Yield gap mapping as a support tool for risk management in agriculture

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The increasing frequency and magnitude of droughts in Morocco and the mounting losses from extended droughts in the agricultural sector emphasized the need to develop reliable and timely tools to manage drought and to mitigate resulting catastrophic damage. In 2011, Morocco launched a cereals multi-risk insurance with drought as the most threatening and the most frequent hazard in the country. However, and in order to assess the gap and to implement the more suitable compensation, it is essential to quantify the potential yield in each area. In collaboration with the University of Nebraska-Lincoln, a study is carried out in Morocco and aims to determine the yield potentials and the yield gaps in the different agro-climatic zones of the country. It fits into the large project: Global Yield Gap and Water Productivity Atlas: http://www.yieldgap.org/. The yield gap (Yg) is the magnitude and difference between crop yield potential (Yp) or water limited yield potential (Yw) and actual yields, reached by farmers. World Food Studies (WOFOST), which is a Crop simulation mechanistic model, has been used for this purpose. Prior to simulations, reliable information about actual yields, weather data, crop management data and soil data have been collected in 7 Moroccan buffer zones considered, each, within a circle of 100 km around a weather station point, homogenously spread across the country and where cereals are widely grown. The model calibration was also carried out using WOFOST default varieties data. The map-based results represent a robust tool, not only for drought insurance organization, but for agricultural and agricultural risk management. Moreover, accurate and geospatially granular estimates of Yg and Yw will allow to focus on regions with largest unexploited yield gaps and greatest potential to close them, and consequently to improve food security in the country.