



watchITgrow

An innovative platform for a sustainable growth of the Belgian potato production

Curnel Y., Planchon V., Le Clef A., Goffart J.P. (CRA-W)

Piccard I., Gobin A. (VITO)

Wellens J. (Ulg)

Cattoor N., Cools R. (Belgapom)



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watchITgrow platform is an output of iPot project

“Industrial potato monitoring for the Belgian potato sector”



- Funded by the **BEL**gian Science Policy Office (BELSPO)
- **iPot** :
 - 36 months (06.2014 - 05.2017)
 - Application project
 - Crop: **Potato**
- **Partners** :

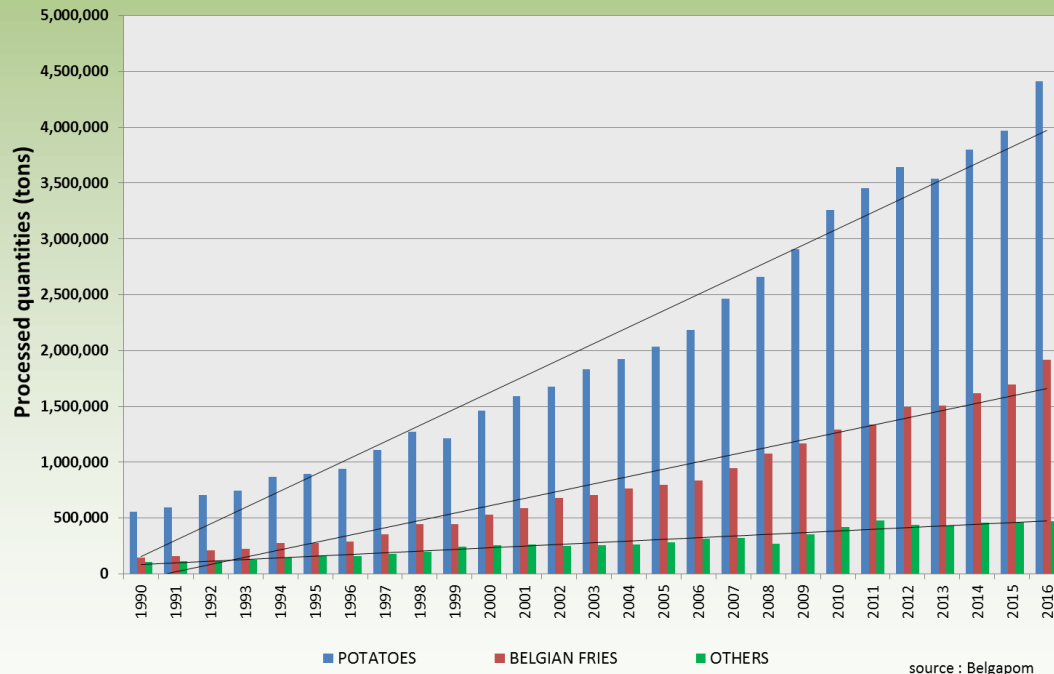




Potato and Belgium...A love story



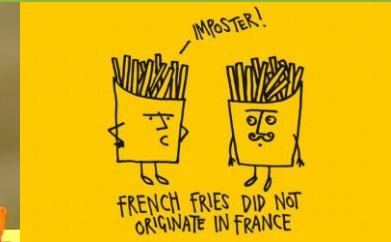
Belgian potato processing - potatoes as raw material 1990 - 2016



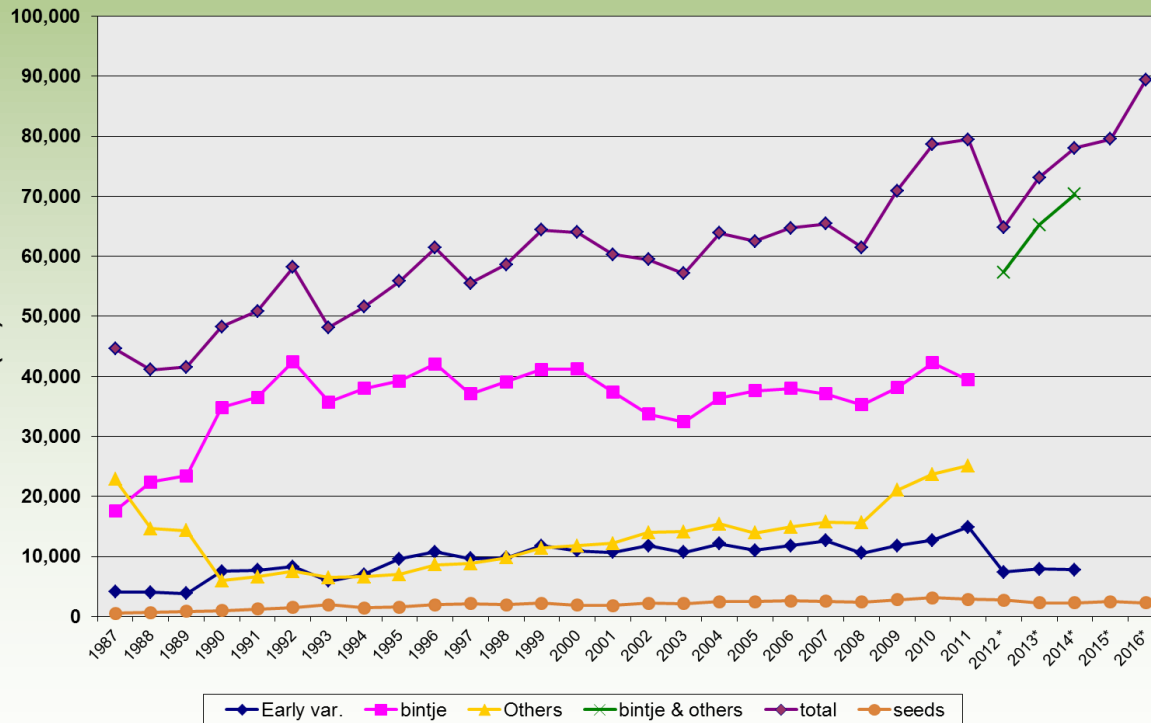
- Belgium is the 17th biggest potato producer of the world.
- Belgium is at the 4th rank when considering the potato production per inhabitant (395.5 tons per 1000 inhabitants) (WES report, 2013).
- Industrial potatoes represent around 80% of the total potato cropped area in Belgium.



Potato and Belgium...A love story



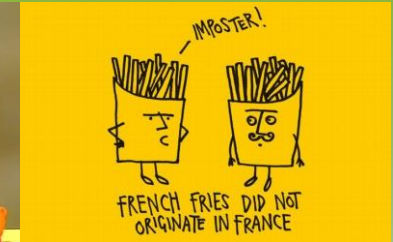
Area of potatoes in Belgium (1987 - 2016)



- Up to 100.000 ha expected in 2017!
- Potatoes have evolved from a 'side crop' to a 'main crop' for arable farmers : need for professionalization and R&D.
- Potatoes are a part of 'crop rotation' : need for arable land and efficient land use



Potato and Belgium...A love story



The potato sector is growing fast.



In order to ensure / fasten this development, the sector is looking for new developments/new tools (such as [WatchItGrow](#))

Risk of yield or quality losses ?

Contract negotiations !
Expected yields ?

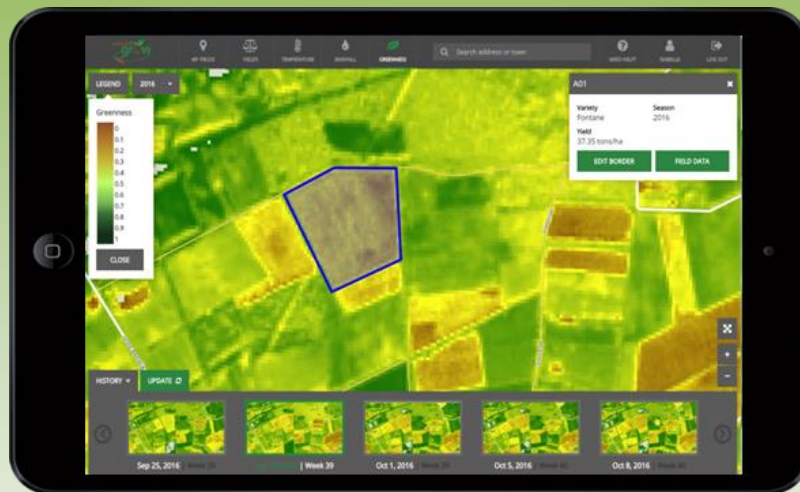


Problems ?
Where? Priority list for field visits?

Planning ! Crop development stage



WatchITgrow® for the future of the Belgian potato chain



Monitoring potatoes from space!

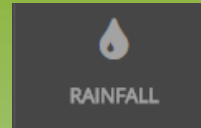
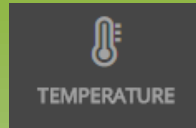
- Crop development
- Field heterogeneity
- Risks at production and quality losses
- Yield forecasts

For all actors in the potato chain:

- Get access to satellite images/products, weather data, yield forecasts
- Store your own field data (e.g. treatments, yield samples,...)

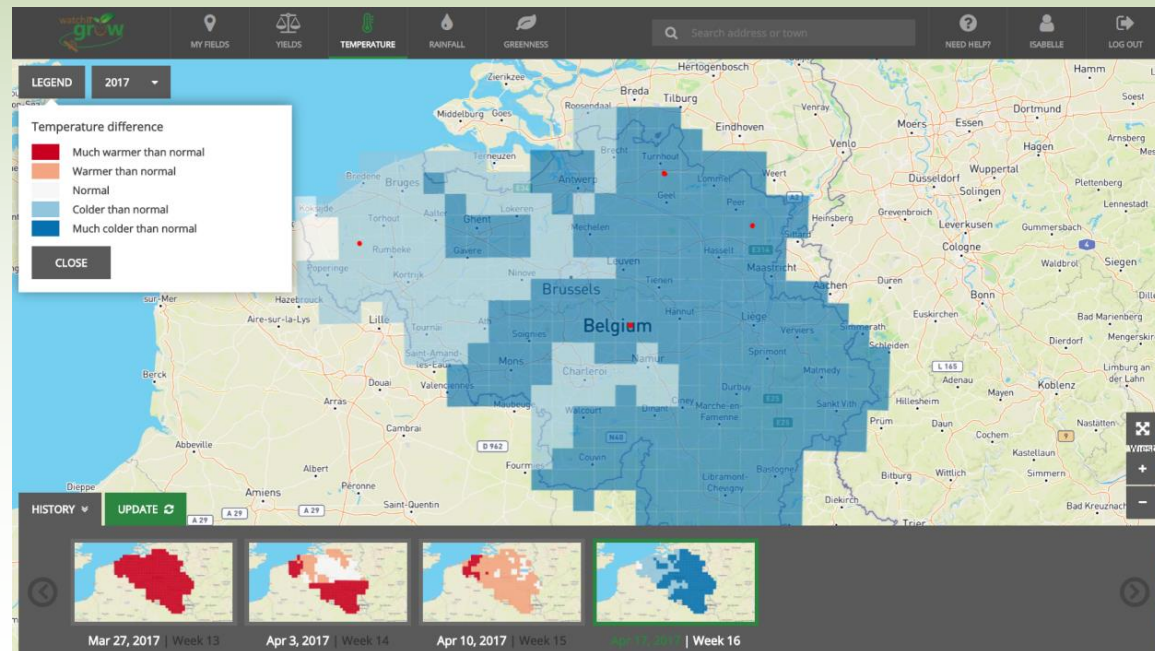


Weather data



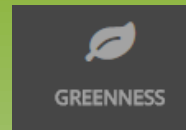
- Country wide weather info on a weekly basis:
 - Average temperature
 - Precipitation sum
- “deviation with average”

→ risk at production or quality losses?

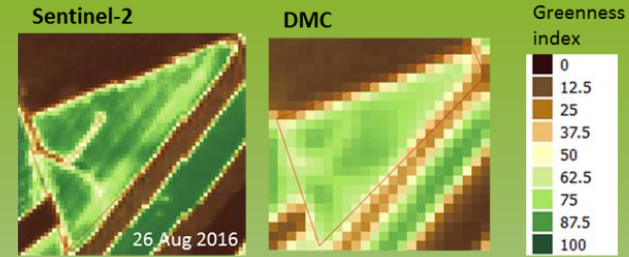




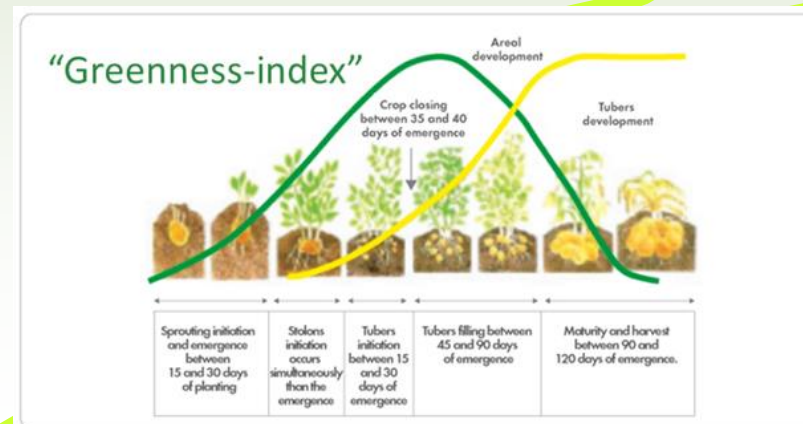
Satellite images



→ monitor & compare fields



- **Sentinel-2:**
 - 10m pixels
 - Since August 2015
 - Every 10 and soon every 5 days
- **DMC/Deimos:**
 - 22m pixels
 - since 2009
 - Every 2 days





Monitor your fields throughout the season

Emergence →

1 May 2016

8 May 2016

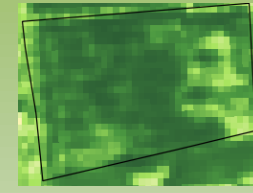
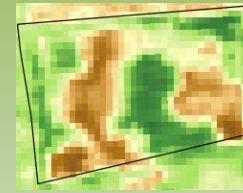
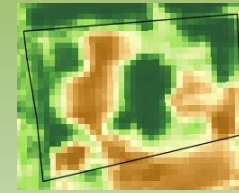
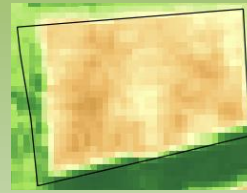
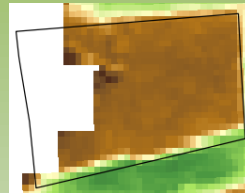
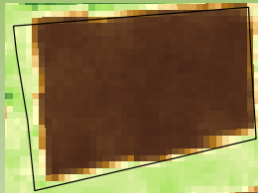
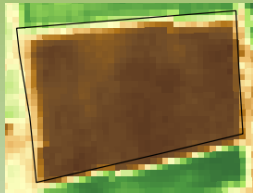
28 May 2016

6 June 2016

10 July 2016

20 July 2016

9 Aug 2016



Senescence →

26 Aug 2016

5 Sept 2016

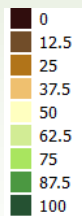
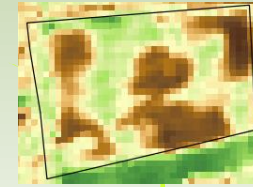
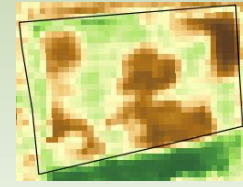
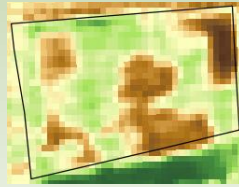
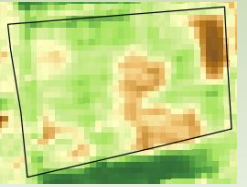
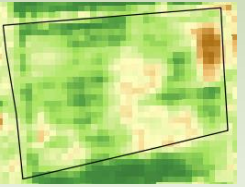
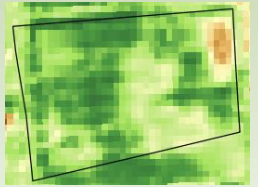
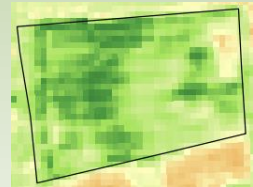
8 Sept 2016

15 Sept 2016

25 Sept 2016

28 Sept 2016

5 Oct 2016



Greenness index



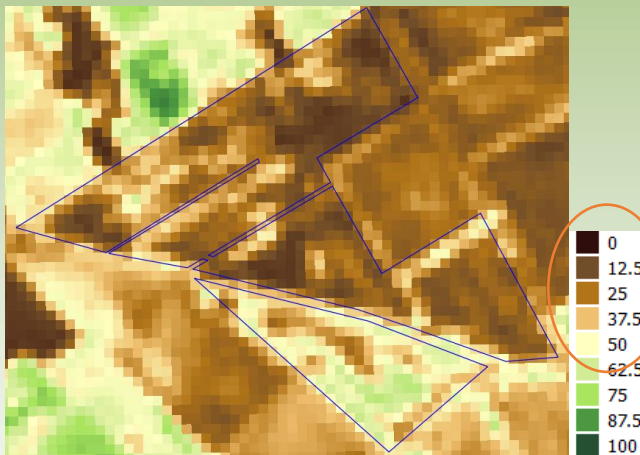


Check your fields for anomaly

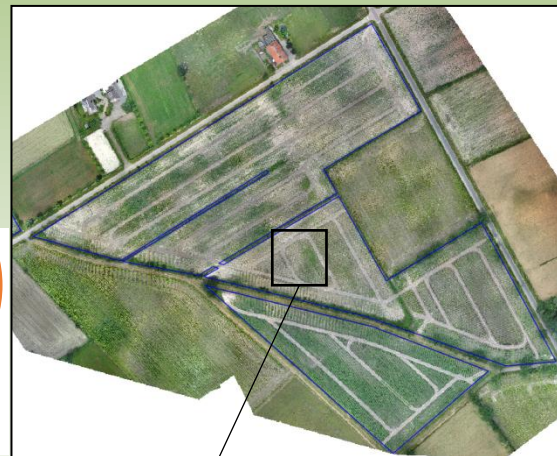
Heavy rainfall in June 2016 (a record): waterlogging...

| June (Uccle) | rainfall (mm) |
|--------------|---------------|
| 2016 | 174.6 |
| 1839 | 173.7 |
| 1963 | 153.7 |
| 1966 | 140.5 |
| 1859 | 137.4 |
| Normal | 71.8 |

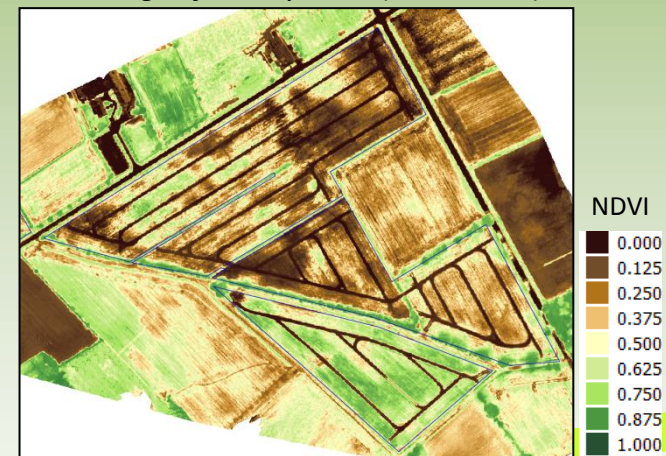
Sentinel-2 of 20 July 2016 (10m)



UAV image of 18 July 2016 (RGB, 3 cm)



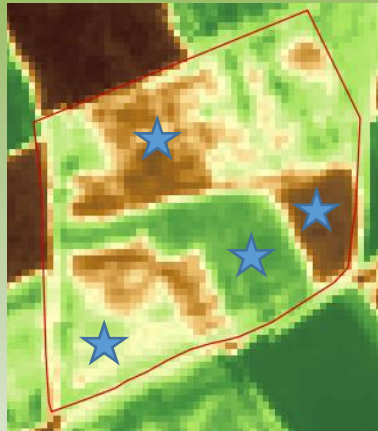
UAV image of 18 July 2016 (NDVI, 8 cm)



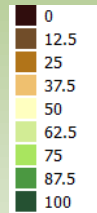


Check your fields for heterogeneity

Sentinel-2 of 20 Aug 2016



Greenness index

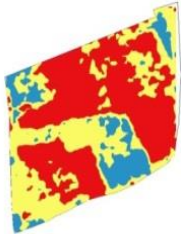


useful for field selection (historical data)

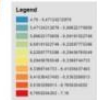
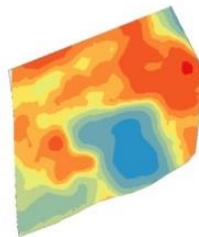
improved sampling (per zone)

evolution towards precision agriculture:
variable rate application of fertilizers,
irrigation, haulm killing,...

Electrical conductivity (EC)



Acidity (pH)



Reference data from soil scans (source: CRA-W)

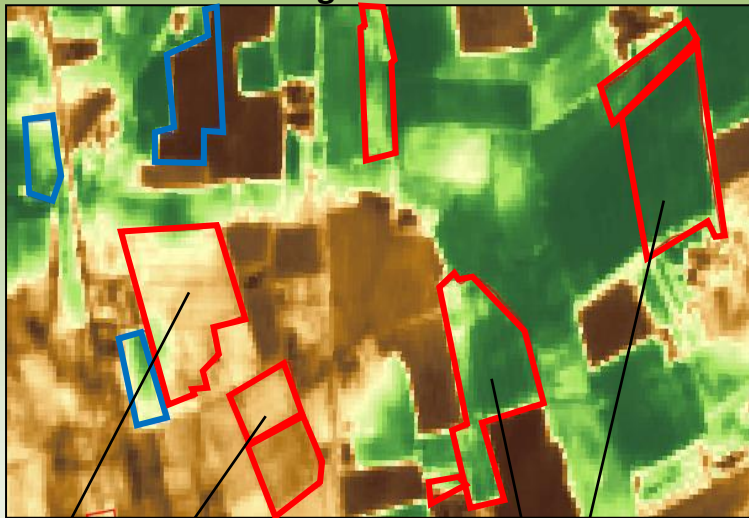




Compare your fields

Early varieties (in blue) vs. late varieties (in red)

Sentinel-2 of 22 Aug 2016

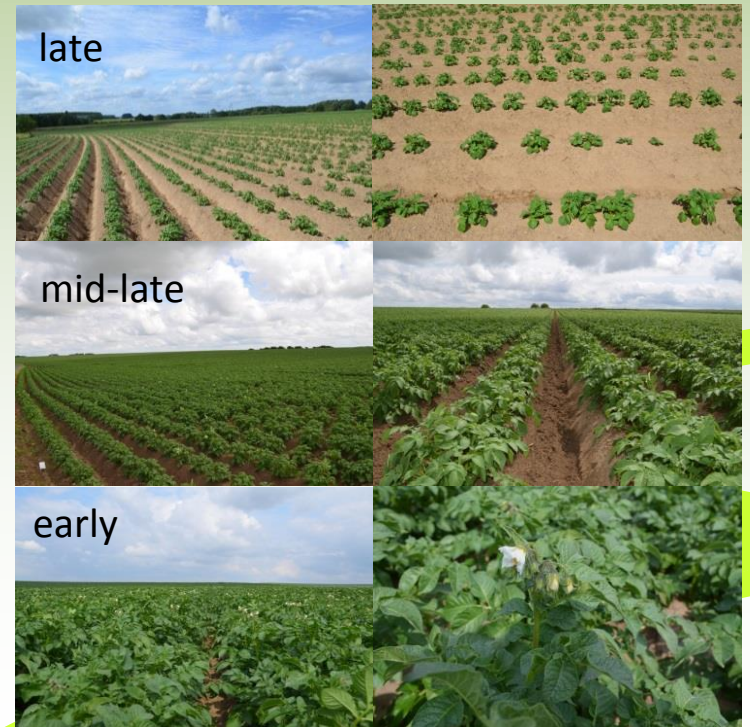


More advanced senescence

Still green

- optimize field visits
- input for planning / logistics (harvest)

Senescence started?
Haulm killing applied?

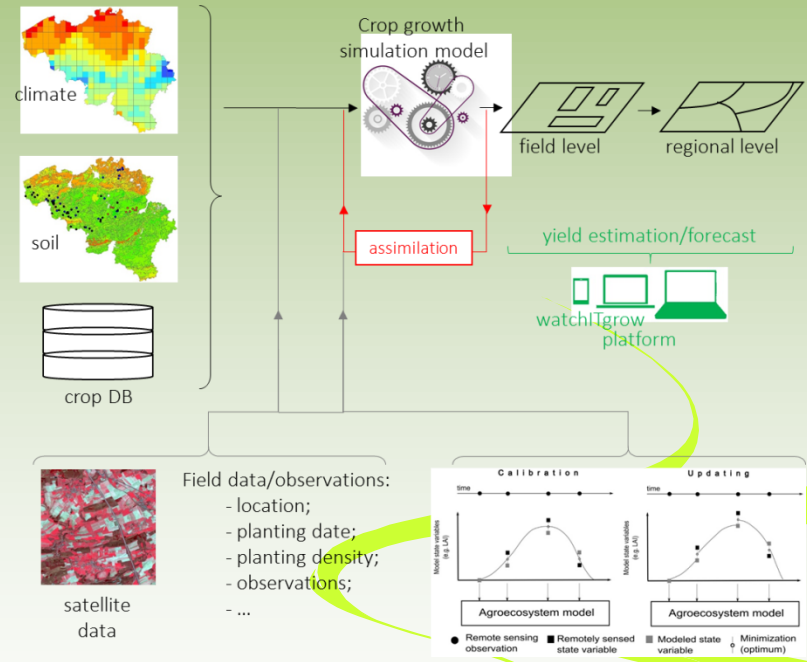
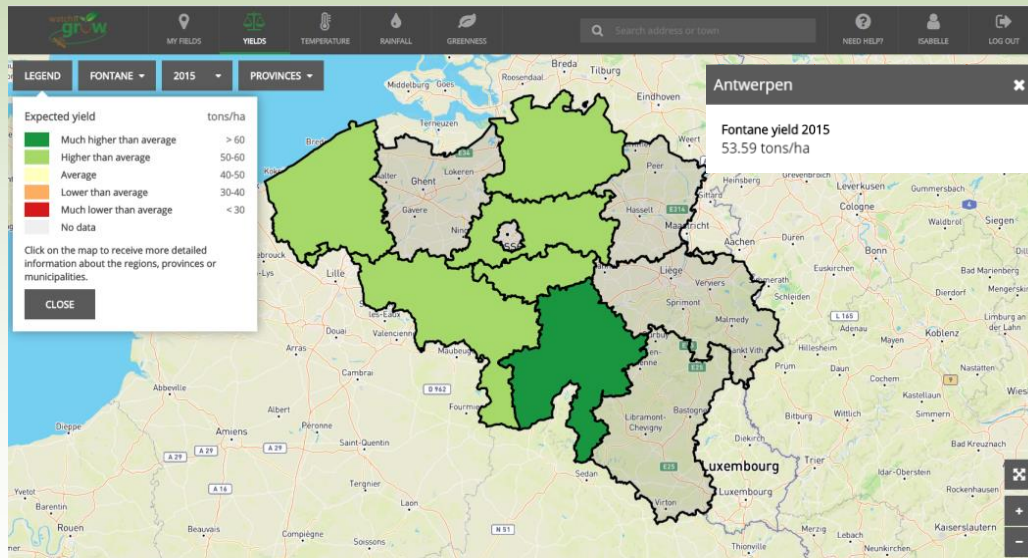




Yields forecast



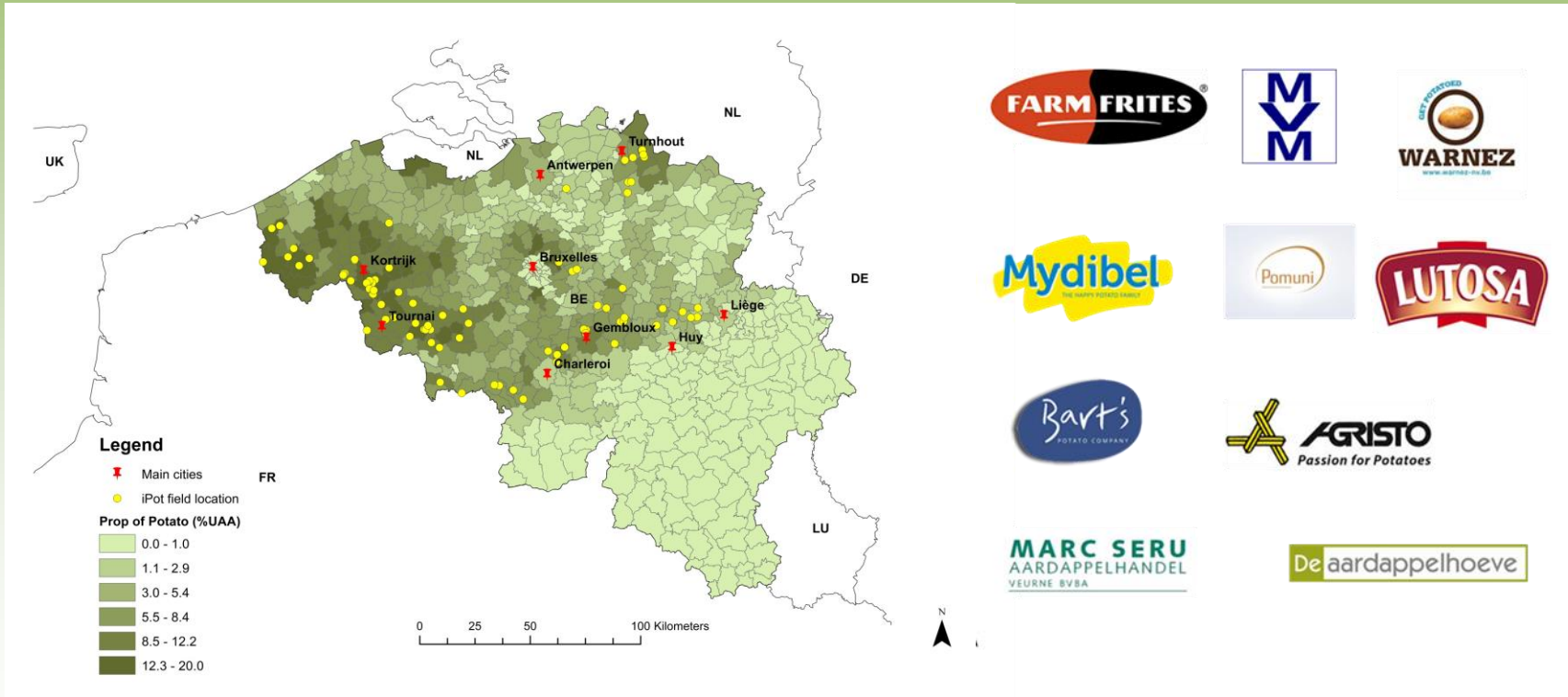
- Based on combination of yield models
- For 3 varieties: Fontane, Bintje, Nicola
- Per field, municipality, province, region
- From August onwards





Field data

2 intensive field campaigns have been organised (2015, 2016)
~75 parcels per year



3 varieties : Fontane, Bintje et Nicola



Field data

- **Field location :**
 - geographic coordinates
 - Field area
 - ...
- **Management data :**
 - Variety
 - Planting / haulm killing / harvest dates
 - Planting density
 - Fertilisation & irrigation
 - ...
- **Tubers samplings**
 - Tubers sampling every 2 weeks from the begin of July (Nicola variety) / mid-July (Fontane and Bintje varieties) up to harvest.
 - Sampling over 3 m (4 replications)

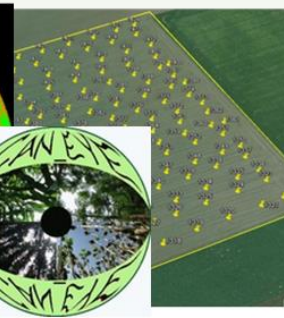
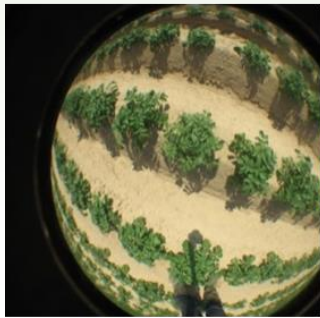
- **Phenological stages**
 - BBCH scale (2-digits)
 - Every 2 weeks
- **Specific events :**
 - Waterlogging / flooding
 - Drought
 - ...





Field data (Validation of satellite's VI)

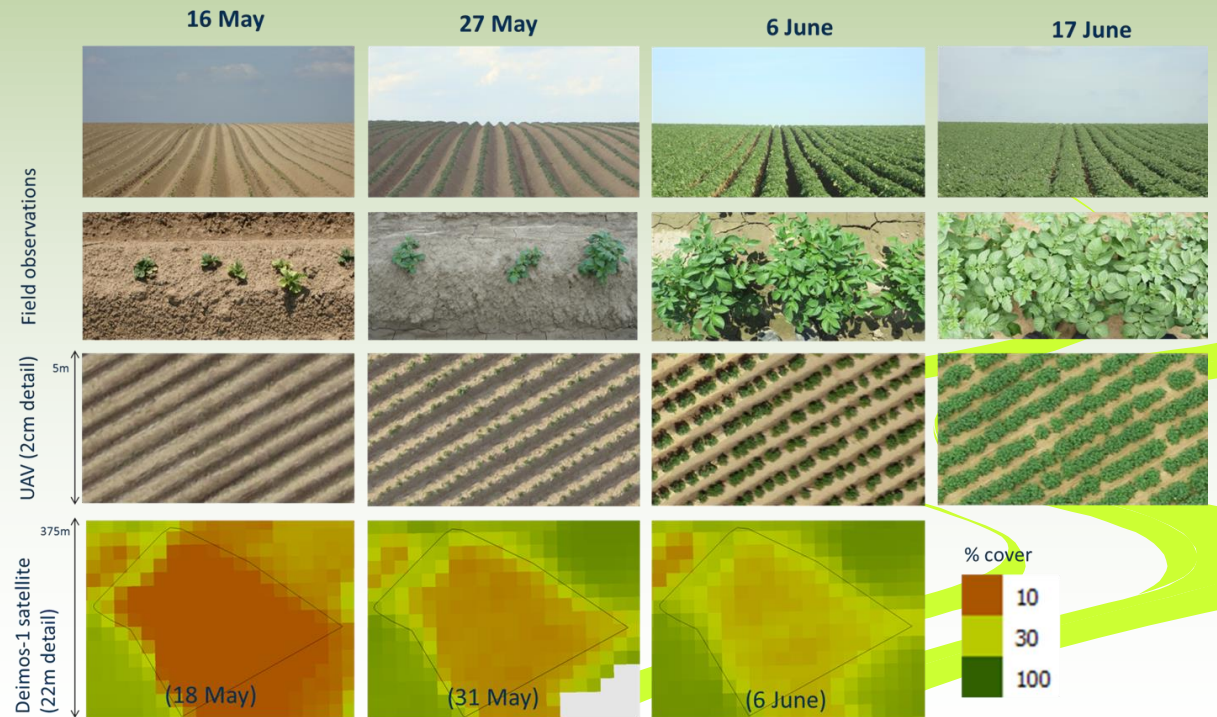
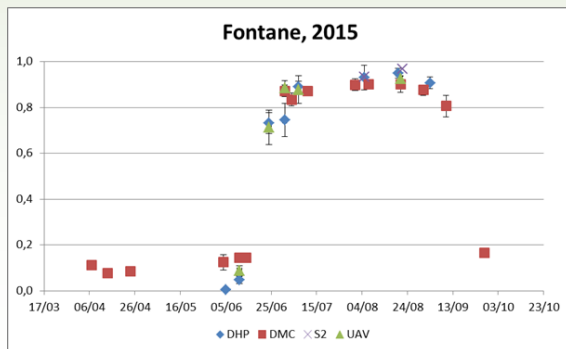
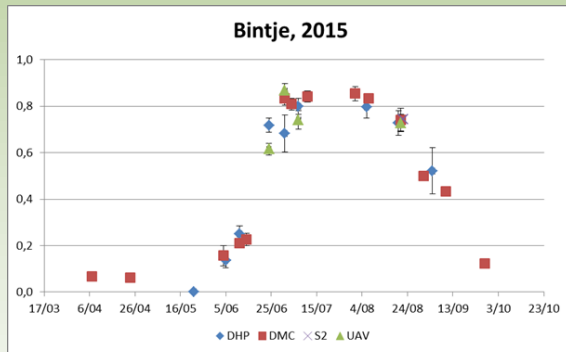
- 3 UAV monitoring campaign (2014-2016) in 3 fields (1 per variety: Fontane, Bintje & Nicola) in Gembloux – equipped with a RGB/Mspec Camera
- Comparison of VI from satellite vs. UAV and ground measurements (DHP)





Field data (Validation of satellite's VI)

- 3 UAV monitoring campaign (2014-2016) in 3 fields (1 per variety: Fontane, Bintje & Nicola) in Gembloux – equipped with a RGB/Mspec Camera
- Comparison of VI from satellite vs. UAV and ground measurements (DHP)





Field specific monitoring ?


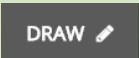



- For farmers
- Data can be shared with other actors in the potato chain



Enter your fields...



-  from existing parcel layer (IACS crop type declarations)
-  your parcel on the map
-  a shapefile with your parcel boundaries





Field specific monitoring ?

...and start monitoring your fields

| Field name | Location | Variety | Planting date | Harvested | Yield | Health |
|------------|--------------|---------|---------------|-----------|-------|--------|
| A01 | Turnhout | Fontane | 04-05-2016 | ✓ | 37.35 | |
| B03 | Aisemont | Bintje | 14-05-2016 | ✓ | 41.98 | |
| Bailly | Limont | Nicola | 11-05-2016 | ✓ | 42.72 | |
| Fresnoy | Molenbaix | Fontane | 18-04-2016 | ✓ | 56.62 | |
| Hangar | Sauvinière | Nicola | 10-05-2016 | ✓ | 37.91 | |
| M06 | Bellegem | Fontane | 13-05-2016 | ✓ | 36.19 | |
| Mouw | Gelinden | Fontane | 17-04-2016 | ✓ | 41.36 | |
| Perceel 6 | Westvleteren | Bintje | 20-04-2016 | ✓ | 44.64 | |
| Waterwal | Kanegem | Fontane | 14-05-2016 | ✓ | 44.28 | |



Field specific monitoring ?

...and start monitoring your fields

The screenshot displays the 'watch it grow' web application interface. At the top, there is a navigation bar with icons for 'MY FIELDS', 'YIELDS', 'TEMPERATURE', 'RAINFALL', 'GREENNESS', 'NEED HELP?', 'ISABELLE', and 'LOG OUT'. Below this is a secondary navigation bar with 'MAP', 'LIST', '+ ADD FIELDS', 'ALL', and '2016'.

The main content area is divided into two panels. The left panel shows a table of field information:

| Field name | Location | Variety |
|------------|--------------|---------|
| A01 | Turnhout | Fontane |
| B03 | Aisemont | Bintje |
| Bailly | Limont | Nicola |
| Fresnoy | Molenbaix | Fontane |
| Hangar | Sauvenière | Nicola |
| M06 | Bellegem | Fontane |
| Mouw | Gelinden | Fontane |
| Perceel 6 | Westvleteren | Bintje |
| Waterwal | Kanegem | Fontane |

The right panel shows a more detailed view of the same data, including 'Planting date', 'Harvested' status, and 'Yield' values. A modal dialog is overlaid on this panel, asking 'What do you want to do?' with options 'VIEW ON MAP', 'FIELD DATA', and 'CANCEL'.

| Field name | Location | Variety | Planting date | Harvested | Yield | Health |
|------------|--------------|---------|---------------|-----------|-------|--------|
| A01 | Turnhout | Fontane | 04-05-2016 | ✓ | 37.35 | Low |
| B03 | Aisemont | Bintje | 14-05-2016 | ✓ | 41.98 | Medium |
| Bailly | Limont | Nicola | 11-05-2016 | ✓ | 42.72 | Medium |
| Fresnoy | Molenbaix | Fontane | | | 56.62 | High |
| Hangar | Sauvenière | Nicola | | | 37.91 | Low |
| M06 | Bellegem | Fontane | | | 36.19 | Low |
| Mouw | Gelinden | Fontane | | | 41.36 | Medium |
| Perceel 6 | Westvleteren | Bintje | 20-04-2016 | ✓ | 44.64 | High |
| Waterwal | Kanegem | Fontane | 14-05-2016 | ✓ | 44.28 | High |



All data in one place

View watchITgrow® data and add your own data!

GENERAL
TEMPERATURE
RAINFALL
GREENNESS
BENCHMARKS
SAMPLES
DELEGATE

Fresnoy - 2016

DELETE
SAVE

General info ^

| | | | |
|--|---|--|---|
| Field name | Surface | Expected yield | |
| <input type="text" value="Fresnoy"/> | <input type="text" value="20.95"/> ha | <input type="text" value="56.62"/> tons/ha | <input type="text" value="1186.33"/> tons |
| Location | Irrigated | Actual yield | |
| <input type="text" value="7760"/> <input type="text" value="Molenbaix"/> | <input type="radio"/> Yes <input checked="" type="radio"/> No | <input type="text" value=""/> tons/ha | <input type="text" value="0"/> tons |

Crop characteristics ^

| | |
|---|---|
| Variety | Planting date |
| <input type="text" value="Fontane"/> | <input type="text" value="18-04-2016"/> |
| Haulm killing | Harvest date |
| <input type="text" value="19-09-2016"/> | <input type="text" value="13-10-2016"/> |

Treatments v

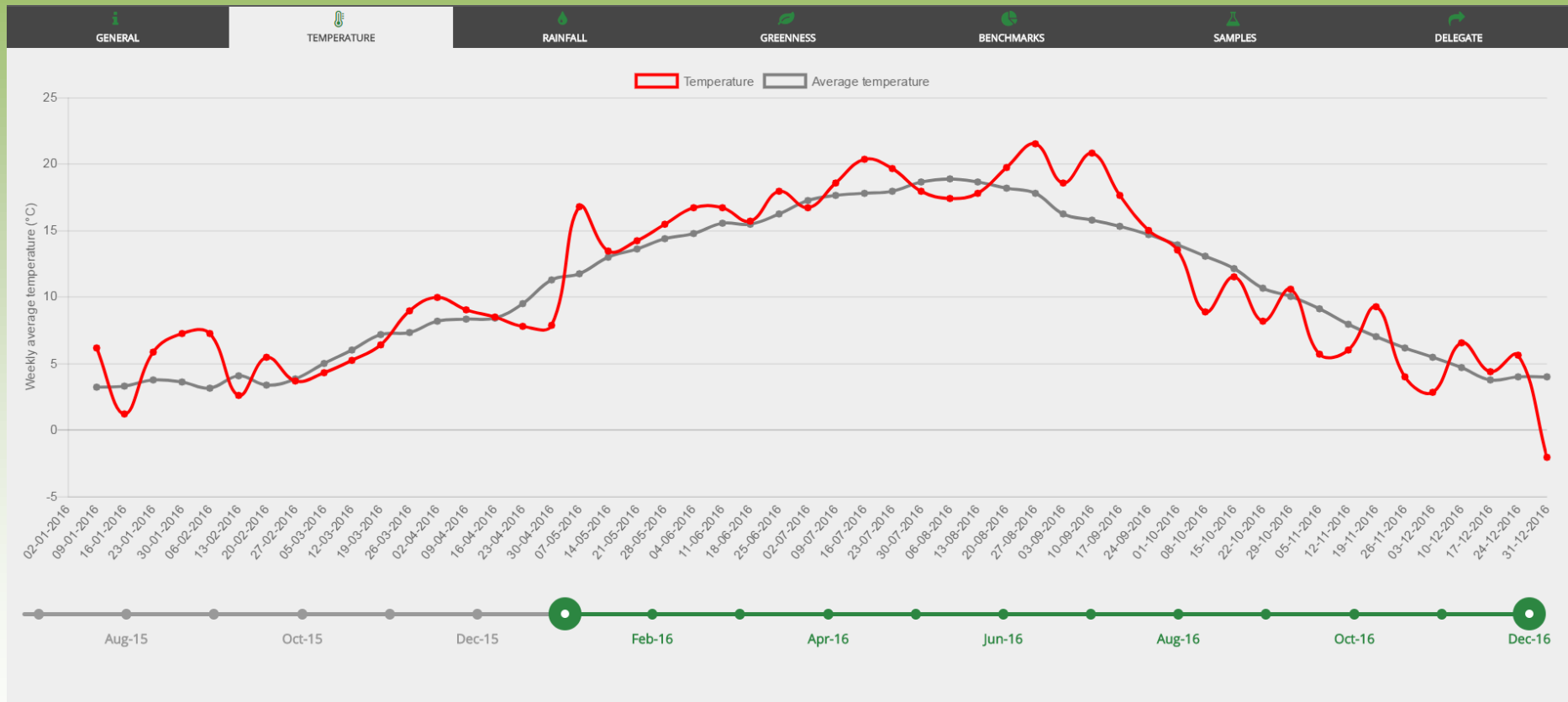
Damage v

Warnings ^



All data in one place

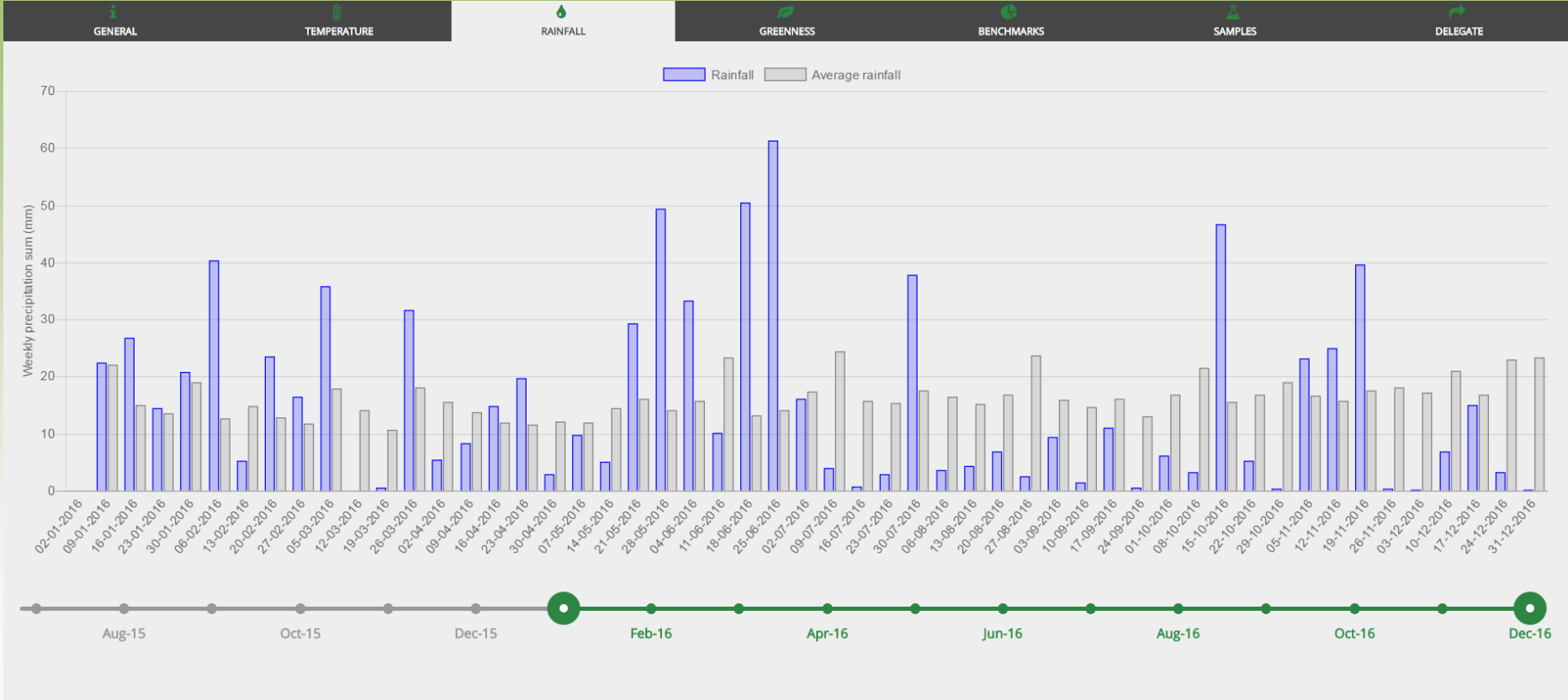
View watchITgrow® data and add your own data!





All data in one place

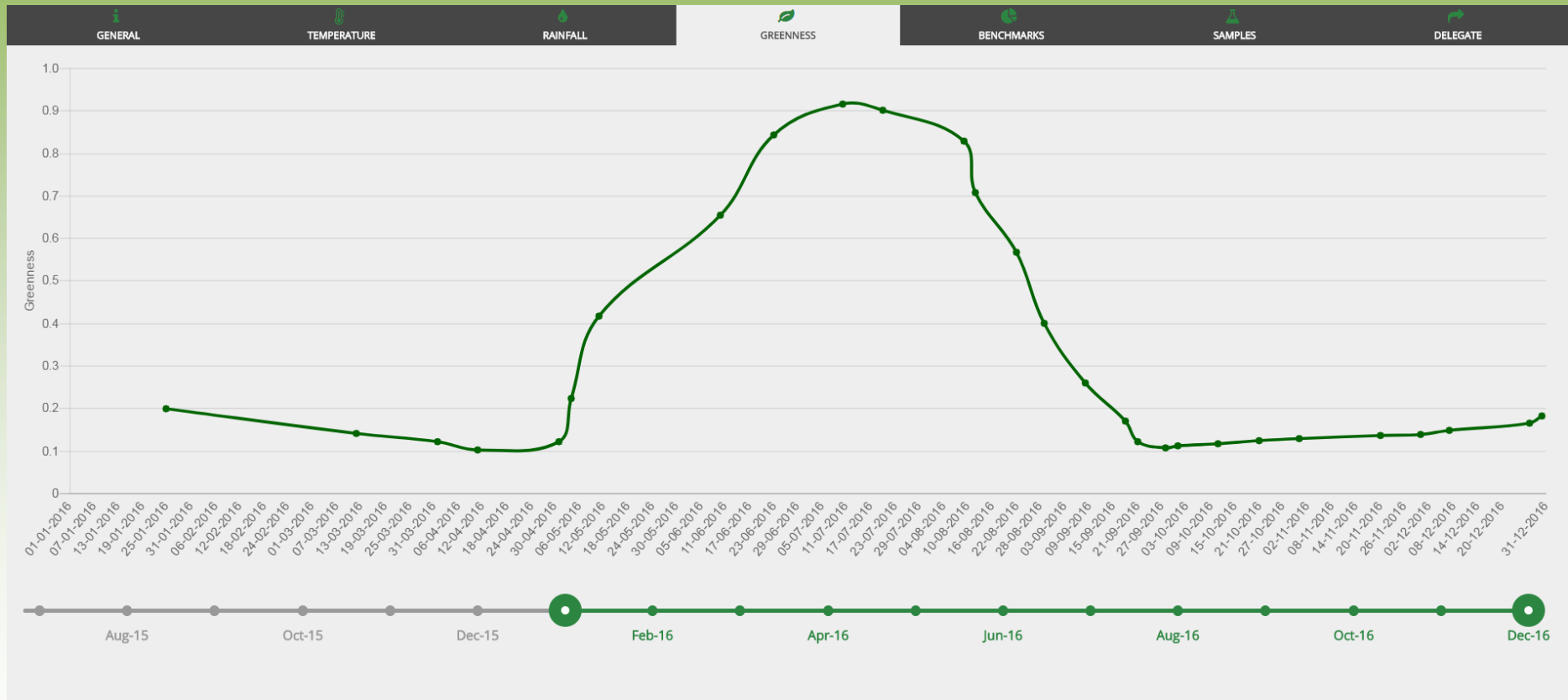
View watchITgrow® data and add your own data!





All data in one place

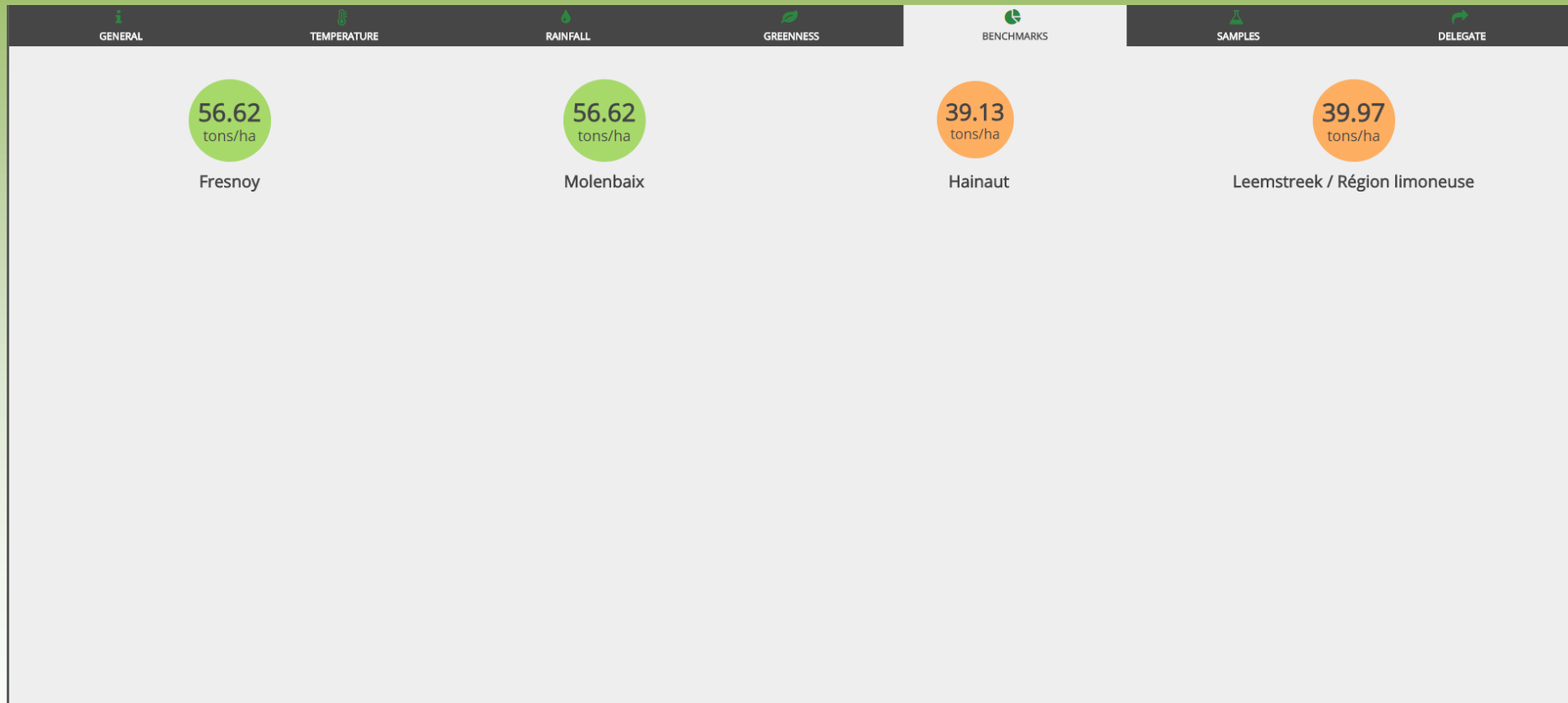
View watchITgrow[®] data and add your own data!





All data in one place

View watchITgrow[®] data and add your own data!





All data in one place

View watchITgrow[®] data and add your own data!

GENERAL
TEMPERATURE
RAINFALL
GREENNESS
BENCHMARKS
SAMPLES
DELEGATE

LIST
≡
CHART

SAVE

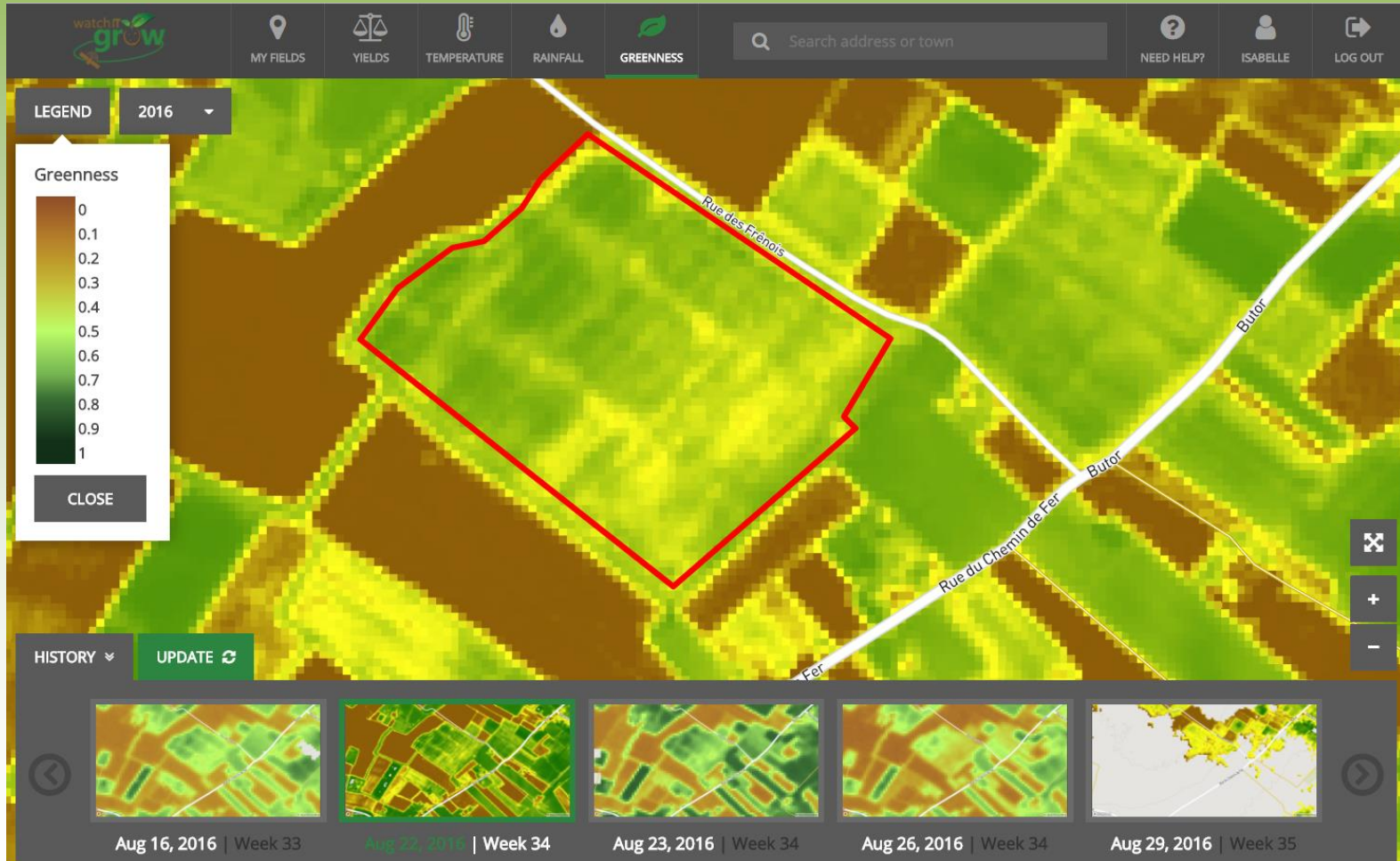
| Date | no. | Harvest | Plants | Stems per plant | Tubers per plant | Total fresh weight | % dry matter >35 mm | Under water weight >35 mm | % low sorting 35-50 mm | % high sorting >50 mm | |
|------------|-----|--------------------------|--------|-----------------|------------------|--------------------|---------------------|---------------------------|------------------------|-----------------------|--|
| 13-07-2016 | 1 | <input type="checkbox"/> | 7 | 4.29 | 16.43 | 9350 g | 18.2 % | 329 g | 82 % | 18 % | |
| 04-08-2016 | 2 | <input type="checkbox"/> | 7 | 4.25 | 17.71 | 12350 g | 21.2 % | 390 g | 43 % | 57 % | |
| 17-08-2016 | 3 | <input type="checkbox"/> | 8 | 4.88 | 20.25 | 15600 g | 22.2 % | 409 g | 42 % | 58 % | |
| 21-09-2016 | 4 | <input type="checkbox"/> | 7 | 4.26 | 15.75 | 14250 g | 22.7 % | 420 g | 30 % | 70 % | |

ADD SAMPLE +



Your field from space

[VIEW ON MAP](#)





www.watchitgrow.be





Thank you for your attention !





For further information
please visit: www.macsur.eu