

Extended Abstract

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Paper/Poster Title	Assessing the water footprint of food waste in Spain and its regions
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Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	<i>200 words max</i>
<p>This study aims to enhance the understanding of household food waste in Spain and its environmental impact in terms of water resources through the evaluation of the water footprint. By integrating data on food waste quantities from a unique database supplied by the Kantar World Panel with information on the unitary water footprint of consumption from the CWASI database, we estimate the water footprint associated to food waste. Preliminary findings indicate that the per capita food waste in Spain stands at 23.52 kilolitres annually, resulting in a water footprint of 48.79 m³ per person and year. The analysis of the water footprint figures associated with Spanish food wastage reveals discernible temporal and geographical patterns. Ongoing analyses employ statistical and econometric methodologies to assess the impact of different household characteristics on the water footprint associated to food waste. Results hold the potential to furnish valuable insights for the formulation of strategies aimed at mitigating food waste and its water-related impacts. This, in turn, could lead to a reduction in water withdrawals, an enhancement of water efficiency and sustainability, and contribute substantively to addressing water scarcity and climate change adaptation.</p>	
Keywords	Food Waste, Water Footprint, Household, Disaggregated data, Spain
JEL Code	Agricultural Policy; Food Policy; Animal Welfare Policy Q18, Water Q25
Introduction	<i>100 – 250 words</i>
<p>Current estimates reveal that around one third of the total food produced globally for human uses is wasted or lost (FAO, 2011, FAO 2015). Additionally, according to Godfray et al. (2010), a growing population and rising per capita food consumption patterns will continue increasing food demand for at least the next 40 years. Hence, increasing production and reducing food waste should go in hand, implying an efficient use of resources aimed at reducing environmental impact. Of special relevance are the consequences in terms of water use. It is estimated that approximately two thirds of the worldwide population live under water scarcity (Mekonnen and Hoekstra, 2016), that almost 80% of water withdrawals are used in the agrifood sector, and that the water footprint of food wastage is about 250 km³ per year (FAO, 2013). In this context, this paper aims to enhance the understanding of household food waste in Spain and its environmental impact in terms of water resources by means of the assessment of the so-called water footprint.</p>	

Methodology	100 – 250 words
<p>Food waste data is sourced from a unique database supplied by the Kantar World Panel, offering comprehensive information on Spanish food waste quantities across various parameters such as food categories, regions, household sizes, presence of children, age, and social class, for the period spanning 2018-2022 (n=15,487). To estimate the water footprint associated to food waste, the tonnage of food waste is multiplied by the unitary water footprint of consumption (measured in m³/tonne) obtained from the CWASI database (Tamea et al., 2020). The CWASI database furnishes details on the Spanish unitary water footprint of consumption for diverse crops and animal products for the most recent available year (2016). The unitary water footprint of different crop products is aggregated into the food categories provided by Kantar, using the averaged unitary water footprint weighted by the consumption of each product (according to information of the FAOSTAT database). The analysis of the water footprint figures associated with Spanish food waste facilitates examination of temporal and geographical patterns, as well as variations based on household characteristics. To achieve this, statistical and panel econometric techniques, along with spatial analysis tools, are employed.</p>	
Results	100 – 250 words
<p>Initial findings indicate that per capita food waste in Spain amounts to 23.52 kilolitres per person and year, corresponding to a water footprint of 48.79 m³ per person and year or 133.67 litres per person and day. Over the annual span, there is a noteworthy reduction of water footprint associated to food waste of 34.57% (from 59.51 m³/person in 2018 to 38.93 m³/person in 2022). Examining food categories, dairy products and meat products emerge prominently, constituting 19.59% and 10.90%, respectively, of total water footprint associated with food waste, respectively. However, these two categories exhibit the most substantial reductions in water footprint during the analysed period (-39.23% for dairy products and -38.19% for meat products). Geographical disparities are evident, with the Metropolitan area of Barcelona (59.02 m³/person) and the north-east region of Spain (55.32 m³/person) recording the highest water footprints linked to uneaten food. Conversely, Andalusia registers the lowest value (45.11 m³/person) and experiences the highest reduction in water footprint (-44.87%). Regions with elevated water footprint, such as the Metropolitan area of Barcelona (-17.76%) and Andalusia (-20.45%), display comparatively lower reduction rates. Ongoing analyses delve into the impact of diverse household characteristics on the water footprint associated with food waste and explore the existence of potential spatial patterns.</p>	
Discussion and Conclusion	100 – 250 words
<p>This study endeavours to analyse the water footprint linked to household food waste in Spain, emphasizing temporal and geographical patterns, as well as the influence of household characteristics. Preliminary findings indicate that this water footprint amounts to 48.79 m³ per person and year, a figure consistent with results from previous studies (e.g., Blas et al. (2018) reported a value of 47.7 for the Spanish case using aggregated data for the year 2014/2015). Notably, regional differences emerge,</p>	

an issue that has received limited attention in the previous literature. Ongoing analyses are actively probing the impact of various household characteristics on the water footprint associated with food waste. This exploration holds the potential to deepen our understanding of the factors shaping this water footprint. In conclusion, the outcomes of this research offer valuable insights for the formulation of strategies aimed at mitigating food waste and its water-related impacts, reducing water withdrawals, fostering efficient and sustainable water use, and consequently addressing water scarcity while contributing to climate change adaptation.