

## Drought in Argentina

In the actual summer season precipitation is below average and crops suffer from drought stress, where irrigation cannot be applied.

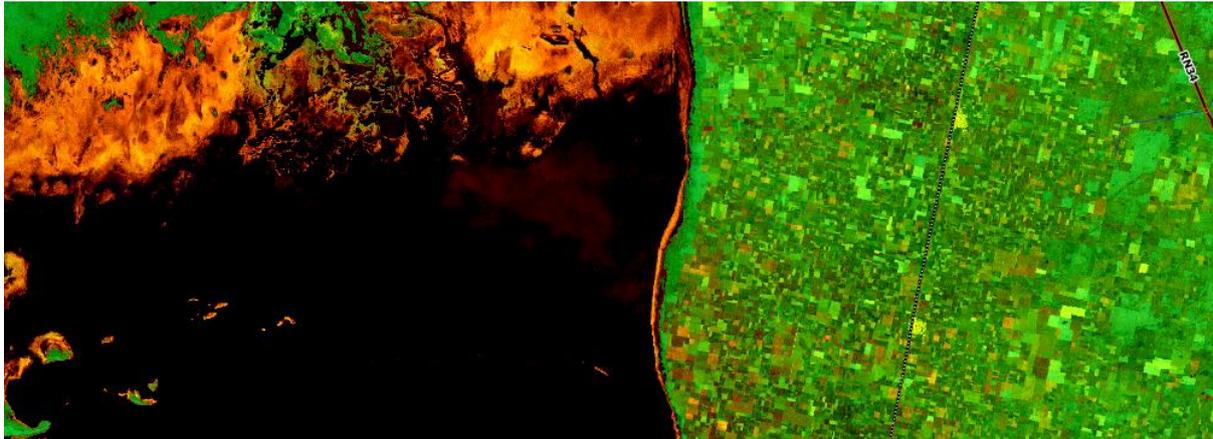
From SAR data we get stable time-series and can compare data within but as well cross season.

Here we compare the data from December of the years 2018, 2019, 2020 and 2021.

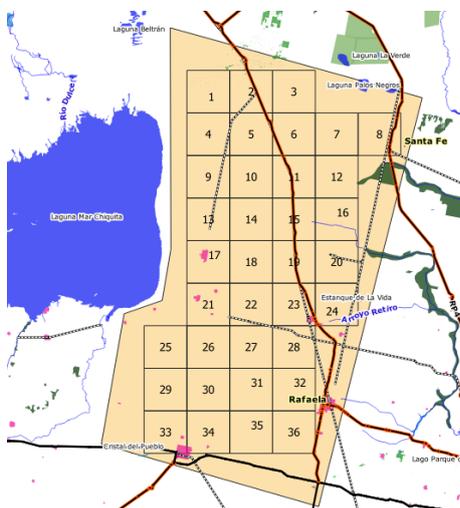
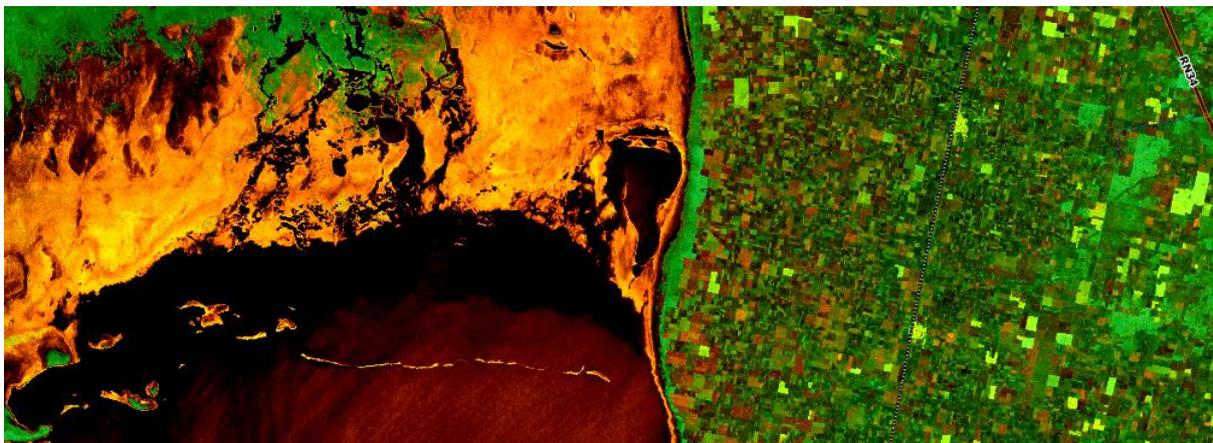
The following images show in the east cropland from Santa Fé province.

The main crops are corn, soybeans, sunflower and wheat. While winter crops like wheat are about to mature in December, corn and sunflower are fully developed. Soybeans are still growing up.

Sentinel-1 SAR Color Composite Dec 28, 2018. In the west Mar Chiquita, which is a saline lake.



Same dataset and same extent from Dec 30, 2021. We see a lower water level and dryer cropland.



**Method:** Over the cropland of the same footprint we generated a grid with 36 cells of 20 x 20 km.

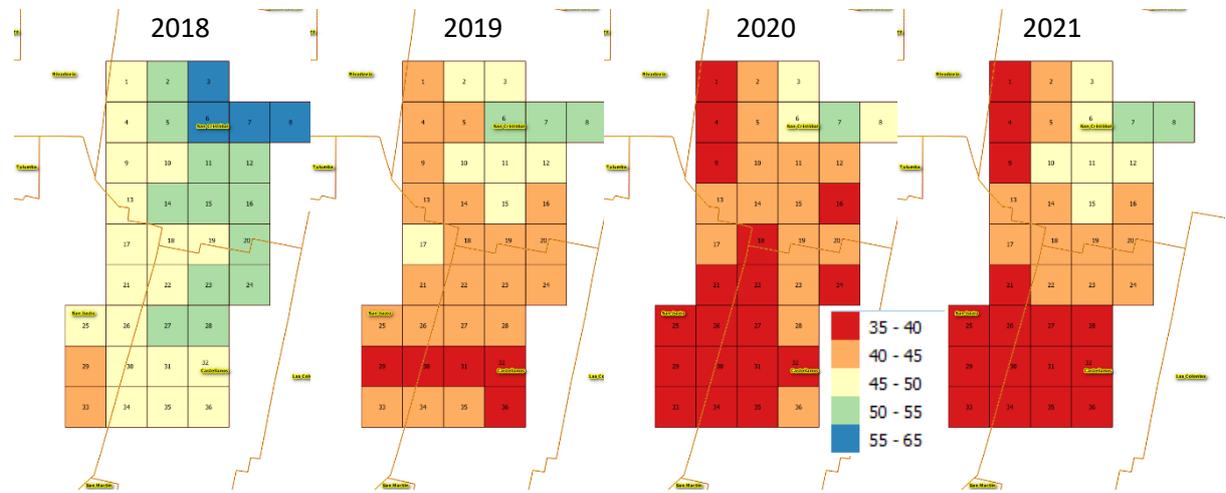
Due to crop rotation single plots were cultivated with different crop-types from year to year.

Nevertheless an area of 400 sqkm is expected to be cultivated with a stable mix of the crop-types.

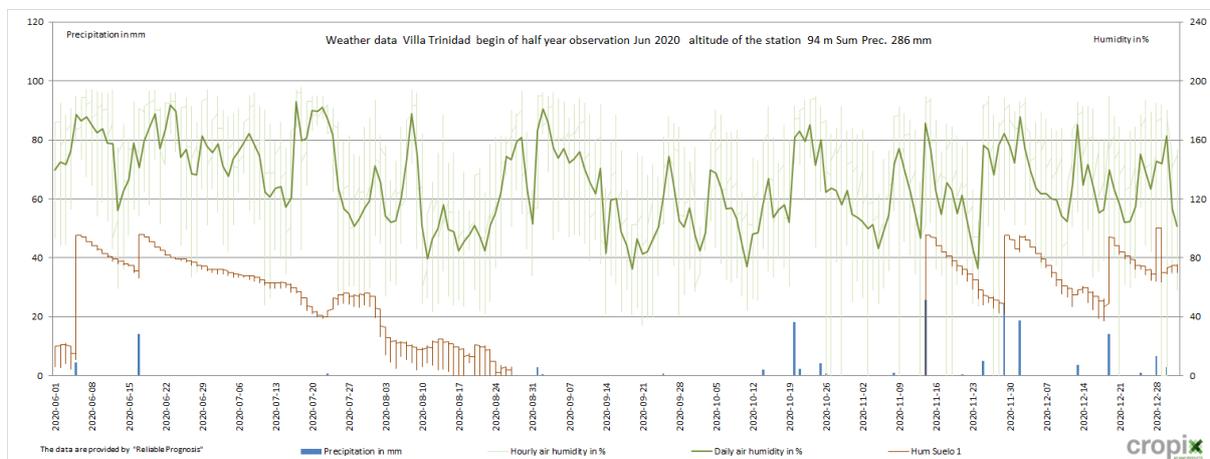
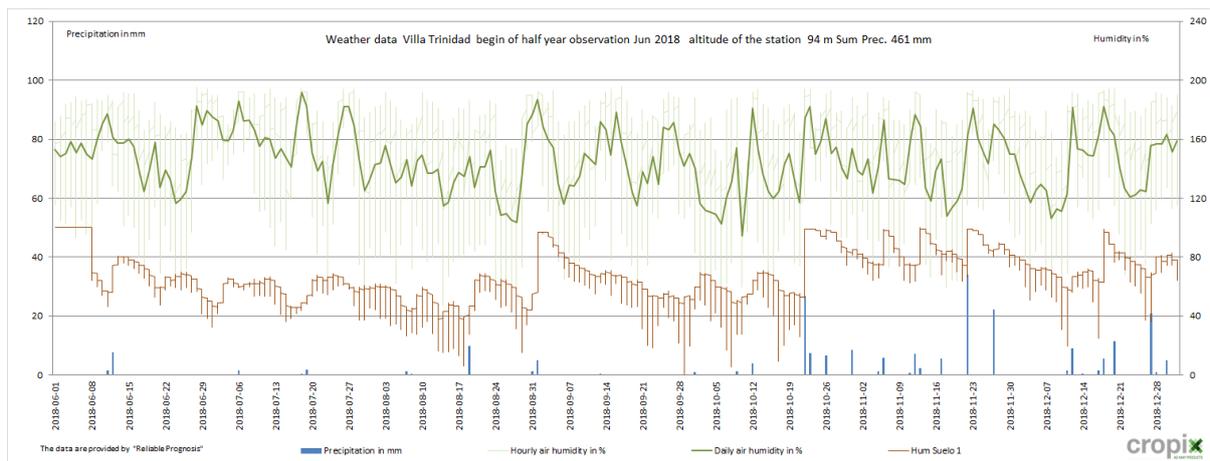
In some gridcells there are more forests, which are permanent cultures and retrieve higher values in SAR backscatter and humidity in the biomass.

Those cells will perform different over the years than other gridcells, where we find mainly cropland.

**Data:** For the analysis we used datasets of SAR Water Index<sup>1</sup>, which reflects the humidity content in the biomass. In the first step we calculated the mean value per pixel for the entire month of December for each of the four years. In the second step we calculated the mean value per grid cell. The **result** shows, that the December of the year 2018 was more humid than in the years 2020-2021.



The mean values of SWI (Sar Water Index) range from 35 red to 65 blue. It can be clearly seen that the drought is more severe in the west and south, while in the east the situation trends to be better. The 2 following graphics show weather data from the station in Villa Trinidad from 2018 and 2020.



The difference in sum of precipitation from July to Dec is 461mm in 2018 to 286 mm in 2020.

<sup>1</sup> SWI: more information at <https://cropix.ch/wp-content/uploads/SAR-Water-Index.pdf>