



**GEO Task AG-07-03 a  
Developing a  
Global Agricultural Monitoring  
System of Systems:  
Yesterday, Today and Tomorrow**

**Chris Justice, Olivier Leo, Wu Bingfang, Jai Singh  
Parihar  
and the  
GEO Agricultural Monitoring ( Ag0703 )  
Community of Practice**



# GEO Agricultural Monitoring System of Systems: Approach

1. Develop a common vision for the system amongst the Community of Practice (CoP)
2. Establish the conditions under which such a system can develop (with GEO partners)
3. Raise awareness to the importance of EO for agricultural monitoring and the level of national commitments for the Task Activities (CoP)
4. Identify near term practical steps (task activities and initiatives) that would contribute to achieving the vision (CoP)



# GEO Agricultural Monitoring Near Term Initiatives (3 years)

- **Initiative** : A Multi-source Production, Acreage and Yield (PAY) database
- **Initiative** : Coordinated Data Initiatives for Global Agricultural Monitoring (CDIGAM).
- **Initiative** : Joint Experiments on Crop Assessment and Monitoring (JECAM)
- **Initiative** : GLAMSS Thematic Workshop Series (GTWS).
- **Initiative** : Agricultural Land Use and Climate Change.



# Initiative : PAY: a Production, Acreage, Yield multi-source online database

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- A common centralized online database of Production, Area and Yield statistics generated by different agencies
- Enable identification of agreements and disagreements in national level crop statistics
- Four groups generate agricultural statistics on a regular basis for multiple countries: the USDA FAS, JRC MARS, IRSA Crop Watch and the UN FAO
- Initially the database will be populated with national level estimates from these 4 agencies and will later be expanded to include statistics from individual countries



About The PAY Initiative · Contact Us

Welcome to the PAY: Production Area Yield Database  
 Select your query options and press the "Perform Query" button.  
 Your query results will be displayed at the bottom of the page.

**Important Note - This is a preliminary, unofficial version of the PAY website. All numbers published on this website are unofficial**

Agency	Commodity	Country	Market Year	Date of Forecast	Data Type
JRC USDA	Corn Soybean Rice, Milled Wheat	Algeria Algeria Algeria Angola Argentina Armenia Australia Austria Azerbaijan Bahrain Bangladesh Belarus	2005 2005 2006 2007 2008 2009	January February March April May June July August September October November December	FORECAST REPORTED

Type field down arrow to select value from one item in a box.

Order Rows By: Country (asc) Commodity (asc) Market Year (asc) Date of Forecast (asc) Agency (asc) (No Sort)

Show Agencies Side-by-side?  
 Yes - use list data print in menu

Include Columns:  
 Production  Area  Yield

Perform Query Basic Query

Query Results

**Important Note - This is a preliminary, unofficial version of the PAY website. All numbers published on this website are unofficial**

Query Results:

#	Commodity	Country	Data Type	Market Year	JRC Date of Forecast	JRC Yield (MT/HA)	USDA Date of Forecast	USDA Yield (MT/HA)
1	Wheat	Ukraine	FORECAST	2008	2008-04-29	2.80	-	-
2	Wheat	Ukraine	FORECAST	2008	2008-05-09	3.00	2008-05-01	2.94
3	Wheat	Ukraine	FORECAST	2008	2008-06-08	2.40	2008-06-01	3.09
4	Wheat	Ukraine	FORECAST	2008	2008-07-18	2.70	2008-07-01	3.09
5	Wheat	Ukraine	FORECAST	2008	2008-08-07	2.40	2008-08-01	3.28
6	Wheat	Ukraine	FORECAST	2008	-	-	2008-09-01	3.50
7	Wheat	Ukraine	FORECAST	2008	-	-	2008-10-01	3.64
8	Wheat	Ukraine	FORECAST	2008	-	-	2008-11-01	3.64
9	Wheat	Ukraine	FORECAST	2008	-	-	2008-12-01	3.64
10	Wheat	Ukraine	REPORTED	2008	-	-	N/A	3.67
11	Wheat	Ukraine	FORECAST	2009	2009-03-11	2.60	-	-
12	Wheat	Ukraine	FORECAST	2009	2009-04-30	2.40	-	-

Links: GEO, JRC, USDA, FAS, EAD, JRC, M&BE, G&S, Prostatec

Participating Programs:  
 GEO ON EARTH OBSERVATIONS



# The PAY web-interface

Interface allows for queries on Yield, Production and Area by:

- Agency
- Commodity (Corn, Soy, Wheat, Rice)
- Country
- Year (2005-present)
- Date of Forecast
- Data Type (Forecast, Reported)

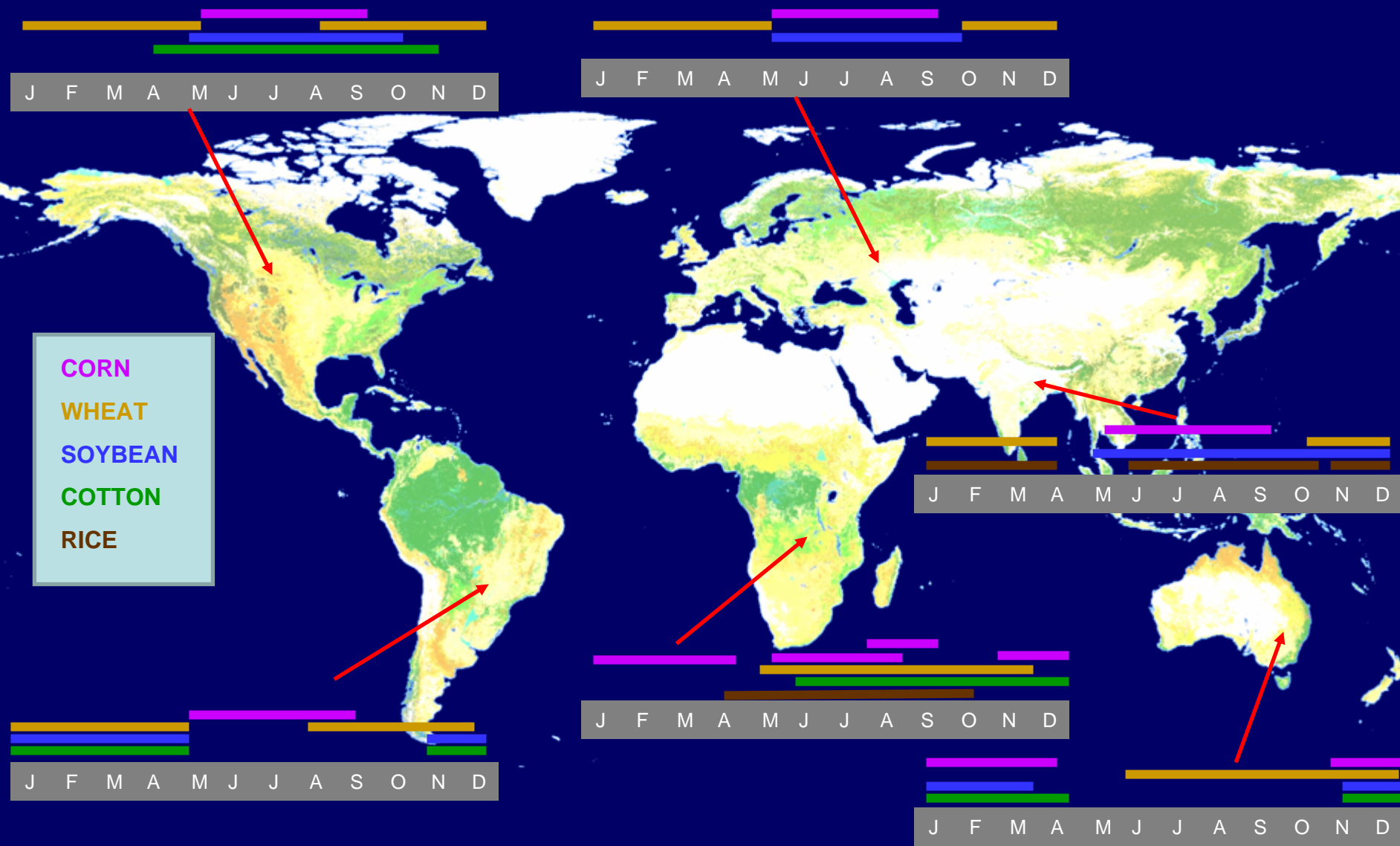


# Coordinated Data Initiatives for Global Agricultural Monitoring (CDIGAM)

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- To ensure the on-going, frequent and timely acquisition, accessibility of satellite data during crop growing season and the continuity of those observations necessary for agricultural monitoring
- Compile the best available information on agricultural areas, crop calendars and cropping systems – define a global acquisition strategy
- To fill the gaps in the current in-situ observations.
- **Near Term CoP Contributions:**
  - Dynamic Global Croplands Likelihood Map (250m)
  - Near Real Time data from MODIS (NASA/USDA/UMD)
  - Compilation of Enhanced Global Crop Calendars (ISRO)

# Crop Calendars



Crop calendars needed in the definition of satellite data acquisition strategies

# JECAM

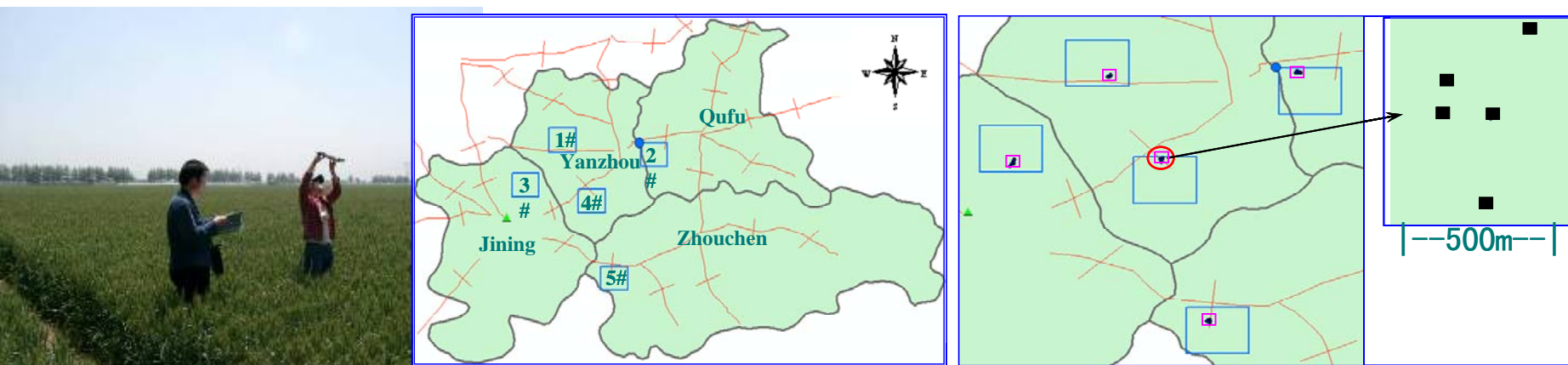
## Joint Experiments on Crop Assessment and Monitoring

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- A GEO Ag CoP Initiative, led by Canada GEO, that aims to facilitate the inter-comparison of monitoring and modeling methods, product accuracy assessments, data fusion and product integration, for agricultural monitoring
- This will be achieved by setting up a network of distributed regional experiments in cropland pilot sites around the world which represent a range of agricultural systems
- Time series datasets from a variety of earth observing satellites and in-situ data sources will be acquired for each of the sites
- Synthesis of the results from JECAM will enable:
  - Development of international standards for monitoring and reporting protocols
  - A convergence of the approaches to define best practices for different agricultural systems
  - Identify requirements for future EO systems for agricultural monitoring.

# JECAM will build on Ongoing Field Measurement Programs

## 作物单产预测验证



County	Forecasted Trend Yield in 2005	Forecasted Fluctuate Yield in 2005	Forecasted Yield in 2005 (y)	Observed Yield in 2005 (y)	Relative Error ( $\Delta y/Y$ )
Qufu	387.479	6.33575	393.815	422.542	-6.80%
Yanzhou	443.926	-2.69289	441.234	419.351	5.22%
Zhouchen	354.075	56.3438	410.419	459.866	-10.75%
Jining	404.59	17.8112	422.4019	404.706	4.37%

Compute the farmland weighted average yield of experimental plot, accuracy:97.8%

区域作物单产精度: **97.8%**

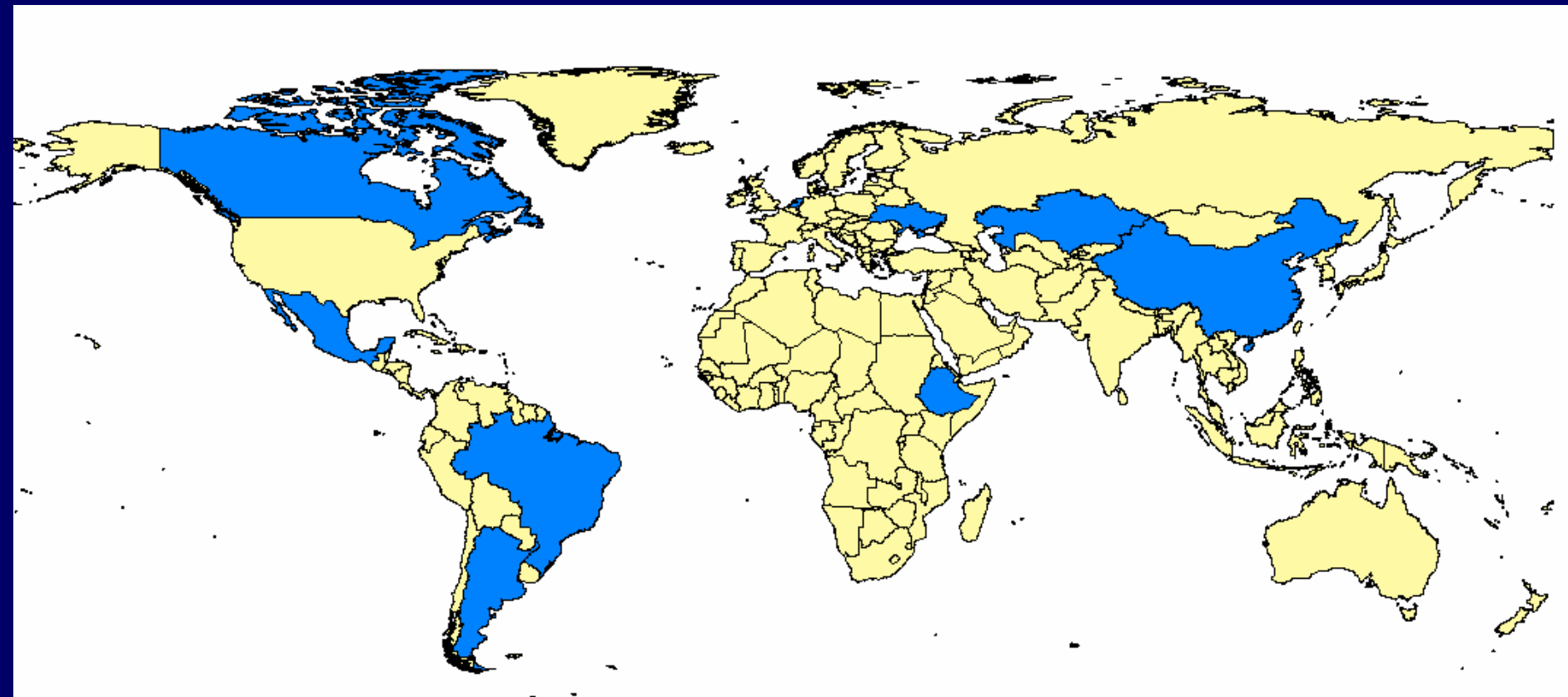
# Validation in crop yield prediction

# Initial Countries participating in the JECAM Study

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Initiative coordination by Canada GEO with Agriculture and Agri-Food Canada

Next step coordinated data acquisition working with CEOS



# GLAMSS Thematic Workshop Series (GTWS)

- To improve communication among the Community of Practice,
- Develop best practices and standards ,
- Increase international cooperation and coordination

**Beijing 2009 –  
System of Systems Components**



**Ispra 2008 – Crop Area Estimation  
Best Practices**



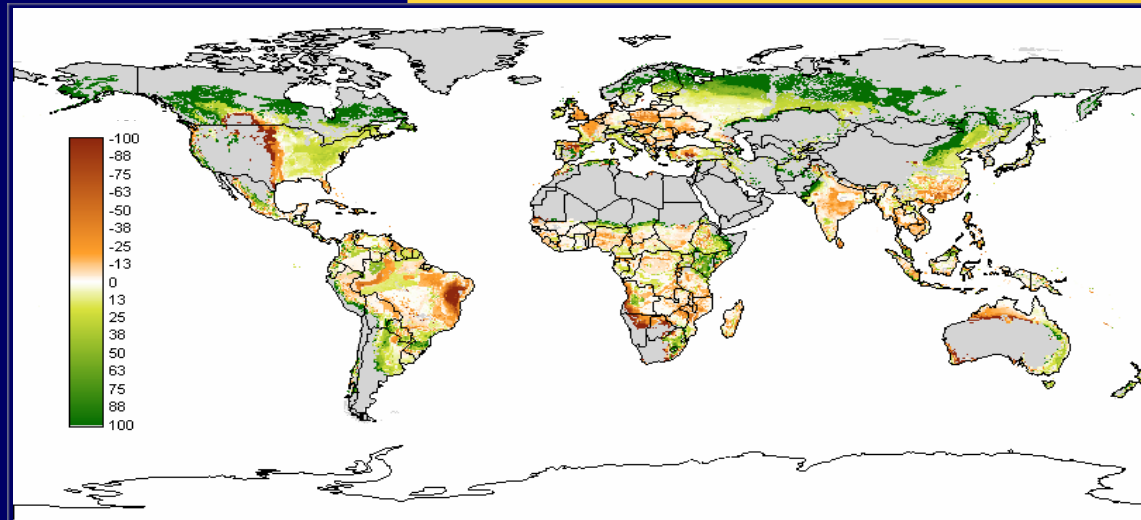
**Ahmedabad 2009  
Impact of Climate Change on Agriculture**



**Kananaskis 2009 - SAR to support AGMON**



# Initiative: Climate Change Impacts on Agriculture



**ISPRS WG VIII/6 & GEO AG 07 03**

**Workshop on**

**Impact of Climate Change on Agriculture**

**Hosted by:**

**Space Applications Centre, ISRO, Ahmedabad India**

**&**

**Indian Society of Remote Sensing- Ahmedabad Chapter, Ahmedabad, India**

**Venue: SAC, Ahmedabad**

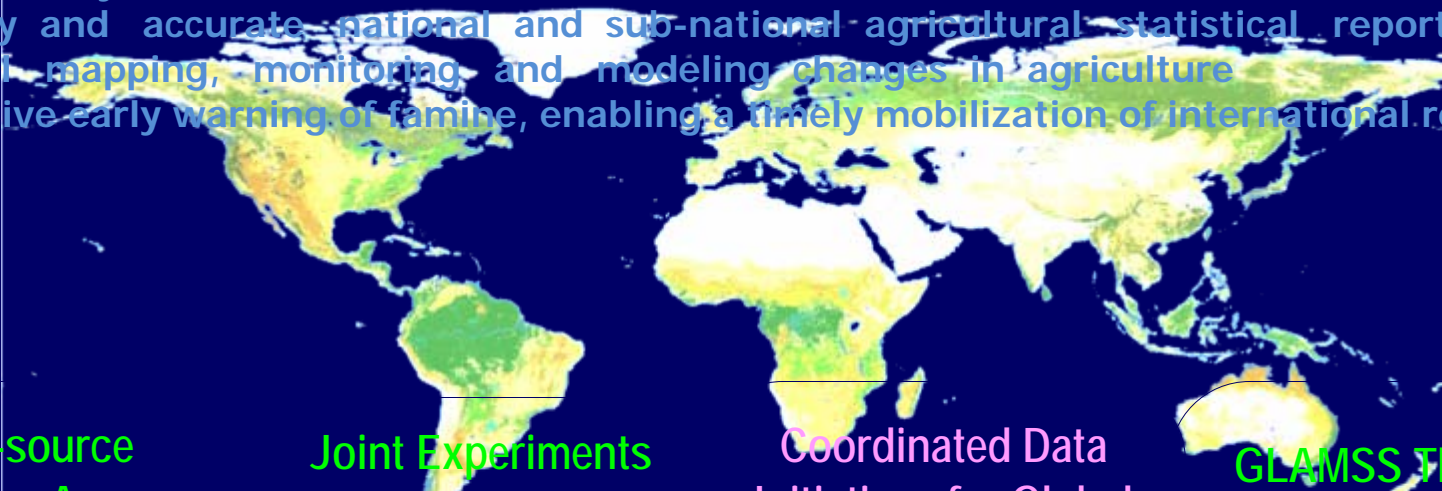
**Date: 17-18, December, 2009**

**Web site: [www.commission8.isprs.org/wg6/](http://www.commission8.isprs.org/wg6/)**



## Aims

- Global monitoring of agricultural production, facilitating risk reduction and increase in productivity.
- Timely and accurate national and sub-national agricultural statistical reporting.
- Global mapping, monitoring, and modeling changes in agriculture
- Effective early warning of famine, enabling a timely mobilization of international response.



### Multi-source Production, Acreage, Yield (PAY) Database

Common centralized online database to enable objective assessment of food security and risk management planning

Facilitate inter-comparison and convergence of estimation methods

### Joint Experiments on Crop Assessment and Monitoring (JECAM)

Cooperative field experiments using multi-source satellite and in-situ data, facilitate inter-comparison of monitoring and modeling methods & products.

Provide prototyping of GLAMSS

### Coordinated Data Initiatives for Global Agricultural Monitoring (CDIGAM)

Working with space agencies to establish coordinated, timely acquisition and improved accessibility of satellite data.

Evolve a free and open data policy to support agricultural monitoring

### GLAMSS Thematic Workshop Series (GTWS)

To improve communication among the Community of Practice on priority topics, developing best practices and standards

Encourage international cooperation and coordination

