

# **CEOS-GEOGLAM Cooperation – a review of activities and proposed way forward.**

## **Memo presented to the CEOS chair and SIT chair in advance of the SIT 28 meeting**

### **1. Purpose**

The purpose of this memo is to provide the CEOS Chair and SIT chair with a state of advancement on the activities of the CEOS Ad hoc Advisory Team on GEOGLAM. The memo includes a background on GEOGLAM, provides a response on the SIT-27 actions relevant to GEOGLAM, briefly presents the progress and results while referring to substantive documents, suggests a CEOS phased implementation action plan in response to the GEOGLAM action plan, and finally presents a recommendation to CEOS for the way forward.

### **2. GEOGLAM Background**

The Group on Earth Observations Global Agricultural Monitoring (GEOGLAM) initiative aims to enhance agricultural production estimates through the use of Earth observations. It was developed in response to the G20 Agricultural Ministers' concern about reducing market volatility for the world's major crops. The initiative builds on recent advances in Earth observation technologies. These technologies have great potential to contribute to timely forecasts of crop production and early warnings of potentially significant harvest shortfalls and the interrelated spikes in food prices. The initiative's goal is to strengthen the international community's capacity to produce and disseminate relevant, timely and accurate forecasts of agricultural production at national, regional and global scales through the use of Earth observations. The work plan for the initiative is divided into six components:

- enhancing global agricultural production monitoring systems;
- building capacity at the national level to utilize Earth observations;
- supporting the monitoring of countries at risk to improve food security;
- improving the coordination of Earth observations for agricultural monitoring;
- coordinating research and development (R&D) in support of improved operational agricultural monitoring; and
- disseminating data, products and information.

The work plan identifies the primary activities and deliverables under each component together with the broad level of funding needed to implement them.

GEOGLAM organized a working meeting and an Executive session in Washington D.C. in February of 2013. The purpose and objectives of the meetings were to define a detailed work plan with associated costs, taking into consideration the phased approach suggested by the GEO Executive committee and the GEO plenary and present the details of their implementation plan to Senior executives of stakeholder organizations (i.e. FAO, USDA, USGEO, CEOS, World Bank, etc.).

### 3. CEOS Actions at SIT-27

At the 27th CEOS Strategic Implementation Team (SIT-27) meeting in March 2012, CEOS Agencies agreed to support initial development of the GEOGLAM initiative, and define the data and resources required to provide for GEOGLAM's space-based EO component. GEOGLAM will place significant demands on the capacities of CEOS Members' land surface imaging systems – requiring long-term coverage of global croplands at sustained repeat frequencies. Nevertheless, this initiative represents a major opportunity for the CEOS and GEO membership to demonstrate their ability to support critical societal needs.

The SIT recognised the importance of GEOGLAM and of the CEOS contribution, but registered the need for far greater definition of the EO component of the GEOGLAM Work Plan. SIT-27 established a number of decisions and actions through which CEOS would take control of the further definition and implementation of that component of the Work Plan. Relevant SIT-27 actions and responses are shown below.

SIT Action 27-11: An Ad Hoc CEOS team to take responsibility for working with GEOGLAM to further develop the space-based observations component suggested by the draft Work Plan. (Due: 2013 CEOS Plenary)

- *Creation of an Ad hoc Advisory Team*
- *Focused on the details of the collaboration between CEOS and GEOGLAM through the year (User requirements meeting, Co-Community meeting, participation of CEOS in the GEOGLAM Strategy meeting, elaboration of a CEOS phased-implementation approach*
- *Developed a phased implementation approach leading toward an operational GEOGLAM in ~5 years (2018). The initial phase will primarily focus on freely available mid- and low-resolution datasets in 2013 and expand over time. Additional updates and definition of this plan will be presented to CEOS at the 2013 Plenary.*

SIT Action 27-12: SIT Chair will explore with SDCG the possibility of tasking/augmenting the SDCG group to undertake a preliminary global acquisition strategy in support of GEOGLAM needs. SDCG tasking would begin following approval at Plenary. (Due: 2013 CEOS Plenary)

- *The composition, skill set and expertise of the CEOS Ad hoc Advisory Team on GEOGLAM allowed the group to develop a coordination framework to address the initial needs of GEOGLAM.*
- *Low level of coordination support required in 2013-14. Coordination activities to focus on a) data coordination meeting in support of the ADB-funded Asia-RiCE project, b) Co-community meeting, c) planning for new datasets (new missions and integration of “ppp” missions).*
- *Conducting discussions with SDCG to learn how it is supporting GFOI and how a similar group may be needed to support GEOGLAM in the future. Expecting CEOS instructions on Coordination (following discussion on Topical Team on Roles and Responsibilities).*

SIT Action 27-13: Building upon the outcomes of the user requirements and space data coordination activities, responsible CEOS team will provide their analysis and recommendations to CEOS leadership

on further steps vis-à-vis the GEOGLAM initiative – including a plan for the pre-2015 outcomes. (Due: SIT-28)

- *Present a status of 2012-13 activities.*
- *Developed a phased implementation approach leading toward an operational GEOGLAM in ~5 years (2018). The initial phase will primarily focus on freely available mid- and low-resolution datasets in 2013 and expand over time. Additional updates and definition of this plan will be presented to CEOS at the 2013 Plenary.*
- *Present recommendations to proceed after SIT in order to avoid the loss of a growing season*

#### **4. Ad hoc Advisory Team on GEOGLAM**

The CEOS Ad hoc Advisory Team was created in response of SIT action 27-11 to take responsibility for working with GEOGLAM to further develop the space-based observations component suggested by the draft Work Plan. The Ad hoc Advisory Team is composed of representatives from the following agencies: CONAE, CSA, ESA, INPE, ISRO, JAXA, NASA, USGS. It includes participation from CEOS Agency staff with expertise in satellite mission planning, coordination, and management, and the use of space-based EO data to generate actionable information for agricultural decision-makers. The composition, skill set and expertise of the CEOS Ad hoc Advisory Team on GEOGLAM allowed the group to develop a coordination framework to address the CEOS SIT actions and initial needs of GEOGLAM.

The Ad hoc advisory team is committed to continuing the dialogue on synergistic issues of interest with the SDCG for GFOI. The session on GEOGLAM, at SDCG-3 held February 7-9, 2013, has demonstrated the benefits of maintaining the dialogue between the two initiatives (see GEOGLAM SDCG-3 memo). As both, the agriculture and forest initiatives will grow in time, a closer coordination relation between the initiatives will be foreseeable. Linkages with the LSI VC are also critical in the context of developing a global strategy that is optimized for all global monitoring initiatives.

The CEOS Ad hoc Advisory Team will report back to SIT and Plenary on the progress achieved during the past year and provide recommendations to ensure CEOS support on GEOGLAM requirements are endorsed by the CEOS community.

#### **5. Progress and Results**

Progress and results achieved by the Ad hoc Advisory Team on GEOGLAM are summarized below. Information on each element is addressed in detailed reports identified in the respective section.

- **Space Data Requirements Statement:** A User Requirements meeting was hosted by CSA in July 2012, with the aim of producing a definitive statement of information requirements related to GEOGLAM. A statement of these requirements has been developed jointly with the GEOGLAM task team, the GEO Agricultural CoP and the CEOS Ad hoc Advisory Team. (User Requirements Document)
- **Preliminary observation strategy:** It was decided to develop a phased observation strategy that matches the implementation approach of GEOGLAM and the capacity of many of the countries

to perform agricultural monitoring. The preliminary observation strategy was developed in collaboration with the GEOGLAM task team. It involved the participation of the NASA SEO and was presented to the CEOS SDCG for GFOI. (see the GEOGLAM meeting summary at SDCG-3). The first phase of the observation strategy will only require the use of coarse and medium-resolution missions. Most of the data from the targeted missions are available free of charge on mission portals.

- Led by JAXA and supported by Asian national space agencies and/or ministries of Agriculture (China, India, Indonesia, Malaysia, Thailand, Vietnam) and others, the Asia-Rice project brings together a team of stakeholders with an interest in the development of an Asia-Rice Crop Estimation & Monitoring component for the GEOGLAM initiative. The Asia-Rice Team monitoring plan for rice will be integrated into the CEOS Ad hoc Advisory Team strategy in support for GEOGLAM.

The implementation of the demonstration and early feasibility phase (2013-15) will involve the monitoring of four major producer countries and one at-risk country, focus on four main crops (maize, wheat, corn and soy), and call upon the utilisation of coarse and medium resolution optical data which are readily available and would necessitate low coordination involvement from CEOS. The Asia-Rice component will make use of available SAR missions for the monitoring of rice growing areas in Asian and South-East Asian countries. The Asia-Rice project is calling upon the Ad hoc Advisory Team to ensure the coordination of SAR missions in support of their demonstration phase over initial demonstration sites during the 2013-2015 phase 1 period.

There is a potential overlap of geographical areas of interest between the Asia-Rice and the GFOI for SAR missions requirements. This overlap is an opportunity to ensure a harmonized collaboration between the two initiatives.

## **6. Way Forward - Proposed CEOS activities in support of the GEOGLAM phased-implementation strategy**

The proposed Global Observation Strategy has been designed to mesh with the GEOGLAM Implementation Strategy.

It is developed in the context of the CEOS workplan statement under section 6.1.

*“Decision on whether and how CEOS Agencies may provide coordinated data acquisition support to the GEO Global Agricultural Monitoring (GEOGLAM) initiative:*

*In response to a request by GEO, an ad hoc CEOS Team on GEOGLAM has further developed the space-based EO component of the GEOGLAM Work Plan. Building upon the outcomes of ongoing CEOS-GEOGLAM user requirements and space data coordination activities, the ad hoc Team will provide to CEOS leadership its analysis on further steps vis-à-vis the GEOGLAM initiative – including a plan for the pre-2015 outcomes. The presentation at the March 2013 SIT-28 Meeting will focus on a status of the GEOGLAM activity and plans for a phased implementation that increases the need for CEOS support over time.”*

The proposed approach suggests an implementation strategy in three phases over five years preceded by a 18 month phase 0 (completed). This would permit an evolution of growing capacity in several parameters:

- Increased number of countries,
- Integration of additional sensors as agencies and new sensors come on board, and datasets are made available.
- Assimilation, processing, product creation, distribution and integration of information products into decision making processes,
- Capacity building, particularly in at-risk countries for ingestion and processing of EO data.

Under the proposed approach, a progress report would be presented yearly at SIT and recommendations would be tabled prior to the start of each phase. The phases will overlap and coincide with the CEOS yearly milestones - SIT and Plenary.

The description and timing of the phases are given below.

#### Phase 0: Foundation activities (2011-2013) **Completed**

This phase will focus on the relation with the GEO ag CoP in order to better develop an understanding of the requirements, the creation of an Ad hoc Advisory Team, focused on the details of the collaboration between CEOS and GEOGLAM through the year (User requirements meeting, Co-Community meeting, participation of CEOS in the GEOGLAM Strategy meeting, elaboration of a CEOS phased-implementation approach, developed a phased implementation approach leading toward an operational GEOGLAM in ~5 years (2018). The activities planned during phase 0 were:

- Understanding the context
- Created the Ad hoc Advisory Team
- Supported the user requirements definition
- Contribute to the phased-implementation approach through a Co-community meeting
- Preliminary analysis of requirements for phase 1

#### Phase 1: Support for demonstration and feasibility (2013-2015)

The work will test sample sites and information products, to validate their usefulness, robustness and affordability. The focus will be on major grain crops (wheat, maize, rice and soybean, total grain). Some observations will be wall to wall, others will be sampled. The Rice Monitoring pilot study plan will be expanded with available SAR data in Asia and other region. The activities planned during phase 1 are:

- Agree with the “5 countries” initial demo and ensure availability and accessibility of datasets identified in the CEOS portfolio to support phase 1 objectives (coarse and med resolution optical data and sample sets of SAR for Asia-Rice.

- Continue to support JECAM – ensure successful assessment of key science questions for the development of best practices and optimal usage of EO data. Participate in the JECAM science meeting (summer 2013).
- Organize a Co-community meeting (Montreal 2.0) – refining requirements, initiate planning for the up-coming missions in the CEOS portfolio, assess how to integrate “PPP” missions in the CEOS contribution framework to GEOGLAM.
- Organize a SAR data coordination meeting in support of the Asia-Rice project (summer 2013).
- Strive on supporting the creation of RESULTS for the GEO 2015 milestone.
- Review process (internal and external).

#### Phase 2: Assessment and expansion phase (2014- 2016)

This phase will pilot a global sampling strategy for the main producers. There will be new regions for wall-to-wall coverage (about 5%). New missions will be added (i.e. Sentinels & Amazonia). SAR missions will be added. The Rice Monitoring pilot study plan will be expanded with available SAR data in Asia and other regions. New information products will be added. A sampling strategy will be started for at-risk countries. The activities planned during phase 2 are:

- Ensure availability and accessibility of datasets identified in the CEOS portfolio to support phase 2 objectives.
- Support the expansion to broader areas of interest.
- Look at ways where missions can be tasked to support a Global Sampling Strategy.
- Integration of new missions – review planning and ensure data availability while pooling distributed workloads across agencies.
- Integrate SAR and assess how and where it can contribute to the GEOGLAM objectives outside of the Asia-Rice framework – if required, look at fluid accessibility approaches for “hybrid” missions.
- Review process (internal and external).

#### Phase 3: Pre-operational details (2015 – 2017)

This phase will solidify the sampling strategy for at-risk countries. Global information will be produced. At the end of Phase 3, all large producer countries will be covered (global producer sampling), 3-5 at risk countries will be covered, and new missions will be integrated. The activities planned during phase 2 are:

- Ensure availability and accessibility of datasets identified in the CEOS portfolio to support phase 3 objectives.
- Increase the observation footprint over the “large producers” countries.
- Assess feasibility of supporting dense observation requirements for 20+ countries.
- Seek synergy with other monitoring initiatives.
- Assessment of CEOS contribution.

## **7. Recommendations to CEOS for way forward**

- The CEOS Ad hoc Advisory Team for GEOGLAM requests that CEOS acknowledge the efforts of the group and its relevance to GEO's agriculture objectives and global food security.
- The CEOS Ad hoc Advisory Team for GEOGLAM requests that they continue this effort and report on CEOS SIT Actions 27-11 and 27-12 at the 2013 CEOS Plenary Meeting. This report will present a more detailed space-based observation plan and will address the need for data acquisition planning support from CEOS in 2014 and beyond.
- The CEOS Ad hoc Advisory Team for GEOGLAM plans to seek the endorsement of the GEOGLAM phased implementation plan at the 2013 CEOS Plenary. Such endorsement will require renewal on an annual basis to ensure space data acquisition needs are met.

Prepared by Yves Crevier on behalf of the Ad hoc Advisory Team on GEOGLAM – Feb 28, 2013