

Climatic Elements Variability Affecting Maize Yield in Northern Minas Gerais, Brazil

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In semiarid region of Minas Gerais State, Brazil, there is a large deficit on corn supply, even for family livelihood. In spite of being considered one of the most efficient crops in converting solar radiant energy into biomass, rainfed maize production in that region is strongly affected by climate variability. Understanding factors that affect maize yield is crucial to develop appropriate crop management strategies. The study aimed at to identifying climatic factors that affect maize yield in Janaúba-MG, Brazil, simulated with CSM-CERES-Maize model. The model was used to simulate maize, cultivar BRS 1030, grain yield, sowed weekly throughout the year, under irrigated and rainfed conditions, from 1977 to 2008. Statistical analysis performed on simulated grain yield data indicated that the factors sowing date, year and irrigation (rainfed and irrigated) and their double interactions were significant at a 5% level. Rain availability accounted for the greatest amount of total maize yield variation in the study region (61.9%), followed by sowing date and its second order interactions (26.2%). Year was a lesser factor in total maize yield variation. Without water stress, the factors sowing date and year influenced yield mainly due to interannual and seasonal variations in air temperature and solar radiation. Low yield values were found when incident solar radiation was below average. Average grain yield of 2,300 kg ha⁻¹ were obtained for average incident radiation of 15 MJ m⁻² day⁻¹, compared to 6,300 kg ha⁻¹ obtained for an average incident solar radiation of 20.2 MJ m⁻² day⁻¹.

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