



## **A Mediterranean assessment on the risk of climate change on vineyards**

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We wish to suggest how climate change will transform vineyards in the Mediterranean region. We only consider changes in climate variables as drivers and recognise the limitations of excluding numerous social and environmental changes. However, this assessment has novel features which are of interest for developing policies that may drive adaptation. Here we present and discuss the analysis of three impact indicators aimed at exploring the benefits of transition-based policies. (1) A drought indicator provides insights to prepare for extreme events in probabilistic terms. (2) A temperature suitability indicator provides information on the transition between types of quality wine. (3) A Understanding and reducing vulnerability does not demand accurate predictions of the incidence of extreme events. (4) Extreme events are created by context. (5) It is politically difficult to justify vulnerability reduction on economic grounds. (6) Vulnerability reduction is a human rights issue; risk reduction is not. Our aim is to explore the adaptation choices to climate change in the grapevine regions of Spain from two points of view. First, what are the main reasons for concern? Second, how large is the adaptation effort in each region? We address the first question by measuring sensitivity to climate change with Huglin, Cold Night and Dryness Indices over the entire territory, providing information on the adaptation type (e.g. varieties, zoning, water allocation). We then estimate probabilistic projections across scenario, zone and sensitivity indices in the 56 Protected Designation of Origin areas to inform on the magnitude of the adaptation effort. Second, we propose an adaptation effort measure that is framed according to the local environmental context. Results suggest that most areas urgently need an adaptation plan due to the deterioration of production and quality indices as a result of climate change. Potential opportunities in many climate regions might be limited by current policy. The production objectives of quality and quantity trade-offs will probably need to be revised by analyzing the sustainability of grapevine production.