# Implementation Plan for GEO Community Activity

# - Global Land Cover

## 1. Executive Summary (1 page)

*（This section will appear in the main GEO Work Programme document presented to GEO Plenary）*

### (1) Title of the Community Activity

Global Land Cover (GLC)

### (2) Rationale and objective

Information regarding Land Cover and Change over time (LCC) is essential for a variety of Societal Benefits Areas (SBA), such as environmental change analysis, geographical condition monitoring, urban and rural management, earth surface process modeling. While the world is now moving towards the implementation and monitoring of the United Nations 2030 Agenda with 17 sustainable development goals (SDGs), users are demanding more reliable LCC data (at higher spatial, temporal, and thematic resolutions) and results-oriented services. With this background, the GEO Community Activity GLC is aiming to support 2030 SDGs with reliable LCC information and value-added applications.

The key tasks of GEO-GLC will include: enhancing the networking and collaboration of LCC researchers and users within the GEO framework; coordinating LCC related activities to support SDGs implementation and monitoring; promoting the production, updating and validation of multiple scale LCC data products; promoting the provision of value-added LCC information and knowledge service; and supporting LCC related capacity building.

### (3) Planned activities for 2020-2022

- Utilizing LCC to define and generate Essential SDGs variables (ESDGVs) through workshop(s) and pilot testing jointly with GEO EO4SDGs and UN IAEG: SDGs-WGGI;
- Documenting new approaches and tools for automated updating of global and regional land cover data and efficient generation of LCC-related ESDGVs through workshop(s) or journal special issue (s) jointly with ISPRS and ESA
- Support the inter-comparison and valuation of new global and regional LLC data products (such as GlobeLand30- 2015, Copernicus global land, CCI) jointly with ESA, NGCC and other stakeholders;
- Organize LCC related education and capacity building activities jointly with UN-GGIM and ISPRS

### (4) Points of Contact:

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## 2. Purpose (1 page)

### (1) Rationale (i.e. evidence of need) for the Community Activity.

LCC is fundamental for understanding the state, trends, drivers, and impacts of different land activities on social and natural processes, as well as designing transformations towards sustainable development. A number of global and regional LCC data products had been developed and widely used in the past twenty years. However, the existing LCC data products are far from satisfying all user requirements, in particular, the needs of timely and reliable LCC data with higher spatial, temporal, and thematic resolutions. More innovative efforts and international collaborations are therefore needed to promote the development and applications of LCC data product, including continuous updating, comprehensive validation, and value-added applications.

The major activities in the period 2020-2022 will be focused on supporting 2030 SDGs measuring and monitoring with reliable LCC information and knowledge. The role of LCC in identifying and generating SDGs essential variables will be investigated jointly with GEO EO4SDGs and UN IAEG: SDGs-WGGI. The approaches and tools for efficient generation of ESDGVs from global/regional land cover data will then be explored or documented jointly with ISPRS and ESA. The other issues to be discussed by the GLC activity include the automated updating of global/regional land cover data, inter-comparison and valuation of new global and regional LLC data products (such as GlobeLand30- 2015, Copernicus global land, CCI). In addition, some education and capacity building activities will be organized jointly with UN-GGIM and ISPRS.

### (2) Actual and/or planned outputs of the Community Activity

(i.e. data sets, open methods, information products or services, or other openly available results intended for external users) and their geographical scope)

The outputs will consist of (a) a set of ESDGVs that LCC may contribute directly or indirectly; (b) a set of examples and approaches for generating the LCC related ESDGVs from global/regional land cover data sets; (c) results of inter-comparison of new GlobeLand30- 2015, Copernicus global land and CCI at specific areas, (d) documents summarizing new approaches and tools for automatic updating of global and regional LCC data.

### (3) Actual and/or intended users of the outputs and the expected types of decisions these outputs are expected to inform

The current users come from environmental change studies, Earth system simulation, disaster management and many other SBAs. The output of this task will be used for the status and change analysis of earth surfaces, cause and consequence analysis, coupled analysis with earth system and other models. The targeted new users will be the Inter Agency and Expert Group on SDG indicators (IAEG-SDGs), national and local statistical agencies in charging of SDGs reporting, and UN-Systems (such as UNEP, Un-Habitat). The outputs of this task might provide them with new ideas or approaches to derive those SDGs indicators having a geographical context, designing an efficient SDGs monitoring mechanism with essential variables, and spatio-temporal evidence-based SDGs analysis.

## 3. Background and Previous Achievements (½ page) optional

*( If the proposal emerged from, or is related to, an existing GEO Flagship, Initiative, Community Activity, Community of Practice or other GEO activity, please describe this relationship; For Community Activities already in the GEO Work Programme, Status of implementation of planned activities and outputs for the 2017- 2019 period)*

### (1) Relations with the existing community

The GLC was a GEO task before 2016 and became a Community Activity from 2017. During the 2017-2019 period (CA-01), its major activities were focused on promoting the development and data sharing of global and regional multi-scale land cover datasets. For the period 2020-2022, the GLC community activity will follow the concept of "Results-oriented GEOSS", and move to supporting SDGs with LCC, including the definition and generation of ESDGVs with LCC data sets.

### (2) Status of implementation of planned activities and outputs for the 2017-2019 period

**Major events organized**:

- GEO/ISPRS Workshop on Analysis and Application of Global Land Cover Information, September 24-25, 2016, Beijing, China
- ISPRS/GEO Workshop on Collaborative and Dynamic Land Cover Information Services Supporting UN Sustainable Development Goals, Jinan, China, 16th Sep. 2017
- ISPRS/GEO Seminar, Validation of Global Land Cover Data, Sept 14-16, 2017, Beijing
- ISPRS/GEO Seminar "Capacity Building for High-Resolution Land Cover Inter-comparison and Validation", September 3, 2018, Nairobi, Kenya

**Representative publications:**

- Chen J, Cao X, Peng S, et al. Analysis and applications of GlobeLand30: a review. ISPRS International Journal of Geo-Information, 2017, 6(8): 230.
- Chen J, Li S, Wu H, et al. Towards a collaborative global land cover information service. International Journal of Digital Earth, 2017, 10(4): 356-370.
- Kilsedar C E, Bratic G, Molinari M E, et al. Open educational resources for the validation of global high-resolution land cover maps. Report in PeerJ Preprints, 2018.

**Representative Presentations**

- Chen J., A comprehensive measurement of progress towards SDGs by China at a county level, invited presentation at the panel 'Earth observations in Support of the Sustainable Development', 2018 GEO Week (Oct 31--Nov. 2, 2018, Kyoto, Japan).
- Chen J., Comprehensive measurement of Deqing's progress towards 2030 SDGs, presentation at UN World Geospatial Information Congress, Deqing China, Nov., 20, 2018.
- Ban, Y. Earth Observation & GeoSpatial Big Data for Monitoring SDG Indicators. presentation at UN World Geospatial Information Congress, Deqing China, Nov., 20, 2018.

## 4. Key Activities (1 page)

(*Summary of key planned tasks to be undertaken by the Community Activity during 2020 - 2022 period)*

**Year 2020**

- Organize a workshop on "Essential SDG Variables and LCC information" jointly with EO4SDGs, UNIEAG-SDGs WGGI and ISPRS, aiming to discuss how ESDGVs can be defined and generated with LCC. A discussion paper will be drafted and circulate for further comments and discussion.
- Organize a special session on "Deriving ESDGVs from Imagery" in the XXIV ISPRS Congress (June 14-20, 2020, Nice, France)
- Provide support to ESA and NGCC for a joint inter-comparison and validation of new LLC data products ( GlobeLand30- 2015, Copernicus global land, CCI) in selected areas;
- Co-organize a side event on ESDGVs in the 17th GEO Week jointly with EO4SDGs

**Year 2021**

- Organize the second workshop on "ESDGVs and LCC information" jointly with ESA and ISPRS, aiming to discuss how to develop new approaches and tools for automatic updating of global and regional land cover data and efficient generation of LCC-related ESDGVs. A review or overview paper will be drafted later.
- Conduct pilot tests on deriving ESDGVs with LCC information in selected case study areas.
- Organize a special issue on 'Defining and Deriving ESDGVs with LCC information' in one open access journal in the field of remoted sensing.
- Present the preliminary results at one of the events of the 19th GEO Week

**Year 2022**

- Organize an education and capacity building seminar jointly with UN-GGIM and ISPRS to present and disseminate the outputs of this community activity
- Publish papers to introduce the findings from the three-year work
- Complete the proposed special issue
- Report to the 20th GEO Week