

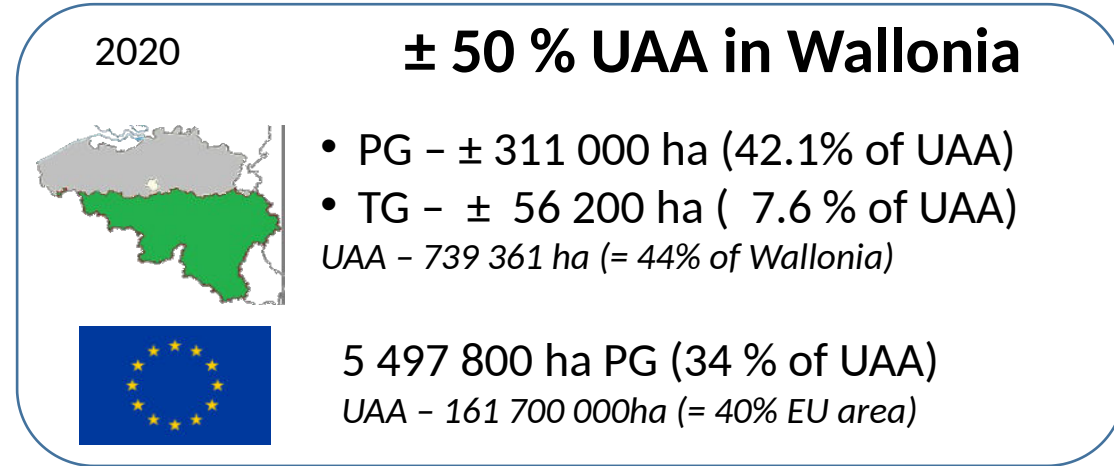
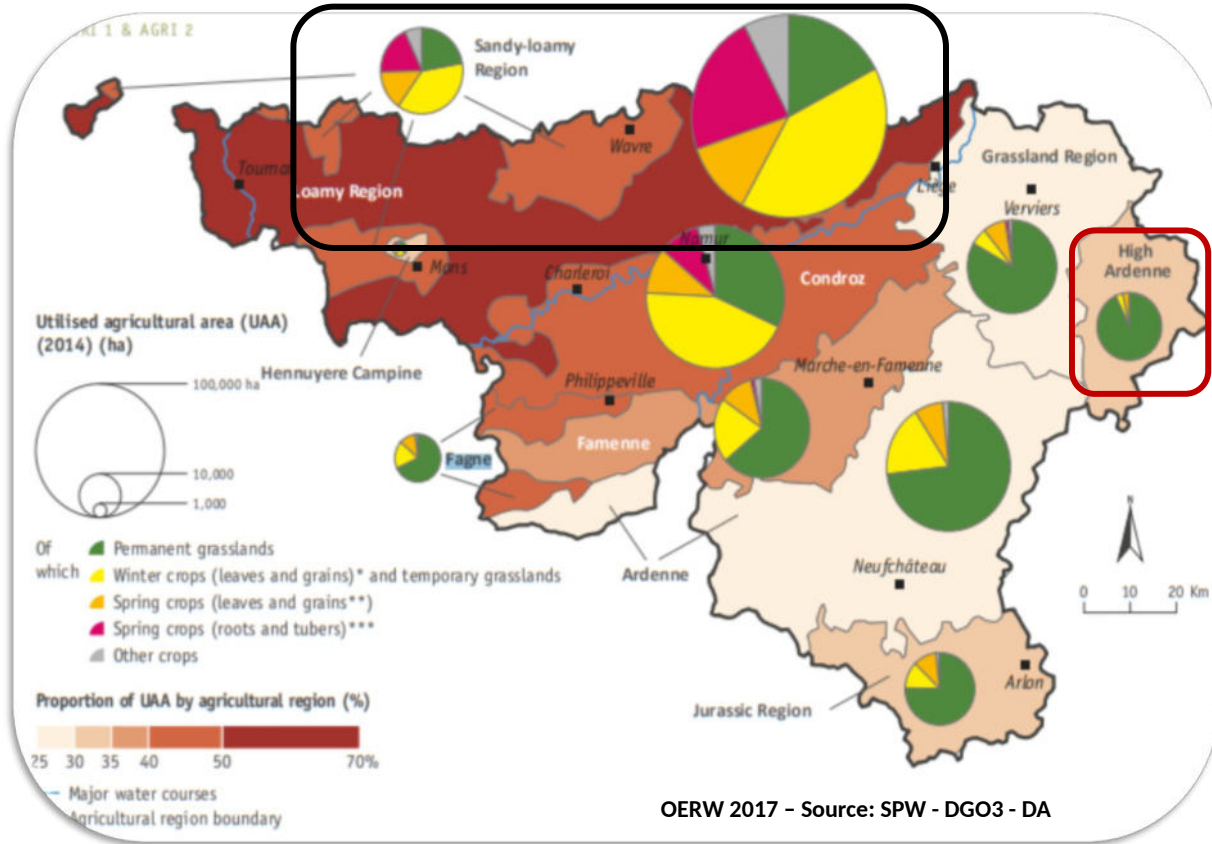
Sunshine

# Grass growth monitoring and modeling for smart grazing management (2.0) - SUNSHINE

Cozmin LUCAU, Yannick CURNEL, Viviane PLANCHON

CRA-W - ILVO  
Gembloux, 19-10-2022

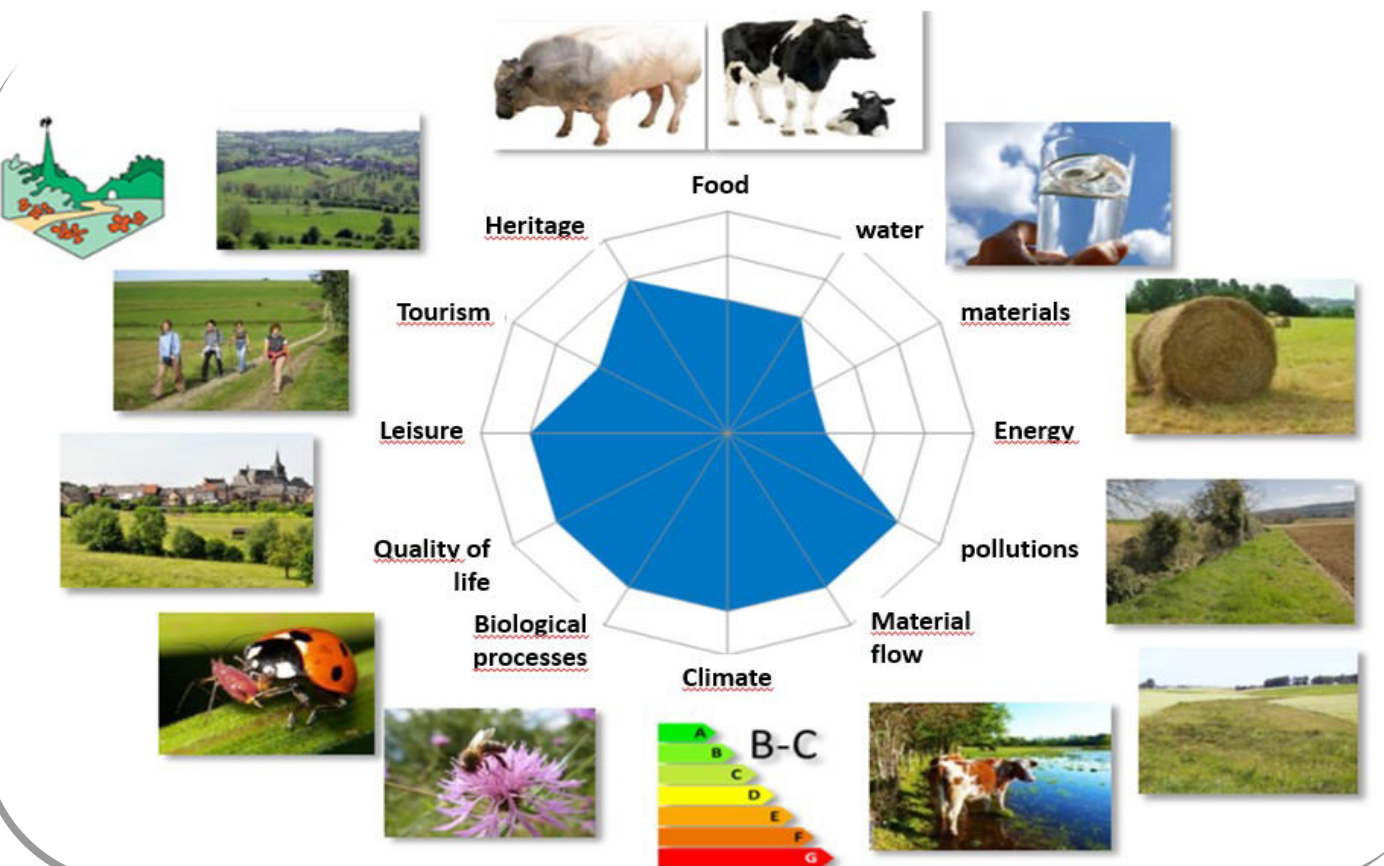
# Grasslands play a major role in Walloon agriculture providing different ecosystem services



On different agricultural region in Wallonia the grasslands represents between **34%** and **95%** of UAA

UAA - Utilised Agricultural Area  
PG - Permanent Grassland  
TG - Temporary Grassland

# Grasslands play a major role in Walloon agriculture providing different ecosystem services



(Source : BIOECOSYS, CRA-W)

2020 **± 50 % UAA in Wallonia**

- PG – ± 311 000 ha (42.1% of UAA)
- TG – ± 56 200 ha ( 7.6 % of UAA)

UAA - 739 361 ha (= 44% of Wallonia)

5 497 800 ha PG (34 % of UAA)  
UAA - 161 700 000ha (= 40% EU area)

Protection and sustainable management of grasslands is critical for both the **protection of biodiversity and climate.**

# Managing pastures is a difficult exercise relying on permanent adjustment between grassland production (quantity / quality) and cattle needs



Tools measuring compressed sward height (CSH) available for quantifying grassland production

Pros :

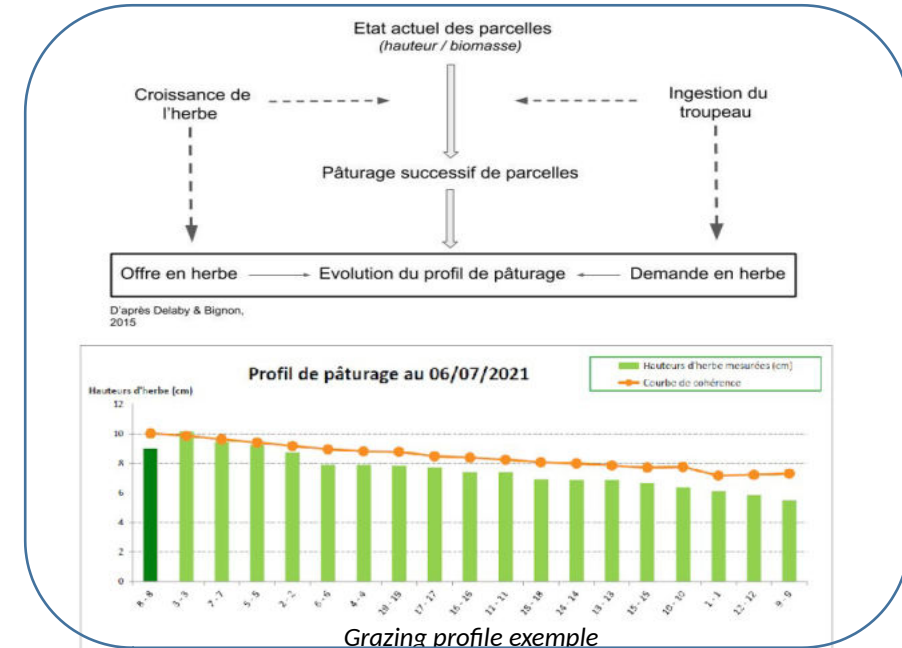
- Objectivity
- Inputs for several management tools
- Regional calibration available (source: effort project)

$$\text{Available Biomass} \frac{\text{Kg DM}}{\text{ha}} = 215 \frac{\text{Kg DM}}{\text{cm} * \text{ha}} * \text{CSH (cm)}$$



Cons :

- Time consuming (1h for 10ha)



- **Managing** and not measuring
- Being able to monitor the **current grass growth** and its (short-term) evolution
- A better assessment of **intra-field heterogeneity**
- Monitoring **grass production and quality**

## Optimal situation

Developping an  
user-oriented  
DSS

# SUNSHINE project

(04/2022 - 03/2025)

## Objective

### Development of a Decision Support System allowing :

- A smart management of mowing calendars
- An assessment, in articulation with the mowing calendars, of grassland growth (quantity/quality) and its evolution
- An improvement, on this basis, of rationing tools

## Partners



**FOURRAGES MIEUX**



## Multi-source approach

Optical and SAR satellite images (e.g. S1, S2, ..), aerial data ..

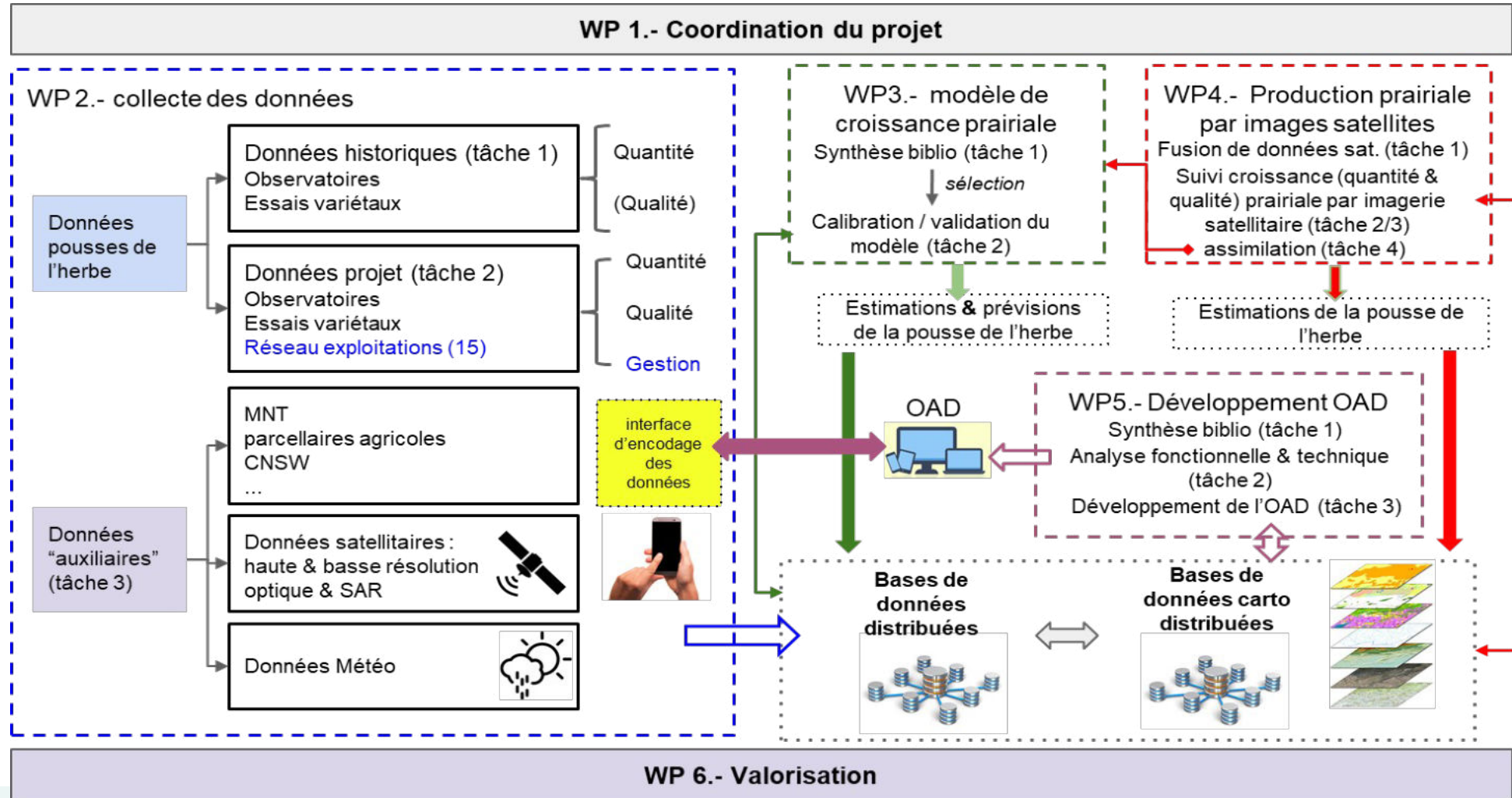
Field data

Observed and forecasted weather data

Grassland growth models

# SUNSHINE project

(04/2022 - 03/2025)



# SUNSHINE project

## Field data

15 farms distributed in Wallonia (+3 CRA-W sites)

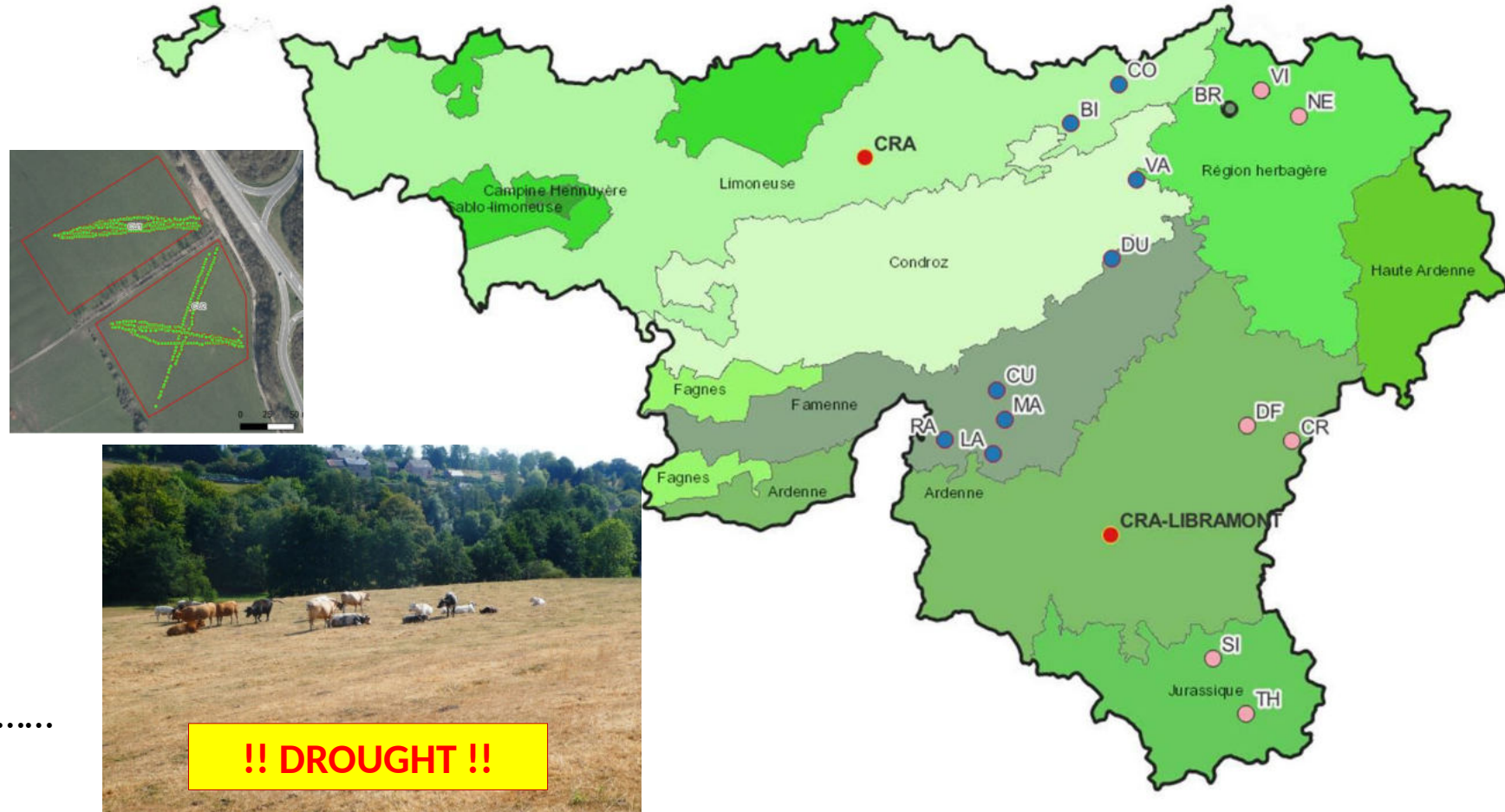
3-5 grassland parcels are considered per farm

Weekly geolocalised measurements of CSH

Monthly assessment of biomass & quality

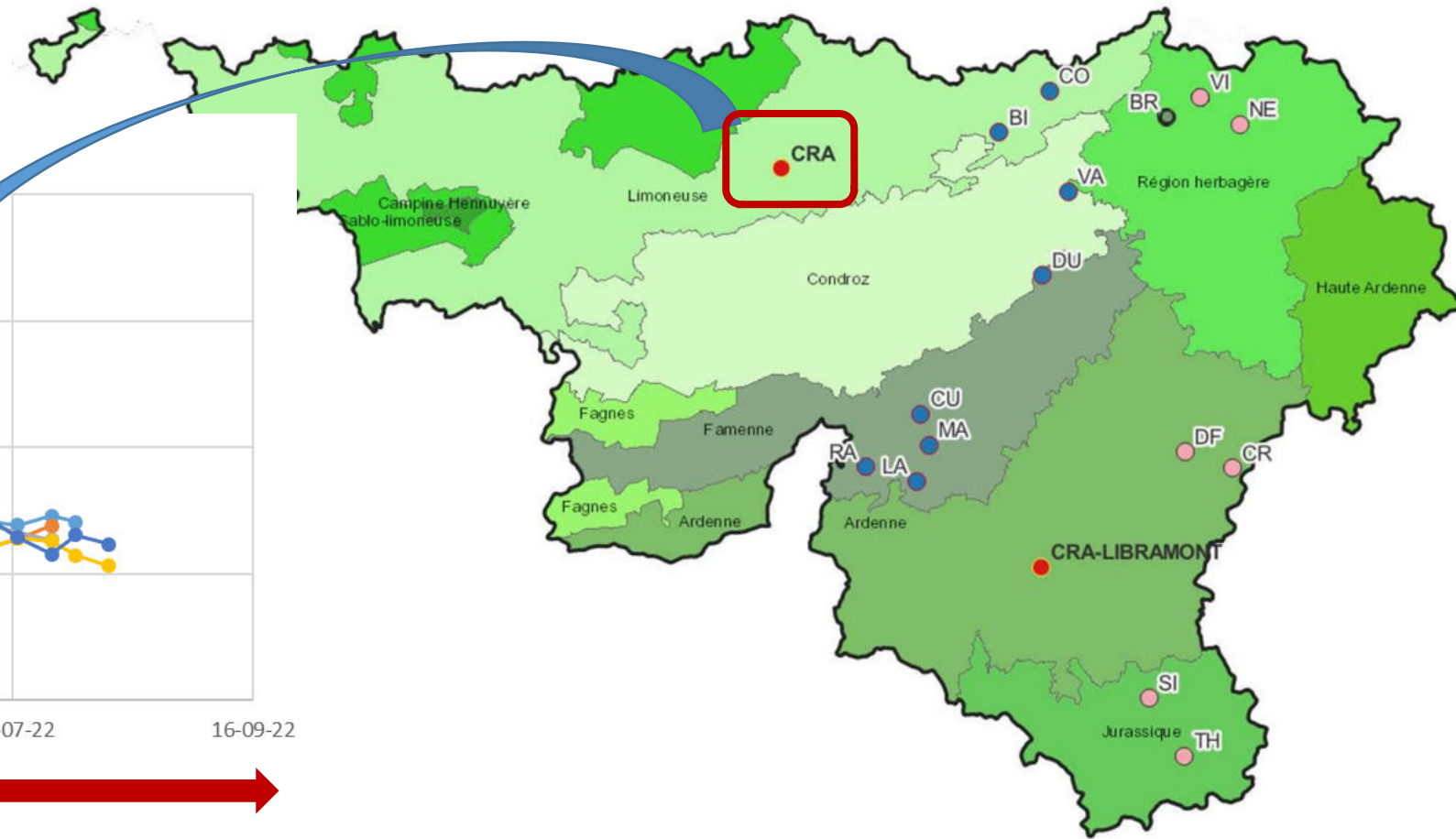
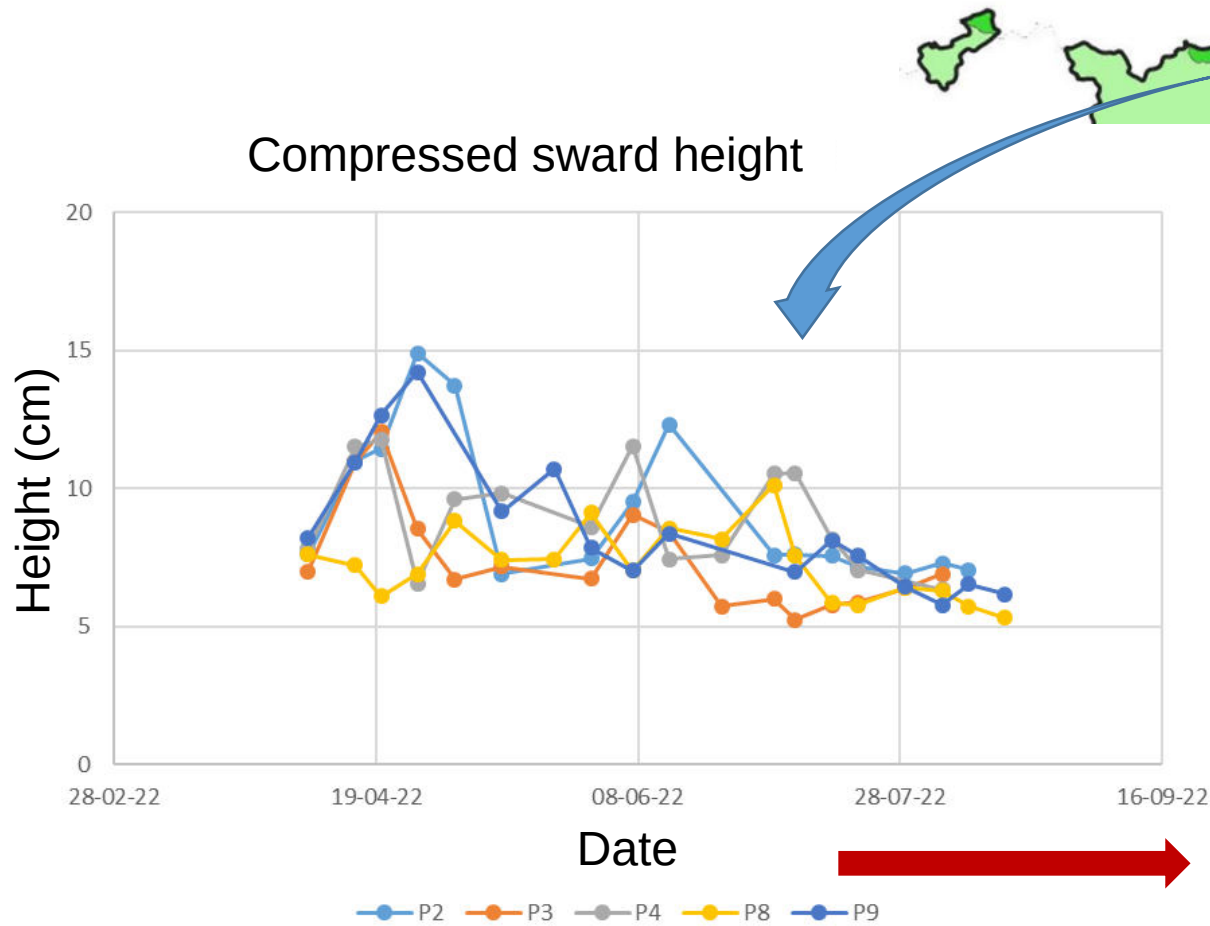
Recording of parcels management

Avril 2022  .....



# SUNSHINE project

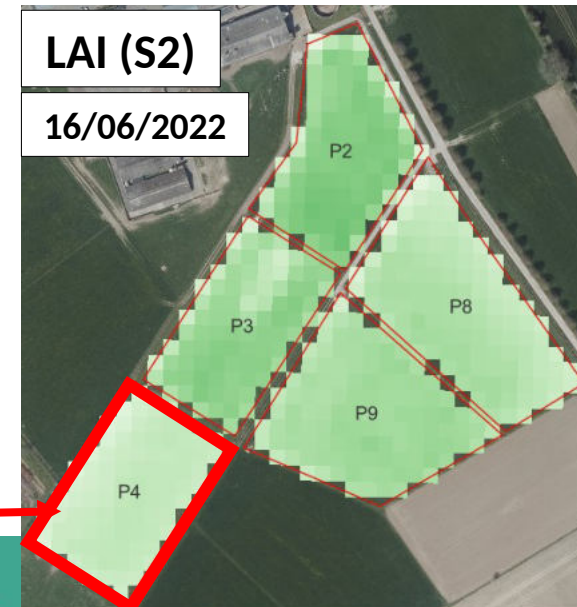
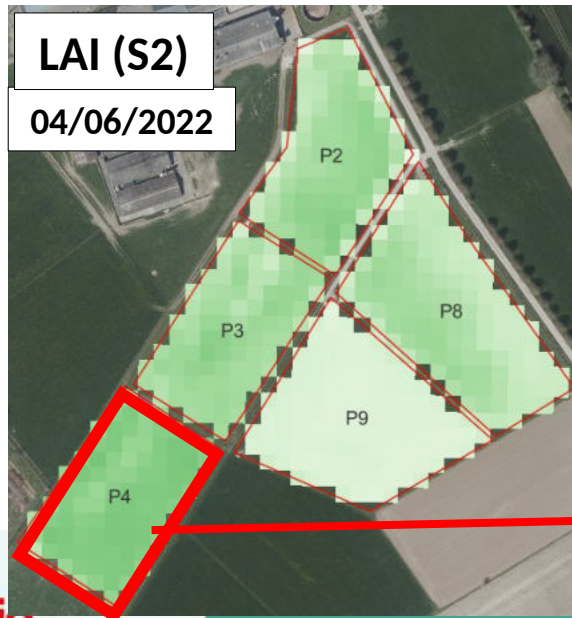
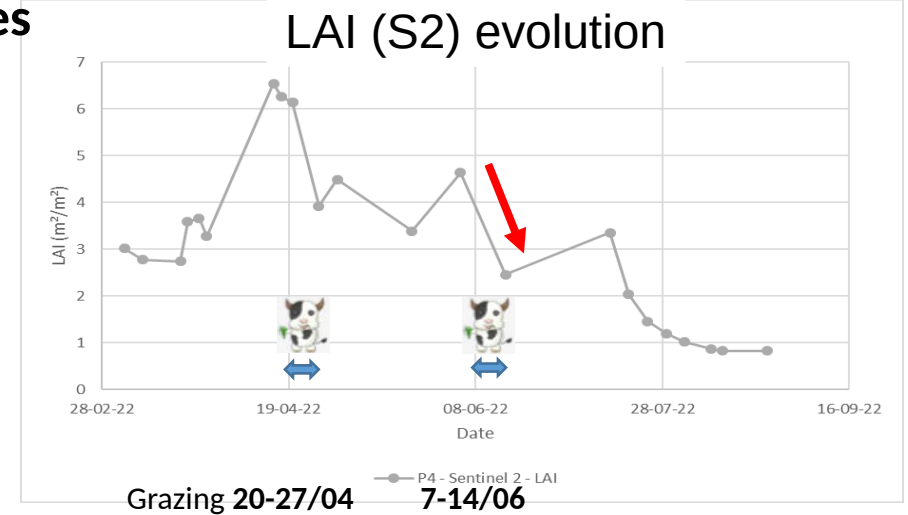
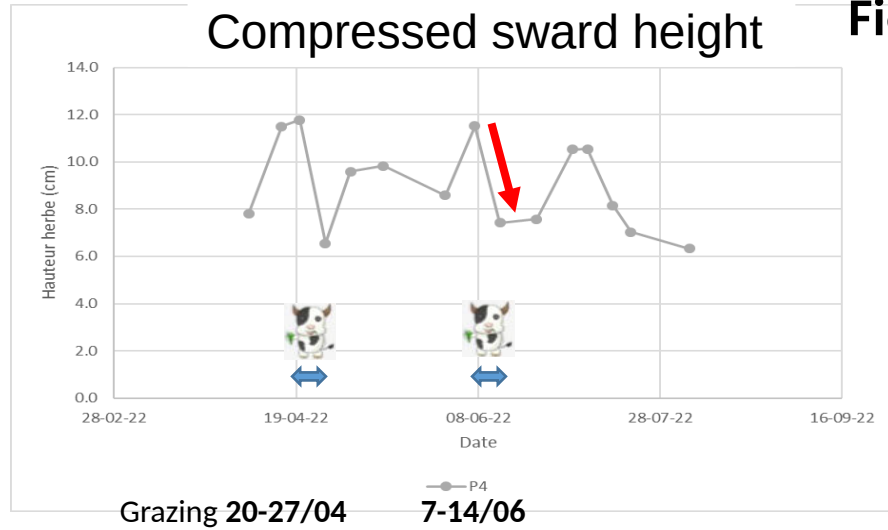
## Field data





# SUNSHINE project

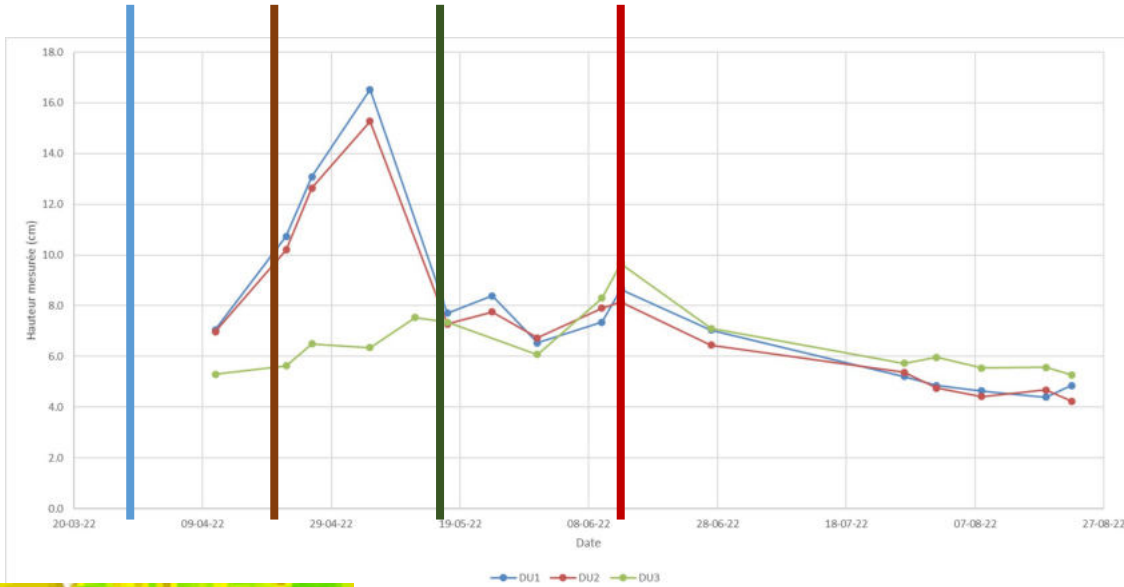
## Field data and RS images



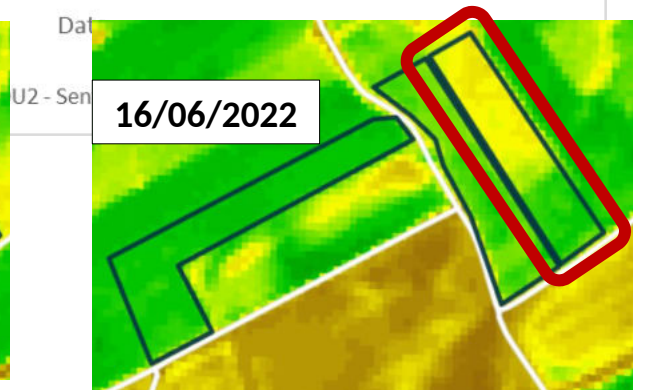
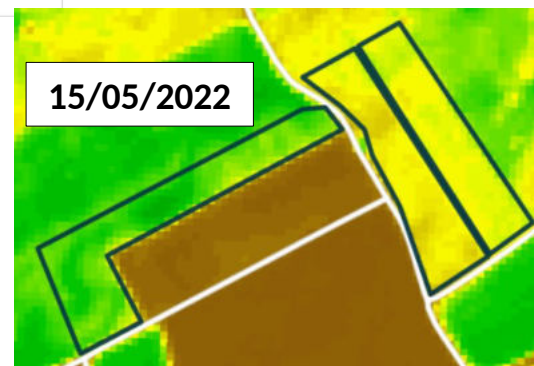
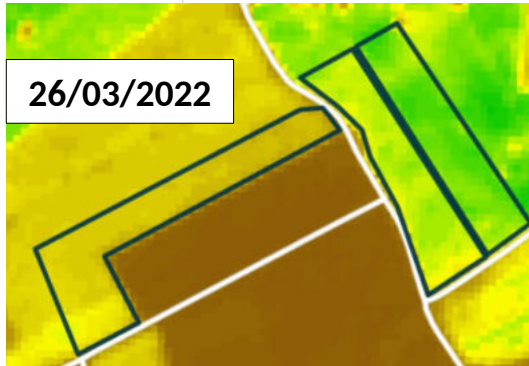
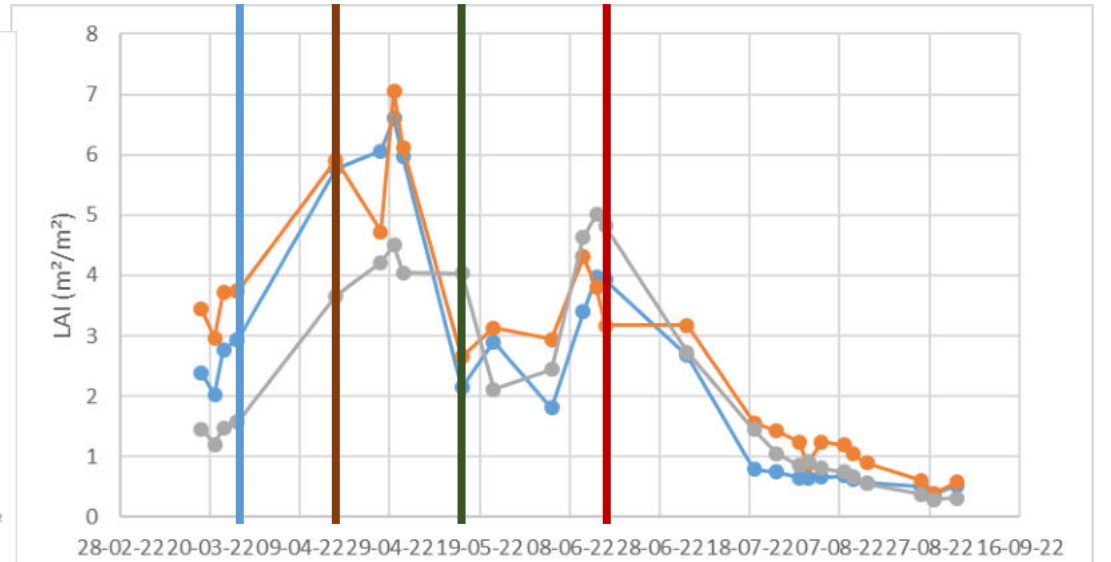
# SUNSHINE project

## Field data and RS images

Compressed sward height



LAI (S2) evolution

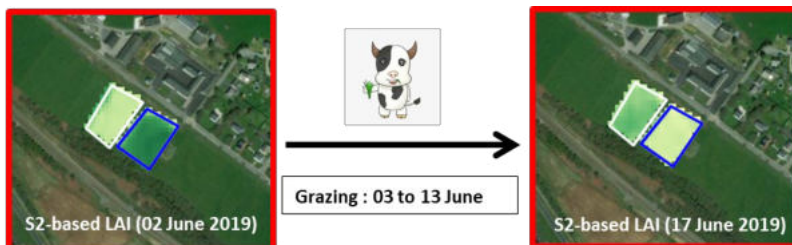


# SUNSHINE project

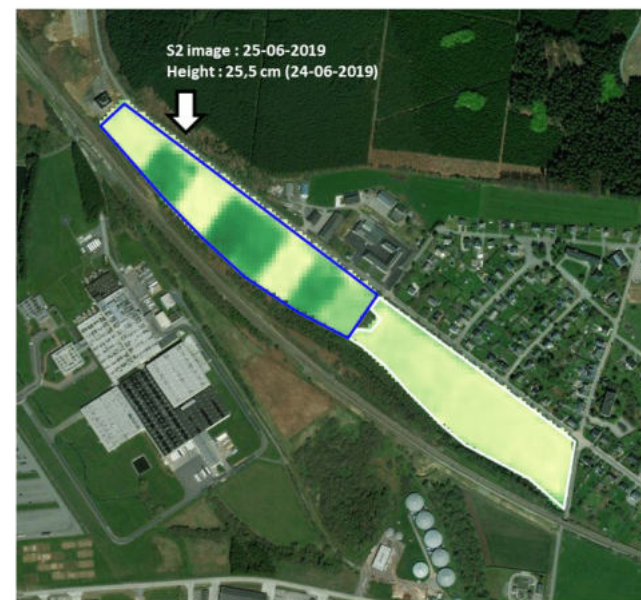
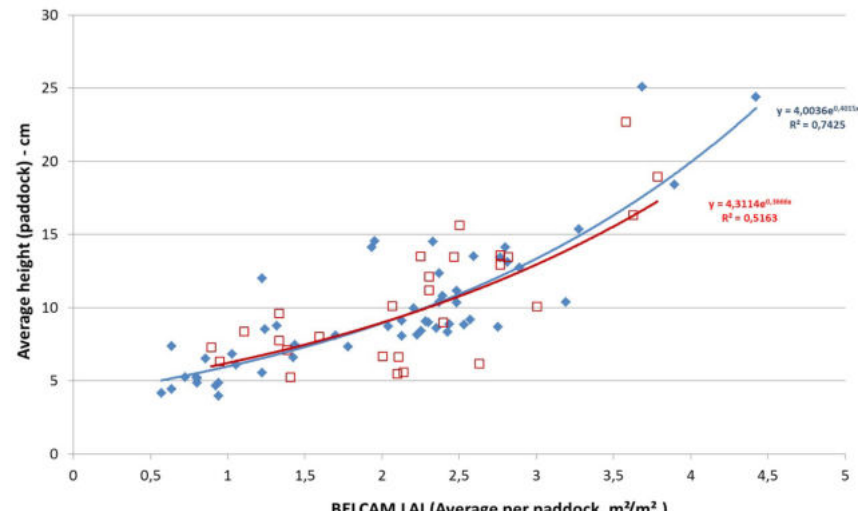
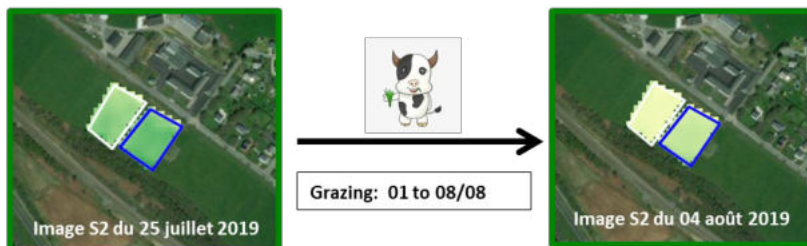
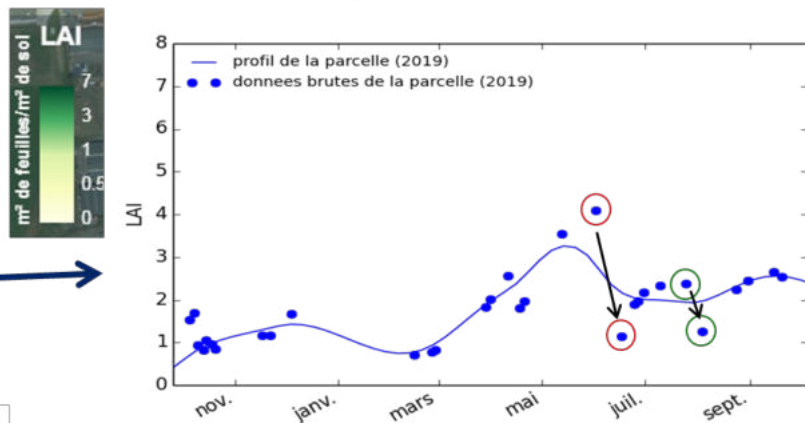
## Field data and RS images



Rotational grazing



⊗ CRA-W Libramont



150 ANS

au service de l'agriculture & de la société



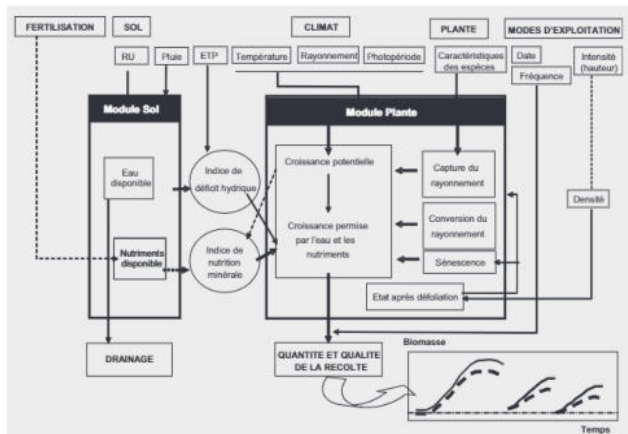
# SUNSHINE project

Next steps ...

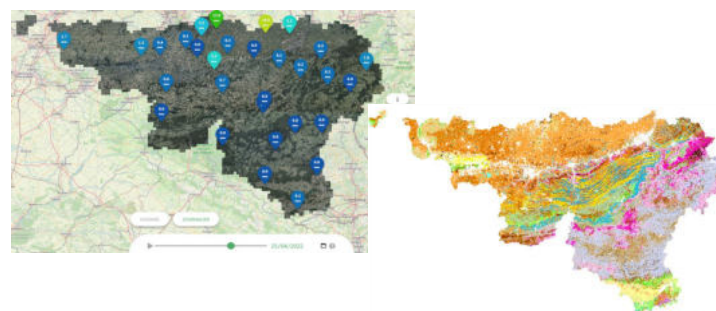
## Field campaign

## Grassland growth models

## RS images



## Complementary data set



DECISION  
SUPPORT  
SYSTEM

Farmers ...

Sentinel 1 (SAR)		Sentinel 2A		MICASENSE RedEdge-M	
Bandes Sentinel-2	Longueur d'onde centrale (nm)	Largeur de bande (nm)			
Bande 1 - Azimut oblique	443.7	21	Bleu	475	(32)
Bande 2 - Bleu	482.4	46	Vert	560	(27)
Bande 3 - Vert	560.8	36	Rouge	668	(14)
Bande 4 - Rouge	664.6	31			
Bande 5 - Végétation "red edge"	714.1	13			
Bande 6 - Végétation "red edge"	740.5	13			
Bande 7 - Végétation "red edge"	782.6	20			
Bande 8 - PIR	822.8	108			
Bande 9A - PIR "wide"	864.7	27			
Bande 9B - Végétation étendue	865.1	20			
Bande 10 - SWIR - Citrus	1173.2	31			
Bande 11 - SWIR	1613.7	51			
Bande 12 - SWIR	2202.4	175			

OK

PIR 842 (57)

LAI

$NDVI = \frac{PIR - R}{PIR + R}$



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Thank you !

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& de la société

