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Cambridge Conference 2017
Mapping Nations: The Next Decade

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Key considerations

EO business case development, value assessment and capacity building growing in importance.

Open data and information provide knowledge and insight for policy development and decision making.

Geospatial information (including EO) provide context when integrated with socioeconomic data, such as national statistics; open standards are essential.

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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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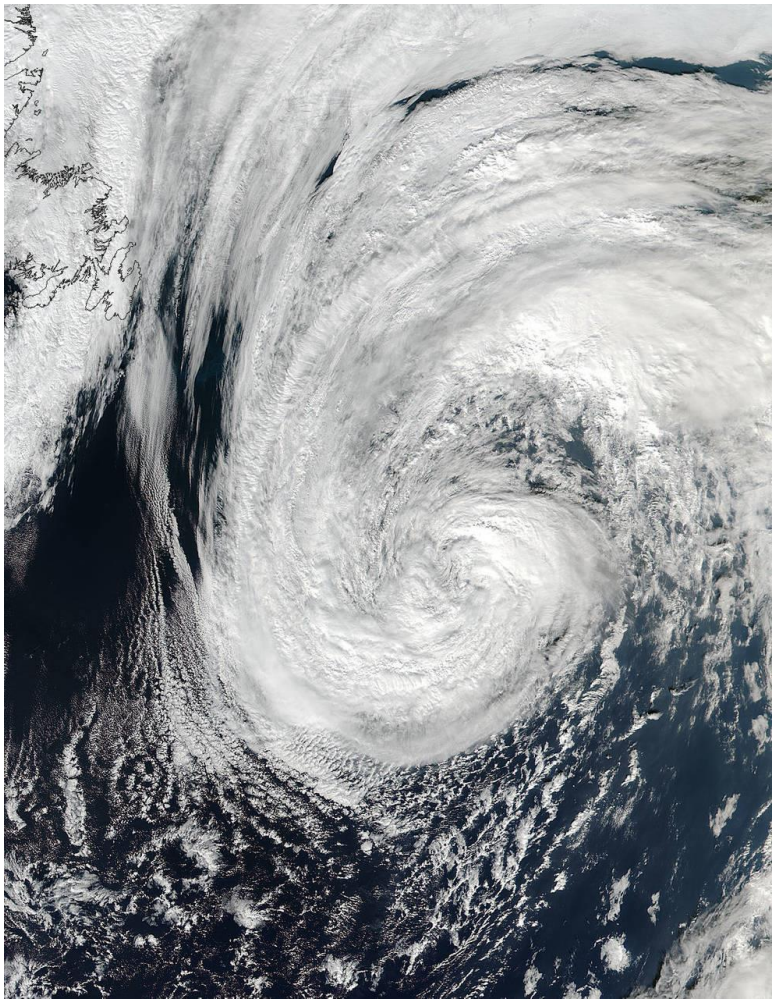
Observations in, on and around the Earth



Credits: NASA Goddard MODIS Rapid Response/NOAA

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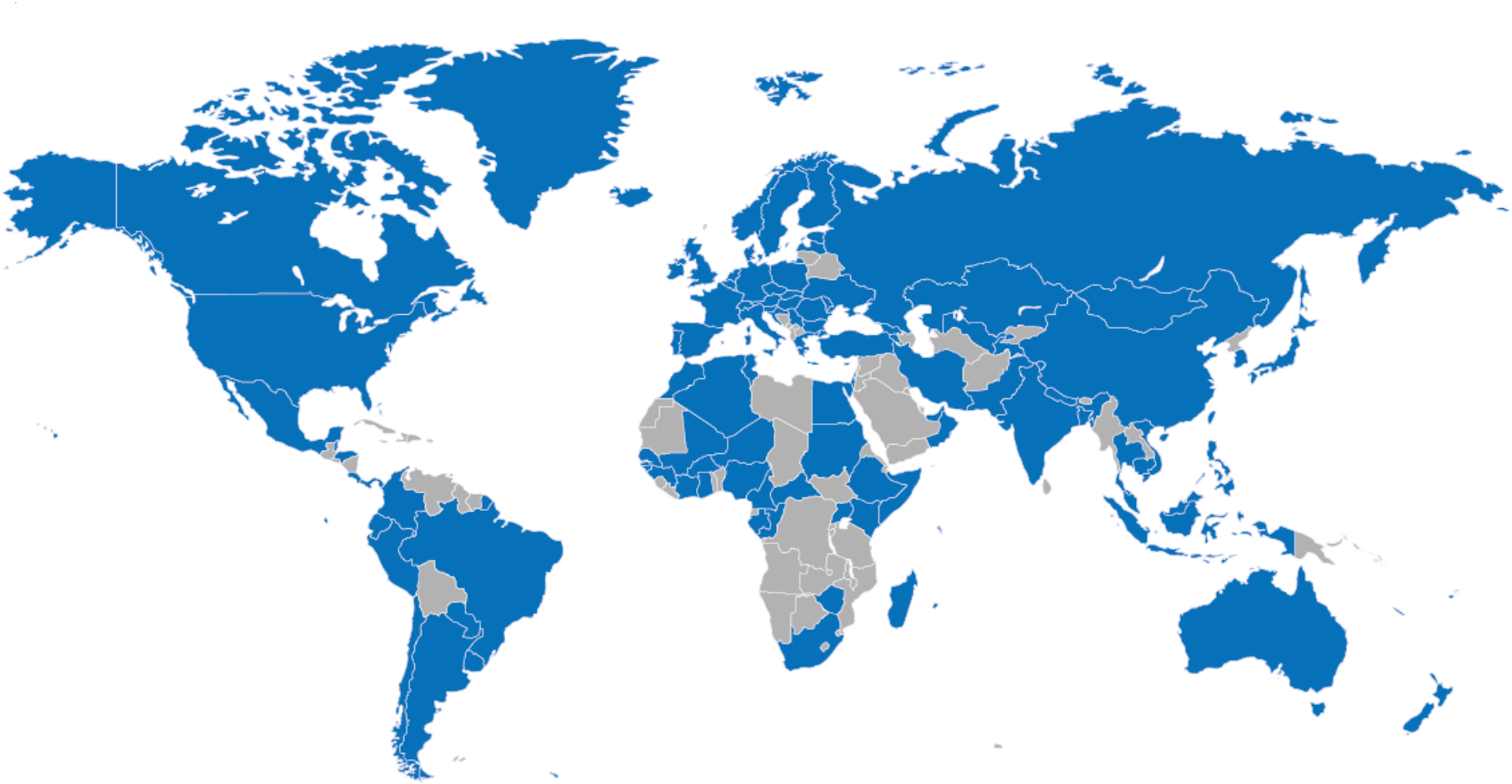
105 GEO Members – National Governments (including European Commission)



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

GEO Strategic Plan 2016 – 2025
Implementing GEOSS core functions

Cultivating awareness, building capacity and promoting innovation

Building capacity, as well as sustaining and enhancing existing capacity, is essential for developing competencies in the effective use of Earth observations for responding to societal challenges and addressing sustainable development issues.

- Promote the engagement of institutional users worldwide;
- Assist countries to acquire, share, store, maintain and utilize EO data;
- Engage with the international development and donor organizations;
- Work with the appropriate national entities to develop activities; and
- Promote cooperation through national and regional GEO mechanisms.

Promote cooperation and engagement

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109 GEO Participating Organizations (international and non-governmental)

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GEO Strategic Plan 2016-2025: Implementation

- **Capacity Building Foundational Task** to coordinate and work with all to design and implement the best ways to conduct and promote transfer of knowledge & knowhow;
  - Need to look beyond projects – maintain built capacity and established cooperation;
  - Funding tends to be finished before impact assessment of activities (or does not include it);
  - Build institutional capacity through a value proposition that survives political processes;
- Capacity Building in all **implementation** mechanisms, especially in initiatives and flagships i.e. in the 2017 – 2019 Work Programme;
  - Activities not exclusive to developing countries;
  - Also feasible for developing countries considering language, culture, learning styles etc;
  - Promote collaboration between developed and developing countries: GEO Regional Initiatives;

Not exclusive to developing countries

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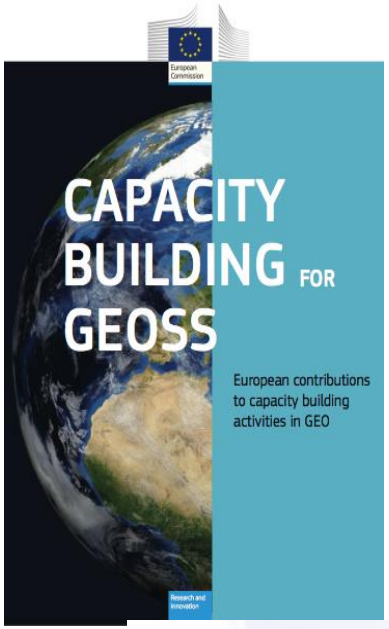
Build on existing efforts



GEONETCAB

Power

AGRICAB

E2Heaven

AFRIMAISON

EnerGEO

enviroGRIDS

CEOP AEGIS

B.GN BALKAN GEO NET

SEOCA

GEONETCast
Delivering Environmental Data to Users Worldwide

BSERVE

Bringing GEOSS services into practice

ILWIS

ARP GEO

EGO ARM TO ERA

Success stories and good practice

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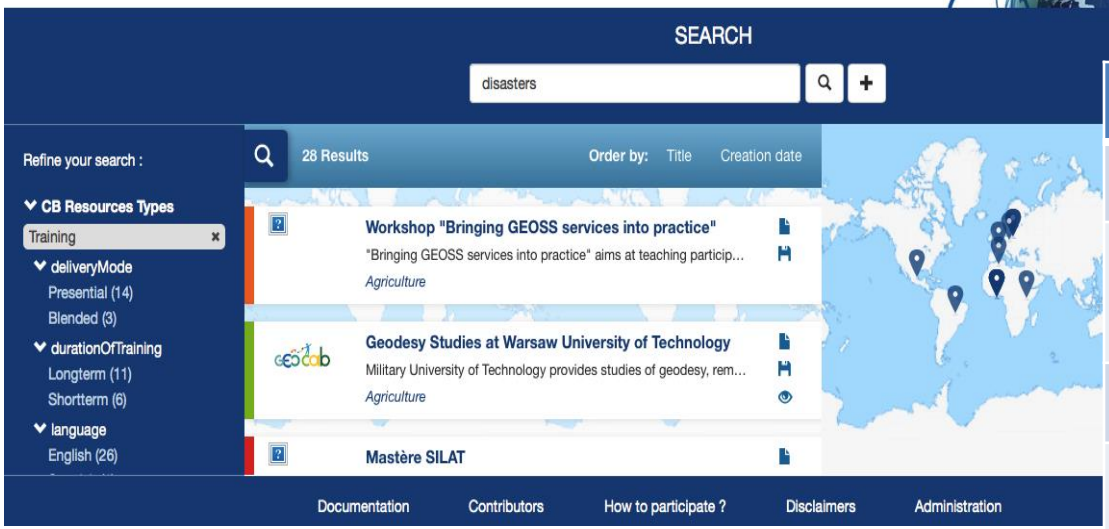
GeoCaB
Earth Observation Capacity Building Portal

http://www.geocab.org/



Over 1500 **resources**: any element of interest (human, organizational, infrastructure, methodological, technical, promotion, best practice) that can help development of knowledge in EO field;

Discoverable through GEOSS Portal:

www.geoportal.org

By Type	By SBA
Organizations	Biodiversity
Raw EO Products	Climate
Software	Disaster
Success Stories	Ecosystem
Tutorial	Water
Marketing Tool Kits	Weather
Training Material	Energy
	Health
	Agriculture

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AfriGEOSS Training

- Software Carpentry
- Google Earth Engine
- Sentinel Data Access & Processing Tools

Outcomes: new skills and also identified participants for 'Train the Trainers' course

AfriGEOSS software carpentry USAID NASA SERVIR

AfriGEOSS SERVIR WEST AFRICA CILSS NASA USAID FROM THE AMERICAN PEOPLE

esa University of Energy and Natural Resources GEO VisioTerra

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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.

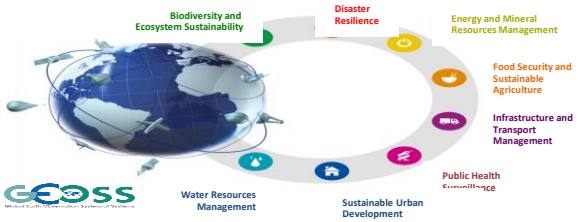
How to access data from GEOSS?

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

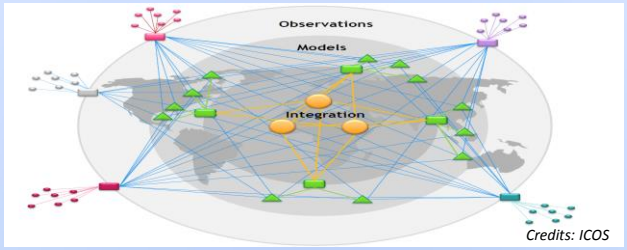
The *GEO Carbon and GHG Initiative (GEO-C)* is a global effort proposed in the framework of GEO to promote interoperability and provide integration across different parts of the system, particularly at domain interfaces. The final users, in addition to the scientific community, are countries and decision 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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Societal Benefit Areas

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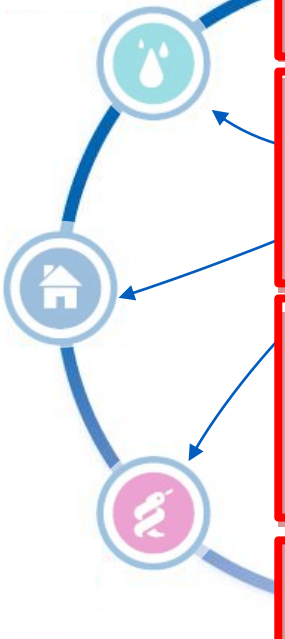
Disaster Resilience



GEO Initiatives

GEO-DARMA
Data Access for Risk management

GSNL
Geohazard Supersites and Natural Laboratories

GWIS
Global Wildfire Information System

GDIS
Global Drought Information System

Community Activities

Chinese tsunami mitigation system

Earth Observations for Disaster Risk Management

EO for Geohazards, Land Degradation and Environmental Monitoring

Global Flood Risk Monitoring

GloFAS
Global Flood Awareness System

Space & Security

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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 in the Working Group on Geospatial Information (WGGI).

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

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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)

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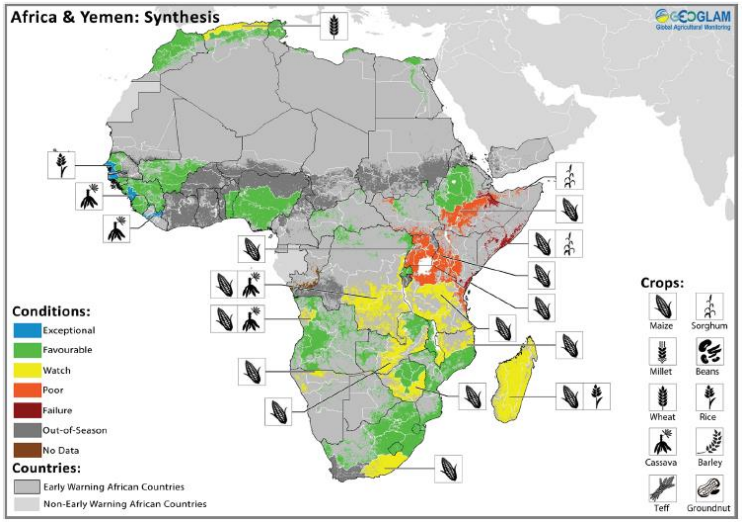
GEOGLAM Global Agricultural Monitoring

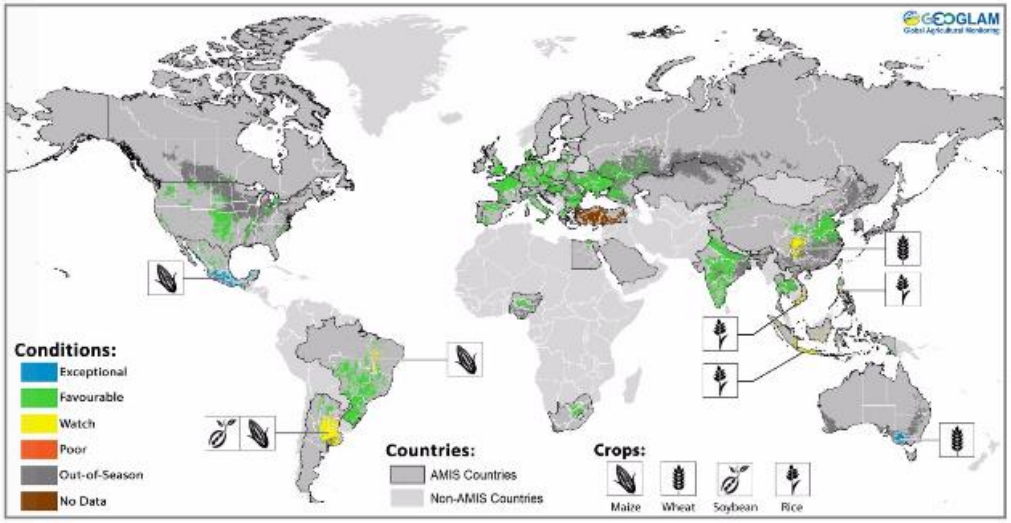
GEO GLAM – leveraging Earth observations for a food-secure world

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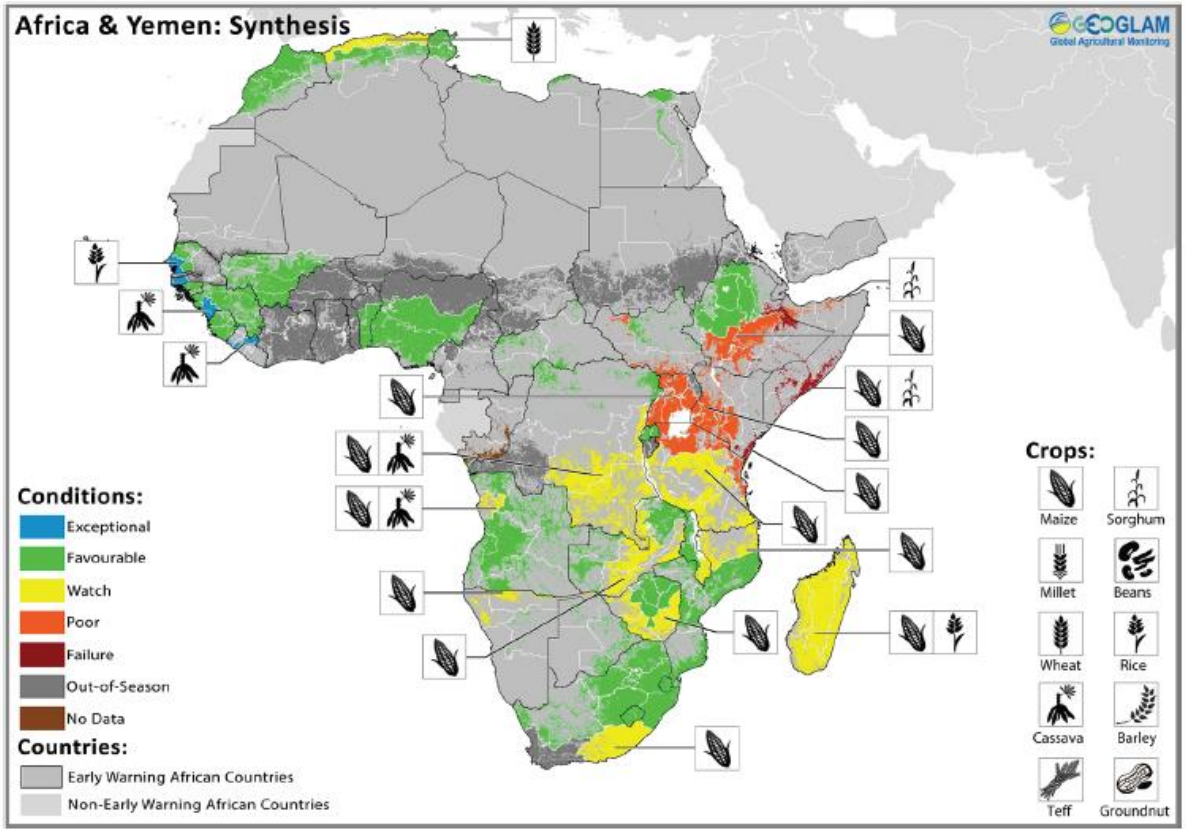
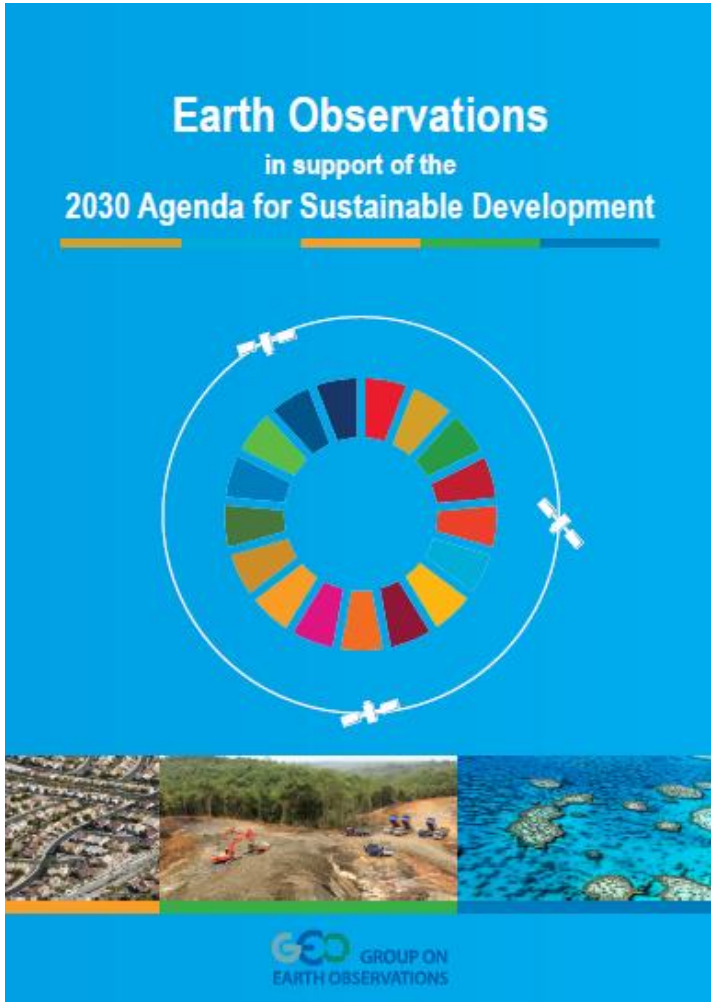
2.c	Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

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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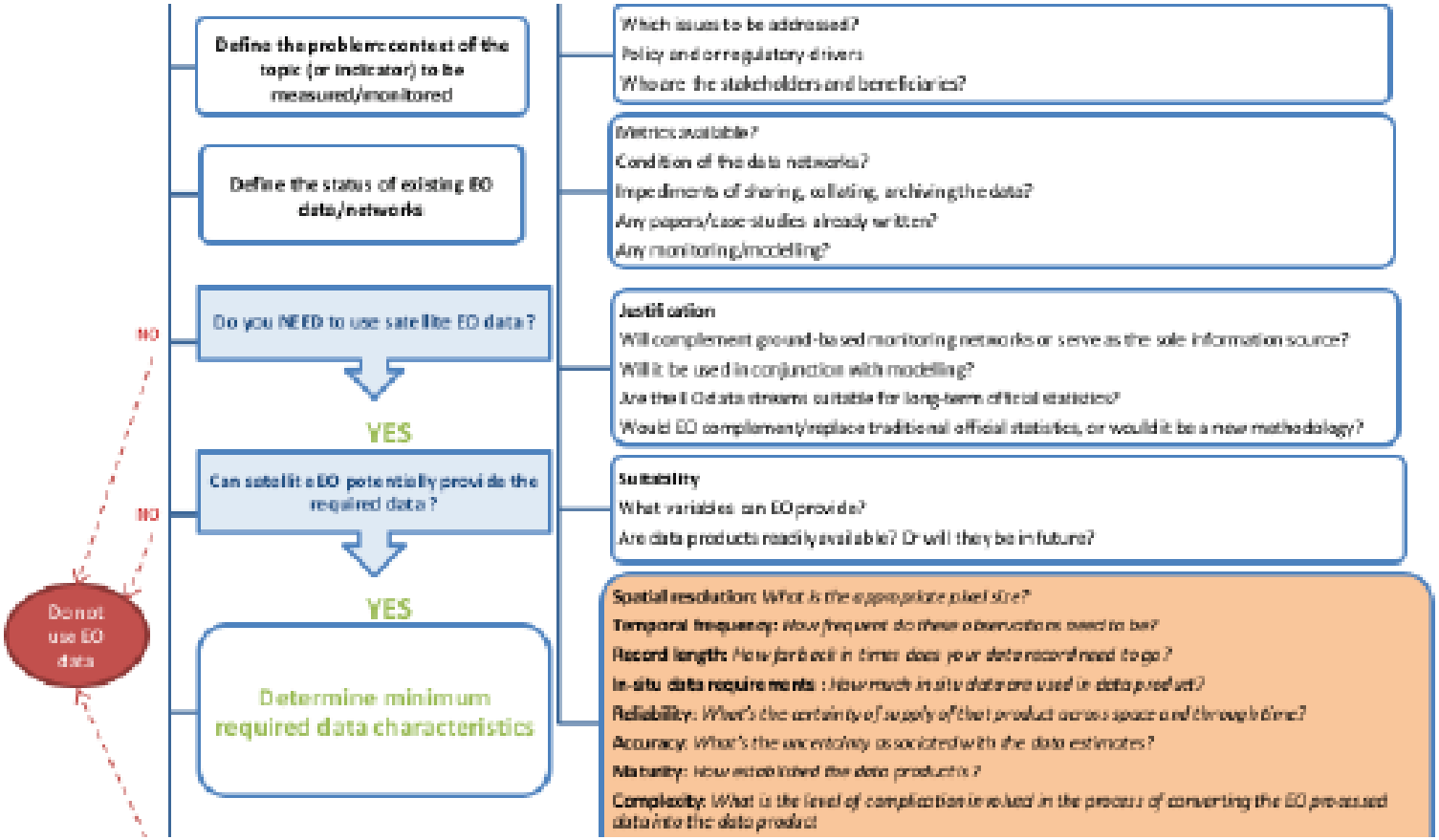
Decision tree on usage of EO data for National Statistical Organisations



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

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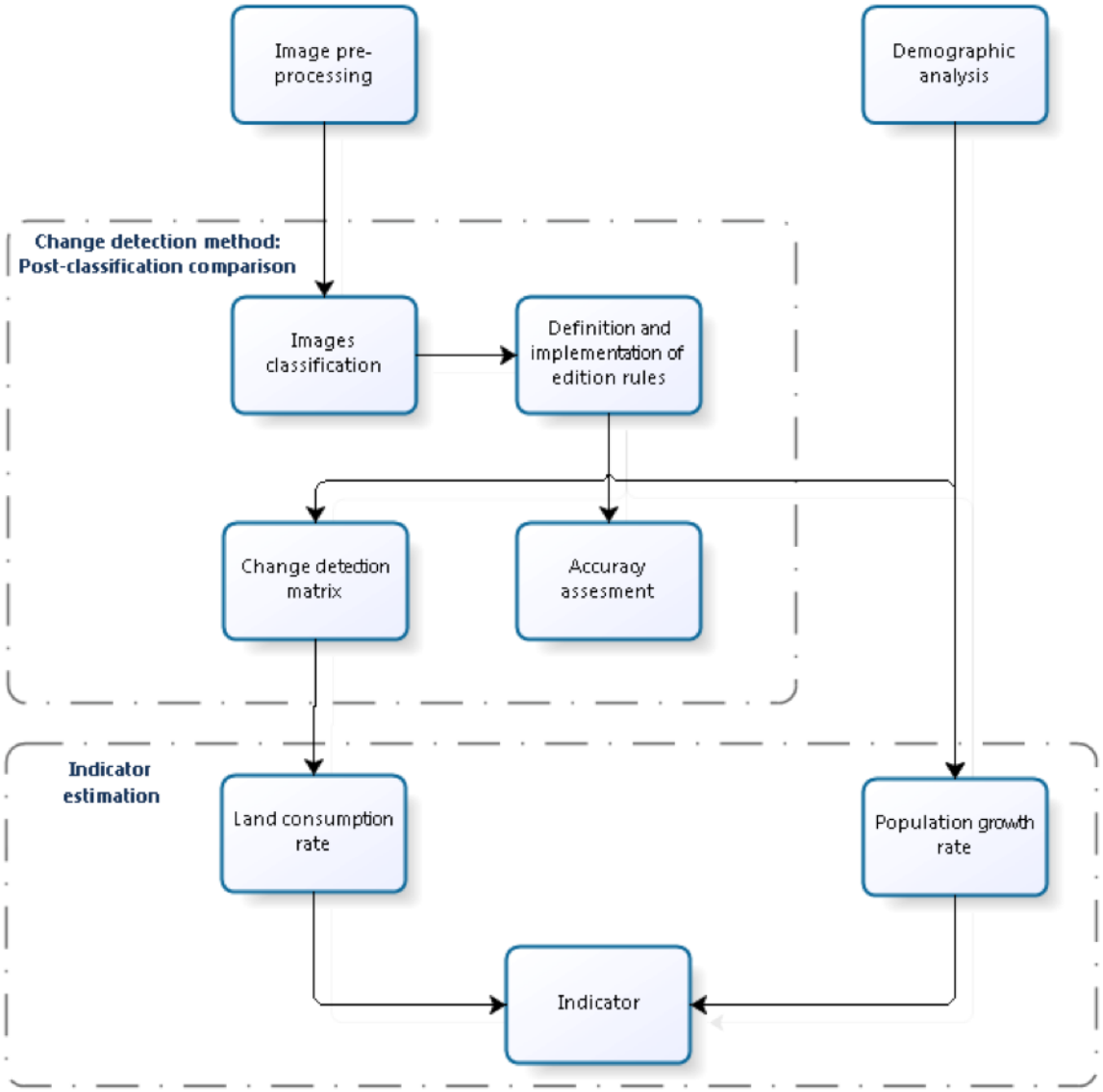
Integration of EO & statistical data to report on SDGs [Indicator 68: Ratio of land consumption & population growth rates]



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

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

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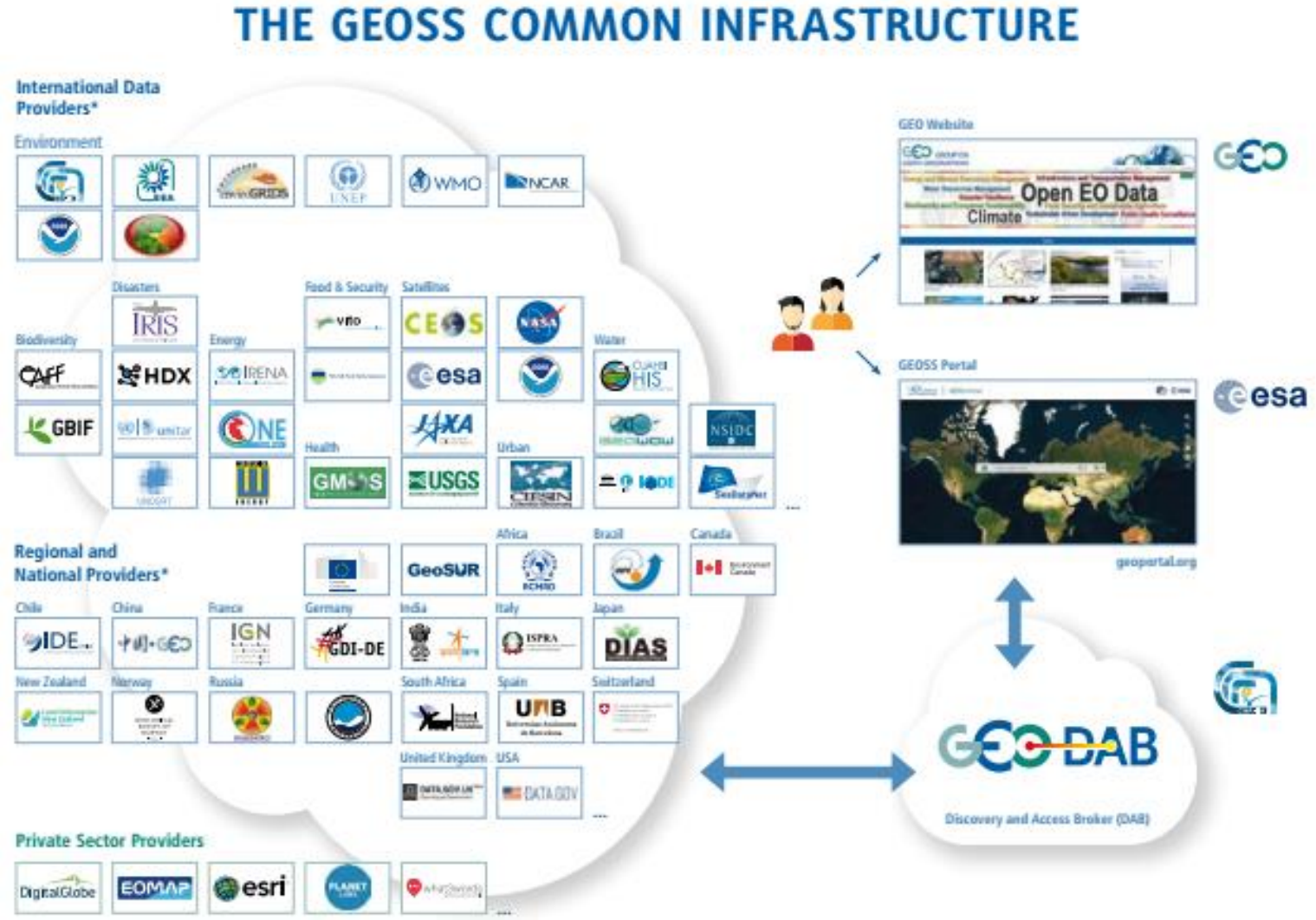
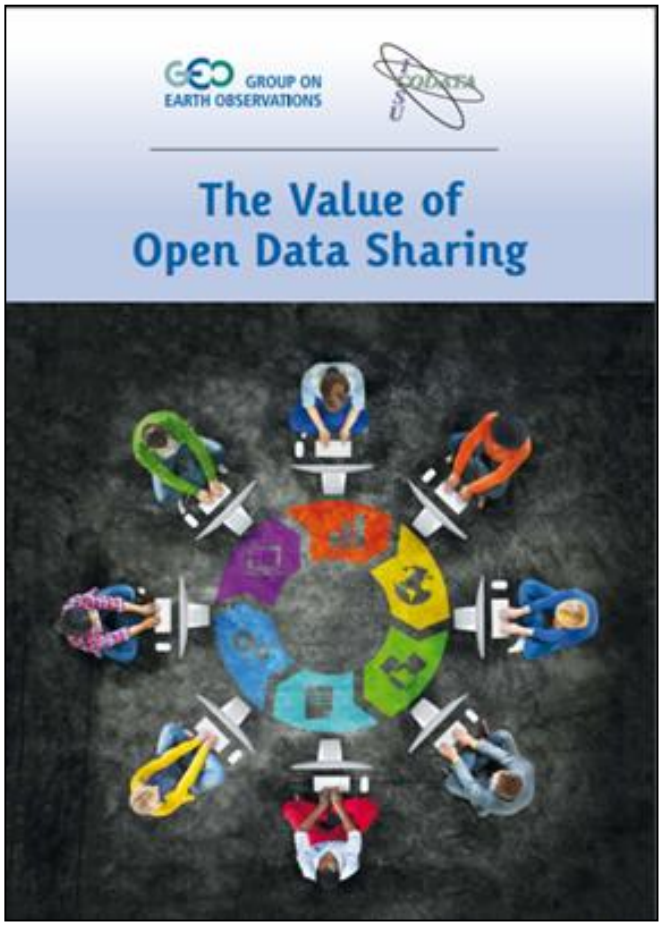
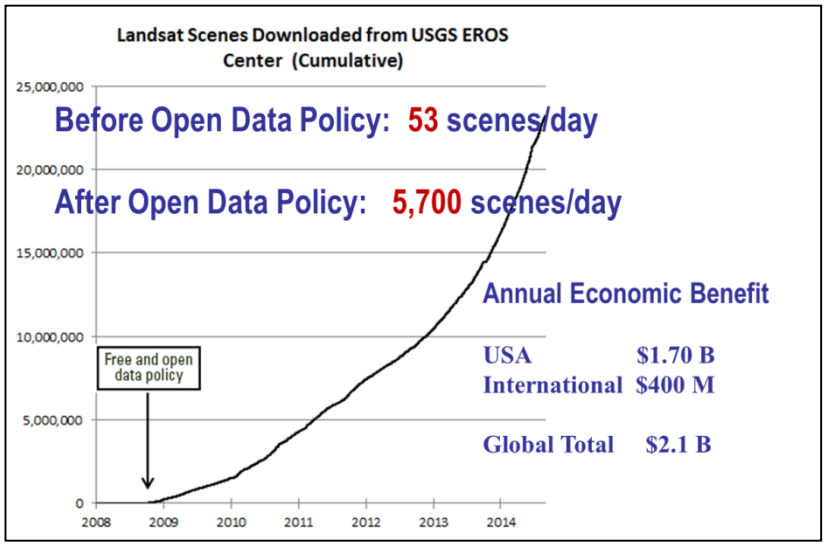
GEOSS Common Infrastructure (GCI)



Build the socioeconomic business case





Your Cases!

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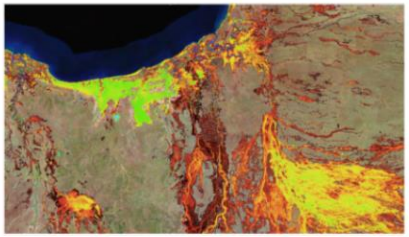
GEO Observations Blog: Geoscience Australia

May 17, 2017

Digital Earth Australia: Big Data for a Big Country.



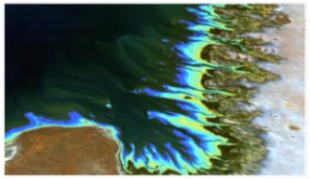
The Australian government recently announced funding of AUD $15.3m over the next 2 years to transform the prototype Australian Geoscience Data Cube (AGDC) into an operational Earth observation service called Digital Earth Australia.

Digital Earth Australia Video

For those who have not heard of the Data Cube (I could ask where have you been?), it is an analytical engine that has been developed in Australia to routinely transform Earth observations into actionable information for users. The AGDC has organised over 30 years of free and open Landsat data across the entire Australian continent into a calibrated, ortho-rectified, time-series tool for delivering information products of use to non-remote sensing specialists. Water Observations from Space (WoFS) was the first product developed which tracks the presence or absence of water over the last 30 years for every 25 metre square in Australia. WoFS is being used for flood risk assessment, agricultural water tracking, coastal change detection and even mangrove monitoring.

Digital Earth Australia will operationalise all the products showcased in the AGDC by providing regular scheduled updates of all products, and improving the resolution and frequency of all products through incorporation of multiple satellite sources. In full operation, DEA will provide most products at 10 metre resolution every 5 days for the entire continent. A prospectus detailing the first suite of operational products to be delivered is available here.

This is big news for the global GEO community since each product produced by Digital Earth Australia can potentially also be generated for every country in the world!! Digital Earth Australia has been developed on the open source "Open Data Cube" platform which is being further developed both by Australian researchers and through the Committee on Earth Observation Satellites (CEOS) the space-coordination arm of GEO. CEOS has demonstrated that with free and open Landsat and Copernicus (Sentinel) data, Open Data Cube can be developed rapidly for any country in the world, and even hosted in a cloud environment for quick deployment without the need for a huge infrastructure investment.



Australia, through its investment in the fully operational Digital Earth Australia, will demonstrate that operational Earth Observation services can be as important as having a national weather service and that an operational service like DEA can stimulate a rich commercial sector value adding industry for societal use of Earth Observation information. I think the next ten years will see this sort of operational service become the norm across to world, and it will have the spin-off benefit of making reporting on key issues like climate change and progress against the United Nations Sustainable Development Goals much easier on a global scale.

The open source community code for the Open Data Cube is now available to all GEO Members and Participating Organisations, as well as anyone else with an interest in open EO data and information. It is supported by CEOS and the data is free and open so now is the time to engage!

More information on Digital Earth Australia is available here.
More information on Open Data Cube can be found at opendatacube.org

About the author:

Dr Stuart Minchin is the Australian GEO Principal and the Chief of the Environmental Geoscience Division at Australia's geoscience agency Geoscience Australia.

You can follow Stuart on Twitter @sminchin and the agency he works for @GeoscienceAus

WWW.EARTHOBSERVATIONS.ORG/BLOG

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Mark your calendar now!

earthobservations.org/geoweek2017

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Steven Ramage, GEO Secretariat
sramage@geosec.org

Connect and collaborate:

@GEOSEC2025 and @steven_ramage

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earthobservations.org and **geoportal.org**

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Contribution to open standards policy and national mapping guidance

https://www.ordnancesurvey.co.uk/docs/policies/ordnance-survey-geospatial-standards-policy.pdf

http://ggim.un.org/docs/meetings/GGIM4/National%20Mapping%20Authority%20Perspective%20-%20International%20Geospatial%20Standards.pdf