

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

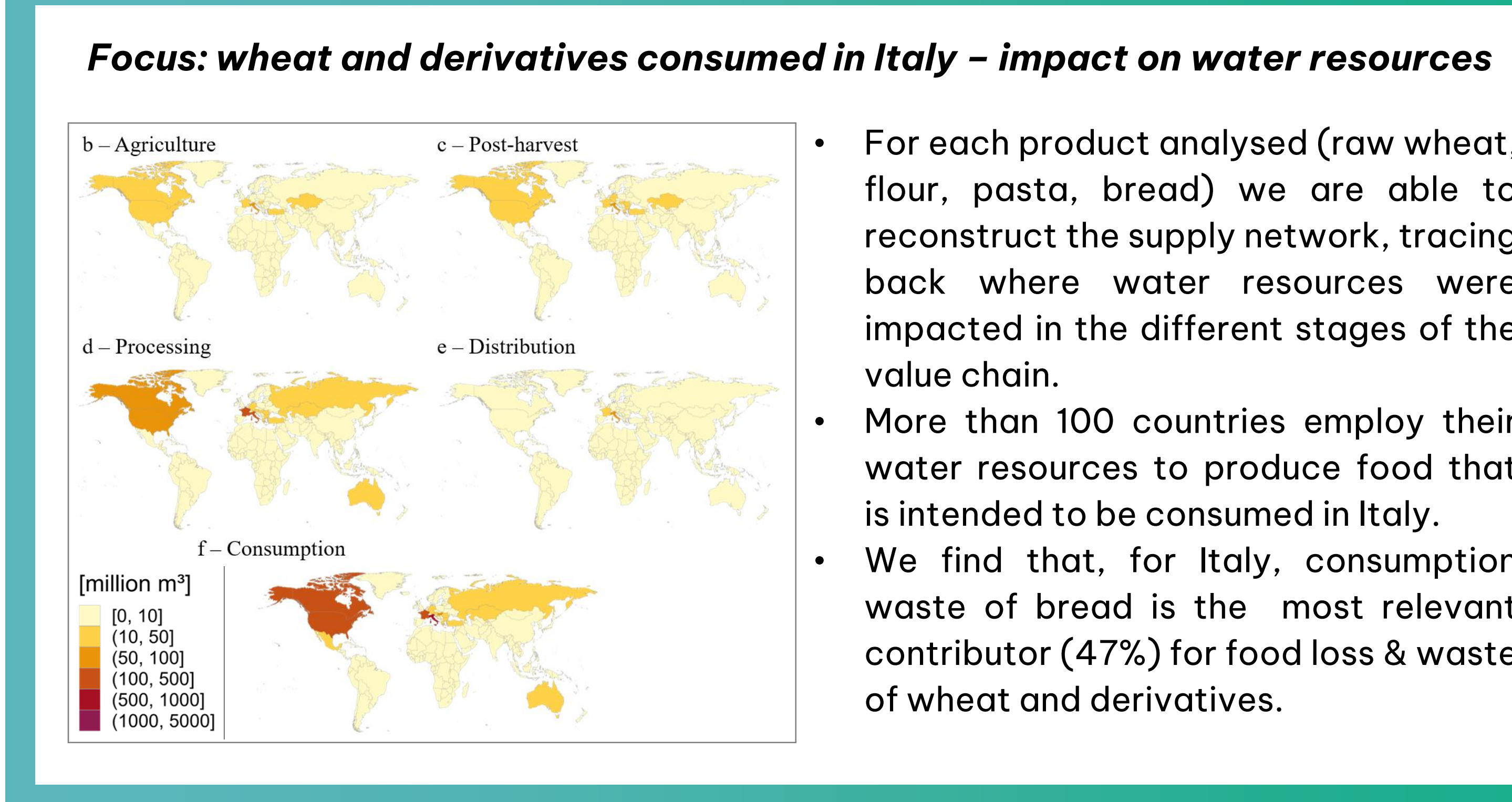
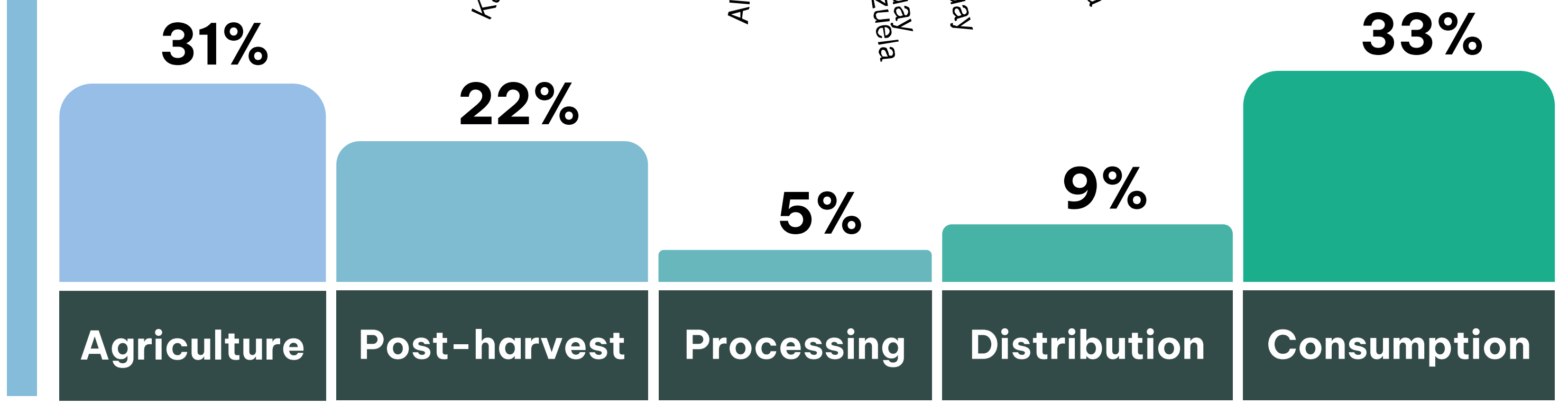
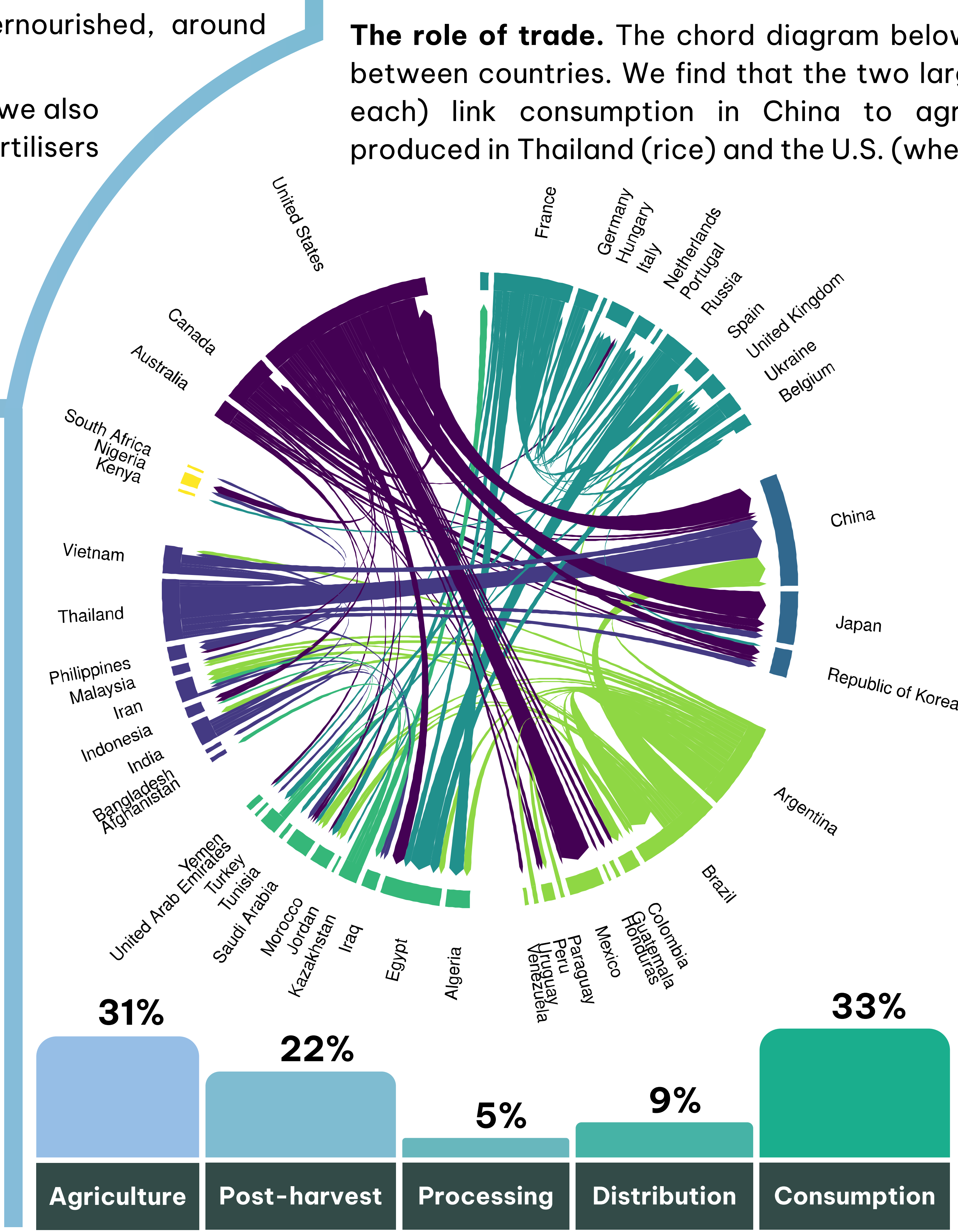
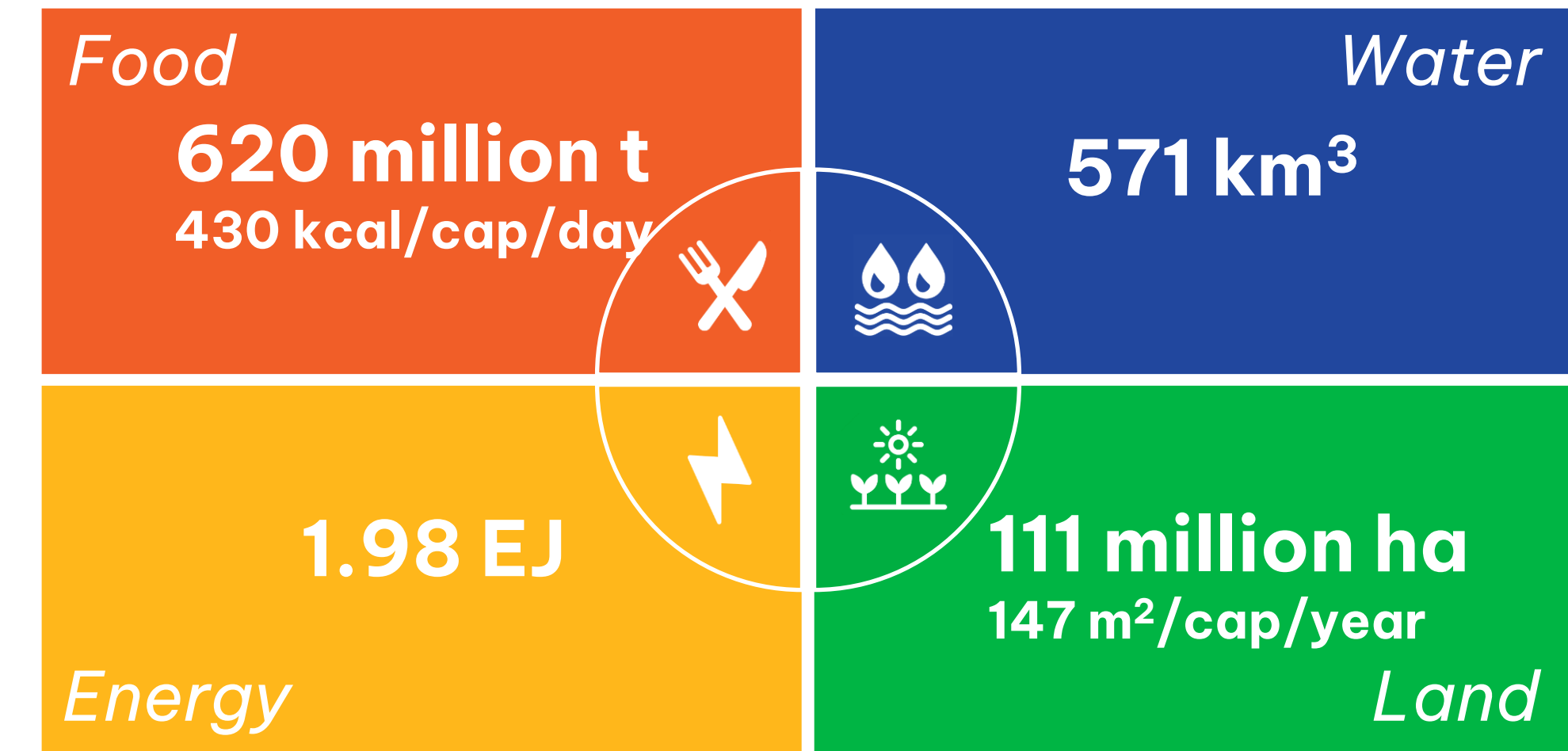
Francesco Semeria^{1,2} (francesco.semeria@polito.it), Giacomo Falchetta^{2,3}, Adriano Vinca², Francesco Laio¹, Luca Ridolfi¹, and Marta Tuninetti¹ ¹ Politecnico di Torino, Italy. ² IIASA, Austria. ³ CMCC, Italy.

Why is food loss & waste relevant?

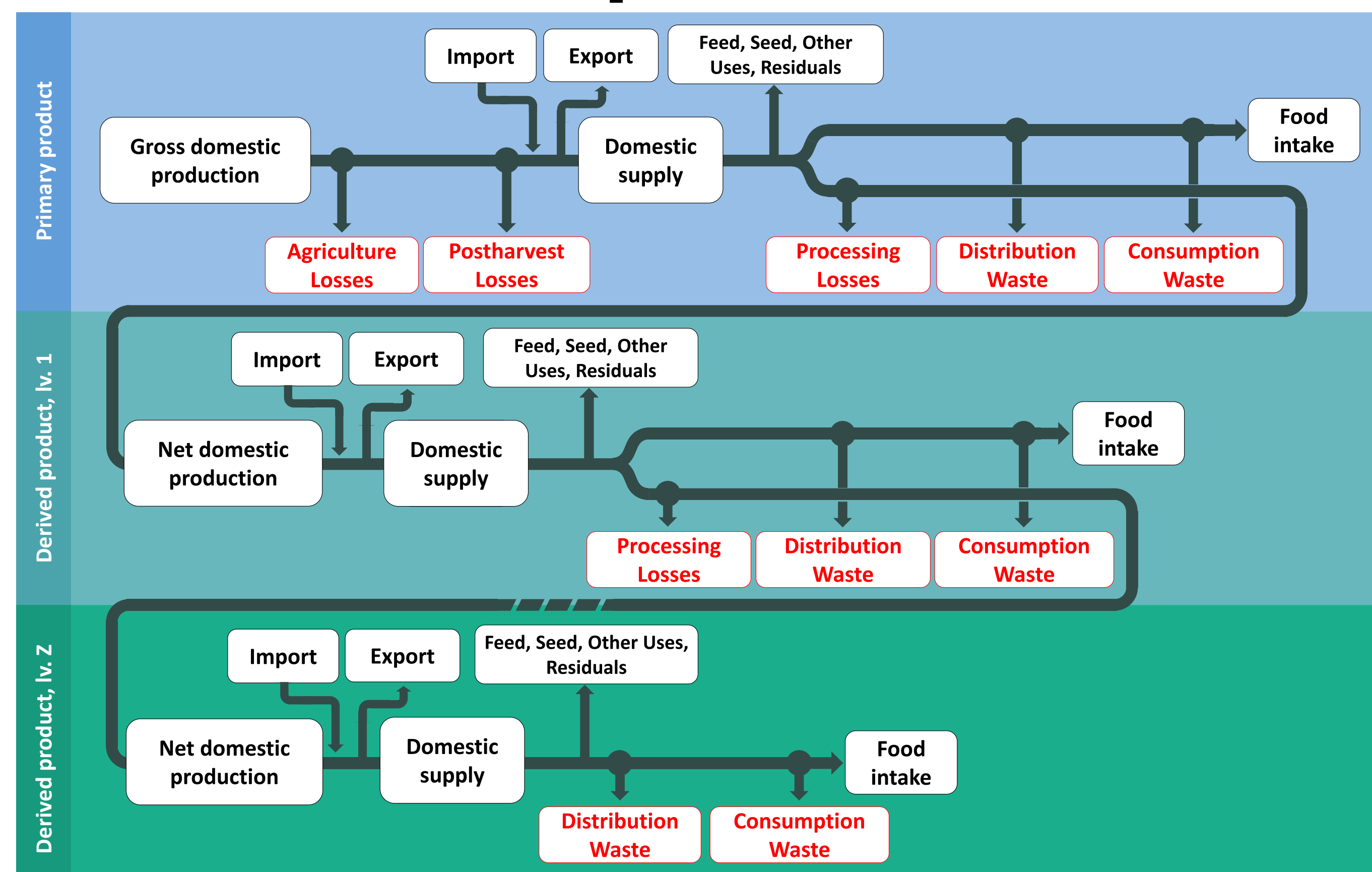
- **A world of contradictions.** While one in ten people is undernourished, around a third of the food is lost or wasted along the value chain.
- **Lost food, wasted resources.** Together with food loss & waste, we also lose about 23-24% of the *blue* water resources, cropland and fertilisers which are 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.

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).



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.

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.

