



Cereal Production Ratio and NDVI in Spain

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Droughts are long-term phenomena affecting large regions causing significant damages both in human lives and economic losses. The use of remote sensing has proved to be very important in monitoring the growth of agricultural crops and trying to assess weather impact on crop loss. Several indices have been developed based in remote sensing data being one of them the normalized difference vegetation index (NDVI). In this study we have focus to know the correlation between NDVI data and the losses of rain fed cereal in the Spanish area where this crop is majority.

For this propose data from drought damage in cereal come from the pool of agricultural insurance in Spain (AGROSEGURO) including 2007/2008 to 2011/2012 (five agricultural campaigns). This data is given as a ratio between drought party claims against the insured value of production aggregated at the agrarian region level. Medium resolution (500x500 m²) MODIS images were used during the same campaigns to estimate the eight-day composites NDVI at these locations. The NDVI values are accumulated following the normal cycle of the cereal taking in account the sowing date at different sites. At the same time, CORINE Land Cover (2006) was used to classify the pixels belonging to rain fed cereal use including a set of conditions such as pixels showing dry during summer, area in which there has been no change of use.

Fallow presence is studied with particular attention as it imposes an inter annual variation between crop and bare soil and causes decreases in greenness in a pixel and mix both situations. This is more complex in the situation in which the avoid fallow and a continuous monoculture is performed. The results shown that around 40% of the area is subject to the regime of fallow while 60% have growing every year. In addition, another variation is detected if the year is humid (decrease of fallow) or dry (increase of fallow).

The level of correlation between the drought damage ratios and cumulative NDVI for the cereal campaign obtained are classified according to their level of significance at 99, 95, 90 and 85%. Approximately half of the regions with high surface assurance have meaningful relationships. In the regions where no significant relationships are achieved several situations are discussed such as extreme situations in critical phenological periods that could have great influence on the final yields.

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