

Climate risks in maize crop in the southeastern of Buenos Aires Province: B. water deficiencies and yields

Panunzio Moscoso, M. P.; A. I. Irigoyen, A. I. Della Maggiora and R.H. Rizzalli
Revista Argentina de Agrometeorología RADA, v. VII (2016): 57-71

Summary

Changes in climate patterns modify the crop growing season and, then, the risks of exposure to adverse conditions. The assessment of agricultural practices by generation of scenarios is useful to identify options of adaptation to minimize risks and improve the benefits. The objectives were a) to describe the water deficits and b) to evaluate the impact of water deficit on crop yield for agricultural scenarios in center-southeastern of Province of Buenos Aires, Argentina. Scenarios with three maturity cultivars were simulated for six planting dates over the region. The maize growing season agroclimatology (1971-2010) was based on a simple model of crop development using growing degree-days as estimator. The approach was performed for four locations of the region (Azul, Tandil, Balcarce and Mar del Plata). Water deficit for each scenario was computed as difference between maximum and actual evapotranspiration (ETM-ETR). Soil water balance were computed following an adjusted locally model with daily step. Relative evapotranspiration (ETR/ETM) was computed for each scenario and growing season at each location. Maximum yield was estimated from the product between seasonal ETM and water use efficiency. The response of yield to water supply was quantified through the yield response factor (k_y) which relates relative yield decrease to relative evapotranspiration deficit ($1 - \text{ETR}/\text{ETM}$). Intensity of water deficits during the growing season (DAEC) is homogeneous over the region, without significant differences among locations for each scenario. No significant differences among maturity cultivars or planting dates were detected, except in Mar del Plata. DAEC. Late maturity cultivar yields significantly more than early one, the intermediate cultivar do not differ from each other.

Key words: planting date; relative maturity cultivar; soil water balance; relative evapotranspiration