



## 2021 Stocktaking Report for The GEO Global Agricultural Monitoring Initiative (GEOGLAM)

G20 1st Meeting of Agriculture Deputies, 19-20 April 2021, Italy

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### 1. Overview activities before 2020

The Group on Earth Observations Global Agricultural Monitoring Initiative (GEOGLAM.org) was initially launched by the Group of Twenty (G20) Agriculture Ministers in Paris, June 2011 as part of the Minister's G20 Action Plan on Food Price Volatility. Since 2011 the GEOGLAM focus has expanded along with the G20's to also include a broader focus on global food security. GEOGLAM delivers on its mission by producing and openly disseminating consensus based, relevant, timely, and actionable information on agricultural conditions and outlooks of production at national, regional, and global scales (Cropmonitor.org). GEOGLAM participants include representatives from most G20 nations as well as many other countries, and several international organizations and NGOs. Participation is from more than 120 institutions from over 50 nations, with beneficiaries from least developed nations further expanding the reach of GEOGLAM.

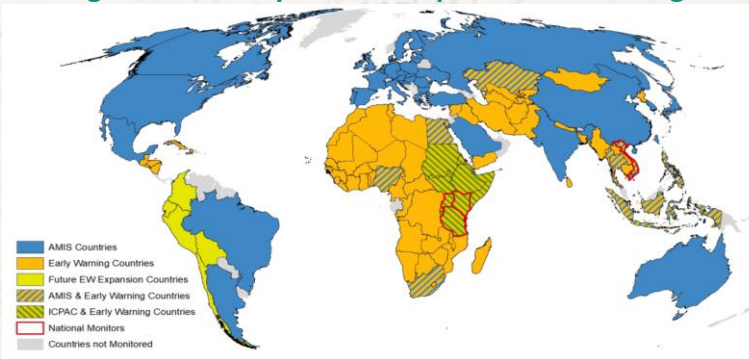
While the focus of GEOGLAM continues to be on operational outcomes, these are underlain by a solid research foundation, including the Joint Experiments for Crop Assessment and Monitoring (JECAM). JECAM was initiated in 2009 and has grown to be a global network of about 50 research sites working together to develop operational solutions.

Since 2012 GEOGLAM information has covered G20 nations, as well as other AMIS major importing and exporting countries. The GEOGLAM Crop Monitor encompasses over 80% of global production, consumption and trade volumes of AMIS targeted crops. Over forty nations and institutions contribute to the Crop Monitor. Since 2016 the Crop Monitor for Early Warning (CM4EW) has monitored crops that are important for food security by region, generally encompassing countries and regions that are susceptible to food insecurity. Participants include the major food security organizations including WFP, FAO, USAID FEWSNET, EC JRC, AsiaRice along with several regional and national agencies. Combined, the GEOGLAM Crop Monitors cover most of the world (Figure 1).

#### Key milestones 2011-2021:

- Since 2012: Key information deliverables include monthly crop monitor reports for GEOGLAM's partner initiative, the Agricultural Markets Information System (AMIS). These are consensus reports on the four major food commodities (maize, wheat, rice, and soybean). They are based on science-based information including satellite EO data, agro-climate assessments, and expert analysis. The monthly Crop Monitors are key component of the AMIS Market Monitor.
- Since 2016: Early warning crop condition reports for food insecure nations have been produced for international food security response organizations. These reports
- Since 2017: Working with least developed countries to co-develop their own crop monitoring systems within national mandated agencies. These efforts have had a significant impact on food security by supporting proactive responses that save lives, improve livelihoods while reducing the cost of emergency food aid.
- Since 2017: Development of Special Reports in response to emerging food security concerns. Developed in response to UNOCHA requests for more frequent information in areas of emerging concern.
- Since 2018: To augment the crop condition reports GEOGLAM has been publishing global climate outlooks, including El Niño-Southern Oscillation (ENSO) status reports.

**Figure 1. 2020 Synthesis Crop Monitor Coverage**



## 2. Progress since the previous stocktaking exercise (March 2020)

Despite the challenges posed by the COVID 19 pandemic GEOGLAM has a productive year and continues to deliver operations without delay, while also improving key aspects of GEOGLAM to address evolving policy drivers. In fact, the ongoing pandemic has served to highlight the urgency and need for enhanced agricultural information and the gaps that earth observations can help fill.

### GEOGLAM Operations 2020:

- Published 11 monthly Crop Monitor for AMIS reports which were incorporated into the AMIS Crop Monitor
  - GEOGLAM and AMIS are now conducting joint monthly calls to review agricultural conditions. In the words of Tony McDougall, Canadian Delegate to the AMIS Information Group:
 

*"joint GEOGLAM/AMIS calls are richer and more informative. The combination of the expertise from the GEOGLAM side giving the overview of the country or region-specific weather and growing conditions followed by the AMIS Secretariat and country analysts providing their expertise from a supply and demand perspective add real value. The perspective that the GEOGLAM group brings in regard to the scientific unbiased reporting really helps us here in Canada as we are preparing our short-term forecast "*
  - GEOGLAM Rice Monitoring (AsiaRice/Georice) was able to track changes showing a decrease in rice production area in several South East Asian countries due to drought between 2019 & 2020
  - Expanded generation of national crop condition assessments by the GEOGLAM Latin America regional group (AMA)
  - GEOGLAM Crop Monitor data has been featured by the UNEP World Environment Situation Room
- Published 11 monthly Crop Monitor for Early Warning reports (CM4EW)
  - The UN World Food Programme (WFP) has expanded participation in CM4EW to its Regional Bureaus, improving local expert input into the crop monitors. Dakar (for West Africa) and Nairobi (East Africa) are now routinely providing inputs in to the CM4EW discussions
- Published 7 Special Reports on emerging areas of concern, including: Africa-multiple areas; DPRK-North Korea; and Central America
- Published 5 Climate Outlook reports including El Niño-Southern Oscillation (ENSO) status reports. The current focus is 10 day to monthly analysis with seasonal ENSO outlooks
- New initiative. GEOGLAM has begun to publish Conflict reports, with two releases on the Lake Chad Basin and South Sudan in 2020. War and conflict are among the leading causes of world hunger and can have disastrous impacts on the affected regions' agricultural production and food security. GEOGLAM has initiated work with partners to bring conflict status information in food insecure regions to the global community
- New initiative. Published new monthly synthesis maps that integrate the AMIS Crop Monitor with the Crop Monitor for Early Warning to provide a snap-shot overview of global conditions



#### **Enhanced Coordination of Co-Development Activities (Focus on Africa):**

- GEOGLAM has co-developed 7 national and one regional operational crop monitoring systems in African countries. Demand for support from least developed nations has outstripped our capacity to deliver and we are looking at new strategies to scale up activities
- GEOGLAM has been working with the UNFCCC and the GEO Climate Change Working Group to support climate change adaptation. We are drafting Supplemental Guidance Document for the UNFCCC to help integrate the GEOGLAM crop monitoring system into National Adaptation Plans
- Working with the development of the GEO Knowledge Hub (GKH) we have begun creating knowledge packages to assist the co-development of agricultural monitoring in least developed nations

#### **Adopting a Federated Approach to Information Communication Technologies (ICT):**

- Developed knowledge packages to streamline the utilization of cloud services for agricultural monitoring, including the development of a 'click and go' implementation of monitoring tools, lowering the bar to utilization

#### **Development of Essential Agricultural Variables:**

- The development of EAV's are central to the evolution of GEOGLAM monitoring to be able to support emerging policy drivers around AMIS, SDG's, climate and disasters
- Work to define the initial set of EAV's is on-going but has been delayed due to the pandemic

#### **Development and Implementation of specific GEOGLAM Engagement Strategies (SDG's, Climate and Disasters):**

- Climate Mitigation. Development of an agriculture strategy document as input to the Committee of Earth Observing Satellites (CEOS) Roadmap to supporting the UNFCCC Global Stocktake and the development of Nationally Determined Contributions in least developed countries.
- Climate Adaptation and Early Warning for Disaster Response. Developing Supplemental Guidelines for the UNFCCC National Adaptation Planning process (see above in the co-development section)

#### **GEOGLAM Secretariat Sustainability:**

- The pandemic had detrimental impact on GEOGLAM's ability to conduct resource mobilization outreach, and the availability of international funding in 2020. Notwithstanding this there were great strides made towards funding sustainability in large part due to direct funding support from Germany (BMEL). We have also had on-going direct support from Canada (AAFC) and support from the UK (DEFRA) directed at capacity development activities (NAP guidance, climate strategy, knowledge management and in situ data coordination). NASA Harvest has provided indirect funding for Secretariat staff support
- Current funding has provided some stability to the GEOGLAM Secretariat, however more support is required to ensure GEOGLAM is set on a sustainable footing for the future. As such GEOGLAM welcomes the opportunity to discuss incremental support from G20 nations.



### 3. COVID-19 impacts

The world is currently facing one of the greatest food emergencies in more than a generation. GEOGLAM monitoring indicated that global food insecurity was already rising leading up to 2020 due the challenges associated with increasing conflict, and the world's changing weather and climate conditions. Impacts were from events, including floods, to wind, to drought to one of the worst waves of locusts in Africa in a generation. These challenges are not unusual and to some extent occur every year. What is different in 2020 is that COVID-19 has amplified the risks already facing the world's 690 million hungry people, potentially doubling the population facing acute food shortages (WFP). A Joint Research Centre study in Kenya indicated that 76% of smallholder farmers were impacted by pandemic measures affecting the availability of inputs, labour, transport, and cross-border trade, and compounded by crop loss on 16% of farms due to the locust invasions.

In response to the evolving food crisis the provision of objective and transparent near real time information on global agriculture has never been so critical. GEOGLAM has risen to the challenge in 2020 and continues to do so in 2021 by providing state of the science information products to the AMIS G20 community. In a year when much of the world was in some form of lockdown, the pandemic has clearly demonstrated the importance of space based observations compensate for the reduction in ground information to provide insights on the state and changes to crop conditions in near real-time. Just as important as technology to GEOGLAM's response has been our ability to manage the human dimension. Because GEOGLAM has established resilient and committed expert networks we were able to rally the community to continue to deliver vetted, consensus information to support food commodity markets without missing a step.

Beyond global markets the COVID-19 pandemic has posed a credible and mounting threat to food security at the local level, which requires timely decisions and interventions to mitigate the crisis. In terms of National and International response programs, the COVID-19 pandemic is exacerbating already existing food crises and driving worsening food insecurity among vulnerable populations. In countries dependent on humanitarian and development aid, the sudden diversion of funds to address the COVID-19 crisis are impacting food aid distribution, requiring evermore efficient utilization of resources. In this regard GEOGLAM continues to work with International food security response organizations to provide information and help them do their job more efficiently and effectively. We are also proud of the recognition GEOGLAM partner World Food Program has received by winning the 2020 Nobel Peace Prize.

At the National level, as we have demonstrated through our co-development work with least developed countries that EO based agricultural monitoring systems can provide timely early warning information to enable proactive policy responses. Past GEOGLAM investments in National co-development, made prior to the pandemic, have clearly paid off, and highlighted the importance of this work. In summary, GEOGLAM activities have had a tremendous impact on the global coordination of food security reporting and monitoring. Some specific response activities:

- The GEOGLAM crop monitor information has been incorporated into the the tri-agency COVID-19 Dashboard, a concerted effort between the European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA), and National Aeronautics and Space Administration (NASA) to respond to the pandemic
- Argentina used the GLAM system to supplement data missing due to pandemic response
- AsiaRice partners will continue to monitor rice for agricultural land use change impact at regional scale, with a particular focus on the lower Mekong. AsiaRice is also working with agriculture economists to study the COVID-19 impact in South East Asia
- During 2020 GEOGLAM has noted an increase in demand for crop monitoring support from countries G20 and otherwise. GEOGLAM has risen to this challenge, and as we look forward, we are considering the feasibility of developing an emergency activation process, where participating countries and international organizations can request rapid response in the face of emerging food security concerns



#### 4. Workplan for the future

As we look toward the next 10 years GEOGLAM will continue to improve our operational crop monitoring, focusing more on national co-development of crop monitoring. We are looking to increase our support for the big policy challenges of the day, sustainable development; disaster risk reduction; and climate change.

##### **GEOGLAM Crop Monitoring Operations 2020:**

- Continued delivery of the AMIS Crop Monitor, CM4EW, and Special Reports as circumstances demand
- GEOGLAM will continue to produce Climate Outlooks (10 day to monthly), and developmental work is underway towards the integration of seasonal outlooks. These will be operationalized when/if the quality of seasonal forecasts warrants
- New initiative. Piloting the development of one-page global synthesis reports that integrate AMIS crop monitoring with the Crop Monitor for Early Warning
- WFP will continue to expand participation in CM4EW, including Johannesburg and Cairo bureaus in 2021
- GEOGLAM is a partner in WorldCereal, a systematic open science initiative to map global cropland

##### **Enhanced Coordination of Co-Development Activities (Focus on Africa):**

- GEOGLAM has been working with the UNFCCC and the GEO Climate Change Working Group to support climate change adaptation. We are drafting Supplemental Guidance Document for the UNFCCC to help integrate the GEOGLAM crop monitoring system into National Adaptation Plans (NAP).
- Release of the NAP Guidance and Knowledge Hub support tools in time for COP 26. This work has in part been funded through a grant from the UK (DEFRA). In support of the NAP guidance, we will continue the development of knowledge packages in the GEO Knowledge Hub (GKH) to assist the co-development of agricultural monitoring in least developed nations

##### **Adopting a Federated Approach to Information Communication Technologies (ICT):**

- Continue to improve access to cloud computing services and analytical tools for least developed nations

##### **Development of Essential Agricultural Variables:**

- Complete the definition of core EAV's

##### **Development and Implementation of specific GEOGLAM Engagement Strategies (SDG's, Climate and Disasters):**

- Work with new GEO SDG coordinator and the GEO community to develop a GEOGLAM SDG strategy

##### **GEOGLAM Secretariat Sustainability:**

- Accelerate the engagement with G20 nations to build a sustainable funding reserve. The goal is to ensure the long-term stability of the GEOGLAM Secretariat within three years.

##### **New Activities:**

- In Situ Data Coordination. data are the current major hurdle to fully release the power of EO for food security program and policy development. This is particularly important in least developed nations where collection of in situ data is difficult, and open data sharing practices have not been widely adopted. As a first step in 2021 GEOGLAM has developed an in situ data strategy paper (UK-DEFRA support) and we have moved to implementation by establishing an in situ data working group. Through 2021 we will implement an in situ data strategy, initially focussed on global crop mapping efforts.
- Inter-Comparison Initiative. This activity builds on the work of the GEOGLAM in situ working group. The focus will be on the assessment of existing mapping products. This will be achieved through the development of inter-comparison best practices and guidelines for agriculture. Once the guidelines are complete the approach inter-comparison approach will be tested in the East Africa region.

**GEOGLAM Thanks the G20 for a decade of support and we look forward to your questions.**