



Quantitative assessment of current and future risks related rainfall in processing tomato in the Guadiana river basin (SW Spain)

Alba Castañeda-Vera (1), Alberto Garrido (1), Margarita Ruiz-Ramos (1), Enrique Sánchez-Sánchez (2), and M. Inés Mínguez (1)

(1) Research Centre for the Management of Agricultural and Environmental Risks (CEIGRAM), Technical University of Madrid, Spain, (2) Faculty of Environmental Sciences and Biochemistry, University of Castilla-La Mancha, Toledo, Spain

An extension of risk coverages in the insurance policies for processing tomato, mainly related to rainfall events, has resulted in an important increase in claims. This suggests that damages related to extreme or ill-timed showers have been underestimated in previous years. An estimation of damages related to rainfall in the last thirty years and the impact of climate change in the risk related to rainfall in processing tomato crops in the Guadiana river basin (SW Spain) were studied through a risk index. First, the risk index was defined with temperature and relative humidity thresholds related to different damage magnitudes. Then, this index was applied to current climate and to future climate scenarios in nine weather stations representative of the studied area to determine the trends in losses related to extreme or inopportune rainfall events. Thresholds of temperature and relative humidity were obtained from cross-checking agricultural insurance records and meteorological data from local weather stations (REDAREX, <http://sw-aperos.juntaex.es/redarex>). To consider longer time series, the reanalysis database ERA-INTERIM (Dee et al., 2011) was used. Simulated climate was obtained from the European Project ENSEMBLES (<http://www.ensembles-eu.org/>). Trends in climatic risk were analysed by applying the risk index to three sets of data defining current climate (1980-2010), mid-future climate (2010-2040) and long-term future climate (2040-2070). An algorithm to choose the surrounding cell that minimizes the temperature and precipitation climatic biases and maximizes seasonal correlation when comparing ENSEMBLES regional climate model simulations and observed climate was applied before index calculation. The results show the trends in frequency and magnitude of the risk of suffering damages related to rainfall events. The methodology decreased the uncertainty on risk levels. Results contribute to detect the periods during the growing season with larger risk of damage in order to provide information to assist research on risk management practices and to support insurance policy makers to extend guarantees and to adapt the insurance conditions and costs to real crop risks.

This research is being financed by MULCLIVAR project (CGL2012-38923-C02-02), MINECO, Spain

Keywords: climate change, risk, rainfall, processing tomato.

References

Dee, D. P., with 35 co-authors, 2011: The ERA-Interim reanalysis: configuration and performance of the data assimilation system. *Quart. J. R. Meteorol. Soc.*, 137, 553-597.