Objective: Demonstrating the value of SEN2AGRI products for:
- Water management
- Territorial development

Users:
- Water management company (85 dams)
- Agriculture cooperatives
Site location: Occitanie
Site features
Site features

• **Key crops:**
  – Winter/spring crops (wheat, barley, rapeseed)
  – Summer crops: maize, sunflower, soybean
• **Most of the maize (grain, silage) is irrigated**
• **More and more cover crops**
Site features
Product used for now: crop types map
Crop types

France -- End of Season

OA = 94.2 %

Accuracy metrics
- F-score
- Precision
- Recall

Crop categories
- Main crops
- Other crops
• **Monthly cloud-free composites**
  - *Not used yet*
  - *Main expected use:*
    - *Quick and NRT assessment of crop status over large areas*
    - *background images for web services*

• **Monthly crop masks**
  - *Not really useful for France*
  - *Maybe useful in the future for*
    - *multi-year records for monitoring agricultural land consumption by urbanization (?)*
    - *Crop area during extreme events (e.g. 2003 drought)*

• **Crop type maps**
  - *Acceptable quality, especially in areas close to sampled areas (in situ data)*
  - *Availability of fresh in-situ data seems to be the main bottleneck for working over large areas. Not impossible but worth to think about it for reducing costs and improve accuracy. To be thought together with the algorithms (e.g. use of previous year(s) maps)*

• **LAI**
  - *Not used, but evaluated*
  - *The problem is with the in-situ data: unrealistic.*
  - *Temporary difficulty for downloading the 20 Gbytes file (File corrupted)*
Crop types: Maize

Extraction of maize fields: most fields are irrigated, mainly from rivers.

River flows are sustained by dams located in or close to the Pyrenees mountain.

Water is managed within hydrographic zones.
Purpose:

- Illustrating how crop type information can be used for a diversity of goal
- The following results are rather “academic”, or even a crude simplification of the reality
Use case

Calculation of maize surface per hydrological zone
Use case

Estimation of maize irrigation requirement per hydrological zone:

- 2500 m³ for the whole season (average, calculated and observed)

Possible application: design of infrastructures such as new dams
Use case

Estimation of farmers income (maize only) per hydrological zone:
- Yield estimated at 10 t/ha in 2016
- Market price of ~170 €/t (~ 1700 €/ha)
- Assumption: grain corn only, no silage (wrong assumption !)

Possible application: socio-economic studies, EO business models
Estimation of electricity consumption for irrigation:
- 0.5 kWh / m³, 2500 m³
- Cost can be estimated: 0.07 €/kWh (~ 87 €/ha)

Possible application: socio-economic studies, EO business models
Use case

Which surface of photovoltaïc panels for producing the energy required by irrigation:

- Calculation with JRC-Eumtesat tool:
  « Photovoltaic Geographical Information System - Interactive Maps »

Possible application: socio-economic studies, design of infrastructures
Irrigation: about 8 water turns in summer. (160 kWh/turn.ha)

The rest of the time, the electricity produced can be sold

Assumption: 0.11 € /kWh

⇒ 4900 €/ha, to be compared to the sale of corn (1700€/ha)

But investment and ROI not accounted for

Possible application: socio-economic studies, design of infrastructures
CACG (water management company) started to develop web services with CESBIO and E2L. CACG is implementing crop type product. Might be interested by implementing SEN2AGRI processing chain.
• Only Crop type product used
• Time for in depth testing too short
• Demonstration phase is too short for in depth testing: 2 or more years => continuation of production?
• In-situ training and validation data is crucial. Validation could be done a posteriori in Europe with CAP declaration.
• Main issue: how could we improve the collection of in-situ training and validation data. Which strategy