Food loss & waste of staple crop products: mapping environmental impacts within the Nexus paradigm

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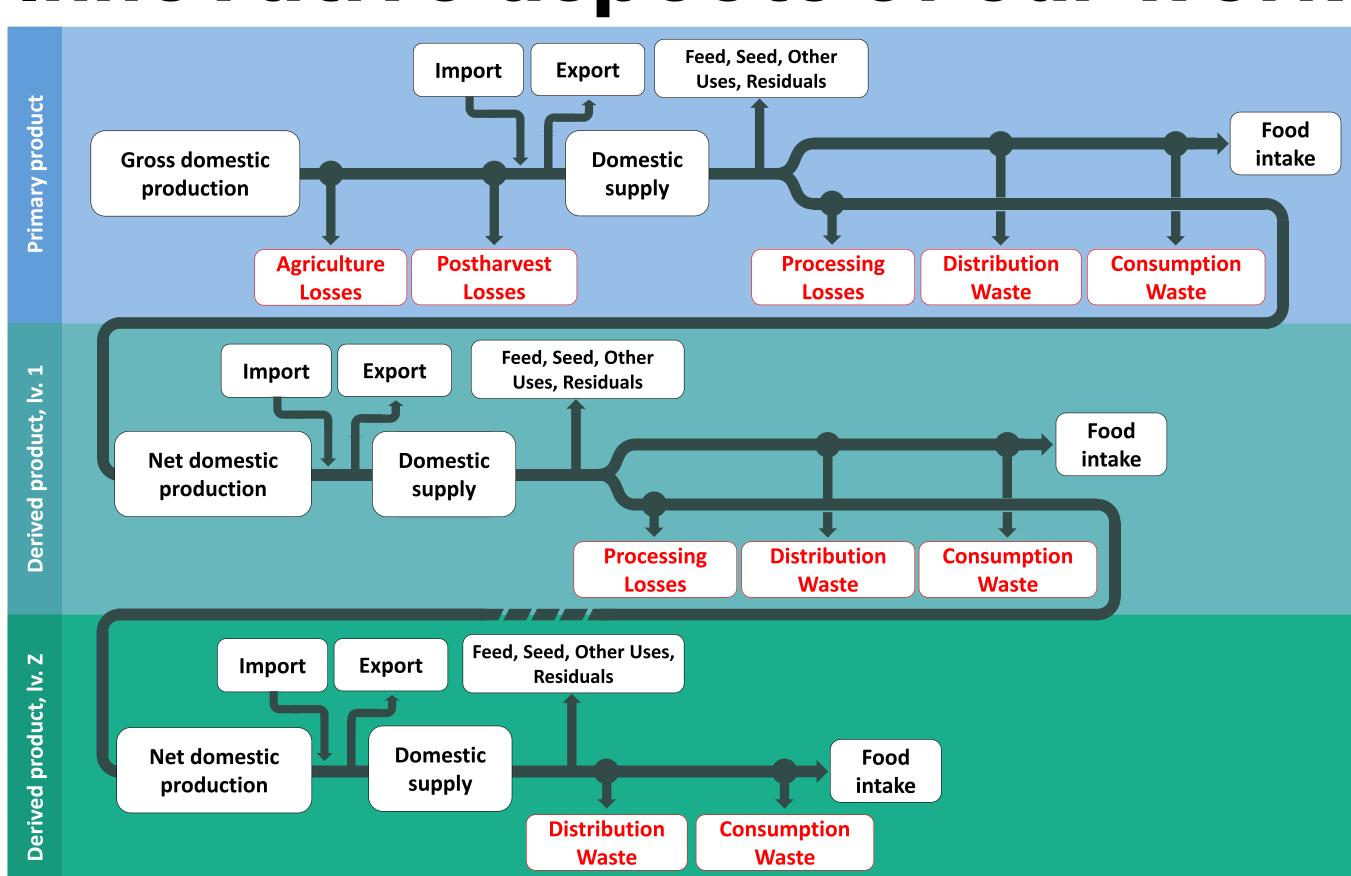
Why is food loss & waste relevant?

• A world of contradictions. While one in ten people is undernourished, around a third of the food is lost or wasted along the value chain.

Lost food, wasted resources. Together with food loss & waste, we also lose about 23-24% of the *blue* water resources, cropland and fertilisers which are employed in food production.

Multiple implications. About 70% of global freshwater uses are for agricultural purposes, while 44% of the world's habitable land is used for agriculture. Moreover, the food value chain accounts for 26% of global GHG emissions.

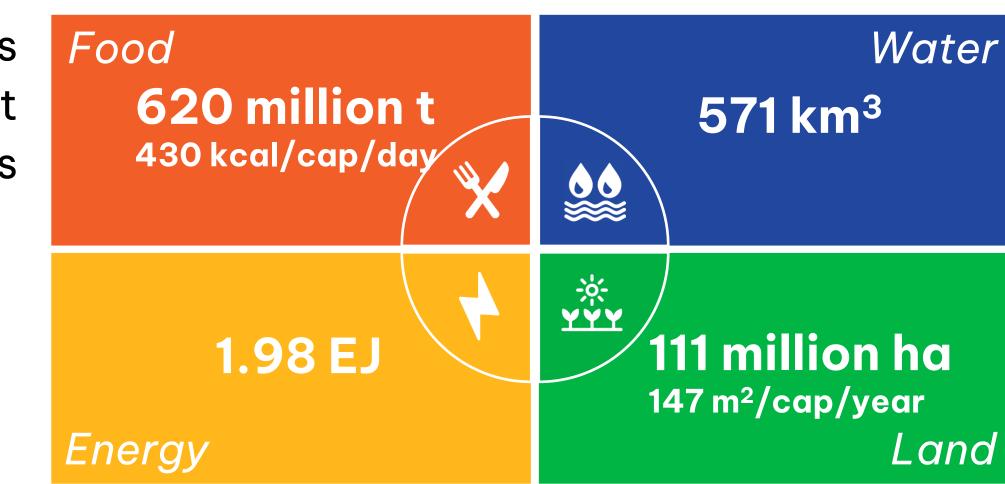
Innovative aspects of our work



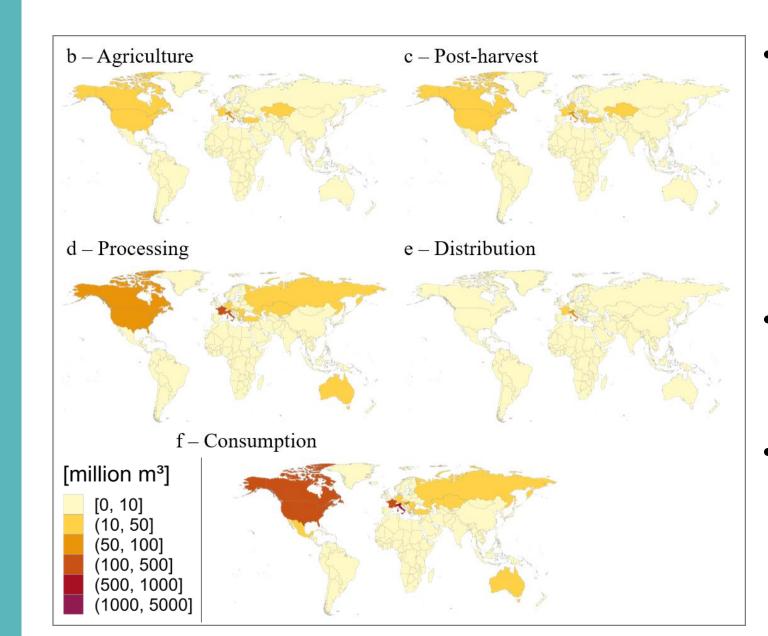
- **Novel modelling tool!** Able to quantify food loss & waste at the commodity level.
- Global analysis. Covering 53 agricultural products from 16 of the most widely grown staple crops, both for human consumption and feed production. Average for 2015-2019.

The impacts on the Water-Energy-Food Nexus

The role of trade. The chord diagram below shows the main links between countries. We find that the two largest flows (~2 million t each) link consumption in China to agricultural commodities produced in Thailand (rice) and the U.S. (wheat, soy and maize).



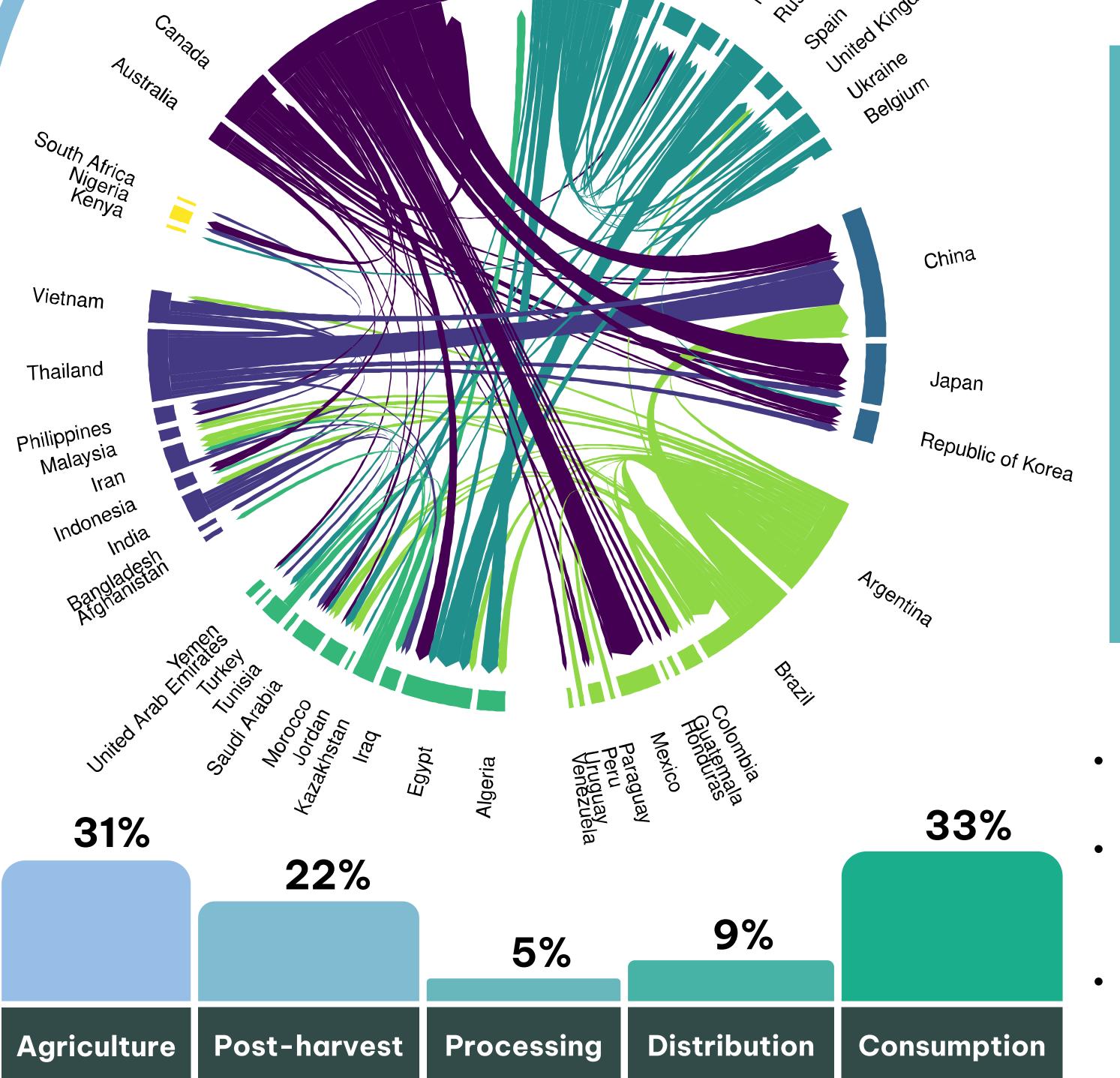
Focus: wheat and derivatives consumed in Italy – impact on water resources



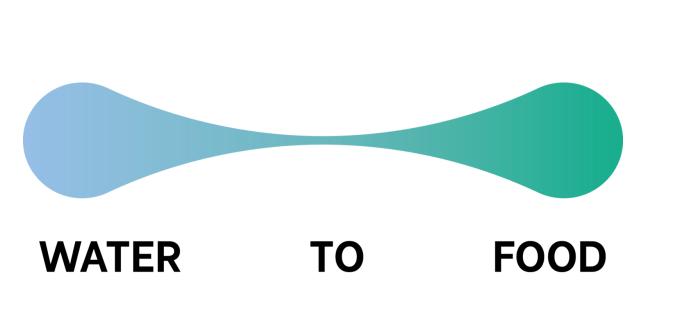
- For each product analysed (raw wheat, flour, pasta, bread) we are able to reconstruct the supply network, tracing back where water resources were impacted in the different stages of the value chain.
- More than 100 countries employ their water resources to produce food that is intended to be consumed in Italy.
- We find that, for Italy, consumption waste of bread is the most relevant contributor (47%) for food loss & waste of wheat and derivatives.

Conclusions

- **NEXUS perspective.** This work aims to provide a more complete picture of the many environmental impacts of food loss & waste.
- **Transnational flows.** Despite representing a small portion of the overall food loss & waste, interesting interdependencies between nations emerge when performing a network analysis.
- **Policy implications.** A level of disaggregation similar to that presented in this work is necessary to accurately inform public policy aimed at tackling food loss & waste.









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