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Food waste: new model helps estimate current levels in all EU countries

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Food waste has serious economic, environmental, and social impacts. To meet the EU's commitment to reduce food waste by 2030 — accurate, baseline data are needed for all Member States (MS). This study considers two models for estimating food waste to assist the EU in identifying a consistent methodology for collating food-waste data by 2022 — to help defining mandatory targets outlined in the Farm to Fork Strategy[1].

By 2030 the UN's Sustainable Development Goal (SDG) 12.3 aims to 'halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains including post-harvest losses'[1]. The European Commission has committed to achieving this goal in the 2015 Circular Economy Action Plan, and again in the 2020 Farm to Fork Strategy[2]. To fight food waste, this study emphasises the importance of quantifying the current amount of food waste generated by EU MSs at each stage of the food supply chain. These data can then be used to design effective food-waste prevention strategies, and advise binding targets for halving the EU's food waste by 2030.

The EU will propose legally binding targets to reduce food waste by the end of 2023, using baseline data for from the year 2020, to be submitted by MSs in 2022. The researchers suggest that it is essential to have a consistent modelling system across the EU to estimate food waste generated by MSs — to centrally assess the amounts reported by each country — as EU MSs' national strategies for food-waste quantification vary greatly.

In order to accurately estimate food waste in each MS over time, this study considered two modelling approaches — one based on material flow analysis (assessing the flow and stocks of materials (such as food or water) within a given time and system); and the other on waste statistics (quantifying food waste based on statistics). For both approaches, the definition of food waste is aligned with that of the EU — including both edible and inedible parts of food. This study focused on Italy, Germany and Denmark to illustrate both approaches, with a comparison of the food waste obtained for these MSs in the year 2012[3].

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Food waste: new model helps estimate current levels in all EU countries (continued)

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The material-flow-analysis approach combines statistical information on the production and trade of food products with food-waste coefficients (i.e. waste as a percentage of the total input flow) from a number of sources — enabling calculation of food waste along the supply chain. The data sources for material flow analysis include the Food and Agriculture Organization's FAOSTAT, the EU's EUROSTAT, food industry associations and scientific literature. The definition of food waste for the material-flow-analysis model does not include crops left in the field ploughed in, or animals ready for slaughter that die prematurely — instead these are categorised as 'food losses'. At the manufacturing stage a distinction is made between production residues that are disposed of (classified as food waste) and those that are valorised as animal feed or for the production of non-food products (classified as by-products). To improve the robustness of the material-flow-analysis approach the researchers suggest that country-specific food waste coefficients should be collected.

The waste-statistics approach quantifies food waste based on those submitted to Eurostat by MSs. As food waste isn't listed separately as a European Waste Category, an equation is used to estimate the amount leftover food contained within three different waste categories — animal and mixed food, vegetal and household and similar wastes.

The analysis, using both approaches, found that the waste-statistic approach produced lower estimates than the material flow analysis, particularly for the early stages of the food chain — with results between 87–98% lower across the three countries. The researchers suggest that this large difference in early-stage results is because waste statistics do not include food waste generated in primary production — as much of this is very likely disposed of on-site, via composting and anaerobic digestion.

A similar pattern was seen at the processing stage, but the difference was smaller. However, irrespective of the model, the dominant role of food waste at the household and food services' consumption stage is present in both approaches.

The material-flow-analysis model presents a detailed picture of the food system — providing a breakdown of food-waste estimates at each stage of the food supply chain and per food group — allowing identification of critical food groups and stages. This level of detail assists the design of tailored food-waste prevention actions. The model has the potential to be used to assess the data on food waste that will be reported by MSs in the coming years — and this could support the definition of a baseline and binding targets to reduce food waste across the EU, as announced in the EU's Farm to Fork Strategy.

1. The Food and Agriculture Organization's definition of post-harvest losses is '…a measurable quantitative and qualitative loss in a given product. These losses can occur during any of the various phases of the post-harvest system'. Post-harvest food loss occurs as a result of crop spillage and/or pest attack, and from bacteria, fungi, and yeasts etc., which affect perishable food crops such as fruit and vegetables; environmental factors such as temperature and humidity can also affect crops,

2. For more information see: https://ec.europa.eu/food/food/food-waste/eu-actions-against-food-waste/food-waste-measurement_en

3. More information on the material-flow-analysis model applied to other MSs can be found here.