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[The carbon footprint of the hake supply chain in Spain: Accounting for fisheries, international transportation and domestic distribution.](#)

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Abstract: Climate change mitigation depends to a large extent on economic sectors modifying their production processes to significantly reduce their greenhouse gas emissions, particularly CO₂. However, greenhouse gas emission assessments are usually excluded from management of capture fisheries. Traditionally, hake (*Merluccius spp.*) has been an important food for the population of Western Europe, and remains one of the most consumed fish in Spain's gastronomic culture. This paper reconstructs, for the first time, the hake seafood chain in Spain with the aim of estimating the carbon footprint of its extraction (fishing), transport and distribution. Our results show that total greenhouse gas emissions from the hake production and value chain in 2017 were 681 kt CO₂e, with an emission intensity of 4.42 kgCO₂e kg⁻¹ of whole fish. From these total emissions, those related to fishing operations represent 67% (456 kt CO₂e), with the remaining 33% (225 kt CO₂e) associated with transport (maritime, air or road). Air transport was the highest in terms of emission intensity per kilogram of hake transported (15.85 kgCO₂e kg⁻¹), and contributed to the largest share (72%) of transport emissions. Maritime transport presented the least emission intensity (0.33 kgCO₂e kg⁻¹) and predominated for hake caught outside the EU (e.g., Argentina, Namibia), offsetting the long distances the hake had to travel with greater transport efficiency. Our study highlights the importance of including greenhouse gas emissions analysis in the operationalization of the ecosystem-based fisheries management in the European Common Fisheries Policy as well as other regulations such as the Marine Strategy Framework Directive as a key tool for decision makers to appropriately address climate change impacts. The evidence provided by our study highlights the importance of finding a balance between healthy fish consumption patterns and their associated environmental impacts.

Keywords: Hake, Fisheries, Carbon footprint, Transformative changes, Spain