

# Report on SDGs Related Activities

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WGGI

Mexico City, Mexico

March 9-11, 2020

1. Follow-up Survey on EO data use for SDGs by GEO Member countries
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"*



Country Use Case of EO Use for SDG Indicator	
SDG Indicator/Sub-indicator . . .	
Country or region . . .	Status of EO data use
Status (please check) . . .	<input type="checkbox"/> being used in official SDG Indicator reporting . . . <input type="checkbox"/> being verified or tested by country . . . <input type="checkbox"/> studying feasibility . . .
Earth Observation Data Used and its links . . .	EO data used
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 . . .	Data access, process, analysis
Work flow . . .	Work flow
Lessons learned, any gaps, key issues and recommendations . . .	LL, gaps, issues, action
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) . . .	


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

# 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

SDG	Indicator	Countries using EO for Indicator																			
		Countries using EO for Indicator										Countries planning to use EO for Indicator									
SDG 2	2.3.1																				
	2.4.1																				
SDG 3	3.9.1																				
	6.3.2																				
	6.4.2																				
	6.6.1																				
	9.1.1																				
SDG 11	11.1.1																				
	11.2.1																				
	11.3.1																				
	11.3.2																				
	11.5																				
	11.6.2																				
	11.7.1																				
SDG 13	13.1.1																				
	13.1.2																				
	13.1.3																				
SDG 14	14.1.1																				
SDG 15	15.1.1																				
	15.1.2																				
	15.3.1																				
	15.4.1																				
	15.4.2																				

-  Austria
-  UK
-  Ukraine
-  Canada
-  South Africa
-  Armenia
-  Germany
-  US
-  New Zealand
-  Nigeria
-  Senegal
-  Madagascar
-  Mongolia
-  Vietnam

### 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 -

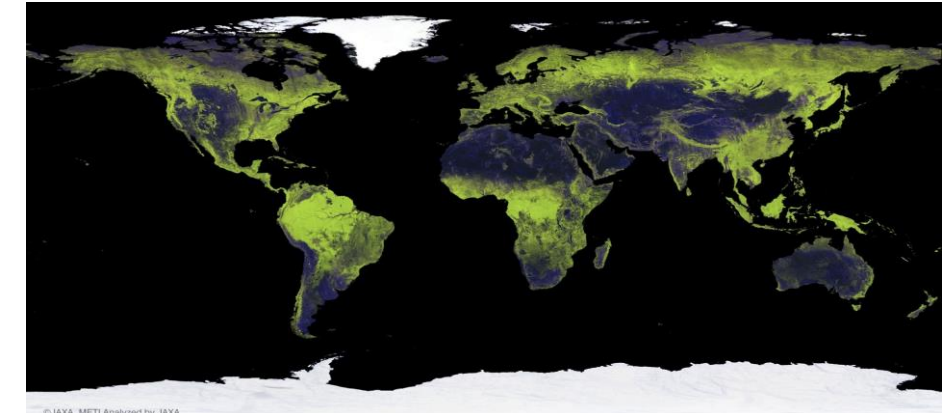
The Global Mangrove Watch – a consistent global dataset (partially) filling the mangrove information gap.

### The GMW dataset

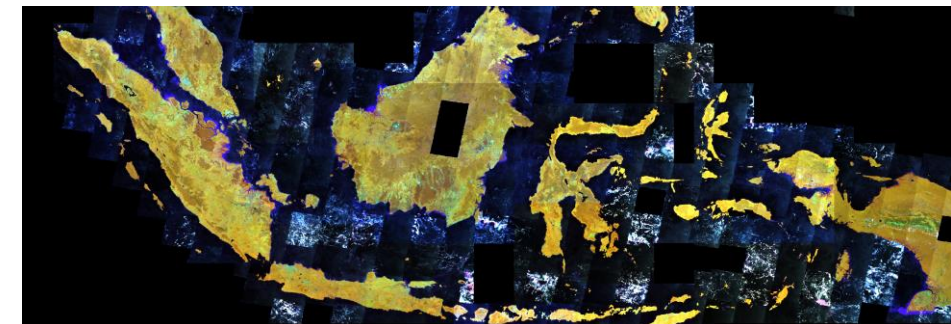
- The Global Mangrove Watch\* dataset shows the **global extent of mangroves** for 7 annual epochs in the period 1996 – 2016.
- 2010 baseline map generated from ALOS PALSAR and Landsat imagery
- Other 6 epochs generated from JERS-1, ALOS and ALOS-2 SAR mosaics
- Consistent methodology applied globally

### 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 (Landsat 5 & Landsat 7)

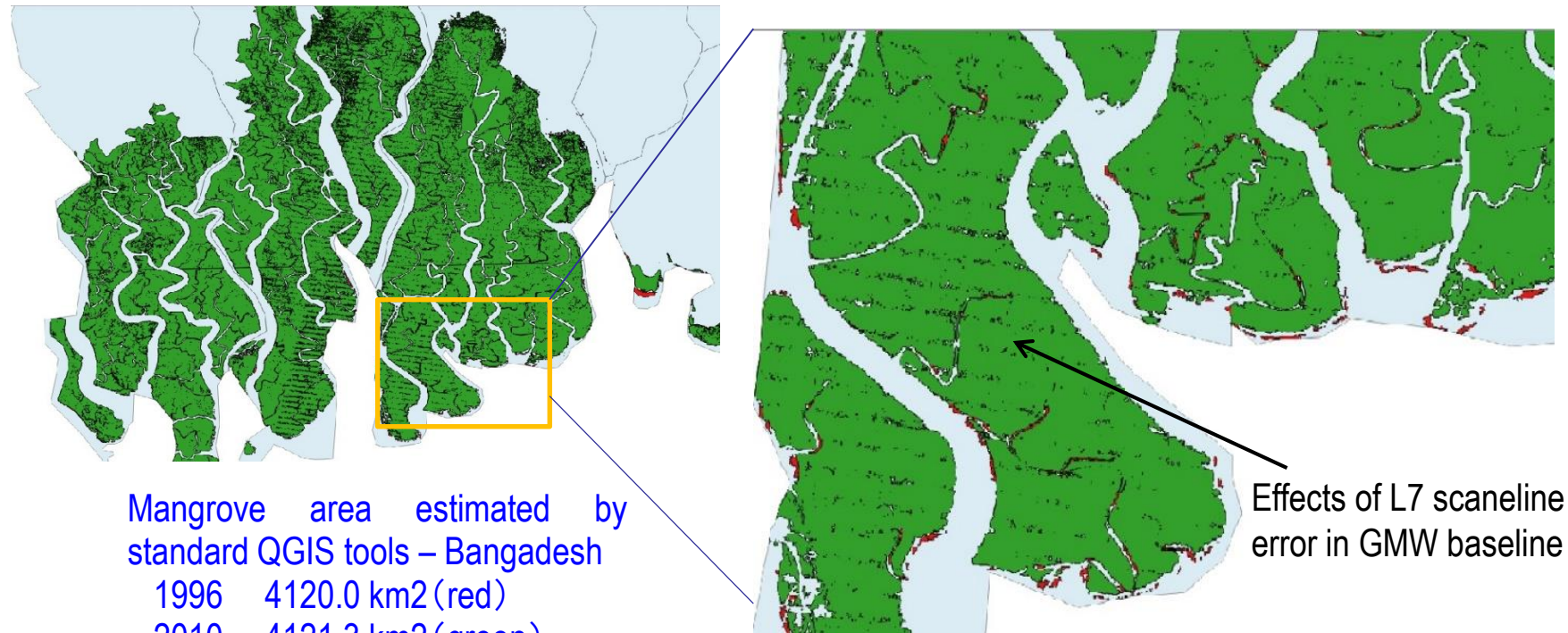
\* The Global Mangrove Watch (GMW) is an international initiative led by JAXA, Aberystwyth University (U.K.) and soloEO (Japan) in collaboration with NGOs (WI, IWMI, TNC, WCMC, WRI), NASA GSFC and academic institutions. GMW contributes to GEO-Wetlands



# 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](http://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 – Bangladesh	
1996	4120.0 km <sup>2</sup> (red)
2010	4121.3 km <sup>2</sup> (green)

Effects of L7 scanline error in GMW baseline

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

Global Mangrove Watch www:

[www.globalmangrovetwatch.org](http://www.globalmangrovetwatch.org)

[www.eorc.jaxa.jp/ALOS/en/kyoto/mangrovetwatch.htm](http://www.eorc.jaxa.jp/ALOS/en/kyoto/mangrovetwatch.htm)

Data access:

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

UNEP SDG6.6.1 www: [www.sdg661.app](http://www.sdg661.app)

JAXA EORC www: 2020/Q2 (GeoTiff)

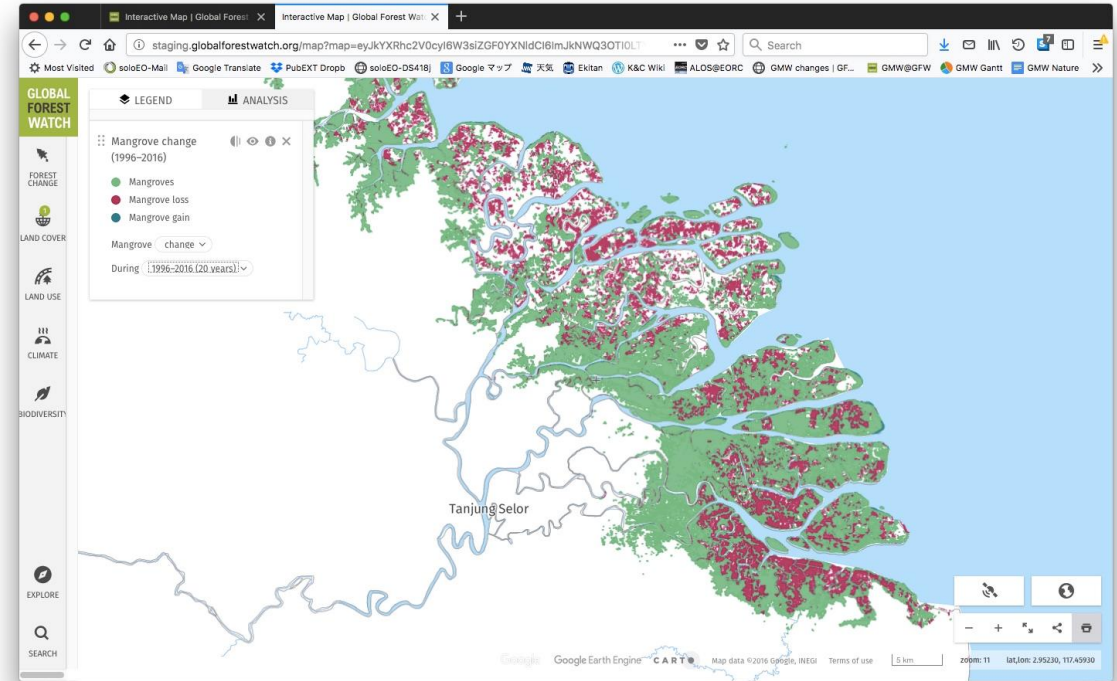
Online viewing:

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*



GMW on GFW www



# 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	
<b>Indonesia</b>	2,842	2,716	2,708	2,702	2,689	2,667	2,668	-6.1%	
<b>Brazil</b>	1,122	1,105	1,106	1,106	1,107	1,092	1,096	-2.1%	
<b>Mexico</b>		1,057	1,023	1,033	1,022	954	990	971	
<b>Australia</b>		1,012	1,003	1,004	1,004	1,006	983	984	
	693	693	-1.4%	<b>Nigeria</b>	702	700	700	700	696
	495	498	-8.0%	<b>Myanmar/Burma</b>	542	503	510	510	501
	513	513	-2.3%	<b>Malaysia</b>	525	514	515	516	520
74	476	470	471	-1.2%	<b>Papua New Guinea</b>	477	474	474	474
15	416	412	411	-1.3%	<b>Bangladesh</b>	416	416	416	416
52	352	349	351	-2.7%	<b>India</b>	361	352	352	352

*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>

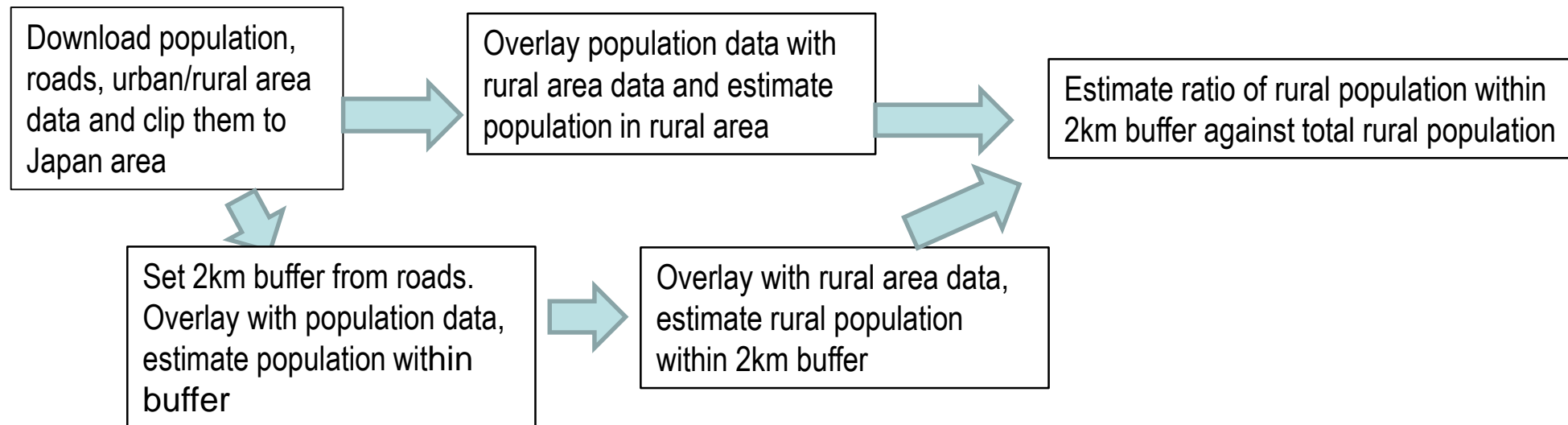
Roads: GRIP (Global Roads Inventory Project) data(2018)

<https://datacatalog.worldbank.org/dataset/grip-global-roads-inventory-project-2018>

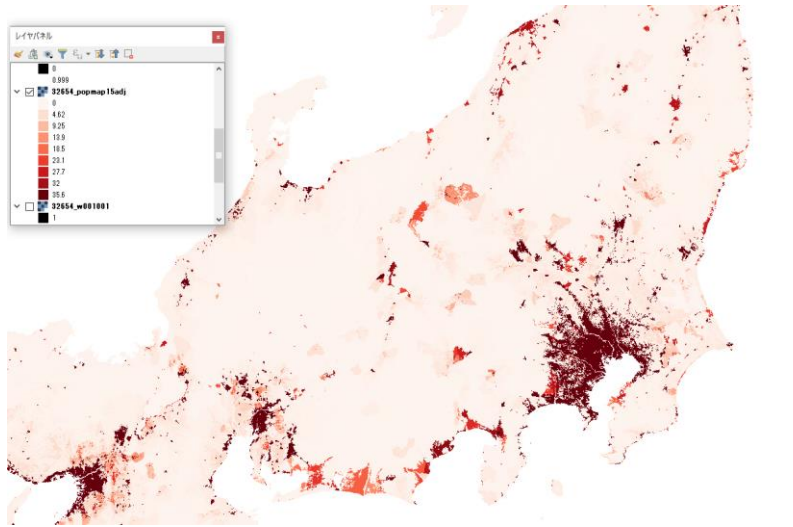
Rural/urban areas: Global Rural-Urban Mapping Project (GRUMP), v1 (2014)

<https://sedac.ciesin.columbia.edu/data/collection/grump-v1>

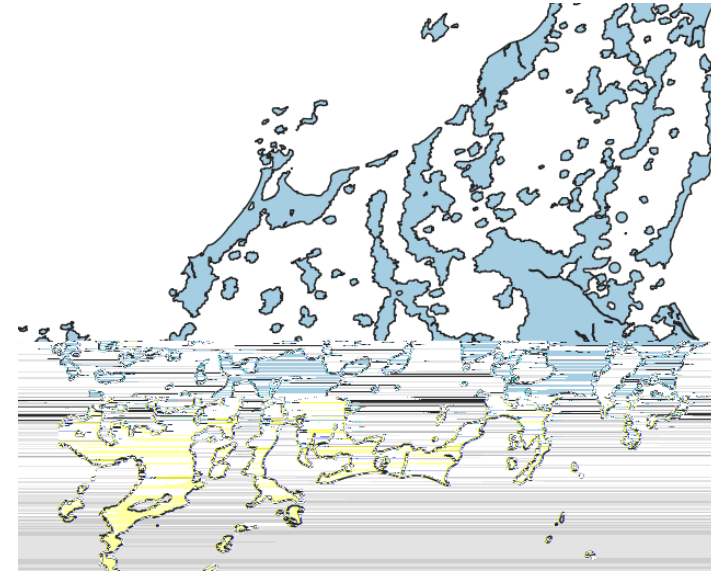
## Workflow:



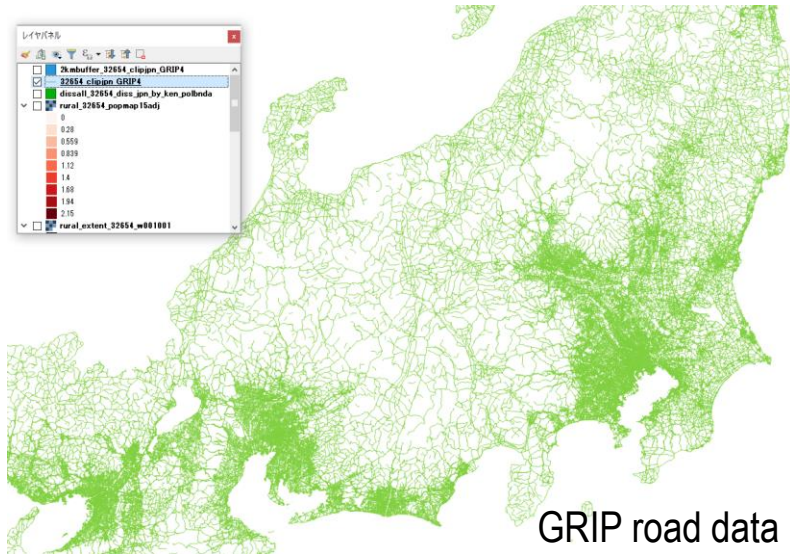
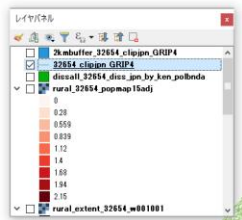
# SDG 9.1.1 Rural Population within 2km Distance from All-season Roads



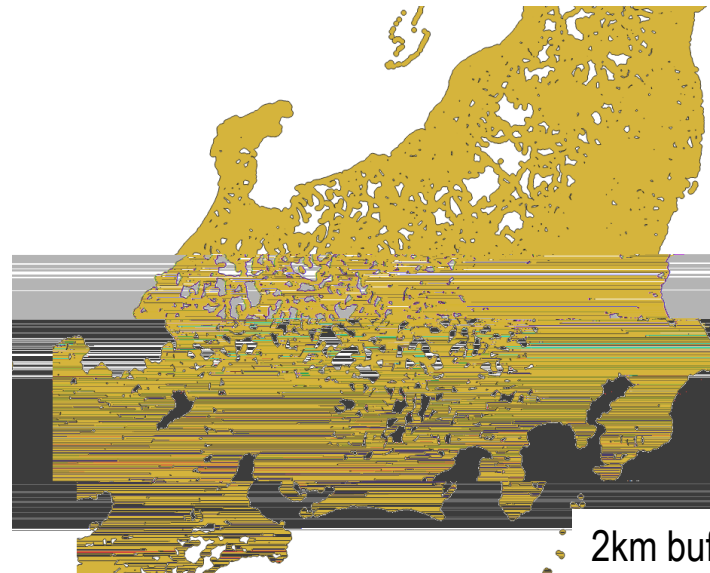
WorldPoP population grid data (100m resolution)



GRUMP urban area (1km)



GRIP road data

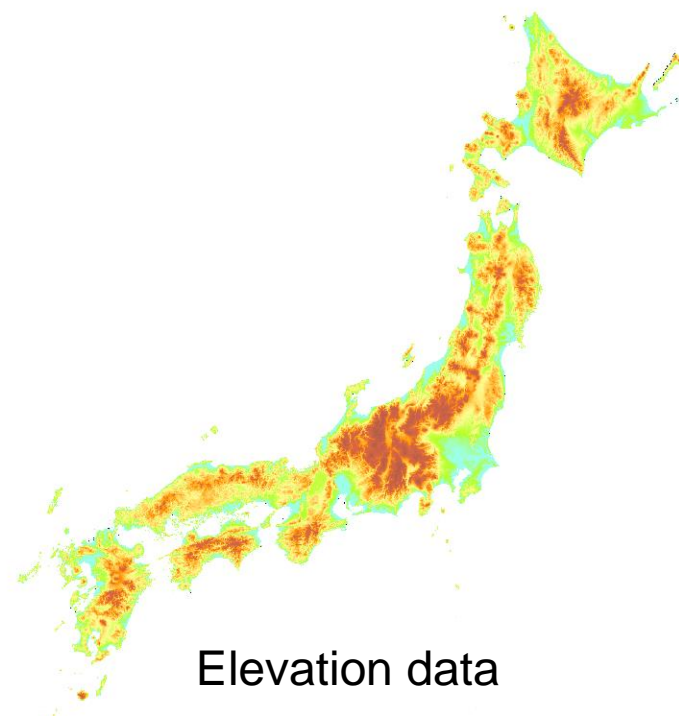


2km buffer from roads

	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 \*



\*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%



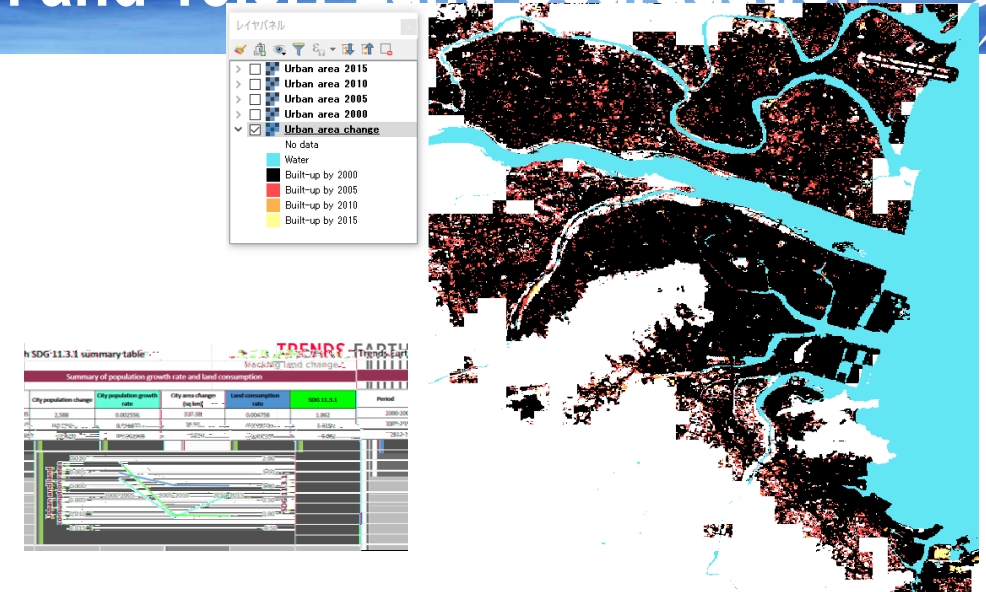


# 11.3.1 Land Consumption and 15.3.1 Land Degradation

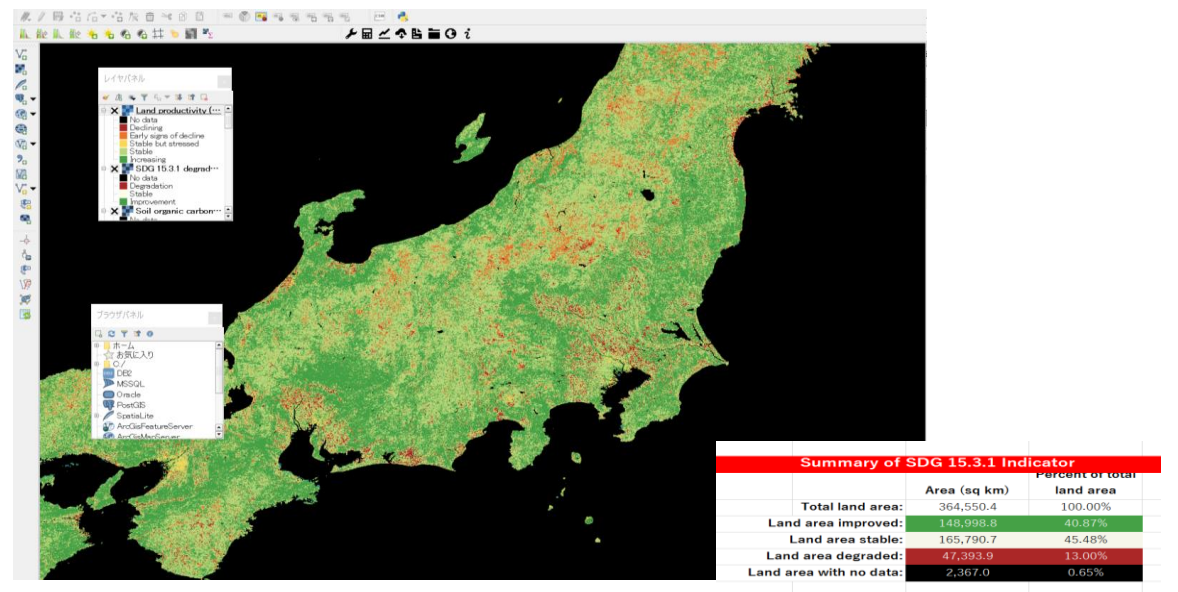


Indicators 11.3.1 and 15.3.1 were computed using Trends.Earth tool developed by Conservation Int'l and NASA.

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



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



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

15.3.1 Land Degradation Neutralization (LDN)



- 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.