GEO EUROPEAN PROJECTS' WORKSHOP-7

Barcelona
15-16 April 2013

GROUP ON EARTH OBSERVATIONS

GEOGLAM
Global Agricultural Monitoring

João Soares
Scientific Consultant for Agriculture
GEO Secretariat

On behalf of the GEO AG CoP

GEO vision in building GEOSS…

…the use of coordinated, comprehensive and sustained Earth observations to inform decisions and actions

COMMUNITY OF PRACTICE

Groups of people who share a concern, a set of problems, or a passion about a topic by interacting on an ongoing basis*

GEO Global Agricultural Monitoring Community of Practice

- Individuals or organizations with an interest in improving earth observations in support of agricultural monitoring and sharing the common vision of the task.

- An open community of interested parties – Agricultural Monitoring practitioners, space agencies, data providers of in-situ and satellite observation

all welcome!!!

** Cultivating communities of practice, Harvard Business School Press 2002*

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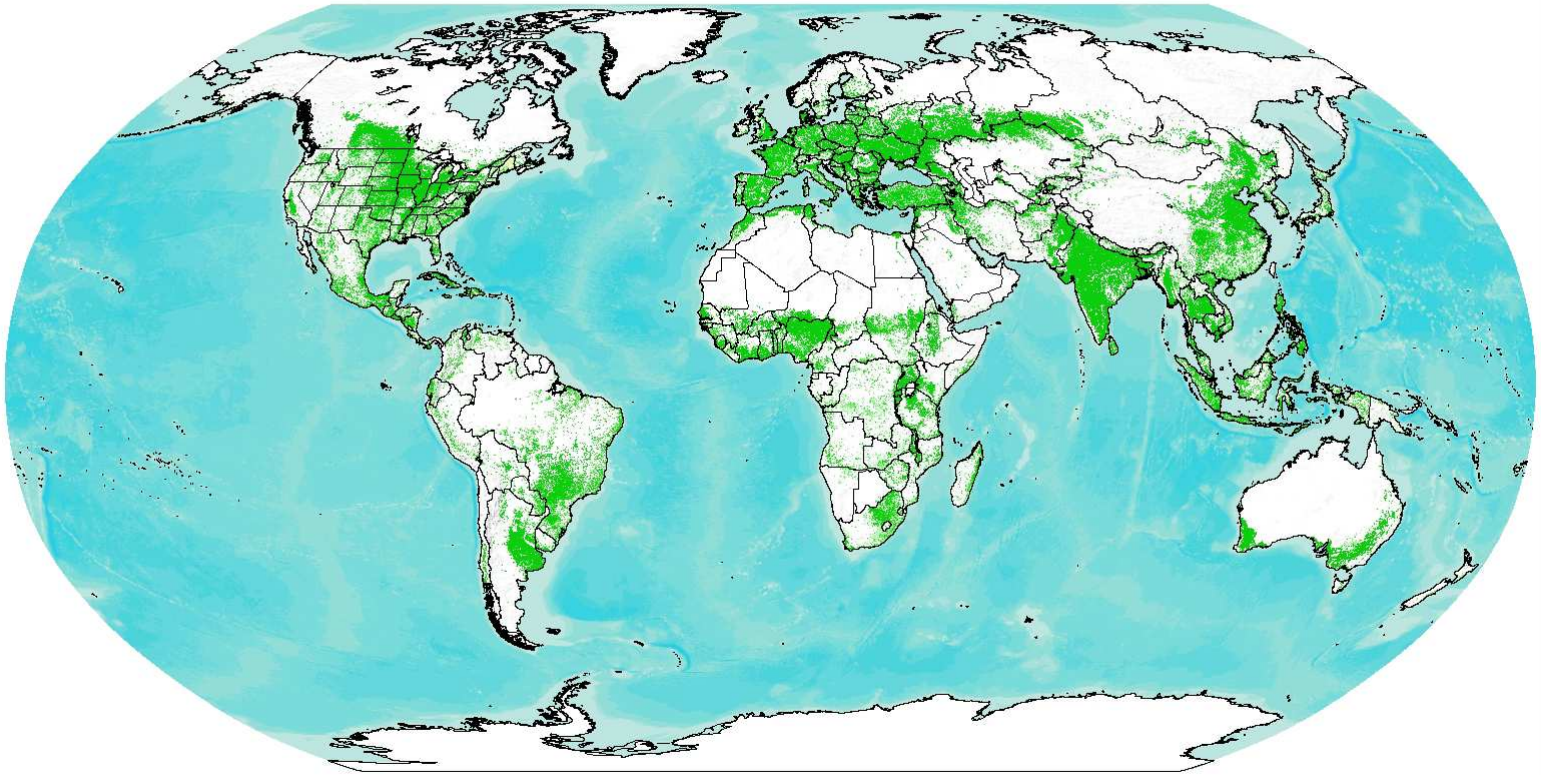
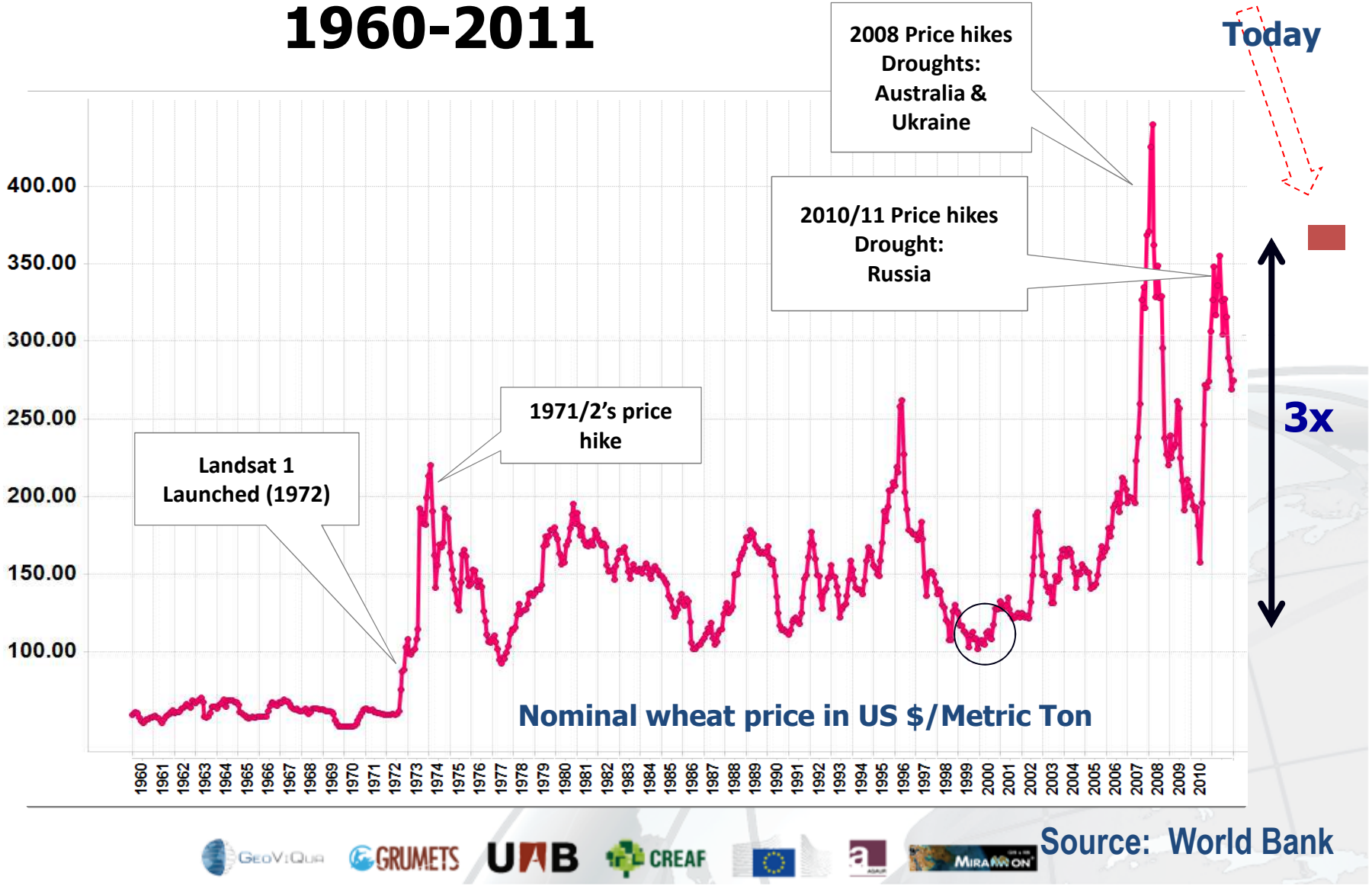
Rice Information System

Best Available Cropland Distribution



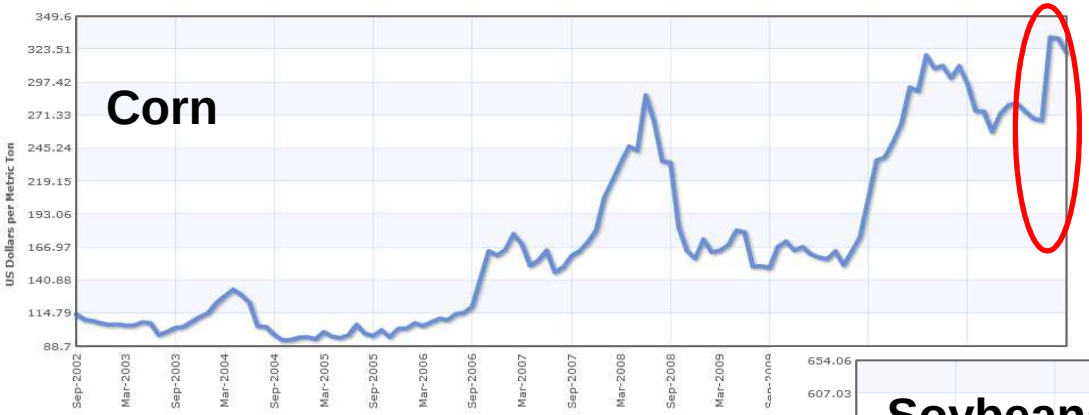
Source: IIASA, Fritz et al. Beta Version 1

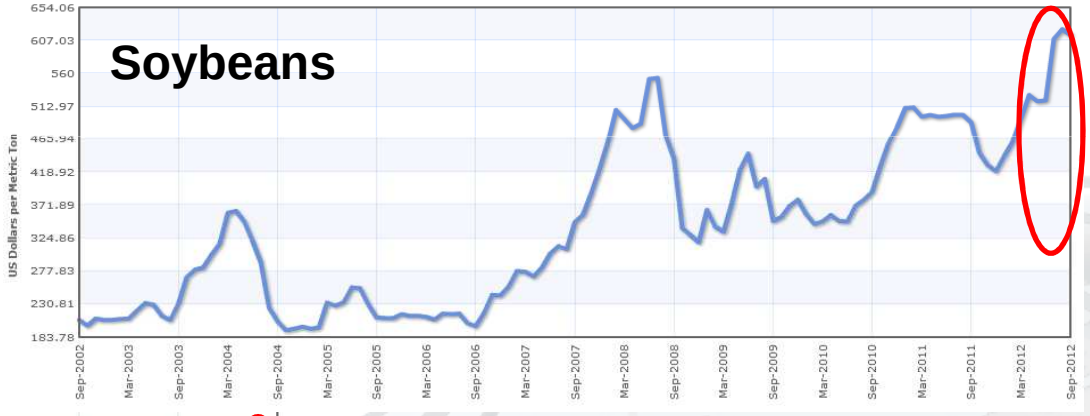
Monthly Wheat Prices 1960-2011

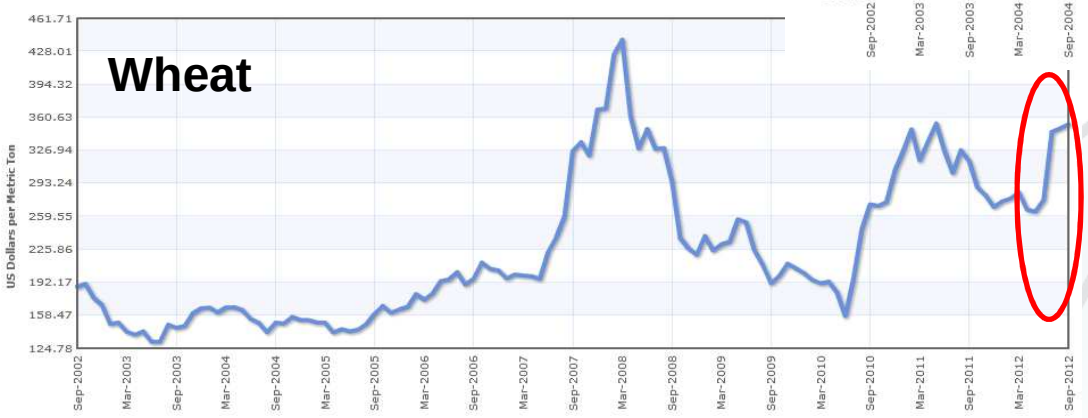


Source: World Bank

10 year (2002-2012) Monthly Market Prices ($/MT)







Background : the G20 Agriculture priority (2011)

G20 Final Declaration – Cannes, November 2011

*44. We commit to **improve market information and transparency** in order to make international markets for agricultural commodities more effective. To that end, we launched:*

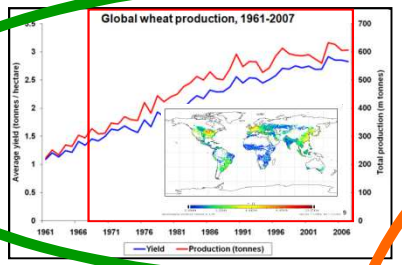
*The **"Agricultural Market Information System" (AMIS)** in Rome on September 15, 2011, to improve information on markets ...;*

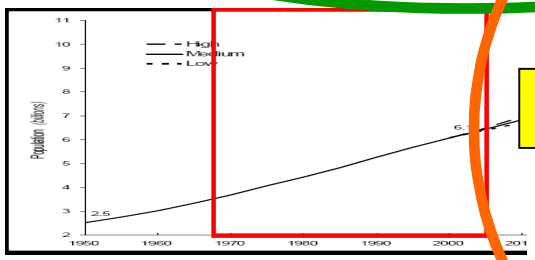
*The **"Global Agricultural Geo-monitoring Initiative" (GEOGLAM)** in Geneva on September 22-23, 2011. This initiative will coordinate satellite monitoring observation systems in different regions of the world in order to enhance crop production projections and weather forecasting data.*

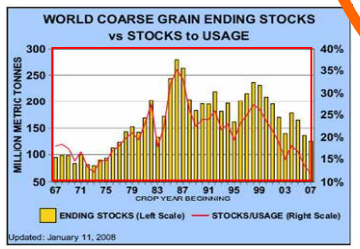
Background : the G20 Agriculture priority (2011)

2 initiatives to increase information availability, quality and transparency

GEOGLAM







Supply

Price

Demand

Policies

Finance

Trade

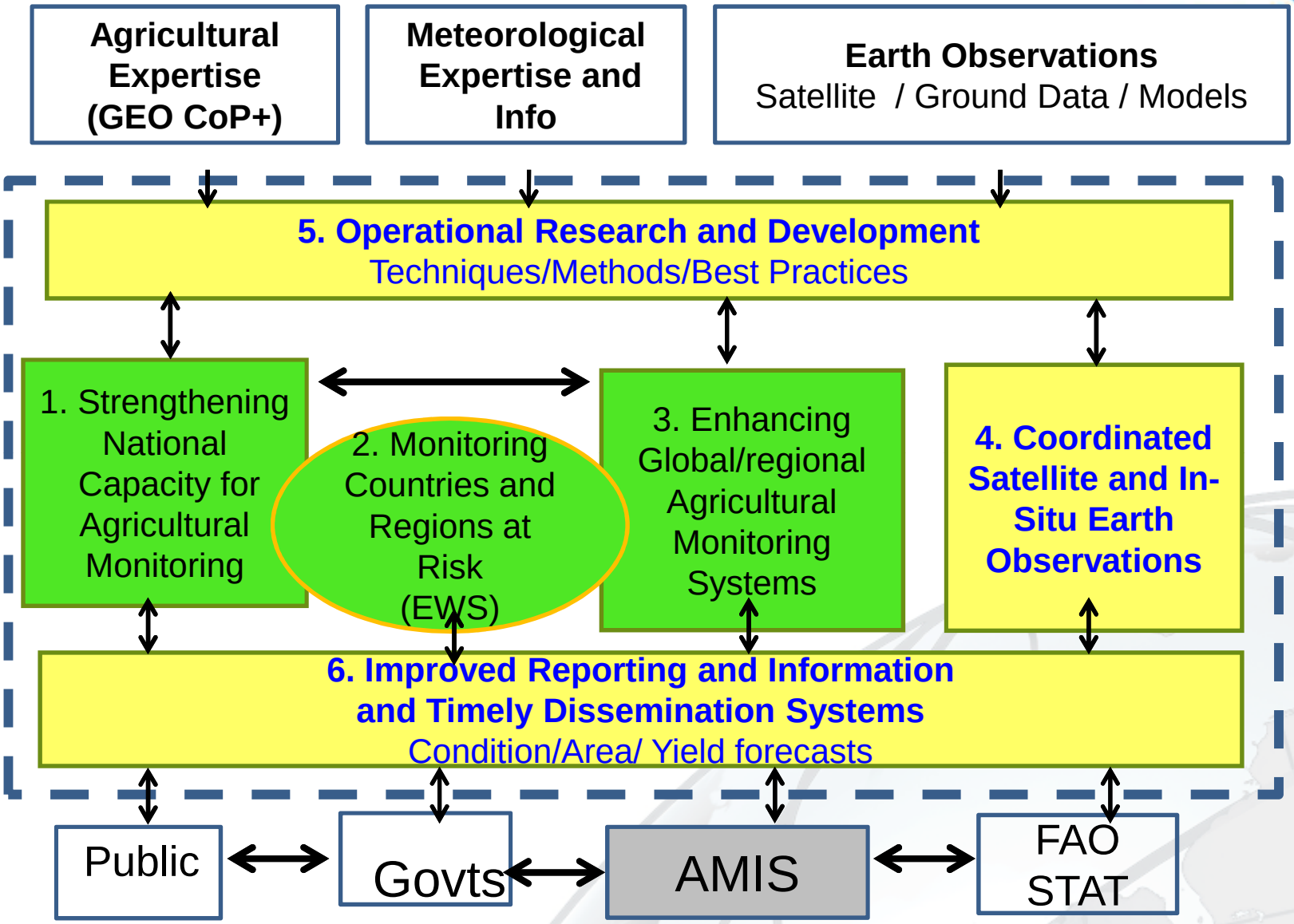
Stocks

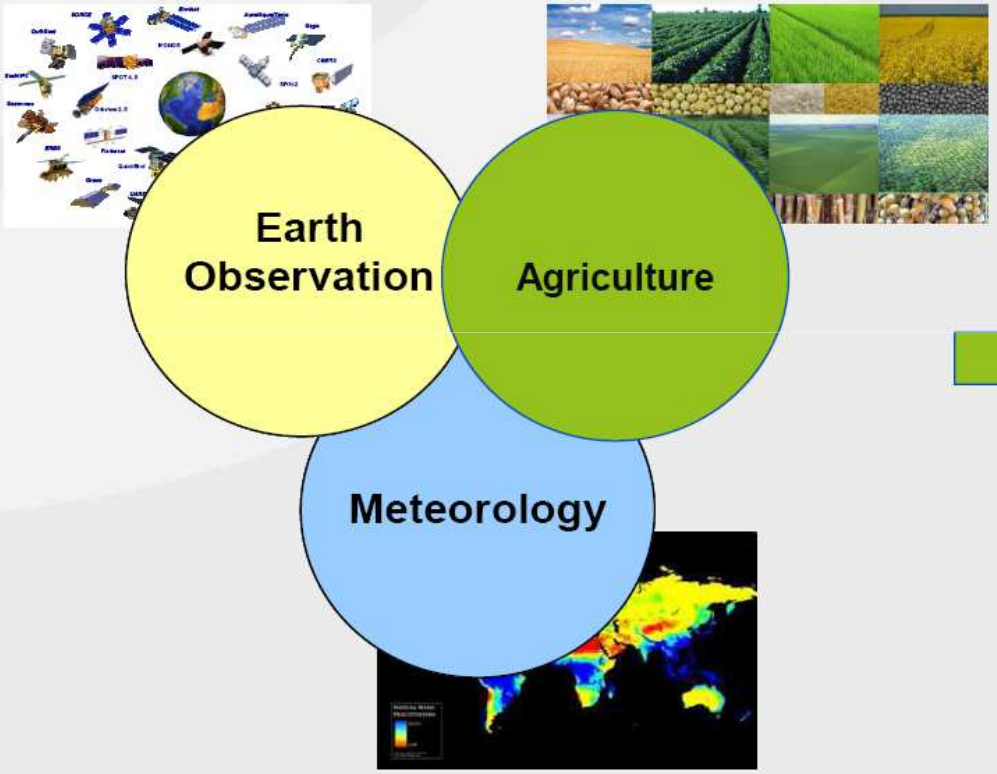
AMIS

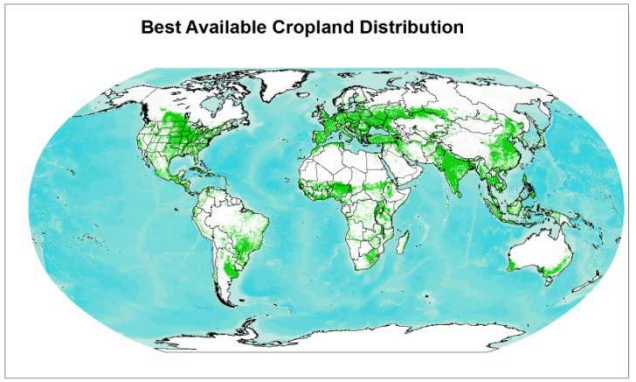
GOAL AND SCOPE

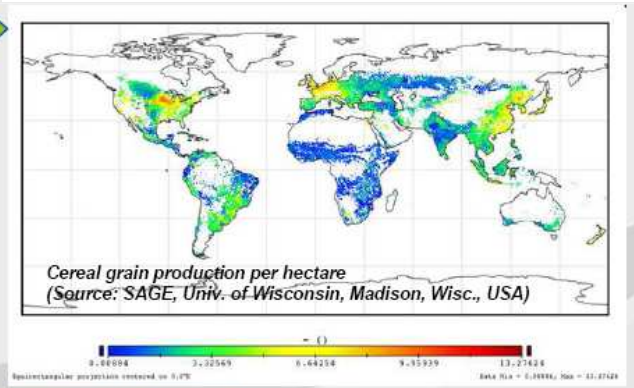
- To strengthen the international community's capacity to produce and disseminate relevant information on agricultural production at national, regional and global scales, through reinforced use of Earth Observations.

- GEOGLAM is a « coordination programme », aiming at:
  - supporting, strengthening and articulating existing efforts
  - developing capacities and awareness at national and global level
  - disseminating information

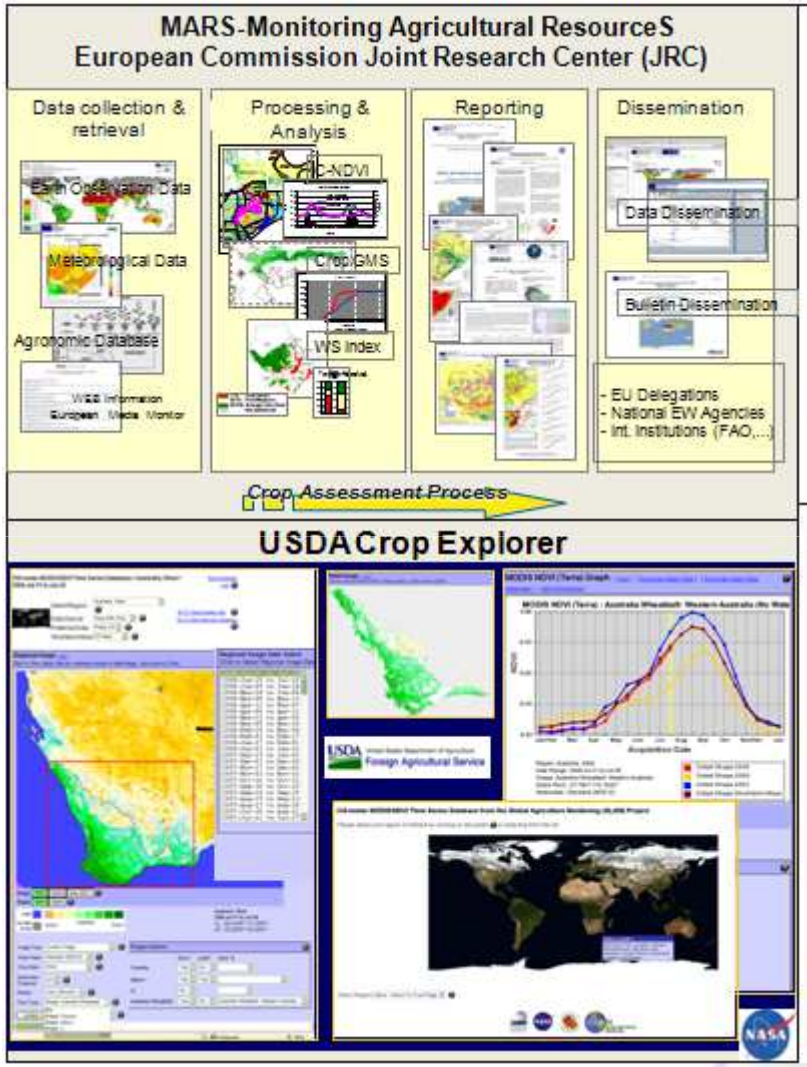

Agricultural Expertise (GEO CoP+)
Meteorological Expertise and Info
Earth Observations
Satellite / Ground Data / Models
5. Operational Research and Development
Techniques/Methods/Best Practices
1. Strengthening National Capacity for Agricultural Monitoring
2. Monitoring Countries and Regions at Risk (EWS)
3. Enhancing Global/regional Agricultural Monitoring Systems
4. Coordinated Satellite and In-Situ Earth Observations
6. Improved Reporting and Information and Timely Dissemination Systems
Condition/Area/ Yield forecasts
Public
Govts
AMIS
FAO STAT

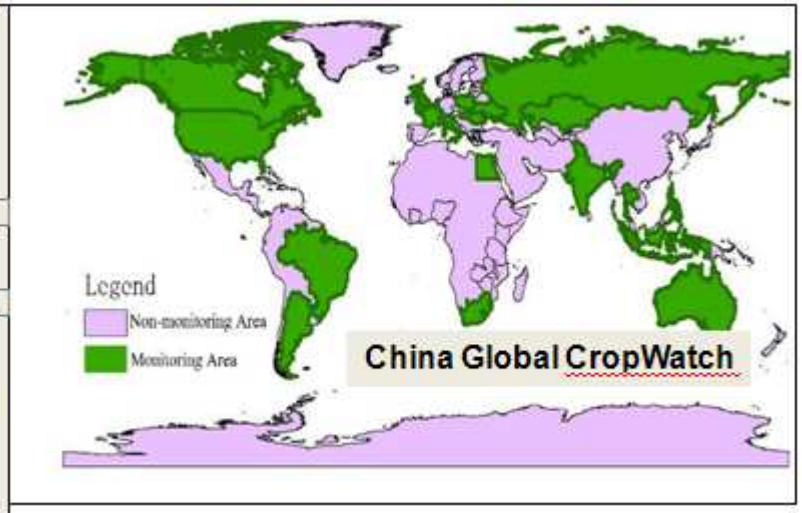




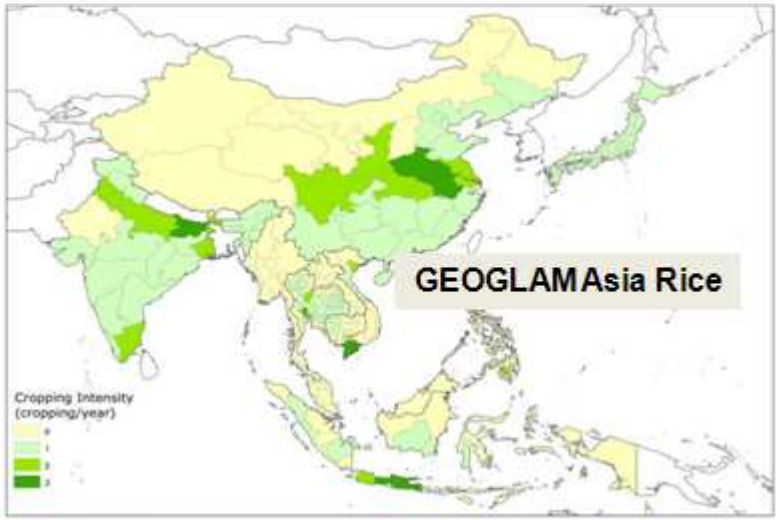


Crop yield forecast


MARS-Monitoring Agricultural ResourceS
European Commission Joint Research Center (JRC)
Data collection & retrieval
Earth Observation Data
Meteorological Data
Agronomic Database
Processing & Analysis
C-NDVI
CropGMS
WS Index
Reporting
Dissemination
Data Dissemination
Bulletin Dissemination
- EU Delegations
- National EW Agencies
- Int. Institutions (FAO,...)
Crop Assessment Process


Legend
Non-monitoring Area
Monitoring Area
China Global CropWatch

USDA Crop Explorer


GEOGLAM Asia Rice
Cropping Intensity
(cropping/year)

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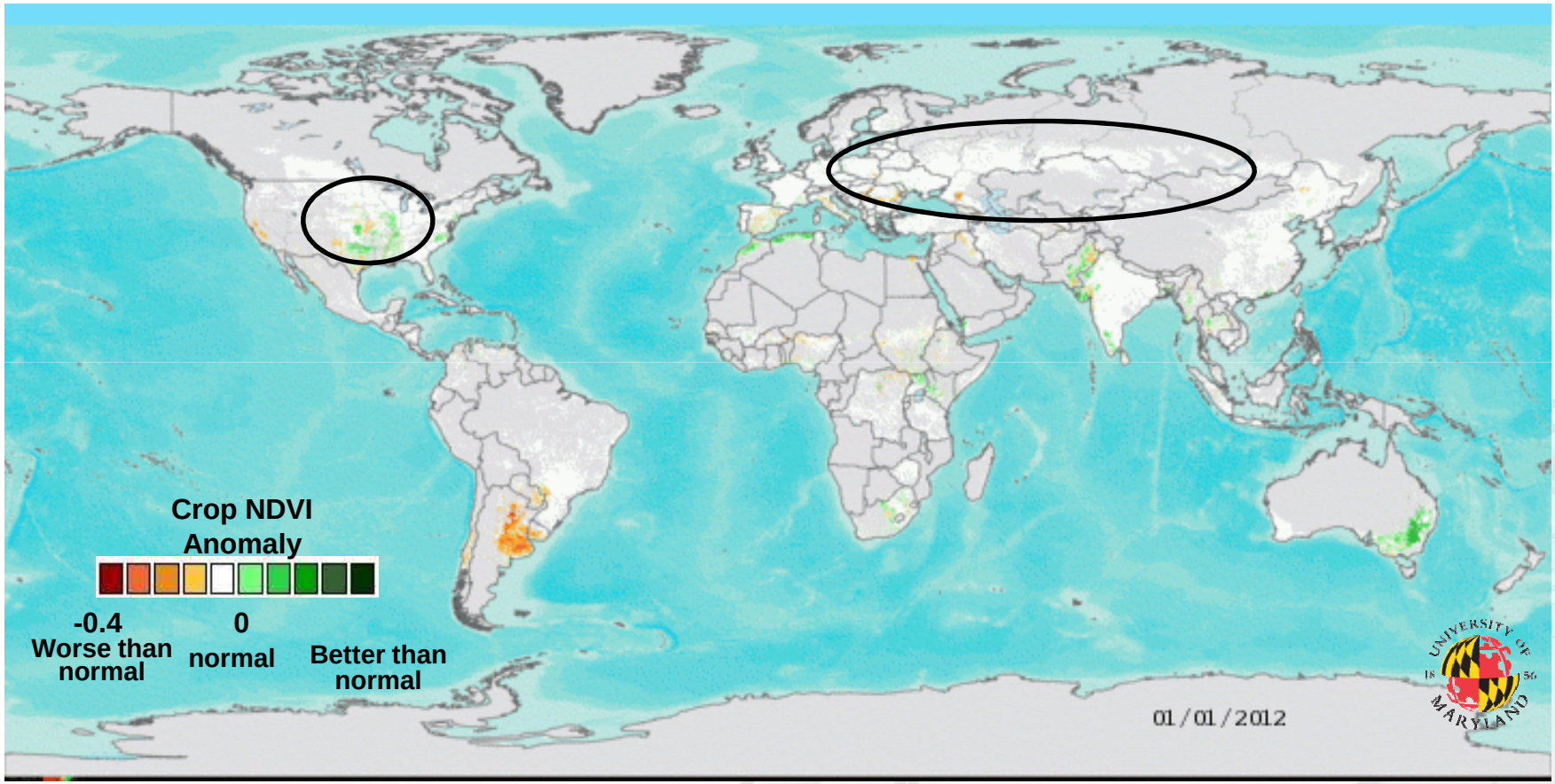
THE NORTHERN HEMISPHERE 2012 AGRICULTURE DROUGHT CASE

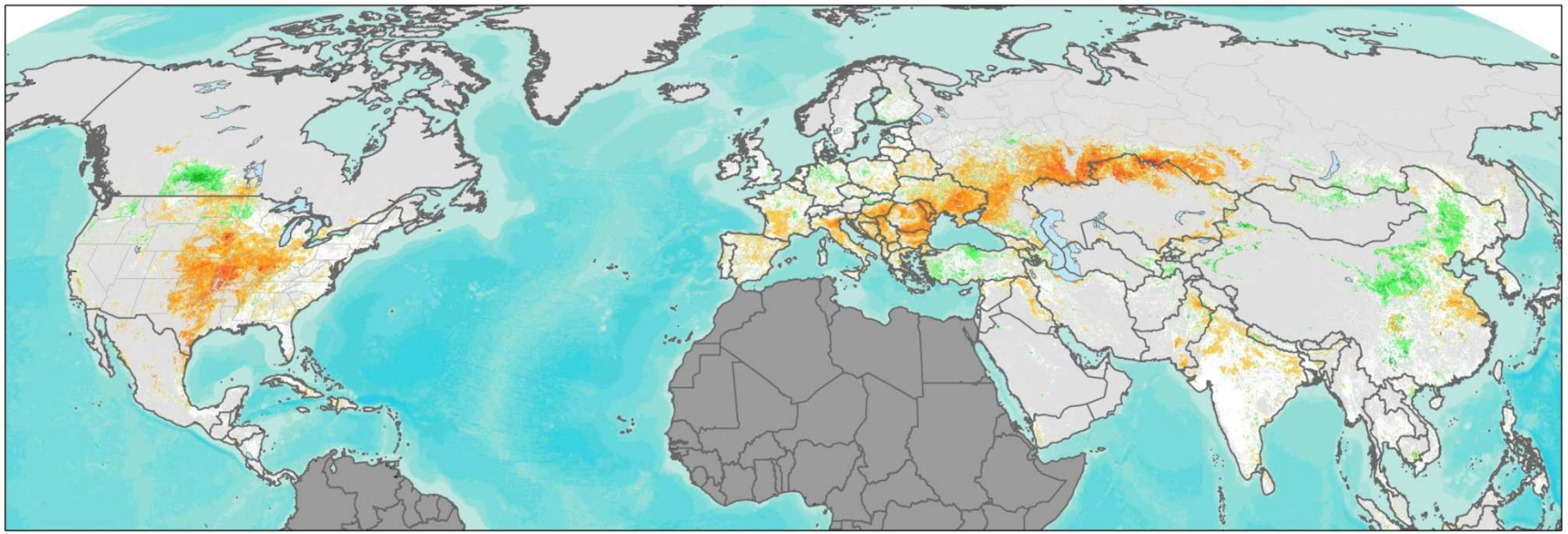
…A DEMONSTRATION ON WHAT GEOGLAM IS DELIVERING (GLOBAL PRODUCTS)

2012 Daily Crop NDVI Anomaly from MODIS
January 1 through September 10th, 2012



NDVI Departure from Median (2000-2011)

Northern Hemisphere Crop NDVI Anomalies



Crop NDVI Anomaly

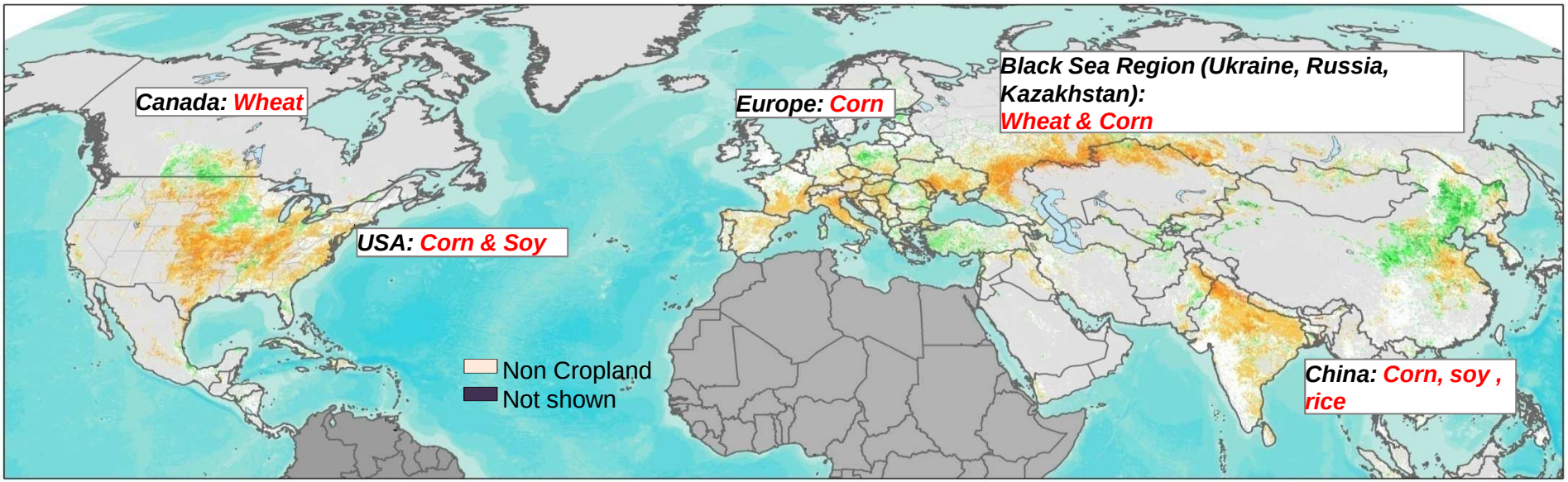
-0.4
Worse than normal

0
normal

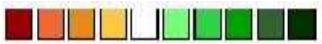
Better than normal

Non Cropland
Not shown

Northern Hemisphere NDVI Crop Anomaly, July 1st, 2012



Crop NDVI Anomaly



-0.4	0	0.4
Worse than normal	normal	Better than normal

- *Crop stage sensitive to moisture and temperature*
- Crop stages largely based on USDA/NOAA Joint Agricultural Weather Facility (JAWF

Notes/Questions?

- US NDVI anoms continues to spread and intensify- affect on corn/soy?
- NDVI anoms in Ukraine intensifying in the south
- NDVI anoms in Russia, Kazakhstan intensifying, - impact on summer crops/wheat?

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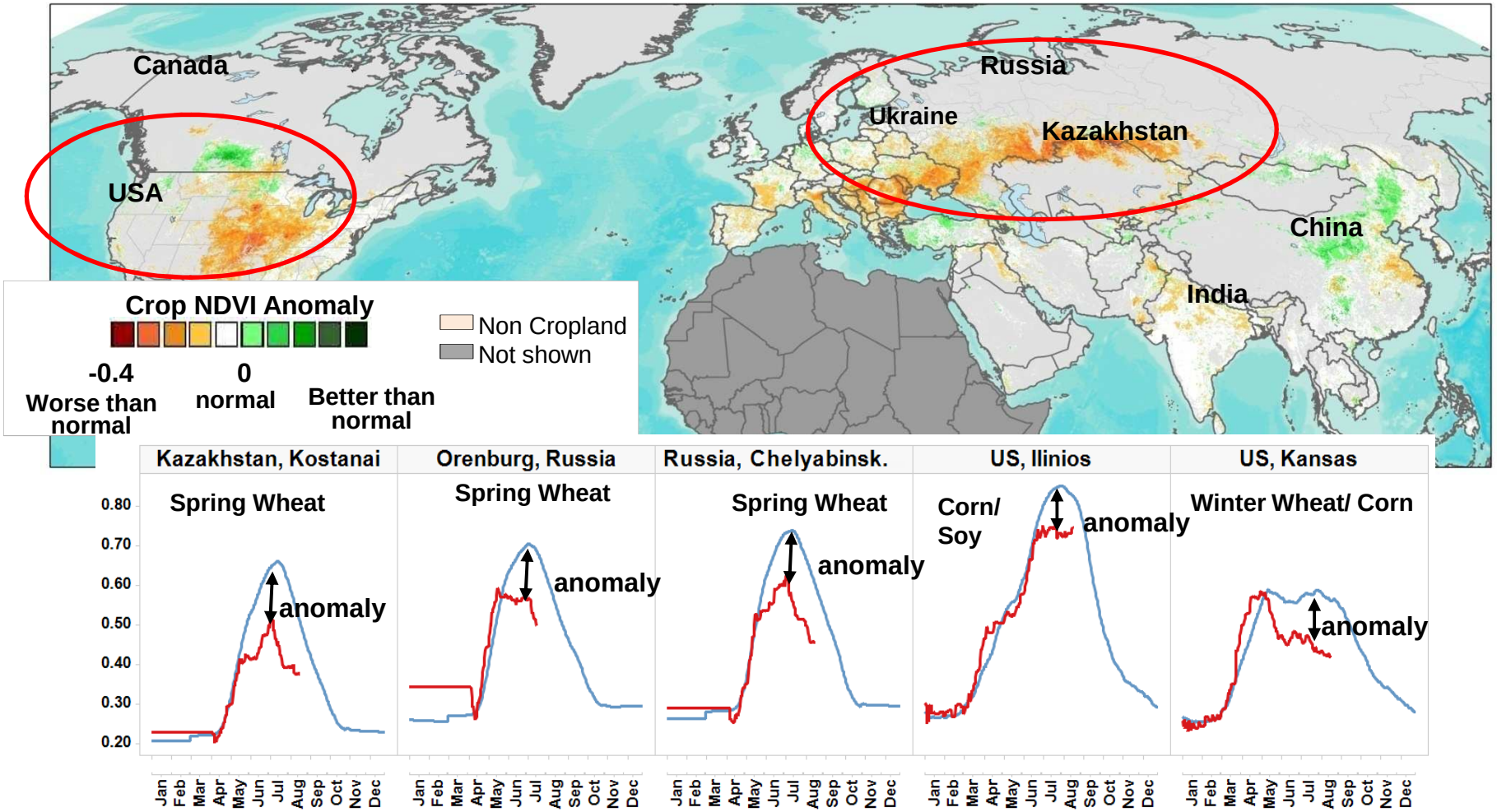
Northern Hemisphere Crop NDVI Anomalies - August 13th, 2012

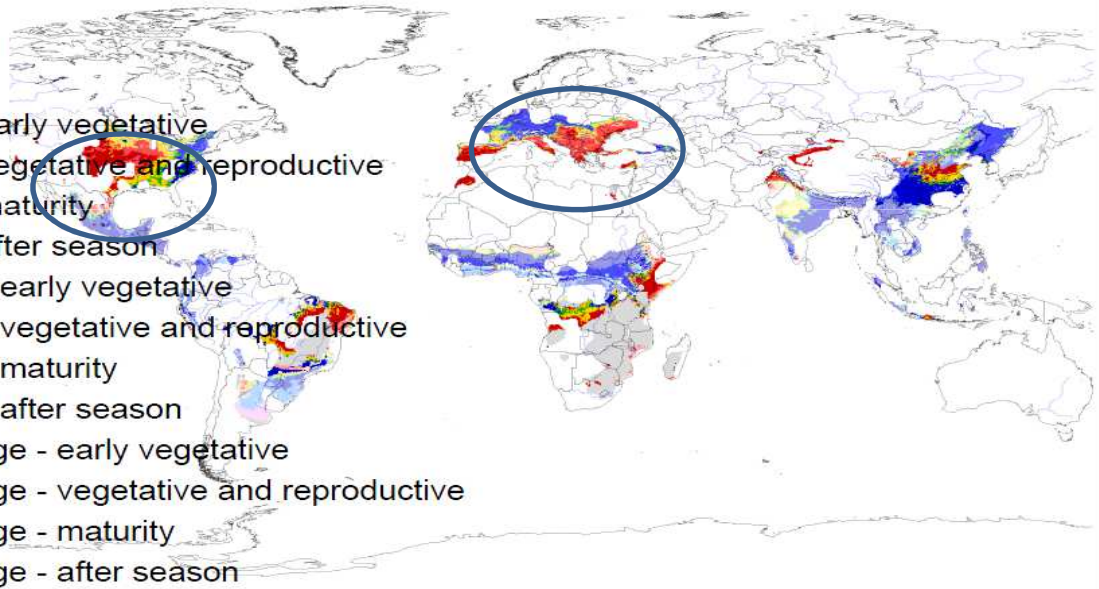


PROGRESS AND WATER SATISFACTION INDEX - NORMAL
GRAIN MAIZE

from : **21 August 2012**
to : **31 August 2012**

Year of interest (YOI)
After-season period length (dekads): 9

Unit: -

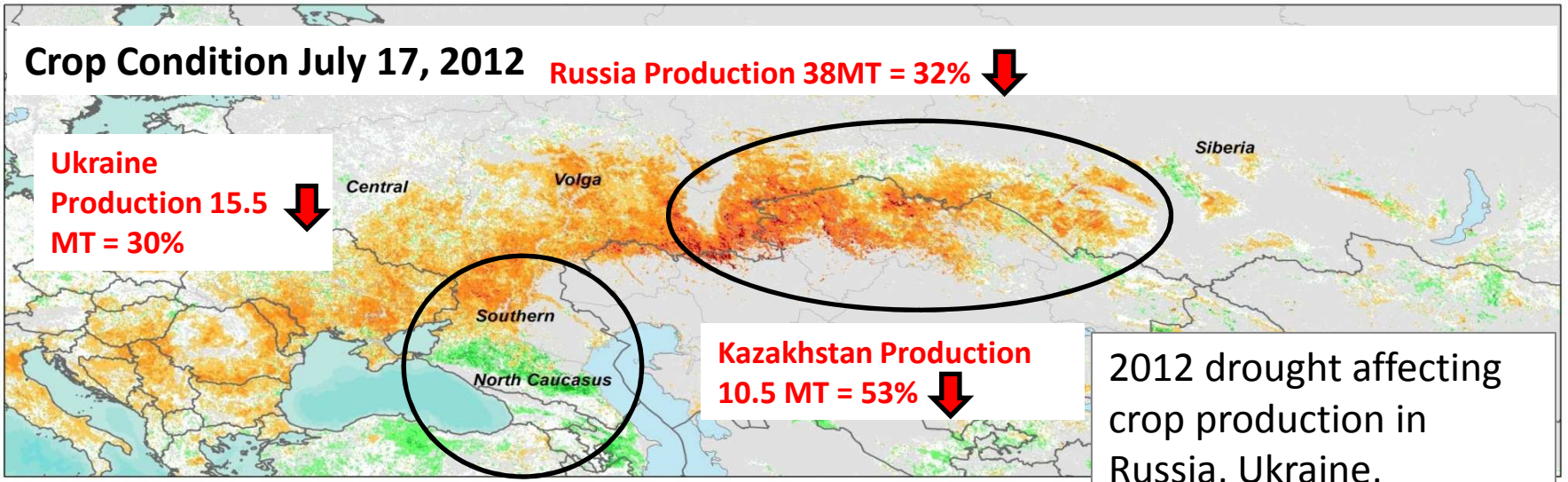


- sowing rule scanning
- outside crop season
- no water shortage - early vegetative
- no water shortage - vegetative and reproductive
- no water shortage - maturity
- no water shortage - after season
- light water shortage - early vegetative
- light water shortage - vegetative and reproductive
- light water shortage - maturity
- light water shortage - after season
- medium water shortage - early vegetative
- medium water shortage - vegetative and reproductive
- medium water shortage - maturity
- medium water shortage - after season
- severe water shortage - early vegetative
- severe water shortage - vegetative and reproductive
- severe water shortage - maturity
- severe water shortage - after season

05/09/2012
resolution: 0.125 x 0.125 degrees

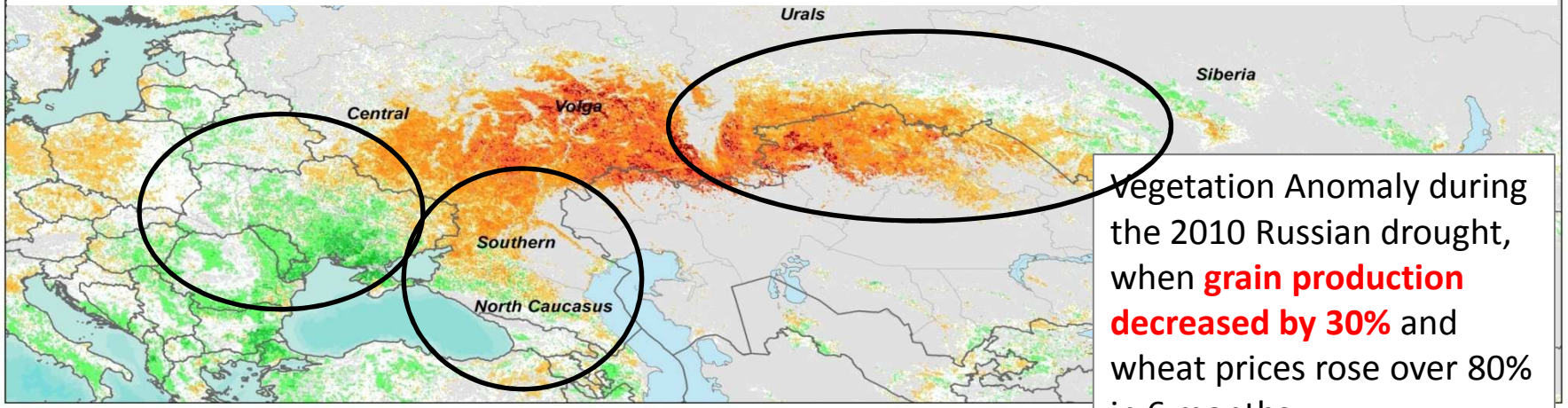
Source: JRC - FOODSEC Action - MARS Unit
source: Joint Research Centre
Processed by: ALTERRA consortium

Crop Condition July 17, 2012



2012 drought affecting crop production in Russia, Ukraine, Kazakhstan

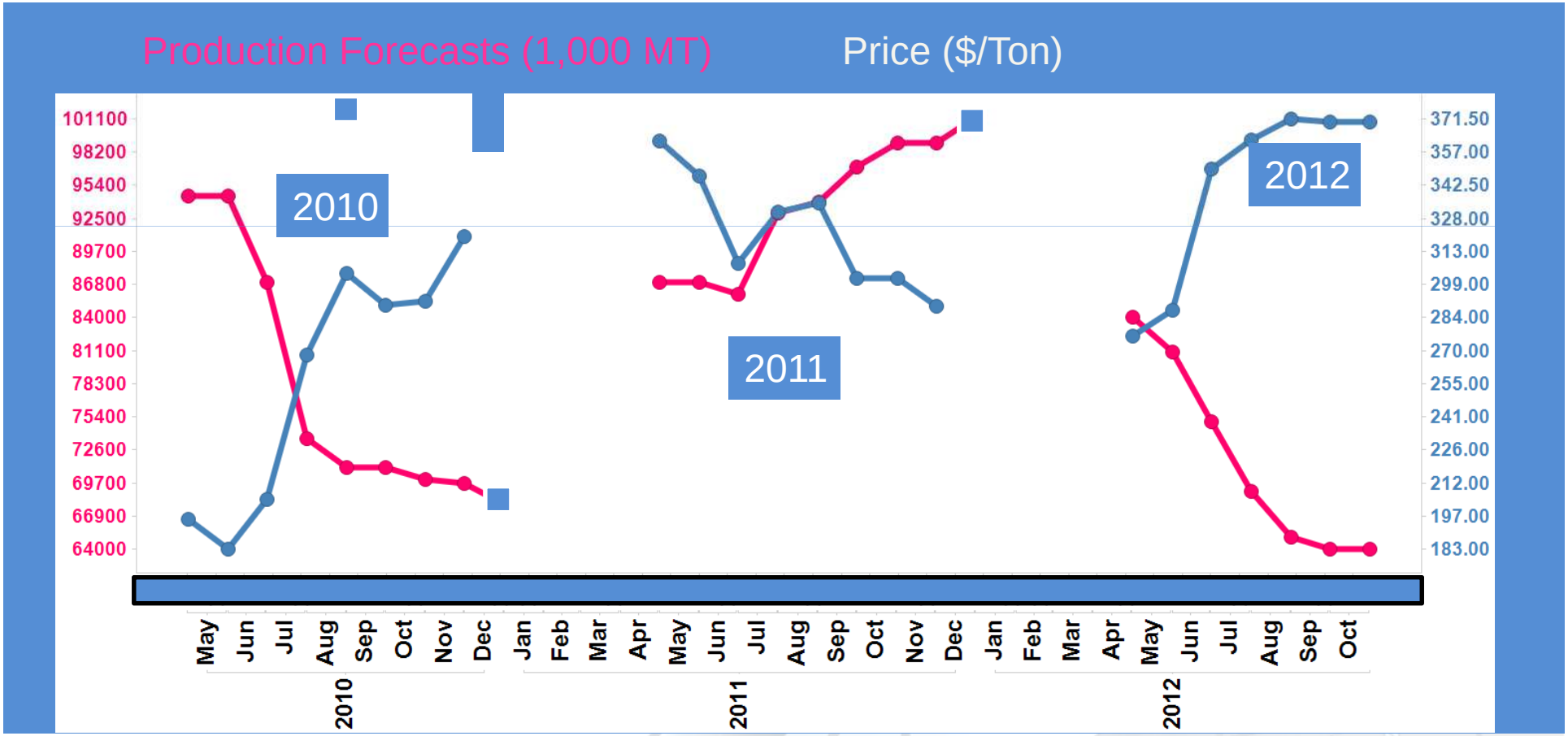
Crop Condition During the 2010 Russian Drought: (July 17 2010)



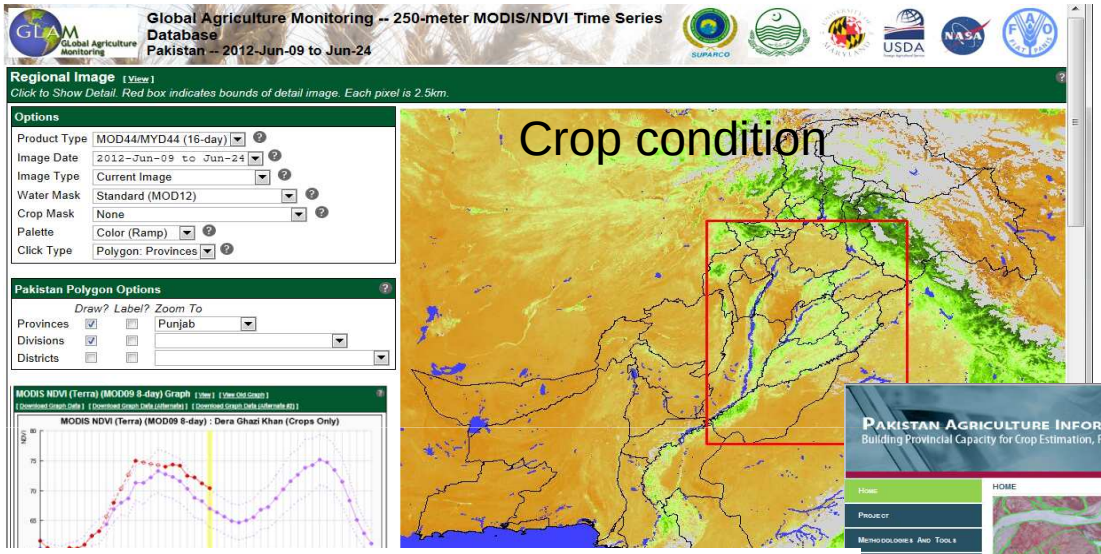
Vegetation Anomaly during the 2010 Russian drought, when **grain production decreased by 30%** and wheat prices rose over 80% in 6 months

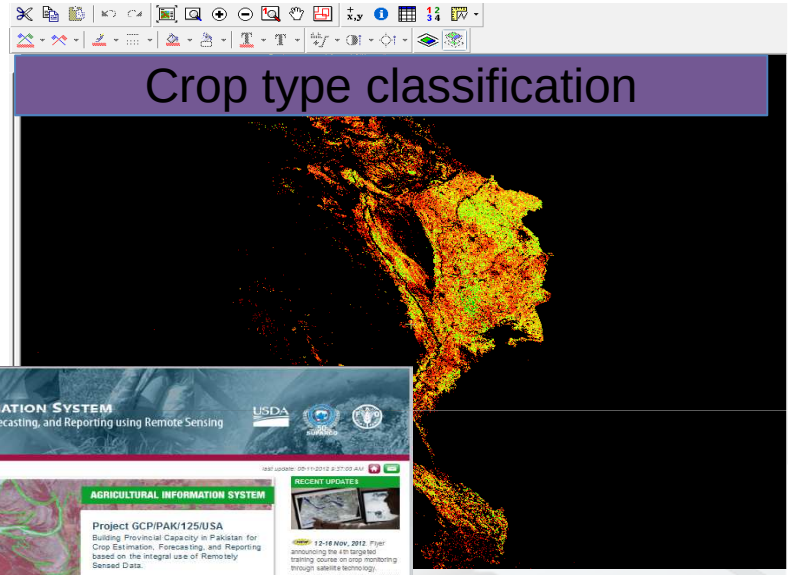
Making the case for improved crop forecasts

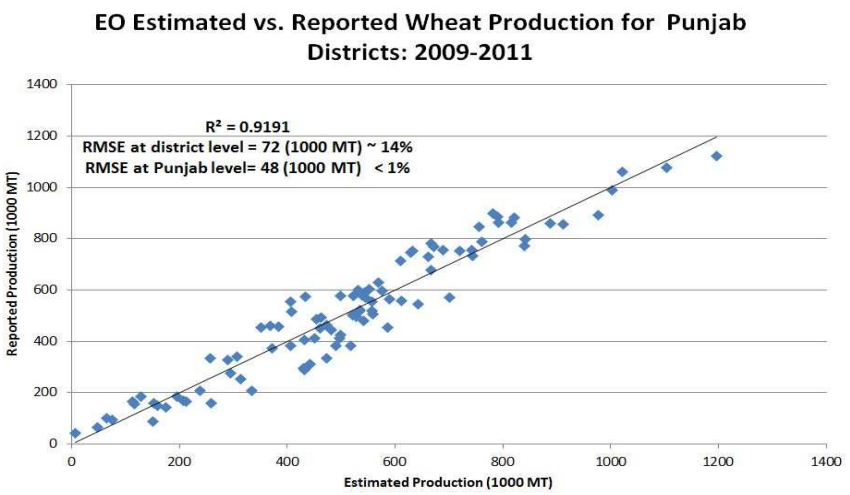
Aggregation of Wheat Production Forecasts from Main Wheat Export Countries vs. International Market Price 2010-2012



PAKISTAN AGRICULTURAL INFORMATION SYSTEM (COLLABORATION BETWEEN USDA, FAO, SUPARCO, CRS, & UMD)

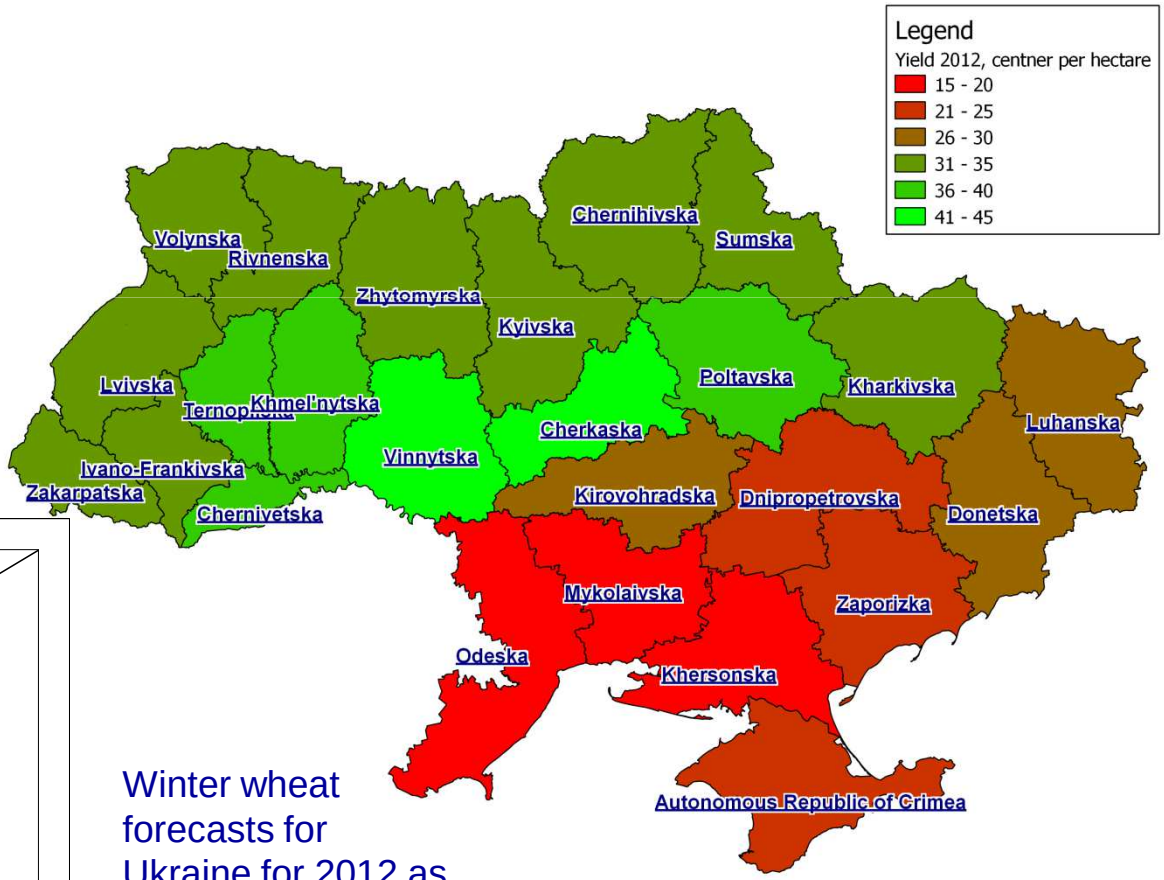


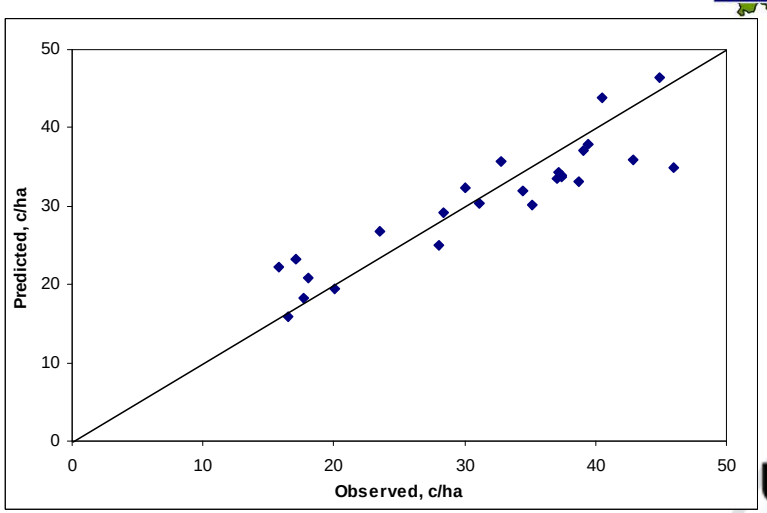




Winter wheat forecast for 2012

- **Operational forecasting of winter wheat yield in Ukraine for 2012 based on Earth observation**





Winter wheat forecasts for Ukraine for 2012 as of 2 June 2012

SOME FINDINGS & WAY FORWARD

- EO and Agromet models provide now globally objective indicators for crop monitoring
- GEOGLAM Community of Practice coming together to share information and discuss openly the findings
  - Clear convergence of evidences between sources
  - Many countries and institutions involved
  - A first proof of concept

GEOGLAM : Earth Observation requirements

Input to CEOS : Summary **table of requirements**

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

OBSERVATIONS					DERIVED PRODUCTS							GLOBAL	REGION SPECIFIC ACQUISITIONS**			
Spatial resolution	Spectral range	Effective observ. frequency (cloud free)	Swath	Use (Primary Source /Secondary S.)	Croplands mask	Crop type area	Crop cond. indicators	Crop bioph. var.	Env. variables (reservoir, water, soil moisture)	Ag. Practices / Cropping systems	Crop yield	Agricult. coverage	Large, Medium, Small fields	Crop types diversity	Calendar/Multi-ple cropping	Cloud coverage
2000 - 500 m	thermal IR + optical	few per day	global	NRT products (PS)			x	x (LF)				x				
100-300m	optical + SWIR	2 to 5 per week	global	NRT products (PS)	x	x	x	x (LF)		x (LF)	x (LF)	x	all L			
1-15km	passive microwave	daily	global	NRT products (PS)					x			x				
150-75 m	SAR dual pol. (X,C,L)	5 per season	main crops	NRT products (SS/PS)*	x	x	x	x (LF)	x	x (LF)			all L	rice area	entire growing seasons	high cloud cov.
5-10m	SAR dual pol. (X,C,L)	5 per season	main crops	NRT products (SS/PS)*		x	x	x	x	x			L/M/S	rice area		high cloud cov.
20-70m	optical + SWIR	1 per month (if possible same sensor)	croplands	annual products (PS)	x	x							all M		year-round, focus on growing season	
Footprint	RADAR Altimetry	weekly		NRT products (PS)					x							
50-100m	thermal	daily ?	main crops	NRT products (PS)			x						L/M/S		entire growing seasons	
20-70m	optical+SWIR	1 per week (min. 1 per 2 weeks)	main crops	NRT products (PS)			x	x	x	x			country specific (1) L/M		entire growing seasons	
5-10 m	optical (+SWIR)***	1 per month (if possible same sensor)	croplands	annual products (PS)	x	x							all S		year-round, focus on growing season	
5-10 m	optical (+SWIR)***	1 per week (min. 1 per 2 weeks)	main crops	NRT products (PS)			x	x	x	x			country specific (1) S		entire growing seasons	
< 5 m	optical	1 to 2 per month	croplands	annual products (PS)		x				x	x		demo. case (2 to 5% of		2 to 4 coverages per year	

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

GROUP ON EARTH OBSERVATIONS

Examples of Phase 1 Support: Current & Potential

- US

  NASA
  - Global Soy Area Estimation
  - GEOGLAM operations
  - Drought monitoring system prototype
  - Wheat Yield Forecasting prototype

  USDA
  - Pakistan Capacity Building
  - GLAM Operation w. NASA
- Japan, India:
  - Asia Rice Initiative (ADB)
- China:
  - GEO Agriculture - MOST, indication considering support GEOGLAM next year
- Canada
  - JECAM office

EU FP 7
- 9 Million Euro Call in Process

France
- GEOGLAM operations - secondment of project coordinator

Gates Foundation
- Indicated interest in supporting Africa capacity building activities

Germany
- Indicated interest to support GEOGLAM

Argentina (Ministry of Ag)
- National capacity building initiative

Mexico (SIAP)
- National capacity building initiative

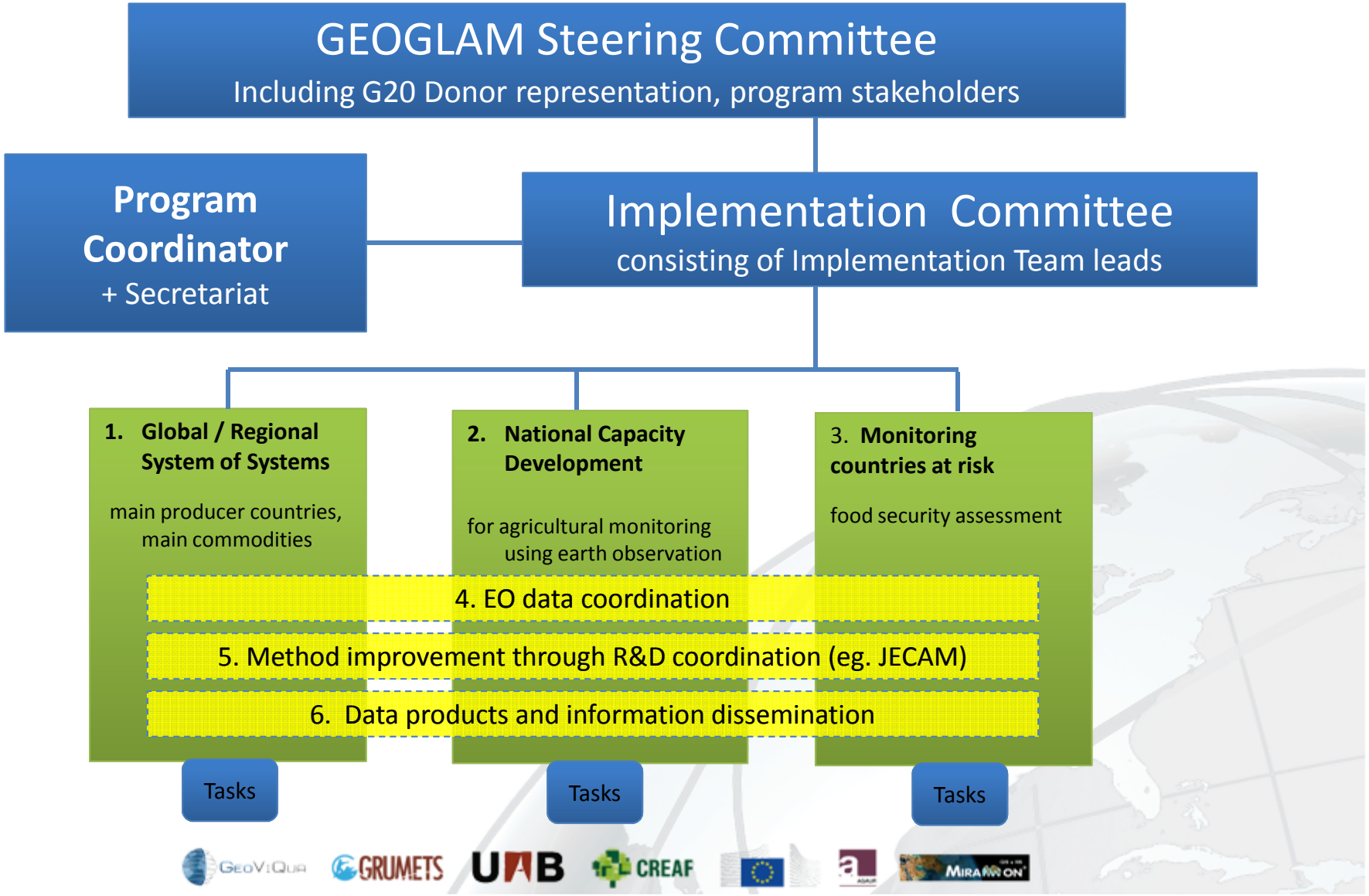
GROUP ON
EARTH OBSERVATIONS

THANK YOU !

earthobservations.org

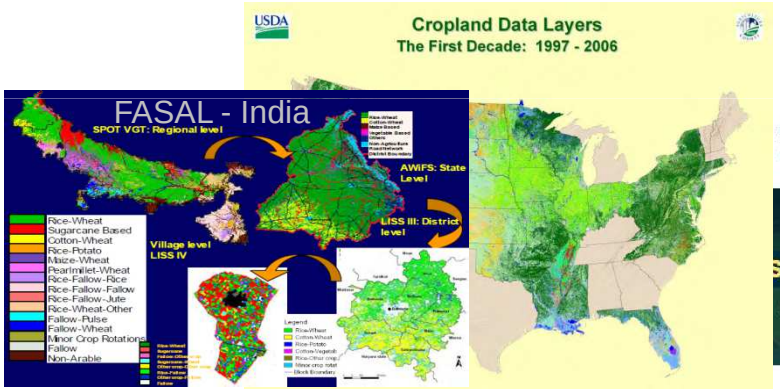
jsoares@geosec.org

GEOGLAM GEO Governance



Improved Crop Management

(Argentina, Brazil, Canada, China, EC, France, India, Mexico, Russia, South Africa, USA, FAO)



* New GEO proposal adopted by G20 (Cannes, 3-4 Nov 2011)
* Inter-comparisons of agricultural modeling & monitoring methods
* 7 pilot sites in Argentina, Canada, China, Europe and Mexico
* 2 new pilot-sites in Brazil
* Satellite data acquisition coordinated with CEOS

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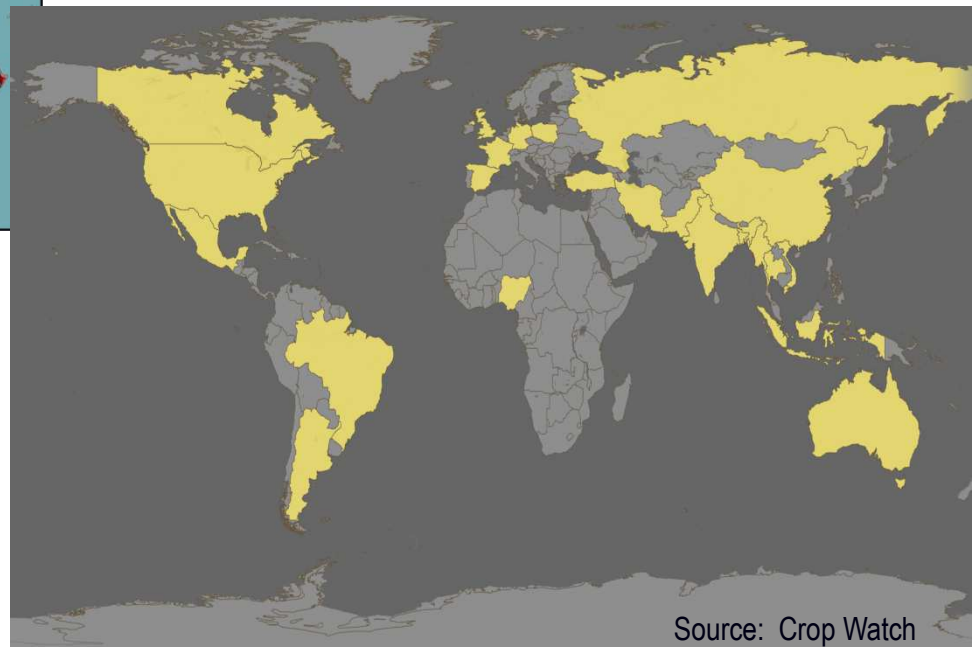
GEO Member Countries

25 Countries Producing
80% World's Crops



GROUP ON EARTH OBSERVATIONS

Phased implementation across all components

- **Phase 1 (P1) 2012-2014 Foundation Activities**
  - Build on existing activities
  - Initiate Pilot Projects
- **Phase 2 (P2) 2014 – 2016 Review and Expansion**
  - Continue/Complete Phase 1 Activities
  - New Starts
- **Phase 3 (P3) 2015- 2017 Pre-Operational**
  - Completion of Phase 1 / 2 Projects
  - Geographic Expansion

- Operational Phase 2017 >