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# Remotely Sensed Hydrometeorological and Agrometeorological Drought Risk Identification for Sustainable Agriculture.

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Drought is considered as one of the major environmental hazards with significant impacts to agriculture, environment, economy and society. This paper addresses drought as a hazard within the risk management framework. Indeed, hazards may be defined as a potential threat to humans and their welfare and risk (or consequence) as the probability of a hazard occurring and creating loss. Besides, risk management consists of risk assessment and feedback of the adopted risk reduction measures. And risk assessment comprises three distinct steps, namely risk identification, risk estimation and risk evaluation. In order to ensure sustainability in agricultural production a better understanding of the natural disasters, in particular droughts, that impact agriculture is essential. Droughts may result in environmental degradation of an area, which is one of the factors contributing to the vulnerability of agriculture, because it directly magnifies the risk of natural disasters. This paper deals with drought risk identification, which involves hazard quantification, event monitoring including early warning systems and statistical inference. For drought quantification the Reconnaissance Drought Index (RDI) combined with Vegetation Health Index (VHI) is employed. RDI is a new index based on hydrometeorological parameters, and in particular precipitation and potential evapotranspiration, which has been recently modified to incorporate monthly satellite (NOAA/AVHAA) data for a period of 20 years (1981-2001). VHI is based on NDVI. The study area is Thessaly in central Greece, which is one of the major agricultural areas of the country occasionally facing droughts. Drought monitoring is conducted by monthly remotely sensed RID and VHI images and several drought features are extracted such as severity, duration, areal extent, onset and end time. Drought early warning is developed using empirical relationships of the above mentioned features. In particular, two second-order polynomials are fitted relating severity and areal extend (number of pixels), one for low and other for high severity drought. The two fitted curves offer a forecasting tool on a monthly basis from the beginning of each hydrological year with high severity droughts occurring from October, whereas low severity droughts start in April. The results of this drought risk identification effort are considered quite satisfactory offering a prognostic potential of drought. The adopted remote sensing data and methods have proven very effective in delineating spatial variability and features in drought quantification and monitoring.