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### A G20 Initiative for Combatting Food Insecurity and Market Volatility

Agricultural markets have become increasingly volatile, threatening food security and human livelihoods. Access to timely, accurate, transparent, and actionable information about crop condition and production can help stabilize markets and provide early warnings of crop failure, thereby promoting food security. In 2011, the Group of Twenty (G20) Agricultural Ministers developed the G20 Action Plan on Food Price Volatility and Agriculture that includes the launching of the Agricultural Market Information System (AMIS; [www.amis-outlook.org](http://www.amis-outlook.org)), and the Group on Earth Observations Global Agricultural Monitoring initiative (GEOGLAM; [www.geoglam.org](http://www.geoglam.org)), the latter utilizing Earth observations (EO) for improved information about crop condition and production. In June 2016, the G20 reaffirmed its support of GEOGLAM.

### Toward Improved National, Regional, and Global Agricultural Monitoring

GEOGLAM’s primary objective is to reinforce the international community’s capacity to produce and disseminate timely and accurate information on and forecasts of agricultural production at national, regional, and global scales through the use of satellite and *in-situ* Earth observations. Over recent decades, the tools underpinning remote sensing-based agricultural monitoring have developed, but the adoption of these tools as well as the access to the space-based data required for monitoring has been uneven across the globe. Through the coordination of satellite, *in-situ*, and agrometeorological observations, and through the transparent sharing of methods and information, GEOGLAM aims to strengthen national, regional, and global monitoring systems and improve access to timely, accurate, and actionable information.

### A voluntary and collaborative initiative

GEOGLAM is a voluntary and collaborative initiative. Its Agricultural Monitoring Community of Practice (Ag CoP) is open and draws on the expert knowledge and experience from agricultural ministries, space agencies, universities, and industry from all over the world.

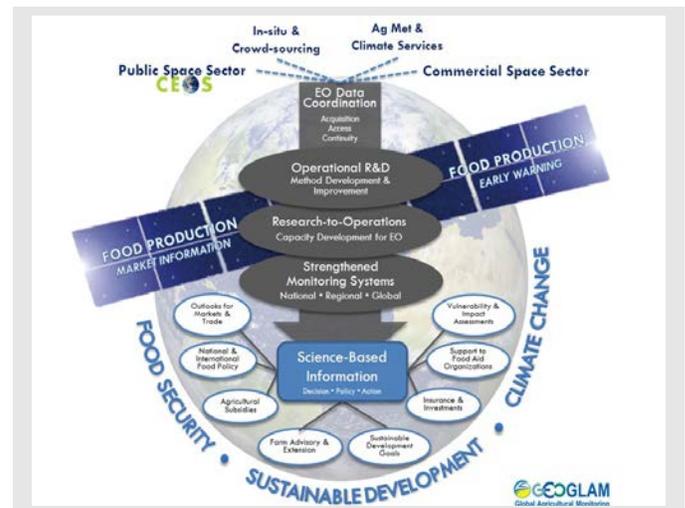
The GEOGLAM Community of Practice is constantly expanding. For information on how to participate, contact [mdeshayes@geosec.org](mailto:mdeshayes@geosec.org) at GEOGLAM Secretariat.



### GEOGLAM Coordinates a System of Systems

GEOGLAM builds upon and facilitates collaboration and communication between various agricultural monitoring systems and actors. This enhances the relevance, timeliness, and quality of EO-based information on agriculture. GEOGLAM is driven from the bottom-up, with the GEOGLAM Secretariat Office facilitating coordination between agricultural monitoring activities from around the world toward the creation of regional and global “Systems of Systems.”

GEOGLAM’s structure follows a logical flow from input data, through expert analysis based on best-practices, with the end goal being strengthened monitoring systems that can provide evidence-based information to strengthen decision-making, action-taking, and policy in the realms of food security and sustainable development, and in the context of climate change.



Crucial activities within GEOGLAM to enable this include:

- Coordination of space based EO with the Committee on Earth Observation Satellites and the commercial space sector;
- Coordination of an operational R&D network (JECAM) and contributing R&D activities (SIGMA, Sen2Agri, Asia-RiCE, RAPP Pilot Sites) producing “best-practices” guidance and methods documentation;
- Translation of R&D outcomes into the operational context, including via capacity development;
- Development and coordination of regional networks focusing on regional concerns and interests, including Asia-RiCE, GEOGLAM Latinoamérica, and AfriGAM.
- Monthly production of international consensus reports drawn from national, regional, and global monitoring partners, on crop conditions in major producing areas (Crop Monitor for AMIS) and in countries-at-risk for food insecurity (Crop Monitor for Early Warning).

## Example GEOGLAM Activities

**Crop Monitors** (<http://www.cropmonitor.org/>) Operational since 2013, the **Crop Monitor for AMIS** is an international and transparent multi-source, consensus assessment of the crop growing conditions, status, and agro-climatic conditions which are likely to impact global production. This activity covers the four primary crop types (wheat, maize, rice, and soybean) within the main agricultural producing regions of the AMIS countries. The CM for AMIS provides a monthly outlook for the 4 commodities (including maps, pie charts, and textual summaries), which comprises a valuable portion of the monthly AMIS Market Monitor.

GEOGLAM launched its **Crop Monitor for Early Warning** in February 2016. An analog to the CM for AMIS, the CM4EW is focused instead on countries-at-risk for food insecurity and their relevant crops and drivers. These two GEOGLAM-produced Crop Monitors have already become a trusted source by policymakers to inform decisions about food aid and food policy with real impacts on human livelihoods.

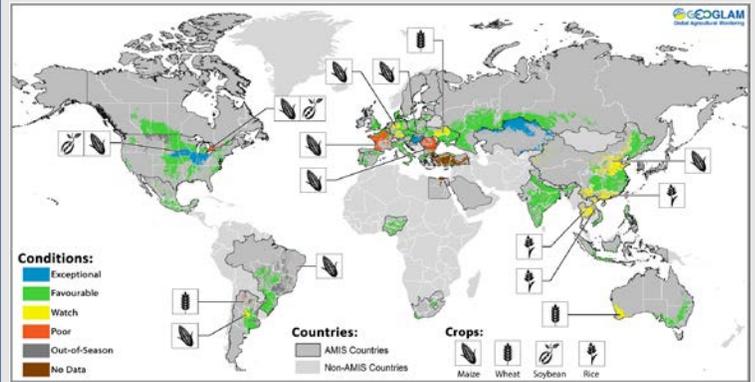
**Asia-RiCE** (<http://www.asia-rice.org/>). Rice is the staple food for more than half of humanity, with 90% of global rice crops grown and consumed in Asia. Since 2013, the Asia-RiCE team has been estimating rice crop planted area, growing status, and production at its technical demonstration sites around Asia using time series of SAR and optical data provided by CEOS agencies. The Asia-RiCE team is also developing consistent ground data collection guidelines, carrying out fruitful R&D activities in rice production areas, and aims to validate rice crop area and production estimation by remote sensing data. The Asia-RiCE team continuously provides monthly rice outlooks for four target ASEAN countries in cooperation with the ASEAN Food Security Information System (AFSIS) project).

**JECAM** ([www.jecam.org](http://www.jecam.org)). The goal of JECAM, Joint Experiment for **Crop Assessment and Monitoring** is to reach a convergence of approaches and to develop monitoring protocols and best practices for a variety of global agricultural systems. JECAM enables the global agricultural monitoring community to compare results based on disparate sources of data, using various methods, over a variety of global cropping systems. JECAM experiments will facilitate international standards for data products and reporting, eventually supporting the development of a global system of systems for agricultural crop assessment and monitoring. Other critical R&D activities such as **SIGMA** (Stimulating Innovation for Global Monitoring of Agriculture, [www.geoglam-sigma.info](http://www.geoglam-sigma.info)) and **Sentinel-2-for-Agriculture** ([www.esa-sen2agri.org/](http://www.esa-sen2agri.org/)), contribute to JECAM and best practices for monitoring.

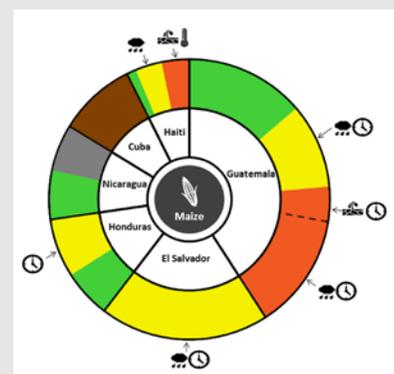
**RAPP** ([www.geo-rapp.org](http://www.geo-rapp.org)) The Rangeland and Pasture productivity initiative aims at developing capacity to monitor the world's rangelands and pasture lands and the production of animal protein. Led by CSIRO Australia, this activity includes a network of R&D sites which aim to advance the monitoring science for this important food security resource.

**EO Data Coordination.** Through interaction with the CEOS Ad Hoc Working Group for GEOGLAM, the challenges around data acquisition, continuity, access, and utilization are addressed, to facilitate broader adoption of space-based data for agricultural decision making.

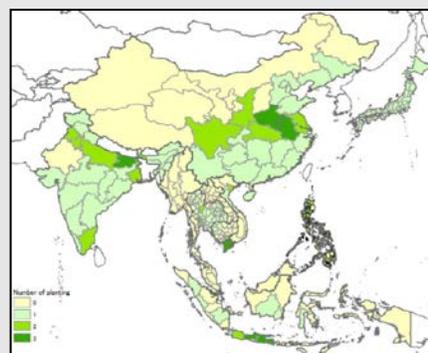
**Crop Monitor for AMIS:** Crop conditions for all 4 AMIS crops as of 28 August 2016. Crops that are in other than favorable conditions are displayed on the map with their crop symbol.



Both the CM4AMIS and the CM4EW release their consensus reports as text, maps, and pie charts describing the crop conditions. Each slice represents a country's share of regional or world production. The largest producing countries within each region are shown individually, clockwise by rank of production, while lower-producing areas are grouped into a single slice. The area within each slice is divided between crops in-season (colour) and out-of-season (gray). The in-season portion is coloured according to the various crop conditions within that country.



**CM4EW maize condition pie chart for Central America as of 28 June 2016**



**Rice cropping intensity** (number of planting cycles per year, 0-3) in the Asian region. Data provided by Asia-RiCE in cooperation with AFSIS and Asian national agriculture and space organisations. Asia-RiCE has been developing rice crop estimations and outlooks using space-based EO.



**Network of JECAM sites.** Distributed in a variety of agrosystems, the sites allow to intercompare and assess agricultural monitoring methods and datasets in different agricultural landscapes. JECAM sites collect minimum *in-situ* and satellite datasets, and carry out experiments related to deriving target products ranging from crop area mapping to crop yield forecasting to crop biophysical variable measurements.

Learn more at [www.geoglam.org](http://www.geoglam.org)