



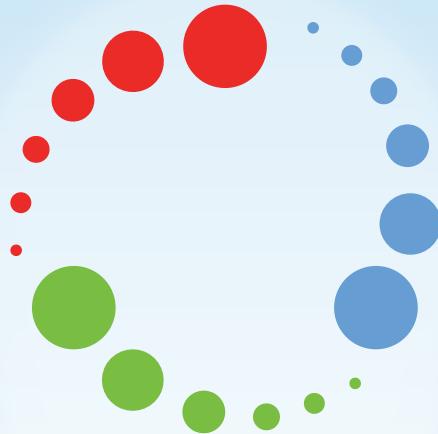
Impacts of brazilian wheat production on human health, ecosystem quality and resource scarcity

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Agriculture is the challenge of increasing production while promoting environmental sustainability by reducing impacts on human health, ecosystem quality and natural resources. Wheat, as one of the major commodities of the world, plays a critical role in global food security. The wheat production reached 785 million metric tons across 242.7 ha harvested, in 2023/2024. Life cycle assessment (LCA) is a robust tool for evaluating the environmental impacts of a product or service. The aim of this study was to assess the endpoint categories, human health, ecosystem quality and resource scarcity to support the scientific debate on the sustainability of Brazilian wheat cultivation. For this purpose, 61 wheat farmers in Southern Brazil, the country's main producing region, were surveyed. The farms were categorised into two groups: 17 large (ranging from 145 to 697 ha) and 44 small (ranging from 7 to 123 ha) with average productivity of 4.039 and 3.559 kg ha⁻¹, respectively. The functional unit was defined as one kilogram of cultivated wheat. Environmental impacts were analysed using the ReCiPe 2016 Endpoint (H) 1.09 method and the SimaPro 9.6.0.1 software. The results showed impacts of 1.07E-6 and 1.41E-6 DALY for human health, 1.27E-8 and 1.55E-8 species yr for ecosystem quality, and 2.22E-02 and 2.61E-02 USD2013 for resource scarcity, for large and small farms, respectively. Small farms exhibited higher impacts than large farms, primarily due to their lower yields, secondly due to low efficiency of inputs and excessive field operations. These findings establish parameters for developing strategies to reduce the environmental impacts of Brazilian wheat cultivation, promoting more sustainable agriculture practices.



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