# Lessons learned from Copernicus R&D projects

Application to the Monitoring Area System
in Castile and León (Spain)

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IACS 2019 Workshop (Valladolid 10—11th April)

Outlook

National Ministry of Agriculture…

FEGA (Coordinating body)
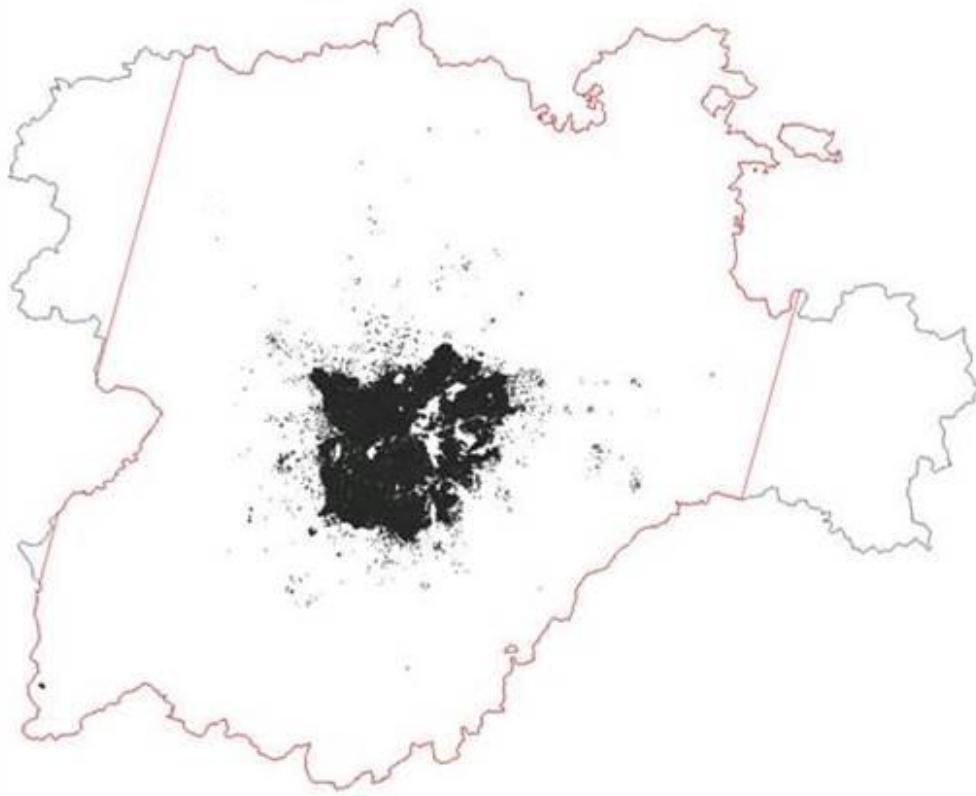
Castilla y León Ministry of Agriculture

DG Common Agricultural Policy
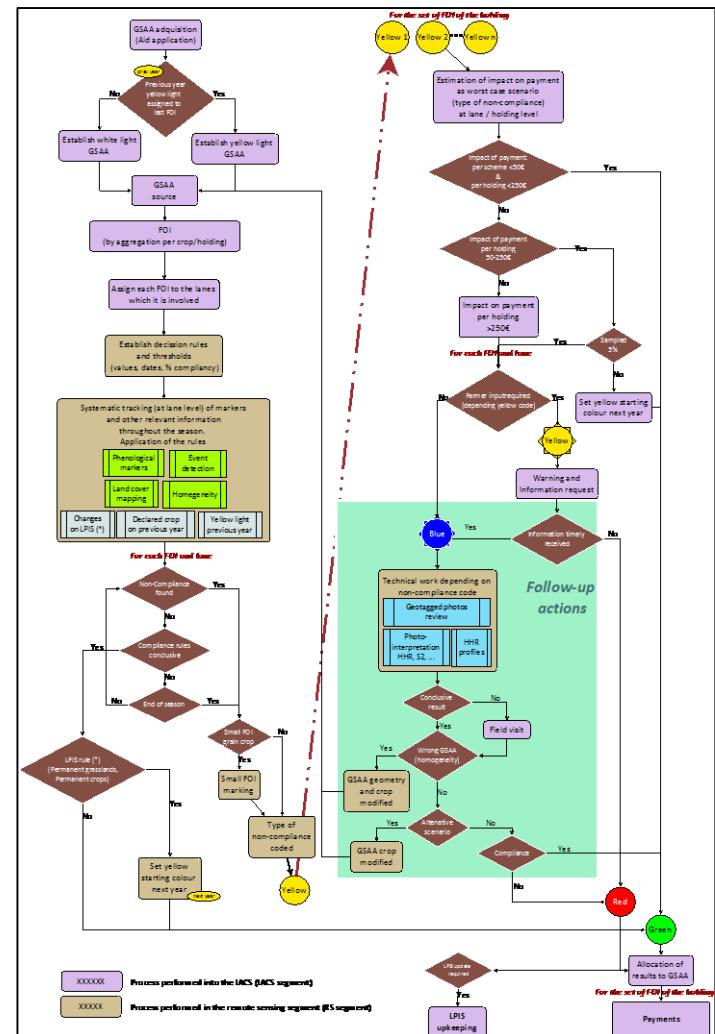
IACS IT Team

Agricultural Technological Institute

2019 Monitoring Phase-in

All pillar 1 direct payments schemes (BPS+Greening+VCS

R&D Projects

Sensagri
Sentinels Synergy for Agriculture

ECoLaSS
Evolution of Copernicus Land Services
based on Sentinel data

sen4cap
common agricultural policy

EO4AGRI

NIVA / A New IACS Vision in Action

Pure Remote Sensing products

Data management oriented

Things that you may need and where to find them (openly)
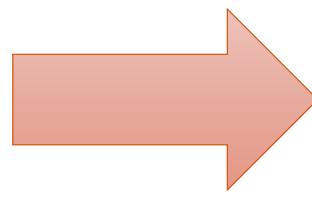
Tools for signal processing

Tools for follow up actions

GSA Geotagg picture APP
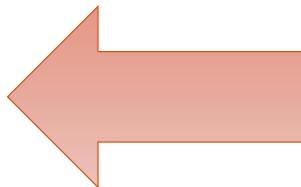
FAST Tool

Algorithms or RS products for agricultural practices identification (Markers)

Sensagri
Sentinels Synergy for Agriculture

ECoLaSS
Evolution of Copernicus Land Services based on Sentinel data

sen4cap
common agricultural policy

Copernicus
Europe's eyes on Earth
Land Monitoring Service

Signal processing tools

Markers, Scenarios, Lanes and Rules

Agricultural practices: Tillage detection

Tillage change map between July 13 and July 19, 2017, over-imposed to the NDVI on July 17, 2017. The dark yellow and red colours identify negative and positive changes, respectively.

- Top agricultural activity marker
- Challenging in Mediterranean conditions: Low NDVI does not imply tillage.

Agricultural practices: Presence/Loss of vegetation, harvest

Leaf Area Index (Green and Brown)

- LAI is a sensor independent variable compared to NDVI

- Precise harvest detection in Mediterranean conditions thanks to brown LAI

- Interesting indicator for non bare soil detection

- LAI Green as a Proxy for number of plants present (important for some VCS)
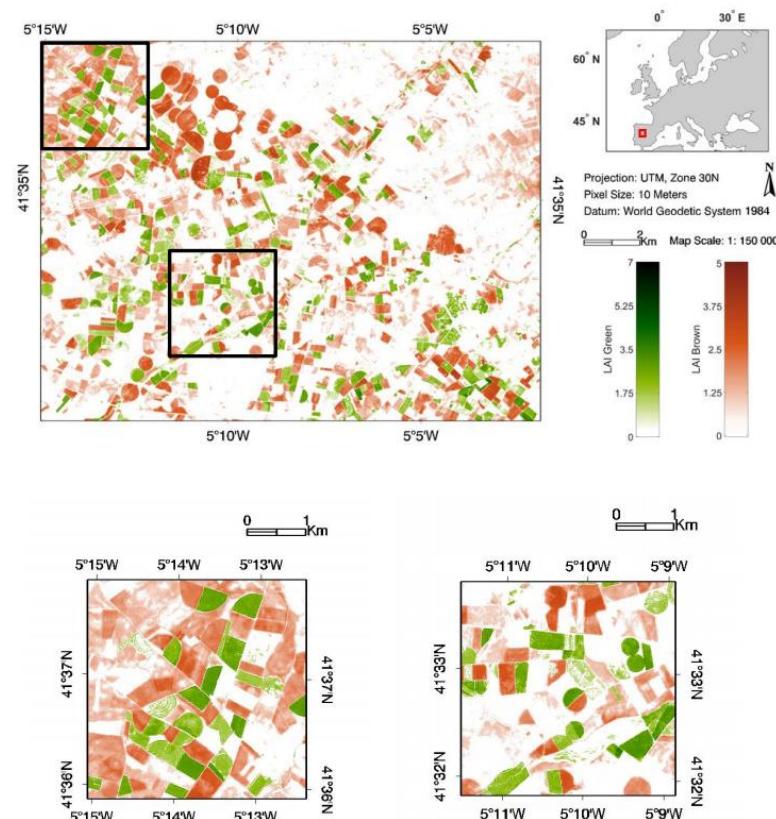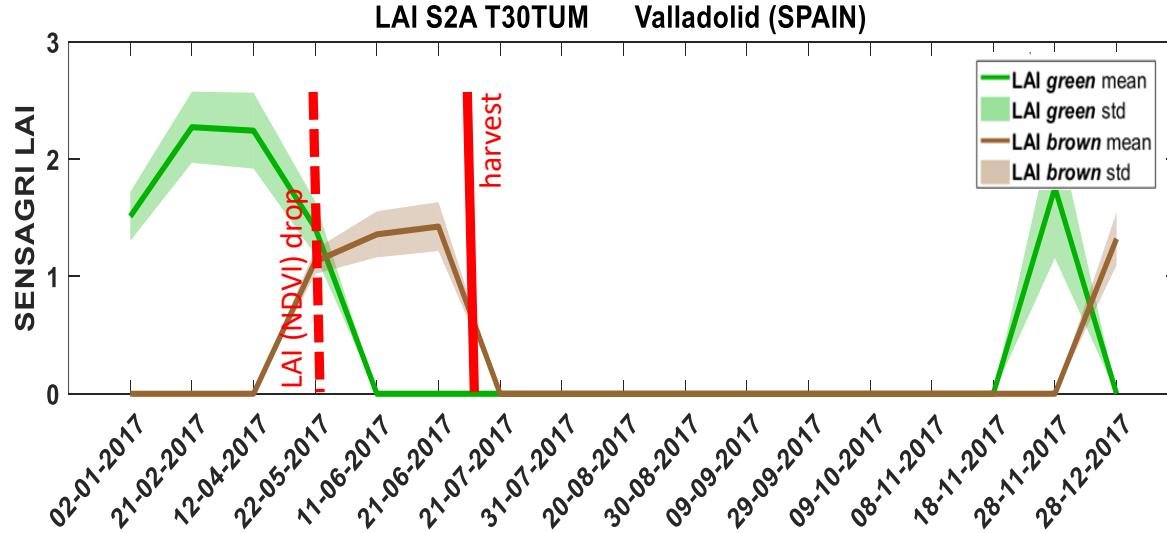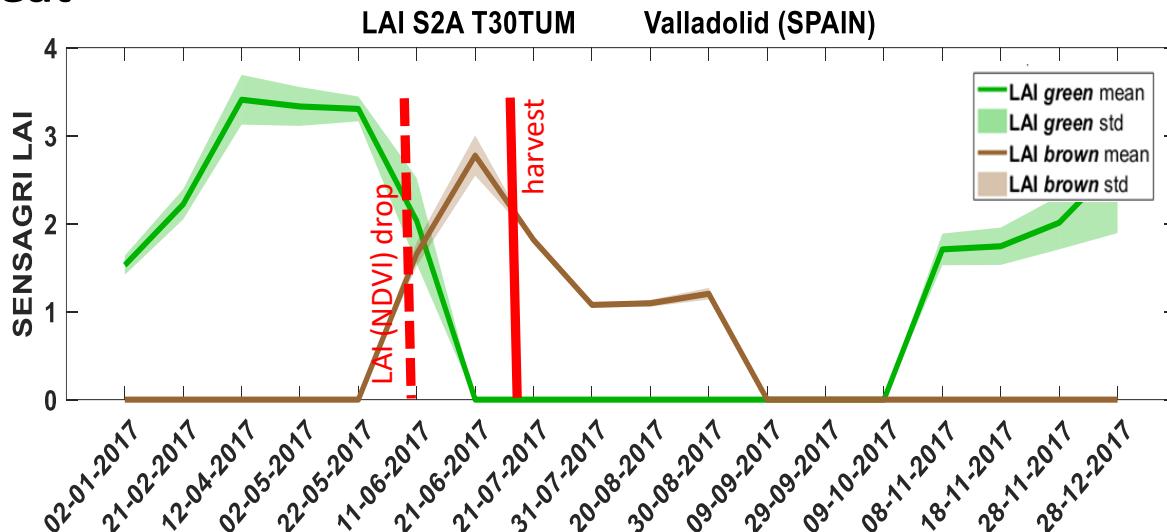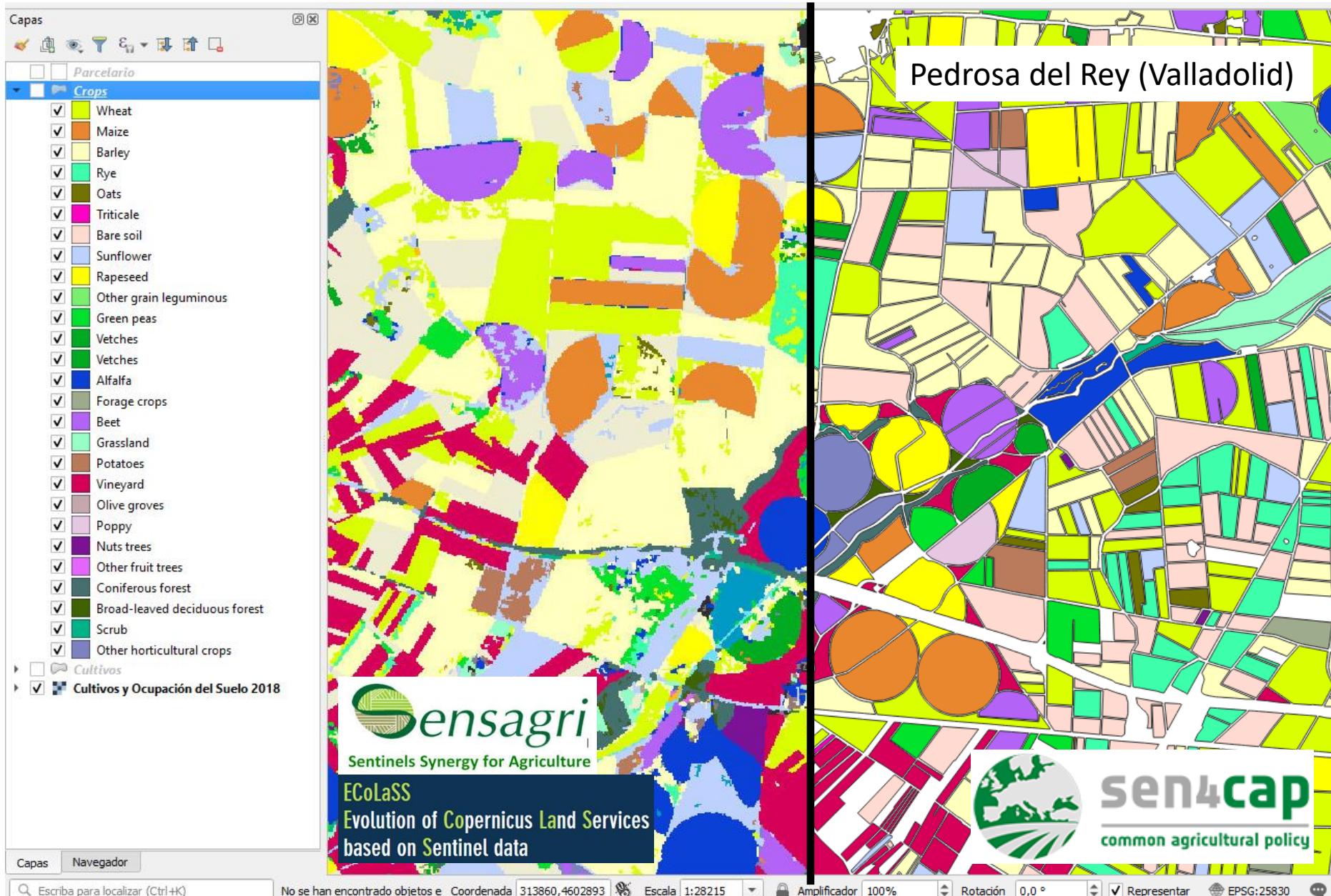
Figure 12. Composite map of LAI green and LAI brown within 50% uncertainty threshold over Valladolid (Spain).

Leaf Area Index

Wheat

Crop type Classification: time is crucial

Pedrosa del Rey (Valladolid)
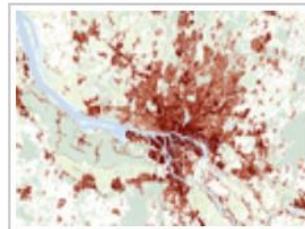
Pixel classification vs GSAA

Other classifications to detect ineligibility

- Classifications are much more powerful than setting thresholds based on indexes.

- IACS is a massive source for training ML algorithms

- IACS does not contain all kind of features that are ineligible.

High Resolution Layers
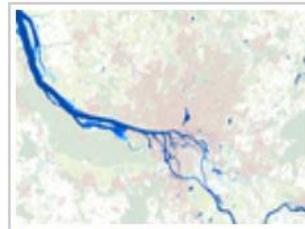
Imperviousness

Forests

Grassland

Water & Wetness

Coming Soon
Small Woody Features

Things to be developed

- Abandonment indicators for grassland and Permanent Crops: linked to LPIS update (annually or 3-year term)

  Detect long term increase of woody vegetation by means of higher NDVI at the end of dry season

  Decrease of pro-rata:
  Detect Increase of areas covered by bushes by means of an increase of area with vegetation height over 1 m above ground. **LIDAR**
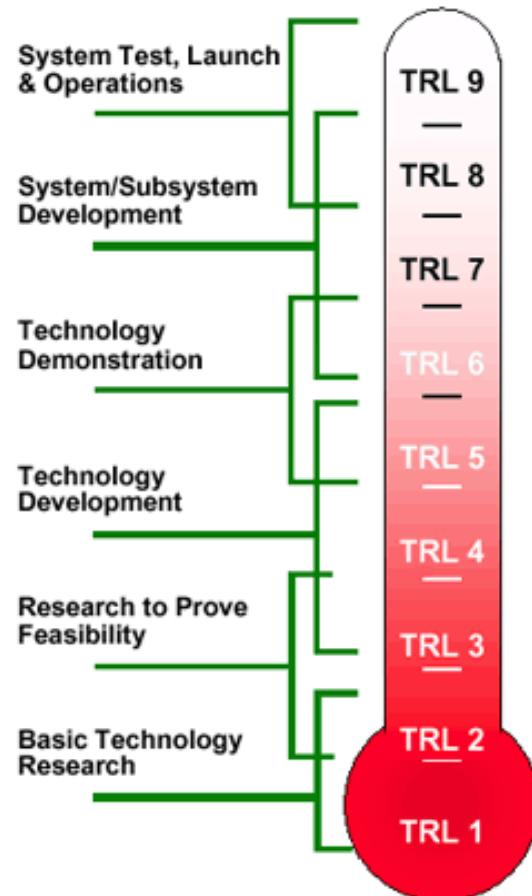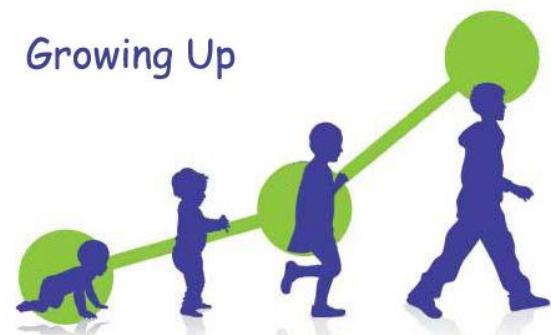
From R&D to operational product

R&D projects and Copernicus services	Paying Agency
1. Few users. Small impact 2. No legal binding with the users 3. Accuracy issues accepted 4. Very innovative approaches are welcome 5. Delayed production is not an issue	1. Many organizations and beneficiaries involved. 2. Very strong legal concerns due to the Public money transfer. EU+MS Layers 3. Used to 100% assurance in the controlled files. 4. Reluctance to dramatic changes 5. Tough time constrains

From R&D to operational product

child	Adult
silly	serious
imagination	reality
innocent	ignorant
unintentional	self aware
new	old
immature	mature
play	work
ask questions?	answer questions
anarchy	rules
artist	Artist
informal	formal
irresponsible	responsible

Growing Up

Lesson learned

- Cloud screening is still an issue
- Try to use several complementary markers within a decision rule.
  Easy for detecting activity. Complex in very specific schemes.
- Most markers require fine tuning for each PA. Difficulties to integrate R&D Projects results into PA operations.
- Start with very basic markers
- Select areas to start with according with your capacity.
- If you are dealing with a small areas, DIAS may not be necessary.
- Phase-in allows you to involve all the PA meanwhile testing stays in the "R&D" team.
- Interaction and commitment between RS/GIS team, PA managers and IACS IT team is needed.

Final message: Monitoring is not just a Remote Sensing issue