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Pasture Drought Insurance Based on NDVI and SAVI

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Drought is a complex phenomenon, which is difficult to define. The term is used to refer to deficiency in rainfall, soil moisture, vegetation greenness, ecological conditions or socio economic conditions, and different drought types can be inferred. In this study, drought is considered as a period when the pasture growth is low in regard to long-term average conditions. The extensive livestock production is based on the natural resources available. The good management practices concurs the maximum livestock nutrition needs with the maximum pasture availability. Therefore, early drought detection and impact assessment on the amount of pasture biomass are important in several areas in Spain, whose economy strongly depends on livestock production. The use of remote sensing data presents a number of advantages when determining drought impact on vegetation. The information covers the whole of a territory and the repetition of images provides multi-temporal measurements. In addition, vegetation indexes, being NDVI (normalized difference vegetation index) and SAVI (soil-adjusted vegetation index) the most common ones, obtainedfrom satellite data allow areas affected by droughts to be identified. These indices are being used for estimation of vegetation photosynthesis activity and monitoring drought. The present study shows the application of these vegetation indices for pasture drought monitoring in three places in Spain and their correlation with several field measurements.

During 2010 and 2011 three locations, El Cubo de Don Sancho (Salamanca), Trujillo (Cáceres) and Pozoblanco (Córdoba), were selected and a periodic pasture monitoring and botanic composition were achieved. Daily precipitation, temperature and monthly soil water content were measurement as well as fresh and dry pasture weight. At the same time, remote sensing images were capture by DEIMOS-1 of the chosen places.This satellite is based on the concept Microsat-100 from Surrey. It is conceived for obtaining Earth images with a good enough resolution to study the terrestrial vegetation cover (20x20 m), although with a great range of visual field (600 km) in order to obtain those images with high temporal resolution and at a reduced cost. It has 6 cameras in red, green and near infrared bands, equivalent to Landsat ones.

A discussion on the correlations found between field measurements and both vegetation index considering seasonal pattern and location are presented.

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