



## **Climate risk to agricultural production: impacts across geographical areas**

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This paper provides a methodology to measure agricultural risk to climate across geographical areas and analyses the potential risk of crop yields. The methodology has three components: first, models are developed for each region to estimate the risk of climate variability and functional forms are derived from sixty years of empirical data for Mediterranean crops; second, Monte Carlo models are used to analyse with more detail the probabilistic properties of the agricultural yields; and finally, a risk factor index is applied to compare across geographical areas. The advantages of this methodological approach is that it links agricultural areas with representative meteorological stations and uses a Monte Carlo approach to define large samples of crop yields that reflect more accurately the statistical properties needed for risk analysis. The methods are robust to develop further climate and management scenario analysis. The analysis is carried out in five case studies in Spain that exemplify other Mediterranean areas where climate is a main source of agricultural risk and exerts pressure on already limited and competing water supplies. The results show that risk characterization is complex, due to the multiple attributes of risk beyond variability of the climate, and that our method for risk analysis is useful to compare across locations.