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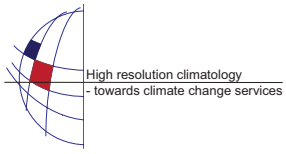

Impact of climate change on cotton cultivation grown in the rainfed system in northeastern region of Brazil

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This study aimed to assess the impacts of climate change on the agricultural zoning of climatic risk in cotton crop (Gossypium hirsutum L) grown in rainfed system in northeastern region of Brazil, based on the Intergovernmental Panel on Climatic Change reports of increasing mean air temperature. The water balance model combined with Geographical Information System technique was used to identify areas where cotton crop would suffer yield restrictions due to climate change. Model input variables were daily time series in rainfall at least 30 years, crop coefficients, potential evapotranspiration and crop growth cycle duration. The scenarios analyzed were 1.5, 3.0 and 5.0 oC increases in air temperature combined with potential changes in rainfall of $\pm$ 10, $\pm$ 25 and $\pm$ 40%, which are associated to El Niño (negative deviations) and La Niña (positive deviations) events in the simulation of crop sowing dates. It was adopted the value of 0.55 as baseline for the Water Requirement Satisfaction Index, defined as the ratio between actual evapotranspiration and maximum evapotranspiration. The results suggest that the climate change leads to the significant reduction in the currently favorable areas of cotton crop growth in northeastern region of Brazil, resulting in significant losses in crop production. The increasing air temperature scenarios combined with negative rainfall anomalies will cause highest impact in the cotton crop production, mainly in areas with low rainfall regime and high air temperature values, as well as in areas with strong spatial rainfall and air temperature variation in all northeastern region of Brazil.