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Delimitation of guava water productivity in the Brazilian Northeast

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The intensification of agricultural crops in the Brazilian Northeast results in a change of natural vegetation, making important the quantification and evaluation of the additional water use. Applications of a Geographic Information System (GIS) are presented in this paper to estimate guava water productivity at the large scale. Long term weather data were used together with simple regression models involving crop coefficient (K_c), reference evapotranspiration (ET_o) and accumulated degree days (DD_{ac}) to quantify the guava water requirement (GWR) in the commercial production States of the Brazilian Northeast, considering growing season of six months and the cv. Paluma as reference. Coupling GWR data with total precipitation for a growing season it was possible to quantify the guava water deficit (GWD) giving an approach about irrigation needs. Considering the whole region, the variation of the averaged GWD values varied from 75 mm for pruning dates in December to 430 mm, with pruning in May. Associating the average GWR values with yield data for 2010 from the Brazilian Geographical and Statistical Institute (IBGE), the average bio-physical and economic values of guava water productivity were estimated for each guava producer state. The bio-physical values are between 0.86 and 4.95 kg m⁻³ for pruning dates in July and January in Rio Grande do Norte and Pernambuco states, respectively, while the economic ones were from 0.40 to 3.18 R\$ m⁻³ for the same pruning periods, however with the lowest averaged value being for Paraíba state. Highlights are for the States of Pernambuco, Bahia and Piauí, which present both, bio-physical and economic values of guava water productivity. The analyses spatially presented, can subsidize programs for expansion of rain fed guava crop as well as water allocation criterions under irrigation conditions, when aiming improvements on water resources use in the Brazilian Northeast.

Keywords: degree days, crop coefficient, evapotranspiration.

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