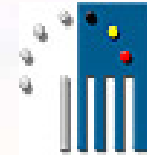


# ***GLOBALAM – a Globally Distributed Agricultural Monitoring Experiment based on EO***

***4-y research project supported by  
Belgian Science Policy Office (2007-2010)***



***based on an international partnerships combining  
research labs, EO production entities and  
(pre-)operational systems (currently MARS-FOOD, GMFS)***



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Yannick Curnel and Robert Oger, CRAGbx, Belgium*

***with close collaboration with national partners***

# Overall *GLOBAM* objectives

- methodological development/adjustment to take advantage of state of the art and research findings for use in global operational systems



- scientific research to tune and to assess methods potentially operational over large areas and in different agro-ecological contexts



- ‘globally distributed’ ag monitoring experiment for cereals in 2007 (3 sites of 300 x 300 km) and 2009 & 2010 (5 sites) including large scale validation strategy for performance assessment

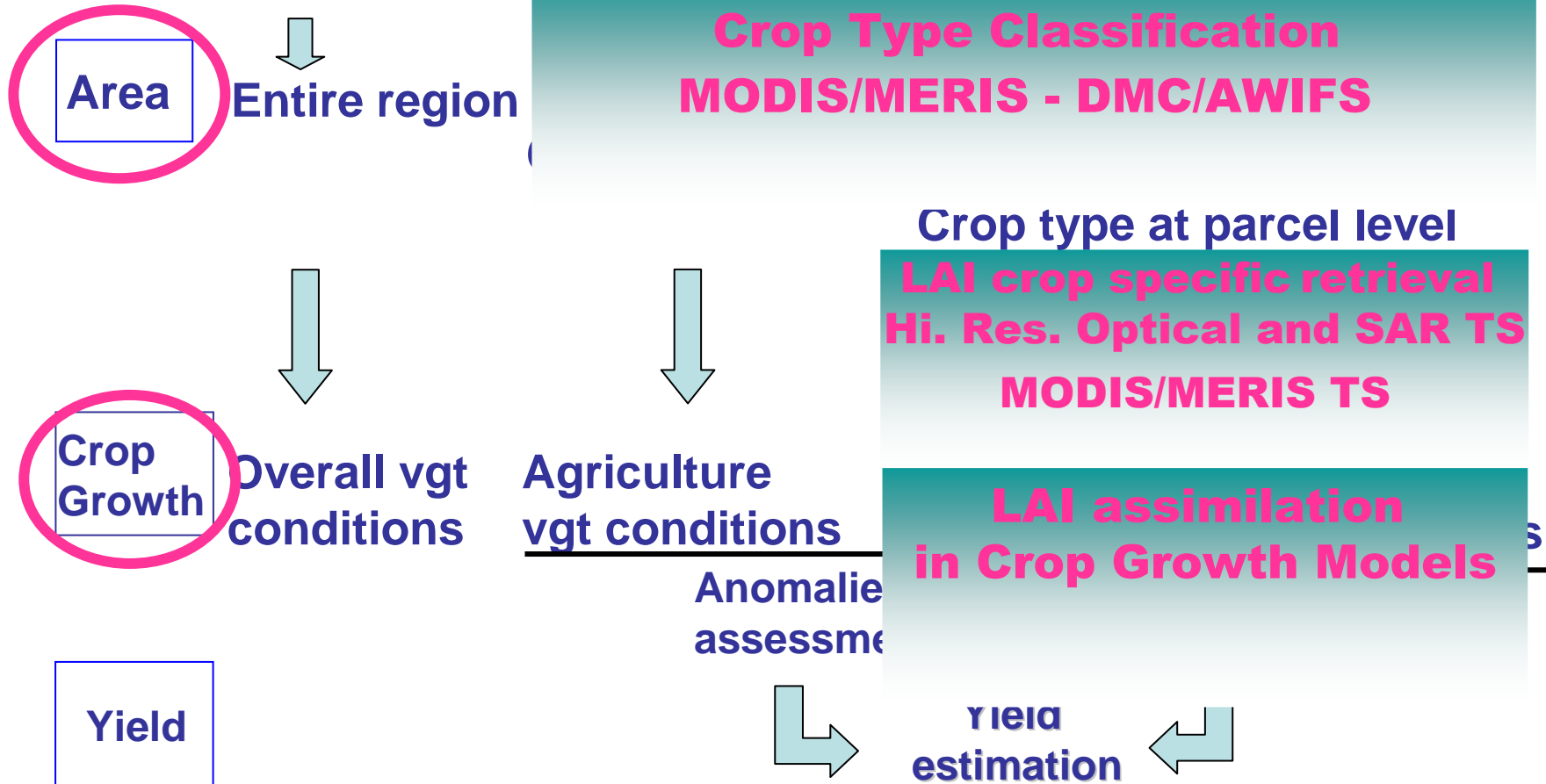




**GLOBALAM – a Globally Distributed Agricultural Monitoring Experiment to develop generic methods for advanced EO use while recognizing local diversity of ag. practices**

**EO**

*Spatial resolution*  
*Revisiting capabilities*



## ***GLOBALAM Key Ideas :***

- **crop type mapping for specific monitoring (mask for each main eq-reasoning crop)**
- **crop specific retrieval of LAI, biomass from optical and SAR data**
- **ET retrieval from MSG for croplands area**
- **focus EO effort on early stage crop growth (high variability, better sensitivity of the rs signal) and decaying phase to calibrate the growth model**
- **select / adjust crop models sensitive to EO retrieved variables**
- **assimilation of EO retrieved variables including ET from MSG into crop growth models**
- **synthetic production indicators**

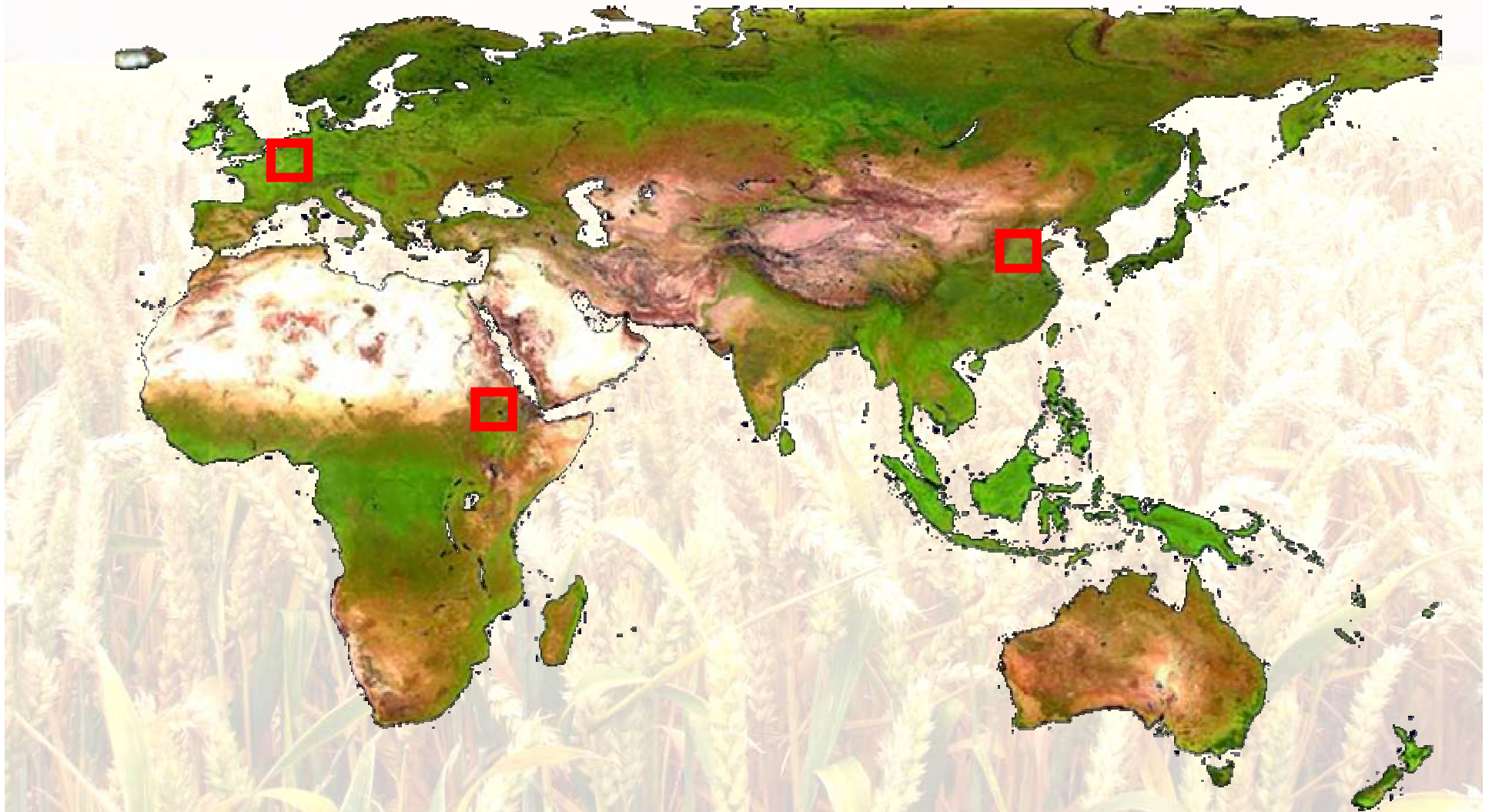
**=> Target scale for information production : NUTS 3**





## ***GLOBALAM – a Globally Distributed Agricultural Monitoring Experiment***

***3 study sites of 300 x 300 km in Northern Europe, China and Ethiopia  
joint field and EO data collection during the 2007 growing season  
for cereals and maize to look for robust and generic methods***



# LOBAM field campaign protocol (2007) – Data collection

- Plant density



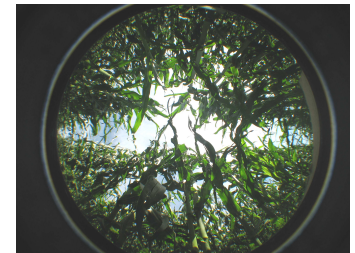
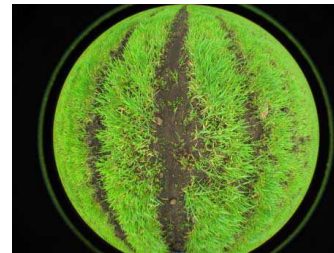
- Plant height





# LOBAM field campaign protocol (2007) – Data collection

- Leaf area index



- Canopy cover





# GLOBAM field campaign protocol (2007) – Data collection

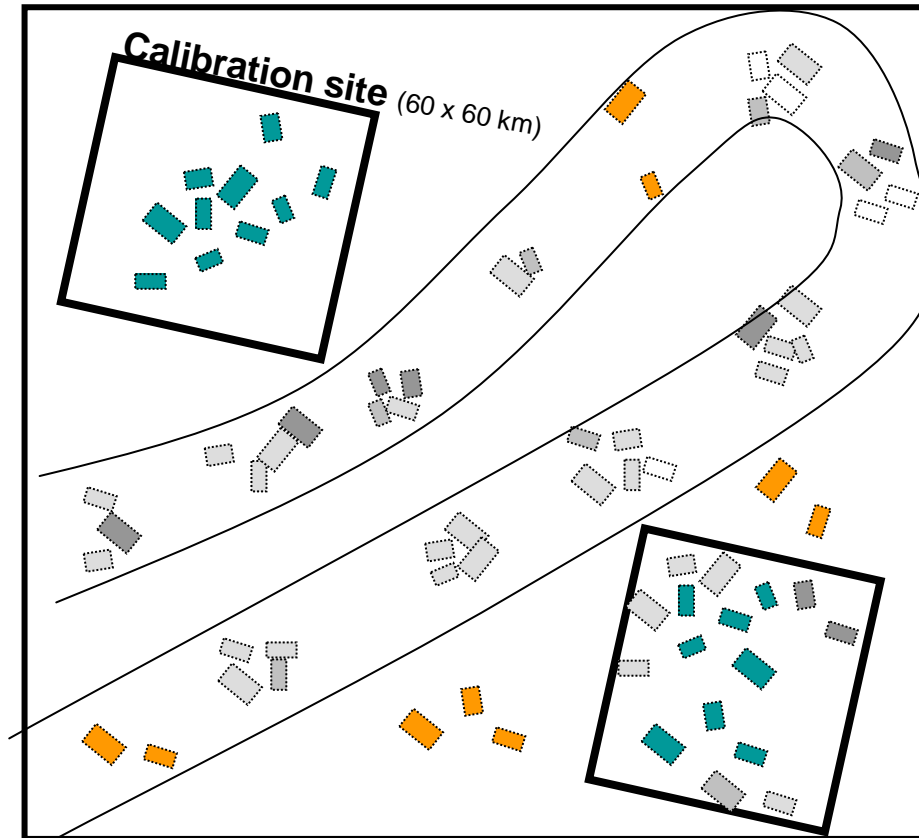
- Top soil moisture



# GLOBAM field campaign protocol (2007) – Northern Europe

(when large scale aerial photographs or existing vector database allow identifying accurately the crop type over blocks corresponding to about 3x3 MODIS 250m pixels )

Validation site (300 x 300 km)



**Calibration set**  
60 fields visited  
5 times to measure  
on SAR acq. dates  
6 variables :

- Field geolocation
- Leaf Area Index
- Green canopy cover
- Canopy height
- Volumetric Top Soil Moisture (humid and dry weight)

**LAI validation set**  
70 fields observed  
by photographs  
taken during  
1 times to measure  
2 variables :

- Field geolocation
- Green canopy cover

**Crop type validation set**

100 blocks of fields observed by photographs taken during  
1 visit to measure  
2 variables :

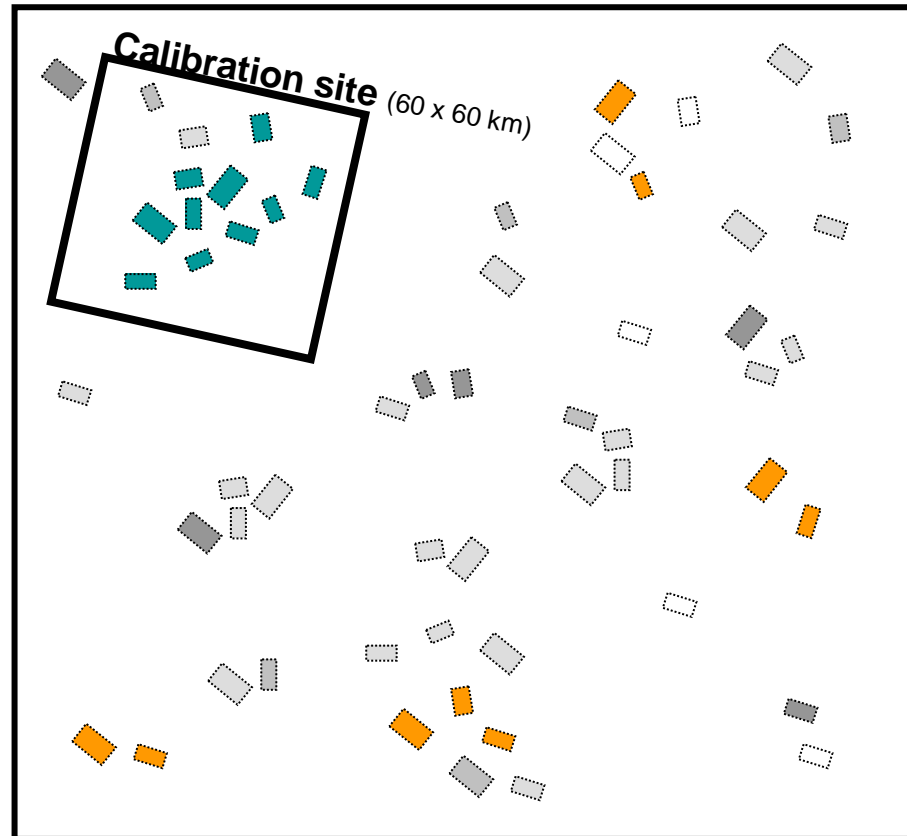
- Field geolocation
- Crop type



# GLOBALAM field campaign protocol (2007) – Ethiopia

(when, in addition to the calibration site, several HiRes images allow classifying accurately the crop type over the whole validation site thanks to DMC/AWiFs imagery)

Validation site (300 x 300 km)



## Calibration set

36 fields visited

5 times to measure:

- Field geolocation
- Leaf Area Index
- Green canopy cover
- Canopy height

## LAI validation set

30 fields visited

1 times to measure:

- Field geolocation
- Leaf Area Index
- Canopy height

## Crop type validation set

100 fields of various crops to train HiRes classification

1 visit to measure

2 variables :

- Field geolocation
- Crop type





# GLOBALAM field campaign protocol (2007) – China

(when, in addition to the calibration site, several HiRes images allow classifying accurately the crop type over the whole validation site thanks to DMC/AWiFs imagery)

## Calibration set

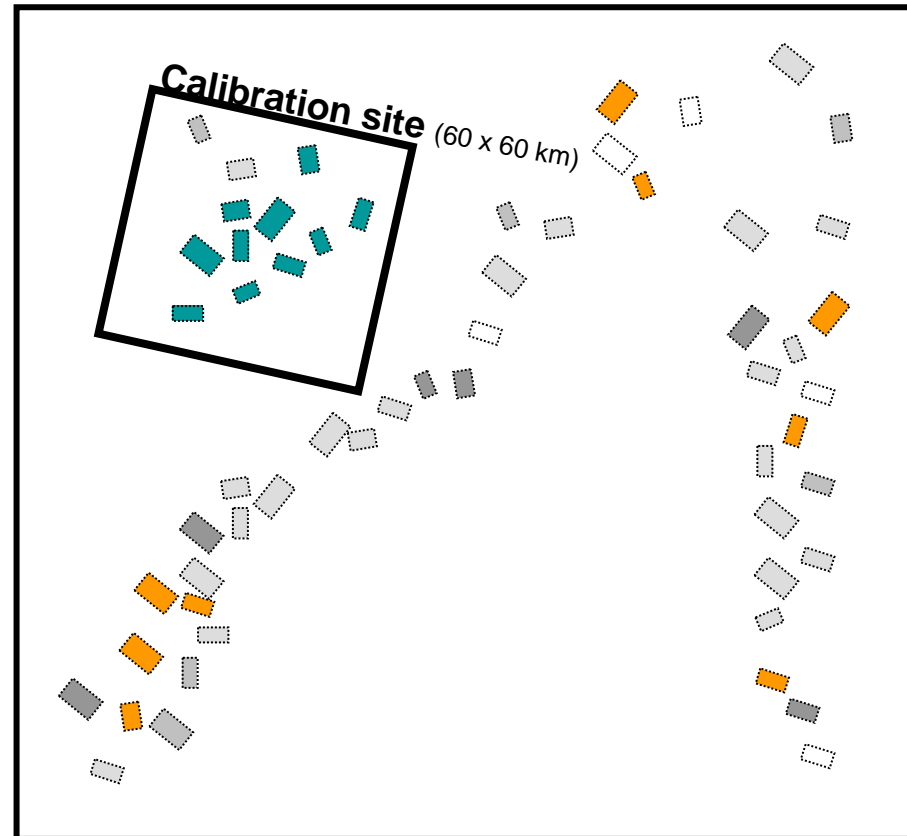
18 fields visited

1 time to measure

6 variables :

- Field geolocation
- Leaf Area Index
- Green canopy cover
- Canopy height
- Volumetric Top Soil Moisture (humid and dry weight)

Validation site (300 x 300 km)



## LAI validation set

13 fields visited

1 time to measure

3 variables :

- Field geolocation
- Leaf Area Index
- Canopy height

## Crop type validation set

60 fields of various crops to train HiRes classification

1 visit to measure

2 variables :

- Field geolocation
- Crop type



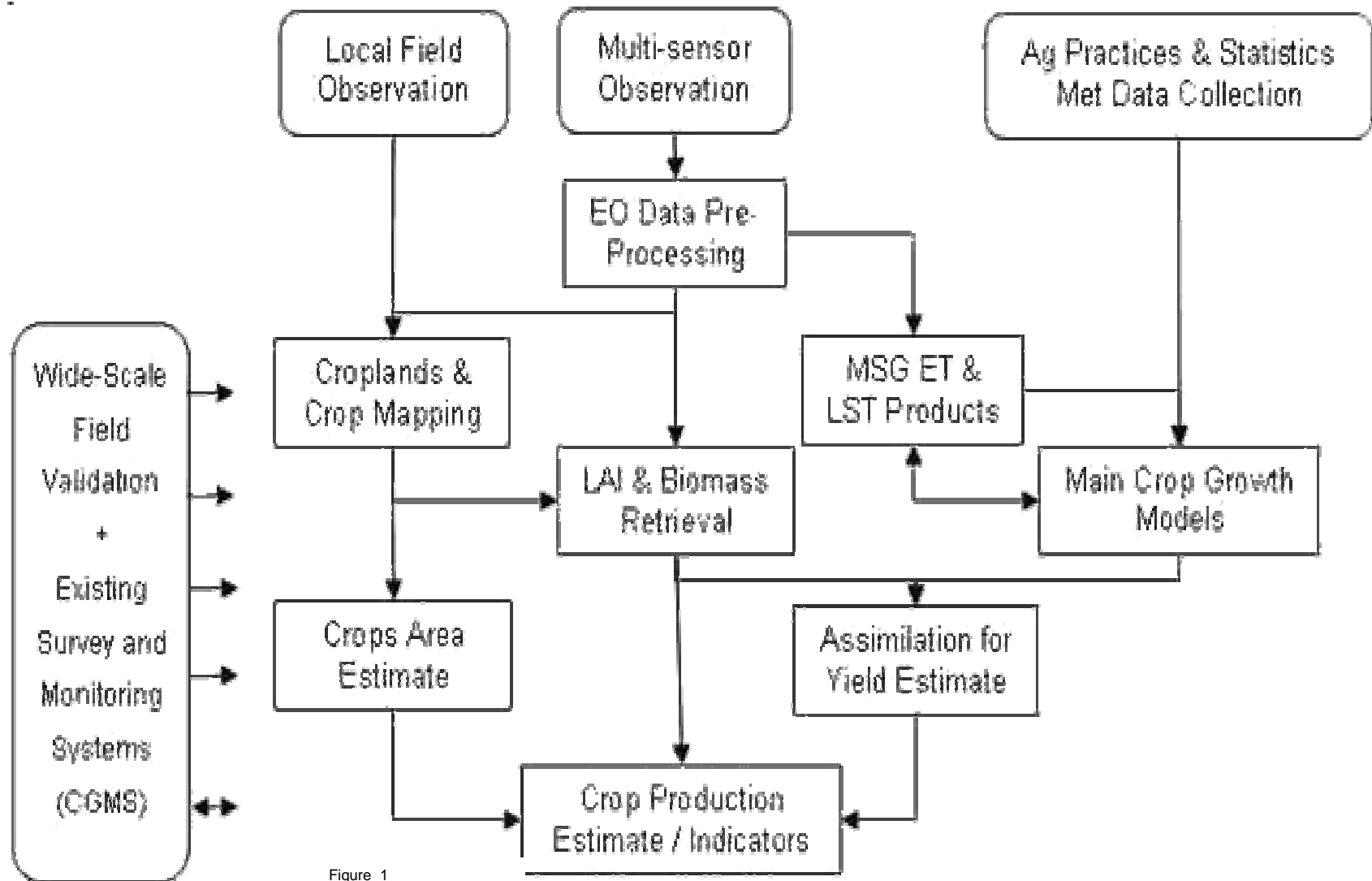


Figure 1

Overall flowchart of the research strategy



Work package	2007	2008	2009	2010
WP 1 Coordination	█	█	█	█
WP 2 Data collection	█		█	█
WP 3 Preprocessing	█	█	█	█
WP 4 Crop mapping	█	█	█	█
WP 5 EO retrieval	█	█	█	█
WP 6 Crop modeling	█	█	█	█
WP 7 MSG contribution	█	█	█	█
WP 8 Assimilation	█	█	█	█
WP 9 Validation	█	█	█	█
WP 10 Prod. Indicators	█	█	█	█
WP 11 Comparison	█	█	█	█
<b>Milestones</b>				
Initial report	█			
Annual reports	█	█	█	█
Final report	█			█
Steering Committee Meetings	█	█	█	█
Open Technical Workshop	█	█	█	█





***GLOBAM experiment is seen as a pilot experiment for the agricultural global community***

***Gathered under the GEO/IGOL Agriculture Monitoring Working Group***



***Towards a Global Earth Observing System of Systems***

