



cropix founded in 2020 provides map products from Sentinel-1 SAR data for applications in precision farming, crop monitoring and crop insurance.

Those map products are purely from Sentinel-1. The satellites from this constellation cover the whole world in a (6/12) days repetition cycle. Due to a failure in Sentinel-1 B the repetition is 12 days for the time being, until the new constellations Sentinel-1 C & D are launched

The strength of SAR is definitely, that the data is acquired each time from the same angle, the same geometry and with the same energy.

Since SAR data is independent from light conditions and atmospheric disturbances it solely measures the change on the surface.

Hence the sensors are ideal for permanent crop monitoring and change detection.

Especially after events we can measure significant changes and estimate the area effected. We can as well derive base lines over several years and compare with the actual performance of the crop.

Cropix offers consultancy for tailor-made solutions to our customers for certain use-cases like loss assessment, parametric insurance, precision farming.

Cropix partners with sarmap, the owner of the software MapScape, who has 20+ years of experience in SAR data processing and software development.

We have in our portfolio standard map products like:

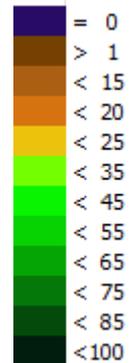
ESVI (enhanced SAR Vegetation Index) Index for fresh biomass of field crops in a scale from 0-100. Can be used crop-type specific as proxy for Leaf area index (LAI).

SWI (SAR Water Index) Shows in a relative scale (crop-type specific) from 0-150 the humidity of crops. Indicates water stress and maturity.

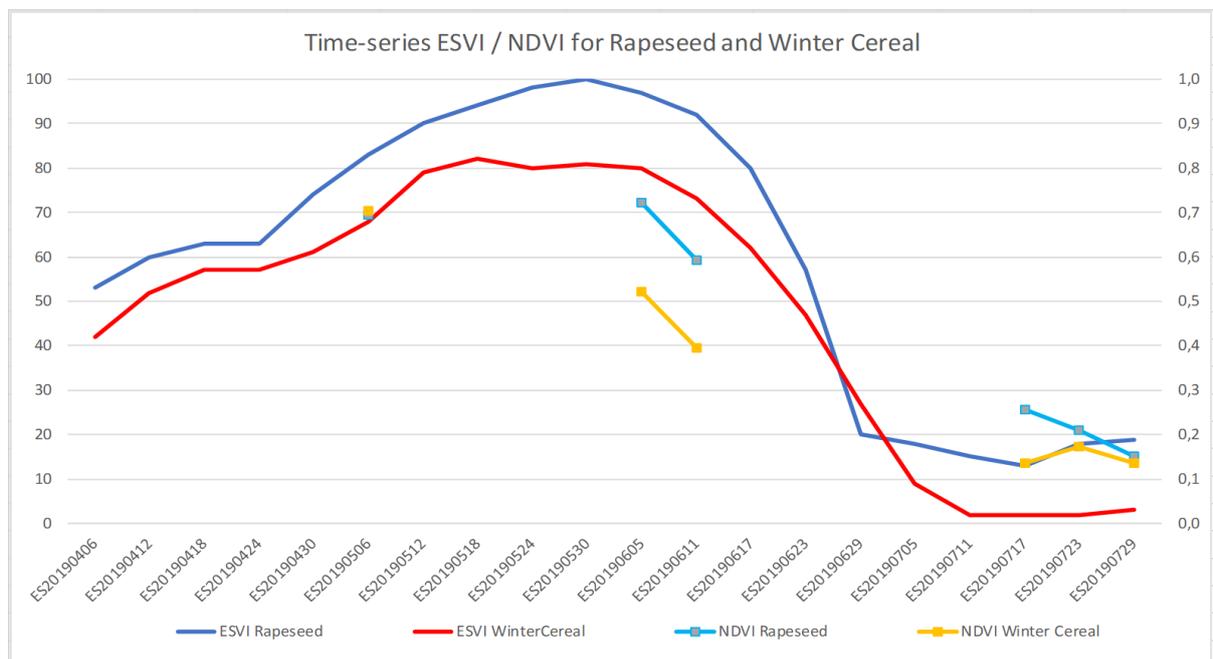
CC (pseudo-true color composite) gives a high contrast for visual monitoring of cropland.

ESVI (enhanced SAR vegetation index)

- The product is derived entirely from Sentinel-1 SAR (C-Band) data
- Useful for crop monitoring (time-series analysis and change detection)
- Useful for precision farming and crop insurance (zoning and change maps)
- The map product can be seen as proxy for fresh biomass and LAI (leaf area index)
- Cross crop and cross seasonal scale from 0 – 100
- Processing chain is fully automated.
- The map product was calibrated with field trials and optical satellite data.
- Test areas in different countries in Europe, North and South America, Africa, Australia, Asia.
- Crops: Wheat, Barley, Rapeseed, Corn, Sunflower, Soya, Sugarcane, Potatoes, Rice etc.



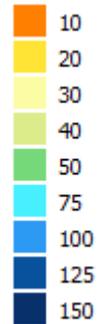
How does it compare with NDVI, which is the common standard in biomass observation? Here an example from Hungary (Sentinel-1 ESVI vs. Sentinel-2 NDVI).



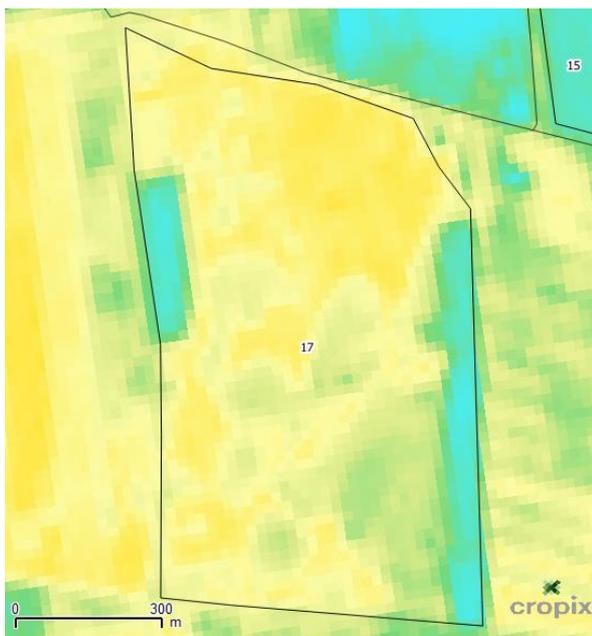
The biggest difference to optical data is, that we have a continuous time-series. Compared to optical data we have nearly no saturation of the signal over cropland. Maturity is detected by a loss of humidity in the plants not by a loss of greenness. Flowering rapeseed (low chlorophyll) shows a drop in NDVI but not in ESVI.

SWI (SAR Water Index)

- The product is derived entirely from Sentinel-1 SAR (C-Band) data
- Designed for drought monitoring.
- Useful for irrigation schemes and crop insurance (drought index insurance)
- The map product is calibrated against NDWI
- Cross crop and cross seasonal scale from 0 – 150
- Processing chain is fully automated.
- The map product was calibrated with optical satellite data.
- Test areas in Hungary and Argentina.
- Crops: Wheat, Barley, Rapeseed, Corn, Sunflower, Soya, Alfalfa.

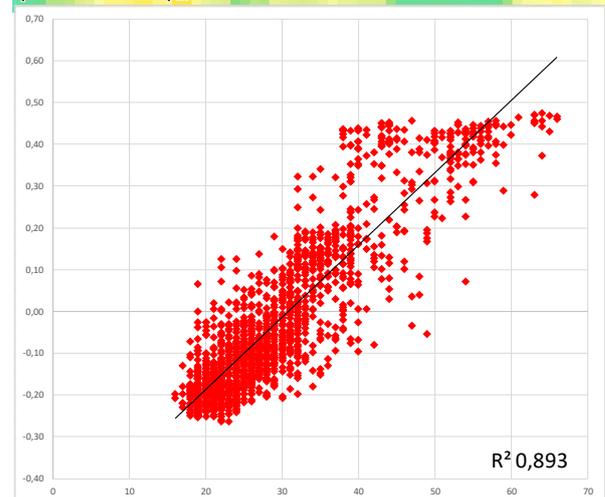
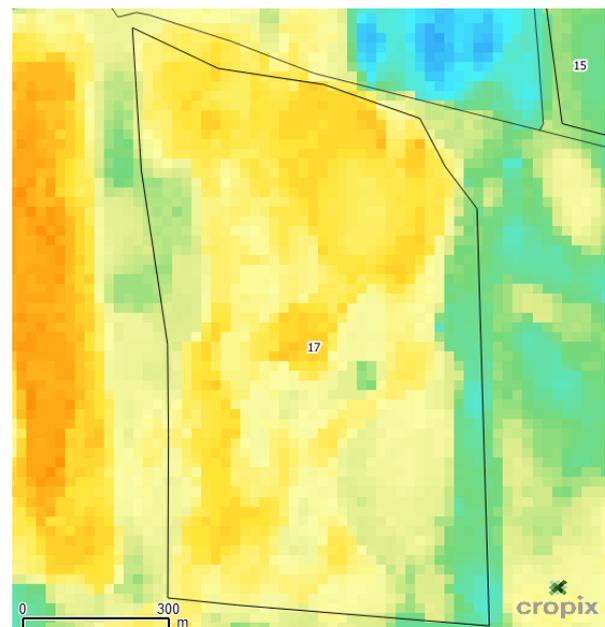


Sentinel-2 NDWI 2019-07-19



We tested the map product in Hungary with optical data on single plots and ZIP-code areas and found good correlations.

Sentinel-1 SWI 2019-07-18



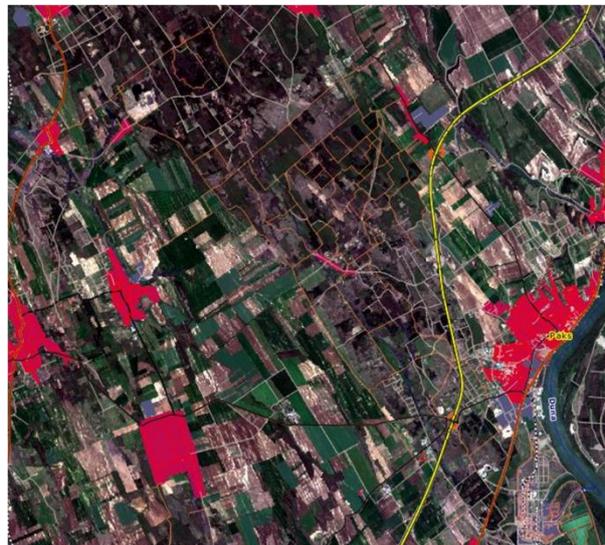
Color Composite (Pseudo-true-color crop map)

- The product is derived entirely from Sentinel-1 SAR (C-Band) data
- Ideal for visual monitoring.
- Useful to detect abnormalities due to higher contrast given through the color coding.
- The map product is calibrated against human optical sense.
- Cross crop and cross seasonal three channel RGB.
- Processing chain is fully automated.
- Test areas in Germany, Hungary and Argentina.

Sentinel-1 Colour Composite 2018-04-05



Sentinel-2 Colour Composite 2018-04-08



In the Color Composite high biomass values appear in cyan. Concerning cropland this was in early April mainly rapeseed. Forests which are in the center of the image appear as well in cyan.

In early April the broad leaf forest was not yet fully foliated and hence they appear not very green in the optical image.

Bare soil condition can be observed in both images.

You can visit our Web-GIS application and see those map products in different regions of the world. The link for the entry point is:

iMap: <https://imap-cropix.sarmap.ch/>

If you want to see all the map products for different regions of the world you need to log-in: You can log-in **for free** at: <https://cropix.ch/imap-en/>

There you will find as well the terms-of-use and a user documentation, if needed.