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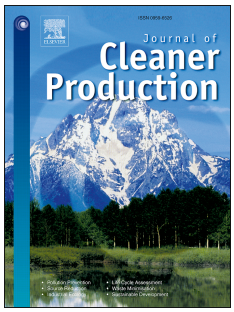

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Water footprint accounting and scarcity indicators of conventional and organic dairy production systems

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ABSTRACT

The amount of water that is used in animal agriculture influences society's view of its environmental sustainability. Estimates of how much water is consumed to produce one kg of milk remain scarce. Such information needs to be given to society and water resource managers. The aim of this study were to assess the water footprint of both a conventional and an organic dairy production system and identified the components and processes that have the greatest water use in terms of green, blue, gray water, and virtual water. Additionally, it analyzed the impact of element on gray water footprint, and utilized indicators to evaluate the water scarcity. These were done following a water footprint method compliant with Water Footprint Network. Green water footprint was the most significant contributor to the total footprint values for both systems. This situation can be understood as an opportunity to improve the agriculture water use efficiency and promote the integration between agriculture and livestock. Virtual water represents from 39% to 57% of footprint value for the conventional and from 32% to 59% for the organic. The consumption of water for irrigation accounted for the greatest percentage of blue water, 95% for conventional and 96% for organic. The element used to calculate gray water footprint has a significant impact on its values. Footprints calculated having phosphorus as element were 1.5 and 1.9 times higher for conventional and organic, respectively. Both conventional and organic farms showed an equal green water scarcity index (1.1) and despite the two farms are located in places with high rainfall, they suffered green water scarcity The blue water scarcity index was 0.11 for conventional and 0.13 for organic. Study concluded that a product with a lower water footprint could be more damaging to the environment than one with a higher water footprint depending on water availability. The water footprint approach evidenced that nutritional management is crucial to improve water use. Results cannot support the consequences in changing the conventional or the organic production system regarding the use of water. The more efficient water use depend on productions factors and water availabilities that are specific to each system.

Keywords: Blue, Effluent, Green, Nitrate, Phosphorus

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