



# monitoring potatoes from space...

Isabelle Piccard, VITO

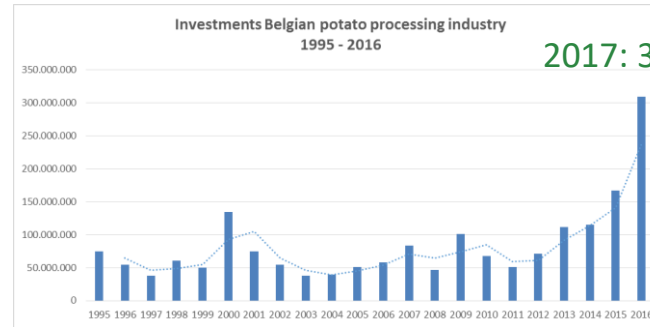
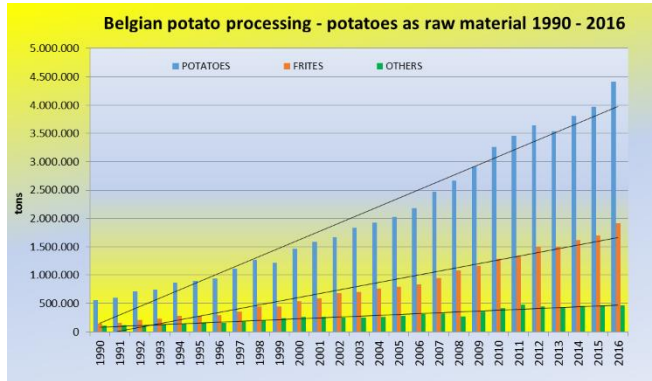


Luxembourg Earth Observation & Integrated Applications Day,  
Mondorf-les-Bains (LU),  
19 April 2018

*With contributions from: Jean-Pierre Goffart, Yannick Curnel, Viviane Planchon, Joost Wellens, Bernard Tychon, Anne Gobin, Jürgen Decloedt, Romain Cools, Nele Cattoor*

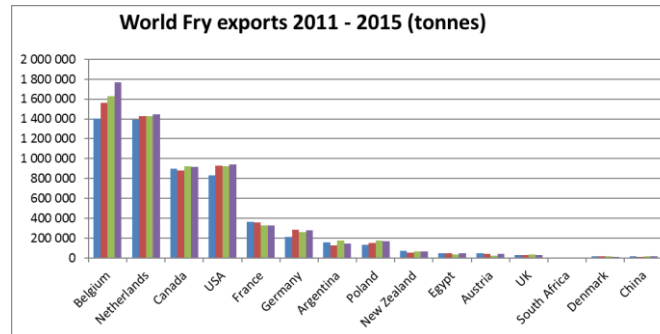
# Background

- Potatoes remain a major staple food product in most of the EU countries
- Global demand for fresh potatoes and processed potato products is increasing



2017: 305 M€ invested

2017: 4,57 million tons of potatoes processed!



2017: 2,2 million tons of fries exports

# Why WatchITgrow?

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## Need for more potatoes!

- Need for more arable land and efficient land use
- Potato yields have capacity to increase!

## Need for new instruments!

*“to measure is to know”*

*“if you can measure it, you can improve it”*

- Nature product = risks! Soil, weather, disease & pests,... → Early Warning!
- Evolution towards precision agriculture



# History

- **2014-2017: iPot project**

- Financed by BELSPO, Stereo-III programme
- Partners: Belgapom, CRA-W, VITO, ULg

→ R&D: set-up of a potato monitoring system



- **2017-... WatchITgrow® service**

- Launched in March 2017
- A tool for all actors in the potato chain: farmers, advisors, traders, processing companies, researchers,...

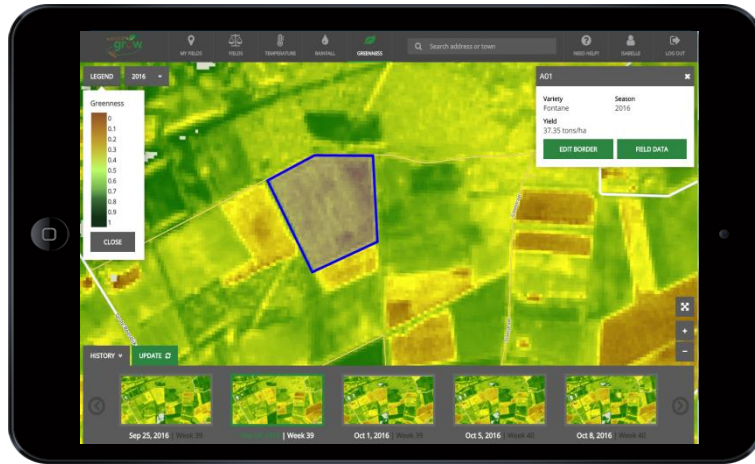
Free after registration on [www.watchitgrow.be](http://www.watchitgrow.be)

2017 season: > 300 users, > 1300 parcels, > 7500 ha potatoes monitored



[www.watchitgrow.be](http://www.watchitgrow.be)

# WatchITgrow<sup>®</sup> for the future of the Belgian potato chain

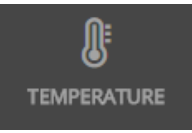


## Monitoring potatoes from space!

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

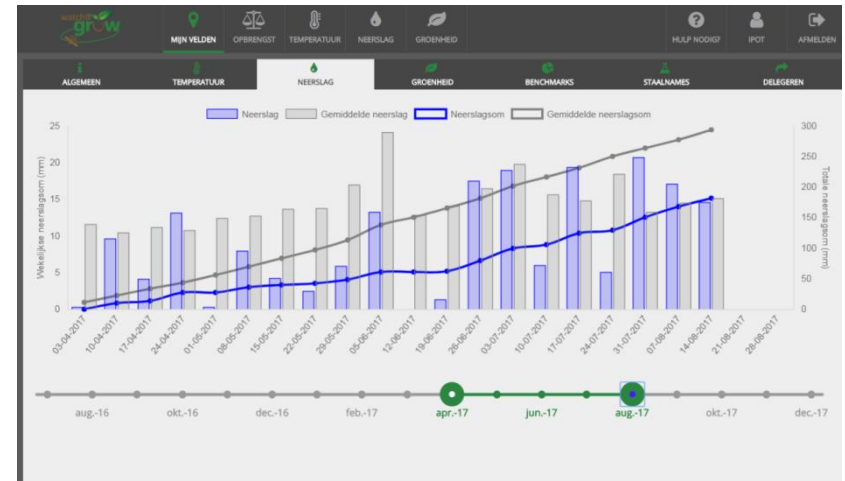
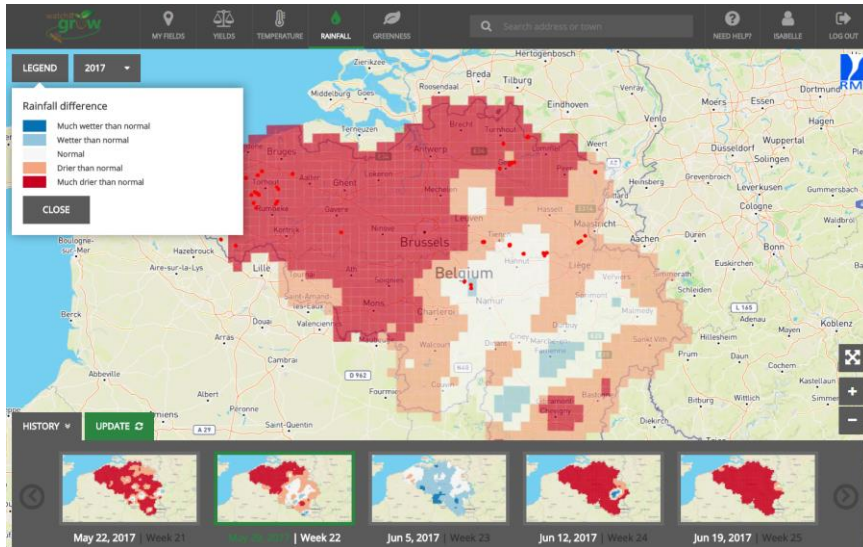
## For all actors in the potato chain:

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

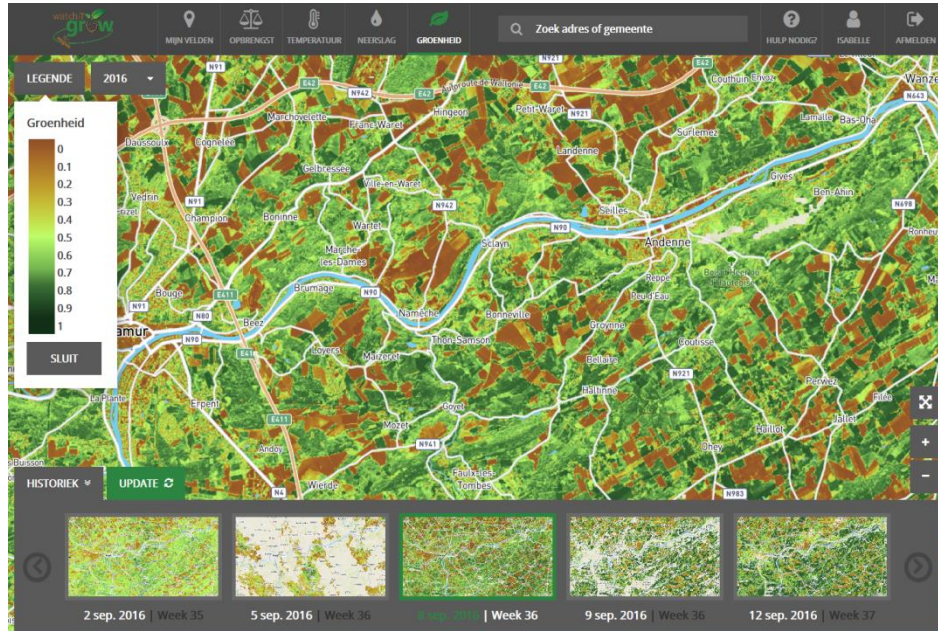


# Weather info

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

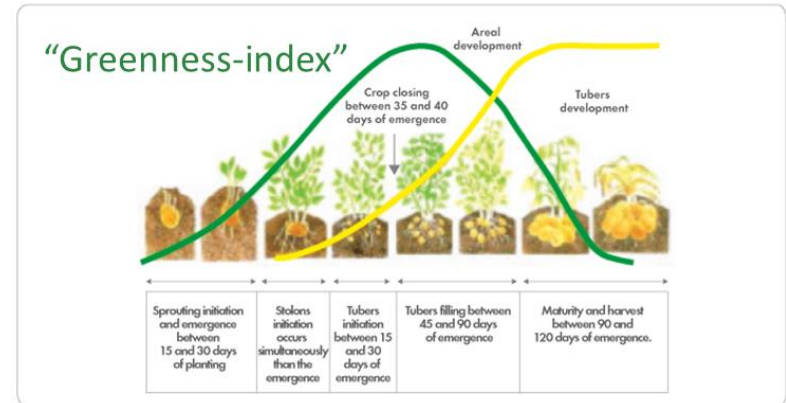


→ risk at production or quality losses?



→ monitor & compare fields

- **Via satellite: Sentinel-2A+B**
  - 1 image every 5 days
  - 10m detail
- **Greenness index**

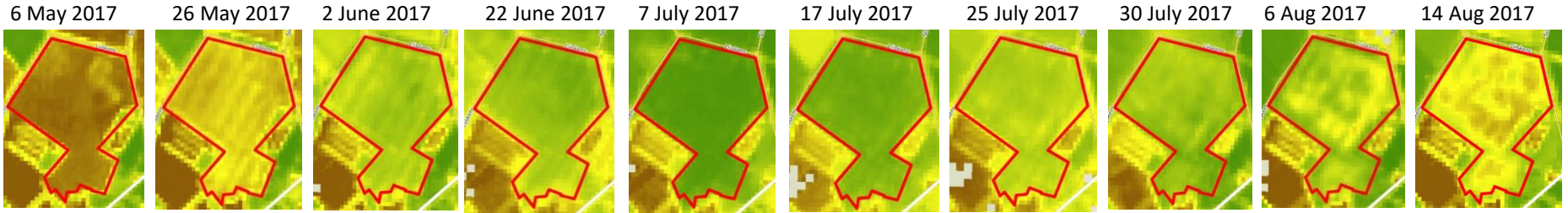


# Crop growth

## Emergence →

## Senescence →

Harvest: 20 Aug 2017



- **Normal crop growth & development?**

- **Heterogeneity?**

  - improved sampling (per zone)

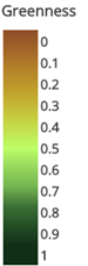
  - evolution towards “smart farming”: variable rate application of fertilizers, irrigation, haulm killing,...

  - useful for field selection (historical data)

- **Comparison of fields:**

  - optimize field visits

  - input for planning / logistics (harvest)

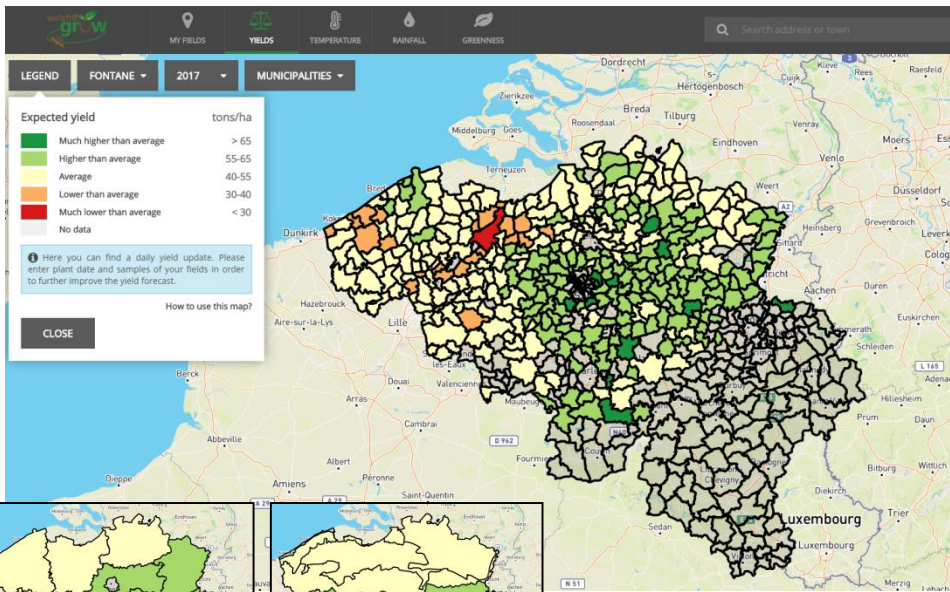






# Yield forecast

- Based on combination of yield models
- For 3 varieties: Fontane, Bintje, Nicola



demo - 2017

DELETE SAVE

General info

Field name	Surface	Minimum expected yield	Actual yield
demo	3.24	66.7 tons/ha 215.84 tons	tons/ha tons

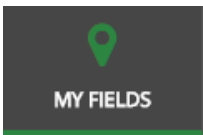
Location

5030	Gemblooux	Irrigated	Maximum expected yield
		<input type="radio"/> Yes <input checked="" type="radio"/> No	71.4 tons/ha 231,16 tons

Crop characteristics

Variety	Planting date
Fontane	dd-mm-2017
Haulm killing	Harvest date
dd-mm-2017	dd-mm-2017








# Field specific monitoring?

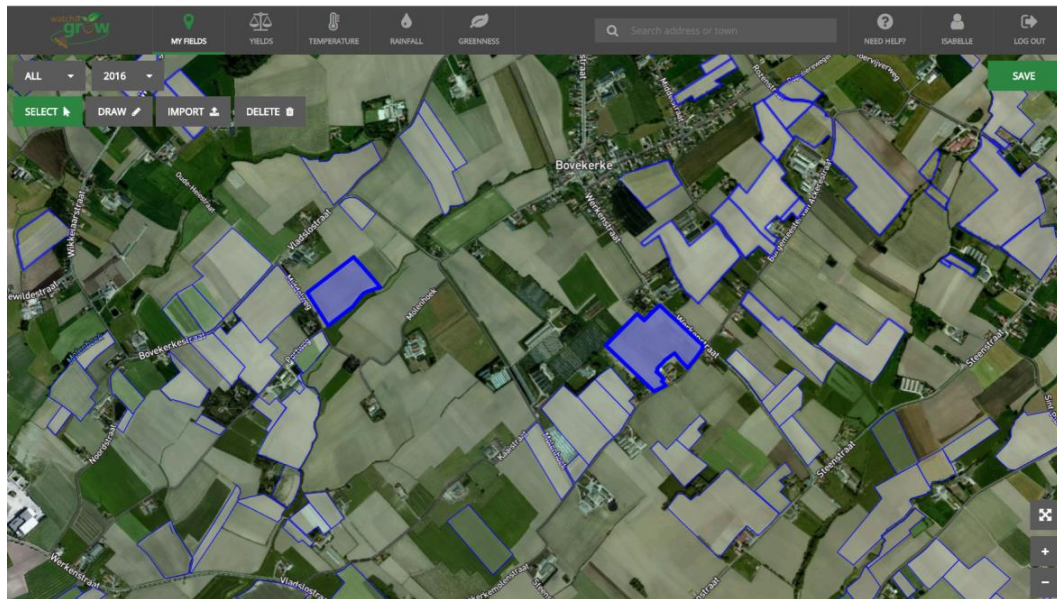
- For farmers
- Data can be shared with other actors in the potato chain



## Enter your fields...



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



# ... and start monitoring your fields!

The screenshot displays the Watchitgrow 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 buttons for MAP, LIST, + ADD FIELDS, ALL, 2017, and MULTI SELECT. The main content area shows a table of field data with columns for Field name, Location, Variety, Planting date, Harvested, Yield, and Health. A modal dialog is open over the table, asking "What do you want to do?" and offering options: VIEW ON MAP, FIELD DATA, EDIT MULTIPLE FIELDS, and CANCEL.

Field name	Location	Variety	Planting date	Harvested	Yield	Health
Potential proof	Reusel	Fontane	16-04-2017	✓	47 51	🟡
Potential	Reusel	Fontane	16-04-2017	✓	48 52	🟡
Kievermont	Geel	Fontane			51 55	🟢
Potential-P	Tongerlo	Fontane			58 62	🟢
Potential-VO	Turnhout	Fontane			59 63	🟢
proefveld	Geel	Fontane			59 63	🟢
ernage	Gembloux	Bintje			59 63	🟢
demo	Gembloux	Fontane	14-04-2017	✓	67 71	🟢

## FIELD DATA

# All data in one place

- View watchITgrow® data and add your own data!

The screenshot displays the watchITgrow 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 tabs for GENERAL, TEMPERATURE, RAINFALL, GREENNESS, SHADOW MAP, BENCHMARKS, SAMPLES, and DELEGATE. The main content area shows a table with columns for Date, No., Harvest, Plants, Stems per plant, Tubers per plant, Total fresh weight (g), % dry matter >35 mm, Under water weight (g) >35 mm, % low sorting 35-50 mm, % high sorting >50 mm, and a delete icon. The table contains 16 rows of data. A 'LIST' button and a 'CHART' button are visible above the table, along with a 'SAVE' button on the right side.

Date	No.	Harvest	Plants	Stems per plant	Tubers per plant	Total fresh weight (g)	% dry matter >35 mm	Under water weight (g) >35 mm	% low sorting 35-50 mm	% high sorting >50 mm	
30-06-2017	1	<input type="checkbox"/>	8	5	14	5060 g	14.2 %	249 g	56 %	0 %	
30-06-2017	2	<input type="checkbox"/>	8	5	12	3550 g	14.2 %	251 g	74 %	0 %	
13-07-2017	1	<input type="checkbox"/>	8	4	15	7800 g	18 %	325 g	62 %	36 %	
13-07-2017	2	<input type="checkbox"/>	7	7	11	5920 g	20.7 %	380 g	41 %	59 %	
13-07-2017	3	<input type="checkbox"/>	8	4	13	6650 g	20.2 %	370 g	65 %	33 %	
27-07-2017	1	<input type="checkbox"/>	7	3	12	8690 g	19.8 %	361 g	23 %	73 %	
27-07-2017	2	<input type="checkbox"/>	8	3	13	9500 g	21.9 %	404 g	40 %	59 %	
10-08-2017	1	<input type="checkbox"/>	8	3	12	10490 g	22.9 %	424 g	23 %	76 %	
10-08-2017	2	<input type="checkbox"/>	8	4	12	10150 g	23.6 %	439 g	19 %	81 %	
24-08-2017	1	<input type="checkbox"/>	9	4	11	11700 g	23.1 %	428 g	21 %	78 %	
24-08-2017	2	<input type="checkbox"/>	9	4	11	12500 g	22.2 %	411 g	17 %	82 %	
24-08-2017	3	<input type="checkbox"/>	8	4	16	13800 g	22.6 %	418 g	12 %	88 %	
07-09-2017	1	<input type="checkbox"/>	9	4	12	14200 g	22.4 %	414 g	14 %	85 %	
07-09-2017	2	<input type="checkbox"/>	7	2	12	14250 g	20.7 %	380 g	7 %	92 %	

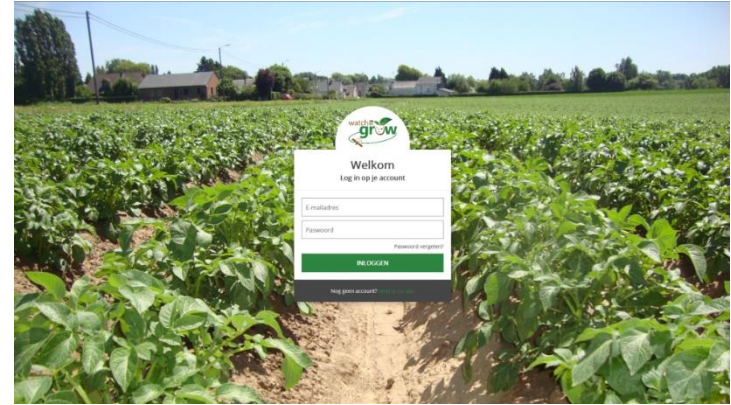
# Summary & outlook

Try watchITgrow® for free during the 2018 season!

Plans for the (near) future:

- July 2018: extend monitoring to other crops (sugar beets, maize, wheat, vegetables,...)
- Further link watchITgrow® with other web tools (Vegaplan, commercial field registration tools,...)
- Move towards “precision agriculture”: add N-fertilization and irrigation advice,... in collaboration with partners from the potato sector

→ “WatchITgrow as collaboration platform”: benefit from combination of field, weather, soil, satellite data to increase yields.



[www.watchitgrow.be](http://www.watchitgrow.be)

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Thanks!

