GROUP ON EARTH OBSERVATIONS

EARTH OBSERVATIONS FOR SUSTAINABLE DEVELOPMENT GOALS

Japan Aerospace Exploration Agency

Report on SDGs Related Activities

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WGGI
Mexico City, Mexico
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2. Demonstration in computation of selected SDG Indicators using existing global/national datasets and tools (QGIS, Trends.Earth)

1. Follow-up Survey on EO data use for SDG Indicators by GEO Member countries

- GEO survey on EO data use for SDGs by Member countries made in 2019 found 25 existing EO data use cases and 21 planned uses.
- A simple template to share country use cases were sent to the survey respondents who kindly indicated willing to share them.
- So far received inputs from New Zealand, Germany, Canada and Colombia. Other interested countries are requested to provide inputs.
- Collected information will be shared through GEO SDG toolkit for SDGs.

Report "Responses to the Questionnaire on Uses of Earth Observation Data for SDG analysis and reporting by GEO Member Countries, February 2019"

Template to follow-up GEO survey on EO data use for SDG Indicators

Country Use Case of EO Use for SDG Indicator	
SDG Indicator/Sub-indicator	
Country or region	
Status (please check)	_ being used in official SDG Indicator reporting _ being verified or tested by country _ studying feasibility
Earth Observation Data Used and its links	
Additional/ Other Data Used and its links	
Description of data access, processing, and analysis, including methodology that was developed, associated tools or applications, and how these are applied to compute SDG Indicator	
Work flow	
Lessons learned, any gaps, key issues and recommendations	
Supporting material about this use case. Include links, publications, etc.	
Name(s) and email address of individual(s) involved in this effort. Please note the principal point(s) of contact (POCs).	

Status of EO data use

EO data used

Data access, process, analysis

Work flow

LL, gaps, issues, action

Overview of the Use of EO for SDG Indicator Reporting (2019 Survey)

Existing and planned country use cases of EO data for SDG Indicator

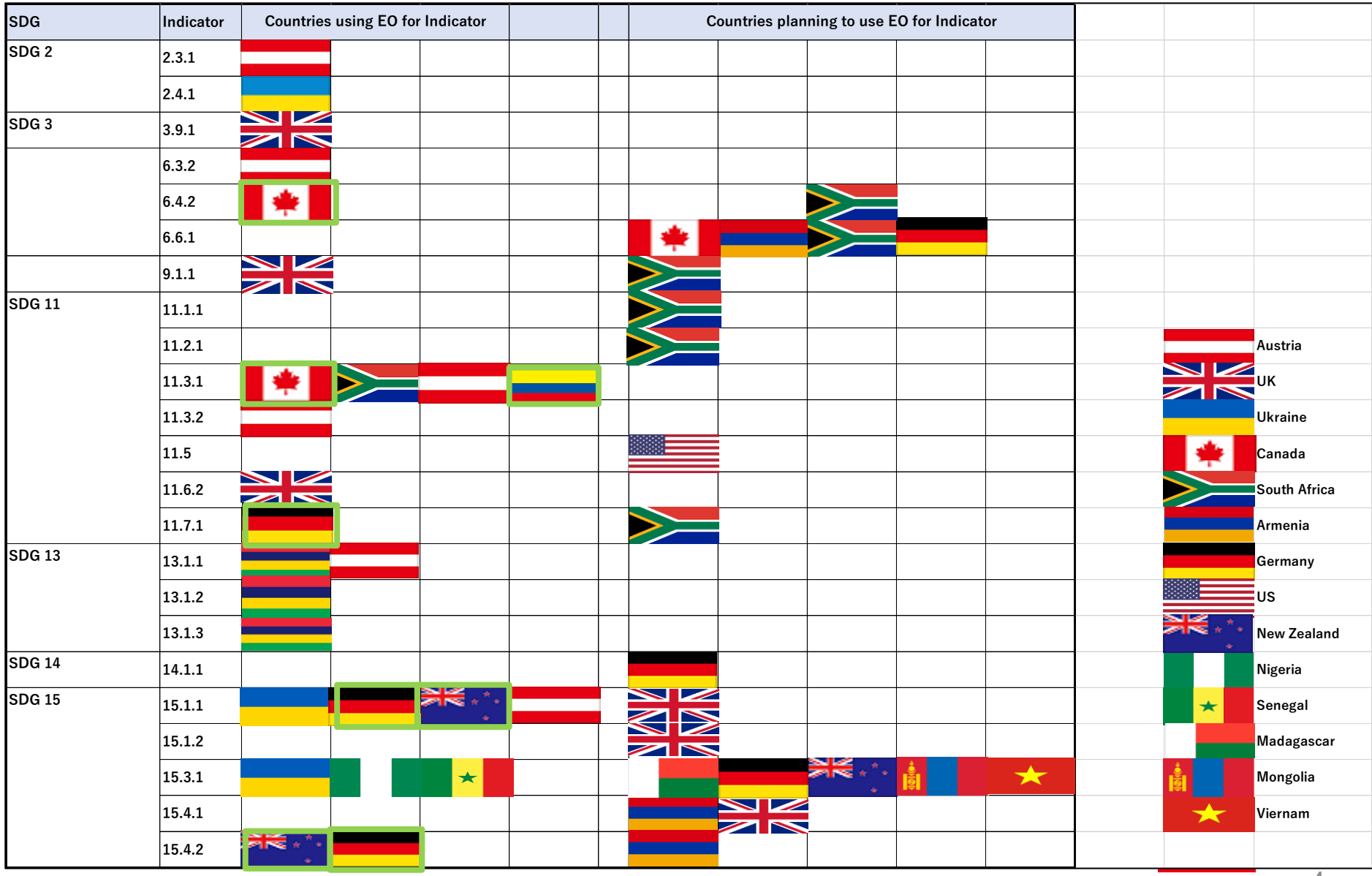
Left

25 cases of existing country use cases of EO data for SDG Indicators

Right

21 cases of planned country use cases

Follow-up info received



Objectives

Compute selected SDG Indicators on experimental-basis using existing global 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.

Target SDG Indicators :

The following indicators were computed. Results of 6.6.1, 9.1.1 and 15.4.2 are reported here.

- 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*

SDG 6.6.1 Change in Extent of Water-related Ecosystems over Time
- Mangroves -

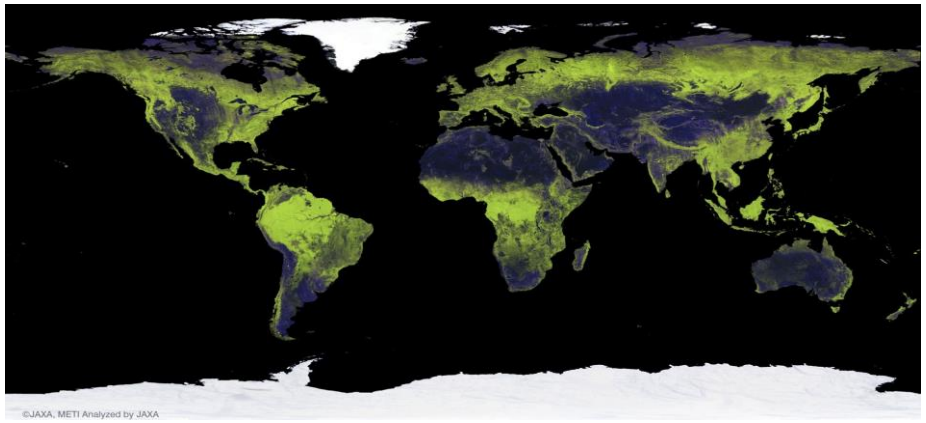
The Global Mangrove Watch – a consistent global dataset (partially) filling the mangrove information gap.

The GMW dataset

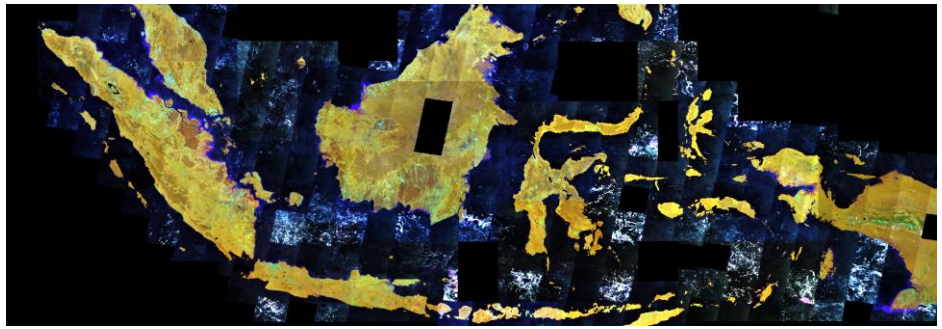
- The Global Mangrove Watch* dataset shows the global extent of mangroves for 7 annual epochs in the period 1996 – 2016.
- 2010 baseline map generated from ALOS PALSAR and Landsat imagery
- Other 6 epochs generated from JERS-1, ALOS and ALOS-2 SAR mosaics
- Consistent methodology applied globally

Constraints and limitations

- 25 m pixel spacing a limitation in small or fragmented mangroves
- SAR mosaic generation time lag
- 2010 baseline artefacts due to cloud cover and



GMW input source: L-band SAR global mosaics @ 25 m
1996 (JERS-1), 2007-2010 (ALOS PALSAR) , 2015-2016 ALOS-2 PALSAR-)



GMW input source: Optical global mosaic @ 30 m
~2010 (Lansdat 5 & Landsat 7)

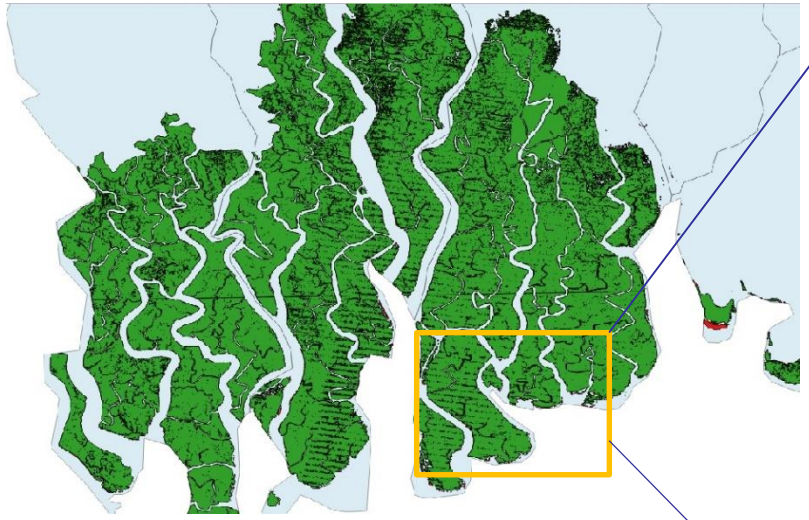
* The Global Mangrove Watch (GMW) is an international initiative led by JAXA, Aberystwyth University (U.K.) and soloEO (Japan) in collaboration with NGOs (WI, IWMI, TNC, WCMC, WRI), NASA GSFC and academic institutions. GMW contributes to GEO-Wetlands

SDG 6.6.1 Change in Extent of Water-related Ecosystems over Time — Mangroves

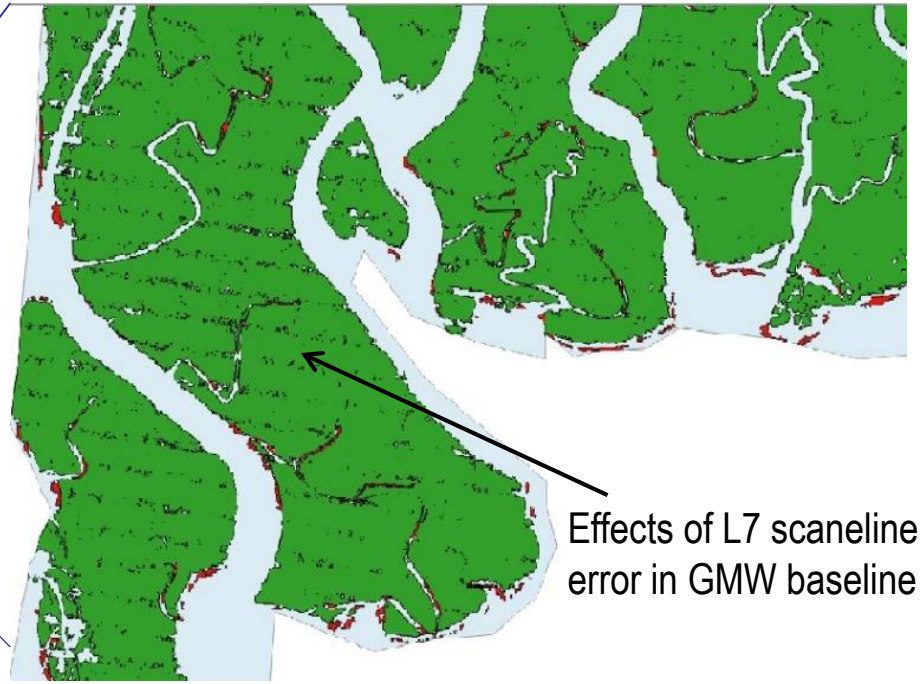
The GMW dataset was designated 2019 by UNEP (SDG6.6.1 co-custodian) as official mangrove dataset for country reporting on Indicator 6.6.1.

GMW data to be released on UNEP SDG www (www.sdg661.app) late March 2020 . The site provides free and open access tools for calculation SDG6.6.1 components at national or sub-national basis.

GMW data can also be downloaded directly and areas calculated by common GIS software.



Mangrove area estimated by standard QGIS tools – Bangadesh
1996 4120.0 km2（red）
2010 4121.3 km2（green）



Effects of L7 scaneline error in GMW baseline

SDG 6.6.1 Change in Extent of Water-related Ecosystems over Time — Mangroves

Global Mangrove Watch www:

www.globalmangrovewatch.org

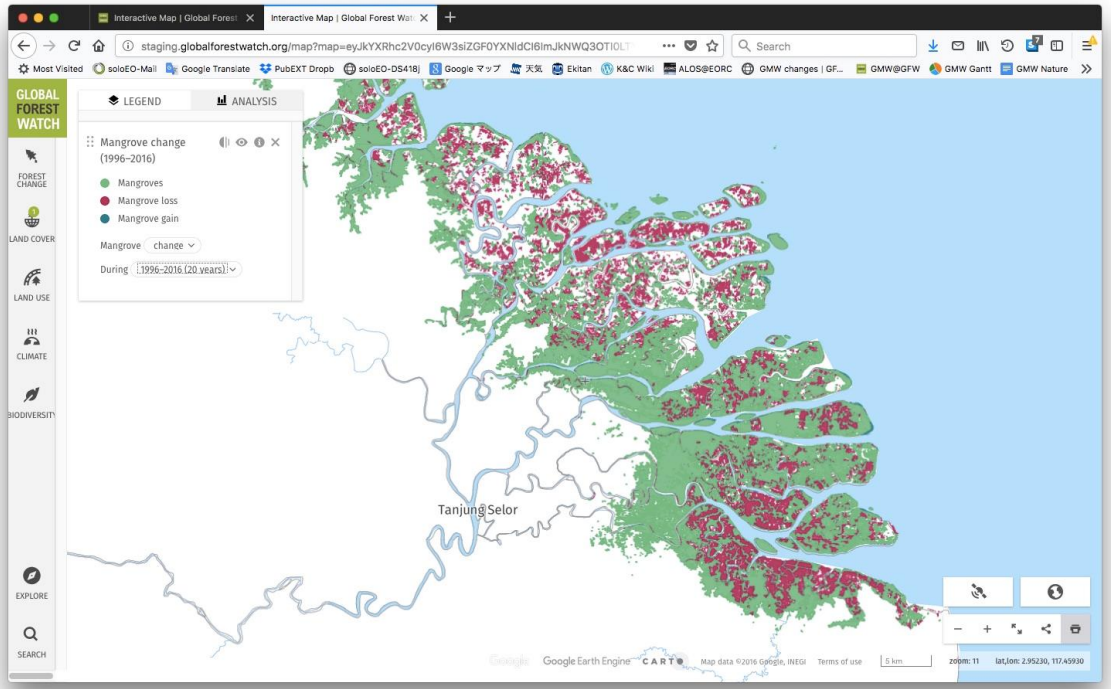
www.eorc.jaxa.jp/ALOS/en/kyoto/mangrovewatch.htm

Data access:

UNEP-WCMC: data.unep-wcmc.org/datasets/45 (.shp)

UNEP SDG6.6.1 www: www.sdg661.app

JAXA EORC www: 2020/Q2 (GeoTiff)



GMW on GFW www

Online viewing:

Global Forest Watch www (select “Mangrove forest” layer under “Land Cover” tab)

https://www.globalforestwatch.org/

For technical details see:

Bunting P., Rosenqvist A., Lucas R., Rebelo L-M., Hilarides L., Thomas N., Hardy A., Itoh T., Shimada M. and Finlayson C.M. (2018). The Global Mangrove Watch – a New 2010 Global Baseline of Mangrove Extent. Remote Sensing 10(10): 1669. doi: 10.3390/rs1010669

SDG 6.6.1 Change in Extent of Water-related Ecosystems over Time — Mangroves

Next steps

2020/Q2: Revision of GMW v2.0 to include known missing areas
2021: Add mangrove biomass (AGB) derived from SRTM height (collaboration w. NASA GSFC)
2021: Generation of 2017, 2018 & 2019 GMW maps
2021+: Integration of wider range of EO datasets (L-band SAR, C-band SAR, optical data @10m) to improve classification accuracy

Mangrove area [1000*ha]	1996	2007	2008	2009	2010	2015	2016	Net change 1996-2016
Indonesia	2,842	2,716	2,708	2,702	2,689	2,667	2,668	-6.1%
Brazil	1,132	1,105	1,106	1,106	1,107	1,093	1,096	-3.1%
Mexico	1,057	1,023	1,033	1,022	954	990	971	-8.1%
Australia	1,012	1,003	1,004	1,004	1,006	983	984	-2.8%
Nigeria	702	700	700	700	696	693	693	-1.4%
Myanmar/Burma	542	503	510	510	501	495	498	-8.0%
Malaysia	525	514	515	516	520	513	513	-2.3%
Papua New Guinea	477	474	474	474	476	470	471	-1.2%
Bangladesh	416	416	416	415	416	412	411	-1.3%
India	361	352	352	352	352	349	351	-2.7%

GMW estimates for the world's Top-10 mangrove countries

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

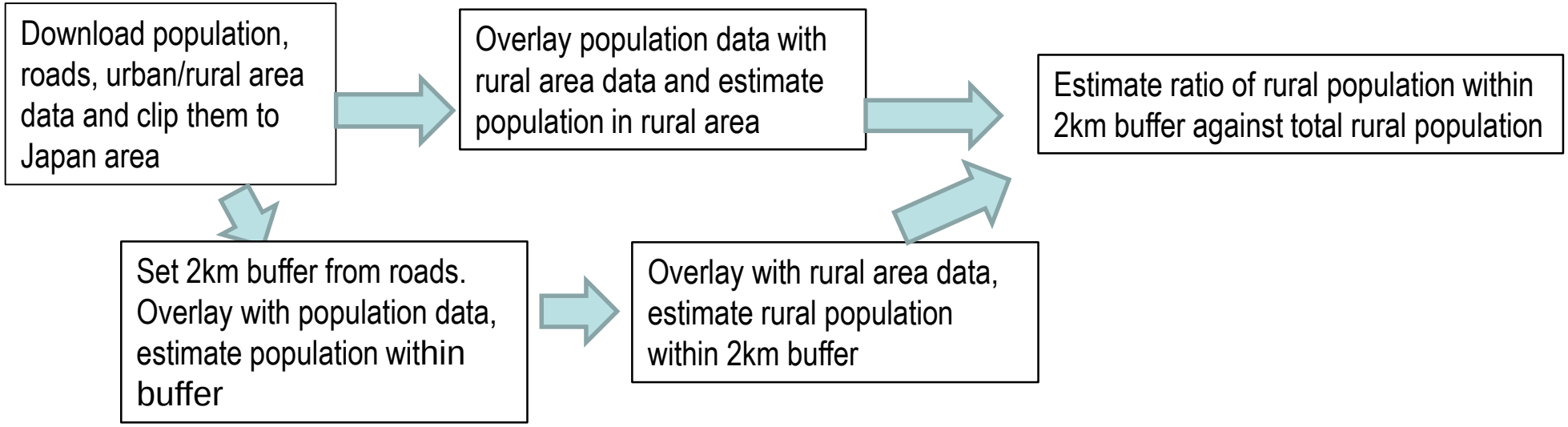
Data:

Population: WorldPoP, 100m grid Japan (2015) https://www.worldpop.org/project/categories?id=3

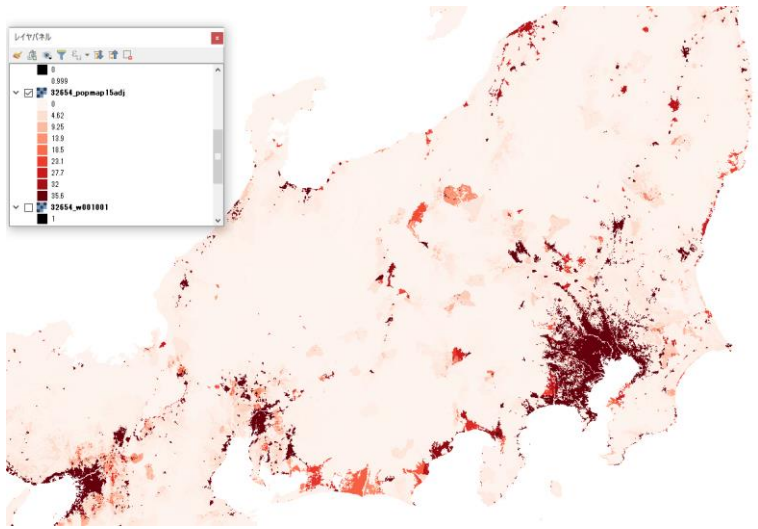
Roads: GRIP (Global Roads Inventory Project) data(2018)
https://datacatalog.worldbank.org/dataset/grip-global-roads-inventory-project-2018

Rural/urban areas: Global Rural-Urban Mapping Project (GRUMP), v1 (2014)
https://sedac.ciesin.columbia.edu/data/collection/grump-v1

Workflow:

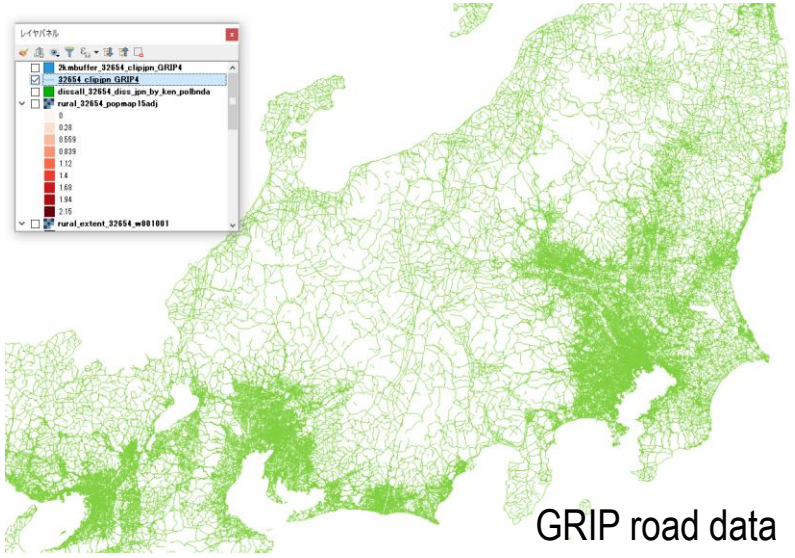


SDG 9.1.1 Rural Population within 2km Distance from All-season Roads

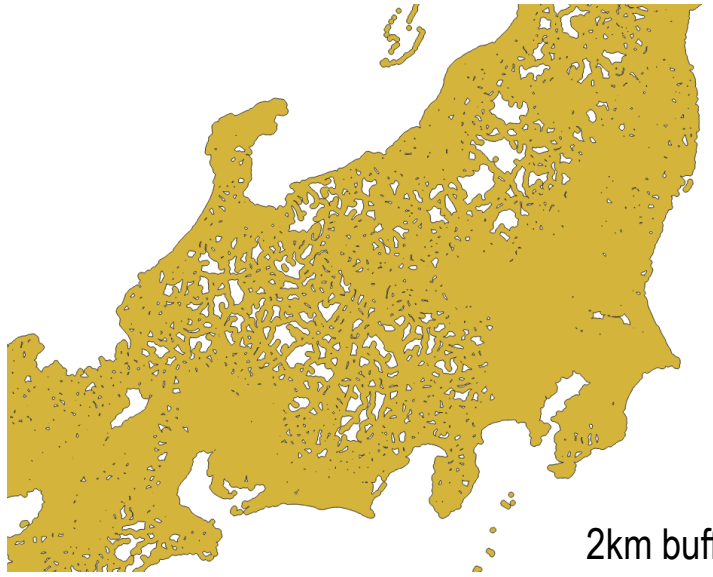


WorldPoP population grid data（100m resolution）

GRUMP urban area (1km)



GRIP road data



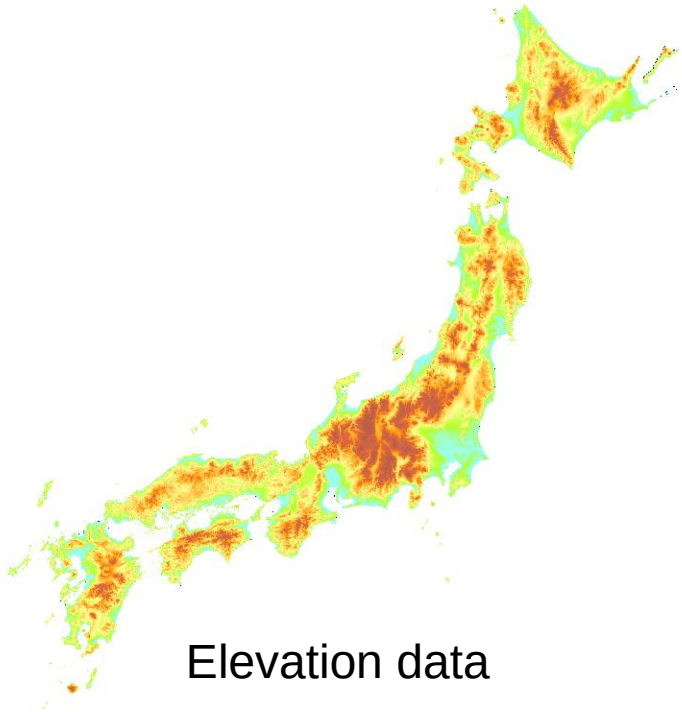
2km buffer from roads

	Population	Density (per ha)
National population	134,853,493	2.41
Rural area population-A	10,963,884	0.29
Within 2km from roads (national)	134,821,984	2.87
ditto（rural area）-B	10,488,073	0.35
B/A	95.6%	

15.4.2 Mountain Vegetation Cover Index

- GSI/Global Map data (1km, land use, elevation and administrative boundary) and ALOS land use map (250m, 2014-2016) and AW3D(300m) were used.
- Mountain area was delineated considering elevation and slope *

Land use data



Elevation data

Mountain green coverage

*300m elevation range within 700 m radius for 300-1500 m elevation was not considered.

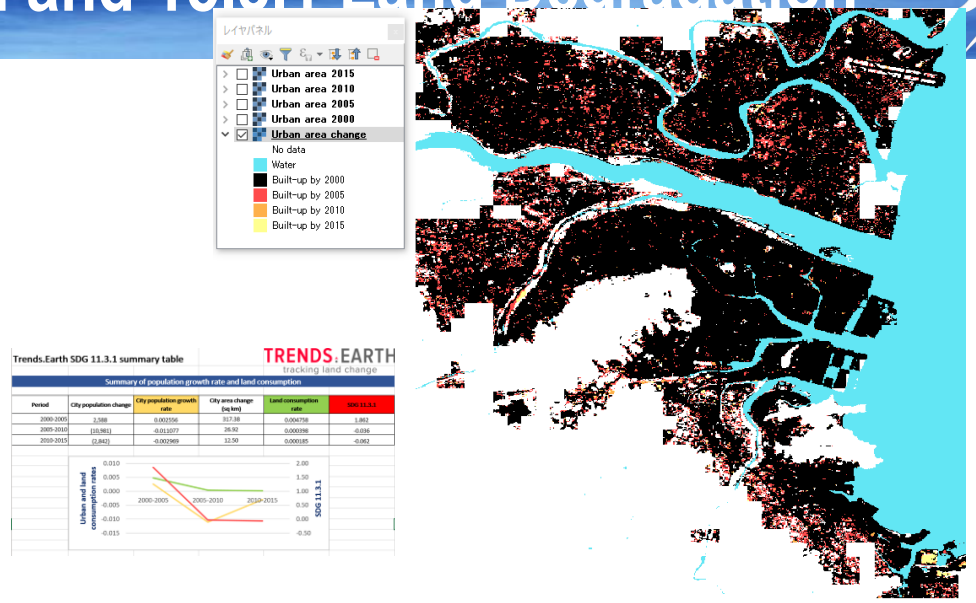
	Mountain area	Mountain Green Coverage
Computation using Global Map	72.2%	96.71%
Computation using ALOS data	45.9%	91.2%
Analysis by FAO	44.9%	97%

11.3.1 Land Consumption and 15.3.1 Land Degradation

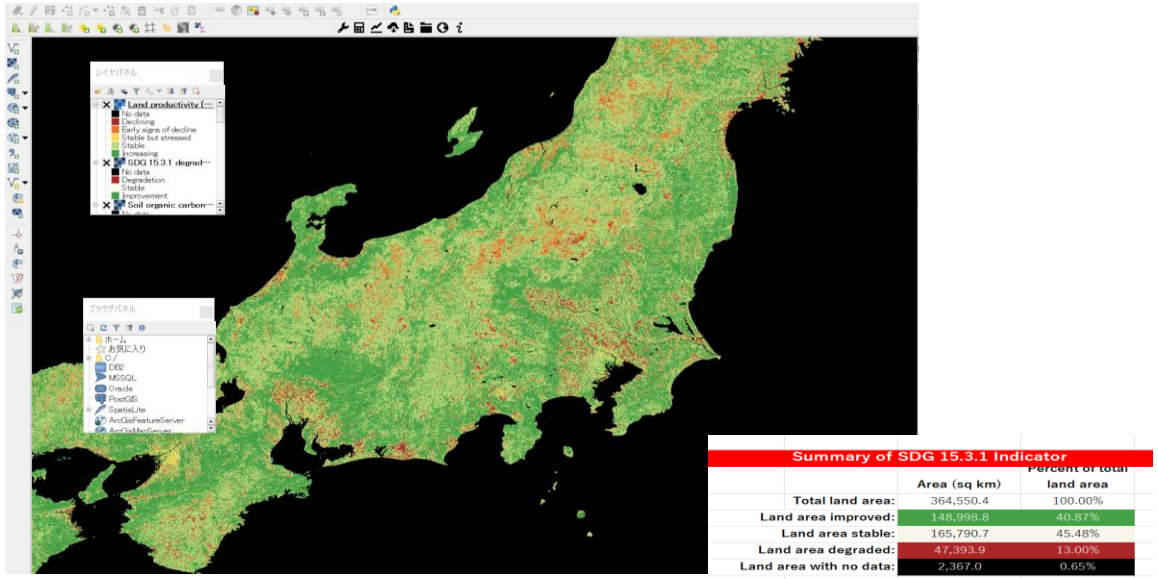
Indicatiors 11.3.1 and 15.3.1 were computed using Trends.Earth tool developed by Conservation Int'l and NASA.

Google Earth Engine is tasked to compute these indicators using Landsat and Sentinel data.

http://trends.earth/docs/en/



13.1.1 Ratio of land consumption against population growth（Tokushima city）



15.3.1 Land Degradation Neutralization (LDN)

Summary

- SDG Indicators were computed on experimental basis using global/national datasets and tools (QGIS and Trends.Earth).
- Once datasets are selected and a workflow is established, it is rather straight forward to compute the Indicators using existing datasets and tools.
- Datasets need to be selected to fit for the purpose.
- 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 in a consistent manner.
- It needs further analysis and consultation with NSOs and line ministries to assess applicability of datasets and tools for SDG Indicator reporting.