Satellite imagery
Serving Agriculture

The idea to take some height to better understand the environment is not new
Agriculture developed quickly as a key market for Earth Observation

- Food security
- Modernize practices
- Subsidy allocation
- Farming land management
Precision Agriculture took off recently, when image frequency increased with the number of satellites in orbit.

**Sentinel 2**
Free access
2-3 day revisit
Spectral richness

150 EO satellites currently in orbit*
20 Companies trying to develop low cost EO constellations**

Yet turning satellite pixels into crop analytics remains somewhat rocket science.

- Clouds
- Image size
- Different resolutions
- Different revisits
- Different spectral responses
There are different ways to translate pixels into vegetation analytics

**NDVI**
- Easy to compute
- Relative estimation of vegetation
- No agronomic meaning
- Sensitive to light, angle, sensor
- Saturation after canopy is closed

**Biophysical Parameters**
(fCover, LAI, CHL)
- Requires a series of models
- Absolute quantification of plant parameters
- Robust regardless of the sensor, angle, light
- Easy integration into agro-meteo models
- No saturation after canopy closure

These analytics are crucial, though just the starting point of precision ag

- Observation
  - LAI, fCover, CHL...
  - “The chlorophyll is at 65 µg/m²”

- Diagnosis
  - “The N-Uptake is too low”

- Action in the field
  - “Bring 35 units of nitrogen”

- Recommendation
  - “Bring 35 units of nitrogen”

- + Soil information
- + Crop models
- + Soil moisture
- + Rain
- + Temperature
- + Weather forecast
- + Farming habits
- + …
And they are just one source of information depending on what you want to monitor

Use Case
- Resolution
- Frequency
- Coverage
- Cost

Further work is required collectively to unlock the full potential of satellite imagery for precision agriculture

1. More bands & ground data to explore further machine learning for new use cases
2. More reliability in the service to the farmer
3. A real ROI for the farmer (certification / label)