

Crop water parameters of mango orchard under the semi-arid conditions of Brazil

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Because of the importance of the water management in fruit crops, daily and seasonal water use patterns of a large commercial mango orchard were collected. The results presented in this paper are important for irrigation management, water allocation, water savings and environmental sustainability of irrigated mango orchards.

Despite the aerodynamically rough surface with the crowns of mango trees exceeding 5 m, the actual evapotranspiration of the mango orchard was less than for grass as a reference crop ($ET_a/ET_0 = 0.91$). The underlying reason is the presence of a relatively large bulk surface resistance ($r_s = 135 \text{ s m}^{-1}$) due to presence of older leaves, shadow in the crown, distance between trees for mechanical access and the absence of a ground cover crop.

In the commercial farm investigated, soil moisture and the evaporative fraction were in general kept at ideal levels, especially considering the values for the entire growing seasons. The drawback of a wet light textured soil is the capacity to percolate excessive water resources. The seasonal percolation flow was 300 mm, and this can be a threat to groundwater contamination and soil salinity build up, if drainage is not given proper attention.

The bio-physical and economical water productivities of mango are very high. An economic water productivity based on actual evapotranspiration of US\$3 m^{-3} to US\$4 m^{-3} is in order of magnitude much better than for annual crops. Hence from the water resources point of view, water allocation to irrigated mango orchards is desirable. Although this water usage is highly productive, the environmental consequences must be considered keeping irrigated horticulture in pace with sustainability requirements. The challenge is to find a balance between water productivity and environmental pollution.