



Detectives Clima Hércules, Spain

**LPS 2022 Climate Detectives School Award Ceremony**

# OUR TEAM





## *Drought risk in Chiclana (Cádiz)*

*Is there a relationship between climate change and the water stress of the vegetation in Chiclana?*

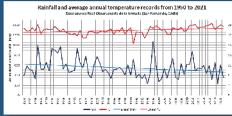
## CLIMATE DETECTIVES RESEARCH: DROUGHT RISK AND WATER QUALITY IN CHICLANA

IES Ciudad de Hércules, Chiclana de la Fra. (España)

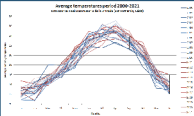



### RAINFALL AND TEMPERATURE RECORDS SINCE 1950

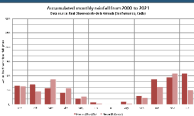
Records of the Royal Observatory of the Navy in San Fernando



Using a linear approximation, the trend over the last 72 years demonstrates a decrease in annual rainfall by about 150 mm and an increase in the average annual temperature by 0.9 °C




Regarding the analysis of the monthly temperature records since the year 2000, the graphs seem to indicate that the period from September to December is getting increasingly warmer (also May, although less noticeably). This would signify an extension of summer in the place of what was mainly autumn and, to a lesser extent, spring. We do not detect significant changes in temperatures in the summer and winter




In reference to the monthly accumulated rainfall, we observe a decrease in rainfall, especially in February, September, October and December. On the other hand, rainfall increases in March and, less significantly, in April


### VEGETATION WATER STRESS FROM 2016 TO 2021

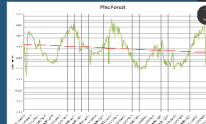


In the marsh, the vegetation lives under constant hydric stress, however, there appears to have been no worsening over the last 5 years, perhaps because halophytic plants have adapted to live with a shortage of fresh water




In the rainfed field, an increase in water stress is observed in the same period (linear decrease in the NDMI of 0.01). Peaks of lesser stress coincide with the growth of cereal plants, from March to June





The pine forest ecosystem is suffering the most from drought stress (linear decrease in the NDMI of 0.04)



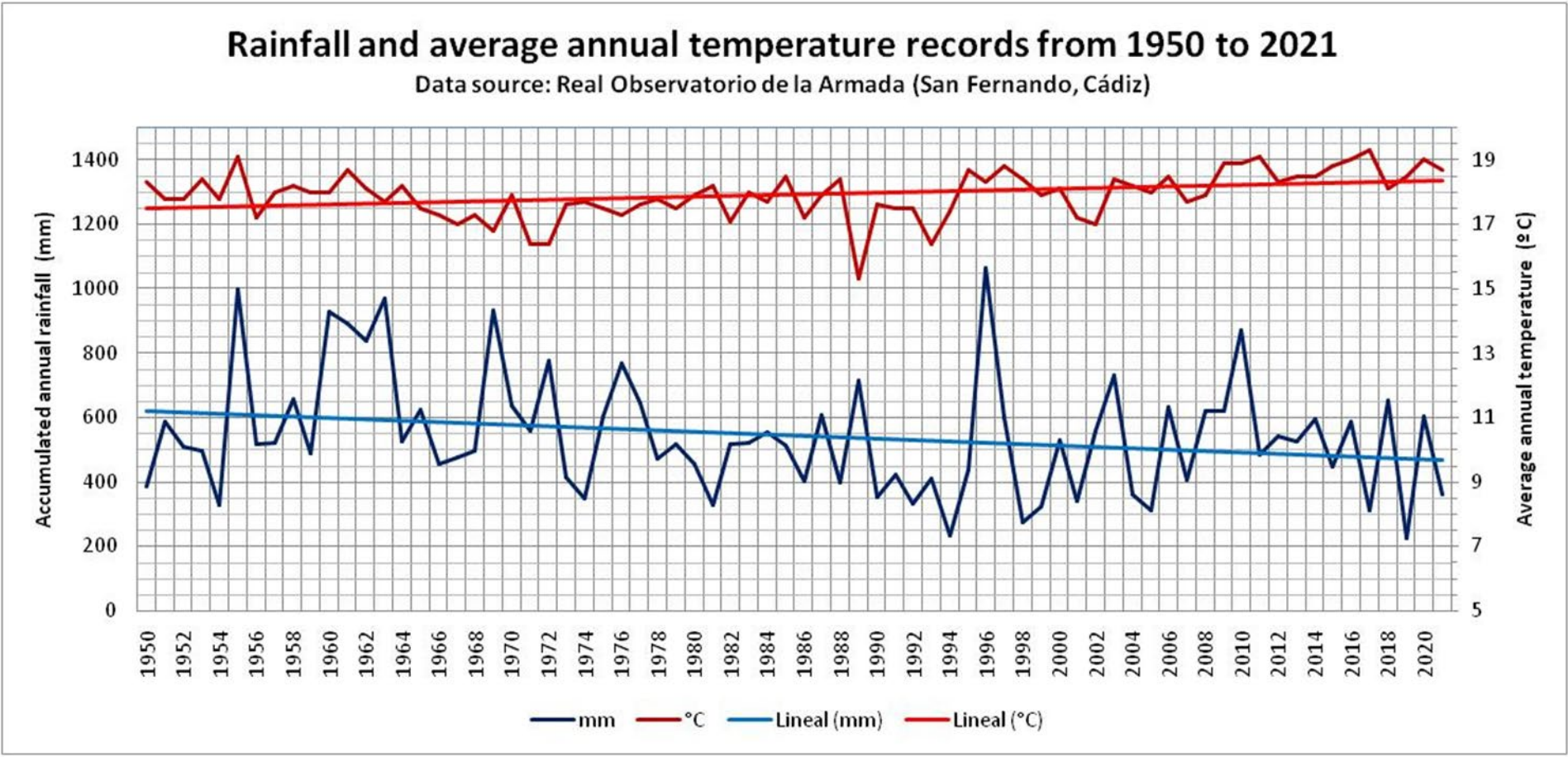
The golf course is always in a situation of stress, despite the irrigation, since its vegetation is not adapted to the climate and it too is affected by the decrease in rainfall (linear decrease in the NDMI of 0.01)

NDMI script available in Sentinel Hub EO Browser

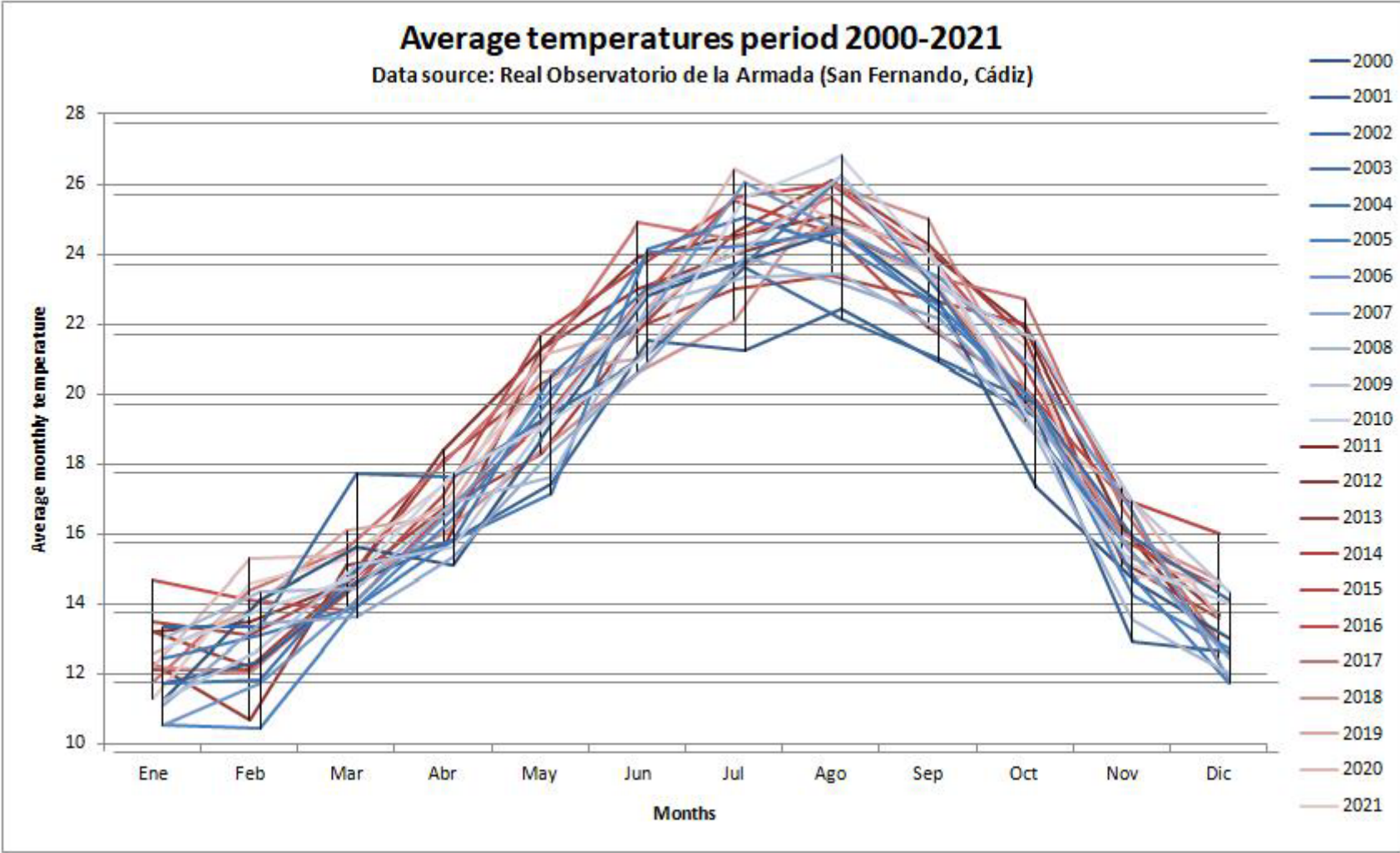
The NDMI index measures the water content of the vegetation (the interval from -0.2 to +0.4 represents water stress, higher as the index values decrease)

Beatriz Alcántara, Inmaculada Medrán, Tomás Guerrero, Irene Ortiz, Ana Muñoz, Lorena Salvado, Lucía Cabrera, Isabel Salva, Marta Caspevilla, Rocío Moma

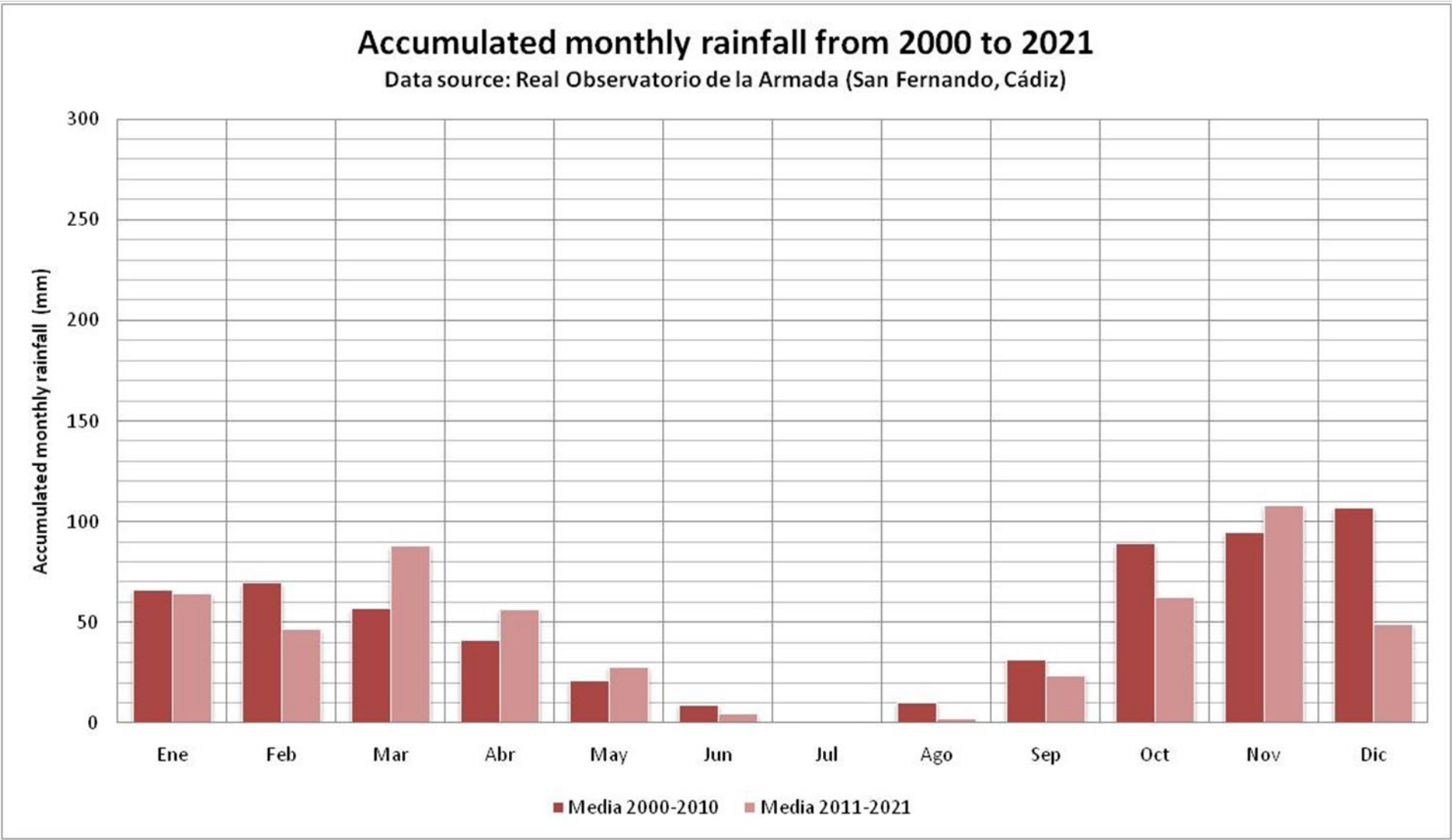
# Our Climate Detectives Project

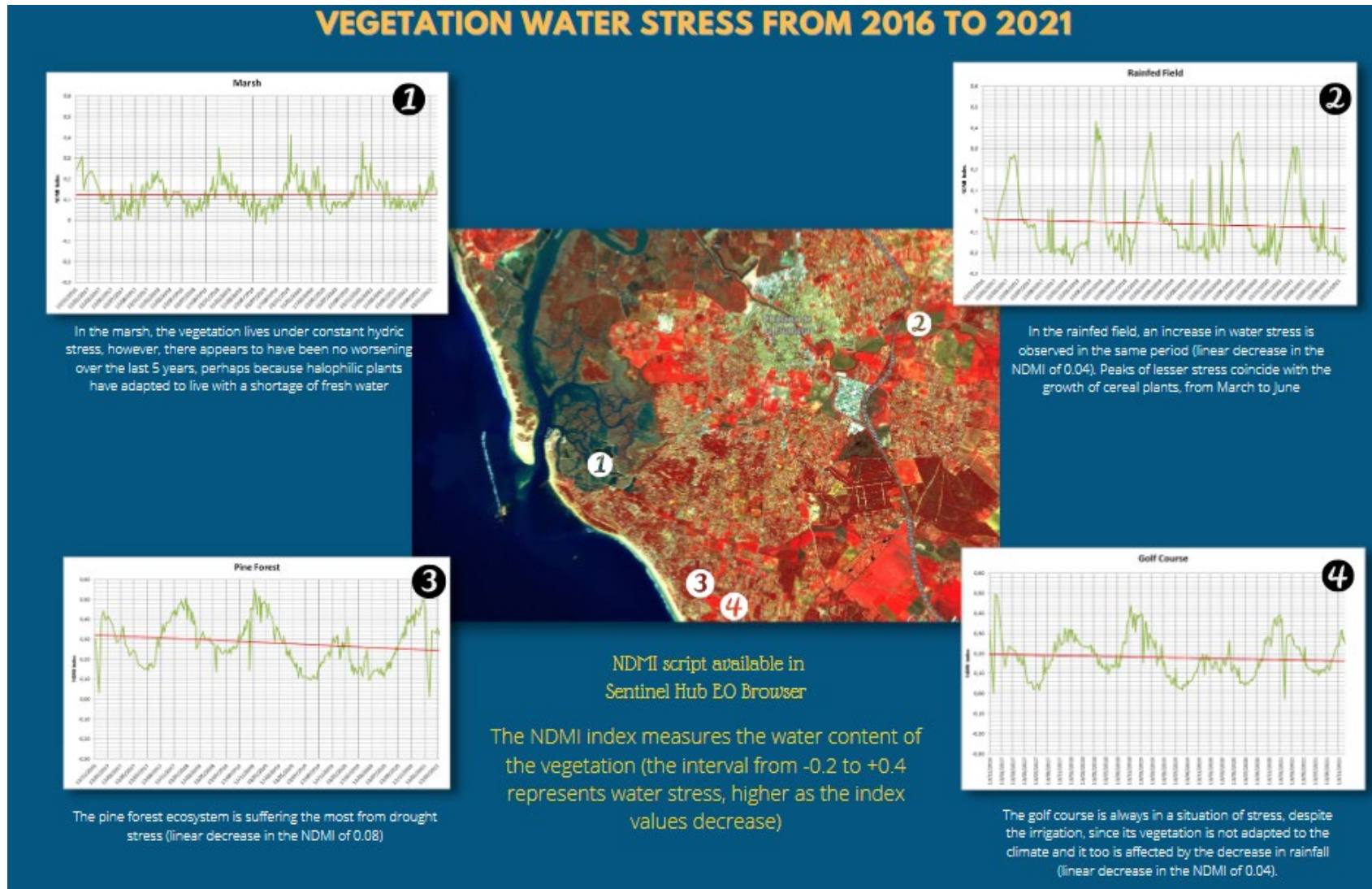


# Our Climate Detectives Project



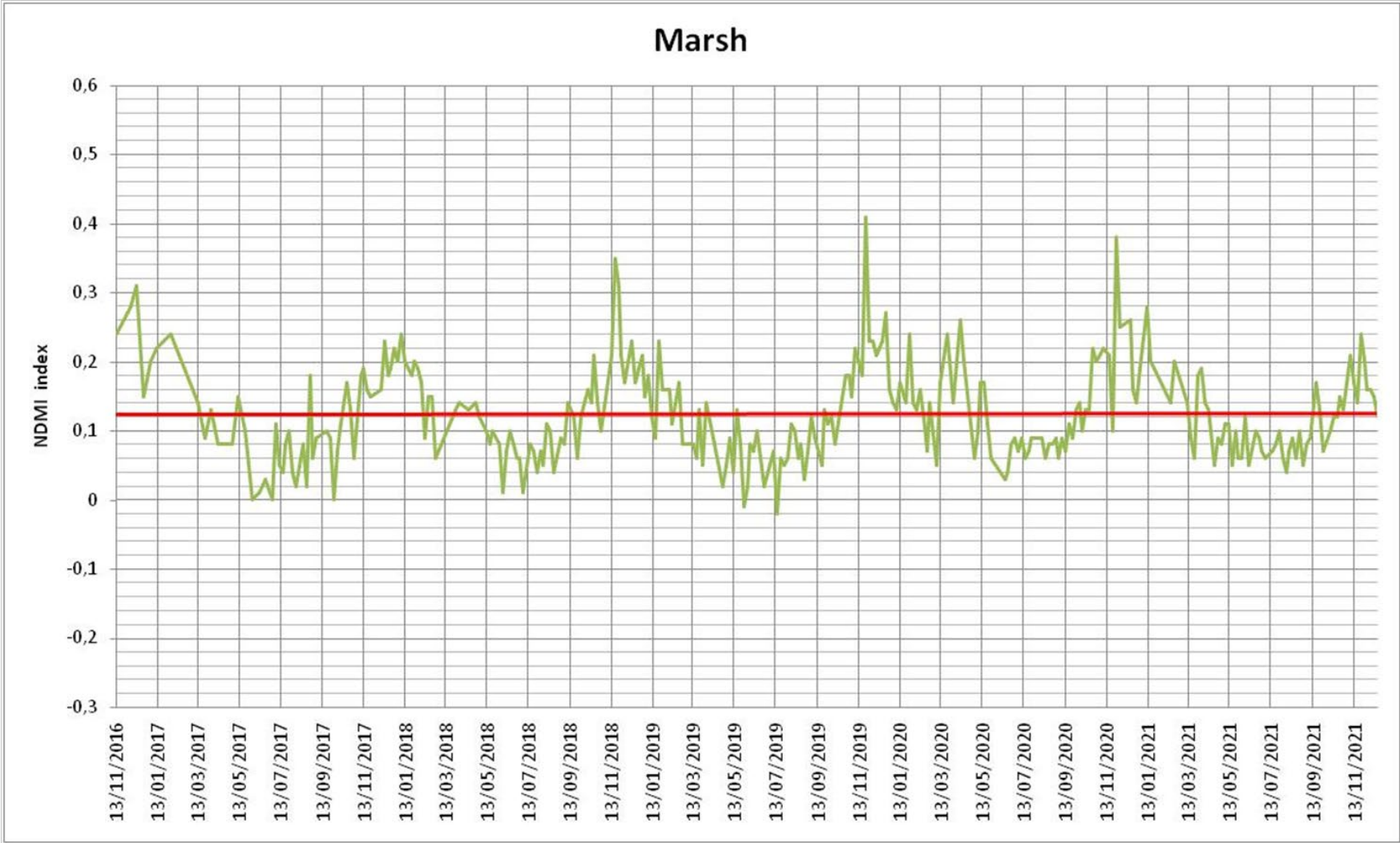
# Our Climate Detectives Project



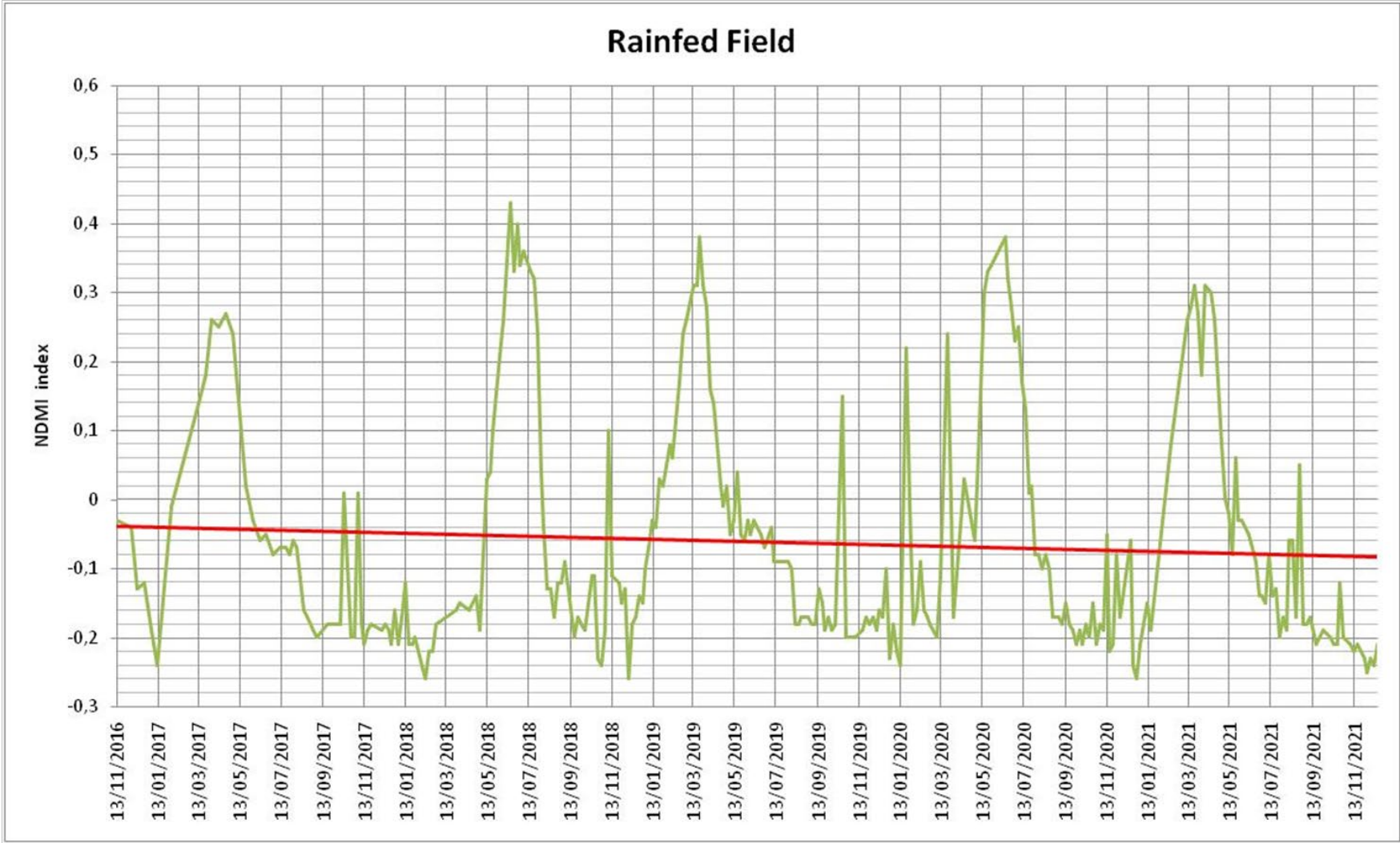




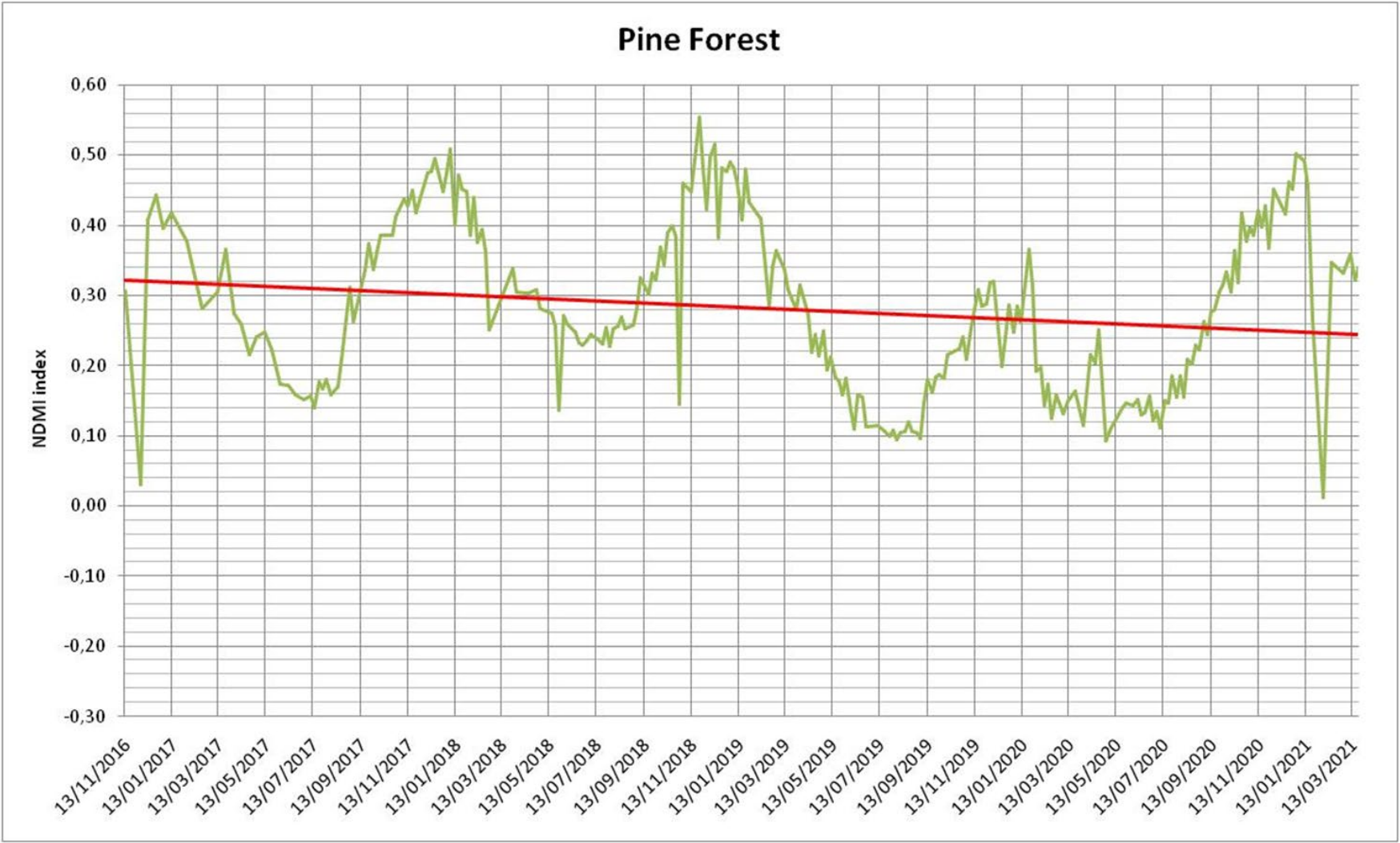
# Our Climate Detectives Project



# Our Climate Detectives Project



# Our Climate Detectives Project



# Our Climate Detectives Project



## Climate change is already measurable in Chiclana !!!

### Actions of our “Climate Activists” group:

- Dissemination of conclusions of our research (website, podcasts, media, science fairs, environmental associations ...)
- Proposal of a sustainable energy production system in our school
- Continue with the planting of trees in the courtyard of our school
- Ecological awareness at a personal, family and institutional level !!!

