



Linking seasonal climate forecasts with crop models in Iberian Peninsula

Mirian Capa (a,b), Amor Ines (c), Walter Baethgen (c), Belen Rodriguez-Fonseca (a,d,e), Eunjin Han (c),
Margarita Ruiz-Ramos (a,b)

(a) Campus of International Excellence Moncloa, UCM-UPM, Madrid, Spain 28040, (b)
CEIGRAM-AgSystems-Producción Agraria, ETSI Agrónomos, Technical University of Madrid, Madrid, Spain. 28040, (c)
International Research Institute for Climate and Society, 61 Route 9W, Palisades, New York 10964-800 USA, (d)
Departamento de Geofísica y Meteorología, Facultad de Ciencias Físicas, Universidad Complutense de Madrid, Spain, (e)
Instituto de Geociencias (CSIC-UCM), Plaza de Ciencias 1, Madrid, Spain 28040

Translating seasonal climate forecasts into agricultural production forecasts could help to establish early warning systems and to design crop management adaptation strategies that take advantage of favorable conditions or reduce the effect of adverse conditions. In this study, we use seasonal rainfall forecasts and crop models to improve predictability of wheat yield in the Iberian Peninsula (IP). Additionally, we estimate economic margins and production risks associated with extreme scenarios of seasonal rainfall forecast.

This study evaluates two methods for disaggregating seasonal climate forecasts into daily weather data: 1) a stochastic weather generator (CondWG), and 2) a forecast tercile resampler (FResampler). Both methods were used to generate 100 (with FResampler) and 110 (with CondWG) weather series/sequences for three scenarios of seasonal rainfall forecasts. Simulated wheat yield is computed with the crop model CERES-wheat (Ritchie and Otter, 1985), which is included in Decision Support System for Agrotechnology Transfer (DSSAT v.4.5, Hoogenboom et al., 2010). Simulations were run at two locations in northeastern Spain where the crop model was calibrated and validated with independent field data. Once simulated yields were obtained, an assessment of farmer's gross margin for different seasonal climate forecasts was accomplished to estimate production risks under different climate scenarios.

This methodology allows farmers to assess the benefits and risks of a seasonal weather forecast in IP prior to the crop growing season. The results of this study may have important implications on both, public (agricultural planning) and private (decision support to farmers, insurance companies) sectors.

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