

G20 Global Agricultural Monitoring Initiative GOGLAM Update

G20 MACS, November 15, 2017

G20 Global Agricultural Monitoring Initiative

- **Launched by G20 in 2011 (French Presidency), under Action Plan on Food Price Volatility and Agriculture**
 - **Alongside the Agricultural Market Information System (AMIS)**
- **Vision: Strengthen the international community's capacity to provide actionable, science-driven, open, information at sub-national to global scales, in support of food security, and agricultural markets.**
- **Many nations here today are active members of GEOGLAM and all G20 nations benefit from information provided by GEOGLAM to AMIS**

G20 Mandate Renewed, Strengthened

G20 Agriculture Ministers' Declaration 2017

*Towards food and water security:
Fostering sustainability, advancing innovation*

January 22nd 2017 in Berlin



Continued Support for AMIS and GEOGLAM:

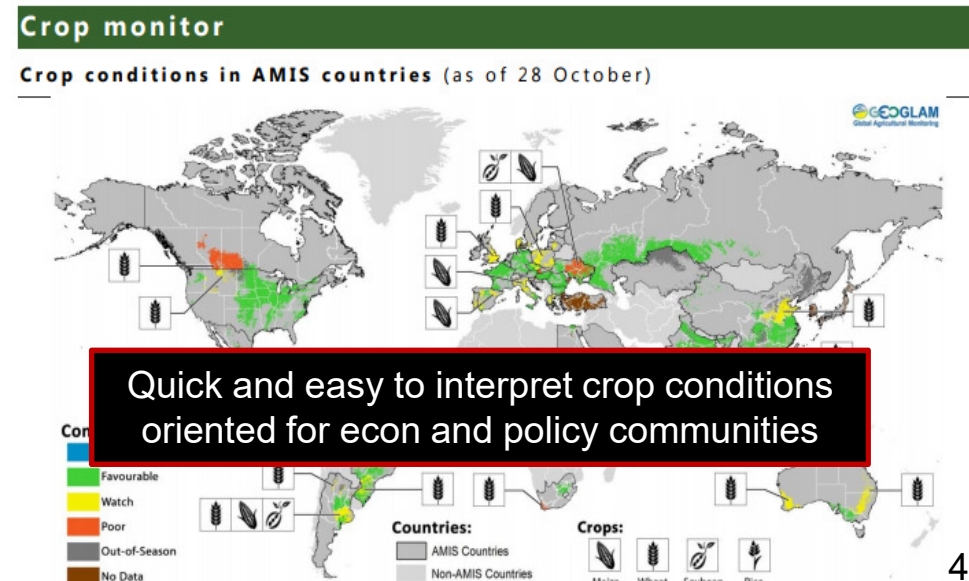
- *“We acknowledge that AMIS, launched in 2011 by the G20 Agriculture Ministers... **Successful collaboration with the Group on Earth Observations Global Agricultural Monitoring (GEOGLAM) initiative**, which joined AMIS in June 2016, contributes to these objectives. We underscore that reliable information on supply and utilisation balances concerning food commodities is very important for sound assessment of how well markets are supplied.”*

G20 Ministers commitment parallels GEO priorities:

- *“We, the G20 Ministers of Agriculture, are committed to supporting the implementation of the **2030 Agenda for Sustainable Development** as well as the UN Framework Convention on **Climate Change (UNFCCC)** and the **Paris Agreement¹** adopted in 2015”*

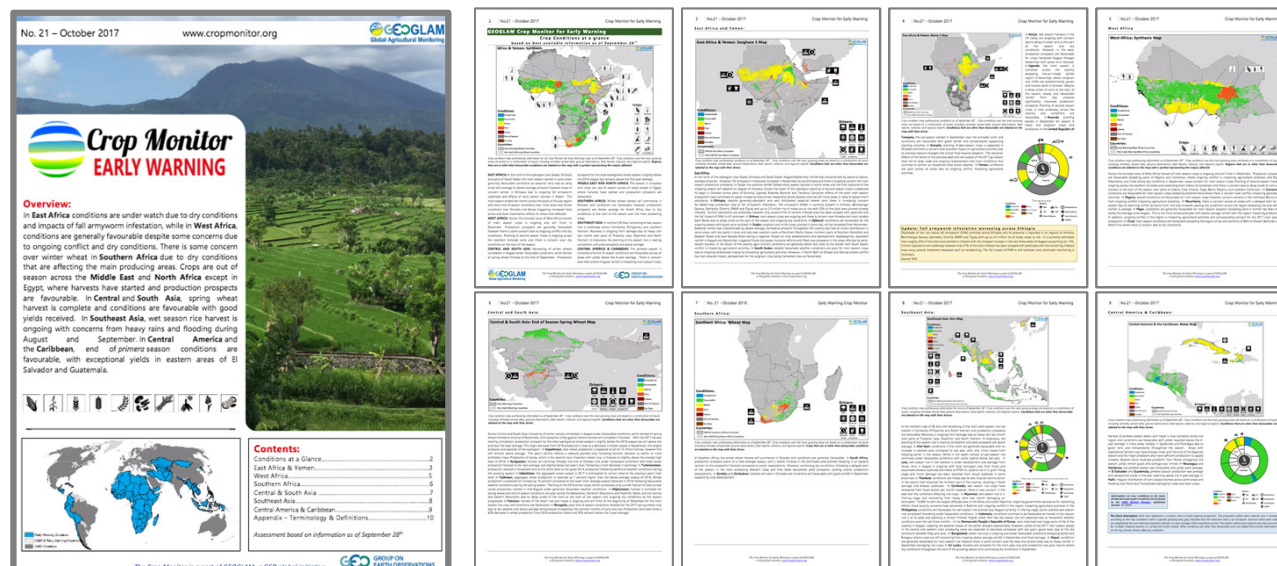
Crop Monitor for AMIS

- Designed to combine science based information and discussion to arrive at an international consensus
- ~ 40 partners, monthly inputs primarily from national sources, 45 monthly issues
- Continued focus on strengthening partnership with AMIS
- Filling gaps for 'no data' countries
 - Working towards EC JRC and USDA agreement to cover Turkey
 - India will participate
- Interest from a number of countries to develop national and regional Crop Monitors



Crop Monitor for Early Warning

- Grew out of the success of the AMIS Crop Monitor
- Focus on countries most vulnerable to food insecurity
- Significant progress & gained international recognition since launch in 2016
 - Grew from 3 to 11 partners
 - Published 22 monthly issues
- Recognition of the need for enhanced, reliable, vetted information on crop conditions within countries at risk
- Focus on expanding partnerships & engaging regional and national agencies



Regional & National Crop Monitors

- Strong interest within GEOGLAM community for national and regional Crop Monitors
- South America: Initial discussions in Argentina & Brazil for the development of a regional Market Monitor
- East Africa: Prototype developed with national contributions from its 11 member states. To be launched in Feb 2018
- Interest for national Crop Monitors in Kenya and Vietnam, and ongoing support to Tanzania and Uganda national bulletins

Overall Crop Monitor Progress

- Providing a public good: open, timely, information supporting transparency, reducing uncertainty, and building trust and confidence among international and national partners
- International cooperation and information sharing on a voluntary in-kind basis
- Increasing knowledge transfer amongst national, regional & int. organizations
- Internationally recognized as a highly valuable source of information, user driven

EO Data Coordination

Harnessing Public Investments in Space to Support the Agriculture Sector and Enhance Food Security

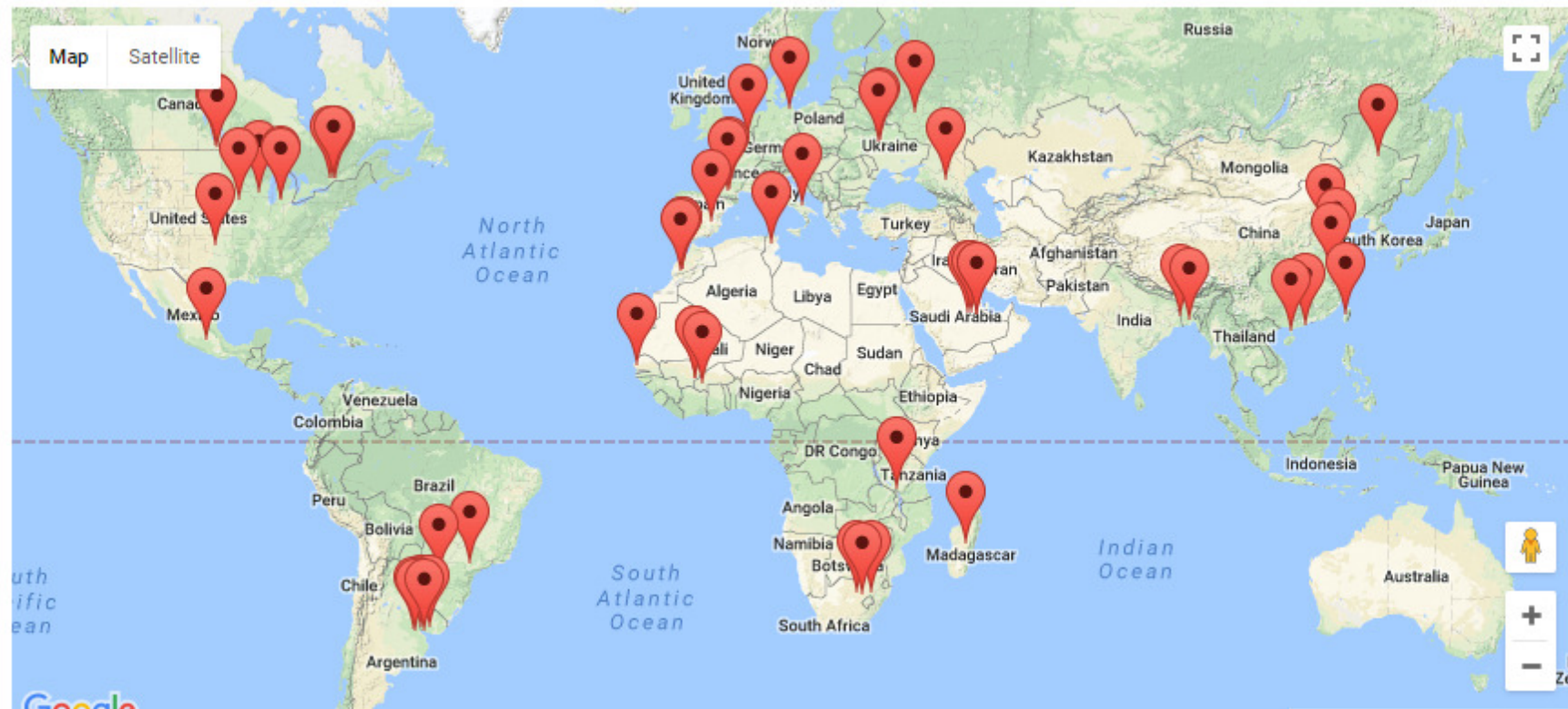
- 5 Years ago GEOGLAM worked with the Committee on Earth Observation Satellites (CEOS) to develop the first comprehensive set of requirements for global agricultural monitoring
 - Primarily an R&D focus
- In 2018 the main focus will be a refresh of EO data requirements with CEOS
 - Operational user focus – gaps, challenges, opportunities
- Increasing need for comprehensive, “holistic” approach to data access and use → new GEOGLAM emphasis on computing environments (cloud/cube)
 - EC Copernicus; ESA Thematic Exploitation Platform; NASA Cube development for CEOS

Capacity Development Activities

- GEOGLAM recognizes that **regional networks** focused on national end-users are key to capacity development model.
 - Our aim is in institutional rather than individual capacity building
- **Activities Current and Emerging** (Some update slides in Annex to presentation): Africa; LatinoAmerica; Asia (China DBAR initiative); Europe (? as part of EuroGEOSS); ASIARiCE; Rangeland and Pasture Productivity (RAPP)
- **Significant opportunity for support from G20 nations:** For R&D as well as operational implementation of monitoring capacities

Joint Experiments for Crop Assessment and Monitoring (JECAM)

The JECAM network has proven to be a very successful research platform and continues to grow and produce excellent science



Research & Development Update

Recent achievements :

- Major research projects finishing. Best practice development is ongoing with significant peer reviewed publications for cross sites experiments (ESA Sen2Agri, EC SIGMA)
- New multi-site experiments : 6 experiments on-going and two new radar (SAR) inter-comparisons

Forthcoming activities:

- Joint CEOS-GEOGLAM meeting for the revision of EO requirements (EC-JRC led Workshop April)
- Cloud processing-knowledge management workshop in August hosted by the Chinese Academy of Sciences (Part of DBAR initiative)
- 2018 Annual JECAM science meeting – in Chinese Taipei, radar focus (September)
- TBD Development of a best practices compendium

[Study Sites](#) [North America](#) [South America](#) [Europe](#) [Asia](#) [Africa](#) x



More than 30 sites globally distributed with regular in situ data collection

co-leads : AAFC and UCL

JECAM GOALS

The overarching goal of JECAM is to reach a convergence of approaches, develop monitoring and reporting protocols and best practices for a variety of global agricultural systems.

 **Agriculture**
Community of Practice



GEOGLAM

Vision for the next 5 years

GEOGLAM 5 Years on...Time For Renewal

Beyond the renewal of the G20 policy mandate...

AMIS Requirements are evolving:

- Desire for independent EO based quantitative metrics on production (i.e. yield) through the growing season
- A better understanding of what is happening beyond the growing season
 - Impacts of Climate variability and climate change on agricultural production

GEO Priorities are Evolving

- Climate Accord and Sustainable Development Goals(SDG's)
 - Production; sustainability and food security

G20 Priorities are Evolving

- SDG's and Paris Climate Accord



Context for Renewal

- **Major changes in Earth Observation are underway, creating new opportunities for GEOGLAM and the agricultural monitoring community at large**
 - In the last 5 years we have moved from a time when data availability was the major constraint to a time when processing and managing large data volumes is now our greatest challenge.

Capitalizing on New Opportunities

- **Cloud-based systems** are presenting new technical opportunities for operational EO-based monitoring
- There is increasing interest from the **private sector** to provide agricultural monitoring services based on cloud-based data availability, **private sector engagement guidelines in development**
- **The current international virtual constellation of space based EO assets provides a rich source of data, work is required to capitalize:**
 1. **R&D** to ensure we capitalize on new IT (Cube, Cloud) to unleash the potential of billions in space assets for the agriculture sector
 2. **R&D** to develop algorithms and best practices to develop more quantitative metrics
 3. **Renewal of user needs** to ensure that the next generation of sensors continue to meet the growing needs

Summary - Top Priorities the Next 5 years

- **New governance structure** to support broadened scope
 - Stronger Secretariat
- **Develop quantitative metrics** and progress from current state monitoring to look at within season forecasts and monitoring the changes in agricultural production through time
- **Accelerate the Research to Operations** continuum at the national level
 - G20 countries and capacity development in food insecure nations/regions
- **Computing infrastructure.** Establish a cloud-based, GEOGLAM collaborative community for data management and analytics
- **Engage global and national statistical agencies** to support the SDG's and even more importantly deliver policy relevant information to mitigate and adapt to a changing climate

Thank you

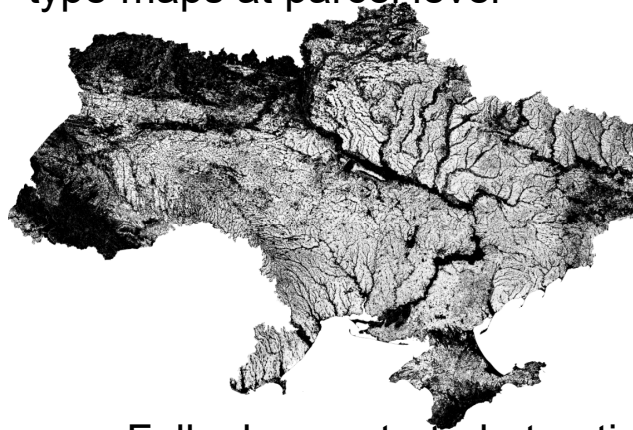
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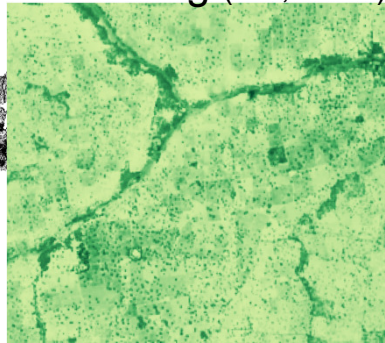
Annex Slides

ESA Sen2-Agri system extended for 12 months to support the uptake by national 10m crop monitoring/mapping at from S2 & L8

National cropland and crop type maps at parcel level



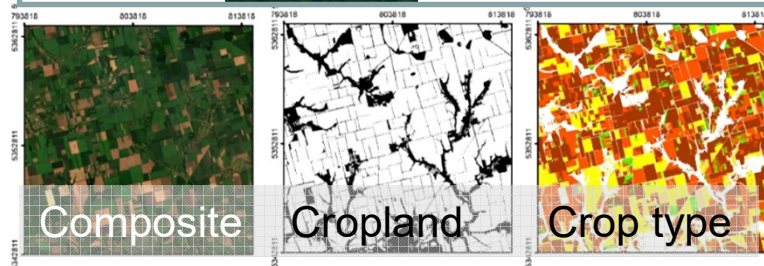
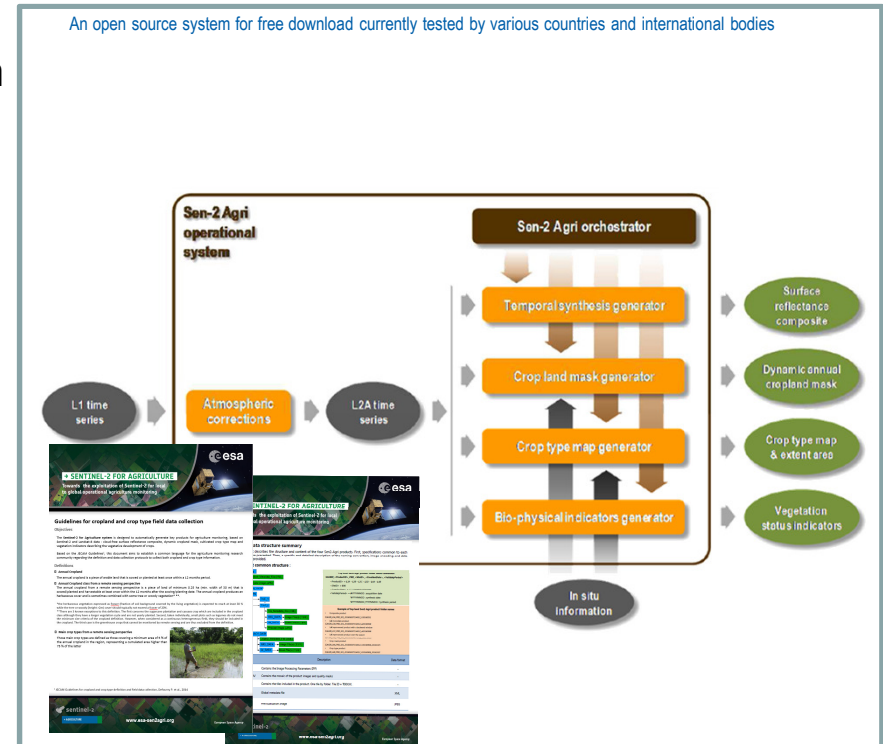
Crop specific at 10m monitoring (LAI, NDVI)



Fully demonstrated at national scale for Mali, Ukraine and South Africa, and for 9 local sites

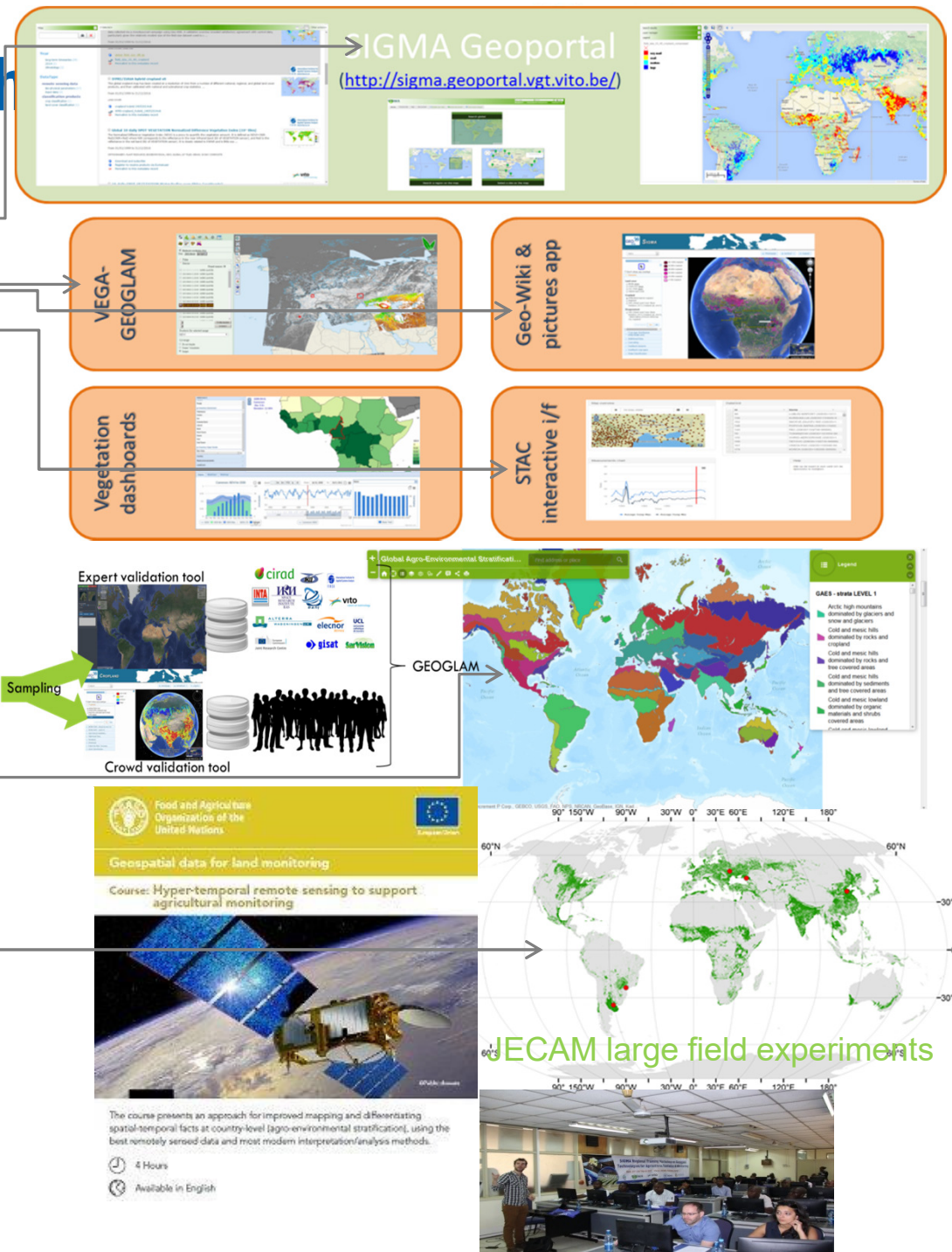


Currently running for Ukraine, Mali region, South-Africa, South Sudan, Belgium, Philippines region, Mexico region, Bangladesh, region of Mexico



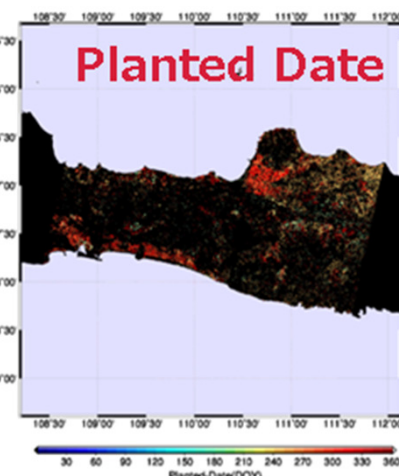
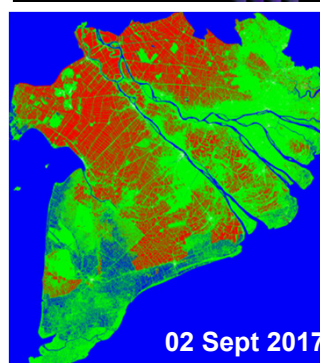
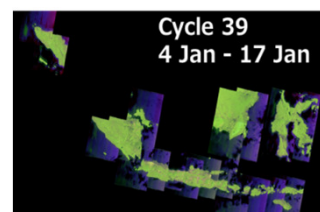
- **Data Distribution**
 - SIGMA distribution facility
 - SIGMA Analysis facility (VEGA)
 - SIGMA Validation facility (GeoWiki)
 - Agricultural in situ database (STAC)
- **JECAM Standards and Best practices**
 - Cropland definition,...
- **JECAM-Cross site experiments**
 - Yield estimations
 - Large field mapping
 - Small field mapping
 - SAR
- **GAES + Global Cropland Map**
- **Global validation Data Set**

"A global reference database of crowdsourced cropland data collected using the Geo-Wiki platform. Scientific Data 4: e170136". DOI:10.1038/sdata.2017.136.
- **Capacity building**
 - 'Methodological aspects of the use of Geospatial technology for agriculture statistics'
 - 'Geodata and Tools for Global Monitoring of Agricultural trends, changes and Environmental Impacts'
 - 'Hyper-temporal remote sensing to support agricultural monitoring'
 - 15+ training sessions, in class, e-learning, webinars

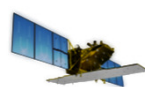


Asia-RiCE (Asia Rice Crop Estimation & Monitoring) is a program led by JAXA and CNES, with more than 20 Asian space agencies and ministries of agriculture, as well as international organizations such as ASEAN/AFSIS, UN/FAO, and IRRI (POCs: Sobue.shinichi@jaxa.jp, ohyoshi.kei@jaxa.jp, Thuy.letuan@cesbio.cnes.fr)

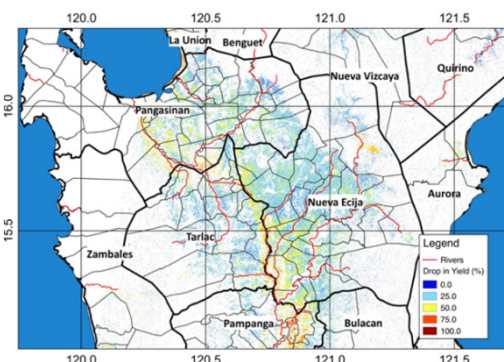
ID	Target Agricultural Products
P1	Rice Crop Area Estimates/Maps
P2	Crop Calendars/Crop Growth Status
P3	Crop Damage Assessment
P4	Agro-meteorological Information Products
P5	Production Estimation and Forecasting



- ADB projects, APRSAF/SAFE projects and GEORICE projects have successfully demonstrated INAHOR, using SAR data to achieve mapping accuracies of 80-90% for the target provinces
- Scaling-up for major rice producing areas (planting area and growing stages) are currently demonstrated in **Vietnam and Indonesia**
- Continuing work on rice crop outlooks for Asia using EO data in cooperation with ASEAN
- Assessing the impact of typhoons on rice production in The Philippines using EO data (in cooperation with PSA and ADB)
- GEOSS-AP AGRICULTURE AND FOOD SECURITY WG was held to share Asia-RiCE accomplishments and linkages with the SDGs



Agricultural damage estimation using multi-temporal ALOS-2 data



Challenges / next steps / events:

- ◆ GEOGLAM sessions at ACRS, APRSAF Space Applications WG (India) and the JECAM/Asia-RiCE meeting (Chinese Taipei)
- ◆ Scale-up of CH₄ measurements to regional-scale, for MRV using SAR/optical data with GHG observations from space
- ◆ Data fusion / integrated usage and inter-comparison (L/X/C-Band SARs + very high and medium resolution optical)

AFRIGAM

- **Momentum is slowly building -**
- **Implementation Team created** (RSA 2, Zim 1, Kenya 1, Uganda 1, West Africa Rep 1) (AgBus Grain offered to host secretariat)
- **Sen2Agri validated on 2 national and 3 local sites in Africa**
- **8 JECAM sites in Africa**
- **Strategy / Action Plan**
 - **Promotion & Awareness** (in GEO, in AfrGEOSS),
 - **Capacity development** (Develop / Adopt Afri-centric EO based crop monitoring systems)
 - **Research (JECAM)**
 - **Operational networking** (CoP, Engage with SAGNET, EAGC)
 - **Availability of Agricultural Intelligence is the AIM**

DBAR-AGRI working group

Chinese Academy of Sciences initiated digital silk road working group on agriculture and food security (DBAR-AGRI), aiming at the information gap related to Zero Hunger and No Poverty in BAR region:

- To establish a partnership community of practice to develop and implement a Strategic Plan for comprehensive agriculture monitoring which will include cropland, rangeland and horticulture;
- To compile and promote good practices on: (1) EO based comprehensive agricultural monitoring cloud platform ; (2) adaptation and customization of EO based agriculture monitoring cloud platform for BAR countries ; and (3) capacity building for agriculture monitoring in DBAR countries.
 - To facilitate partners to carry out their own agronomic monitoring and analysis.
 - To customize the tools and model for local condition.
 - To Enable users to understand their own territory production distribution.
 - Partnership with GEOGLAM region initiatives

Rangeland and Pasture Productivity - Update

- New **RAPP Co-Lead**: Clement Adjorlolo, SANSA (S. Africa)
- Continued development of the **RAPP Map**
 - map.geo-rapp.org - Visualise and interrogate spatio-temporal data on the state and condition of global rangelands
- **RAPP annual workshop**, Frascati (16-17 May 2017)
- RAPP in 37th **ISRSE (Pretoria)** – Rangelands session
- RAPP in i-Bek (**Inter Balkan Environment Center**)
- **Engagement with AmeriGEOSS** in crop & pasture productivity in Costa Rica (with Alyssa W. & Carlos Di Bella)
- New linked project for **operational high res biomass** (Australia)
- EO Data Requirements: continued interest from pilot sites in **DataCubes**
- RAPP workshop 2018: possible joint meeting RAPP/SDGs/DataCube in Kenya (TBD)