

Performing drought indices to identify the relationship between agricultural losses and drought events in Spain.

Marina Peña Gallardo, Sergio Martín Vicente Serrano, Beguería Portugués Santiago, and Tomás Burguera Miquel
Pyrenean Institute of Ecology. Spanish National Research Council, Spain (marinapgallardo@ipe.csic.es)

Drought leads to crop failures reducing the productivity. For this reason, the need of appropriate tool for recognize dry periods and evaluate the impact of drought on crop production is important. In this study, we provide an assessment of the relationship between drought episodes and crop failures in Spain as one of the direct consequences of drought is the diminishing of crop yields.

First, different drought indices [the Standardized Precipitation and Evapotranspiration Index (SPEI); the Standardized Precipitation Index (SPI); the self-calibrated Palmer Moisture Anomaly Index (Z-Index), the self-calibrated Crop Moisture Index (CMI) and the Standardized Palmer Drought Index (SPDI)] have been calculated at different time scales in order to identify the dry events occurred in Spain and determine the duration and intensity of each event. Second, the drought episodes have been correlated with crop production estimated and final crop production data provided by the Spanish Crop Insurance System for the available period from 1995 to 2014 at the municipal spatial scale, with the purpose of knowing if the characteristics of the drought episodes are reflected on the agricultural losses. The analysis has been carried out in particular for two types of crop, wheat and barley.

The results indicate the existence of an agreement between the most important drought events in Spain and the response of the crop productions and the proportion of hectare insurance. Nevertheless, this agreement vary depending on the drought index applied. Authors found a higher competence of the drought indices calculated at different time scales (SPEI, SPI and SPDI) identifying the begging and end of the drought events and the correspondence with the crop failures.