



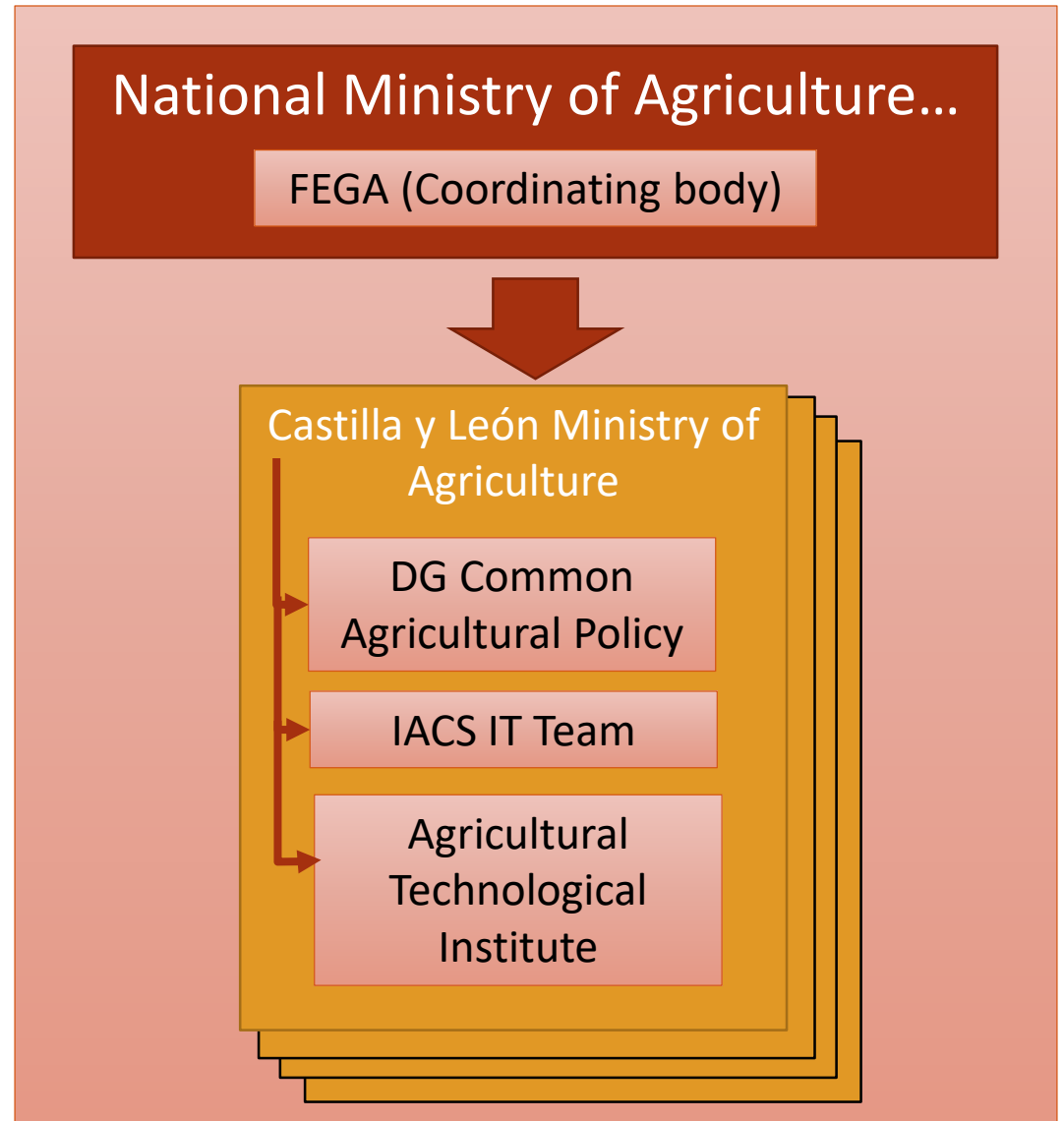
Lessons learned from Copernicus R&D projects

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

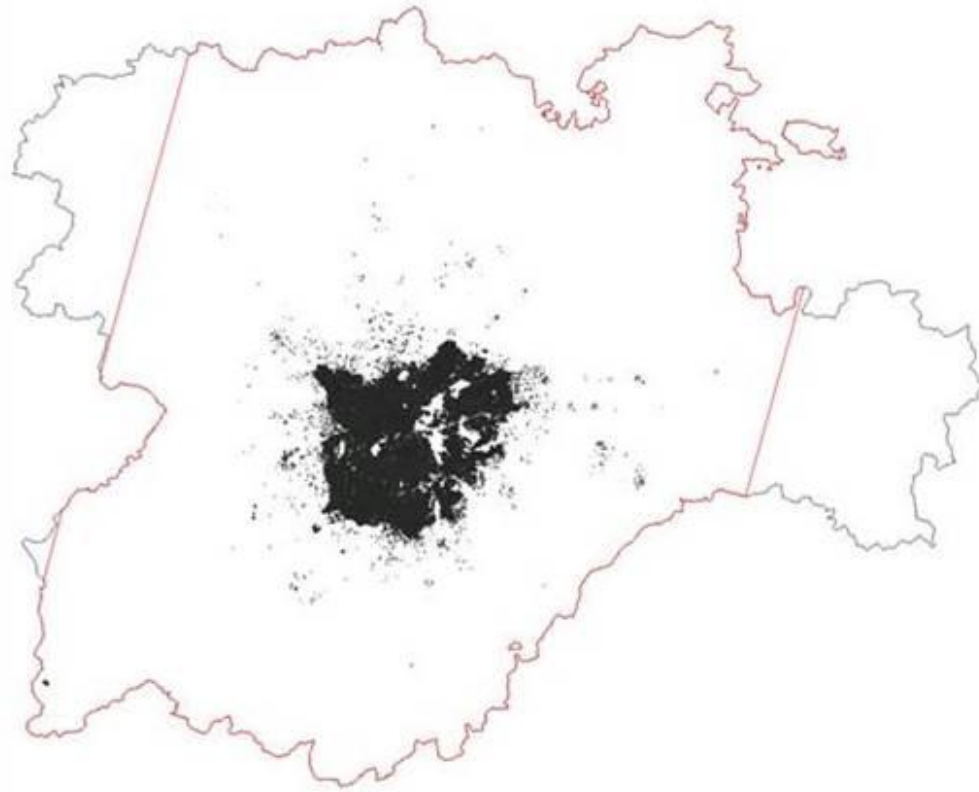
David A. Nafría nafgarda@itacyl.es



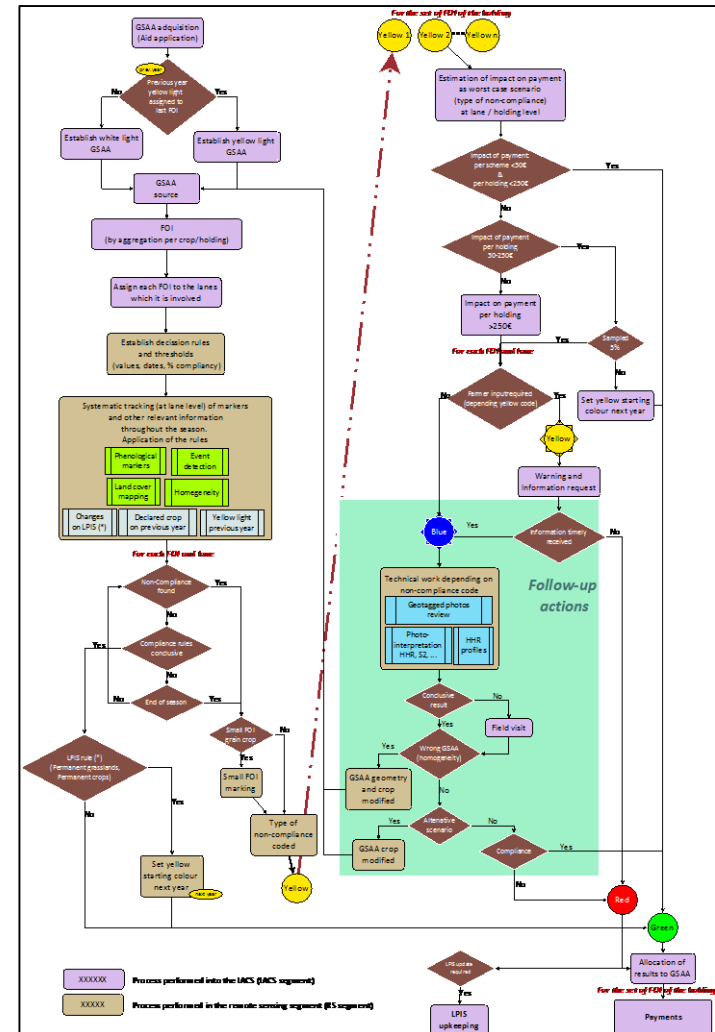
Outlook



2019 Monitoring Phase-in



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



R&D Projects



ECoLaSS
Evolution of Copernicus Land Services
based on Sentinel data



sen4cap
common agricultural policy



NIVA / A New IACS Vision in
Action

Pure Remote
Sensing
products

Data
management
oriented

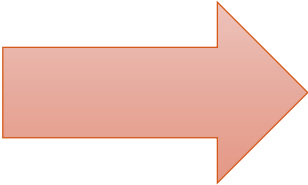


Things that you may need and where to find them (openly)

Tools for signal processing



The logo for sen4cap, featuring a stylized globe with green agricultural fields and the text "sen4cap" in green and "common agricultural policy" below it.



Algorithms or RS products for agricultural practices identification (Markers)



The logo for Sensagri, featuring a stylized green and white circular graphic and the text "Sensagri" in green, with "Sentinels Synergy for Agriculture" below it.

ECoLaSS
Evolution of Copernicus Land Services based on Sentinel data



The logo for sen4cap, featuring a stylized globe with green agricultural fields and the text "sen4cap" in green and "common agricultural policy" below it.



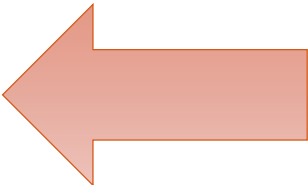
The logo for Copernicus Land Monitoring Service, featuring the Copernicus logo with "Europe's eyes on Earth" and the Land Monitoring Service logo with a stylized green plant.

Tools for follow up actions

GSA Geotagg picture APP

FAST Tool 

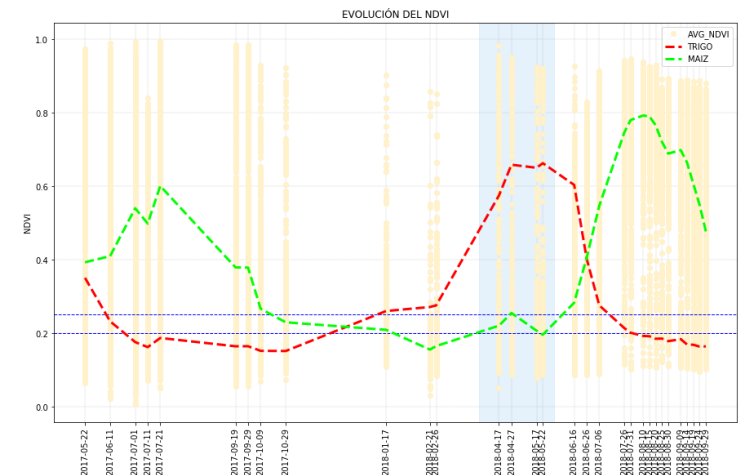
The logo for the European Global Navigation Satellite Systems Agency, featuring the European Union flag and the text "European Global Navigation Satellite Systems Agency".



Signal processing tools

The screenshot shows the 'sen4cap' web interface with the 'products' tab selected. On the left, there is a list of products under the filter 'Cyl'. The list includes various product IDs such as 'L2A Atmospheric correction' and 'L2A Vegetation Status'. On the right, a map of Spain is displayed with a red rectangular box highlighting a region in the northern part of the country, near the border with France. The interface includes navigation tabs like 'sites', 'products', 'system overview', 'dashboard', 'custom jobs', 'monitoring', 'users', 'data sources', and 'logout'.

This screenshot shows the 'monitoring' tab of the 'sen4cap' interface. It displays 'Download statistics' with a progress bar indicating 13 items (94.5%) out of 13 items. Below this, it shows 'Current downloads' with a table that is currently empty. A 'Jobs history' section shows a table with columns for Job ID, End timestamp, Processor, Site, Status, Start type, and Output. The table contains several rows of job data, including 'L4A Crop Type', 'L3B Vegetation Status', and 'L4C Agricultural Practices'. At the bottom, there is a section for 'LPI5/GSAA processing' with a table for Site, File, File Type, and Progress.

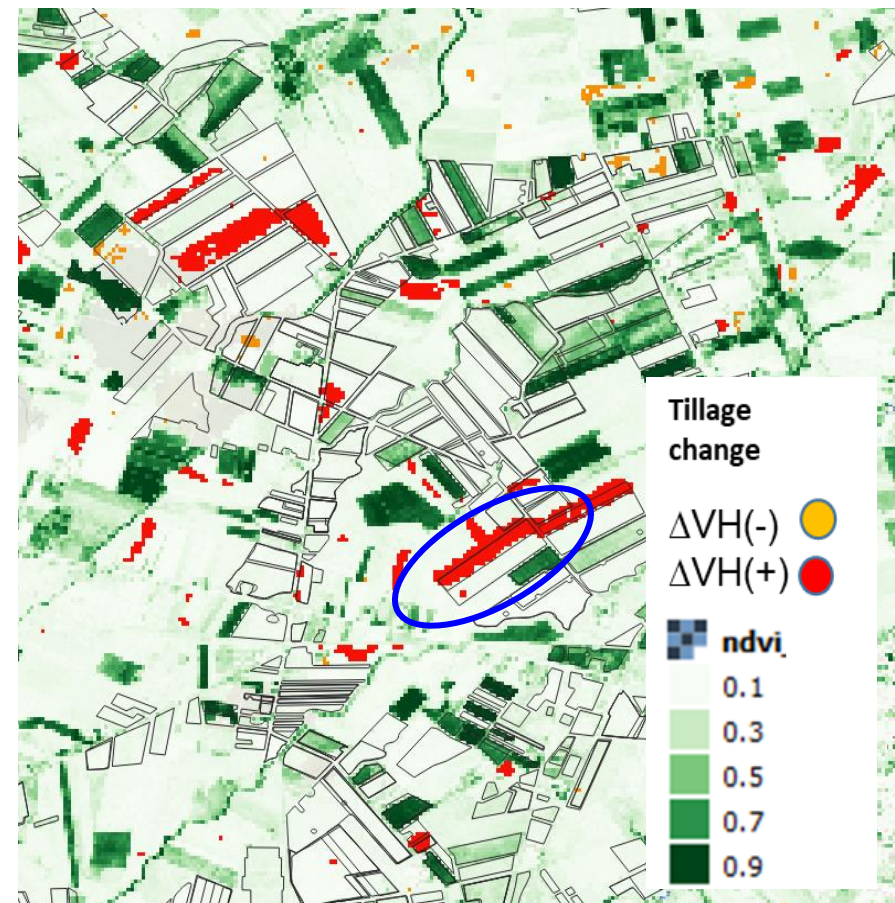


Agricultural practices: Tillage detection

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



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.



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)

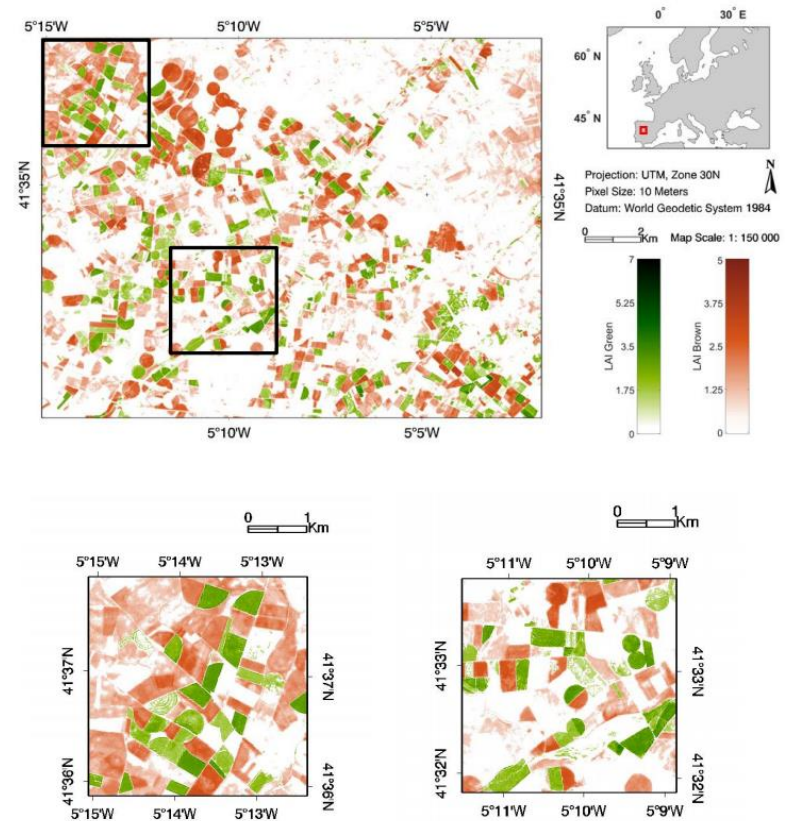
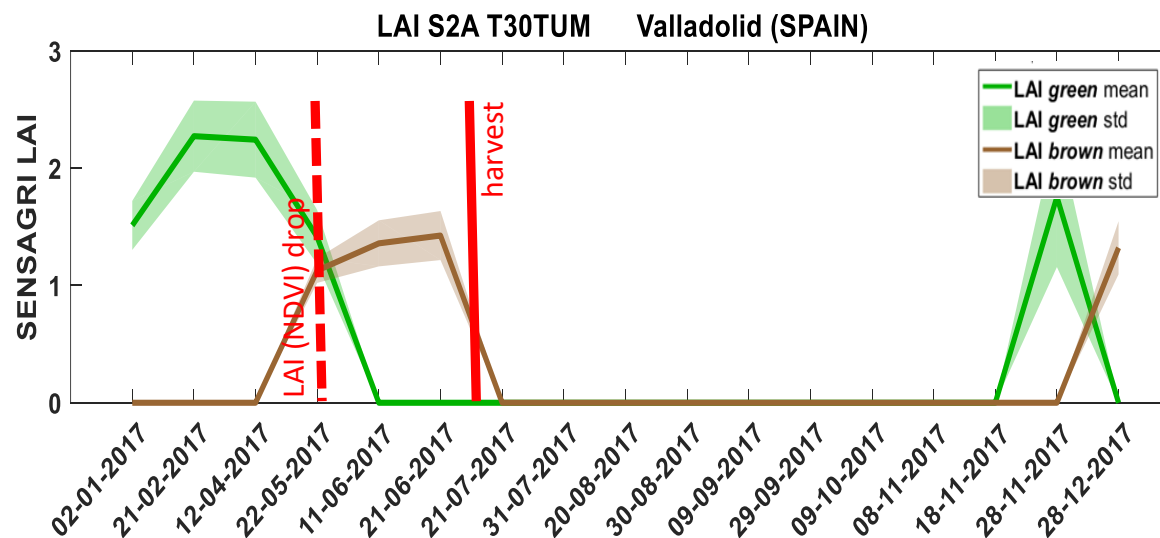
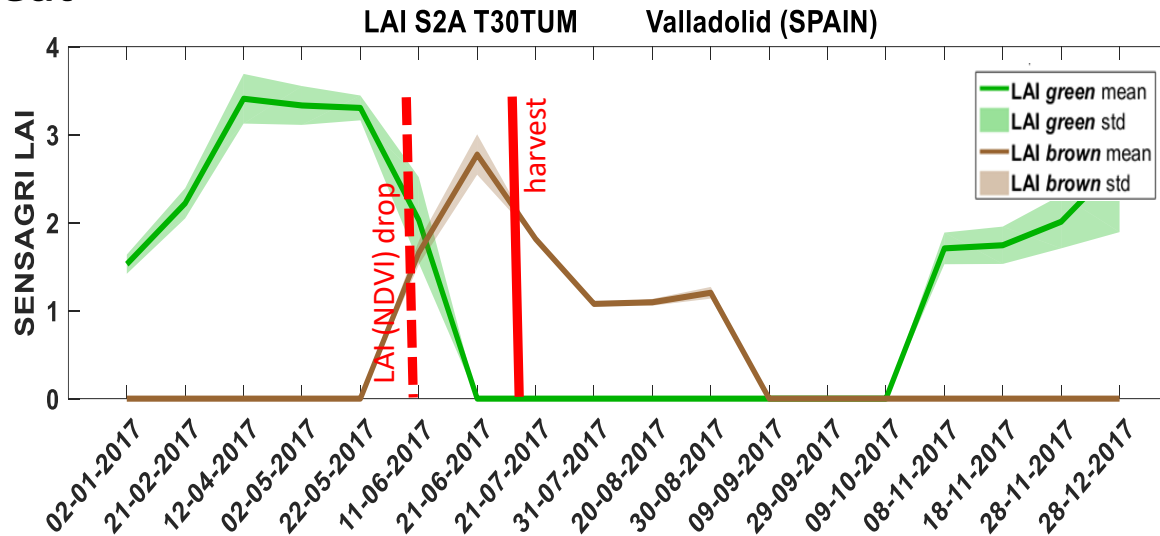


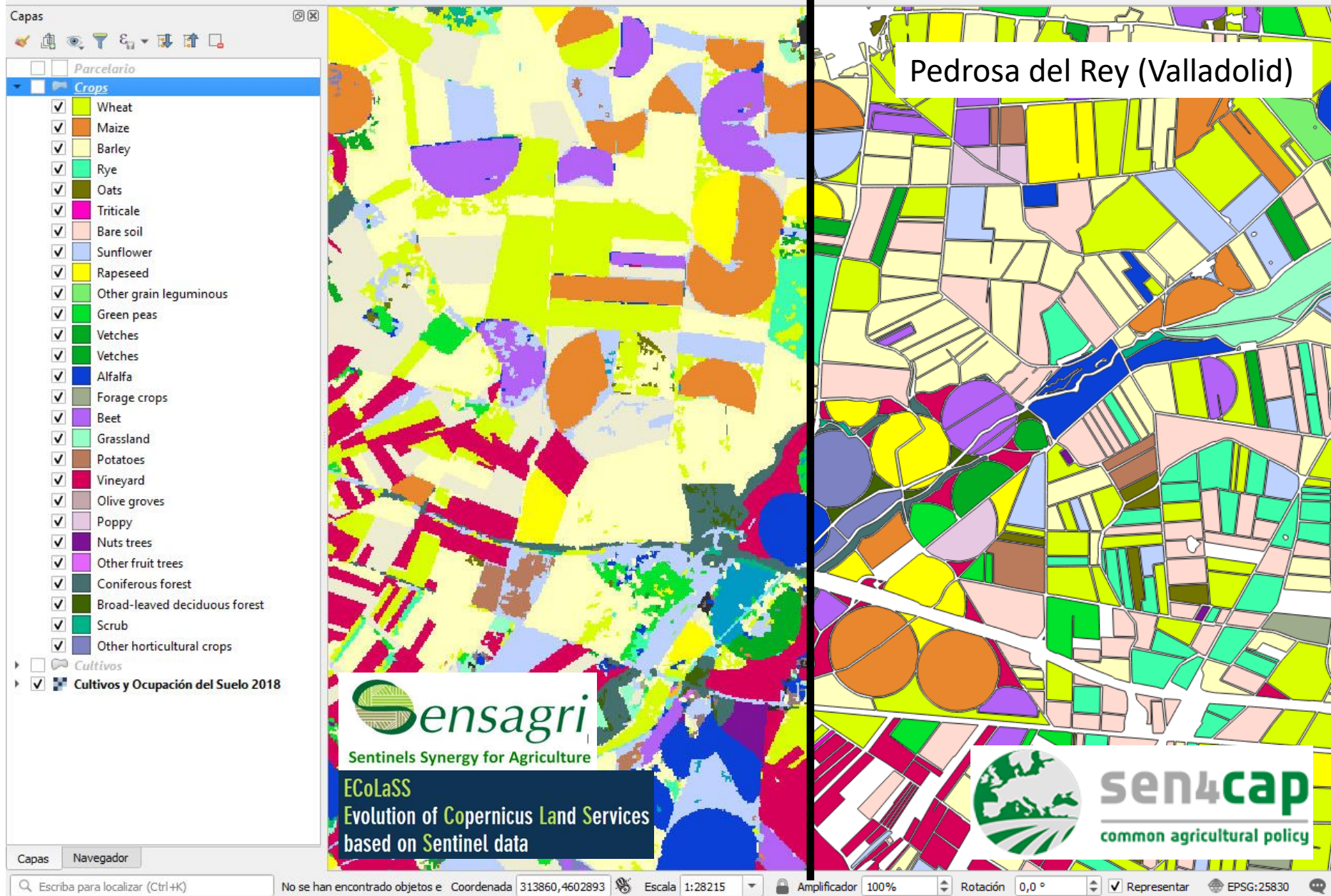
Figure 12. Composite map of LAI green and LAI brown within 50% uncertainty threshold over Valladolid (Spain).

Leaf Area Index

Wheat



Crop type Classification: time is crucial



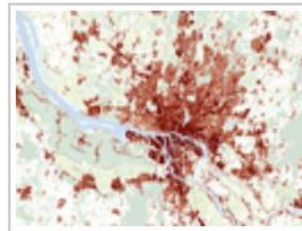
Pixel classification vs GSAA



Other classifications to detect ineligibility

High Resolution Layers

- 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.



Imperviousness



Forests



Grassland



Water & Wetness



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

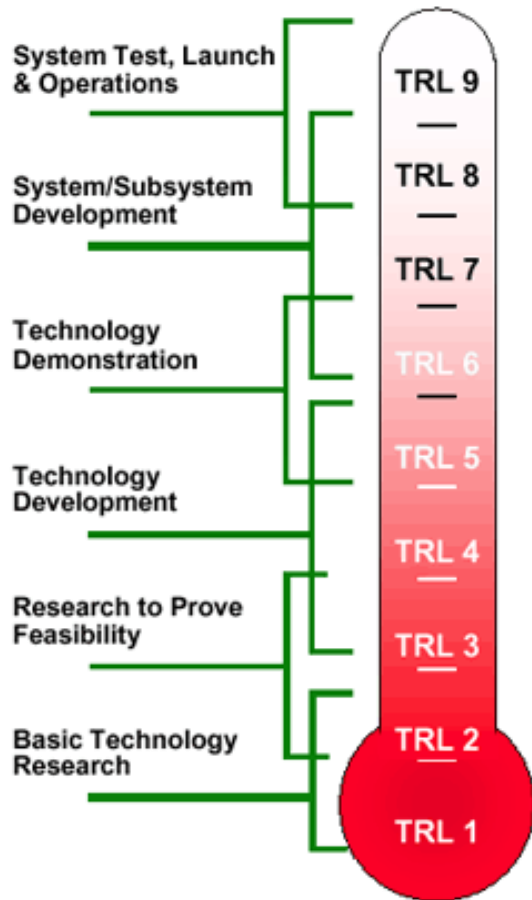
Decrease of pro-rata:
Detect Increase of areas covered by bushes by means of an increase of area with vegetation height over 1 m above ground. **LIDAR**



From R&D to operational product

R&D projects and Copernicus services	Paying Agency
<ol style="list-style-type: none">1. Few users. Small impact2. No legal binding with the users3. Accuracy issues accepted4. Very innovative approaches are welcome5. Delayed production is not an issue	<ol style="list-style-type: none">1. Many organizations and beneficiaries involved.2. Very strong legal concerns due to the Public money transfer. EU+MS Layers3. Used to 100% assurance in the controlled files.4. Reluctance to dramatic changes5. 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



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

