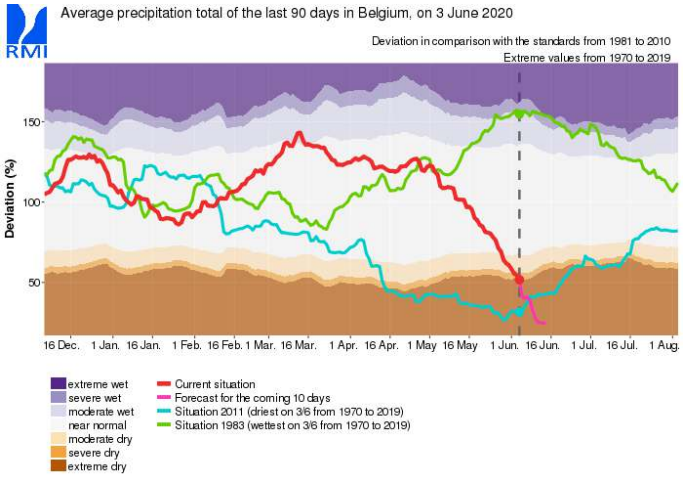
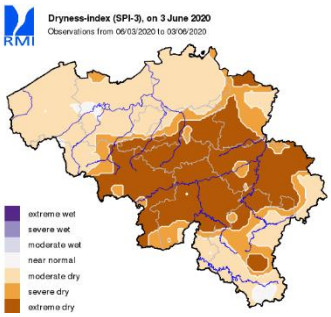
Drought in Belgium

Since early spring Belgium and part of the northern European countries are face to a quite intense regional drought.

These events that are characterized by a lack of rain and high temperatures, are related to the high altitude current named *jets stream*, located more in higher latitudes than usual, blocking the high pressure above North America, Europe and Asia, avoiding the development of low pressure systems characterizing the wet meteorological conditions and giving colder air.

Observing the evolution of the precipitations during the last months and comparing with the more extreme conditions registered from 1970 to 2019, it appears there an **important risk** of lacking water availability on natural reserves in next summer months.





The actual situation is converging to the severe one occurred in 1976, with a subtle difference between the northern and southern regions of Belgium. Less stable air masses over southern Europe have caused rainfall in Wallonia region, especially during the month of February and March, while Flanders has remained dry**.**

This dryness, that is located on the surficial horizon, locally start to make difficult to **seed**, **plant** and **raise** some spring crops.

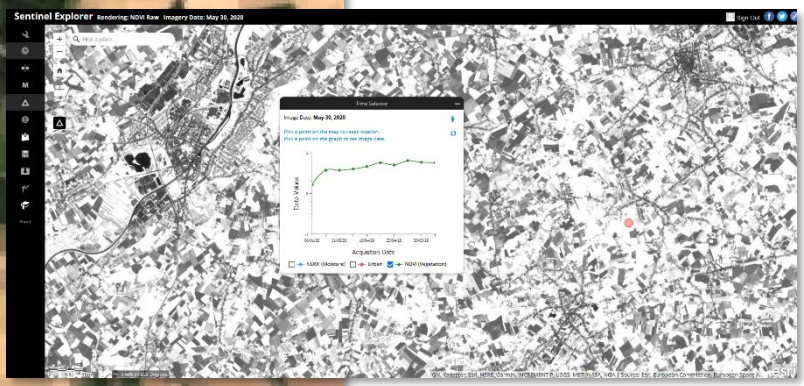
Groundwater levels in Flanders have also **fallen** further. Groundwater levels are very low in 47% of locations and low in 29% of locations for the time of year. In view of the limited predicted amount of precipitation, the flows and levels in the watercourses are expected to **decrease** further, as are the groundwater levels
(source: https://www.integraalwaterbeleid.be/).

Other side effects of the lacking of rain and the presence of higher temperatures are the growing of **toxic** blue-green algae on rivers, ponds and lakes, that is some cases cause the ban to recreational sites, bath and the dead of the local ichthyofauna. The development of abandoned fields with dry grass must be monitored as well: in concordance with winds, events of heatwave and human activity (“barbecuing”, agricultural practices, natural factors…) the development of **wildfires** cannot be underestimated.

How satellites and Esri BeLux can help

Different satellites as the **PROBA-V**, **MODIS** and the Copernicus **Sentinel-1** and **Sentinel-2** constellation are fundamentals to follow the evolution and the **effects of drought** on landscapes and vegetation at regional/local scale. The raw data must be processed and analyzed using high end software in order to show the exact impact of the meteorological events. The results allow to create the **decisional information** to **prevent** and **respond** to the extreme situations associated to these natural events.

Esri BeLux, with his state-of-art **ArcGIS Pro** desktop software, the external modules, and the **ArcGIS Online** platform, can easily analyze the remotely sensed images, from satellite, airborne to drone. Extracting and interpreting the strategic information, allows a better understanding of the **health status** of the crops and the **impact** of drought.



Sentinel-2 satellite images data are available through ArcGIS OnLine platform. Sentinel images are visualized with different spectral bands combination to better explore the vegetation, agriculture, and cities.

Using this platform and the Sentinel-2 viewer, is possible to have access to images **over time** of a defined region; accessing to the historic archive allows to visualize how the crop surface has changed over the last fourteen months. In the example aside the **temporal evolution** of the NDVI (Normalized Difference Vegetation Index), calculated to evaluate the chlorophyll content in the crop vegetation and the **health** status.

Coupling the satellite data with derived products from high resolution digital elevation models (DEM), allow the creation of predictive models about the location of the **drainage** system, the **soil erosion**, the **water/nutrients concentration**, the potential **pollution** of hydrographic system, the **exposition** to winds and anthropic activities of grass or crops…

These data are **strategic,** from single farmer to local associations of productors, helping in prioritizing actions against the evolution of the drought events, where to irrorate with fertilizers or water, helping the vegetation to grow healthy and safely.

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