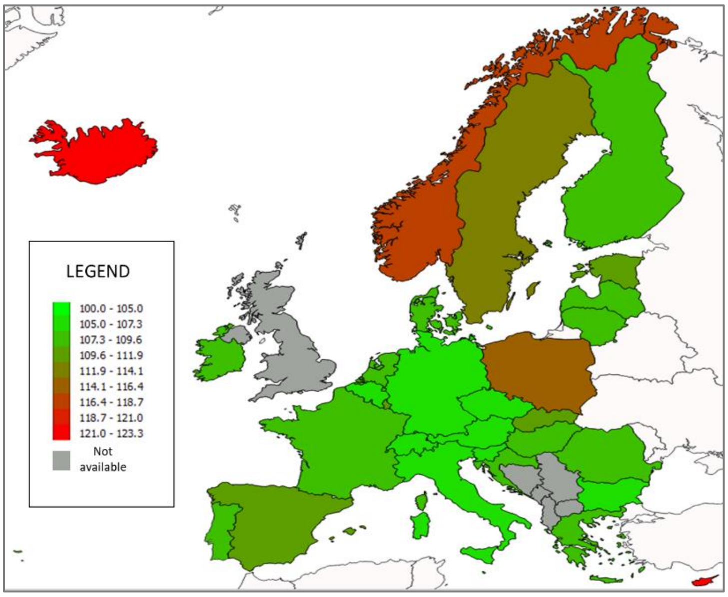
The combination of different data sources, different definition of degradation and different requirements arising from each country, lead to several different potential ways for computing the indicator.

5. RESULTS

Results at European level

Detailed reporting of EU countries on this 15.3.1 indicator is limited. Proxy indicator for the EU context is Eurostat's indicator sdg_15_41 – Soil sealing index.

Figure 2 Soil Sealing Index, 2018



Source: Eurostat, sdg_15_41.

This indicator estimates the increase in sealed soil surfaces with impervious materials due to urban development and construction. It is based on the 20 meters data of Imperviousness High Resolution Layer by Copernicus Land Monitoring Service (CLMS). Figure 2 presents the results of the computation of Eurostat indicator for the year 2018. Data is provided at country level, with soil sealing increase with respect to year 2006 for which a reference value of 100 is considered.

Results at National level

For the computation of SDG indicator 15.3.1, several different approaches based on different (more complex) definitions of land degradation, as well as on different datasets involved in the analysis, can be exploited. In addition, the possibility of disaggregating the information must also be considered by using other geospatial layers, such as, for example, municipality administrative borders.

The following example refer to the analysis carried out in Italy[3]. Following data presented in this section are contained in the report - Consumo di suolo, dinamiche territoriali e servizi ecosistemici (ISPRA).

In the analysis, several factors have been considered related to soil degradation such as:

- Changes in land cover
- Decrease in productivity
- Decrease in soil organic carbon
- Decrease of quality of the habitat
- Soil erosion

This is a non-exhaustive list of degradation factors, since also other factors have also been identified but are not analysed in the following. The first three factors are the same considered in the UNCCD metadata for SDG indicator 15.3.1, nevertheless, their computation has been slightly modified:

- Changes in land cover, mainly generated by using Corine Land Cover and with a transition matrix slightly different from the one of the UNCCD. Soil degradation has affected, in the period 2012-2019, 0.26% of the country territory (source: ISPRA)
- Decrease in productivity has been computed with standard data and considering the three metrics: trend, state, performance. It has affected, in the period 2012-2019, 6.56% of the country territory (source: ISPRA)

[3] Munafò, M. (a cura di), 2020. *Consumo di suolo, dinamiche territoriali e servizi ecosistemici*. Edizione 2020. Report SNPA 15/20.

- Decrease in soil organic carbon has been computed by using land cover data resampled at 50 meters resolution and the National Map of organic carbon obtained by analysing 6748 soil profiles distributed on national territory and collected in the period 1990-2013. In the period 2012-2019, decrease in soil organic carbon has interested 0.18% of the territory (source: ISPRA)

For the remaining factors, they have been computed by leveraging on available local data on country:

- Erosion. This loss, that is very important in the case of agricultural land due the organic matter that is present in the upper part of the soils and supporting soil fertility, has been computed by applying common standard methodology based on the RUSLE soil erosion model considering as parameters:
  - Annual average soil loss
  - Rainfall Erosivity factor
  - Soil Erodibility factor
  - Cover-Management factor
  - Slope Length and Slope Steepness factor

  In particular:
  - parameters leveraging on EU/national datasets have been considered
  - for the Cover-management factor national statistical data for agricultural area have been considered, and Copernicus products and services for all other natural and semi-natural areas

  For this factor, the impact in the period 2012-2019 has been 0.18% of the country territory (source: ISPRA).

- Habitat quality. This degradation is related to the loss of eco-systemic services. This services are supply services (food products, biomass, raw material) and maintenance/tuning services (i.e., management of erosion and carbon stocks, mitigation of extreme hydrological events, biodiversity preservation). This kind of loss has been estimated by computing the difference between the maximum quality value of habitat between years 2012 and 2019 and by considering degraded areas with negative values of 0.1%. This type of degradation has strongly affected area close urban settlements. It has affected 11,57% of country territory (source: ISPRA).

B. NORMATIVE GUIDELINES

1. ALGORITHM WORKFLOW

An algorithm workflow is proposed for three different levels of indicator 15.3.1 computation:

- Use of the standard methodology, based on *Trends.Earth* and related datasets
- Use of a standard methodology but adopting EU-wide datasets
- Use of a standard methodology but adopting local/national datasets

A fourth approach, dealing with a different definition of land degradation and the possibility of involving additional datasets and methodology, has not been considered, since it could involve virtually unlimited workflows depending on degradation definition, datasets, and related processing

In general, when dealing with national datasets, there can be an impact on metrics for degradation definition due to the usage of more datasets in comparison with methodology based on global datasets. The following diagrams with algorithm workflow consider three different phases:

- **Data inventory**, in which all the data needed for indicator computation are identified and collected.

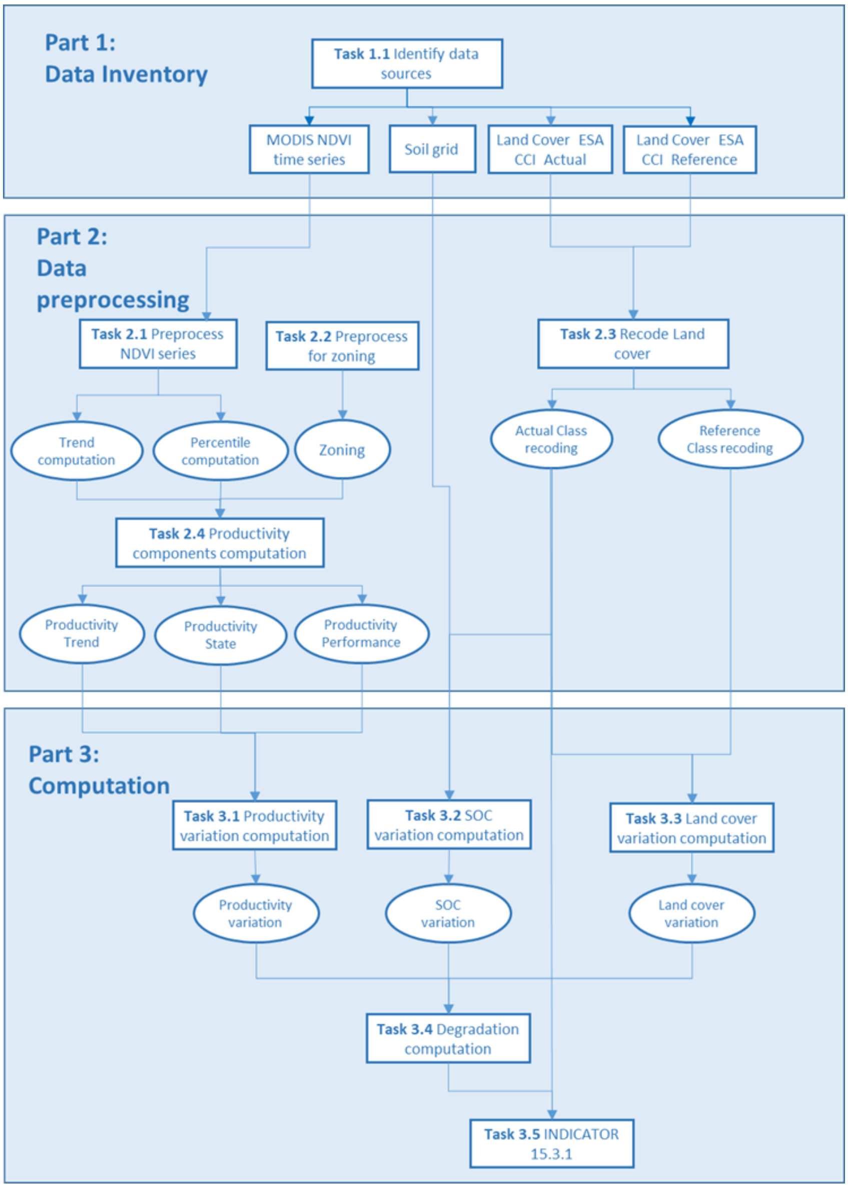
- **Data preprocessing**, in which all data needed for computation are processed for allowing indicator computation.
- **Computation,** in which the final value of the indicator is computed.

Boxes in the diagram are coloured in darker colour when the component in the workflow differs from the standard methodology based on *Trends.Earth.* For all the computation modes, it has also to be considered that the indicator 15.3.1 can be easily disaggregated according to statistical or administrative units, therefore providing a more detailed representation of the area that have been most interested by the degradation in the observation period.

Disaggregation can be obtained with basic operations in a GIS environment that have not been considered in this document.

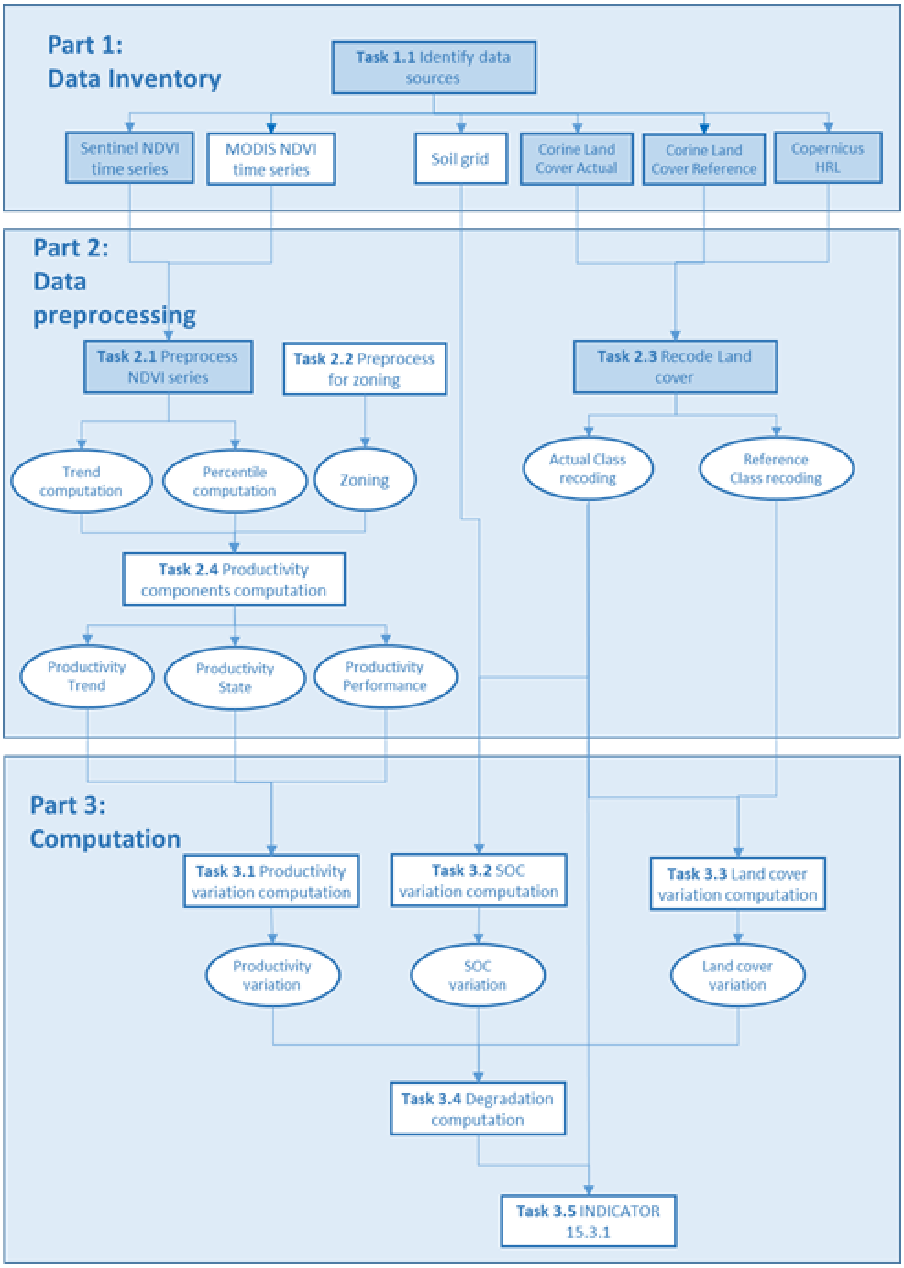
Base computation mode relies on the usage of ***global datasets*** (see Figure 3)**,** as the ones reported on section 3, with processing based on *Trends.Earth.*

Figure 3 Chart summarising the steps for indicator computation at global level



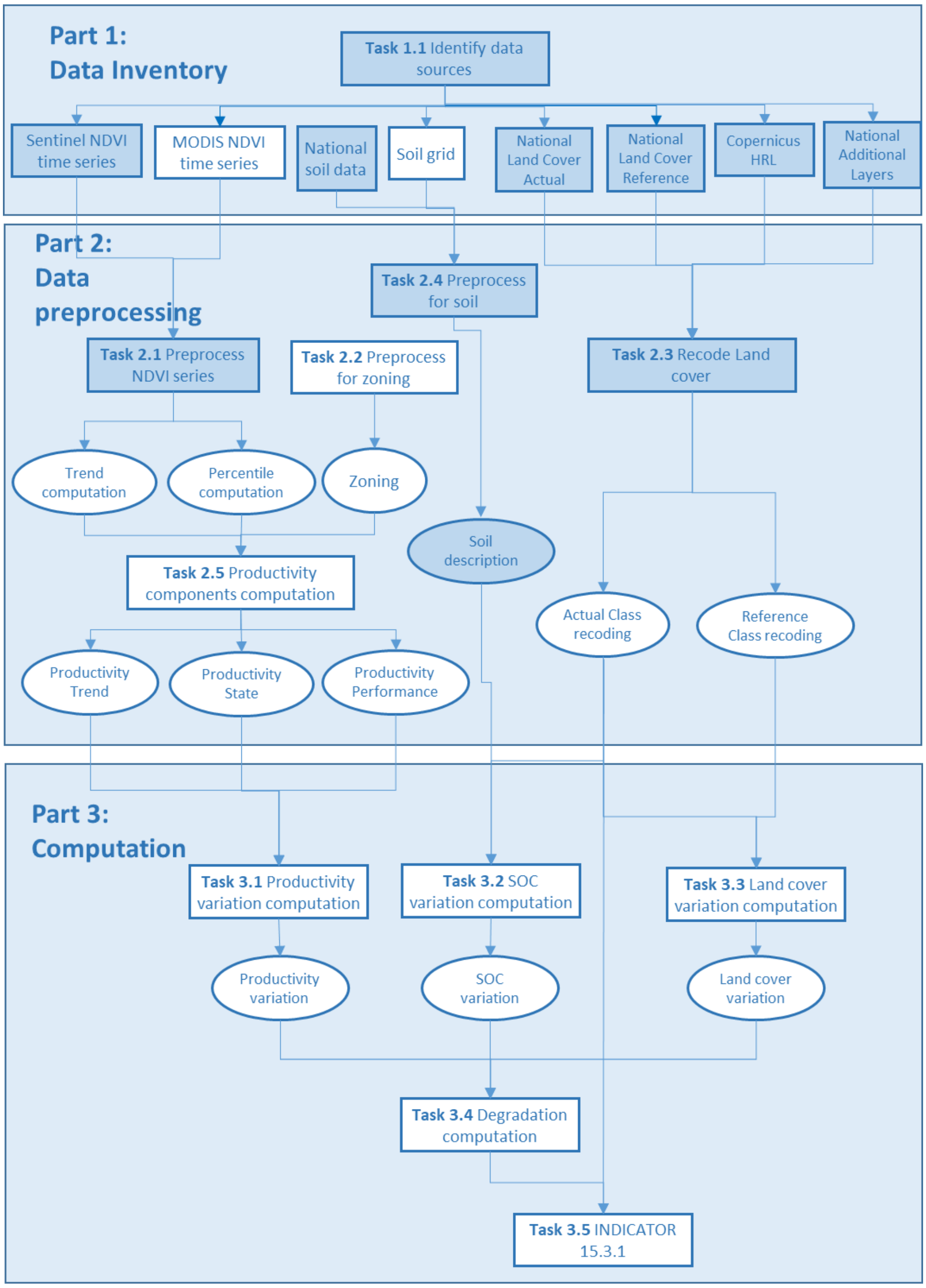
When adopting **EU datasets**, there is of course differences regarding computation with global datasets in data inventory (dark box in Figure 4). There are also differences in data preprocessing and related to modify input data for the generation of the data to be included in the computation.

Figure 4 Chart summarising the steps for indicator computation at EU level



When dealing with **national datasets**, the computation, even if following the standard adopted global workflow, can be more complex due to the potential increase in detail and in the number of involved layers (Figure 5).

Figure 5 Chart summarising the steps for indicator computation at national level



Of course, if the definition of degradation is different (and this is what happens for computation of Eurostat's proxy indicator sdg_15_41), the workflow can be totally different in all its three main components, since there can be a different number of input datasets, a different preprocessing and especially a different computation of land degradation.

2. RECOMMENDATIONS

- Indicator values should be comparable at least at regional (EU) level with those computed by other countries.
- Indicator should be used in support to action planning at national/local level, therefore the integration of more detailed datasets as well the adoption of a more comprehensive definition of land degradation should be considered
- Countries could report with different metrics on this indicator but could also provide a more comparable and homogeneous value at EU or global level by using EU or local datasets.
- The three sub indicators are not fully capturing the complexity of land degradation at national level. In this framework, additional datasets, always with a geographic component are welcomed in the computation. Their usage enables a more comprehensive approach in the management of land degradation, since assessing the phenomena from different points of view and with a level of detail that can enable more focused local actions for limiting the impact of degradation.
- EU Commission recently published the EU Soil Strategy for 2030, that addresses soil degradation and provides an overall picture of the impact of degradation, supporting the tailoring of more detailed evaluations of land degradation
- In general, standard workflow based on the three sub-indicators (land cover, land productivity and carbon stocks) is enough for being customized according to local needs and requirement, easily embedding additional datasets, and integrating land degradation definition.
- EU geospatial dataset are a first step allowing a more detailed computation at EU level with a good degree of homogeneity and comparability of data of the different EU Countries. Their adoption requires some changes in the processing workflow that can be easily implemented. Results can be considered full in line with those required at global level, and more accurate. Some attention should only be paid to the different resolution of more recent datasets available at EU level, requiring a clear definition of how these data can be compared with baseline historical data collected at lower resolution.
- At local level, many different methodologies and dataset can be applied. Therefore, many approaches can be followed, there is still a lot of work to be done to identify the optimal (and possibly shareable) approach. In any case local methodologies are strongly driven by country needs and by local datasets generated by local Agencies. These customized computations of indicator 15.3.1 are of course welcomed, but a standard reporting providing results comparable at EU or Global level should also be provided.