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Water Productivity as an Indicator of Bioenergetic Sustainability in Sugarcane

Authors : Rubens Duarte Coelho, Timóteo Herculino da Silva Barros, Jefferson de Olveira Costa

Abstract : Brazil has an electrical matrix of predominantly renewable origin, with emphasis on water sources, which account for 65.2%, biomass energy for 8.2%, wind for 6.8% and solar for 0.13% of the domestic supply. Among these sources, sugarcane cultivation stands out, aiming both at the production of bioethanol and biomass to supply “clean energy”. However, like all other crops, sugar cane demands a large volume of a natural resource that is increasingly “scarce” in quantity and quality: water. Adequate and strategic water management throughout the entire sugarcane cycle is of fundamental importance, and water productivity can be used to adjust irrigation planning and decision-making, increasing the productivity of stalks, bioethanol, biomass, and sugar. In this way, water productivity is a good indicator for analysis and decision-making considering the sustainability of cultivation, as it allows evaluation of the variation in the ratio between production and the amount of water used, suggesting values that maximize the use of this natural resource. In this context, studies that relate water demand, in this case, expressed by water productivity, with the energy production of this crop, in this case, expressed by the production of bioethanol, biomass and sugar, are fundamental to obtaining an efficient production of renewable energy, which aims at the rational use of natural resources, especially water. The objective of the present work was to evaluate the response of sugarcane varieties subjected to different water availability to obtain better sustainability in bioenergy production, presenting water productivity indices for Bioethanol, Sugar and Biomass. The variety that responded best was RB966928, with a bioethanol yield of 68.7 L Mg-1. Future research should focus on the water response under each of the sugarcane fractions in terms of their elemental composition so that the influence of water on the energy supply of this crop can be better understood.

Keywords : energy matrix, water use, water use efficiency, sustainability
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