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Environmental Impacts of Food Waste in Europe and Priorities for Mitigation

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Life Cycle Assessment research group | *Agroscope*

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What we know about food waste (FW) ?



Around **129 kg** per person per year wasted in Europe[1]



FW environmental impact corresponds to **15%** of the impact of the entire food supply chain [2]



FW leads to a considerable **loss of nutrients** in human diets[3]



FW associated to an annual economic loss of around **€132 billion** [3]

Addressing the increasing rates of FW is a well-known political priority



SDG 12.3



EU Waste Framework Directive [5]



Action plans to reduce food waste

[1]Eurostat, 2026; [2]Scherhaufer et al. (2018); [3] Beuving et al. (2024); [4]European Commission, 2023; [5]Directive (EU) 2025/1892

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?

How can we identify the food categories where food waste **reduction actions should be prioritized** in Europe?

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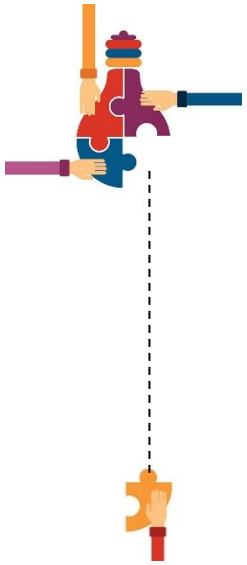
Aim of the work

To develop a **priority matrix** for identifying food categories on which FW prevention and reduction efforts should be prioritized in Europe



Limitations of existing literature

- FW mostly evaluated via mass or environmental value
- Limited environmental impact categories
- High-level food aggregation

.. and how we overcome them

- A combination of minimum 3 FW dimensions
- 16 environmental categories, via a single score
- 282 foods,18 food categories

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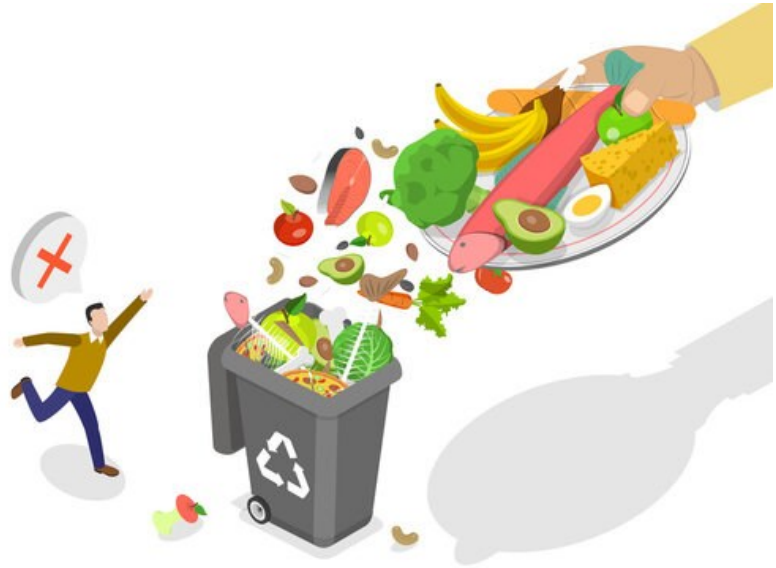
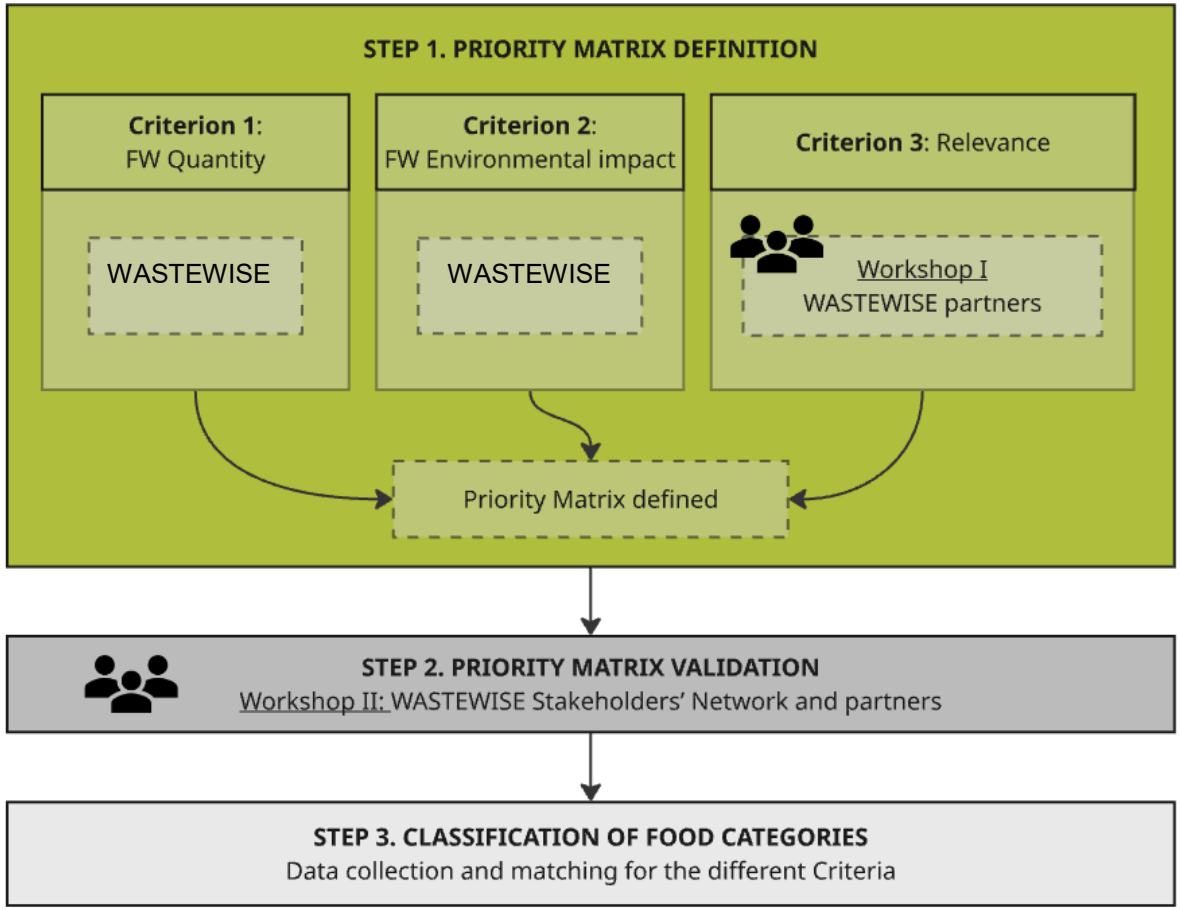
Methods



A 3-steps method



WORKSHOP I

Aim: to identify a set of indicators on "what relevance means" in the context of FW?

Participants: 21 stakeholders from 9 institutions

Output: 2 indicators

WORKSHOP II

Aim: to validate the matrix and assign relative importance to indicators

Participants: 22 stakeholders

Output: weighting factors for each indicator

DATA AVAILABILITY

EU27 as a proxy for Europe

Priority Matrix Structure

Stakeholders' weights

Food Waste **Quantity** (ton/*year*/*EU27*)	**Which food is wasted the most?** *FW quantities based on Eurostat data and adapted via the WASTEWISE dataset*	0.19
Food Waste **Environmental Impact** (*PEF score*/*year*/*EU27*)	**Which food has the largest environmental impact in terms of waste?**	0.38
Food Waste **Nutritional Value** (*NRF*/*year*/*EU27*)	**In which food category do we waste food of the highest nutritional quality?** *Via the Nutrient Rich Food Index - 14 qualifying nutrients*	0.26
Food Waste **Economic Value** (expenditure index/*year*/*EU27*)	**Across food categories, which food waste represents the highest cost?** *Household mean consumption expressed as a share of total household food expenditure (Eurostat data)*	0.18



4 relevant dimensions, aggregated into **a single priority** score*

*via mean of each category's percentage share of the total, summed to 100 across categories

A focus on Criterion 2 (Environmental Impact)



Impacts evaluated via Life Cycle Assessment

- Declared Unit = 1 kg of FW over a year
  - *Waste is not a function of food*

- System boundaries: from primary production, to processing, retail, restaurants & food services, and households

- Harmonised inventory: Minerva database [1]
  - *Assumption is 1 kg of food wasted = 1 kg of food produced + disposal*

- Impact assessment: 16 impact categories aggregated via Product Environmental Footprint score (PEF)[2] - *one person-year of average total environmental burden*

[1] Mérieux NutriSciences, Blonk & RIVM (2025); [2]Bassi et al., 2023

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Conclusions

LIMITATIONS

Results inherit uncertainties and limitations of the **used databases**

Prioritisation includes **unavoidable** FW



IMPACT

It clarifies the importance of FW **beyond food mass**, for policies

Different policy planners can focus on the **most relevant dimension(s)** in their context



NEXT STEPS

To replicate the use of the matrix **across countries and dietary contexts**



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Thank you for your attention