Training

**Food losses and food waste measurement,
reporting and analysis**

16 November 2021

CONTEXT

The universal *2030 Agenda* adopted by the United Nations Member Countries in 2015 launched Sustainable Development Goal (SDG) 12 on production and consumption with target 12.3: "by 2030, halve per capita global food waste at the retail and consumer levels and reduce Food Loss along production and supply chains, including postharvest losses."

Achieving SDG 12.3 requires state and non-state coordination and collaboration for advancements in food losses and food waste (FLW) measurement, data monitoring, and reporting as well as analysis of FLW levels, types, socio-economic and environmental impacts to feed coherent policy development. National data availability and quality for food losses (i.e. from production up to but excluding retail) and food waste (i.e. from retail to households) should be improved through the identification of critical loss and waste points provided by analyses of food supply chains operations, households' food waste generation, and statistical surveys.

Better FLW data can support investment decisions that generate significant returns and drive behaviour change for food systems actors, including consumers. Monitoring and reporting for SDG 12.3 is vital to achieving other SDGs too, such as SDG 2 (zero hunger). A data collection and analysis strategy is central and should coordinate and optimize efforts of integration and aggregation for different levels and sources.

The FAO Multi-partner Programme Support Mechanism Project "Sustainable, resilient and inclusive food systems development" (FMM/GLO/131/MUL) is part of the comprehensive Europe and Central Asia regional programme on food losses and waste prevention and reduction. Among the other countries in the region, for instance, Ukraine and Moldova have also been included in capacity development workshops, focused on the Food Loss Index, under the FAO Regional Technical Co-operation Project "Strategies for Food Loss and Waste Reduction" (TCP/RER/3702) and the FAO Multi-partner Programme Support Mechanism (FMM) Project "Sustainable, resilient and inclusive food systems development" (FMM/GLO/131/MUL).

PARTICIPANTS

The webinar is open to all state and non-state stakeholders with an interest in food losses and food waste prevention and reduction from the Europe and Central Asia region.

WEBINAR CONTENT

The webinar will focus on the following topics:

a. National Food Loss Index (i.e. from production up to but excluding retail);
b. EX-Ante Carbon-balance Tool for value chains (EX-ACT VC) for food losses impact analysis;
c. The FAO case studies method for critical loss points identification and analysis (i.e. from production to retail);
d. National Food Waste Index (i.e. from retail to households);
e. EU methodology for quantifying food waste (i.e. from production to households);
f. The FLW Protocol and Standard (i.e. from production to food services and households);
g. Overview of quantification and reporting methods applicable from wholesale to household food waste, including HoReCa sector.

National Food Loss and Food Waste Indices

SDG 12.3 has two components, food losses and food waste, which are measured using two separate indicators: The Food Loss Index (SDG 12.3.1a) focusing on '*reduction of losses along the food production and supply chains*' (i.e. supply side) and the Food Waste Index (SDG 12.3.1b) targeting '*halving per capita global food waste at the retail and consumer level*' (i.e. demand side).

The National Food Loss Index – SDG 12.3.1.a, from production up to but excluding retail

Indicator 12.3.1.a - Food Loss Index (FLI) and the aggregate Global Food Loss Index (GFLI) - is a statistical indicator measuring food losses from farm up to and excluding the retail level.

In 2019, FAO addressed the challenge of establishing the global food loss definition. The food loss definition includes the inedible parts of foodstuffs, thus allowing statistical reporting. The Indicator 12.3.1.a that tracks food losses (i.e. supply driven) is defined as 'the percentage of food quantities removed from the supply chain'. The full food loss definition[20] adopted for SDG 12.3.1.a is:

Food losses are all the crop and livestock human-edible commodity quantities that, directly or indirectly, completely exit the post-harvest/slaughter production/supply chain by being discarded, incinerated or otherwise, and do not re-enter in any other utilization (such as animal feed, industrial use, etc.), up to, and excluding, the retail level. Losses that occur during storage, transportation and processing, also of imported quantities, are therefore all included. Losses include the commodity as a whole with its non-edible parts.

Source: FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome. Licence: CC BY-NC-SA 3.0 IGO.

Indicator 12.3.1.a - Food Loss Index (FLI) and the aggregate Global Food Loss Index (GFLI) - is a statistical indicator measuring food losses from farm up to and excluding the retail level. FAO developed the methodology, guidelines and tools that help countries through step-by-step approach for the entire reporting process, including data collection, assessment and computation of results.[1]

Indicator 12.3.1.a is an index with base 100 which measures the changes over time in structural losses along the food supply chain, for a basket of 10 main commodities, compared to a base period.

FAO has developed a two-pronged approach to address data scarcity by providing:

- a complete methodological and technical assistance package with a set of guidelines and training material on loss data collection and estimation; how to:
  (a) cost-effectively collect and estimate;
  (b) select methods and tools for the different data collection points;
  (c) achieve representative and robust data suited for monitoring purposes,
  (d) combine data sources and prioritize efforts, and
  (e) aggregate food losses at the farm, transport, storage, industry and wholesale stages.

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[1] The 12.3.1 methodology has been proposed at the Seventh International Conference on Agricultural Statistics (ICAS-VII) in Rome in October 2016, at the FAO External consultation on the Measurement of Food Losses and Waste in September 2017 and has been further refined in collaboration with experts and stakeholders.

- *Statistical* tools to quantify and analyse FLW (e.g. sample surveys, Supply Utilization Accounts and Food Balance Sheets[2], Food Loss Index[3]) and *non-statistical* tools (e.g., field case study methodology for FLW analysis)[4].
- A food loss imputation model to estimate food losses in the absence of measured data: the econometric model was developed first for estimating losses internationally using the scarce loss data in FAO's Food Balance Sheets as reported by countries and factors found in literature. The estimation model is meant to be a placeholder, while countries improve data collection on food losses for the Country Food Loss Index (FLI).

In 2019, FAO released the first global estimates for the *Food Loss Index* (i.e. SDG 12.3.1.a -Sub-indicator) stating that 13.8 percent of all food produced in 2016 was lost – these estimates are of physical quantities for different commodities aggregated by an economic weight – from the farm up to, but excluding, the segment from retail to households.

The National Food Waste Index – SDG 12.3.1.b, from retail to households

The Food Waste Index (Indicator 12.3.1.b), tracking progress from retail to consumer level (i.e. demand driven), is technically supported by the FAO and led by the UN Environment. It measures tons of wasted food per capita, considering a mixed stream of products from processing to consumption.

For the purposes of the Food Waste Index, "food waste" is defined as food and the associated inedible parts removed from the human food supply chain in the following sectors: Retail, Food service, Households "Removed from the human food supply chain" means one of the following end destinations: landfill; controlled combustion; sewer; litter/discards/refuse; co/anaerobic digestion; compost / aerobic digestion; or land application.

Food is defined as any substance – whether processed, semi-processed or raw – that is intended for human consumption. "Food" includes drink, and any substance that has been used in the manufacture, preparation or treatment of food. Therefore, food waste includes both: "edible parts": i.e., the parts of food that were intended for human consumption, and "inedible parts": components associated with a food that are not intended to be consumed by humans. Examples of inedible parts associated with food could include bones, rinds and pits/stones.

Source: Food Waste Index Report 2021

In 2021, the Food Waste Index was published for the first time by UN Environment stating that "around 931 million tons of food waste were generated in 2019, 61 per cent of which came from households, 26 per cent from food service and 13 per cent from retail. This suggests that 17 per cent of total global food production may be wasted (11 per cent in households, 5 per cent in food service and 2 per cent in retail)."

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[2] http://www.fao.org/economic/ess/fbs/en/
[3] http://www.fao.org/sustainable-development-goals/indicators/12.3.1/en/
[4] FAO, 2016. Food loss analysis: causes and solutions, case studies in the small-scale agriculture and fisheries subsectors. Methodology, November 2016. Rome, Food and Agriculture Organization of the United Nations. (Unpublished)

The 2016 estimates, around 88 million tons, reveal that 70% of European Union (EU) food waste comes from household sectors, catering and retail, while production and processing sectors represent the remaining 30%. However, the project that generated these numbers also identified significant gaps in data availability and quality (Stenmarck et al., 2016)[5].

The Directive (EU) 2018/851 established a food waste definition, methodologies for quantification, and the reporting requirements for all 28 Members of the EU that will have to report their food waste baseline in 2022. At the same time, the Member States of the EU are part of the UN and implement and monitor the SDGs. In 2018, the Directive (EU) 2018/851that amends Directive 2008/98/EC on waste (the Waste Framework Directive) and provides the legislative framework for the collection, transport, recovery, and disposal of waste was issued for all EU Member States.

According to the Directive (EU) 2018/851, *food waste* means all food (i.e. both edible and not intended to be eaten parts)—as defined in Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council—that has become waste (i.e. which the holder, in this case a food business operator or household) discards or intends or is required to discard.

Food waste monitoring and the need for EU increased transparency concerning food waste data[6] are being addressed through various EU initiatives (e.g. Code of Conduct for Responsible Business and Marketing Practices). Eurostat (ESTAT), Statistical Office of the European Communities, clarifies that food waste measurement at EU level[7], which is based on mass flow analysis and was developed by the Joint Research Centre (JRC) of the European Commission, will be utilised by the Commission as a complementary method to compare the food waste amounts reported by Member States.

Launched in 2016, the *FLW Protocol and Standard* can be used by private sector actors to develop an inventory based on their quantification goals. FLW data can also be interpreted through the FLW Value Calculator that can estimate the value of FLW in terms of nutritional and environmental impacts.[8] Food business operators' case studies that have applied the *FLW Protocol and Standard* demonstrated that returns on investment are significant.

The *"Food Loss Analysis" case study methodology* was developed by FAO. It identifies the critical loss points in the selected food chains (i.e., the supply chain stages at which most loss occurs), why loss occurs, and the economic, social and environmental implications. It also includes assessing the feasibility of potential interventions to reduce the loss at the identified critical loss points.

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[5] Stenmarck, Åsa & Jensen, Carl & Quested, Tom & Moates, Graham. (2016). Estimates of European food waste levels. 10.13140/RG.2.1.4658.4721.

[6] EU Food waste measurement page: https://ec.europa.eu/food/safety/food_waste/eu_actions/food-waste-measurement_en

[7] Patinha Caldeira, C., De Laurentiis, V., Corrado, S., Holsteijn, F. and Sala, S., Quantification of food waste per product group along the food supply chain in the European Union: a mass flow analysis, Resources Conservation and Recycling, ISSN 0921-3449, 149, 2019, p. 479-488, JRC112843.

[8] Available at: http://flwprotocol.org/why-measure/food-loss-and-waste-value-calculator/

Countries could consider separating food waste from overall organic waste (i.e. food and green waste) when conducting regular waste composition analyses of Municipal Solid Waste (MSW) and estimate the food waste fraction of MSW (e.g. World Bank 'What a Waste 2.0); food waste studies literature; waste compositional analysis from direct measurements; food waste diaries (e.g. bio-waste/food thrown away in the sewer/home composting); mass balance (under certain conditions); for retail: waste compositional analysis; direct measurement; counting/scanning; interviews and surveys.

The EX-Ante Carbon Balance Tool for Value Chains

The Ex-Ante Carbon balance tool for Value Chains (EX-ACT VC), developed by FAO is a multi-appraisal system that evaluates the environmental and socio-economic performance of agri-food value chains, encompassing production, processing, storage, packaging and transportation up to the retailer level. It estimates greenhouse gas (GHG) emissions, food losses, value-added, income, and employment generated for each actor and activity of the value chain, using Intergovernmental Panel on Climate Change (IPCC) methodology, FAO's Global Food Loss Index, and standard micro-economic accounting, and macro-level frameworks on national accounts.

EX-ACT VC tool provides decision support to design (ex-ante) and evaluate (ex-post) agri-food VC projects and policies by comparing a 'current' scenario with baseline information and a 'planned' scenario involving a future vision or goal.

The tool provides stakeholders operating at multiple levels a cost-effective, consistent, and transparent framework to evaluate sustainability of agri-food VCs regardless of their context, size, geography.

EXPECTED RESULTS

Participants are informed on the topic of food loss and food waste measurement, reporting, and socio-economic and environmental impacts. The training is action-oriented towards how to transfer FLW data into state and non-state decisions concerning actions for prevention and reduction, including cost-benefit analyses and guidance on investments.

PROGRAMME

Registration link: https://fao.zoom.us/webinar/register/WN_lKp-xP6OTeyB3DgqDkbxMg

09:00 – 09:15	**Registration**	
Group photo ONLINE		
09:15 – 09:30	**Opening remarks**	FAORs
09:30 – 09:45	**Food loss and waste in Europe and Central Asia – an overview of the regional approach**	FAO REU
09:45 – 10.15	**Food Loss Index**	FAO ESS
10:15 – 10:30	**Country example - Moldova**	Georgeta Mincu, National Consultant on Food Loss and Waste, FAO Moldova
10:30 – 10:45	**Coffee break**	
10:45 – 11:10	**The EX-ACT Carbon Balance Tool (EX-ACT)** applied to food loss reduction and socio-economic linkages	FAO ESA
11:00 – 11:15	**Country example for EX ACT applied to food losses in Ukraine**	Natalia Gerasymenko, National Consultant - Value Chain / Food Loss and Waste, FAO Ukraine
11:15 – 11:30	**Food Loss Analysis (FLA) case study methodology**	Myriam Annette, International Consultant Food Loss and Waste Reduction, FAO Regional Office for Europe and Central Asia
11:30– 12:00	Questions and answers	FAO REU
12:00 – 13:30	**Lunch break**	
Group photo ONLINE		
13:30 – 14:00	**Food Waste Index – overview and regional focus**	Clementine O'Connor, Programme Officer - Sustainable Food Systems, Energy and Climate Branch Economy Division, United Nations Environment Programme (UNEP)
14:00 – 14:30	**European Union methodology for quantifying food waste from production to households**	Bartosz Zambrzycki, Food Waste Team, Farm to Fork Strategy (DG SANTE D1), European Commission (EC)
14:30 – 15:00	**FLW Protocol and Standard – overview and regional focus**	Brian Lipinski, Associate II, World Resources Institute (WRI)
15:00 – 15:30	**A standardized food waste measurement methodology in the hospitality and food service sectors**	Thomas Candeal, Project manager, International Food Waste Coalition (IFWC)
15:30 – 15:45	**Coffee break**	
15:45 – 16:00	**Food loss and food waste data: linkages between measurement, reporting, results analysis for investments and policy development**	Camelia Bucatariu, International Consultant - Food Loss and Waste Analyst, FAO Regional Office for Europe and Central Asia
16:00 – 16:30	**An overview of challenges and opportunities for consumers' food waste prevention and reduction**	Katerina Antanevich, International Consultant Sociologist in Food Supply Chain and Consumption, FAO Regional Office for Europe and Central Asia
16:30 – 16:45	Questions and answers	FAO REU
16:45 – 17:00	Conclusions and next steps	FAO REU

Resources

FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome. Licence: CC BY-NC-SA 3.0 IGO.

Global Panel. 2018. Preventing nutrient loss and waste across the food system: Policy actions for high-quality diets. Policy Brief No. 12. London, UK: Global Panel on Agriculture and Food Systems for Nutrition.

EX-Ante Carbon-balance Tool for value chains | EX-ACT VC supports policy makers in identifying off-farm sources of GHG emissions and farm-to-retail socio-economic benefits when designing projects and policies for low carbon value chains. Available at: http://www.fao.org/in-action/epic/ex-act-tool/overview/en/

Food Loss Analysis (FLA) case study methodology. FAO. 2018. Available at: https://elearning.fao.org/course/view.php?id=374

United Nations Environment Programme (2021). Food Waste Index Report 2021. Nairobi.

EU Platform on Food Losses and Food Waste. Available at: https://ec.europa.eu/food/safety/food-waste/eu-actions-against-food-waste/eu-platform-food-losses-and-food-waste_en

Food Loss and Waste Accounting and Reporting Standard. Available at: https://flwprotocol.org/

Education material package on food waste reduction in primary and secondary schools. FAO. 2018. Available at: https://www.fao.org/publications/card/en/c/CA1475EN/

The Food and Agriculture Organization of the United Nations (FAO) and the International Food Waste Coalition (IFWC) Do Good: Save Food! education package. 4 versions for the 5-7, 8-9, 10-13 and 14+ age groups. Available at: http://www.fao.org/3/CA1475EN/ca1475en.pdf

Collaboration Guide Do Good: Save Food! The collaboration guide outlines the key stages for implementing a collaboration project to reduce waste in schools. The guide helps canteen and kitchen staff, teaching staff, local producers, local authorities, school management and the parents of pupils to mobilise and work together to reduce food waste. Available at: https://internationalfoodwastecoalition.org/wp-content/uploads/2020/11/IFWC_CollaborationGuide_Eng.pdf