UNECE 19th Working Group on Environmental Monitoring and Assessment, 28 June 2017

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GROUP ON EARTH OBSERVATIONS

GEO: Intergovernmental organisation focusing on open Earth observations – insights for decision making

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COUNTRIES HAVE BORDERS, EARTH OBSERVATIONS DO NOT.

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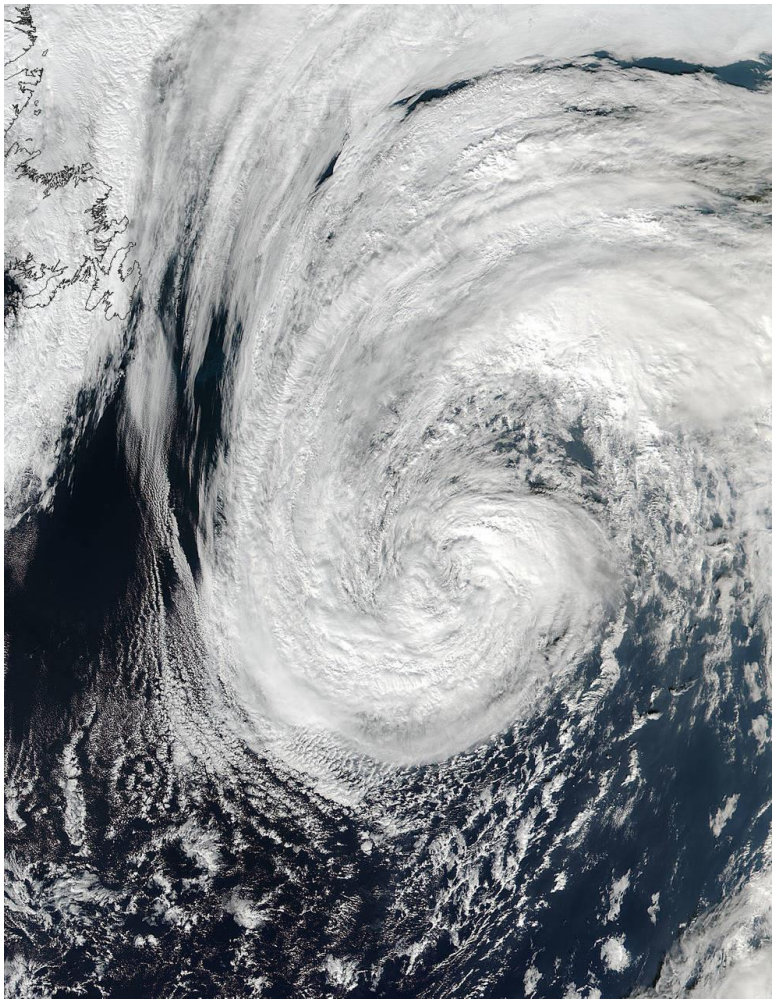
Observations in, on and around the Earth.



Credits: NASA Goddard MODIS Rapid Response/NOAA

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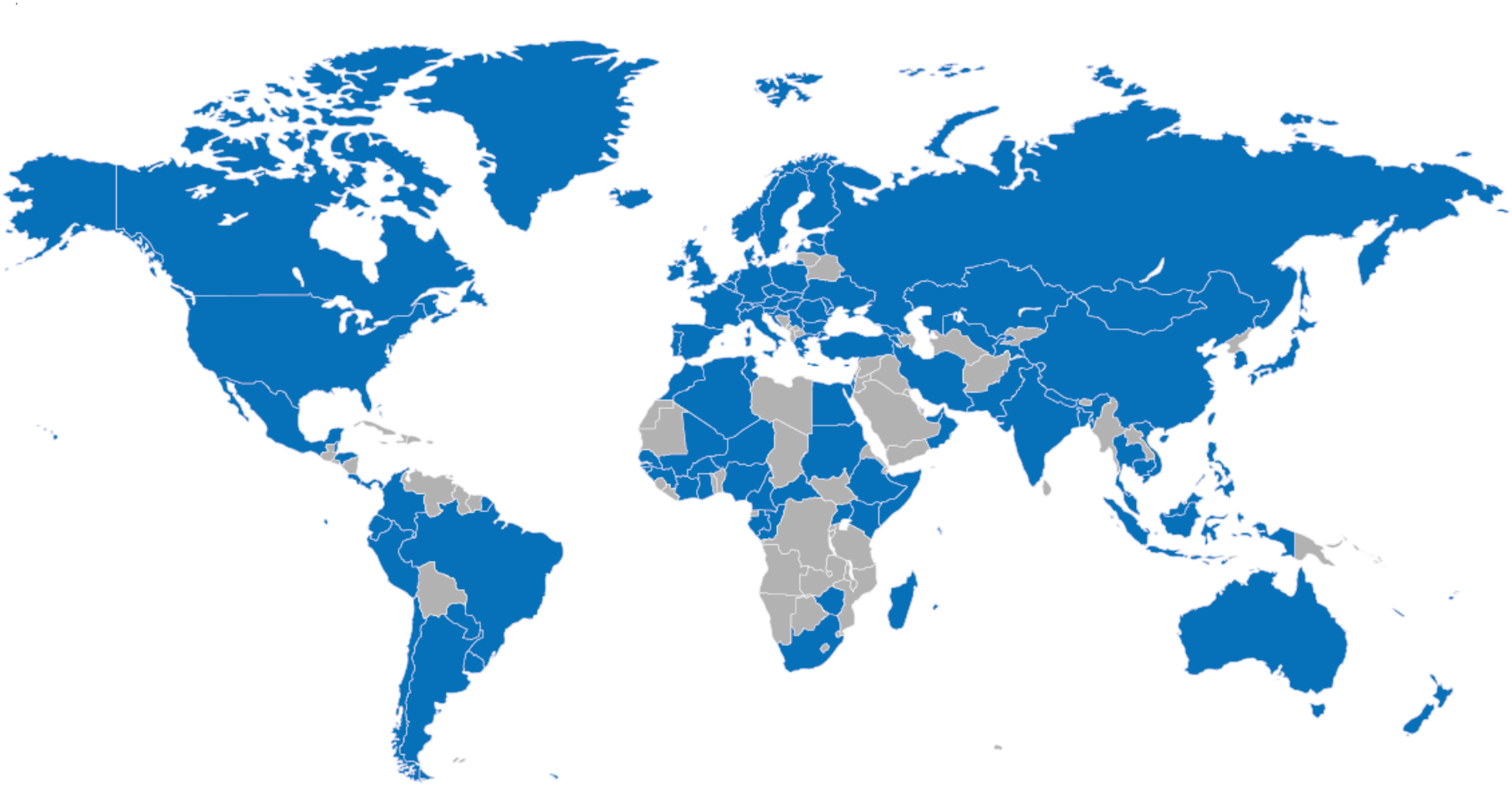
105 GEO Members – National Governments (including European Commission)



Africa: **27** - Asia/Oceania - **21**, Europe: **34** - C.I.S: **7** - Americas: **16** **Total: 105**

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109 GEO Participating Organizations (international and non-governmental)

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Societal Benefit Areas

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GEO Engagement Priorities 2017-2019

PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11

Climate Change

Greenhouse Gas Monitoring

UN World Conference on Disaster Risk Reduction 2015 Sendai Japan

Disaster Risk Reduction

2030 Agenda for Sustainable Development

Open Earth Observation Data

for regional climate research, mitigation and adaptation decision making

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What is GEOSS?

GEOSS is a global infrastructure which builds on national, regional and international observation systems and their thousands of ground, in situ, air-borne, ship-borne and space-based instruments.

Why GEOSS?

No one country has the resources needed to collect the Earth observations data required for addressing the major global environmental issues of today. A global system of systems approach leverages the existing infrastructures used for Earth observations.

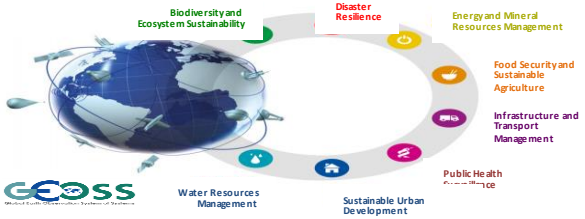
How to access data from GEOSS?

The GEOSS Common Infrastructure (GCI) links more than 150 different data catalogs containing more than 400 million open EO resources, accessible through an easy-to-use GEOSS Portal. There were more than 4.4 million enquiries to the GCI in 2016 alone.

The Group on Earth Observations (GEO)

GEO engages providers and users of climate data resources through targeted workshops and its annual international Plenary to ensure a sustained dialogue around the information needs of those seeking to integrate climate products and services into adaptation processes and decisions.

GEO's Societal Benefit Areas – Climate change is across all areas



Priority Area: Climate Change

GEO-XIII Plenary (November 2016) agreed on three priority engagement areas, including "Climate Change – Greenhouse Gas Monitoring" to support the implementation of the Paris Agreement. Following the GEO Executive Committee in March 2017 the focus will be on both adaptation and mitigation.

Regional Initiatives

AmeriGEOSS

A-GEOSS

AfriGEOSS

GEO is building Regional Initiatives, such as AfriGEOSS (in Africa), AmeriGEOSS (in the Americas) and AOGEOSS (in Asia-Oceania) that provide cooperation frameworks at the regional level to support decision-making and regional sustainable development, as well as building institutional and individual capacity by engaging experts, stakeholders and decision makers in the region. The regional initiatives have identified data access, processing and distribution infrastructure capabilities as limiting factors for countries, in particular developing countries, to the uptake of Earth observations in decision-making.

To combat this challenge AfriGEOSS is leveraging the Africa Data Intensive Research Cloud (ADIRC), which aims to provide researchers in African countries with access to high performance computing (HPC) infrastructures, enabling them to take part in big data science projects and to build Earth observation data processing platforms.

Responding to Paris Agreement

Policy need for research, systematic observations and scientific data emerges from Paris Agreement. GEO aims to repond to:

- ❑ National Reporting (Articles 4 and 13)
- ❑ Mitigation: Knowledge of evolution of sinks and sources (Article 5)
- ❑ Adaptation: Strengthening cooperation (Article 7.6); Scientific knowledge and systematic observations (Article 7.7)
- ❑ Technology Transfer (Article 10)
- ❑ Capacity Development (Article 11)
- ❑ Global Stocktaking (Article 14)

PARIS2015 COP21·CMP11

Towards policy-relevant global carbon cycle observation and analysis

GEO CARBON AND GHG INITIATIVE

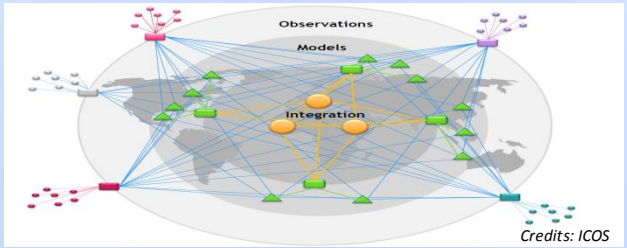
The *GEO Carbon and GHG Initiative (GEO-C)* is a global effort proposed in the framework of GEO to promote interoperability and provide integration across different parts of the system, particularly at domain interfaces. The final users, in addition to the scientific community, are countries and decision makers that can benefit from the improved information flow and use it to address climate change policy.

Comprehensive data

The Initiative is motivated by the long-term vision of a data-driven system to provide comprehensive knowledge on changes in the global carbon cycle and GHG emissions as a result of human activities and global change.

GEO-C builds on existing initiatives and networks, supports continuity and coherence, facilitates cooperation and interoperability and fills in gaps.

Data integration from regional networks



Credits: ICOS

Aligned to Paris Agreement

All activities and deliverables of this Initiative will be aligned, improved and adapted to address the climate policy agenda, particularly to contribute to the successful implementation of the Paris Agreement

Up-to-date information

Support for decision makers with timely policy-relevant information to inform mitigation and adaptation actions.

Key partners

cmcc · CEOS · NASA · NIES JAPAN · esa · GCOS · ICOS · UNEP · JAXA · Global Carbon Project · ipcc

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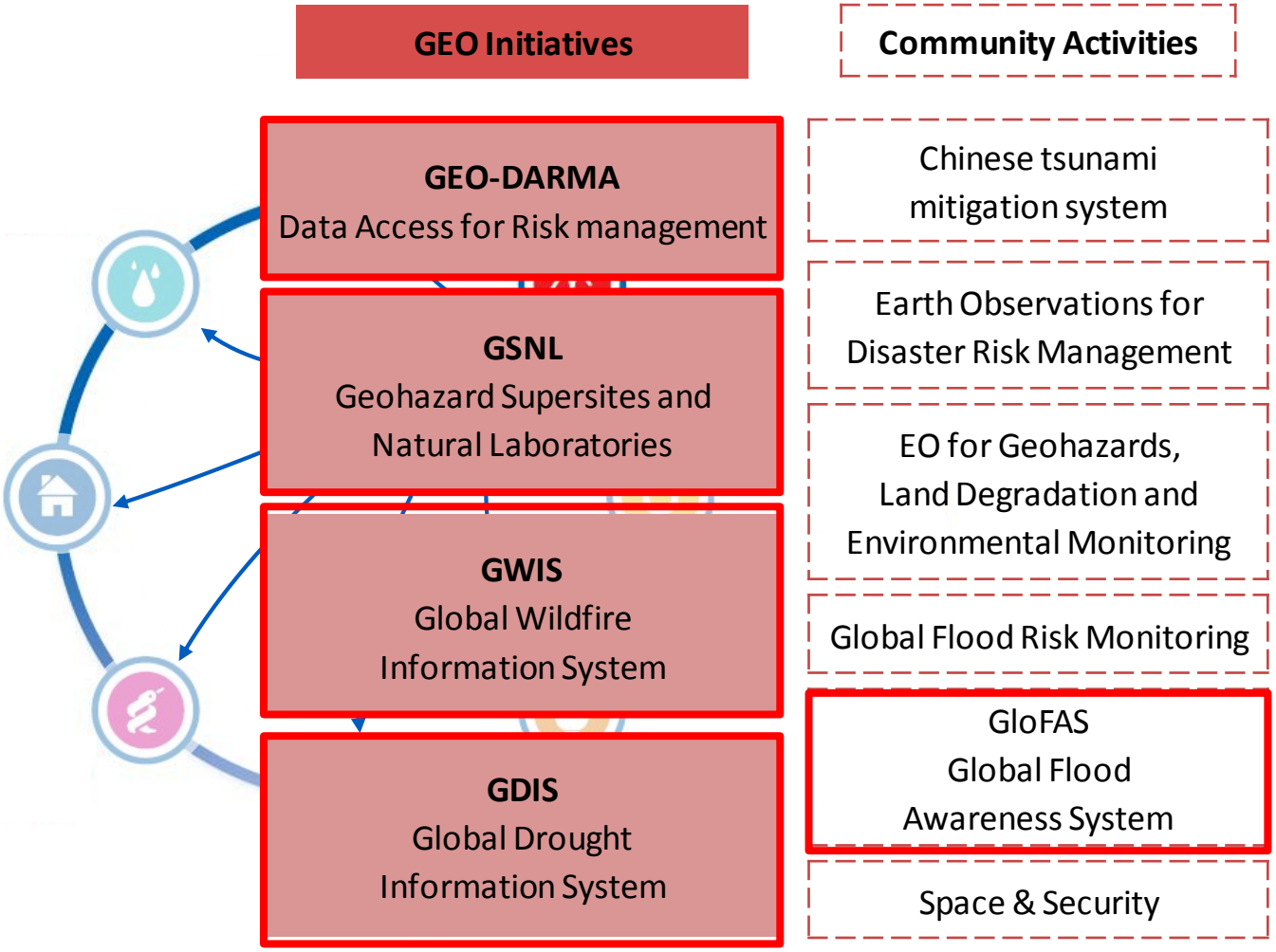
Disaster Resilience



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UNISDR
The United Nations Office for Disaster Risk Reduction

Disaster-related Data for Sustainable Development

Sendai Framework Data Readiness Review 2017

Global Summary Report, Section 2.2

http://www.preventionweb.net/files/53080_entrybgpaperglobalsummaryreportdisa.pdf

22-26 MAY, 2017 | CANCUN, MEXICO

2017 GLOBAL PLATFORM
FOR DISASTER RISK REDUCTION

Global Partnership on Disaster-related Statistics

NSOs called for establishment of a **Global Partnership on Disaster-related Statistics** at the World Data Forum 2017 in Cape Town.

Overall objectives:

- Support Member States' reporting on Sendai Framework and SDG Indicators
- Establish long-term partnerships between National Statistical Offices, national sectoral ministries / disaster risk management / technical institutions, International Organizations and relevant technical partners
- Respond to the instructions of Member States:
  - Open-ended Intergovernmental Expert Working Group on Indicators and Terminology for Disaster Risk Reduction - A/RES/71/276
  - Inter-agency and Expert Group on SDGs Indicators - E/CN.3/2017/2*

UNISDR United Nations Office for Disaster Risk Reduction

UNITED NATIONS ESCAP Economic and Social Commission for Asia and the Pacific

UNECE

CES Task Force on measuring Extreme Events and Disasters

Substantive chapters of the *Recommendations to National Statistical Offices for measuring extreme events and disasters*

- Scope and conceptual understanding of Extreme Events and Disaster-related Statistics
- Defining the role of National Statistical Offices
- Statistical tools for EED-related statistics
  - Surveys
  - Registers
  - Big data
  - **Geospatial information (GEO leading this work package)**
- Conclusions: recommendations to NSOs
- Proposed follow up work
- Glossary of important terms

UNISDR United Nations Office for Disaster Risk Reduction

UNITED NATIONS ESCAP Economic and Social Commission for Asia and the Pacific

UNECE

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UN-GGIM
UNITED NATIONS INITIATIVE ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

UN-GGIM Working Group on Geospatial Information and Services for Disasters
http://ggim.un.org/UN_GGIM_wg5.html

Kunming Forum on UN-GGIM "Cities of the Future: Smart. Resilient and Sustainable" May 2017
Strategic Framework on Geospatial Information and Services for Disasters.
http://ggim.un.org/Kunming_Forum.html

UN-GGIM International Forum on Geospatial Information and Services for Disasters September 2016
http://ggim.un.org/Barbados%20Disaster%20Forum.html

Chengdu Forum on UN-GGIM "Development & Applications in Urban Hazard Mapping" October 2013
Disaster managers and geospatial experts.
http://ggim.un.org/Chengdu%20Forum.html

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EO4SDGs

The 2030 Plan for Global Action - Article 76:

"We will promote transparent and accountable scaling-up of appropriate public-private cooperation to exploit the contribution to be made by a wide range of data, including Earth observation and geo-spatial information, while ensuring national ownership in supporting and tracking progress."

→ **Direct measures of some *Indicators* and indirect support to others.**

→ **Contribute to progress on the *Targets*, which will show up in the Indicators.**

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GEO support for SDGs

SUSTAINABLE DEVELOPMENT GOALS

Target Contribute to progress on the Target yet not the Indicator per se								Goal	Indicator Direct measure or Indirect support				
							1.5	1 No poverty					
					2.3	2.4	2.c	2 Zero hunger	2.4.1				
				3.3	3.4	3.9	3.d	3 Good health and well-being	3.9.1				
								4 Quality education					
								5 Gender equality	5.9.1				
		6.3	6.4	6.5	6.6	6.a	6.b	6 Clean water and sanitation	6.3.2	6.4.2	6.5.1	6.6.1	
				7.2	7.3	7.a	7.b	7 Affordable and clean energy	7.1.1				
							8.4	8 Decent work and economic growth					
				9.1	9.4	9.5	9.a	9 Industry, innovation and infrastructure	9.1.1				
								10 Reduced inequalities					
	11.3	11.4	11.5	11.6	11.7	11.b	11.c	11 Sustainable cities and communities	11.3.1	11.6.2	11.7.1		
					12.2	12.a	12.b	12 Responsible consumption and production					
					13.1	13.3	13.b	13 Climate action	13.1.1				
	14.1	14.2	14.3	14.4	14.6	14.7	14.a	14 Life below water	14.3.1				
15.1	15.2	15.3	15.4	15.5	15.7	15.8	15.9	15 Life on land	15.1.1	15.2.1	15.3.1	15.4.1	15.4.2
								16 Peace, justice and strong institutions					
			17.6	17.7	17.9	17.16	17.17	17 Partnerships for the goals					

Work closely with UN-GGIM.

GEO represented on Inter-Agency Expert Group (IAEG) of the UN Statistics Division.

GEO is the Earth Observation Anchor Partner to the Global Partnership for Sustainable Development Data (GPSDD).

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THE GLOBAL GOALS For Sustainable Development

Sustainable Development Goals

- Multiple applications of land cover and land cover change exist to **evaluate progress** towards various SDG targets;
- Usefulness of land cover information for the **implementation** of the SDGs is being recognized.

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EO4SDGs

Purpose

1) Progress the Targets
2) Support the Indicators
3) Relevance for Land Cover

Water-related ecosystems

6.6 By 2020, **protect and restore water-related ecosystems**, including mountains, forests, wetlands, rivers, aquifers and lakes

- **Indicator 6.6.1 Change in the extent of water-related ecosystems over time (Tier III, Custodian agency: UNEP, Other: UN-Water, IUCN)**

- Land cover datasets can be used to detect changes over time in the extent of wetlands, forests and drylands;
- GEO is referred to in the stakeholder comments as an institution to collaborate with regarding the collection of data (GEOSS);
- Several satellite-based datasets are proposed for the detection of the percentage change in extent of freshwater systems, e.g. derived from Sentinel-2 or Landsat data.

Urbanization

11.3 By 2030, **enhance inclusive and sustainable urbanization** and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

- **Indicator 11.3.1 Ratio of land consumption rate to population growth rate (Tier II, Potential Custodian agency: UN-Habitat, Other: UNEP)**

- The value of satellite-based EO data to monitor land cover change is acknowledged in the stakeholder comments.
- UNEP proposed to contribute to this indicator through work with GEO-GEOSS on land conversion.

Land degradation

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a **land degradation-neutral world**

- Indicator 15.3.1 Percentage of land that is degraded over total land area (**Tier III, Potential Custodian agency: UNCCD, Other: FAO, UNEP)**
- Proposed sub-indicators:
  - Land cover
  - Land productivity
  - Soil organic carbon
- According to UNCCD "land cover and land cover change have multiple applications for evaluating progress towards various SDG targets and give a first indication of land degradation"

Multilateral Environmental Agreements

Convention on Biological Diversity

- 4 Aichi Targets relate to land cover

Ramsar

- Targets 5, 6 and 12 can be informed by land cover

UNCCD

- Focuses on attaining Land Degradation Neutrality and SDG Target 15.3

Climate

- Land Cover is an Essential Climate Variable (ECV)
- Global-scale wall-to-wall land use products allowing change analysis, are needed by climate modelers, mitigation and adaptation communities

- Parties must submit annual national GHG inventories including estimates of anthropogenic emissions and removals in the land use, land use change and forestry sector

- Six broad land use categories in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
- Basis for estimating and reporting greenhouse gas emissions and removals from land use and land use conversions

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GEO Flagship

GEO Biodiversity Observation Network (GEO BON)

GEO Global Agriculture Monitoring (GEOGLAM)

The Global Forest Observations Initiative (GFOI)

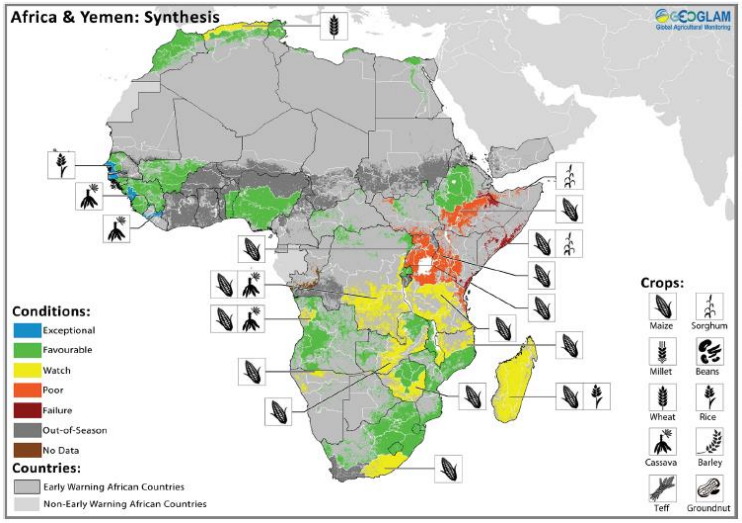
Global Observation System for Mercury (GOS4M)

GEO GROUP ON EARTH OBSERVATIONS

GEOGLAM Global Agricultural Monitoring

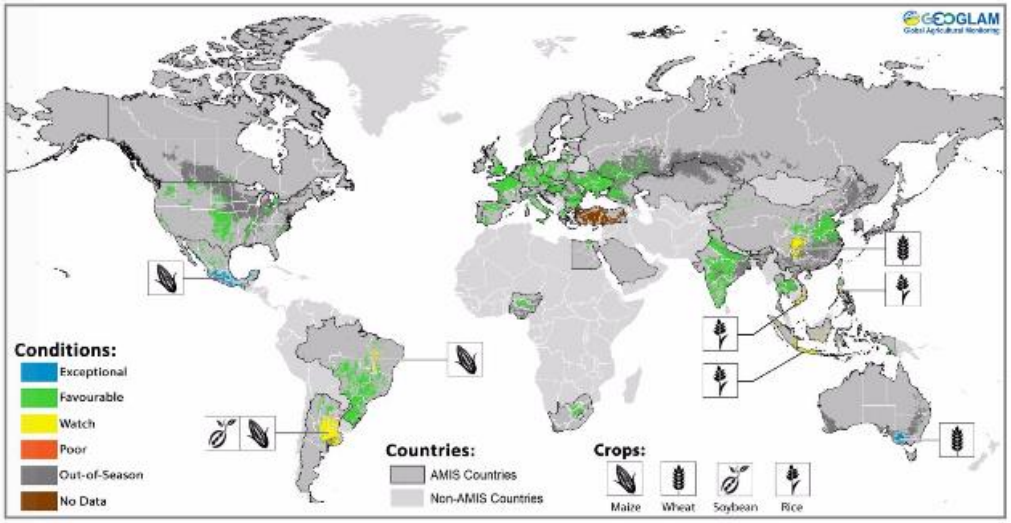
GEO GLAM – leveraging Earth observations for a food-secure world

Crop monitor for Early Warning



Crop monitor for AMIS

Conditions at a glance for AMIS countries (as of January 28th)



Crop condition map synthesizing information for all four AMIS crops as of January 28th. Crop conditions over the main growing areas for wheat, maize, rice, and soybean are based on a combination of national and regional crop analyst inputs along with earth observation data. ***Crops that are in other than favourable conditions are displayed on the map with their crop symbol.***

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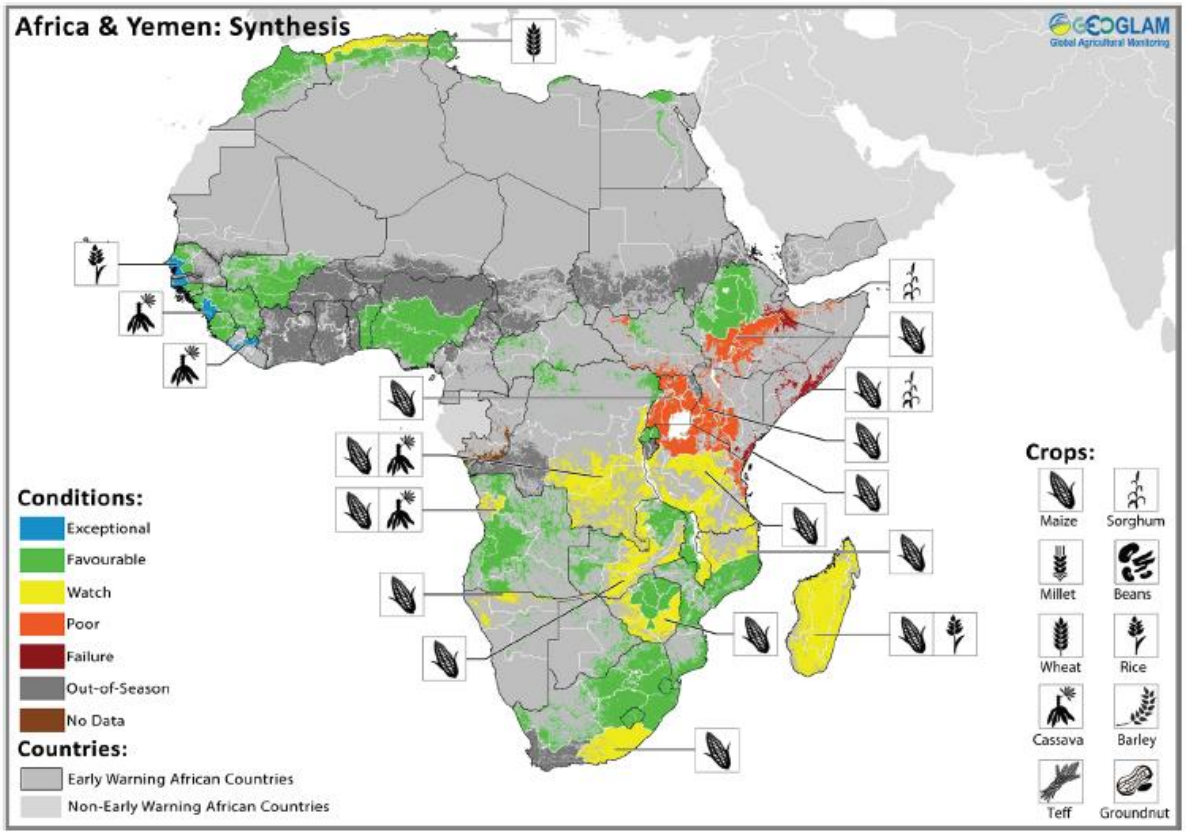
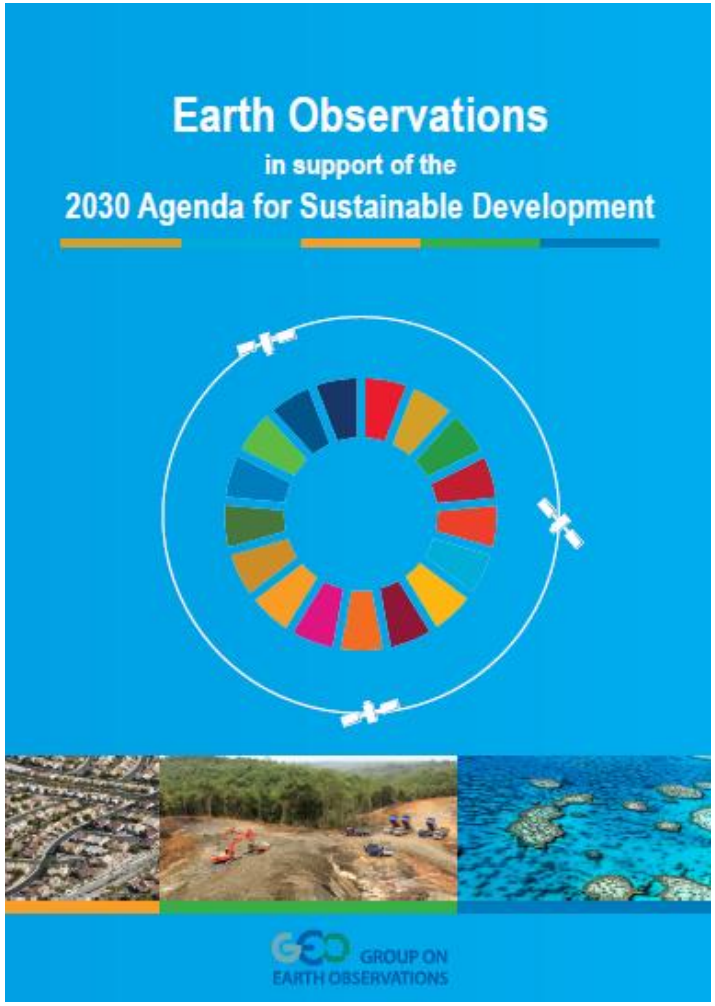
2.c	Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

GEOGLAM can also support other Targets (2.1, 2.4, 2.a, 2.3) and other Goals (12 and 13, with Indicators 12.3 and 13.3).



Crop Monitor for Early Warning: Crop Conditions in Africa and Yemen as of 28 January 2017. Areas which are in other-than-favourable conditions are shown with the affected crop.

EO case studies: Agenda 2030



GEO is instrumental in integrating use of Earth observation data into the methodology of measuring and achieving Sustainable Development Goal Indicators.

This brochure gives graphic illustration of the types of EO data sets and images available which means decision-makers can not only use data to identify the status they need to report, they can visualize the solution, too.

https://www.earthobservations.org/documents/publications/201703_geo_eo_for_2030_agenda.pdf

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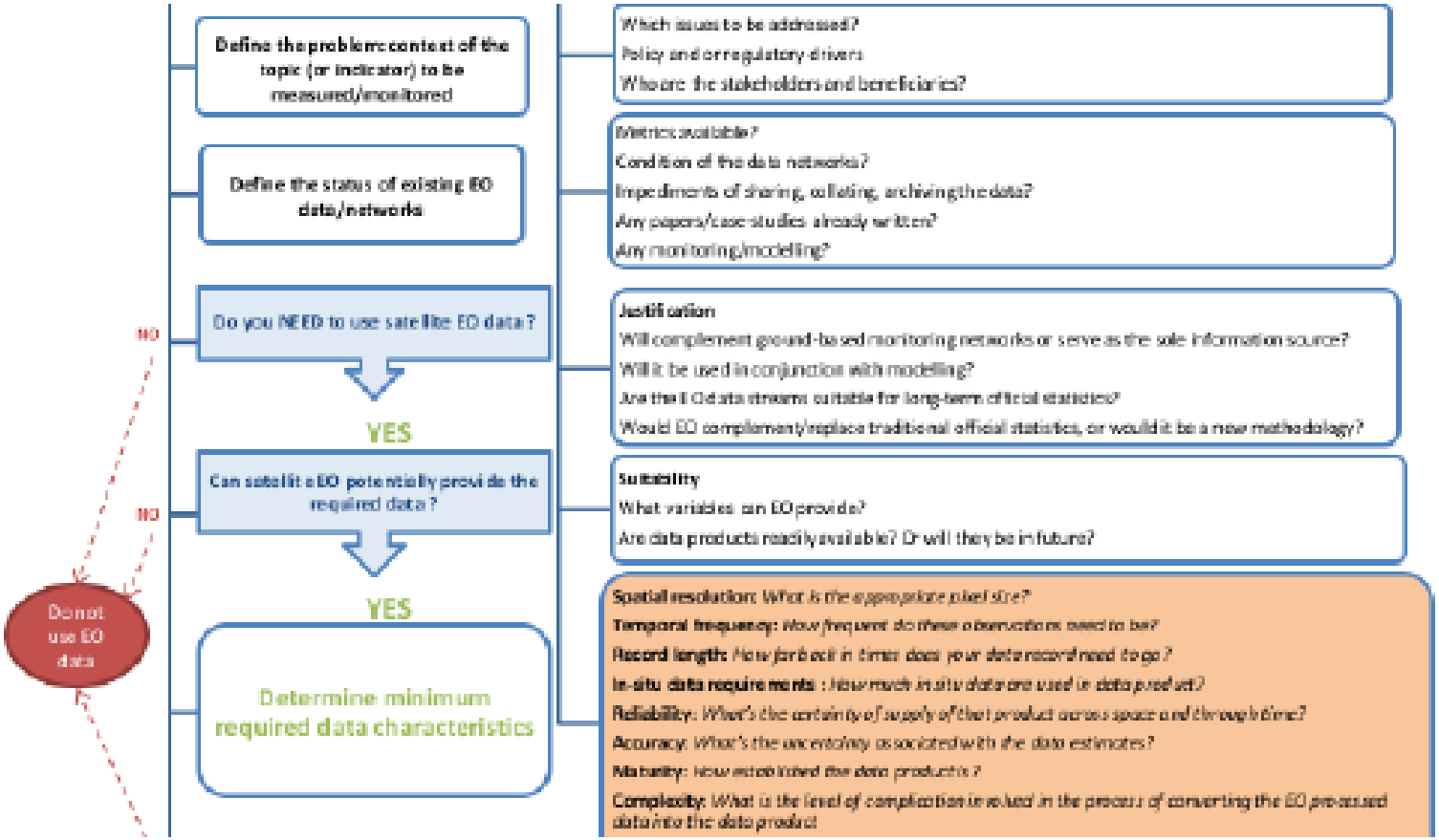
Decision tree on usage of EO data for National Statistical Organisations



https://www.earthobservations.org/documents/publications/201703_geo_eo_for_2030_agenda.pdf P30

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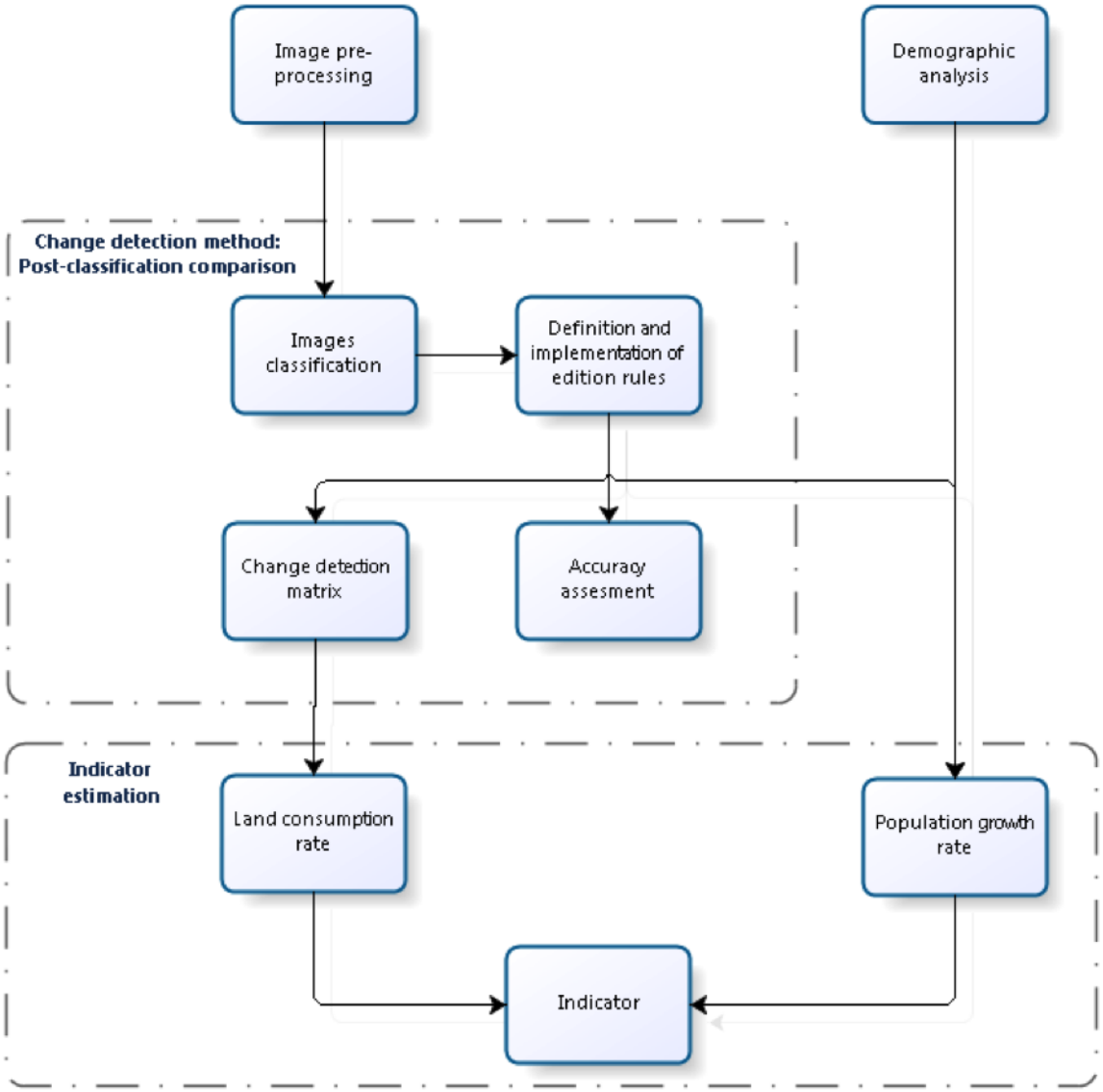
Integration of EO & statistical data to report on SDGs [Indicator 68: Ratio of land consumption & population growth rates]



USE OF SATELLITE IMAGES TO CALCULATE STATISTICS ON LAND COVER AND LAND USE: PILOT PROJECT REPORT FROM DANE (National Statistics Office of Colombia)

400m EO data and information resources in GEOSS Portal www.geoportal.org

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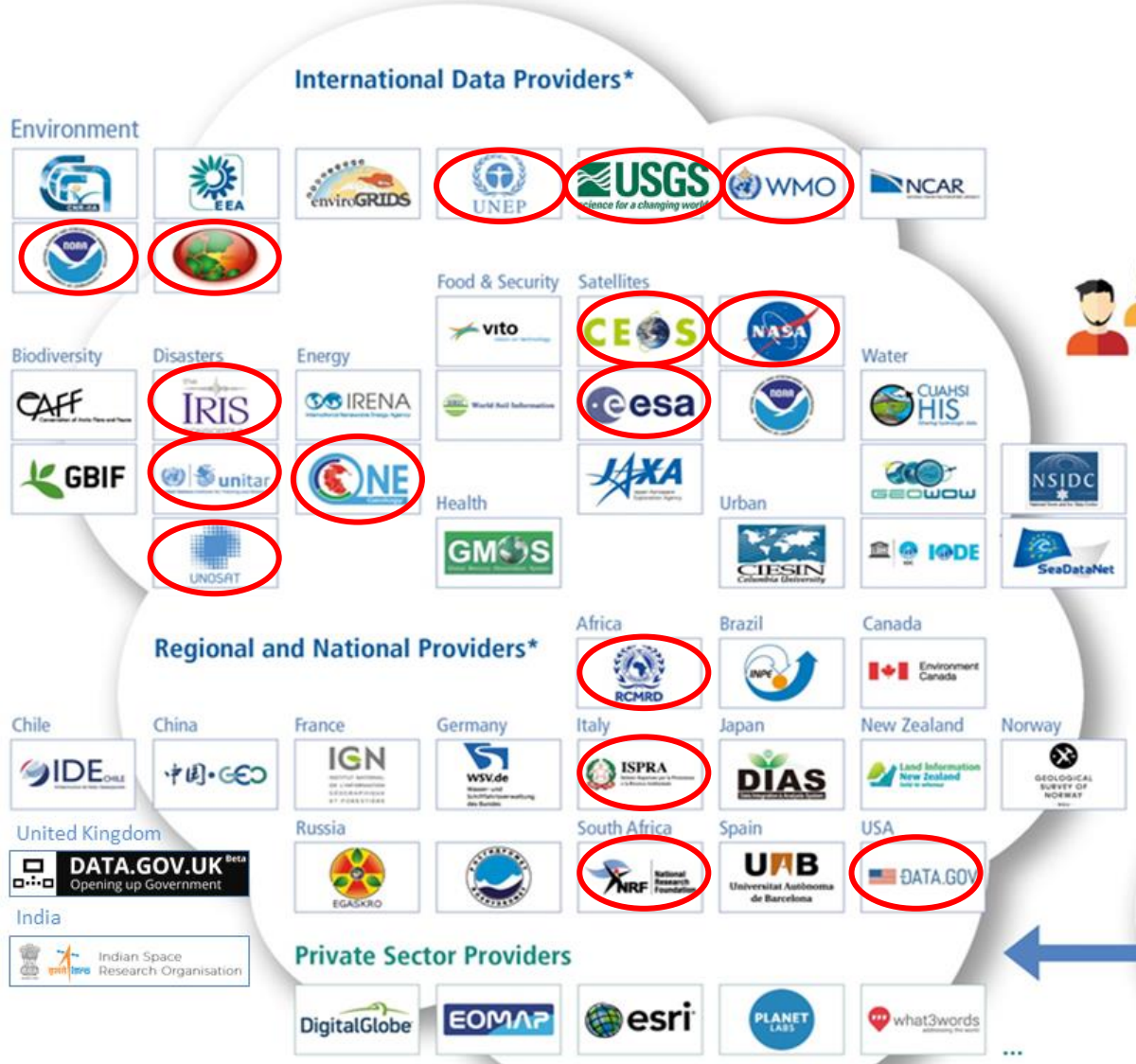
GCI: www.geoportal.org



GEO DAB

Discovery and Access Broker (DAB)

*158 Data Providers

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GCI for Water

GCI for Water - Virtual Seminar
29 March 2017

Presentation of Flagships and Initiatives under the Water SBA
- Toshio Koike – DIAS (Data Integration and Analysis System)
- Will Pozzi - GDIS (Global Drought Information System)
- Angelica Gutierrez, GEOGLOWS (GEO Global Water Sustainability)
- Steven Greb – Aquawatch (GEO Water Quality Community of Practice)
- Hannele Savela – GEOCRI (GEO Cold Region Initiative)

GCI for Agriculture -Virtual Seminar
GCI for Climate - Virtual Seminar
GCI for Disasters - Virtual Seminar etc

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GEO Observations Blog

News

New Zealand Government thanks ChinaGEOSS, CODATA and IRDR for their help following 2016 Kaikoura Earthquake.

New Zealand was hit by a 7.8 magnitude earthquake in Kaikoura in November 2016, and the government has expressed thanks to ChinaGEOSS, CODATA and IRDR for their timely and free provision of satellite data that helped with damage and loss estimation following the disaster.

Damage and loss estimation is often difficult in the hours and days after a natural disaster as data and information are not available. During the Kaikoura earthquake, IRDR's Disaster Loss DATA project and the CODATA Task Group Linked Open Data for Global Disaster Risk Research (LODGD) worked together with environmental and engineering consulancy Tonkin +Taylor in New Zealand to provide TripleSat , Jilin-1A and FY satellite images of the affected Hurunui District.

As both the technical manager of ChinaGEOSS Portal and a member of CODATA LODGD Task Group, Professor Li Guoqing organized the above emergency response data sharing activity under the leadership of China GEO Office.

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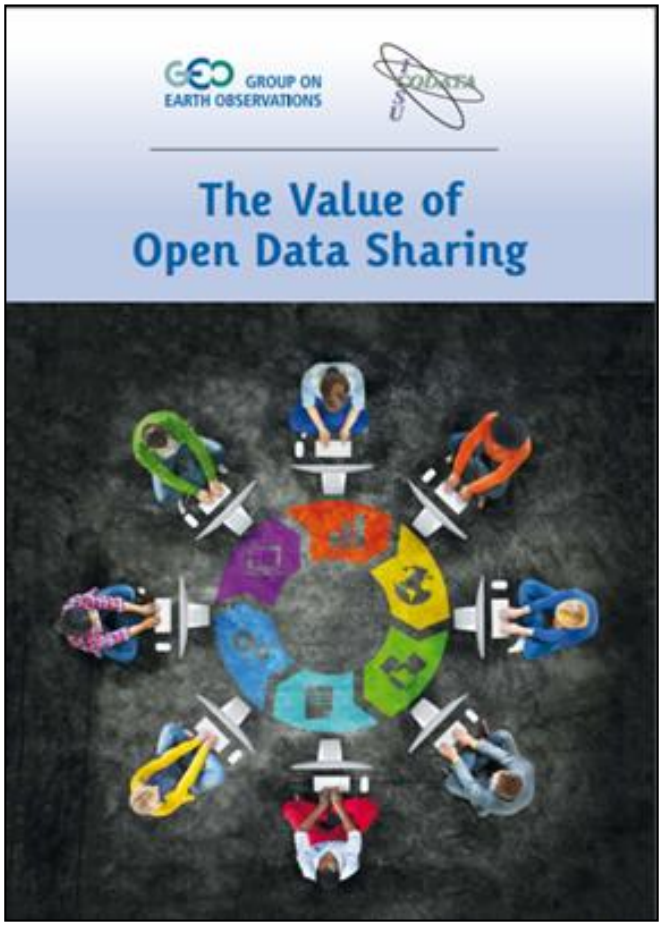
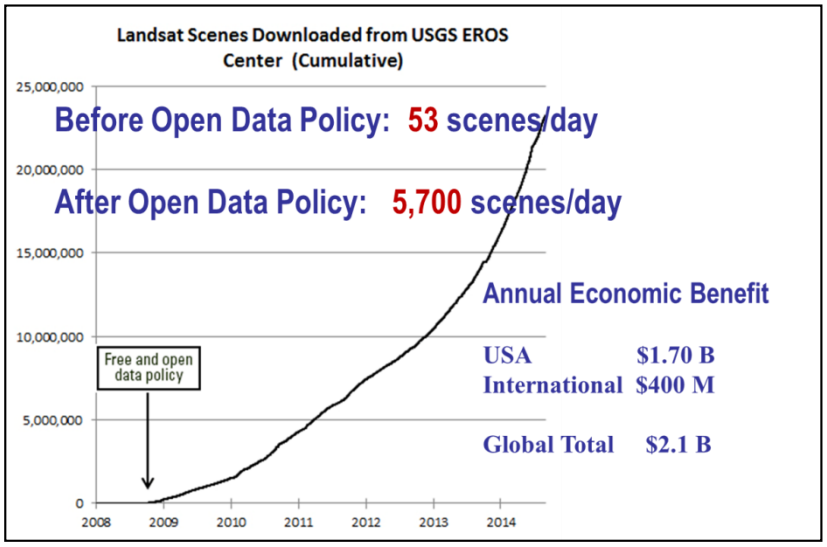
Build the socioeconomic business case





Need more cases!

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GEO Regional Initiatives

AfriGEOSS

Africa region

AmeriGEOSS

Americas region

AsiaGEOSS

Asia Oceania region

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Commercial Sector Engagement

Data providers

Value-added providers

Users

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Steven Ramage, GEO Secretariat
sramage@geosec.org

Connect and collaborate:

@GEOSEC2025 and @steven_ramage

Group on Earth Observations

Group on Earth Observations

earthobservations.org and **geoportal.org**