GROUP ON EARTH OBSERVATIONS

GEOGLAM: Recent Accomplishments

November 21st, 2013

Chris Justice (UMD)
on behalf of GEOGLAM Community of Practice

GEOGLAM
Global Agricultural Monitoring

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GEOGLAM Implementation Plan - July 2013

- Program Objectives
- Developed Phased Approach
- Identified Work Components
  - Tasks
  - Strawman Budgets
- Organization and Governance Structure
- Priorities

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The GEOGLAM Components

1. GLOBAL/ REGIONAL SYSTEM OF SYSTEMS

Main producer countries, main crops

2. NATIONAL CAPACITY DEVELOPMENT

for agricultural monitoring using Earth Observation

3. MONITORING COUNTRIES AT RISK

Food security assessment

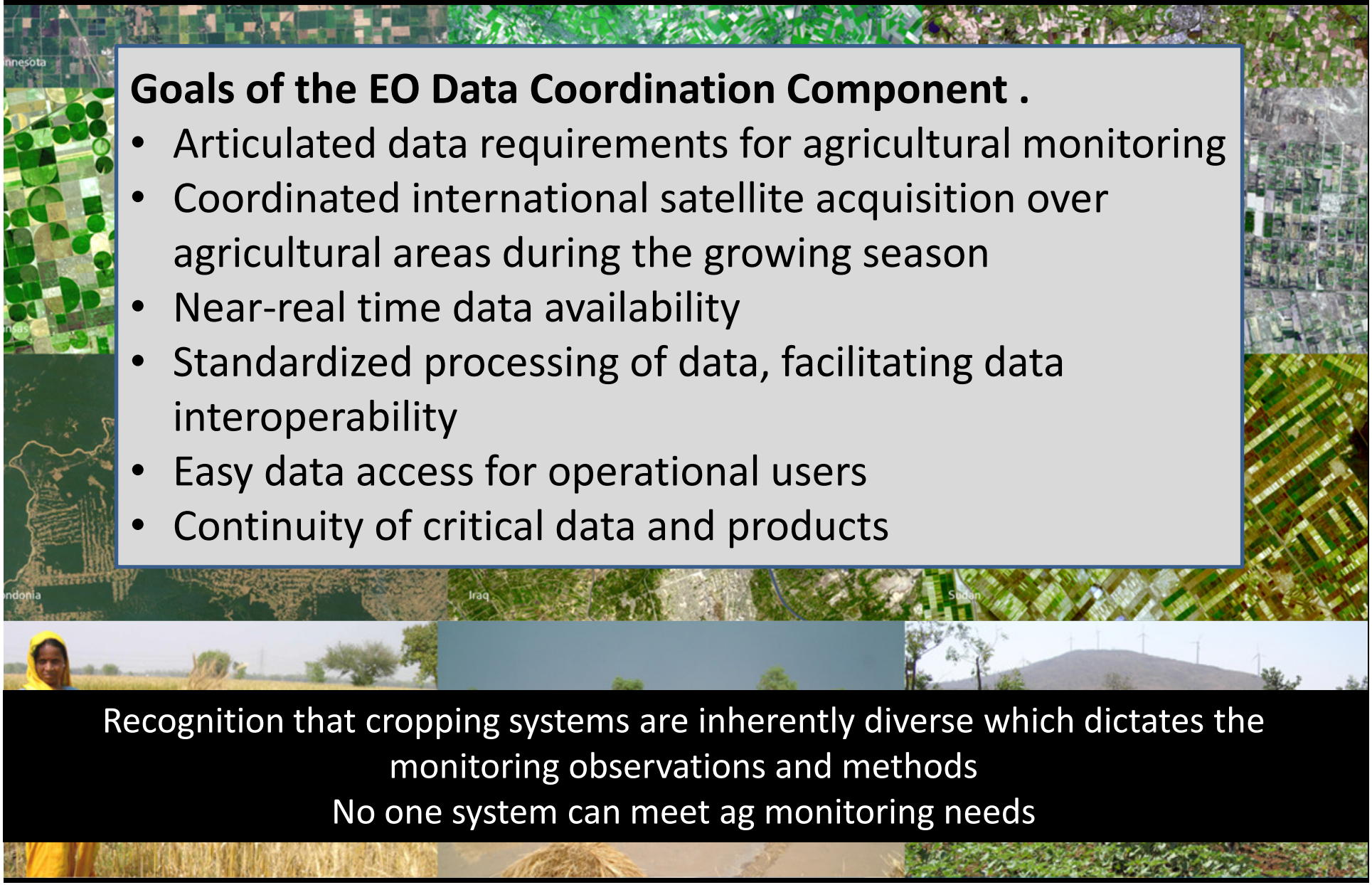
4. EO DATA COORDINATION

CEOS Committee on Earth Observation Satellites

5. METHOD IMPROVEMENT through R&D coordination (JECAM)

6. Data, products and INFORMATION DISSEMINATION

Developing the EO Data Requirements for GEOGLAM: through a CEOS/GEOGLAM Technical Team



Goals of the EO Data Coordination Component .

- Articulated data requirements for agricultural monitoring
- Coordinated international satellite acquisition over agricultural areas during the growing season
- Near-real time data availability
- Standardized processing of data, facilitating data interoperability
- Easy data access for operational users
- Continuity of critical data and products

Recognition that cropping systems are inherently diverse which dictates the monitoring observations and methods

No one system can meet ag monitoring needs

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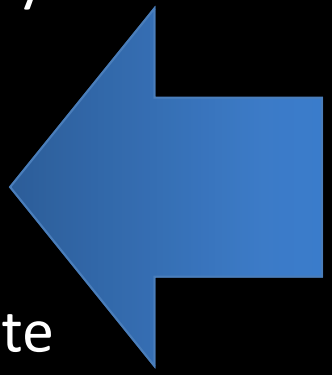
Identifying Information and Product Types

Information Products

- Crop outlook / Early warning
- Area estimate
- Yield forecast
- Production estimate
- Food Sec/vulnerability report
- Statistics reports



EO Data Products

- Cropland mask /Pasturelands
- Ag practices
- Crop condition indicators
- Crop type
- Biophysical variables
- Environmental variables (soil moisture)
- In-situ Weather

First GEOGLAM/CEOS Ad Hoc working group Workshop on Developing the GEOGLAM OBSERVATION REQUIREMENTS CSA, Montreal July 10-11, 2012

Tabulating the satellite observation requirements (spatial resolution, frequency, and period of coverage) for GEOGLAM

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GEOGLAM CEOS: EO Data Requirements Table

developed taking into consideration the observation needs, the derived products they will serve, and regional specificities; CEOS-GEOGLAM July 2012 Montreal)

	OBSERVATION & SENSOR TYPE			REGIONAL CHARACTERISTICS & GEOGRAPHICAL EXTENT						DERIVED PRODUCTS & MONITORING APPLICATONS							
	SPATIAL RES.	SPECTRAL RES.	TEMPORAL RES.	WHERE? (+ cropland mask & sampling scheme)				WHEN?									
Sensor Mission	Spatial resolution	Spectral range	Effective observ. frequency (cloud free)*	Swath / Extent	Sample (s), Refined (rs) or Wall -to-Wall (w2w)	Large, Medium, Small fields	Crop types diversity	Calendar/ Multiple cropping	Cloud coverage	Use (Primary or Secondary Source)	Cropland s mask	Crop type area	Crop cond. indicators	Crop bioph. var.	Env. variables (reservoir, water, soil moisture)	Ag. Practices / Cropping systems	Crop yield
MODIS (aqua/Terra), VIIRS(NPP), Vegetation (SPOT-5)	2000 - 500 m	thermal IR + optical	few per day	global	w2w					NRT products (PS)			x	x (L)			
MODIS (optical not SWIR), Sentinel 3? (future), CMA FY series?, Proba-V (future)	100-300m	optical + SWIR	2 to 5 per week	global	w2w	L/M/S		*		NRT products (PS)	x	x	x	x (L)		x (L)	x (L)
FUTURE	1-15km	passive microwave	daily	global	w2w					NRT products (PS)					x		
FUTURE	50-150 m	SAR dual pol. (X,C,L) ****	5 per season	main crops	s	L/M/S	rice area	entire growing season	high cloud cov.	NRT products (SS/PS)*	x	x	x	x (L)	x	x (L)	
FUTURE	5-20m	SAR dual pol. (X,C,L) ****	5 per season	main crops	s	L/M/S	rice area		high cloud cov.	NRT products (SS/PS)*		x	x	x	x	x	
FUTURE	Footprint	RADAR Altimetry	weekly		s					NRT products (PS)					x		
ETM+ (Landsat-7), ASTER (Terra), TIRS(LDCM), IRMSS (CBERS-3)	50-100m	thermal	daily ?	main crops	s	L/M/S		entire growing season		NRT products (PS)			x				
All Optical Mid-Resoltuion (Landsat, Terra, EO-1, ResourceSat-2, CBERS-3, Sentinel-2)	20-70m	optical + SWIR	1 per month (if possible same sensor) (min 2 out of season + 3 in season)	croplands	w2w	all M/S		year-round, focus on growing season		annual products (PS)	M/S	M					
All Optical Mid-Resoltuion (Landsat, Terra, EO-1, ResourceSat-2, CBERS-3, Sentinel-2)	20-70m	optical+SWIR	1 per week (min. 1 per 2 weeks)	main crops	s	country specific (see phasing) L/M/S		entire growing season		NRT products (PS)	L/M/S	M/S	x	x	x	x	
HGR (SPOT-5), Rapid Eye (optical)	5-10 m	optical (+SWIR)***	1 per month (if possible same sensor) (min 2 out of season + 3 in season)	croplands	rs	L/M/S (focus on S)		year-round, focus on growing season		annual products (PS)	L/M/S	L/M/S					
HGR (SPOT-5), Rapid Eye (optical)	5-10 m	optical (+SWIR)***	1 per week (min. 1 per 2 weeks)	main crops	rs2	country specific (see phasing) S		entire growing season		NRT products (PS)			x	x	x	x	
HIRI (Pleiades), IKONOS, GeoEye, WorldView2 (optical)	< 5 m	optical	1 to 2 per month	croplands	rs3	demo. case (2 - 5% of croplands L/M/S)		2 - 4 coverages per year		annual products (PS)		x				x	x

spatial & spectral

How often ?

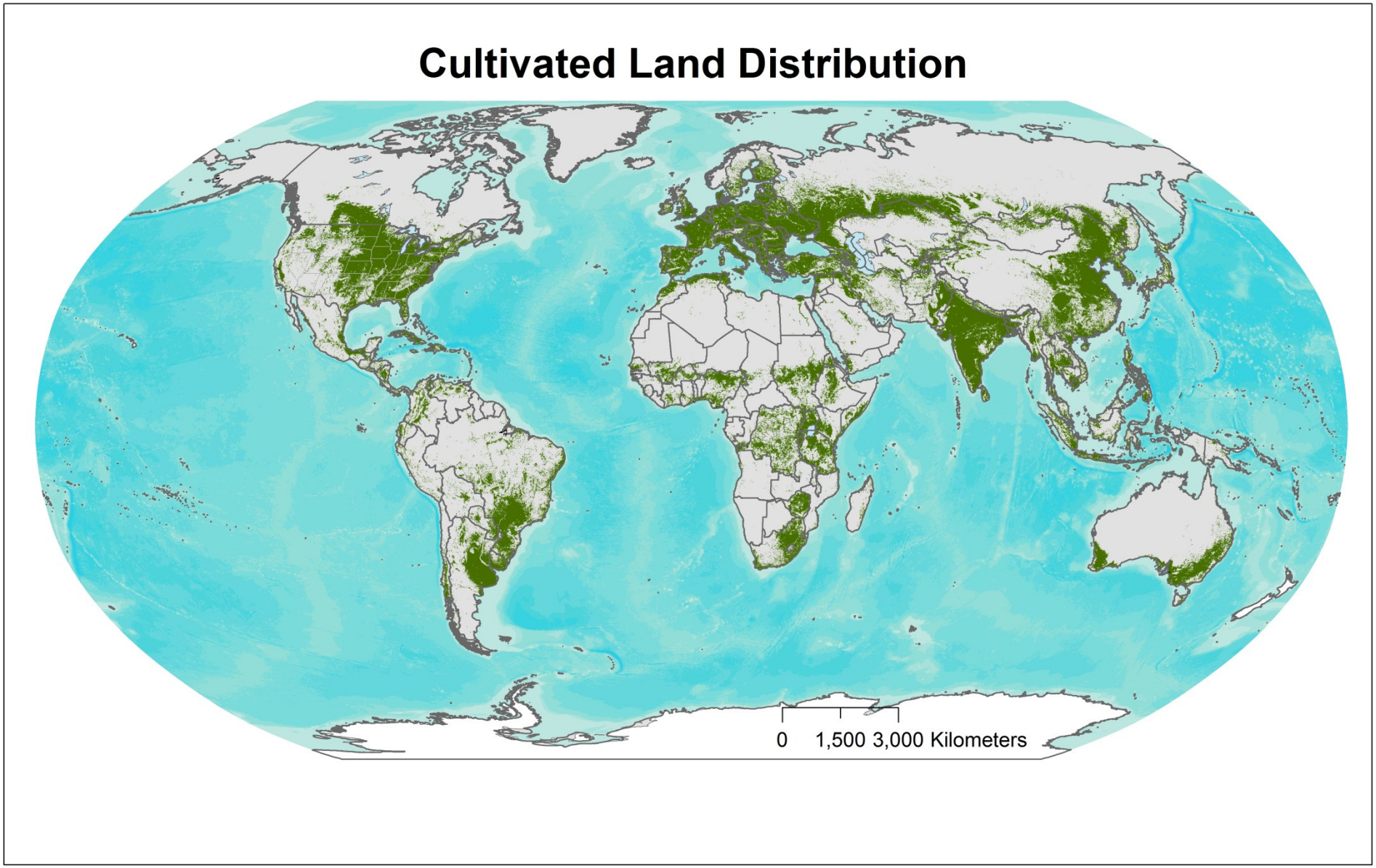
Where?

When?

For What?

GEOGLAM data plan to be submitted to the CEOS plenary in 2013

WHERE?



Fritz et al. IIASA

AT WHAT LEVEL OF DETAIL(SPATIAL RESOLUTION)?

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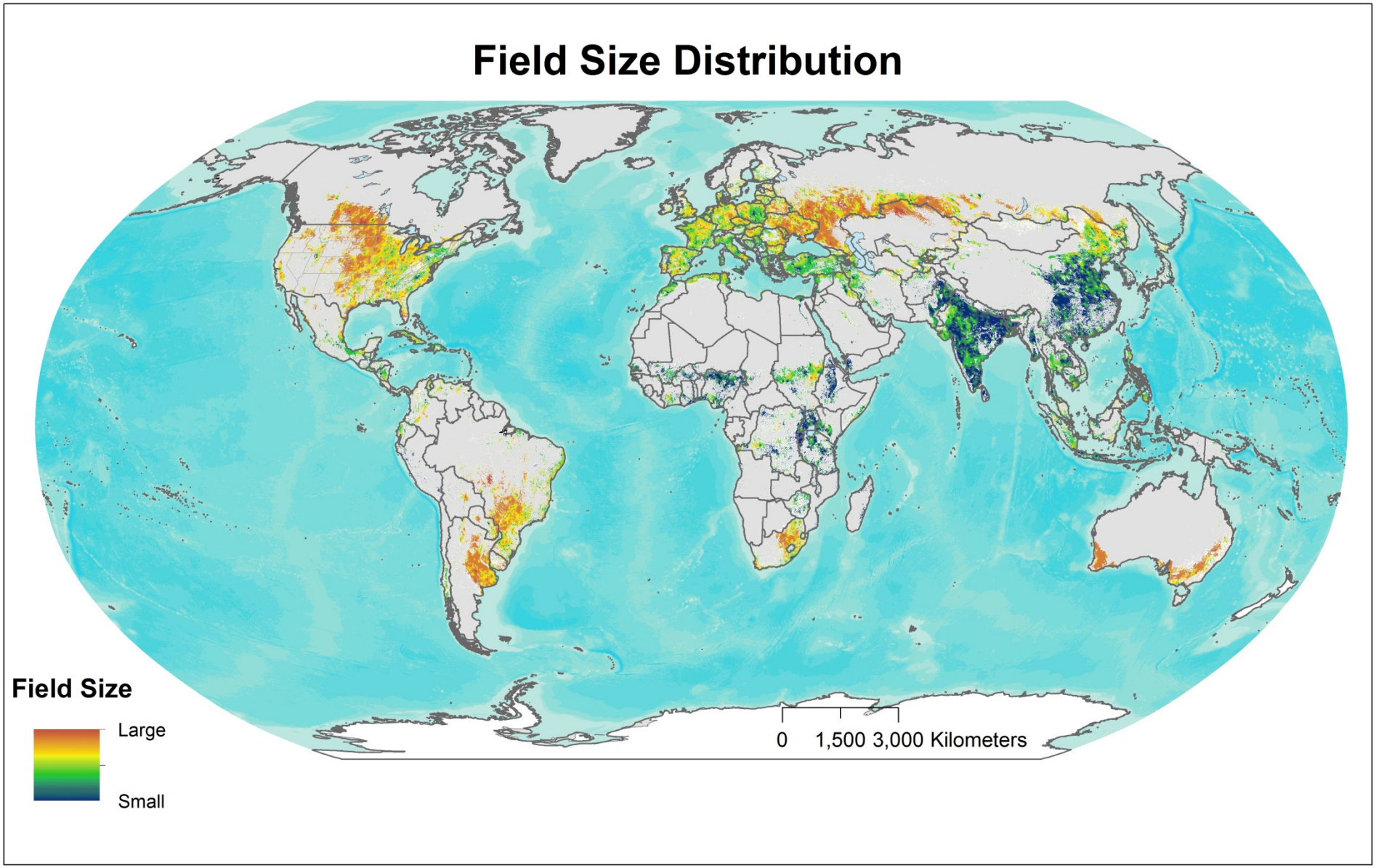
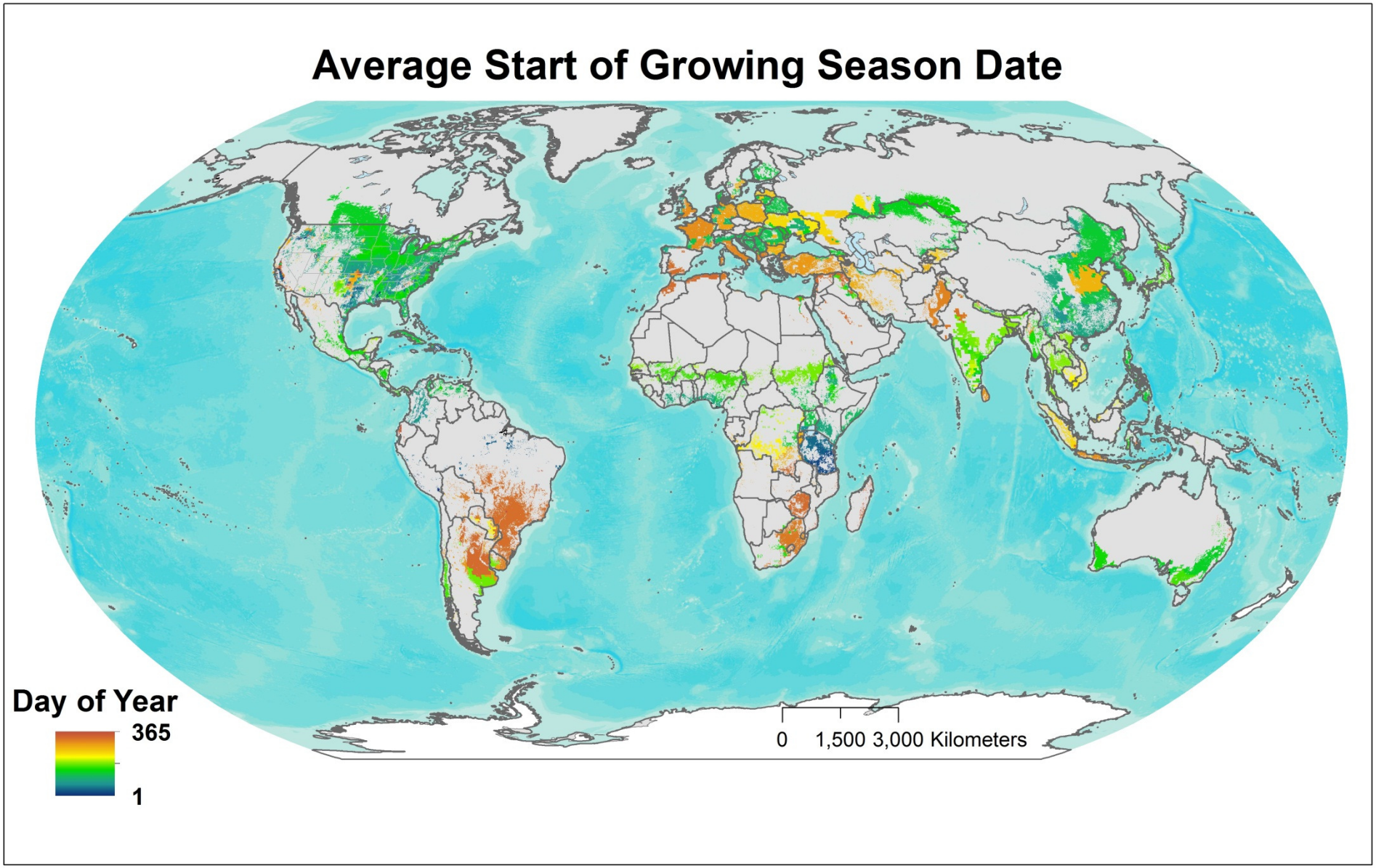


Fritz et al. IIASA

WHEN?



Whitcraft et al. UMD

WHEN?

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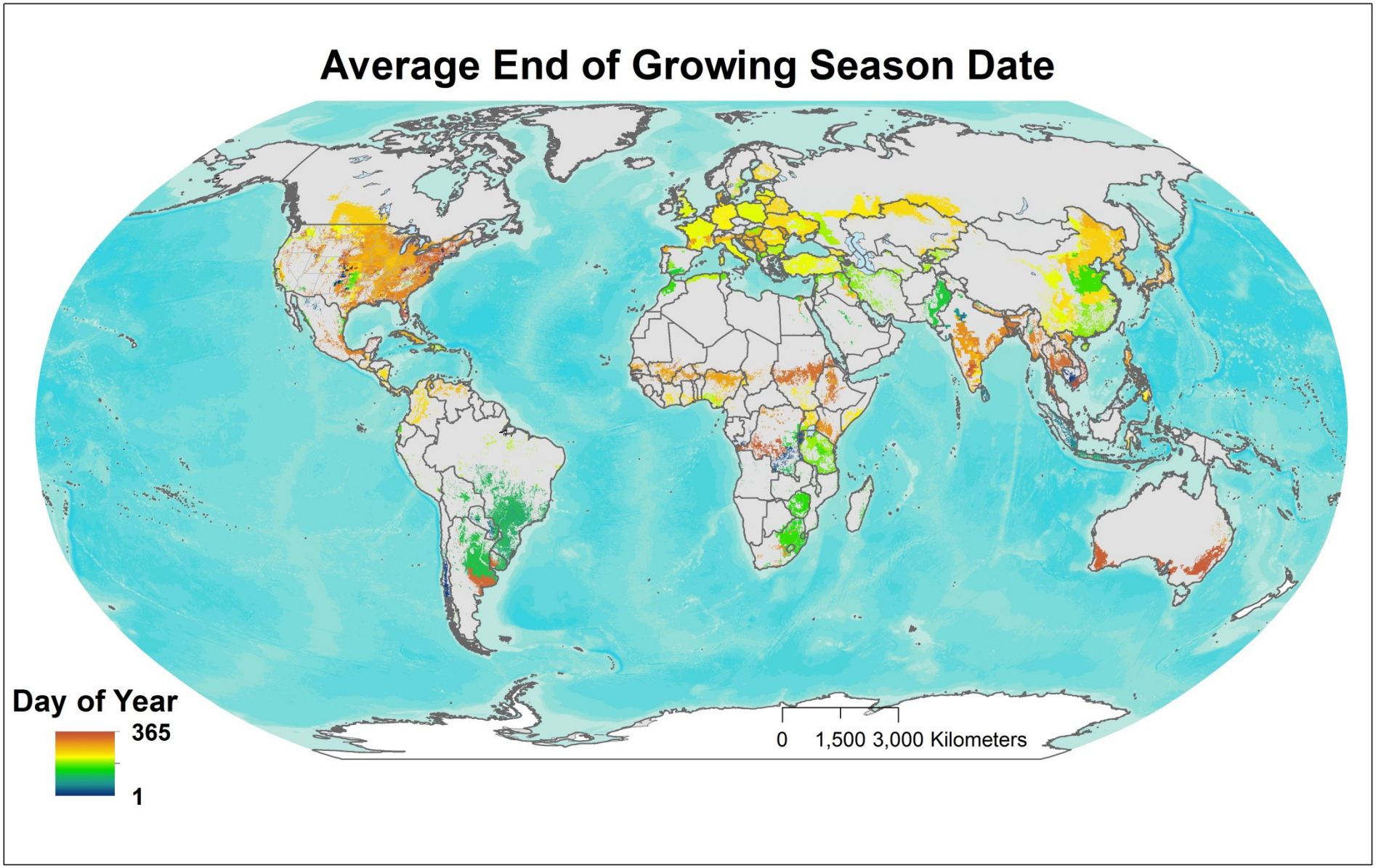
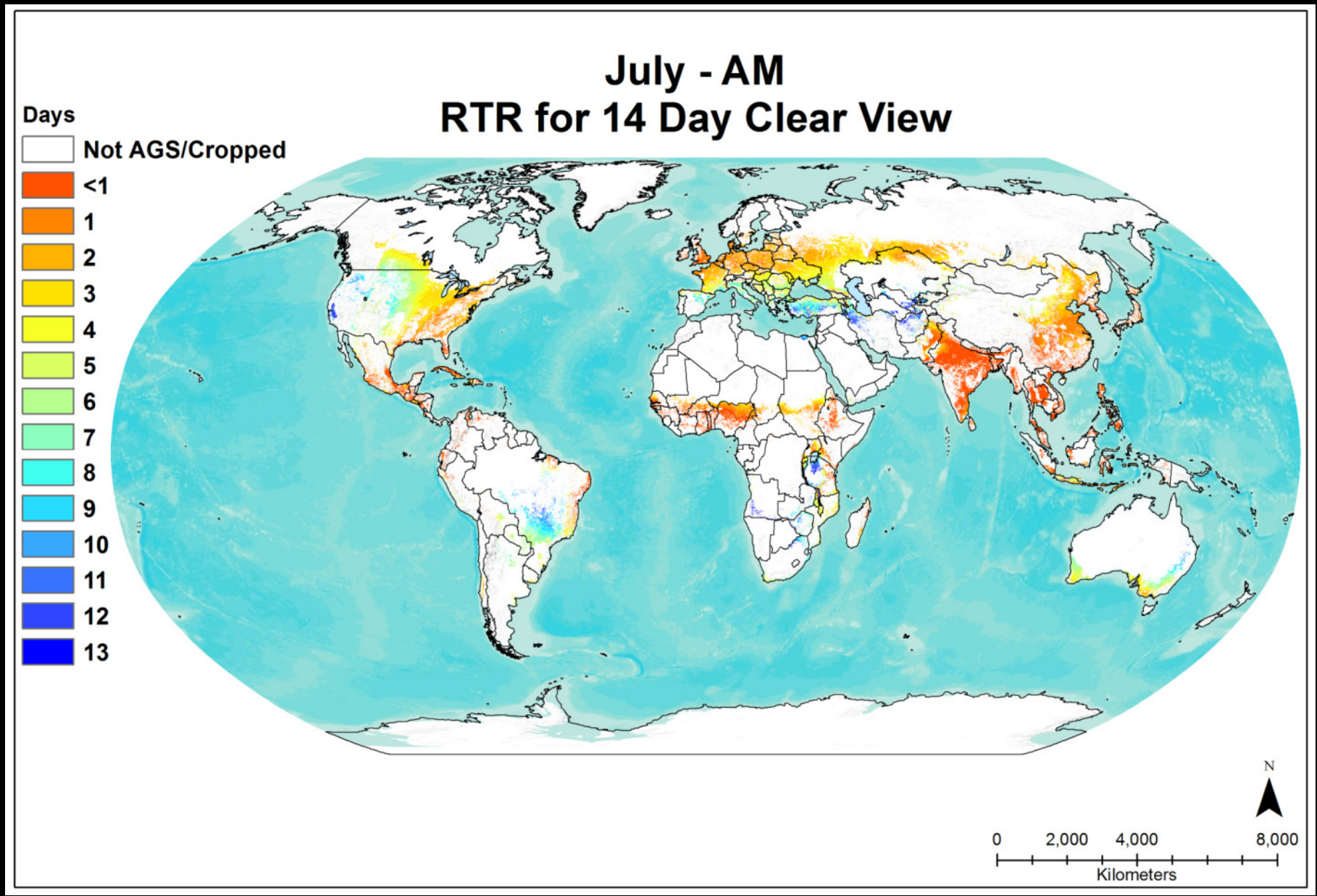


Whitcraft et al. UMD

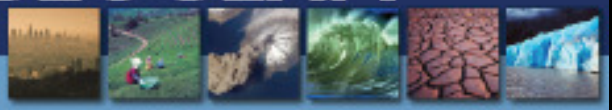
HOW OFTEN?

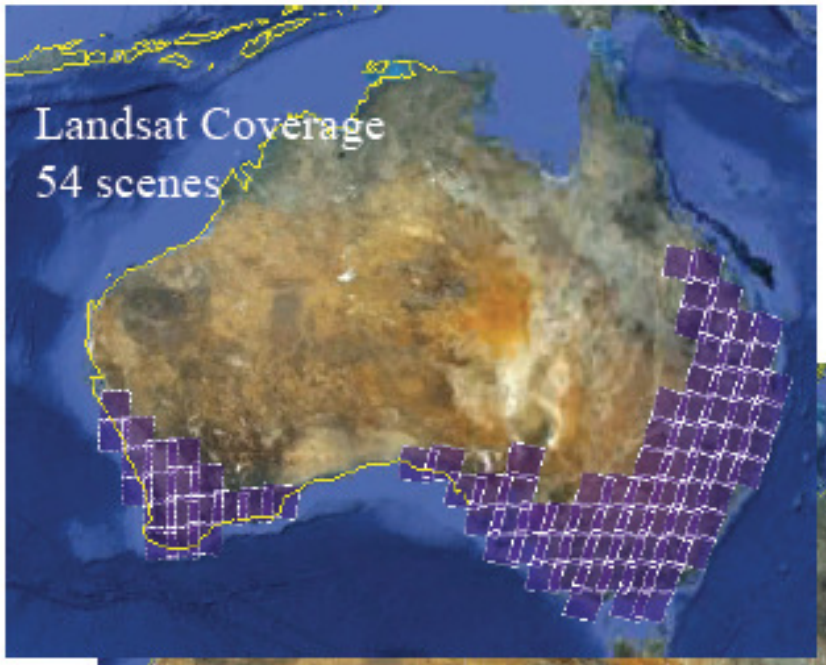


Whitcraft et al. UMD

SDCG-3 Meeting
Sydney, Australia
7-9 February 2013

CEOS SEO Support to GEOGLAM

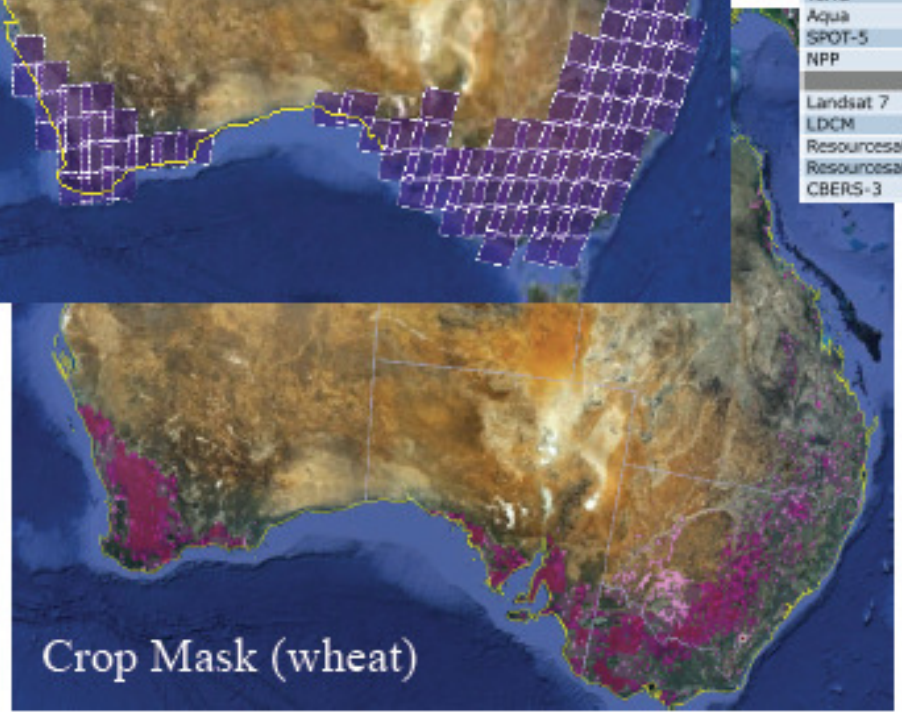


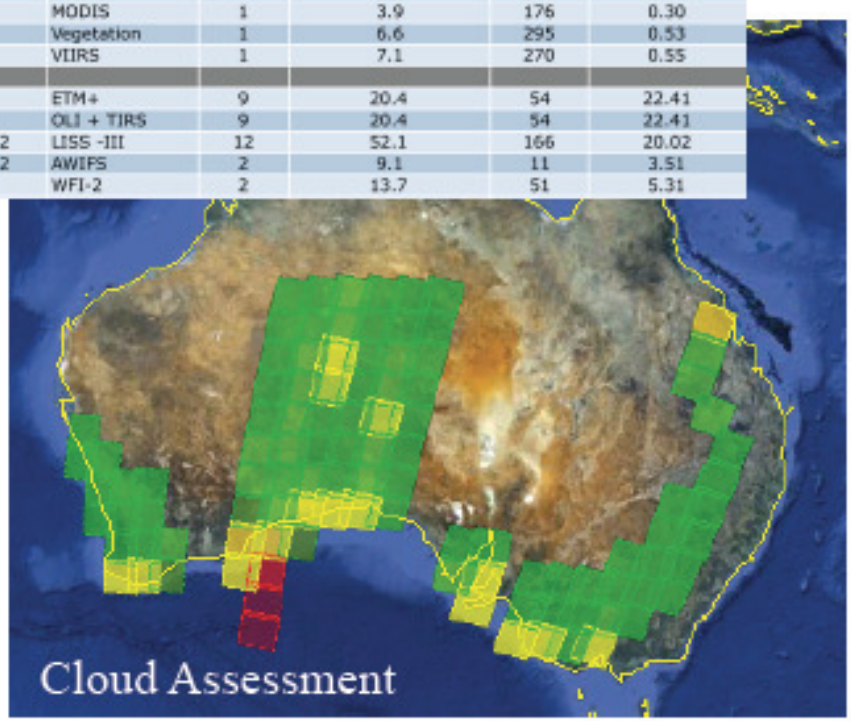


Data Acquisition Planning and Analysis

- Crop Masks, Crop Calendars
- Cloud Statistics (MODIS and ISCCP)
- Data Volume (# paths, duration, # scenes)

Mission	Instrument	Total Paths	Total Duration of Acquisitions (min)	Total Scenes	Total Data Volume (GB)
Terra	MODIS	1	3.9	176	0.30
Aqua	MODIS	1	3.9	176	0.30
SPOT-5	Vegetation	1	6.6	295	0.53
NPP	VIIRS	1	7.1	270	0.55
Landsat 7	ETM+	9	20.4	54	22.41
LDCM	OLI + TIRS	9	20.4	54	22.41
Resourcesat-2	LISS -III	12	52.1	166	20.02
Resourcesat-2	AWIFS	2	9.1	11	3.51
CBERS-3	WFI-2	2	13.7	51	5.31





B. Killough

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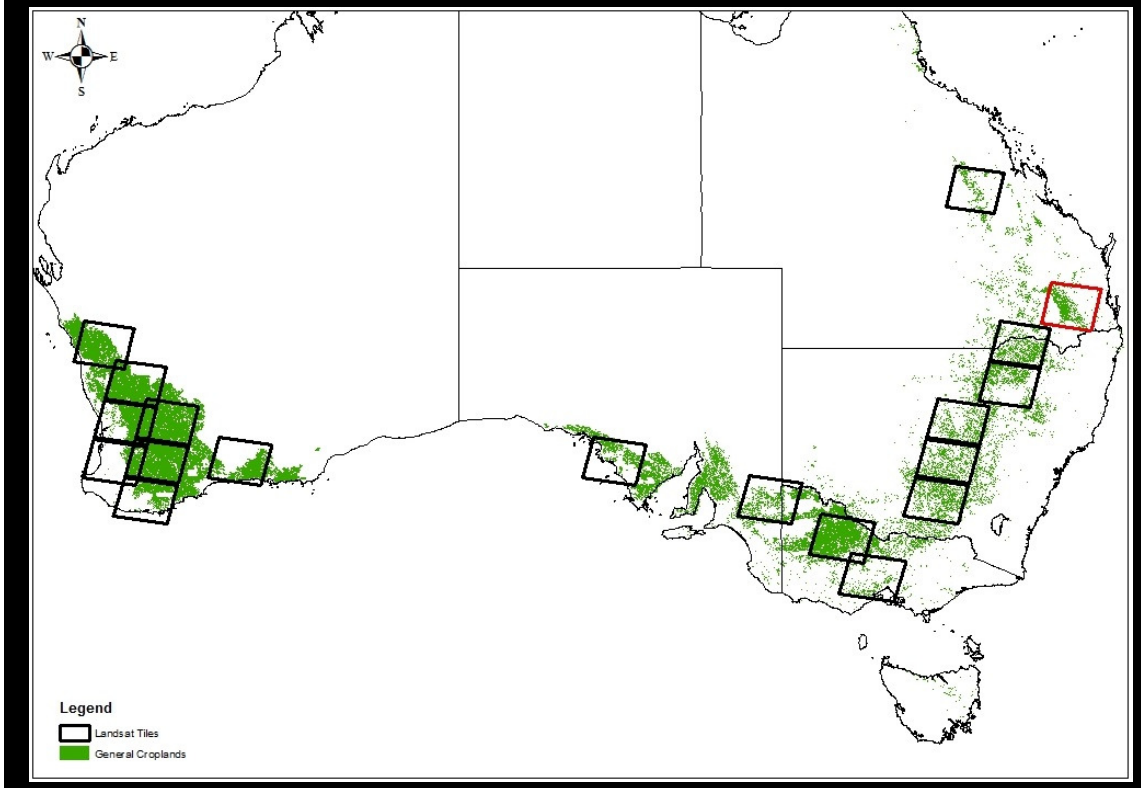
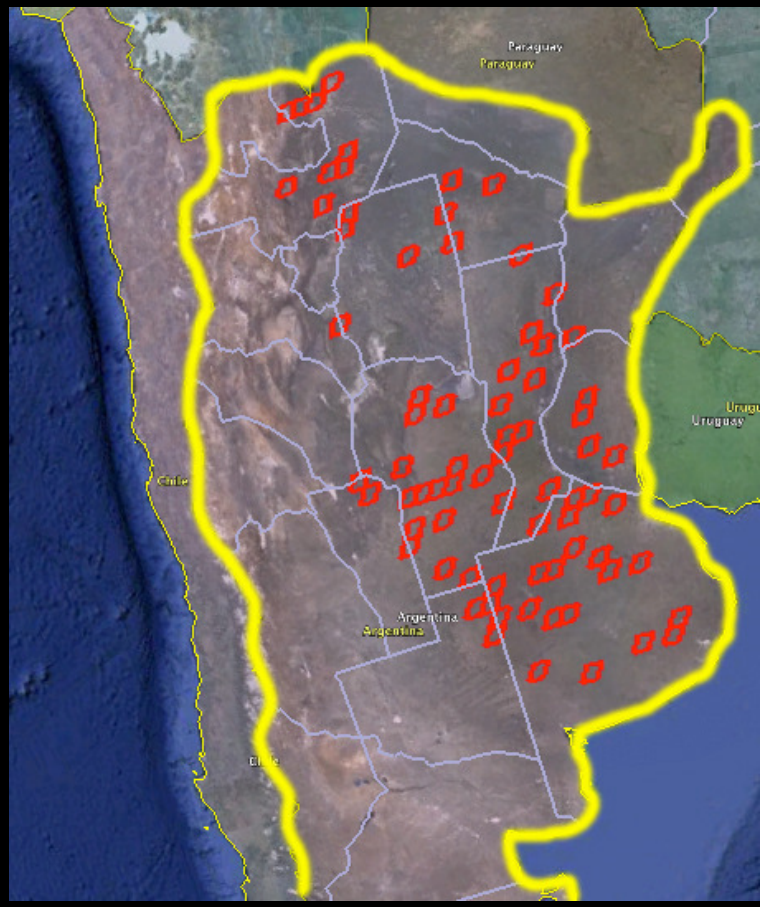
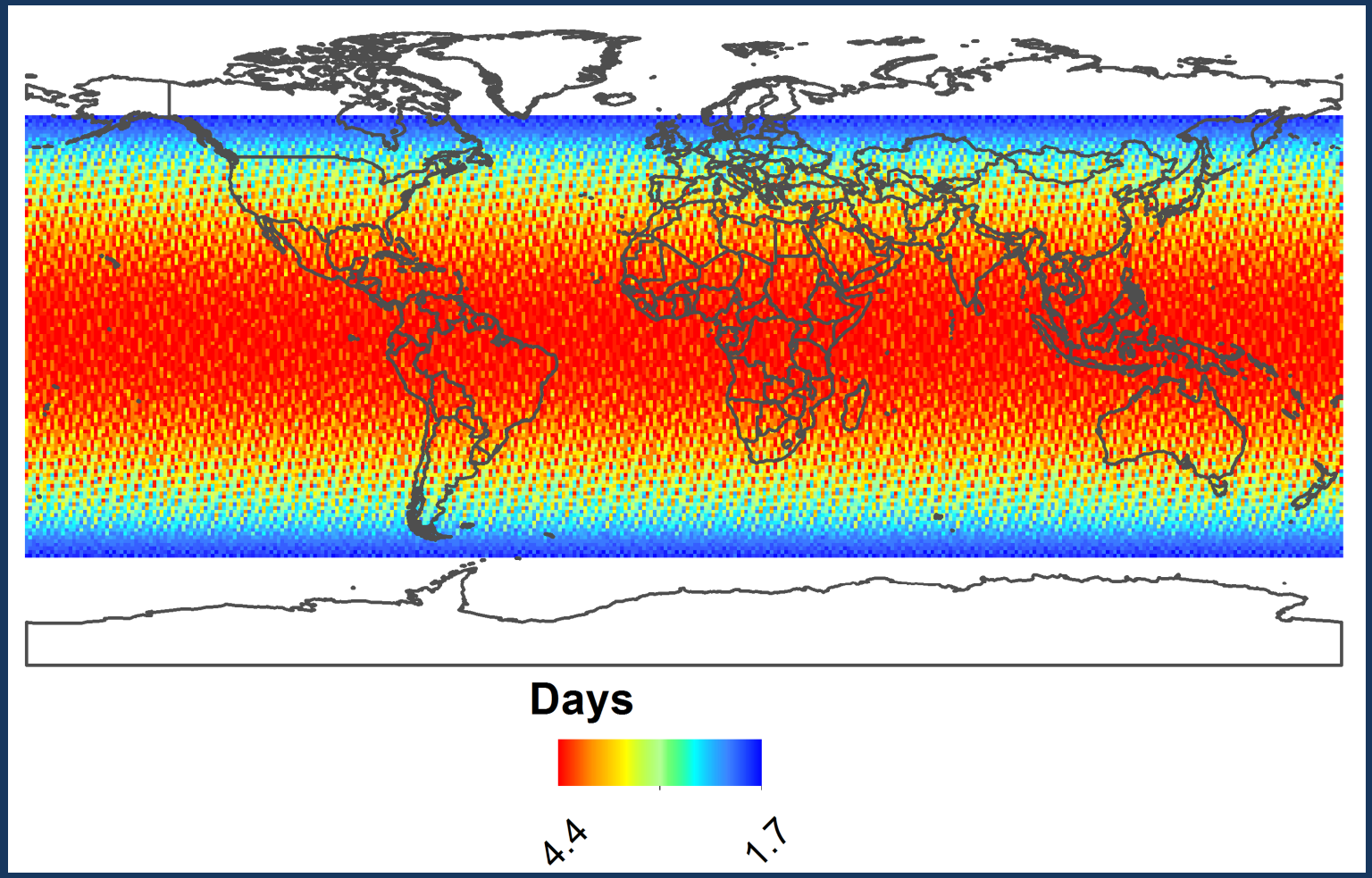
Sampling Strategy for high resolution data for Phase 1a Countries





NASA, ESA, CESBIO,

Landsat 7 – Landsat 8 – Sentinel 2A



The picture shows the number of times LDCM and the Sentinel 2 satellites accessed areas on the ground over an 40 day period of time.

Brian Killough et al. (NASA)

Requirement for Near Real Time Data for Agricultural Monitoring

Timely data is critical for crop monitoring!!

NASA EOS near-real-time daily observations are processed and integrated into USDA FAS system (< 3 hours from observation)

A contribution to GEO-GLAM

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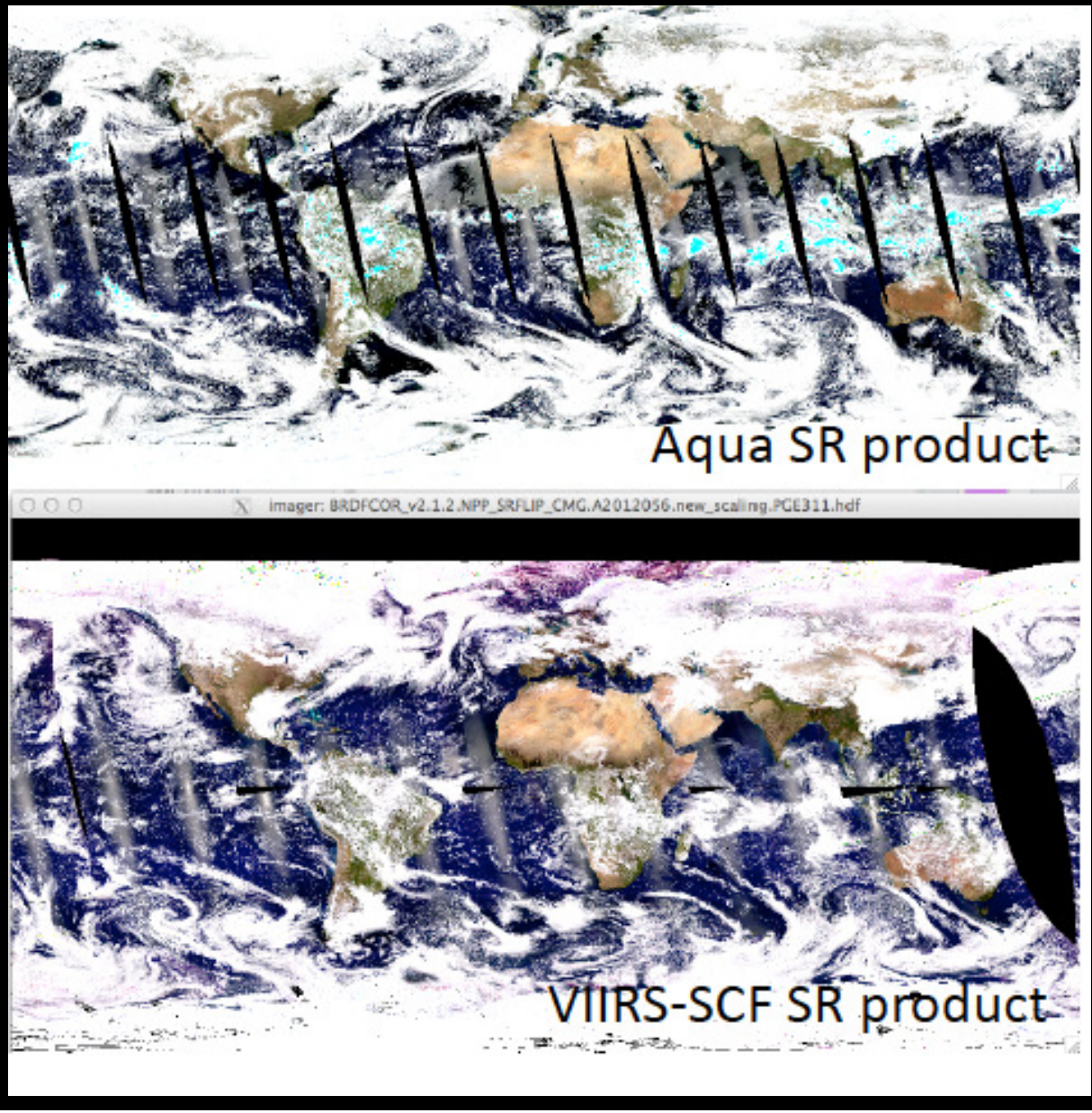
Component 4 Phase 1: Pilot Study on Data Interoperability

Requirement for Critical Data/Product Continuity



Vermote et al.

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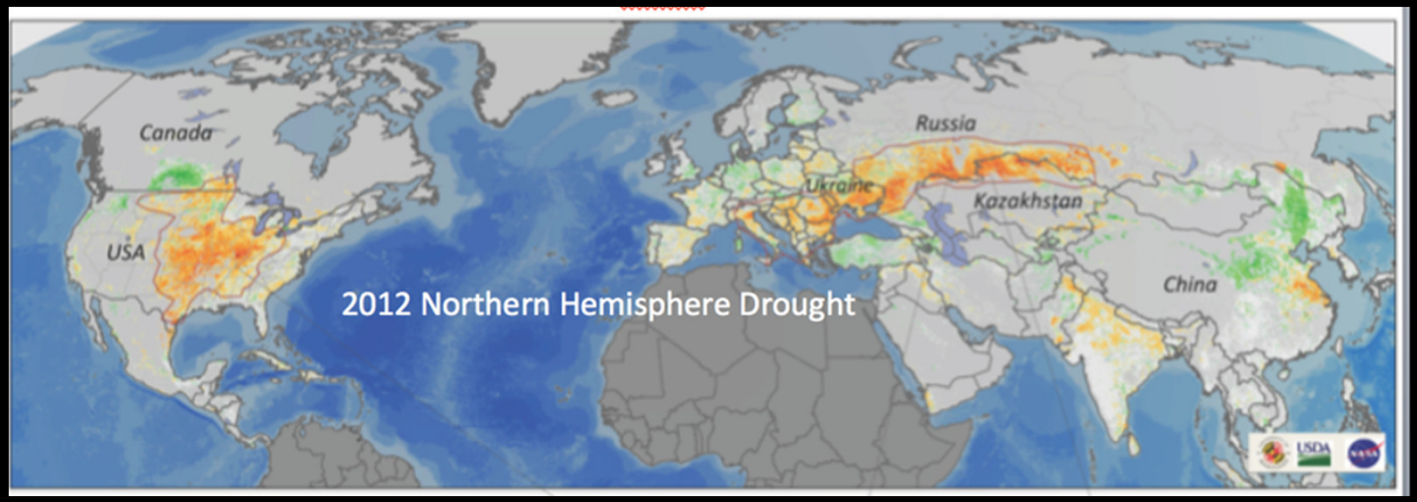
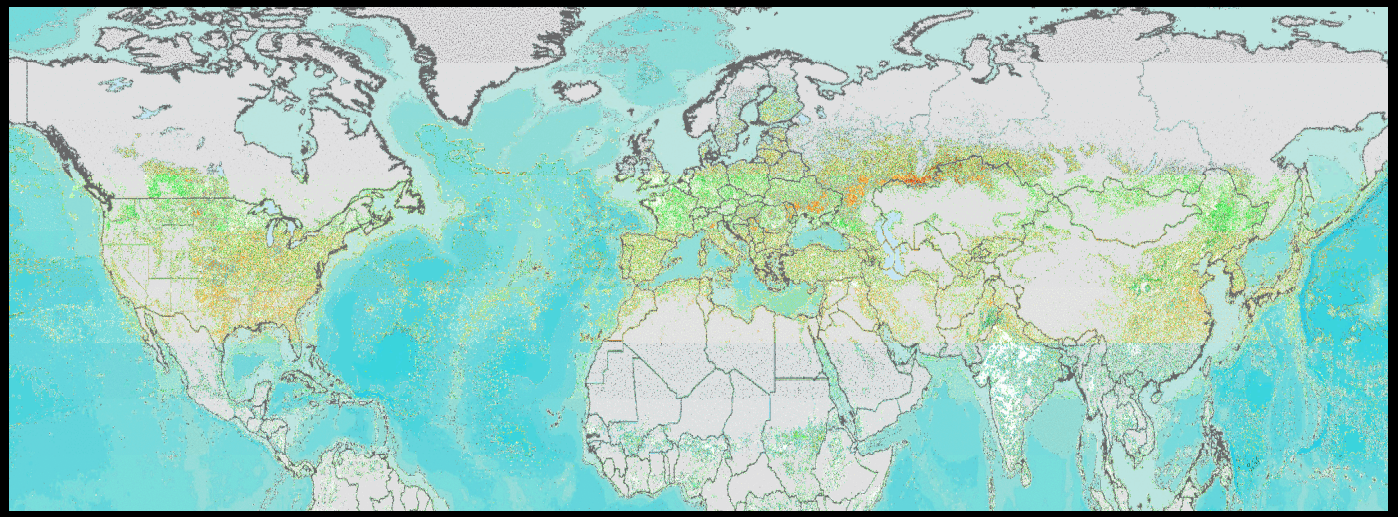
Anomaly Product Continuity/Consistency



July 30 2012

EOS MODIS



JPSS VIIRS

Vermote (GSFC)

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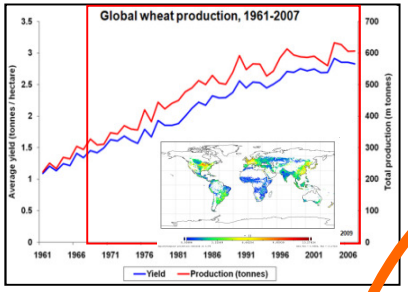
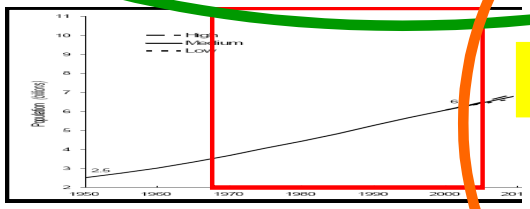
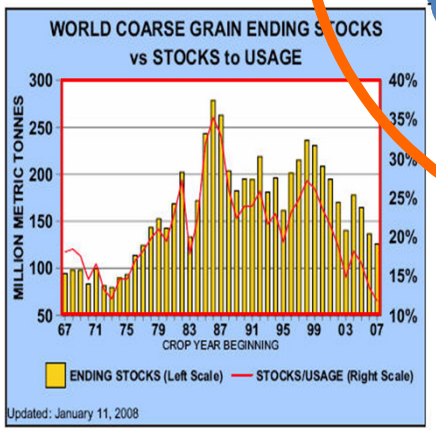
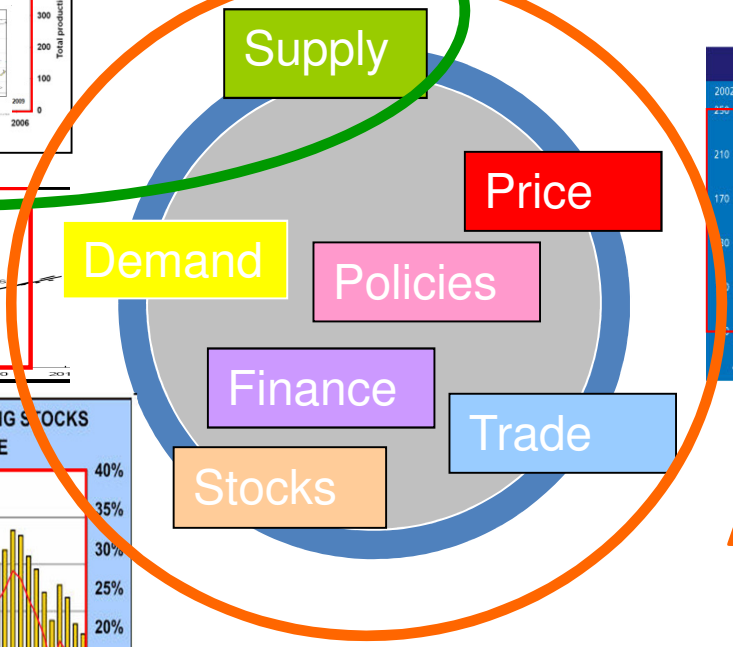
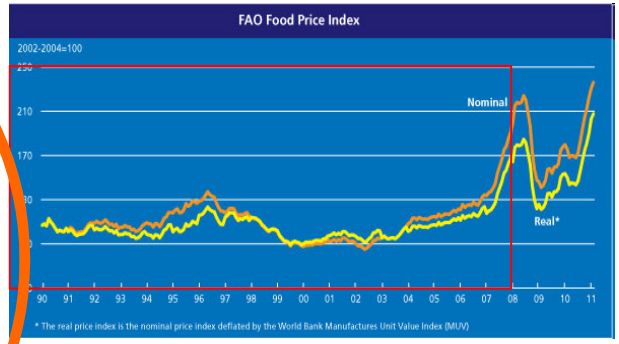
G20 - 2 initiatives to increase information availability, quality and transparency











AMIS

GEOGLAM Crop Monitor for AMIS

- Objective: to develop a transparent, timely, international, qualitative crop condition assessment in primary agricultural production areas highlighting potential hotspots of stress/bumper crops

  – inputs from GEOGLAM Community of Practice, international and national agencies, based on evidence from near real time satellite, weather, agromet, and national expert assessments

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Crop Monitor Current Status

- Developed the international community process for synthesizing and reviewing data and information and establishing the consensus assessment
- Prototyped crop outlooks over summer for June and July, for review by AMIS
- Started provision of routine Crop Monitor to AMIS in September 2013
- Second Crop Monitor submitted for October Market Monitor issue. November Issue in development.

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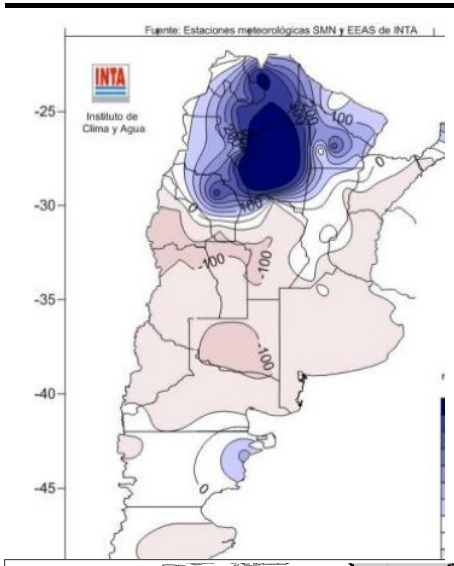
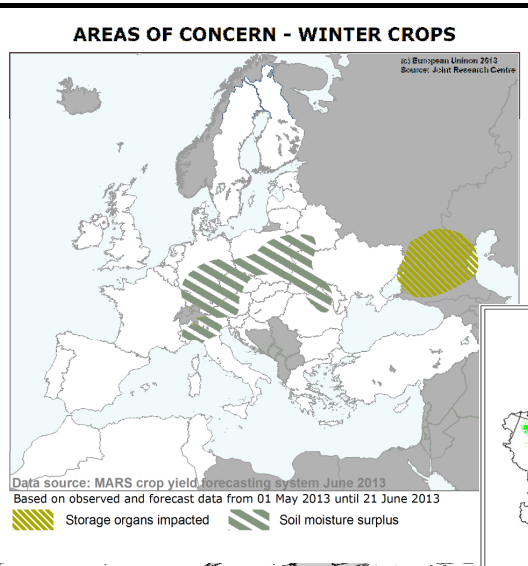
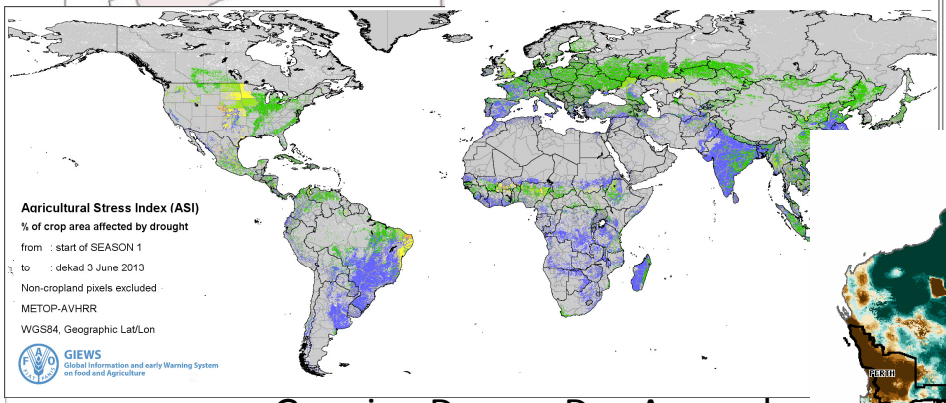
Crop Monitor Partners (>25 partners & growing)

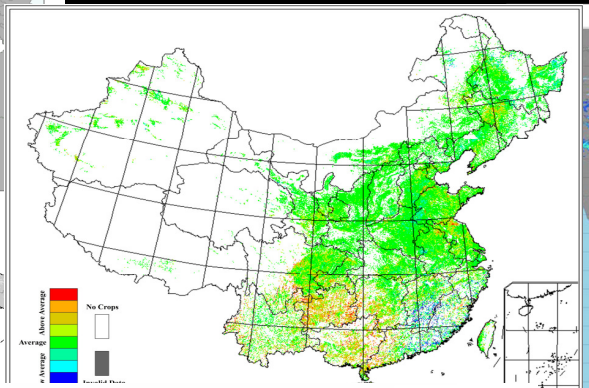
- USDA FAS, NASS
- EC JRC
- UMD
- Canada (Agriculture Canada)
- FAO
- NASA
- China CropWatch
- Russia (IKI)
- Ukraine (Hydromet, NASU-NSAU)
- Kazakhstan (ISR)
- Australia (ABARES, DA, CSIRO)
- South Africa (NRC)
- JAXA/Asia Rice
- Indonesia (LAPAN)
- Thailand (GISTDA)
- Vietnam (VAST,VIMHE)
- IRRI
- Argentina (INTA)
- Brazil (CONAB)
- India (ISRO)
- Mexico (SIAP)
- GEO SEC

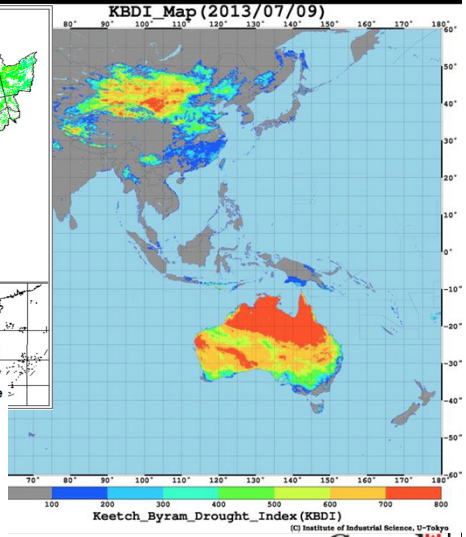
Examples of Input Data National – Global: EO indices, weather, model outputs etc

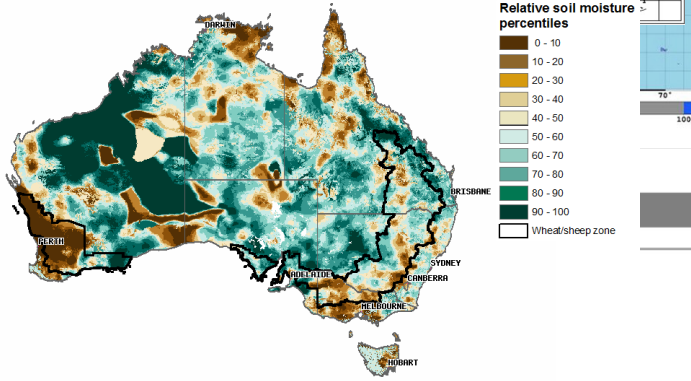


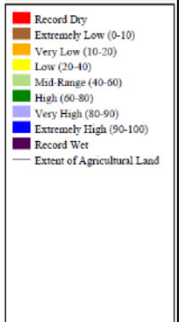




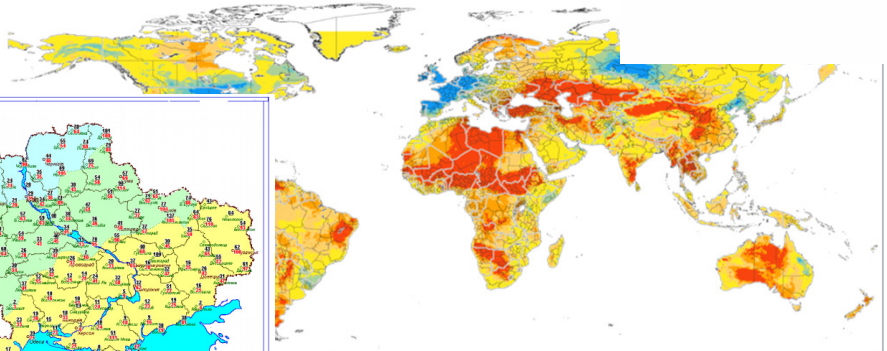


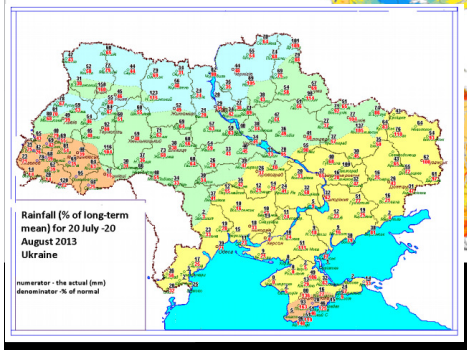


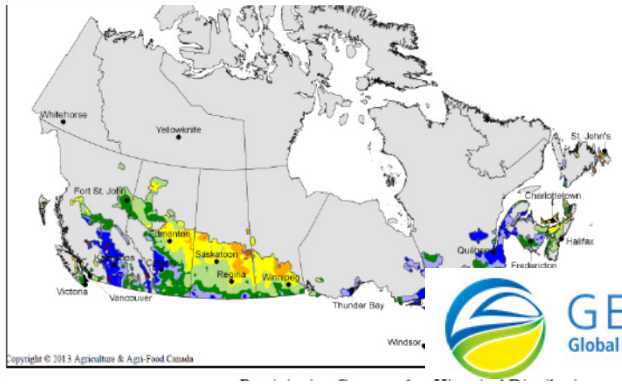




Growing Degree Day Anomaly







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Examples of Detailed National Assessments

Australia (ABARES/DAFF/ CSIRO)

Prospects for total winter crop production remain positive, despite variable growing co
Production is forecast to increase in Victoria, South Australia and Western Australia but fi
New South Wales. Total winter crop production is forecast to increase by 7 per cent to arou
in 2013-14. For the major winter crops wheat production is forecast to rise by 11 per cent
and barley production is forecast to rise by 13 per cent to 7.7 million tonnes. In contrast,
forecast to fall by 18 per cent to 3.3 million tonnes.

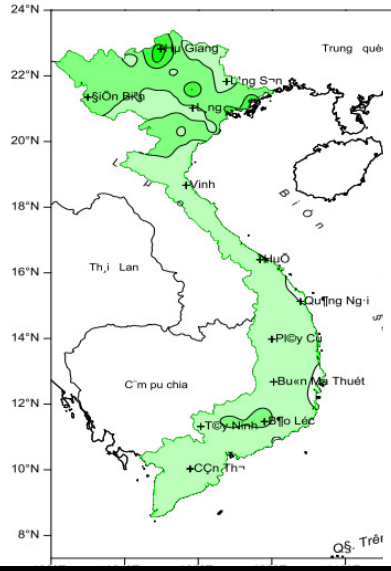
Upper layer soil moisture levels across the eastern Australian wheat/sheep zone de
August 2013 in response to below average rainfall and well above average temperatu
average temperatures combined with little to no rainfall across eastern Australia since late
to have impacted on crops production potentials where soil moisture levels were alre
western New South Wales, southern Queensland and the Mallee region in Victoria are rep
of moisture stress as a result of the recent warm and dry conditions.

Rainfall outlook indicate a wetter than normal spring is likely for much of the Australian wh
neutral-to-cool tropical Pacific and warm sea surface temperatures surrounding much of
Australia. The Indian Ocean Dipole (IOD) has returned to a neutral phase in recent weeks. It
negative IOD event has now concluded and is likely have little influence on the Australian in

Australia Wheat Crop Condition Dashboard

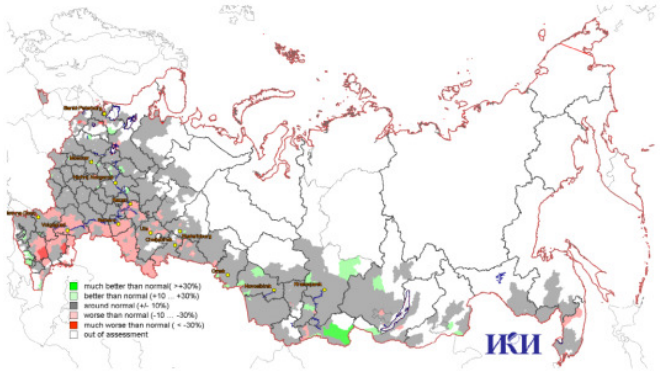
	WA	SA	Vic	NSW	Qld
Crop Status Trend	I	S	W	W	W
12-Sep-13	rains	dry/heat	dry/heat	dry/heat	dry/heat
29-Aug-13	rains	rains	rains	dry	dry
15-Aug-13	rains	rains	rains	dry	dry
01-Aug-13	dry	rains	rains	rains	rains
18-Jul-13	dry	rains	rains	rains	dry
04-Jul-13	dry	rains	rains	rains	rains
20-Jun-13					
06-Jun-13					
23-May-13					
09-May-13					
25-Apr-13					

Vietnam (VAST, VIMHE)

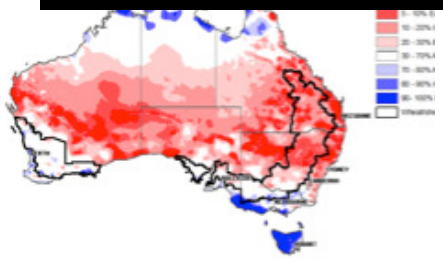


Russia (IKI)

Spring and summer crops Max NDVI Departure from multi-annual mean
Status for August 23, 2013

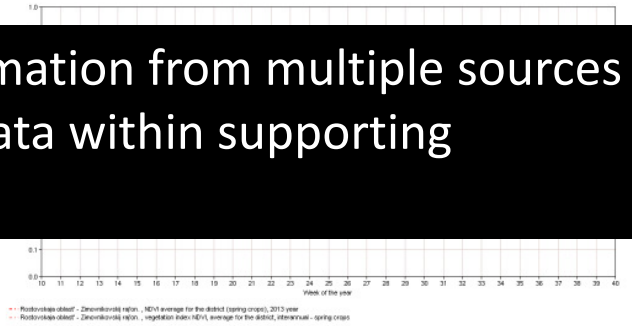


Synthesize and distil a range of data & information from multiple sources while preserving the wealth of underlying data within supporting materials document



Rice Paddy summer, autumn and winter:

As of mid-May, the total sown area of summer rice is estimated at
19.8% over the same period last year. Summer rice is mainly plant
planting time, the southern provinces have been delaying harvest of



The NDVI seasonal profile departure from multi-annual mean is demonstrating strong anomalies whish are caused by drought in several regions in the south of European part of Russia, such as Rostov (the NDVI profiles are presented on the graph above), Stavropol, Volgograd, Samara, Saratov, Tatarstan, Bashkortostan and Orenburg.

The information is prepared using the VEGA web-based service (http://vega.smislab.ru/eng/), developed by the Space Research Institute (IKI) of the Russian Academy of Sciences.

GROUP ON EARTH OBSERVATIONS

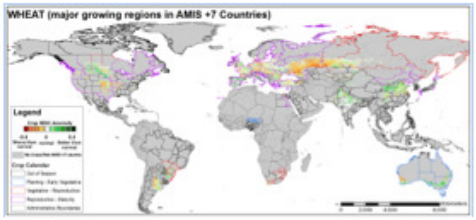
GEOGLAM
Global Agricultural Monitoring

GEOGLAM Prototype Global Crop Assessment

August 1, 2013

GEOGLAM
Global Agricultural Monitoring

Wheat



NDVI anomaly image (NASA MODIS) depicting vegetative growth anomalies on June 28th over the main wheat growing areas. (Orange to red indicates less green vegetation than average, green indicates higher than average vegetation). Administrative unit outline colors indicate growth stage: Blue- planting to early vegetative, Red- Vegetative to Reproductive, Purple- Reproductive to Maturity, Black- out of season. Note: only AMIS+7 countries are highlighted.

Wheat Comments and Highlights

Overall wheat conditions have been favorable. In the **United States** winter wheat has mostly been harvested. By end of July 94% of spring wheat was at or beyond the heading stage, and close to 70% is reportedly in good to excellent conditions according to USDA. In **Canada** crop conditions are favorable across the country for reproductive spring grains with only minor delays and development issues. Winter wheat harvest is in progress in Ontario and early reports indicate excellent yields. In **Russia** winter wheat has mostly been harvested. Widespread showers maintained favorable conditions for heading spring wheat in the Volga District while warm and dry conditions are affecting the southern Urals and Southern District. Rainfall in eastern Russia and **Kazakhstan** improved yield prospects for heading spring wheat. In **Ukraine** wheat harvest was in progress in early July. In **China** wheat has mostly been harvested. In **Europe** this agricultural year has so far been marked by an unusually prolonged winter for western and central Europe and heavy rainfall in May and June. Soft wheat yield at a total is currently forecast by MARS to be above last year's. Forecasts for **France** as the biggest producer show lower yields compared to last year, whereas higher yield levels are foreseen in **Spain, Romania, Bulgaria and Hungary**. In **South Africa** winter wheat is in emergence stage. Although still early in the season, vegetation index anomalies indicate some stress and one or two significant rainfall events are needed in coming months. Growing conditions for **Australia** wheat crops are generally favorable across most of the country. Recent rainfall in Western Australia has reversed the dry conditions of the past few weeks. Southeast production areas are in good condition. Better than average conditions in southern of New South Wales offsets an area of concern in northern New South Wales due to extended dryness in July. In **Argentina** winter wheat planting is mostly complete. Cool weather slowing early wheat development. In **Brazil** wheat is vegetative stages with cool wet temperatures affecting the southern portions of the country.

AMIS

Market Monitor

No.11 – September 2013 www.amis-outlook.org

*The **Market Monitor** is a product of the Agricultural Market Information System (AMIS), a G20 initiative to provide information, analysis and short-term supply and demand forecasts. It covers*

Contents

Crop Monitor (As of 28 August)

This is the first GEOGLAM Crop Monitor developed for AMIS*. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data, and was conducted by experts from global, national and regional monitoring systems. For each of the four crops, a paragraph summarizing current conditions is provided, accompanied by a satellite-based indicator map. Each map depicts crop vegetative growth anomalies from August 28th (relative to a 12 year average), over the main crop growing regions within AMIS countries.

Wheat: Prospects are favourable in the Northern Hemisphere. Winter wheat harvest is complete and spring wheat is in late-maturity to harvest stages. In the US, **Canada, Russia** and **Kazakhstan** spring wheat conditions are good though final yields will depend on favourable weather in the coming month. Crops in the Southern Hemisphere are in early-vegetative to reproductive stages and conditions are mostly favourable. In **Australia** overall conditions are average to above-average but rainfall in the next month will be critical as there is some concern over dry conditions in parts of the country. In **Argentina** conditions are good although additional moisture is needed. In **Brazil** frosts caused some significant crop damage and there is some concern over excessive wetness. In **South Africa** winter wheat conditions have improved since July, following widespread precipitation.

Maize: General conditions are good. In the US approximately half of the maize is in good to excellent condition and in spite of dry weather and rising temperatures in August, a bumper production is expected largely due to increased planted area. In **Canada**, conditions are favourable and yields are expected to be average to above average. In the **EU**, prospects are good except in northern Italy, Hungary, Austria, Slovenia and Croatia where there is concern due to late sowing and dry and hot conditions. In **Russia**, current yield prospects are favourable despite low soil moisture in the south. In **China, India, Mexico** and **Ukraine** conditions are generally good. In **Brazil** the second maize crop harvest is almost complete and it is expected to be favourable.

Rice: Growing conditions are favourable. The monsoon season in **South** and **Southeast Asia** has maintained good moisture across most of the region. In **India**, conditions are favourable as monsoon rains have been well distributed. In **Thailand**, precipitation has been widespread, though there is some concern over localized dryness. Mostly favourable conditions were maintained in **Vietnam** and the **Philippines** with some concern over excess moisture and flooding. In **China**, good moisture conditions were maintained in the North China Plain though there is some concern over flooding in the northeast and excess moisture in the southwest. Meanwhile, south of the Yangtze River, dry conditions and above normal temperatures raise concern. In **Japan**, conditions are mostly favourable in the south for early developing rice.

Soybeans: Growing conditions are favourable. In the US, about half of the crop is in good to excellent condition although prolonged dry conditions in the Midwest are raising concern. In **China**, conditions are favourable in the North China Plain and in the Northeast production regions. In **India**, conditions are favourable but there is some concern over excessive moisture.

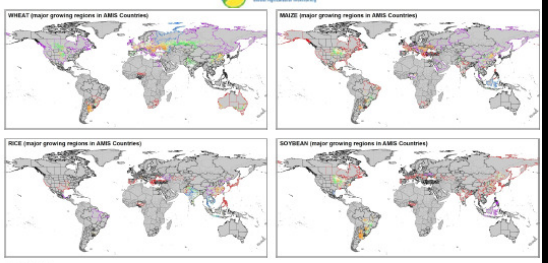
*GEOGLAM aims at strengthening global agricultural monitoring by improving the use of satellite information for crop production forecasting. It is implemented within the framework of the inter-ministerial Group on Earth Observations (GEO). Both GEOGLAM and AMIS were endorsed by the G20 Heads of States Declaration (Cannes, November 2011) when GEOGLAM was tasked to "coordinate satellite monitoring observation systems in different regions of the world in order to enhance crop production projections and weather forecasting data." Within this framework, GEOGLAM is providing global crop outlook assessments in support of AMIS market monitoring activities.

More detailed information on the GEOGLAM crop assessments is available on: www.geoglam-crop-monitor.org

Satellite-Based Vegetative Growth Anomalies
based on the Normalized Difference Vegetation Index (NDVI)

NDVI is an indicator of photosynthesis often used for monitoring croplands. These anomaly images compare the NDVI for August 28th 2013 to the average NDVI for the same date from 2000-2012, over the main growing regions of the four AMIS crops. Orange to red indicates less green vegetation than average, green indicates higher than average vegetation. Administrative unit outline colours indicate crop growth stage: **Blue-planting to early vegetative, Red-Vegetative to Reproductive** (generally the most sensitive crop growth period), **Purple-Reproductive to Maturity, Black-areas out of season. Note: only AMIS countries are highlighted.**

GEOGLAM
Global Agricultural Monitoring



Legend

Crop NDVI Anomaly
-0.4 Less green vegetation than avg
0 Average
0.4 More green vegetation than avg

No Crops / Not an AMIS Country

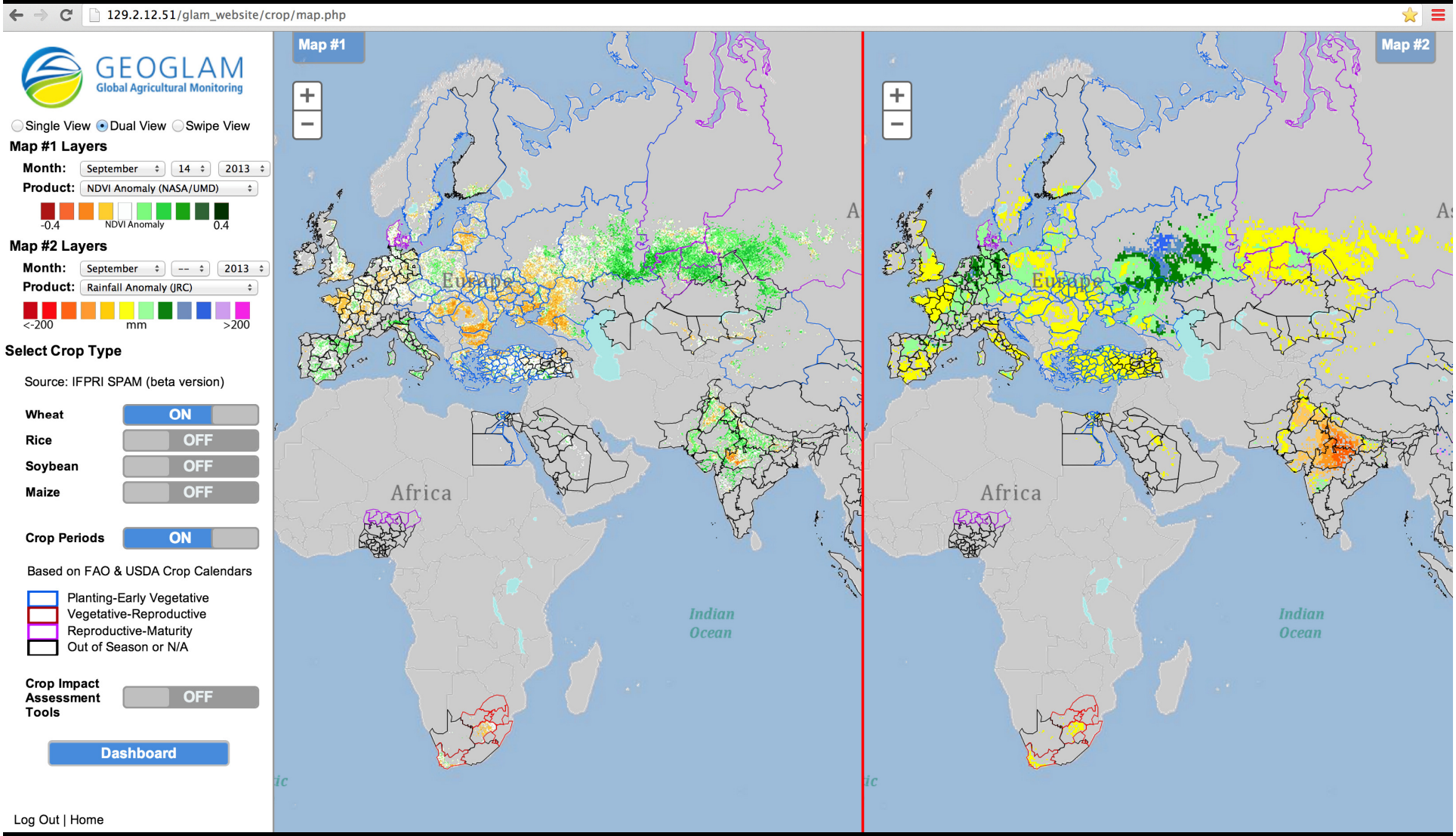
Crop Calendar
Out of Season
Planting - Early Vegetative
Vegetative - Reproductive
Reproductive - Maturity
Administrative Boundaries

Sources & Disclaimer

The Crop Monitor assessment has been conducted by GEOGLAM with inputs from the following partners (in alphabetical order): AAFC (Canada), CAS CropWatch (China), CSIR/ARC (South Africa), ABARES/DAFF/CSIRO (Australia), CONAB/INPE (Brazil), GISTDA (Thailand), EC JRC-MARS, FAO, ISRO (India), JAXA (Japan), ASIA RICE, IKI (Russia), INTA (Argentina), LAPAN/MOA (Indonesia), Mexico (SIAP), NASA, UMD, and USDA FAS/ USDA NASS (US), Ukraine Hydromet Center/NASU-NSAU (Ukraine), VAST/VIMHE (Vietnam).

The findings and conclusions found in this joint multiple-agency reporting are only consensual statements from the GEOGLAM expert group, and do not necessarily reflect those of the individual Agencies represented by these experts. Map data sources: Main crop type areas based on the IFPRI SPAM 2005 beta release (2013). Crop calendars based on FAO and USDA crop calendars. NDVI anomaly data produced by NASA/USDA/UMD based on NASA MODIS data.

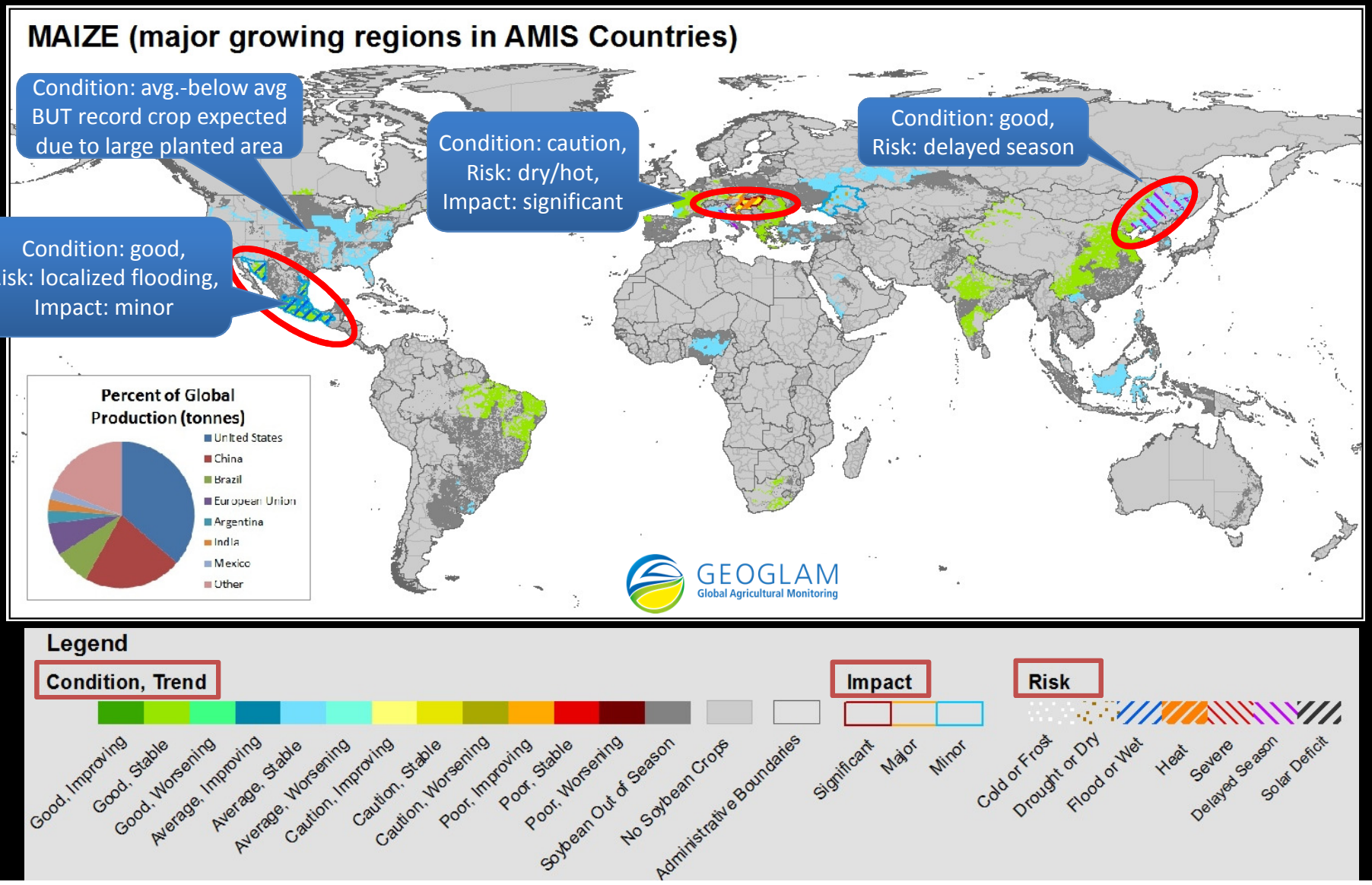
Crop Assessment Interface



Enables comparison between relevant datasets (global, national and regional), by crop type and accounting for crop calendars and enables crop condition labeling and commenting to reflect national expert assessments

First Prototype of Synthesis Crop Condition Map

Depicting Crop Conditions, Trends, Climate Risks, Impact on Crop Prospects



Current Crop Monitor

Crop Monitor*

Crop Monitor is developed for AMIS by GEOGLAM*. It summarizes latest conditions (as of 28 October) for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

Wheat: In the Northern Hemisphere spring wheat harvest is mostly complete and winter wheat planting is well underway. In **Canada** and **Kazakhstan,** spring wheat prospects are average to above average but in **Russia**, spring wheat production is below average due mainly to low yields and harvest problems in the Volga Valley. In the Southern Hemisphere wheat prospects are variable. In **Australia**, harvest has commenced in major producing states earlier than average. Yield prospects vary across the country because of highly variable rainfall conditions during the season. Persistent dryness in the northeastern wheat growing areas have resulted in below average yields. Overall yield prospects are average to above average in the western, southern and southeastern wheat growing regions. In **Argentina**, overall conditions are average and wheat is mostly in tillering and flowering stages. Despite some recent scattered showers, water stress continues in parts of the main growing regions and additional rain is needed. In **South Africa**, wheat prospects are good owing to above-average rain over winter growing areas.

Maize: General conditions are good. In the **US**, harvest is over 75 % complete. Despite less than ideal conditions in mid summer, ratings have improved relative to last month and a record production is likely, largely due to increased planted area. In **Canada**, conditions are favourable and yields are expected to be average to above average. In the **EU** harvest is in full swing or already complete. Mean EU yield forecasts are close to the 5-year average, with above-normal prospects in Spain, Portugal, Bulgaria and Romania, and below-average yields in northern Italy and Hungary. In **Russia, Ukraine** and **India**, prospects are good. In **China**, prospects are good and a bumper crop is expected owing to increases in both area and yield. Despite an earlier than normal freeze across the northeastern growing regions the crop was not significantly affected. In **Mexico**, overall conditions are good largely owing to atypical precipitation from multiple hurricanes, particularly in normally dry regions; however there is some concern over flooding in the south. In **Argentina**, planting of the first crop has initiated and additional rain is needed to replenish soil moisture. In **Brazil**, the first crop planting has started. It is expected that planting area will be slightly reduced in favour of soybeans.

Rice: Overall conditions are favourable. The monsoon season in **South** and **Southeast Asia** maintained good to somewhat excessive moisture across most of the region. In **Pakistan, India** and **Bangladesh,** prospects are good, although a tropical cyclone may have caused localized damage in eastern India and in Bangladesh. Mostly favourable conditions were maintained in **Indonesia** and **Japan**. In **the Philippines** and **Thailand**, prospects are good though there is some concern over excess moisture and damage due to tropical storms mainly affecting northern and central growing regions in Thailand and northern Philippines. In **Vietnam**, harvest is near complete for the summer season and yields are expected to be slightly lower than last year due to unfavourable weather. Autumn planted rice conditions are average. In **China**, rainfall improved prospects in the southern major rice producing regions, which contributed to increased yields of single season rice. Favourable moisture conditions are benefiting late season rice development and grain filling, but the late season rice conditions are still below last year's.

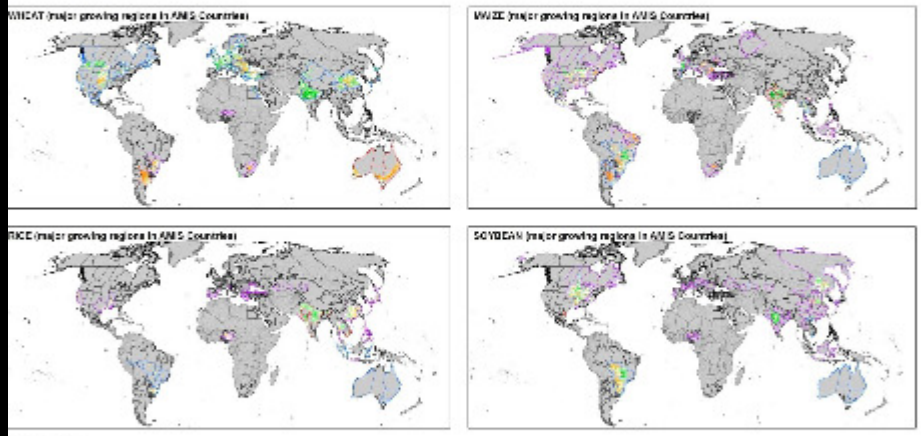
Soybeans: General conditions are favourable. In the **US**, the majority of the crop has been harvested and conditions improved since September. Prospects are good though a record is not expected. In **China**, harvest is complete and prospects are generally favorable. In **India**, harvest is in progress and there is some concern due to excessive precipitation. In **Brazil**, soy planting is in progress and beneficial rains provided moisture for the emerging crops. Planted area is expected to increase this season largely at the expense of corn area. In **Argentina**, scattered showers brought some relief but additional rain is needed particularly in southern growing regions where planting is delayed due to dryness.

Satellite-Based Vegetative Growth Anomalies

Based on Normalized Difference Vegetation Index (NDVI)

NDVI is an indicator of photosynthesis often used for monitoring croplands. These anomaly images compare the NDVI for October 28th, 2013 to the average NDVI for the same date from 2000-2012, over the main growing regions of the four AMIS crops. Orange to red indicates less green vegetation than average, green indicates higher than average vegetation. Administrative unit outline colours indicate crop growth stage: **Blue = Planting to early vegetative, Red = Vegetative to reproductive** (generally the most sensitive crop growth period), **Purple = Reproductive to maturity, Black = Areas out of season.** Note: only AMIS countries are highlighted.

GEOGLAM



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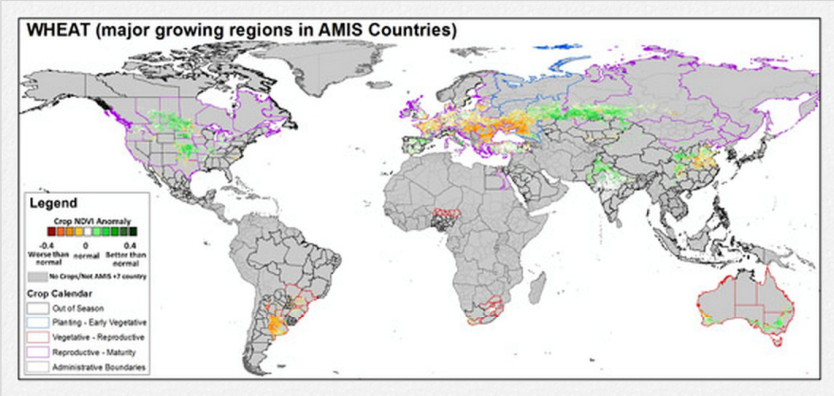
Crop Monitor Website: www.geoglam-crop-monitor.org

GEOGLAM Global Agricultural Monitoring **Crop Monitor**

HOME | CROP MONITOR ASSESSMENTS | CROP ASSESSMENT TOOL | CROP MONITOR GROUP

Crop Monitor Assessments



The GEOGLAM Crop Monitor Assessment is an international consensus assessment developed for AMIS*. It summarizes latest crop conditions for the four AMIS crops, based on regional expertise and analysis of satellite data, ground observations, and meteorological data and was conducted by experts from global, national and regional monitoring systems. For each of the four crops (wheat, maize, soy, rice) a summary of current conditions is provided accompanied by a map of the main crop growing regions for each crop, depicting general crop stage and satellite based vegetation indices satellited derived anomalies. The report includes supporting material used to develop the current assessment.

Tell me more

GEOGLAM Initiative

GEOGLAM, the GEO Global Agricultural Monitoring initiative was initially launched by the Group of Twenty (G20) Agriculture Ministers in June 2011, in Paris. The initiative forms part of the G20 Action Plan on Food Price Volatility, which also includes the Agricultural Market Information System (AMIS, http://www.amis-outlook.org), another inter-institutional initiative hosted by the UN Food and Agriculture Organization (FAO). The G20 Ministerial Declaration states that GEOGLAM "will strengthen global agricultural monitoring by improving the use of remote sensing tools for crop production projections and weather forecasting". By providing coordinated Earth observations from satellites and integrating them with ground-

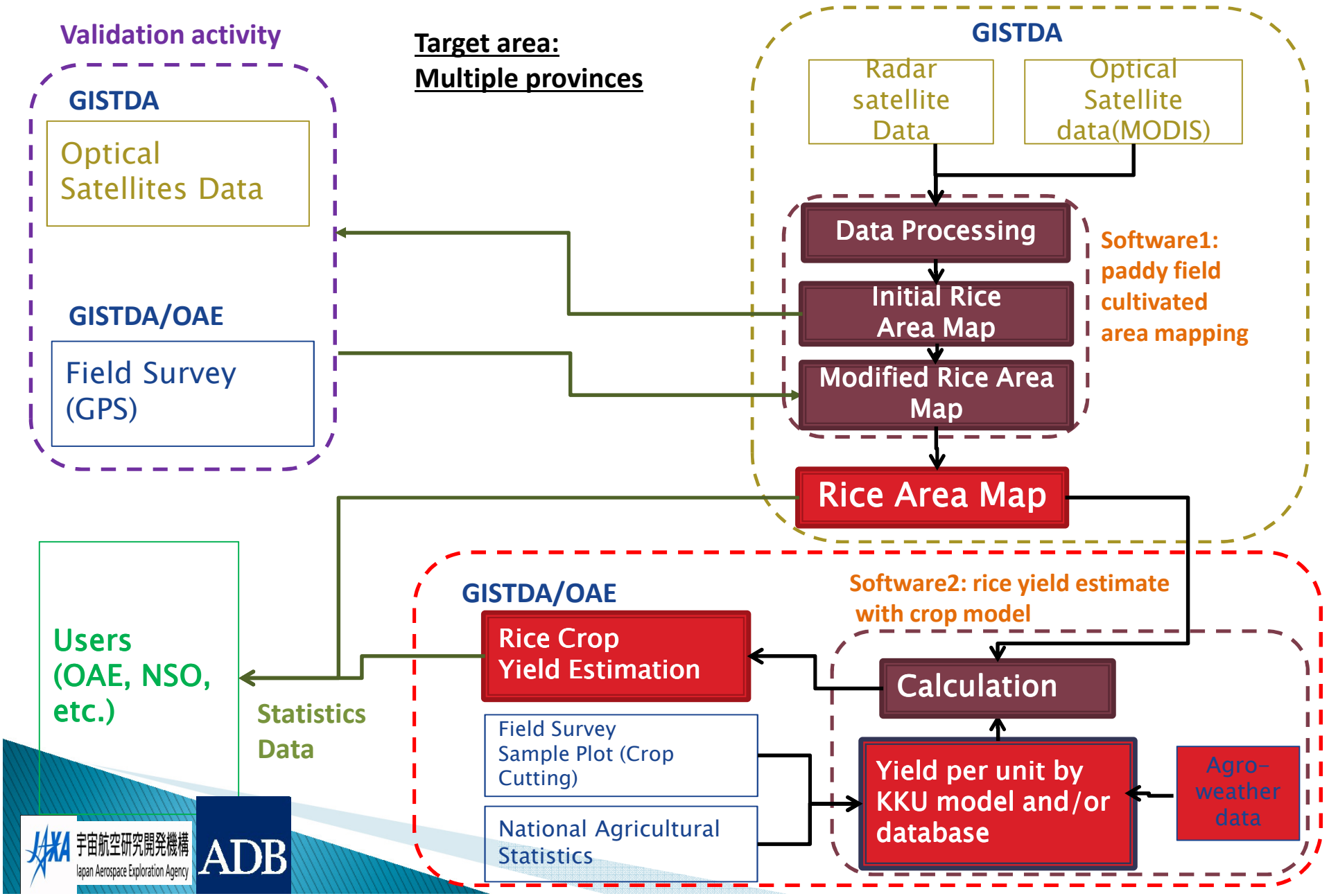
Building the Community of Practice

GEOGLAM
Global Agricultural Monitoring

Open Community made up of international and national agencies concerned with agricultural monitoring including Ministries of Ag, Space Agencies, Universities, and Industry

Component 2 Phase 1-2

SE Asia Regional Rice Monitoring: Thailand



JECAM
Joint Experiment for Crop Assessment and Monitoring

GEO GROUP ON EARTH OBSERVATIONS

- JECAM activities are being undertaken at a **series of study sites** which represent many of the world's main cropping systems
- 29 sites currently exist or are in development

Regional Workshop on
"Satellite Monitoring of Agricultural Lands in Northern Eurasia"
October 28-31, 2013, Moscow, Russia

The goal - to develop a scientific concept of global agricultural monitoring and to coordinate research carried out in countries where agricultural production makes a significant contribution to national economy and food security in the world.

The outcome - recommendations and program of development for agriculture satellite monitoring (GEOGLAM) in the region of Northern Eurasia.

www.geoglam.smiss.ru

Participation - chief scientists and experts from the CIS, EU and Northern America countries, as well as leading international organizations (EC, FAO, WB, GEO, WMO).

The GEOGLAM Rangelands / Pasture lands Task

- Elements:
  - Monitoring of the dynamics of the nature and quantity of available plant biomass, including its condition and trends in productivity, as affected by natural and human-induced impacts across the globe; and
  - Monitoring of the nature and quality of the animals that feed on the biomass and their protein production
  - Timely and accurate national (sub-national) agricultural statistical reporting
  - Accurate forecasts of pasture and rangelands productivity declines
  - Early warning of pasture decline, food production shortfalls

Based on spatially explicit biomass dynamics and biomass utilisation with:

- wall-to-wall satellite data
- standardised land-cover mapping approaches,
- Integrated ground measurements of aboveground biomass and
- simulation modelling

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GEOGLAM Global Agricultural Monitoring

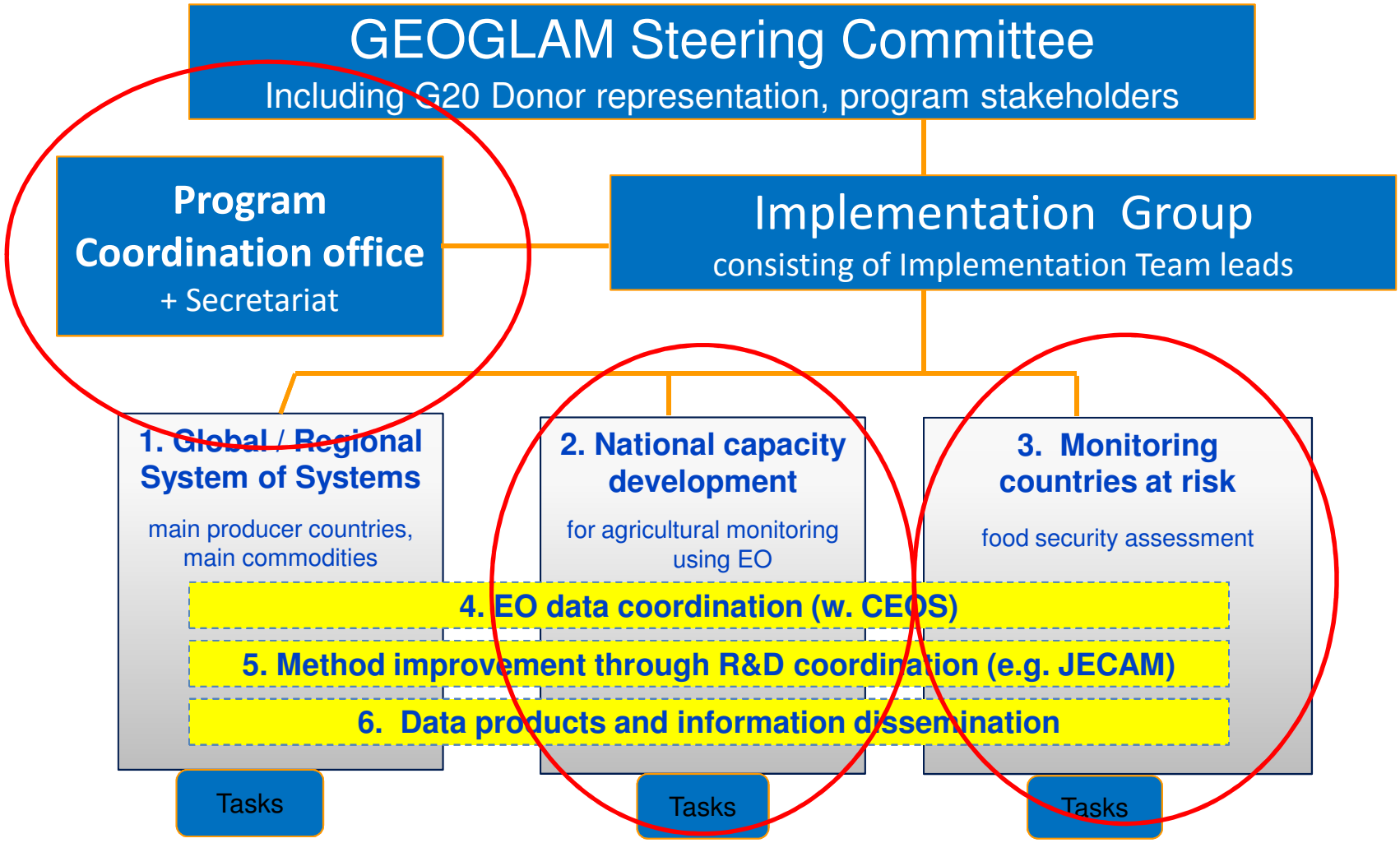
GEOGLAM Next Steps

- Global, EO and Research Components Progressing
- Some national capacity building activities underway more are needed (to support requests from Eastern Europe/Caucuses/Central Asia/S. America)
  - Encourage linkages between GEOGLAM and AMIS for building national monitoring and reporting capability with GEOGLAM support e.g. Argentina/Ukraine
- Support is urgently needed for:
  - The Food Security Component
  - Developing Country Capacity Building for Agricultural Monitoring

GEOGLAM Funding

- A growing and understandable international interest in Food Security
- The need for GEOGLAM is broadly recognized
- Interest now needs to translate into funding for implementation
- A major donor (EC?) is needed to show international leadership and support GEOGLAM Program Implementation (inc. staffing the Project Office) - Other donor funding(s) will then follow

GEOGLAM Organizational Structure



GROUP ON EARTH OBSERVATIONS

Thank You

and

a very big thank you to

Joao Soares

his last meeting as

GEOGLAM

Program Coordinator

who has been

instrumental in launching

the program

GEOGLAM

Global Agricultural Monitoring