Earth Observations for Sustainable Development Goals
Annual Meeting 2019

Executive Secretary: Argyro Kavvada, USA [NASA/BAH]

Co-Chairs: Lawrence Friedl, USA [NASA]
Paloma Merodio, Mexico [INEGI]
Chu Ishida, Japan [JAXA]

5 August 2019 / New York, U.S.A.
AGENDA

Session 1.1: Program Introduction, Recent Updates & Lessons Learned

Session 1.2: 2020-2024 EO4SDG Strategic Implementation Plan

Open Session: Earth Observation Solutions to Address the UN SDG

Session 2.1: Breakout Round A — Group A1, Good practice examples of methods for measuring and reporting on SDG indicators & Group A2, EO4SDG Federated Approach to GEO’s overall service to the SDG

Session 2.2: Breakout Round B — Group B1, Strengthening Partnerships and Advancing EO Use in SDG Monitoring, Reporting & Decision Making, Group B2 — GEO Secretariat support for EO4SDG, Resources, and Prioritization of EO4SDG Deliverables

Adjourn
MEETING OBJECTIVES & ACTIONS

» Agreement on key successes of EO4SDG Initiative
» Increased confidence about the effectiveness of EO4SDG Initiative; reinforce the implementation plan
» Agreement on lessons learned (including success factors, existing gaps & items we need to do better, risks & opportunities)
» Agreement on desired functions for a SDG-focused expert at the GEO Secretariat.

» A process to coordinate across ongoing and new GEO Work Program Elements.
» Agreement on guidelines to package good practice examples of methods on SDG indicators
» Leads for this packaging, particularly with thematic GEO WP elements & GEO Member Countries
» Agreement on key items and associated leads to deliver these items by: 1) GEO Plenary; 2) during 2019-2020.
TO BE COMPLETED BY BREAKOUT GROUPS

**EO4SDG Deliverables Timeline**
- Breakout Group XX

Decisions & Actions

- **EO4SDG Meeting 2019**
- **GEO Week 2019**
- **UNSC 2020**
- **GEO Symp 2020**
- **UN HLPF 2020**
- **UN WDF 2020 / GEO Week 2020**

**Key Outcomes**
1.
2.
3.
4.
5.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00AM - 10:00AM</td>
<td>Event Passes Pick Up &amp; Security Screening for Entrance to UN Headquarters</td>
</tr>
</tbody>
</table>
| 10:00AM-12:30PM | **Work Session 1 (Closed)**  
Session 1.0: Setting the Stage & Meeting Objectives  
Session 1.1: EO4SDG Successes, Challenges, Lessons Learned & Opportunities for the Future  
Session 1.2: 2020-2024 EO4SDG Strategic Implementation Plan |
| 12:30PM - 1:30PM | **Lunch** |
| 1:30 - 2:45 | **Open Session: Earth Observation Solutions to Address the UN SDG**  
Keynote: Mr. Steven Ramage, Head of External Relations, Group on Earth Observations  
Presentation: Mr. Ian Coady, Geospatial Advisor, Department for International Development, UK  
**Moderated Discussion** |
| 2:45-3:00 | **Break** |
| 3:00-6:00 | **Work Session 2 (Closed)**  
Next Steps, Decisions & Actions to Pursue  
Session 2.1 Breakout Round A  
  - Good practice examples of methods for measuring and reporting on SDG indicators  
  - EO4SDG Federated Approach to GEO’s overall service to the SDG  
Session 2.2 Breakout Round B  
  - Strengthening Partnerships and Advancing EO Use in SDG Monitoring, Reporting, and Decision Making  
  - GEO Secretariat support for EO4SDG, Resources, and Prioritization of EO4SDG Deliverables  
**Moderated Discussion and Adjourn** |
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Adjourn
Earth Observations for Sustainable Development Goals - Recent Updates

Executive Secretary: Argyro Kavvada, Ph.D.

5 August 2019 / New York, U.S.A.
2018-2019 Timeline of Activities with EO4SDG Engagement

**August 2018**
- 7/30-8/3 UN-GGIM 8, SDG Training
- 8/12, 15-17 RCMRD Conference, SDG 11.3.1 training
- 8/26-31 World Water Week
- 9/6 IAEG-SDG Virtual September Mtg.
- 9/17-19 UN/ Austria Symposium, Space for SDGs
- 9/24-25 73rd UNGA
- 10/16-18 32nd CEOS Plenary
- 10/22-24 UN World Data Forum 2018
- 10/29-11/2 GEO Week 2018

**October 2018**
- 11/5-8 8th IAEG-SDG Mtg.
- 11/7-9 UNEP SDG 6.6.1 Consultation Workshop, Lake Como, Italy
- 11/19-21 UN World Geospatial Congress
- 12/6-8 5th WGGI Mtg.
- 12/10-14 AGU Fall Meeting
- 3/5-8 50th Session - UN Statistical Commission
- 3/25-28 9th IAEG-SDG
- 4/2-4 CEOS SIT Mtg.
- 5/13-17 ESA Living Planet Symposium
- 5/20 GEO SDG Awards Issuance
- 5/26-29 GEO Symposium

**November 2018**
- 7/9, 16, 23 SDG 11.3.1 & 15.3.1 Webinar
- 8/5-6 EO4SDG Annual Mtg. & GEO SDG Review Panel
- 8/7-9 UN-GGIM 9
- 8/19-23 AmeriGEO Week 2019
- 9/3 GEO PB Mtg. w/ UN Habitat
- 9/9-12 CEOS SIT TW
- 10/6-11 ISRSE-38/Pecora-21 Conference
- 10/21-25 IAC 2019
- 11/4-8 GEO Week 2019
- 12/9-13 AGU Fall Meeting

**December 2019**
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June 2019

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Key Results Achieved in 2017-2019

EO Integration in SDG Methodologies
- SDG indicators 6.6.1, 6.3.2, 11.3.1, 11.7.1, 15.3.1
- Feasibility studies, pilot projects, in-depth endeavors
- Focus on scalability & replicability of methods

Capacity Development
- In-person trainings: UN-GGIM 8, RCMRD Intern. Conf. 2018, AMERIGEO 2019
- Webinars (SDG Awareness; thematic webinars)
- Contribution to UN Habitat, UNEP, UNCCD activities

Stakeholder Engagement
- UN IAEG-SDG WGGI, UN-GGIM, UN Custodian Agencies
- Line ministries, NSOs, Mapping Agencies, GEO Community
- Non-public sector

End User Needs, Data & Information Products
- Survey to GEO Member Countries on EO data use with SDG
- Satellite data requirements, data acquisition, access, discovery and usability (with CEOS, GEOGLAM)
**EO Integration in SDG Methodologies**

*The Water-Related Ecosystems platform, [https://www.sdg661.app/](https://www.sdg661.app/)*

**SDG 6.6.1 Methodology:** Moved from Tier III to Tier I

*(internationally accepted methodology, data regularly produced)*

- Contributed to revised monitoring methodology: explicit references to EO on spatial extent of open waters / vegetated wetlands and WQ
- Pilot tested use of EO for official monitoring on mangroves, wetlands and WQ
- Joined capacity development efforts w/ UNEP to promote EO use for national policy making

Regional workshop on SDG 6.6.1 convened by UNEP with EO4SDG participation, Bogota, Colombia. 
**Countries:** Colombia, Peru, Venezuela, Bolivia, Panama, Costa Rica, Ecuador

Country consultation workshop convened by UNEP, Italy on 7-9 Nov 2018
EO Integration in SDG Methodologies

The Water-Related Ecosystems platform, [https://www.sdg661.app/](https://www.sdg661.app/)

Moving Forward ..

- Global / Regional EO products (UNEP 2020 data drive to countries, SDG661.app)
- Enhanced community engagement, country adoption of using EO (national experiences, good practice examples)
- Joined capacity development efforts w/ UNEP & countries to promote EO use for national policy making
- Guidance on EO fit for purpose datasets, tools & platforms

Regional workshop on SDG 6.6.1 convened by UNEP with EO4SDG participation, Bogota, Colombia.
**Countries:** Colombia, Peru, Venezuela, Bolivia, Panama, Costa Rica, Ecuador

Country consultation workshop convened by UNEP, Italy on 7-9 Nov 2018
**Countries:** Senegal, Uganda, Colombia, Afghanistan, UAE and Malaysia.
Scaling use of EO in support of 11.3.1

Sustainable Urbanization

- National experience from Colombia’s DANE
- Pilot with Conservation International, NASA, UN Habitat, Colombia, Mexico, Morocco, Peru
- Capacity Development Efforts: Webinar Series on SDG 11.3.1 & 15.3.1 – July 2019 (in English & Spanish) [NASA ARSET, UN Habitat, Conservation International, UNCCD]

Moving forward

- EO4SDG work with Human Planet, GUOI, CEOS on guidance on global datasets, EO good practices, platforms & tools, national experiences, relevance of population data at city level, definition of cities, urban vs rural
- Leverage what ALREADY EXISTS!

July 30-31 SDG Training at UN-GGIM 8

Workshop Highlights:
- Approximately 35 people from the Americas participated, with the majority from SIDS in the Caribbean.
- Focus on water management, land cover, and land degradation as part of the SDGs, including remote sensing techniques; overview of data portals and tools for visualizing and acquiring EO.

Presentation material: https://arset.gsfc.nasa.gov/all/workshops/GGIM-SDGs-18

International: Trainings on Earth Observations & SDGs
https://arset.gsfc.nasa.gov/

ARSET Trainings for Monitoring & Meeting the UN Sustainable Development Goals

In 2015, global leaders adopted the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development. These goals aim to end all forms of poverty, and recognize that ending poverty goes hand-in-hand with strategies that build economic growth and address a range of social needs, including education, health, social protection, and job opportunities, while tackling climate change and environmental protection, UN Sustainable Development Agenda.

Earth observations can support the implementation and monitoring of SDG targets and indicators. ARSET training helps people understand how to access and apply those observables. It is a goal below a grouped goal, it does not mean that remote sensing can’t be applied — just that ARSET has yet to offer a training related to that goal.

Click on a goal below to see relevant ARSET trainings:

Advanced Webinar: Remote Sensing for Monitoring Land Degradation and Sustainable Cities SDGs; Webinar Avanzado: Teledetección para el Monitoreo de los ODS sobre la Degradación de Tierras y Ciudades Sostenibles

11.3.1 & 15.3.1 Webinars — NASA ARSET, Conservation International, UN Habitat, UNCCD

- English & Spanish
- 971 participants from 105 countries
- 700 + Unique Organizations
Top 20 countries by number of new users from 2019-07-01 to 2019-08-01 (total new users = 415, total countries = 80)
### CEOS Work Plan (2019-2021)

#### AHT SDG Deliverables

<table>
<thead>
<tr>
<th>#</th>
<th>Objective/Deliverable Description</th>
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<tbody>
<tr>
<td>SDG-2</td>
<td>Compile and maintain a <strong>compendium of CEOS Agencies engagement</strong> on SDGs</td>
</tr>
<tr>
<td>SDG-3</td>
<td>Review and assess the <strong>contribution of EO to the SDG Targets and Indicators</strong>. Produce an assessment and policy brief</td>
</tr>
<tr>
<td>SDG-4</td>
<td>CEOS <strong>engagement plan on SDGs</strong></td>
</tr>
<tr>
<td>SDG-5</td>
<td>Analyze the <strong>SDG satellite data requirements</strong></td>
</tr>
<tr>
<td>SDG-6</td>
<td><strong>Open Data Cube algorithms for the SDG</strong></td>
</tr>
<tr>
<td>CB-41</td>
<td>Collaboration between AHT-SDG and WGCapD to organize <strong>SDG-related training and capacity building</strong> related to the use of space-based EO to meet the data challenges of the 2030 Agenda for Sustainable Development</td>
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</tbody>
</table>
Task Stream with UN IAEG-SDG WGGI on EO and SDG

» Develop expert advice and guidance to IAEG-SDG and the larger statistical community

» Document national experiences and good practices including case studies, elevate use of EO in national monitoring & reporting efforts / VNRs

» Provide recommendations on the role of NSOs on the uptake of Earth observations.

IAEG-SDG feedback (July 2019): “It is envisioned that the Working Group will build on existing work and ongoing working mechanisms among stakeholders, especially the work of custodian agencies, and will consult widely regarding the current status of methodologies and geospatial data collection and input tools as a starting point.”

The membership of the group should be expanded to include experts in any country (not just those that are members of the IAEG or HLG)
EO for SDG Compendium and Policy Brief

A stepwise approach

**Desktop Review**
- **Step 1**: Screen the indicators
- **Step 2**: Analyse indicator metadata
- **Step 3**: Classify supported indicators
- **Step 4**: Describe role of EO in each indicator (factsheets)

**External consultation**
- **Step 5**: Consult EO experts and SDG stakeholders
- **Step 6**: Iterate and refine factsheets

**Collation of materials**
- **Step 7**: Compilation of materials:
  - (i) Compendium
  - (ii) Policy brief
- **Step 8**: Review by GEO/CEOS/WGGI and disseminate

**Under Review**
- Compendium
- Policy brief

**Assessing EO potential for indicators**

**National experience in using EO for selected indicators**

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**Image**: View from the Sky: The Contribution of Earth Observation to the Sustainable Development Goals and Selected Indicators

**Logos**: ESA, UN, WCMC, GeoVille, UNEP-DHI Partnership, DHI, GRAS
Survey on EO Uses for SDGs by GEO Member Countries

69 Unique Responses

Government, Multinational Research or Conservation Entities

Current Use of EO for SDGs

- SDG 15 most commonly addressed, 15.1.1 (forest area), 15.3.1 (degraded land)
- 25 country examples of use of EO for analyzing and reporting on SDG Indicators
- Additional good practice use cases
Survey on EO Uses for SDGs by GEO Member Countries (Cont.)

Recommendations for Action

– **Harmonization** of global best practices of EO uses with the SDGs
– **Toolkit of workflows** between EVs and SDG Indicators with **concrete examples and country use cases, including testimonials** about impact on cost, time, other resources
– Guidance on how to handle and process EO data (for different levels of geospatial expertise)
– A universal platform to enable use of EO for SDG monitoring, including a **library of workflows ready to replicate**
– A dedicated forum between countries to exchange EO best practices and address technical issues
– A process that demonstrates how EO data are used to achieve the Goals
– Workshops at national level to help promote local cross-institutional collaborations and promote skills to apply EO for SDG monitoring, analysis, and reporting
– At the GEO Ministerial Summit 2019, **showcase country success stories** of indicators and targets measured using data generated from EO

**Acknowledgements:**
This survey was conducted by EO4SDG Co-Chair Japan [JAXA] & Symbios in cooperation with the GEO & EO4SDG Secretariat.
Issuance of Earth Observations for Sustainable Development Awards 2019

25 Nominations
(23 valid submissions)

More information:
http://eo4sdg.org
http://earthobservations.org/
@EO4SDG
@GEOSEC2025

Winners will be recognized at GEO Week 2019 in Canberra, Australia.

Recognize excellence and innovation, generating examples that users can consider and pursue.
Select Publications

Initiative’s Website

http://eo4sdg.org

Upcoming Events

EO4SDG Annual Meeting 2019

The GEO EO4SDG Initiative will hold its third Annual Meeting on the margins of the Ninth Session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-CCXG) on August 5, 2019 at the UN Headquarters in New York.

Featured Projects

Copernicus for SDG (C4SDGs)

The Agenda 2030 provides a framework to make life on our planet better and more sustainable for our future generations. It consists of 27 Sustainable Development Goals (SDGs), divided into 169 targets and approximately 232 indicators which relate to all...

Latest News

GEO SGD Awards: Nominations Deadline

Extended to July 13

There is still time to submit nominations for the GEO SGD Awards Program to recognize achievements in the use of Earth observations to support the UN Sustainable Development Goals (SDGs). The deadline is extended to July 13, 2019.

Integration of Earth Observations and National Statistics for the SDGs in Colombia

Several national agencies in Colombia are working to integrate national statistics, household surveys and routine administrative data with Earth observations, geospatial information, and other data to monitor and assess the SDGs; an example is the Measurement of Colombia.

Wetlands Monitoring with Earth Observation Data in Uganda

The objective of the project is to explore the potential of Earth observation to detect and monitor wetlands, a vital component of the global water resource ecosystem. This activity will pilot design and development of...

Pinned Tweet

On August 5, we will hold our 2019 @EO4SDG Annual Meeting on the sidelines of UN #GSSM3. Don’t miss our open session (CR-O, 1:30 PM), #EarthObservation Solutions to Address the #SDG, with guest speakers @GEOSEC2025’s @Stevan_Ramage & @OFOF_Ritas @ansoaddy eo4sdg.org/eo4sdg-annual-...
Good Practices and/or Lessons Learned

- As a result of work on Indicators, statisticians (at global to national level) now recognize that measuring and monitoring requires GI/EO to provide new and consistent data sources and methodologies to inform official statistics & the SDG.
- Need for guidance development to enable NSOs to mainstream EO into national statistical processes
- Need for data standards to enable EO/ GI use as official data in the generation of national statistics
- Capacity development through co-design of applications and functional tools is essential for country adoption & ownership
- Innovative partnerships & cross-cutting activities to encourage data integration from different sources and address challenges in operationalizing successful applications/ projects

Items for Consideration

- How to work with National and Regional GEOs to integrate Earth observations into the development, implementation, and monitoring of the SDG and coordinate with National Statistical Offices for effective reporting.
- Openly accessible and easily discoverable EO methodologies for SDG indicators, coupled with coordinated capacity development to enhance their adoption and sustained, long-term use.
- Key functions for a GEO Sec SDG Technical Expert.
- Reinforce engagement with GEO Member Countries, POs & GEO WP Elements to develop, scale, and/or document examples of EO uses with SDG
Contents

1. Follow-up of the Survey on EO data use for SDGs by GEO Member countries: Country use cases of EO data for SDG Indicators

2. Experimental computation of selected SDG Indicators using existing global/national datasets and tools (QGIS, Trends.Earth)
1. Follow-up of the survey on EO data use for SDGs by GEO Member countries: Country Use Cases of EO data for SDG Indicators

- GEO survey on EO data use for SDGs by Member countries in late 2018 to early 2019 indicated strong requirements by Member countries, particularly by NSOs, on concrete examples and country use cases with testimonials about impact on cost, time other resources, and guidance on how to handle and process EO data (for different levels of geospatial expertise).
- Follow-up request to share country use cases and project documentation was sent to the survey respondents who kindly indicated willing to share them in late March.
- So far received one input from New Zealand on developing national land use map using satellite data.
- A template for the country use case was prepared (thanks to Argie for the draft) and sent to those respondents in May.
- Planning to request GEOSEC to issue a request to GEO Member countries to share country use cases for reporting to GEO Plenary 2019.
2. Experimental Computation of SDG Indicators Using Existing Global/National Datasets and Tools (QGIS, Trends.Earth)

Objectives
• Compute selected SDG Indicators on experimental-basis using existing global/national datasets and tools (QGIS, Trends.Earth) to identify usable datasets and develop a workflow for assessing applicability of datasets and tools and identify any gaps.

Computed SDG Indicators:
6.6.1 Spatial extent of water-related ecosystems*
9.1.1 Rural population within 2km distance from all-season roads*
11.3.1 Land consumption per population growth*
11.7.1 Share of built-up area of cities that is open space for public uses
15.1.1 Forest areas as a proportion of total land area
15.3.1 Proportion of degraded land per total land*
15.4.2 Mountain Green Cover Index

*WGGI Task Stream 2 indicators
SDG6.6.1 Spatial Extent of Water-related Ecosystem—Mangrove

Data: Global Mangrove Watch (GMW) data
Change larger than 1ha is detectable.

Mangrove area estimation for Bangladesh
1996  4120.0 km² (red)
2010  4121.3 km² (green)

Mangrove area estimation for Thailand
1996  2310.5 km²
2010  2177.1 km²

http://data.unep-wcmc.org/datasets/45

Bangladesh
SDG 9.1.1 Rural Population within 2km Distance from All-season Roads

**Data:**
[https://www.worldpop.org/project/categories?id=3](https://www.worldpop.org/project/categories?id=3)
Roads: GRIP (Global Roads Inventory Project) data (2018)  
Rural/urban areas: Global Rural-Urban Mapping Project (GRUMP), v1 (2014)  
[https://sedac.ciesin.columbia.edu/data/collection/grump-v1](https://sedac.ciesin.columbia.edu/data/collection/grump-v1) was initially used, but clipping to Japan area was not possible because of invalid data. As alternative, GHSL (Global Human Settlement Layers) BUILT data (2014)  

**Workflow:**
1. Download population, roads, urban/rural area data and clip them to Japan area
2. Set 2km buffer from roads
3. Overlay with population data, estimate population within buffer
4. Overlay population data with rural area data and estimate population in rural area
5. Overlay with rural area data, estimate rural population within 2km buffer
6. Estimate ratio of rural population within 2km buffer against total rural population

*2km buffering took too much time with QGIS2.18 and QGIS3.8 was used.*
SDG 9.1.1 Rural Population within 2km Distance from All-season Roads

WorldPoP population grid data (100m resolution)

GRIP road data

GHSL rural/urban area (1km)

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Density (number/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National population</td>
<td>126,524,332</td>
<td>2.3</td>
</tr>
<tr>
<td>Rural area population</td>
<td>19,373,121</td>
<td>0.55</td>
</tr>
<tr>
<td>Within 2km from roads</td>
<td>123,866,826</td>
<td>2.80</td>
</tr>
<tr>
<td>ditto (rural area)</td>
<td>18,304,900</td>
<td>0.63</td>
</tr>
</tbody>
</table>
SDG11.3.1 Land Consumption per Population Growth – Tokushima City

GPW Population grid data (1 km, 2000) and 1 km buffer (○) for Tokushima City

ESA CCI land use data (300m, 2010) and 10 km buffer (○)

Table SDG15.3.1 computation based on GPW population and ESA CCI urban data (comparison with Trends.Earth results)

<table>
<thead>
<tr>
<th></th>
<th>City population change</th>
<th>City population growth rate</th>
<th>City areas change (km²)</th>
<th>Land consumption rate</th>
<th>SDG11.3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2005</td>
<td>-11100 (2588)</td>
<td>-0.02271 (0.002556)</td>
<td>5.3 (317.38)</td>
<td>0.04783 (0.004758)</td>
<td>-2.106 (1.862)</td>
</tr>
<tr>
<td>2005-2010</td>
<td>-14527 (10981)</td>
<td>-0.03042 (-0.011077)</td>
<td>16.2 (26.92)</td>
<td>0.13953 (0.000398)</td>
<td>-4.586 (-0.036)</td>
</tr>
<tr>
<td>2010-2015</td>
<td>-18176 (2842)</td>
<td>-0.03925 (-0.002969)</td>
<td>9.2 (12.50)</td>
<td>0.06953 (0.000185)</td>
<td>-1.771 (-0.062)</td>
</tr>
</tbody>
</table>
SDG11.7.1 Share of Built-up Area of Cities that is Open Space for Public Uses - Tokyo

National Land Numerical Information Urban Land use 100m mesh data (2014)
GHSL (Global Human Settlement Layers) BuiltUp data (1km, 2015)

<table>
<thead>
<tr>
<th></th>
<th>UN-Habitat urban pulic space DB (Tokyo)</th>
<th>Estimation by National Numerical Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built Up area</td>
<td>NA</td>
<td>1159.78km2</td>
</tr>
<tr>
<td>Road area</td>
<td>25%</td>
<td>3.9% (44.91km2)</td>
</tr>
<tr>
<td>Park/vegetation cover area</td>
<td>30%</td>
<td>0.86% (9.9km2)</td>
</tr>
<tr>
<td>Open public space ratio</td>
<td>55%</td>
<td>4.8% (54.8km2)</td>
</tr>
</tbody>
</table>
SDG15.1.1 Forest Area

ESA CCI land use data (300m resolution, 1992–2015)
https://maps.elie.ucl.ac.be/CCI/viewer/download.php

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest area (km²)</td>
<td>275394</td>
<td>274000</td>
<td>273833</td>
<td>273000</td>
</tr>
<tr>
<td>Ratio</td>
<td>72.48%</td>
<td>72.11%</td>
<td>72.07%</td>
<td>71.84%</td>
</tr>
<tr>
<td>(reference) FRA</td>
<td>248760</td>
<td>249350</td>
<td>249660</td>
<td>249580</td>
</tr>
</tbody>
</table>

Estimated total land area of Japan: 379949km²
SDG15.3.1 Proportion of Degraded Land per Total Land

Land use change analysis by Trends.Earth and comparison with analysis using ESA CCI land use data

- **Land use changes by Trends.Earth**

<table>
<thead>
<tr>
<th>Land cover type in target year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree-covered areas</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>245,443.20</td>
</tr>
<tr>
<td>1,954.76</td>
</tr>
<tr>
<td>657.21</td>
</tr>
<tr>
<td>15.84</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>5.10</td>
</tr>
</tbody>
</table>

- **Land use changes by ESA CCI data**

<table>
<thead>
<tr>
<th>Land cover type in target year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree-covered areas</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>272,564.00</td>
</tr>
<tr>
<td>5.05</td>
</tr>
<tr>
<td>670.00</td>
</tr>
<tr>
<td>19.00</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>9.47</td>
</tr>
</tbody>
</table>

Good agreement
15.4.2 Mountain Vegetation Cover Index

GSI/Global Map data (1km, land use, elevation and administrative boundary)
Mountain area was delineated considering elevation and slope
(300m elevation range within 700 m radius for 300-1500 elevation has not been considered.)

<table>
<thead>
<tr>
<th></th>
<th>Mountain area</th>
<th>Mountain Green Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis by FAO</td>
<td>44.9%</td>
<td>97%</td>
</tr>
<tr>
<td>Computation using Global Map</td>
<td>72.2%</td>
<td>96.71%</td>
</tr>
</tbody>
</table>
Summary

• SDG Indicators were computed on experimental basis using global/national datasets and tools (QGIS and Trends.Earth).
• It took some time to get used to handling datasets and QGIS. But once a workflow is established, it is rather straightforward to compute the Indicators using existing datasets and tools.
• Trends.Earth provides very simple and efficient means for countries to compute 11.3.1 and 15.3.1.
• Satellite data is large and complex. It is often challenging to preprocess data before analysis. But, it provides great means to make a time-series change analysis at different scales.
• It needs further analysis and consultation with NSOs and line ministries, in particular, to assess applicability of datasets and tools for SDG Indicator reporting.
Report from GEO Blue Planet

Prepared by: Daniel Takaki, Emily Smail, Paul DiGiacomo, Sophie Seeyave
Mission

- **Advance and exploit synergies** among the many observational programmes devoted to ocean and coastal waters

- **Improve engagement** with a variety of stakeholders for enhancing the timeliness, quality and range of services delivered

- **Raise awareness** of the societal benefits of ocean observations at the public and policy levels.
On-going projects and efforts to support the Sustainable Development Goals

SDG Support (14.1.1)

• Working with UN Environment on the methodology for coastal eutrophication & with Esri on the development of a global data product of coastal chlorophyll-a deviations and anomalies

• Developing a white paper for UN Environment

  “A Global Platform for Monitoring Marine Litter and Informing Action”

• Marine Litter/Debris working group
Key Results Achieved in 2017-2019 (Workshops)

- Workshop on Implementing and Monitoring the Sustainable Development Goals in the Caribbean: The Role of the Ocean – St. Vincent and the Grenadines, 2018
- Workshop on Understanding Flooding on Reef-lined Island Coasts – Honolulu, HI, USA, 2018
- Workshop on Sargassum and Oil Spills Monitoring for the Caribbean Sea & Adjacent Regions – Mexico City, Mexico, 2018
- Workshop on Technologies for Observing and Monitoring Plastics in the Oceans – Brest, France, 2018
- Workshop on Ocean and Coastal Information in Support of Marine Resources and Biodiversity in the Macaronesia and Sao Tome and Principe region – Mindelo, São Vicente Island, Cape Verde, 2019
Key Results Achieved in 2017-2019 (Publications)


GEO Blue Planet (2018). What can the ocean tell us? Why ocean observation products and services are vital for us and our planet.

B. Mackenzie, et al. (2019). The role of stakeholders and actors in creating societal value from coastal and ocean observations. Frontiers in Marine Science.

Good Practices and/or Lessons Learned

• Secretariat support and project funding is required

• Information services should be developed based on expressed user need and users should be involved in the process early and often

• Collaboration is key

• Involve operational agencies early
Contact

Daniel Takaki
Daniel.Takaki@noaa.gov

Emily Smail
Emily.Smail@noaa.gov

https://geoblueplanet.org

@geoblueplanet
2nd Human Planet Forum

Presented by:
Robert S. Chen, co-chair, Human Planet Initiative; co-chair Data Sharing WG
Director, CIESIN, the Earth Institute, Columbia University
Manager, NASA Socioeconomic Data and Applications Center

EO4SDG Annual Meeting 2019
New York, USA
August 5, 2019
Global Fundamental Geospatial Data Themes

United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)

- Adopted minimum list of 14 *global fundamental geospatial data themes* to facilitate measurement, monitoring, and management of sustainable development
Results

Population Estimates by Data Set

<table>
<thead>
<tr>
<th>Source</th>
<th>Population Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHSLS</td>
<td>1570029</td>
</tr>
<tr>
<td>GPW4</td>
<td>1478828</td>
</tr>
<tr>
<td>Landscan</td>
<td>1314976</td>
</tr>
<tr>
<td>Worldpop</td>
<td>147674</td>
</tr>
<tr>
<td>ESRI WPE</td>
<td>1065696</td>
</tr>
<tr>
<td>HRSL</td>
<td>1560679</td>
</tr>
</tbody>
</table>

Data Quality Message(s):
- The average national WPE reliability ranking is 2
- The average size of national input units in GPW is 1568 square kilometers
- HRSL has coverage
2nd Human Planet Forum

1. Advances in slum mapping
2. Development of the Human Planet Atlases, 2020-22
3. Downscaled future scenarios of population & economic activity
4. Global definition of cities and rural areas
5. Mapping of secondary and tertiary administrative boundaries
6. Validation and intercomparison strategies for human settlement and population data
7. Applications, decision support, and stakeholder engagement

Columbia University
Lamont campus, Palisades NY
September 30-October 2, 2019

https://humanplanet.eventbrite.com
Report from Cindy Schmidt, NASA
Ecological Forecasting

Supports decision makers by developing remote sensing-based tools to understand and forecast the impacts of environmental change on managed species and ecosystems.

Goal: Understand and save life on Earth with NASA technology

Topics: Conservation, Natural Resource Management, and Sustainable Development

- ~38 active projects
- Projects in Terrestrial, Freshwater, and Marine systems
- Emphases on Citizen Science, Funding Contributions from Partner/End User Organizations, GEO BON, and Earth Observations for Ecosystem Accounting
- Projects touch all 50 states and countries around the world
<table>
<thead>
<tr>
<th>PI</th>
<th>Organization</th>
<th>Title</th>
<th>Biome</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gordon Luikart</td>
<td>U. of Montana</td>
<td>Projecting the Spread of Aquatic Invasive Species Using Remote Sensing, Genetics, and Climate Modeling</td>
<td>Freshwater</td>
<td>USA</td>
</tr>
<tr>
<td>Rebecca Lewison</td>
<td>SDSU</td>
<td>Climate-ready and resilient fisheries: using satellite data to conserve and manage life in the ocean and support sustainable fisheries</td>
<td>Marine</td>
<td>USA</td>
</tr>
<tr>
<td>Robert Jones</td>
<td>TNC</td>
<td>Earth Observations for Climate-Ready Aquaculture Management and Siting to Improve Food Security and Ocean Health in Palau, a Small Island Developing State</td>
<td>Marine</td>
<td>Palau</td>
</tr>
<tr>
<td>Robert Griffin</td>
<td>U. of Alabama</td>
<td>Climate-influenced Nutrient Flows and Threats to the Biodiversity of the Belize Barrier Reef Reserve System</td>
<td>Marine</td>
<td>Belize</td>
</tr>
<tr>
<td>Eric Sanderson</td>
<td>WCS</td>
<td>A near-real time integrated mapping and reporting system for critical biodiversity sites under Sustainable Development Goal 15: the tiger as model</td>
<td>Terrestrial</td>
<td>Indonesia, India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Malaysia, China, Russia</td>
</tr>
<tr>
<td>Solomon Dobrowski</td>
<td>U. of Montana</td>
<td>Integrating Earth observations, ecohydrologic, and plant hydraulic models for forecasting recruitment failure in semi-arid forests: Decision support for adaptive forest management.</td>
<td>Terrestrial</td>
<td>USA</td>
</tr>
<tr>
<td>Andrew Hansen</td>
<td>Montana SU</td>
<td>Maintaining Life on Land (SDG 15) under Scenarios of Land Use and Climate Change in Colombia, Ecuador, and Peru</td>
<td>Terrestrial</td>
<td>Colombia, Ecuador, Peru</td>
</tr>
<tr>
<td>Erika Podest</td>
<td>JPL</td>
<td>A Sustainable Forest Management and Information System (SFMIS) Tool</td>
<td>Terrestrial</td>
<td>Panama</td>
</tr>
<tr>
<td>Danielle Wood</td>
<td>MIT</td>
<td>Designing applications to foster the health of terrestrial and wetland ecosystems in the coastal zone of West Africa</td>
<td>Terrestrial, Freshwater</td>
<td>Benin, Ghana</td>
</tr>
</tbody>
</table>
Maintaining Life on Land (SDG 15) Under Scenarios of Land use and Climate Change in Ecuador, Colombia and Peru

Project Inception Workshop
April 23-26, Ecuador

• Each country is at different levels of SDG reporting
• Necessary to have Ministries of Environment involved from the beginning
• Data validation (by countries) is important.
  • Process is variable, time frame is often unknown
• UNDP country coordinator needed, but funds not available
The changing landscape of EO/GI4SDG-related stakeholders in Hungary

G. Remetey-Fülöpp, Sz. Mihály and T. Palya
Hungary / Hungarian Society of Surveying, Mapping and Remote Sensing WG4SDG
/ Goal 17: Partnership for the Goals

EO4SDG Annual Meeting 2019
New York, USA
August 5, 2019
### The emerging landscape of the SDG-related stakeholders and engaged actors in Hungary

#### The UN 2030 Agenda on SD (25/09/2015)

#### Responsible ministries assigned (28/12/2017)
- Coord.: Foreign Affairs & Trade
- Agriculture
- Human Resources
- Defense
- Justice
- National Economics
- Ministry of the Prime Minister

#### SDG Policy-related entities
- National Assembly
- President of the Republic
- Nat. Council for Sust. Development
- Ombudsman for Future Generation
- Constitutional Court

#### SDG Policy-implementation
- State managed institutions including
- National Statistical Office
- Wide range of supportive civil societies including
  - Nat. Soc. of Conservationists
  - HSoc Surv. Mapp. RS
- MFTTT WG4SDG

#### Implementation stakeholders & actors
- Selected EO/GI Stakeholders & actors
- National Center of Land Management
- Lechner Knowledge Center Nonprofit Ltd
- KIFÜ
- Consortium lead

#### Int’l drivers
- UN 2030 Agenda on SD (25/09/2015)
- Res. of ministries assigned (28/12/2017)

#### Legislation, governance

#### Implementation stakeholders & actors

#### Int’l links
- Int’l Institutions & Organisations
  - FIG
  - FIG
  - UN-GGIM
  - ICA
  - CEOS
  - GISS
  - GEO
  - ESA
  - GEO EO4
  - SDG

#### State financed development: EO information system for Public Administration (FIR)
- State managed institutions including
- National Center of Land Management
- Lechner Knowledge Center Nonprofit Ltd
- KIFÜ
- Consortium lead

#### Some relevant links
- KIFÜ
- State funded development: EO information system for Public Administration (FIR)

Voluntary report presented at UN HLPF on SDG in 2018
Progress in 2019 with relevance to SDG: Partnership for the Goals (Goal 17)

Stakeholder engagement and capacity building

A comprehensive presentation on the sustainability of the surveyor’s profession and the Agenda 2030 was delivered by the lead of WG4SDG for the community working in geoscience, geo-related engineering and land administration in June 2019. Link: https://www.mftt.hu/mfttportal/index.php/letoltes/eloadasok/doc_view/74

SDG-related activities and actors were presented in the Liaison report of the Hungarian Space Office at CEOS WGISS-47 plenary hosted by NOAA in May 2019. Link: www.ceos.org

Parallel developments having influence on SDGs implementation

Governance: a well-balanced institution and legal system exists for the implementation of SD laws and policies including international agreements (NCSD)

Institutional capacity building: concentration of high volume of geospatial and Earth Observation information, airborne data, taking over the expertise and tasks in surveying, remote sensing, land registry and associated mapping at Lechner Nonprofit Ltd, the acknowledged knowledge center for built environment. Link: http://lechnerkozpont.hu

A new department responsible for space research and activities (actually the Hungarian Space Office) is active at the MoFAT. It is anticipated the global policy issues including SDGs will be addressed in the coming National Space Strategy.

Resources: Projects on ‘FIR - EO data infrastructure and services for the Public Administration’ and ‘3D data infrastructure’ are in progress lead by KIFÜ and Lechner Nonprofit Ltd. respectively.

Looking ahead: To ensure timely implementation of the SDGs there is imperative need for inter- and trans-disciplinary cooperation and collaboration among stakeholders of also on domestic level in line with UN guidelines, the national strategy on SD taking into account GEO EO4SDG, CEOS/ESA guides in Earth Observation, the good practices of the Sustainable Development Solution Network in capacity building and curricula development, the UN/GGIM and EFGS recommendations on the integrated use of geospatial information and statistical data for indicator monitoring and reporting. Setting up interoperable EO and spatial data infrastructures, exploitation of new, promising technologies (AI, 5G drones, new data architectures etc.) are inevitable and provides opportunities for benefit of the society.
CEOS SDG-AHT contribution to GEO EO4SDG work program

Presented by: CEOS Ad-Hoc Team on SDGs

EO4SDG Annual Meeting 2019
New York, USA
August 5, 2019
2018-2019 tangible outputs from CEOS SDG-AHT

• CEOS Earth Observation Handbook on SDGs
  • Officially released in March 2018, at the 49th Session of the UN Statistical Commission, during the “Statistical-Geospatial Integration Forum”

• GEO/CEOS joint presence at UN High Level Political Forum (HLPF) 2018
  • HLPF theme: “Transformation towards sustainable and resilient societies”.
  • Australia with CSIRO/GA organised a side event on the use of Earth observations for SDGs followed by two hands-on workshops (Financing and Priority)

• GEO/CEOS special issues on EO for SDGs in scientific journals
  • RSE Special Issue on “Earth Observation for the Sustainable Development Goals” (UNSW, CSIRO, NASA, GEO) – editing phase
  • RS Special Issue on “EO Solutions to Support Countries Implementing the SDGs” (ITC, ESA, NASA, SANSA) – call for papers

• Recognition of CEOS by the UN as a key partner to mobilise Space Agencies’ efforts on SDGs
  • CEOS represented in the IAEG-SDGs Working Group on Geospatial Information (WGGI);
  • CEOS involvement in UN Expert Teams on Indicator monitoring guidelines.
  • CEOS participation to key international events/panels on SDGs (UN HLPF, WDF, UN GGIM annual sessions, GEO plenaries)
### SDG-AHT deliverables in CEOS 2019-2012 Work Plan

<table>
<thead>
<tr>
<th>#</th>
<th>Objective/Deliverable Description</th>
<th>Due date</th>
<th>Leading agency</th>
<th>Main Contributors</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDG-2</td>
<td>Compile and maintain a <em>compendium of CEOS Agencies engagement</em> on SDGs</td>
<td>Q2 2019</td>
<td>CSIRO</td>
<td>All CEOS Agencies (11 so far)</td>
<td>Completed (to be regularly updated)</td>
</tr>
<tr>
<td>SDG-3</td>
<td>Review and assess the <em>contribution of EO to the SDG Targets and Indicators</em>. Produce a detailed assessment and a policy brief</td>
<td>Q3 2019</td>
<td>ESA</td>
<td>NASA, CSIRO</td>
<td>Draft completed (under review)</td>
</tr>
<tr>
<td>SDG-4</td>
<td>CEOS <em>engagement plan on SDGs</em></td>
<td>Q2 2019</td>
<td>ESA</td>
<td>CSIRO, NASA</td>
<td>Draft circulated (to be finalized for SIT TW)</td>
</tr>
<tr>
<td>SDG-5</td>
<td>Analyse the <em>SDG satellite data requirements</em></td>
<td>Q4 2019</td>
<td>NASA</td>
<td>SANSA, ESA, CSIRO, JAXA</td>
<td>Template circulated</td>
</tr>
<tr>
<td>SDG-6</td>
<td>Open Data Cube algorithms for the SDGs</td>
<td>Q4 2019</td>
<td>NASA (SEO)</td>
<td>NASA, CSIRO, GA, UKSA</td>
<td>on-going</td>
</tr>
<tr>
<td>CB-41</td>
<td>SDG-related training and capacity building related to the use of space-based EO to meet the data challenges of the 2030 Agenda for Sustainable Development</td>
<td>Q3 2019</td>
<td>NASA (WGCapD)</td>
<td>SDG AHT Members</td>
<td>Awareness webinars done Indicator-specific webinars under preparation</td>
</tr>
</tbody>
</table>
## CEOS SDG-AHT Activity Prioritization

<table>
<thead>
<tr>
<th>Focus on CEOS unique role and on a few SDG Indicators (start with 6.6.1; 11.3.1; 15.3.1)</th>
<th>The original goals of the SDG AHT were too broad in scope and not fully aligned with the CEOS mandate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complement rather than duplicate the GEO community efforts on SDGs</td>
<td>The AHT activities were too similar to the work of the GEO EO4SDG initiative, which brought some confusion on the respective roles of CEOS and GEO.</td>
</tr>
<tr>
<td>Encourage more commitment and participation from CEOS agencies</td>
<td>The impact of the CEOS activities on SDGs is commensurate to the level of resources available.</td>
</tr>
<tr>
<td>Leverage the knowledge and expertise of CEOS bodies (VCs, WGs, SEO) to maximise impact.</td>
<td>The SDG is a very broad and cross-cutting topic (land, marine, atmosphere) requiring different EO competences (satellite data, EO infrastructures, capacity building, accuracy assessment).</td>
</tr>
<tr>
<td>Identify the key partners with whom CEOS should primarily interface (IAEG-SDGs WGGI, Custodian agencies)</td>
<td>The UN has established a complex governance system on the SDG Global Indicator Framework with many stakeholders involved both at UN and national levels.</td>
</tr>
</tbody>
</table>

Given CEOS mandate to act as the “space-arm” of GEO, CEOS should focus its efforts on facilitating the exploitation of satellite observations by the SDG stakeholders, while GEO should prioritize its activities towards mainstreaming the use of Earth Observations (not limited to satellite observations) in the SDG systems and processes at UN and country levels.
CEOS Engagement on SDGs, a streamlined approach

### UN Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs)
- Working Group on Geo-Spatial Information (WGGI) Task Stream II Application of satellite data for the SDG indicators

#### CEOS SDG AHT
- **Satellite Data Availability** (Observation requirements, ARD)
- **EO Enabling Infrastructures** (Platforms, Data Cubes)
- **Awareness & Capacity Building**
- **EO Good Practice Guidance**
- **EO Quality Standards**

#### GEO EO4SDG
- **GEO Wetlands, Aquawatch GEO GLOWS**
- **GEO Human Planet**
- **GEO Land Degradation Neutrality**

#### CEOS
- **LSI-VC**
- **WGISS SEO**
- **WGCapD**
- **WGCV**

**Indicators**
- **6.6.1 Water related ecosystems**
- **11.3.1 Sustainable Urbanization**
- **15.3.1 Land Degradation Neutrality**

**Topics**
- Surface Water Extent, Vegetated Wetlands, Water Quality
- Human Settlements, Population Density, urban/rural
- Land Cover, Land Productivity, Carbon Stock

**Organizations**
- UN Environment
- UN Habitat
- UNCCD
- GEO Human Planet
- GEO Land Degradation Neutrality
AGENDA

**Session 1.1**: Program Introduction, Recent Updates & Lessons Learned

**Session 1.2**: 2020-2024 EO4SDG Strategic Implementation Plan

**Open Session**: Earth Observation Solutions to Address the UN SDG

**Session 2.1**: Breakout Round A — Group A1, Good practice examples of methods for measuring and reporting on SDG indicators & Group A2, EO4SDG Federated Approach to GEO's overall service to the SDG

**Session 2.2**: Breakout Round B — Group B1, Strengthening Partnerships and Advancing EO Use in SDG Monitoring, Reporting & Decision Making, Group B2 — GEO Secretariat support for EO4SDG, Resources, and Prioritization of EO4SDG Deliverables

**Adjourn**
AGENDA

Session 1.1: Program Introduction, Recent Updates & Lessons Learned

**Session 1.2: 2020-2024 EO4SDG Strategic Implementation Plan**

Open Session: Earth Observation Solutions to Address the UN SDG

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Adjourn
Session 1.2: Updated 2020-2024 Strategic Implementation Plan

GOAL I  Demonstrate how Earth observations, geospatial information, and socio-economic and other data contribute in novel and practical ways to support sustainable development efforts and the SDG.

GOAL II  Increase skills and capabilities in uses of Earth observations for SDG activities and their broader benefits.

GOAL III  Broaden interest, awareness, and understanding of Earth observations support to the SDGs and contributions to social, environmental, and economic benefits.

GEO PB Feedback

»  Bring countries to a higher level of commitment that will lead to an operational integration of EO for SDG monitoring

»  Integration and adoption of EO by national statistical agencies for the monitoring of SDGs should be one of the main objectives to achieve.
Lunch Break
12:30 - 13:30
AGENDA

Session 1.1: Program Introduction, Recent Updates & Lessons Learned

Session 1.2: 2020-2024 EO4SDG Strategic Implementation Plan

Open Session: Earth Observation Solutions to Address the UN SDG

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Adjourn