

GEOspatial empowering billions

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Earth Observations

Earth observations are **data and information** collected about our planet, whether atmospheric, oceanic or terrestrial.

This includes space-based or remotelysensed data, as well as ground-based or in situ data.











Assessing climate change impact Older, thicker Arctic sea ice declines, September 1984 - September 2016



Source: NASA Images of Change







Tracking urbanization Urban expansion in New Delhi, India, March 14, 1991 - March 2, 2016



Source: NASA Images of Change







Flood monitoring Storms swell Ceder River, Iowa, July 8 2016 - September 26, 2016



Source: NASA Images of Change







Drought and water resources management Drying Lake Poopó, Bolivia, April 12, 2013 - January 15, 2016



Source: NASA Images of Change





The challenge

Our planet is facing unprecedented challenges. GEO is contributing to efforts to combat food insecurity, water resources management and the economic, social and environmental costs of the climate crisis and associated disasters.

> Cyclone Idai west of Madagascar Image: contains modified Copernicus Sentinel data (2019), processed by ESA









Water, energy and food security nexus

According to the Food And Agriculture Organisation (FAO) of the United Nations, water security, energy security and food security are linked to one another, meaning that actions in any one particular area often can have effects in one or both of the other areas.







Water, energy and food security nexus

As the world population is nearing 8 **billion**, increasing demands for basic services also rise, such as the growing desire for higher living standards and the need for more conscious stewardship of the vital resources required to achieve those services and these desires have become both more obvious and urgent. (Wikipedia)









Action, impact and value Global issues (SDGs, Sendai Framework, Paris Agreement, Minamata, New Urban Agenda etc.)



Policy, research and decision making Processes, standards and business as usual Census input and validation, trend analysis etc.





Earth observations data and information, science and technology

Satellite and in situ data, Earth on AWS,

Al for Earth, Google Earth Engine, Github etc.



GEO activities at a glance

The GEO Work Programme is the primary instrument to plan and implement GEO activities. The work programme for 2020-2022 is now under review.

http://earthobservations.org/g wp2020 dev.php

Implementation plans now publicly available.







GEO Engagement Priorities

Focus areas are the UN 2030 Agenda for Sustainable Development, the Paris Agreement on Climate and the Sendai Framework for **Disaster Risk Reduction.**

UN-Habitat recently invited the GEO Secretariat to support ongoing efforts around Sustainable Development Goal 11 and the New Urban Agenda through the GEO Work Programme.







UN World Conference on **Disaster Risk Reduction** 2015 Sendai Japan





Regional GEO collaboration













GEO Flagships

GEO Biodiversity Observation Network (GEO BON)

GEO BON contributes to effective management of the world's biodiversity and ecosystem services.

Over 100 governments and organizations are collaborating through GEO BON to organize and improve terrestrial, freshwater and marine biodiversity observations globally.

GEO BON







GEO BON Implementation Plan

GEO BON is committed to become, by 2025, a resource to governments, industry, researchers, and the public around the world, providing sustained and interoperable data, information, and knowledge on ecosystem services that derive from diverse communities of living organisms. GEO BON will be actively used by governments and their advisors, by the **Convention of Biological Diversity (CBD), the Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Ramsar Convention.**

The data, information and knowledge will also be used to assess the progress in achieving the CBD's Aichi Targets by 2020 and the UN's Sustainable Development Goals (SDGs). The observations derived from this network contribute to the development of effective conservation actions, mitigation, and adaptation strategies that help ensure the sustainable use of resources.







GEO Wetlands supports the protection, conservation and sustainable use of wetland ecosystems by providing high quality Earth observation tools, information and knowledge to the global wetland community.











Urban areas face specific challenges in dealing with their water resources. GEOGLOWS uses Earth observation assets to contribute to mitigating water shortages, excesses and degraded quality arising from population growth, climate change and industrial development.









GEO-VENER contributes to the availability of Earth observation data for the effective development and operation of renewable energy systems.















www.geoglam.org

GEOGLAM and the G20

The G20 Endorsed GEOGLAM and AMIS, July 2011:

- Using Earth observations, GEOGLAM reinforces the international community's capacity to produce and disseminate relevant, timely and accurate projections of agricultural production
- Has evolved to provide information on early warning for food security in addition to market price volatility

"We undertake to continue support for GEOGLAM's activities on enhancing national and global agricultural monitoring using earth observations. We recognize this as amongst the key mechanisms to promote transparent markets and food security"



Unanimous consensus on the global agri-food agenda

The G20 agricultural ministerial meeting in Buenos Aires closed with a press conference by the G20 troika representatives who elaborated on the meeting's joint declaration.



2018 G20 Agriculture Ministers Declaration:

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Global - Crop Monitor for AMIS Countries

- Request from AMIS for provision of timely and transparent monthly crop condition <u>assessments</u> in primary agricultural production areas
- Reflecting an international consensus, building on existing systems
- Four major crops: wheat, maize, soybean, rice
- Focus: main production/export countries, stabilizing markets, avoid unexpected food prices
- Output: Crop Monitor, published in Market Monitor, monthly since 2013



GEOGLAM IS A MEMBER OF THE AMIS SECRETARIAT





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Global - Crop Monitor for Early Warning

- Following AMIS approach exchange information, build consensus and reduce uncertainty in countries most vulnerable to food insecurity
- Partners: global food security monitoring agencies
- Monthly publication, first bulletin published Feb 2016
- 14 crops: main food security crops for each region













Monthly crop conditions in 'at risk' countries



The Crop Monitor is a part of GEOGLAM, a GEO global initiative.

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Coverage of Crop Monitors





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Global Snapshot of Current Crop Conditions







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National Crop Monitors

Monthly Early Warning Crop Monitor Examples for Tanzania & Uganda



National Food Security Bulletin, published by the Tanzania Ministry of Agriculture Food Security, National Food Security Division





The Inter-Ministerial/Agencies Monthly National Integrated Multi-Hazard Early Warning Bulletin, published by the Uganda Office of the Prime Minister

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National Impact Stories, Major Producer - Argentina

Argentina Drought 2017-2018

- Argentina suffered one of the worst droughts in its history in 2018
- Agriculture Ministry needed **objective scientific** evidence of drought to enact policy
- Working with INTA (GEOGLAM national partner) the government was able to declare an "agricultural emergency" with great spatial precision, triggering financial safety net programs







LA NACIO

Buenos Aires: declararon la emergencia por sequía para 27 municipios





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National Impact Stories, Food Security Africa - Uganda

Uganda Drought 2017-2018

- GEOGLAM worked with the Ugandan Office of the Prime Minister to develop a crop monitor in 2016
- In 2017 the crop monitor provided **3 months** early warning of a likely crop failure due to drought, time to proactively **mitigate loss and damage**
- Monitoring triggered the Disaster Risk Financing (DRF) fund to scale-up public works projects in Karamoja, off-setting agricultural losses

End result: USD 2.6 million saved, 150k people helped





Crop Monitor August 2017 for Uganda



" In the past we always reacted to crop failure, spending billions of shillings to provide food aid in the region. 2017 was the first time we acted proactively because we had clear evidence from satellite data very early in the season."

Martin Owor, Commissioner Office of the Prime Minister (OPM)



Capacity

Digital literacy, policy & technology translation, co-design and co-production of knowledge

Communications

Awareness raising, free resources, training schedules and venue

Collaboration

Community, human interoperability & regions

Commercial

Public Private Partnerships, platform & pricing













Focus on provision of open data [ongoing challenge].

The future

Focus on results based on open science, notably reproducibility.









The driver for change

Easy access to the products and services developed in GEO.

Access to methods, code, models, source data, scientific papers, etc.

Enable others to reuse the results in their country, based on local circumstances.

consumers of information.





Create a broad global network of EO practitioners who control the tools they use, they are not just



Seeking more R and **Python users/experts**



agriculture

National Institute for Space Research (SNRS), Mar Just dos Campos, Brasil * Pediate of Applied Remimic Recench (198A), Brailia, Braid

2 contributors 10 19 58 Sines (41 slas) - 0.38 #8







Co-design and co-production



Strengthening Institutions



GEO-AMAZON WEB SERVICES – EARTH OBSERVATION CLOUD CREDITS PROGRAMME

GEO and AWS have awarded \$1.5 million in grants, cloud services and technical support for projects in developing countries to use Earth observations to support sustainable environmental development based on GEO priorities.

21 projects announced in 17 developing countries. http://www.earthobservations.org/article.php?id=362







21 Projects from 17 Developing Countries

Brazilian Earth Observation Data Cube using AWS for Land Use and Cover Change	National Institute for Space Research (INPE)	Brazil
Fire Monitoring Service	Tsinghua University/China	China
A Global Modeling Tool for Nature's Contributions to People in Sustainable Development	Ministry of Environment and Energy	Costa Rica
Filtered Alert Hub Toolset	Cairo University, Electronics and Electrical Communications Engineering Department	Egypt
Computing Groundwater Potential in Arid and Semi-arid parts of Ethiopia.	Ministry of Water, Irrigation and Energy	Ethiopia
Capacity Building on Monitoring of SDGs	Remote Sensing and Climate Center Ghana Space Science and Technology Institute	Ghana
Integrating Earth Observation Data with Censuses and Sample Surveys to Estimate Development Indicators for India	Indian Institute for Human Settlements	India
AWS4AgriSAR-Crop inventory mapping from SAR data on cloud computing platform	Centre of Studies in Resources Engineering (CSRE) Indian Institute of Technology Bombay	India
Global Mobile Tsunami Warning System using Amazon Web Sever—A Life-Saving Platform	Ikatan Ahli Tsunami Indonesia, Tsunami Research Foundation	Indonesia
agriBORA - Geodata for actionable farm intelligence	Kenya Agricultural and Livestock Research Organization (KALRO)	Kenya



EO For Sustainable Development	National Institute of Statistics and Geography (INEGI, Mexico)	Mexico/Colombia		
South Asian drought monitoring and outlook system to support agricultural advisory processes	ICIMOD	Nepal		
Operational monitoring system of ground deformations in Nigeria	Department of Geoinformatics and Surveying, University of Nigeria	Nigeria		
Spatial Agricultural Intelligence	African Regional Institute for Geospatial Information Science and Technology (AFRIGIST)	Nigeria		
Implementation of a service of information to monitor the degradation of Zones Marino Coastal	Ministry of Environment / Direction of Monitory and Evaluation of the Natural Resources of the Territory.	Peru		
Automation of processes in the cloud, for the generation of mosaics of annual satellite images free of clouds, to contribute in the generation of information on changes in forest cover.	National Program for the Conservation of Forests for the Mitigation of Climate Change of the Ministry of the Environment of Peru	Peru		
Air Quality Forecasting for Africa	Kigali Collaborative Research Center (KCRC)	Rwanda		
AfriCultuReS Decision Support System (ADSS) Community Version	South African National Space Agency	South Africa		
Methodology for SDGs indicators assessment	Space Research Institute NAS Ukraine and SSA Ukraine	Ukraine		
Deep Learning for Satellite Monitoring of Illegal Amber Mining in Ukraine	Kharkiv National University	Ukraine		
Monitoring Rice Paddy and Flood in the Lower Mekong Basin	HCMC Space Technology Application Center	Vietnam		





GEO WEEK 2019 MINISTERIAL SUMMIT 4-9 NOVEMBER / CANBERRA, AUSTRALIA / #GEOWEEK19





FOR ALCOND EVENITS

GEO WE	Saturday 9/11				
Monday 4/11	Tuesday 5/11	Wednesday 6/11	Inursuay // I	Ministerial	Executive Committee
Side Events		GEO-XVI Plenary		Summit	Meeting
	Executive Committee	Industry Track		Press Conference	
	Meeting Exhibition				
		Ministerial			
		Gala Dinner	Roundtable		
			Ministerial		



Dinner



Canberra Ministerial Summit 2019 "Earth observations: investments in the digital economy"

The importance of 2019 to GEO

Four years on from Mexico City

In 2015, Ministers adopted a new Strategic Plan for GEO focussed on three key priorities: sustainable development, climate change and disaster risk reduction.

From 2015-2018, the GEO community has restructured itself around these priorities.

In 2019, Ministers and the broader GEO community will decide how they will step up and accelerate delivery of the GEO strategy.



Policy issues that need Ministerial attention

Ministerial Summits enable Ministers to connect GEO to the bigger picture

Topics will include:

- Engagement of GEO with the multilateral economic cooperation architecture
- Engaging with vulnerable and developing nations
- Future of Work
- Trade in Digital Services
- Privacy in a Big Data World
- Sharing Economy





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Collaborate and communicate with GEO:





Contact

#GEOWeek19

