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SDG INDICATOR 15.4.2 MOUNTAIN GREEN COVER INDEX (Tier 2)

I. Introduction

The SDG indicator 15.4.2, Mountain Green Cover Index, contributes to the monitoring of the Sustain Development Goal number 15, which is to "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". It specifically aims at monitoring Target 15.4 which is to "ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development".

The Mountain Green Cover Index measures the changes of the green vegetation in mountain areas (forest, shrubs, trees, pasture land, crop land, etc.). The changes in the green vegetation cover will, in turn, provide an indication of the status of the conservation of mountain environments.

II. Methodology

a. Rationale for the SDG Indicator 2.a.1

The scientific mountain community recognizes that there is a direct correlation between the green coverage of mountain areas and their state of health, and as a consequence their capacity of fulfilling their ecosystem roles. Monitoring mountain vegetation changes over time provides an adequate measure of the status of conservation of mountain ecosystems.

b. Classification systems and definitions

Mountains are defined according to the UNEP-WCMC classification that identifies them according to altitude, slope and local elevation range as described by Kapos et al. 2000:

- Class 1: elevation > 4,500 meters
- Class 2: elevation 3,500–4,500 meters
- Class 3: elevation 2,500–3,500 meters
- Class 4: elevation 1,500–2,500 meters and slope > 2
- Class 5: elevation 1,000–1,500 meters and slope > 5 or local elevation range (LER 7 kilometer radius) > 300 meters
- Class 6: elevation 300–1,000 meters and local elevation range (7 kilometer radius) > 300 meters

c. Computation method

The indicator is generated by overlaying sample-based land cover data collected by FAO using the Collect Earth tool, and the global map of mountains produced by FAO/MPS in 2015 based on the UNEP-WMCM mountain classification. Sample plots with green cover in this context are those plots assigned any of the following IPCC land-use categories: Forest land, cropland and grassland/shrubland.

Collect Earth (http://www.openforis.org/tools/collect-earth.html) is a free, customizable and open source tool that facilitates sample-based data collection through visual interpretation of very high resolution satellite images freely available through Google Earth and Bing maps, as well as the publicly available satellite images through Google Earth Engine (Landsat, Sentinel, Modis, etc.). The Collect Earth tool is being used for a wide variety of purposes, including:

- Support to multi-phase National Forest Inventories
- Land Use, Land Use Change and Forestry (LULUCF) assessments
- Monitoring agricultural land and urban areas
- Validation of existing maps
- Collection of spatially explicit socio-economic data
- Quantifying deforestation, reforestation and desertification

d. Interpretation

Monitoring the "Mountain Green Cover Index" over time can provide information status and changes in the forest and vegetation cover in general. For instance, a reduction in green cover will be generally linked to overgrazing, land clearing, urbanization, forest exploitation, timber extraction, fuelwood collection and fires, while an increase can be due to vegetation regrowth linked to land restoration, reforestation or afforestation programmes.

e. Treatment of missing values

As the data are collected through a global remote sensing sample, there are no missing values at regional/global level. The sampling intensity is so high that most countries and territories have samples, however a few very small countries do not get any sampling units within their territory. This do not affect the global and regional aggregates.

f. Regional aggregates

Regional and global aggregates are estimated directly by using the data from the sampling units falling within each respective region.

g. Quality assurance

The estimated proportion of mountain areas with green vegetation cover has a global sampling error of less than 1%, however at national level and in particular for small countries, the estimates are less accurate. Furthermore, the estimates of change between two consecutive measurements are expected to less accurate, as changes only occur on a small proportion of the sampling units.

III. Data sources

a. Description

The data source for green cover is an assessment made by FAO using the Collect Earth tool. Baseline data were collected in 2017. Next assessment is expected in 2020.

Data on mountain coverage are provided by the 2015 FAO/MPS global map of mountains.

b. Time series

No time series are currently available.

c. Collection process

Baseline data were collected as part of a global land use assessment carried out by FAO, with additional samples allocated in mountain areas. For future assessments it is expected to collect data from the same sample plots and with the same methodology in order to ensure data consistency over time.

IV. Conclusion

The indicator was elevated to Tier 2 in 2017, and baseline data were submitted. As data are collected by FAO, and a global map of mountains is being used to delineate the mountain areas, there are still some uncertainties regarding the process for country validation. Also, the method for assessing changes against the baseline needs to be further refined and tested, as the data of most recent satellite imagery do not always correspond to the year of the assessment.