



Food and Agriculture
Organization of the
United Nations



Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 41: Total annual volume of food losses & waste

MUFPP framework of actions' category: Food waste

The indicator measures (decrease in) total annual volume of food losses & waste.

Overview table

MUFPP Work stream	Food waste
MUFPP action	<p>Convene food system actors to assess and monitor food loss and waste reduction at all stages of the city region food supply chain, (including production, processing, packaging, safe food preparation, presentation and handling, re-use and recycling) and ensure holistic planning and design, transparency, accountability and policy integration.</p> <p>Raise awareness of food loss and waste through targeted events and campaigns; identify focal points such as educational institutions, community markets, company shops and other solidarity or circular economy initiatives.</p>
What the indicator measures	Total annual volume of food losses & waste
Which variables need to be measured / what data are needed	<p>-Food waste generated at system stages:</p> <ul style="list-style-type: none"> • Production • Handling and storage • Handling and storage • Distribution and point of purchase • Household/ consumption <p>- Types of food wasted</p> <p>-Edible vs inedible food</p> <p>-Destinations of food waste (landfill, composting, redistribution, etc.)</p>
Unit of measurement (i.e. Percentages, averages, number, etc.)	Tonnes or Kilograms of food waste
Unit(s) of Analysis (i.e. people under 5 years old, etc.)	Weight of food entering municipal waste stream
Possible sources of information of such data	<p>- Municipal waste management department</p> <p>- Private haulage companies</p>

Possible methods/tools for data-collection	Sampling and weighing
Expertise required	No specific expertise is required to operate a weighing device and record the results.
Resources required/estimated costs	Weighing can be costly if an entity is weighing food loss and waste from more than one location. In addition to the initial purchase or rental of a weighing device, transport of the device and personnel can be cost-prohibitive, particularly in areas with poor vehicular access. The main constraints on weighing, however, are logistics and feasibility rather than cost ¹ .
Specific observations	
Examples of application	The Natural Resources Defense Council describes the results of a food waste baseline assessment study in three U.S. cities—Denver, Nashville, and New York City—for residential and non-residential sectors, including the industrial, commercial and institutional sectors. The intent of the study was to characterise the amount of food that is wasted in these cities, identify some of the reasons why the food is going to waste, and then use that data to help inform and inspire initiatives to prevent wasting food, to rescue surplus food to benefit people in need, and to recycle food scraps. Outputs from the study not only include the results of the research, but also templates and descriptions of the methodologies in hopes that this study will contribute to a working model for other cities to perform similar assessments ² .

Rationale/evidence

A significant share of food grown for human consumption is never eaten. It is estimated that one third, by weight, of all food produced in the world was lost or wasted in 2009. This equates to US\$940 billion per year in economic losses and is linked to approximately one quarter of all water used by agriculture³. Food is lost or wasted throughout the supply chain, from production to household consumption. Food waste that rots in landfills emits harmful greenhouse gases. Target 12.3 of the United Nations Sustainable Development Goals calls for the halving of per capita global food waste by 2030.

Cities are key players because they are responsible for solid waste services and have economic, social and sustainability goals that food waste solutions can support. Many cities have analysed the types of materials that end up in the waste stream, few have done comprehensive food waste assessments, especially at the household level. Local governments need further data on the types of food that ends up in the waste stream, what proportion is edible versus inedible and why the food is wasted. This lack of information and the variations in methodologies are barriers to developing strategies to reduce food loss and waste. The World Resources Institute has developed a comprehensive “Food Loss and Waste Accounting and Reporting Standard” to facilitate the quantification of food loss and waste (FLW) and encourage consistency and transparency of the analyses⁴.

Glossary/concepts/definitions used

Food Loss and Waste: All edible and inedible parts that are discarded or wasted.

¹ World Resources Institute (2017). Guidance on FLW Quantification Methods: Supplement to the Food Loss and Waste (FLW) Accounting and Reporting Standard, Version 1.0. Available from http://flwprotocol.org/wp-content/uploads/2017/06/FLW-Protocol_Guidance-on-FLW-Quantification-Methods.pdf.

² Natural Resources Defense Council (2017). Estimating Quantities and Types of Food Waste at the City Level. Available from <https://www.nrdc.org/sites/default/files/food-waste-city-level-report.pdf>.

³ FAO (2011). Global food losses and food waste: Extent, causes and prevention. Rome. <http://www.fao.org/docrep/014/mb060e/mb060e00.pdf>

⁴ World Resources Institute (2017). Food Loss and Waste Accounting and Reporting Standard. Available from https://www.wri.org/sites/default/files/REP_FLW_Standard.pdf.

Food: Any substance that is intended for human consumption. This includes beverages and any substance that has been used in the manufacture, preparation, or treatment of food. “Food” also includes material that has spoiled and is therefore no longer fit for human consumption.

Inedible Parts: Components associated with food that, in a particular food supply chain, are not intended to be consumed by humans. Examples of inedible parts associated with food could include bones, rinds, and pits/stones. “Inedible parts” do not include packaging. What is considered inedible varies among users (e.g., chicken feet are consumed in some food supply chains but not others), changes over time, and is influenced by a range of variables including culture, socio-economic factors, availability, price, technological advances, international trade, and geography.

Destination: Where material removed from the food supply chain is directed, such as landfill, animal feed, composting, etc.

Preparations

A meeting should be organised with all staff who will be involved in this activity to:

- Familiarise them with food loss and waste assessments
- Agree on the objectives and scope of the analysis and data collection requirements
- Define the methodology to be applied for data collection and analysis, and
- How to coordinate the activities.

Sampling:

In many instances it will be impractical to weigh all the Food Loss and Waste (FLW), in which case a sample of FLW should be taken and weighed. Sampling is the process of choosing to measure or approximate, over a given period of time, the amount of FLW from a subset of FLW-producing units within a population, or from a fraction of the physical FLW produced. An entity may undertake both these types of sampling, which involve the following.

Selecting a representative sample impacts the accuracy of the data. It is important that the sample of FLW is as representative as possible of all units and all FLW in the population. There are two main approaches to sampling FLW-producing units, which differ in how well the data produced represents all units. The approaches are “probability” and “non-probability” sampling. In probability sampling, all FLW-producing units in the population stand a known and equal chance of being selected, thus produce a random sample that can statistically represent the characteristics of the whole population being studied. In non-probability sampling, the likelihood of any one FLW-producing unit being selected is often not known (e.g., sometimes because the exact size and nature of the population from which the sample will be drawn are not fully understood). Non-probability samples are less reliable indicators of the characteristics of the whole population. For further guidance, see Appendix A “Approaches to Sampling and Scaling Up Data” in the Loss and Waste Accounting and Reporting Standard (World Resources Institute, 2017).

Data Collection and Analysis

WRI’s Food Loss and Waste Accounting and Reporting Standard⁵ provides detailed steps for data collection methods and data analyses. Please refer to the following resources for further clarification:

- Chapter 8: Collecting, Calculating, and Analysing Data
- Chapter 11: Recording Causes of Food Loss and Waste

⁵ World Resources Institute (2017). Food Loss and Waste Accounting and Reporting Standard.

For a clear language step by step guide to residential household waste assessment, see Chapter 3 of NRDC's Estimating Quantities and Types of Food Waste at the City Level. Chapter 4 provides an overview of industrial, commercial and institutional waste assessments.

References and links to reports/tools

Eurostat (2012). Guidance on municipal waste data collection.

World Resources Institute (2017). Food Loss and Waste Accounting and Reporting Standard. Available from https://www.wri.org/sites/default/files/REP_FLW_Standard.pdf.

World Resources Institute (2017). Guidance on FLW Quantification Methods: Supplement to the Food Loss and Waste (FLW) Accounting and Reporting Standard, Version 1.0. Available from http://flwprotocol.org/wp-content/uploads/2017/06/FLW-Protocol_Guidance-on-FLW-Quantification-Methods.pdf.

WRAP Cymru (2016). National municipal waste compositional analysis in Wales.



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Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 42: Annual number of events and campaigns aimed at decreasing food loss and waste

MUFPP framework of actions' category: Food waste

The indicator collects information on the types of activities (events, campaigns, research studies), targeted sectors (households, business, foodservice, manufacturing, production etc.) and -if applicable-the actual impact on food waste reduction.

Overview table

MUFPP Work stream	Food waste
MUFPP action	Convene food system actors to assess and monitor food loss and waste reduction at all stages of the city region food supply chain, (including production, processing, packaging, safe food preparation, presentation and handling, re-use and recycling) and ensure holistic planning and design, transparency, accountability and policy integration. Raise awareness of food loss and waste through targeted events and campaigns; identify focal points such as educational institutions, community markets, company shops and other solidarity or circular economy initiatives.
What the indicator measures	Annual number of events and campaigns aimed at decreasing food loss and waste
Which variables need to be measured / what data are needed	<ul style="list-style-type: none"> ▪ Types of activities (events, campaigns, research studies) ▪ Targeted sectors (households, business, foodservice, manufacturing, production etc.) ▪ If applicable: the impact on food waste reduction in kg
Unit of measurement	Annual number of events and campaigns
Unit(s) of Analysis	Data disaggregation by type of activity and target audience
Possible sources of information of such data	<ul style="list-style-type: none"> - Civil society annual reports - Annual reports of organizations that implement recovery and redistribution of safe and nutrition food for direct human consumption - Lifelong learning / education institutions - Records from solid waste or environmental departments or external stakeholders supporting events and campaigns
Possible methods/tools for data-collection	<ul style="list-style-type: none"> - Analysis of records for the actions taken - Survey among relevant stakeholders

Expertise required	Data analysis, survey design and implementation
Resources required/ estimated costs	Desk study resource allocation
Specific observations	To the extent possible the actual impacts in terms of food waste or food loss reduction should be highlighted. This will ultimately support assessment of the use and effectiveness, and cost-benefits, of the events and campaigns.
Examples of application	Measuring the Impacts of a Campaign to Reduce Food Waste on Campus in Thailand. This study took place in two dining halls at a large university during the fall 2016 semester ¹ .

Rationale/evidence

A significant share of food produced for human consumption is never eaten. The Food and Agriculture Organization of the United Nations (FAO) estimates that a third, by weight, of all food produced in the world was lost or wasted in 2009. This level of inefficiency has significant economic, social, and environmental impacts. According to FAO estimates (FAO, 2014) the societal costs of a third of the food production getting lost or wasted each year amounts to about USD 2.6 trillion, of which USD 700 billion are societal costs of environmental impacts, USD 1 trillion are costs from economic losses of wasted and lost production, and USD 900 billion are costs due to individual well-being losses. This exacerbates the pressure on the global food system to ensure food security and nutrition for all. The amount of food lost or wasted translates into about a quarter of all water used by agriculture, and it requires cropland equivalent to an area the size of China, while being responsible for an estimated 8% of global greenhouse gas emissions. The wasted and discarded edible parts as well as the inedible parts associated with food (e.g., bones, rinds, pits/stones) take up space in landfills and contribute to increased management costs and greenhouse gas emissions during decomposition.

Many countries, cities, companies, and other entities can improve insight into how much, why, and where food and/or associated inedible parts are removed from the food supply chain. Achieving the Sustainable Development Goals is engaging all actors of the global food system. SDG 12.3 - *By 2030, 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.*

Improved access to information and data availability in the public domain can:

1. Support strategies and prioritise actions to prevent food loss and waste
2. Identify the most efficient ways to prevent safe and nutritious food to be lost or wasted
3. Identify the context-based alternative – for when the resource becomes waste,

And thus help improve the design and targeting of food loss and waste campaigns and events.

For example, the Ontario Food Collaborative (OFC) in Canada is a cross-municipal collaboration to establish a multi-stakeholder strategy for reducing food waste in the Region, which resulted in the approval of a strategic plan of action in 2016. The Ontario Food Collaborative brings together stakeholders to take a holistic food systems approach in supporting individuals and families to reduce food waste. The OFC actors include Government (all levels), Non-Government Organisations (NGOs), Food Producers (Farmers), Food Processors/Manufacturers, Distributors and Retailers, and Restaurants/Food Services. Studies done by the Value Chain Management Centre, Food Waste in Canada (November 2010) and the 'York Region Integrated Waste Management Master Plan 2013' show that 40% of food produced and sold in Canada is wasted (valued at CAD 31 billion), with 51% of food waste in Canada occurring at home. Data are also available on the main sources of food waste in different parts along the supply chain. Household food waste results in economic losses of about CAD 1,500 per year for each Canadian household (equalling one quarter of the average household food

¹ <http://www.fao.org/save-food/regional/asiapacific/en/>

budget). In York Region, approximately 20% of the food wastage at home could be avoided by improved practices (based on York Region audit data). As part of their Waste Management Master Plan, the York Region has targeted a 15% reduction in avoidable food waste by 2031. The Environmental Services Department has developed a communications strategy and public education campaign to help residents take action to reduce food waste. The campaign was based on market research conducted by York Region amongst leading grocery stores to understand consumers' motivations regarding food purchasing, preparation, and waste; and to gather feedback and opinions on food waste and education².

Glossary/concepts/definitions used

Food Loss and Waste (FLW): All edible and inedible parts that are discarded or wasted.

FAO (2014) defines **food loss** as 'the decrease in quantity or quality of food'. It refers to agricultural, livestock, fisheries or forestry products intended for human consumption that are ultimately not eaten by people or that have incurred a reduction in quality reflected in their nutritional value, economic value or food safety.

An important part of food loss is '**food waste**', which refers to the discarding or alternative (non-food) use of food that was fit for human consumption – by choice or after the food has been left to spoil or expire as a result of negligence (FAO, 2014).

Recovery of safe and nutritious food for human consumption is to receive, with or without payment, food (processed, semi-processed or raw) which would otherwise be discarded or wasted from the agricultural, livestock, forestry and fisheries supply chains of the food system.

Redistribution of safe and nutritious food for human consumption is to store or process and then distribute the received food pursuant to appropriate safety, quality and regulatory frameworks directly or through intermediaries, and with or without payment, to those having access to it for food intake. (FAO, 2015)

Preparations

The team responsible for monitoring this indicator should agree on the type of data disaggregation and categories that will be used and the data collection method.

Sampling

Given that food loss and waste events and campaigns are still a new area, it is unlikely that sampling will be needed.

Data Collection and Analysis

During a monitoring/review meeting the following table can be discussed and filled. Specific observations made during the meeting can be added in the final column. Also recommendations for improvement can be added here.

Scoring sheet

² Gianfelici et al, 2016. York, Canada: The Ontario Food Collaborative-A city region initiative for preventing and reducing food waste. In: Dubbeling M., C. Bucatariu, G. Santini, C. Vogt and K. Eisenbeiß, 2016. *City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development*. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016> and <http://www.fao.org/3/a-i6233e.pdf>.

Characteristics	Scoring			Total score	Disaggregation of information	Observations / Recommendations
Presence of annual events and campaigns aimed at decreasing food loss and waste	Yes= 1 point	No= 0 points			Number and type of events and campaigns	
Intended Audiences: -Consumer households -Schools/hospitals/public institutions -Private sector in the food chain (producers, processing, retail, catering) -Other private sector (offices) -Other	Yes, consumer households= 1 point	No consumer households= 0 points			Number and types of groups targeted for events and campaigns	
	Yes, schools/Hospitals/public institutions= 1 point	No schools/hospitals= 0 points				
	Yes, private sector food chain= 1 point	Yes, private sector food chain= 1 point				
	Yes, other private sector= 1 point	No, other private sector= 0 point				
	Other (sub)categories= 1 point	No other (sub)categories= 0 points				
Impact in terms of food waste reduction	Yes= 1 point	No= 0 points			Data on actual impact in Kg or % food loss and waste reduction	
Design of events and campaigns is based on actual information on food loss and waste and stakeholder surveys	Yes, Completely= 2 points	Partial ly, 1 point	No=o points		-Type of information and data used and how this was used -Type of questionnaires and the no. of replies received from participants (e.g. are participants able to identify the main causes and solutions to food loss and waste? Are they able to willing/able to implement actions to reduce loss and waste?	
Total score:						

Note: For the purposes of these guidelines certain qualifiers and scoring points are defined in the scoring sheet above as to determine an overall score or value of the indicator. Nevertheless, for certain cities some of the qualifiers or scoring levels will be more crucial than others to determine the score of the indicator. Cities could, based on the local context and priorities, identify other or additional key qualifiers or scoring levels to define the overall score of the indicator. For example, one city may decide that targeting a specific audience/target group is critical as earlier data have shown that large percentages of food loss and waste are generated at specific stages of the food chain. Addressing

campaigns to such target groups may be reflected in giving these additional scoring points. Cities may also define other specific subcategories of target groups/audiences to be scored separately.

References and links to reports/tools

Dubbeling M., C. Bucatariu, G. Santini, C. Vogt and K. Eisenbeiß (2016). City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016> and <http://www.fao.org/3/a-i6233e.pdf>.

Guidance on FLW Quantification Methods: Supplement to the Food Loss and Waste (FLW) Accounting and Reporting Standard, Version 1.0.
http://flwprotocol.org/wp-content/uploads/2017/06/FLW-Protocol_Guidance-on-FLW-Quantification-Methods.pdf

Hanson, C., Lipinski, B., Robertson, K., Dias, D., Gavilan, I., Gréverath, P. & Timmermans, T. (2016). Food loss and waste accounting and reporting standard. World Resources Institute: Washington DC, USA, 160. Available from https://www.wri.org/sites/default/files/REP_FLW_Standard.pdf



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Milan Urban Food Policy Pact Monitoring Framework

July 2018 version

Indicator 43: Presence of policies or regulations that address food waste prevention, recovery and redistribution

MUFPP framework of actions' category: Food waste

The indicator measures presence of policies or regulations that address food waste prevention, reduction, recovery and redistribution of safe and nutritious food for direct human consumption, food waste utilisation.

Overview table

MUFPP Work stream	Food Waste
MUFPP action	Collaborate with the private sector along with research, educational and community-based organisations to develop and review, municipal policies and regulations to prevent waste or safely recover food.
What the indicator measures	Presence of policies or regulations that address food waste prevention, reduction, recovery and redistribution of safe and nutritious food for direct human consumption, food waste utilization
Which variables need to be measured / what data are needed	<ul style="list-style-type: none"> ▪ Number (and type) of policies and regulations ▪ Level of implementation, enforcement, information and communication tools available ▪ Number and type of target groups ▪ Monitoring, evaluation and update mechanisms ▪ Reporting towards SDG 12.3 mechanisms
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	<ul style="list-style-type: none"> ▪ Number (and types) of policies and regulations ▪ Number (and type) of information and communication mechanisms and target groups ▪ Resources allocated (human, financial) for each measure
Unit(s) of Analysis (i.e people under 5 years old, etc.)	<ul style="list-style-type: none"> ▪ Policies/ regulations related to food waste prevention and reduction ▪ Policies/ regulations related to recovery and redistribution of safe and nutritious food for direct human consumption ▪ Policies/ regulations related to context-based food waste utilization

Possible sources of information of such data	-Social protection and welfare local authorities/national reports -Annual reports of organisations that implement recovery and redistribution of safe and nutritious food for direct human consumption -Local solid waste management departments and private haulage companies
Possible methods/tools for data-collection	Policy review and analysis
Expertise required	Policy analysis
Resources required/ estimated costs	
Specific observations	
Examples of application	Examples of country and city initiatives to address food waste prevention, recovery and distribution can be found here: - https://www.save-food.org/ - Dubbeling M., C. Bucatariu, G. Santini, C. Vogt and K. Eisenbeiß (2016). City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016 and http://www.fao.org/3/a-i6233e.pdf . - http://www.milanurbanfoodpolicypact.org/good-practices/

Rationale/evidence

A significant share of food grown for human consumption is never eaten. The Food and Agriculture Organization of the United Nations (FAO) estimates that a third, by weight, of all food produced in the world was lost or wasted in 2009. This level of inefficiency has significant economic, social, and environmental impacts. For example, it results in approximately US\$940 billion per year in economic losses, according to FAO estimates. It exacerbates the pressures on the global food system and increases the risk of food insecurity. And the amount of food lost or wasted translates into about a quarter of all water used by agriculture, requires cropland equivalent to an area the size of China, and is responsible for an estimated 8% of global greenhouse gas emissions. In 2014 the Committee on World Food Security (CFS) addressed Food Loss and Waste (FLW) prevention and reduction in order to promote more equitable and sustainable food systems - based on a report by its High Level Panel of Experts (HLPE, 2014). The 2014 CFS's policy roundtable recommended an enabling environment facilitated through the "food use-not-loss-or-waste" hierarchy (i.e. the prevention, recovery and redistribution of safe and nutritious food to people). The edible and wasted/discarded parts and the inedible parts associated with food (e.g., bones, rinds, pits/stones) take up space in landfills, and contribute to greenhouse gas emissions during decomposition.

Many countries, cities, companies, and other entities can improve insight into how much, why, and where food and/or associated inedible parts are removed from the food supply chain. Achieving the Sustainable Development Goals is engaging all actors of the global food system.

SDG 12.3 - By 2030, 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.

Improved access to information and data availability in the public domain can:

1. Support strategies and prioritize actions to prevent food loss and waste
2. Identify the most efficient ways to prevent safe and nutritious food to be lost or wasted
3. Identify the context-based alternative – for when the resource becomes waste,

And ultimately enhance the design and implementation of food loss and waste prevention, reduction and recycling policies and programmes.

Cities around the world already implement food loss and waste programmes and policies. Riga (Latvia) for example support the programme "From food waste to healthy, off-season food". Getliņi EKO" is an environmentally friendly, high technology ecological waste management company owned by the Municipality of Riga (in its majority) that operates the waste landfill "Getliņi". It is responsible for the collection and ecological management of waste within the Riga waste management area. About 50% of all waste produced in Latvia, or 300'000 tons of waste annually, is transported to "Getliņi". Food waste makes up 41.5% of waste biomass. Food waste is deposited in environmentally safe biodegradable cells. The landfill gas that forms in the cells is channelled to the Getliņi power unit and transformed into energy. A by-product of energy production is heat that is used for greenhouses that are located in the territory of the landfill and operated by "Getliņi EKO". The greenhouses grow tomatoes during the local vegetable off-season and supply Riga municipality's citizens¹.

The city of Bruges (Belgium) has developed through a bottom-up process a set of guidelines to build a sustainable food policy. Curbing food waste in public organisations is one of the actions highlighted by stakeholders. Food waste reduction in hospitals and healthcare centres presents unique challenges. Therefore, the City of Bruges set out on a programme whose objectives are: to measure and analyse current food waste and its economic impact in four health care institutions in Bruges; to support them in reducing food waste by coaching; to develop and disseminate at least three successful methodologies to reduce food waste in health care institutions; and to raise awareness among health care institutions about food waste, its impact and solutions. Health care institutions are trained to conduct a baseline food waste measurement, then during a one-day workshop, personnel of the healthcare institutions together with food waste experts go through a creative process to develop solutions to their challenges. Each institution's team tests the solution they created under the guidance of experts. After a first test, feedback is gathered among patients and colleagues. Subsequently, impacts of solutions put in place are analysed. The best solutions are then scaled up and evaluated.²

Glossary/concepts/definitions used

Food Loss and Waste (FLW): All edible and inedible parts that are discarded or wasted.

FAO (2014) defines **food loss** as 'the decrease in quantity or quality of food'. It refers to agricultural or fisheries products intended for human consumption that are ultimately not eaten by people or that have incurred a reduction in quality reflected in their nutritional value, economic value or food safety.

An important part of food loss is '**food waste**', which refers to the discarding or alternative (non-food) use of food that was fit for human consumption – by choice or after the food has been left to spoil or expire as a result of negligence (FAO, 2014).

Recovery of safe and nutritious food for human consumption is to receive, with or without payment, food (processed, semi-processed or raw) which would otherwise be discarded or wasted from the agricultural, livestock, forestry and fisheries supply chains of the food system.

Redistribution of safe and nutritious food for human consumption is to store or process and then distribute the received food pursuant to appropriate safety, quality and regulatory frameworks directly

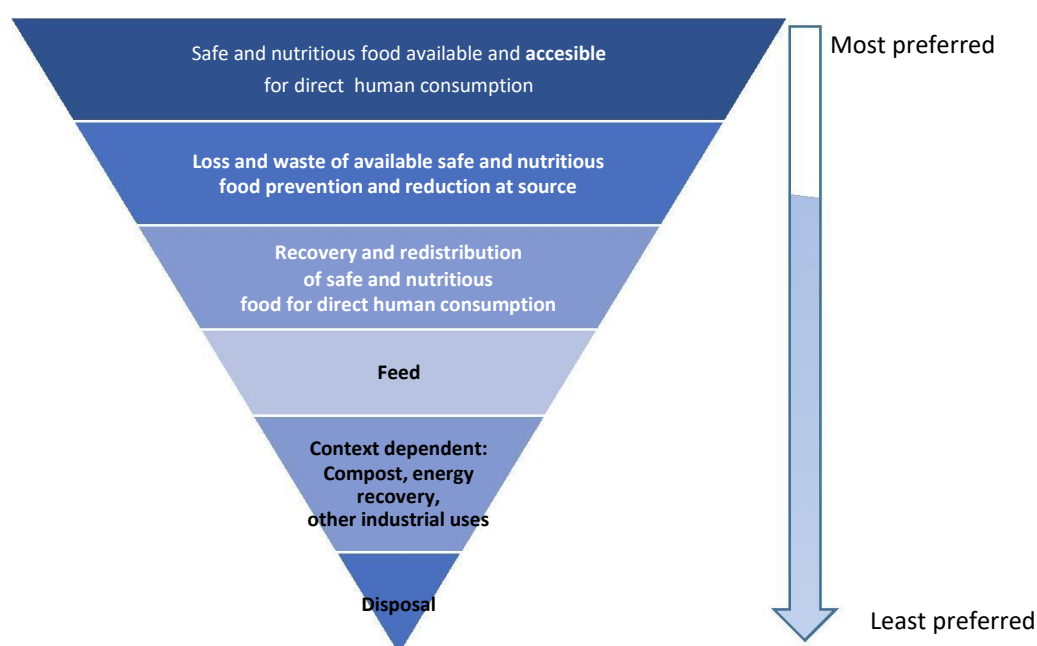
¹ See further: <http://www.milanurbanfoodpolicypact.org/wp-content/uploads/2016/11/MPA-2016-winning-good-practices.pdf> and <http://www.getlini.lv/en/>

² See further: <http://www.milanurbanfoodpolicypact.org/wp-content/uploads/2017/10/MPA-winners-2017.pdf>

or through intermediaries, and with or without payment, to those having access to it for food intake (FAO, 2015).

Policies, regulations, knowledge, norms, standards and data enable coherent, effective and accountable collective action – with governments and/or local authorities that lead – in consultation and implementation - with actors across civil society and the private sector. These can define goals and targets; develop and implement; share information, experiences, and methods in both bottom-up and top-down monitoring and reporting processes.

Figure 1. Food-use-not-loss-or-waste hierarchy



Source: Adapted from CFS 41, 2014 (Bucatariu, 2016)

Preparations

The team responsible for monitoring this indicator should agree on the type of data disaggregation and categories that will be used and the data collection method.

Sampling:

Given that food loss and waste policies and regulations are still a new area, it is unlikely that sampling will be needed.

Data Collection and Analysis

During a monitoring/review meeting the following table can be discussed and filled. Specific observations made during the meeting can be added in the final column. Also recommendations for improvement can be added here.

Scoring sheet

Characteristics	Scoring			Total score	Disaggregation of information	Observations/ Recommendations
Presence of policies or regulations that address food waste prevention, recovery and redistribution	Yes= 1 point	No= 0 points			Number and type of policies and regulations	
					Distinguish among prevention, recovery and redistribution	
Level of implementation: is the municipal policy/implementation actually implemented or enforced?	Yes, completely= 2 points	Yes= 1 point	No= 0 points		Discuss for each of the policies or regulations.	
					Indicate reasons for partial or non-implementation/enforcement	
Information and communication: Are policies and regulations widely shared within city government and to potential beneficiaries	Yes= 1 point	No= 0 points			Number and type of information and communication mechanisms and target groups	
Resources allocated (human, financial) – are they adequate?	Yes= 1 point	Yes= 1 point	No= 0 points		Discuss for each of the policies or regulations.	
Total score:						

References and links to reports/tools

CFS. 2014. Policy recommendations. Food Losses and Waste in the Context of Sustainable Food Systems. Available from: <http://www.fao.org/3/a-av037e.pdf>

Dubbeling M., C. Bucatariu, G. Santini, C. Vogt and K. Eisenbeiß (2016). City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016> and <http://www.fao.org/3/a-i6233e.pdf>.

Guidance on FLW Quantification Methods: Supplement to the Food Loss and Waste (FLW) Accounting and Reporting Standard, Version 1.0.
http://flwprotocol.org/wp-content/uploads/2017/06/FLW-Protocol_Guidance-on-FLW-Quantification-Methods.pdf

Hanson, C., Lipinski, B., Robertson, K., Dias, D., Gavilan, I., Gréverath, P. & Timmermans, T. (2016). Food loss and waste accounting and reporting standard. World Resources Institute: Washington DC, USA, 160. Available from https://www.wri.org/sites/default/files/REP_FLW_Standard.pdf.

Various resources at: FAO. Global Initiative on Food Loss and Waste Reduction. Available from:
www.fao.org/save-food



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Indicator 44: Total annual volume of surplus food recovered and redistributed for direct human consumption

MUFPP framework of actions' category: Food waste

The indicator measures the totality of available food recovered and redistributed for direct human consumption along the entire urban food supply chain, occurring from the time at which availability is recorded (in urban and peri-urban areas) until it reaches and is used by the final urban consumer as food.

Overview table

MUFPP Work stream	Food Waste
MUFPP action	Save food by facilitating recovery and redistribution for human consumption of safe and nutritious foods , if applicable, that are at risk of being lost, discarded or wasted from production, manufacturing, retail, catering, wholesale and hospitality.
What the indicator measures	The indicator measures the totality of available food recovered and redistributed for direct human consumption along the entire urban food supply chain, occurring from the time at which availability is recorded (in urban and peri-urban areas) until it reaches and is used by the final urban consumer as food.
Which variables need to be measured / what data are needed	Safe and nutritious food recovered and redistributed for direct human consumption at various system stages: <ul style="list-style-type: none"> • Production • Handling and storage • Processing and packaging • Catering • Distribution and point of purchase • Household/ consumption If desired: <ul style="list-style-type: none"> - Commodity or types of food recovered/redistributed for human consumption - Kcal or nutrition content of different types of food waste/loss
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	-Tonnes or Kilograms of safe and nutritious food recovered and redistributed for direct human intake

Unit(s) of Analysis (i.e people under 5 years old, etc.)	-Weight of safe and nutritious food recovered and redistributed. If calculated on a quantity basis (volume), this can subsequently be transformed to dietary energy supplies (in kcal) per capita allowing consistent aggregation and comparison. -The indicator will be calculated on an annual frequency and can be broken down by commodity.
Possible sources of information of such data	-Social and welfare entities -Municipal agriculture -Records held by producers, processors, markets, retailers, caterers, and consumers -Food banks, other social and church organisations engaged in food distribution -Food purchase surveys -Food insecurity surveys
Possible methods/tools for data-collection	-Primary data collection: sampling and weighing -Secondary data analysis: previous studies or records
Expertise required Resources required/ estimated costs	E.g. Socio-economic/regulatory/human nutrition The costs of measuring recovered and redistributed safe and nutritious food directly and regularly, for example by sampling and weighing, can be prohibitive. Calculation of the indicator should rather rely on data records kept by various actors in the food supply chain (producers; processors, markets) or by organisations involved (agriculture department, food banks, NGOs, other social, community and church organisations recovering and redistributing food).
Specific observations	This indicator is closely linked to Indicator 41 <i>“Total annual volume of food losses & waste”</i> , which details instruction on weighing and calculations of total food loss and waste before any recovery and redistribution of safe and nutritious food for direct human consumption took place or any food waste context-based utilisation was implemented.
Examples of application	

Rationale/evidence

Achieving the Sustainable Development Goals implies engaging all actors of the global food system. SDG 12.3 calls for *“By 2030, 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”*. Food loss and waste prevention, reduction and management are key components of sustainable city region food systems. Globally it has been estimated (FAO, 2011) that 1/3 of all food produced for human consumption is lost or wasted in supply chains at the local, national, regional and global level. Consumer level waste accounts for 22% and distribution waste accounts for 12% of these losses, making such waste of particular relevance to peri-urban and urban areas.

Food loss and waste (FLW) is a symptom of an unsustainable food system that is undermined in its capacity to provide food and nutrition security for all. Food security and nutrition is achieved if adequate food (in terms of safety, quality, quantity and socio-cultural acceptability) is available and accessible for and effectively utilised by all individuals at all times for a healthy and active life. FLW directly impacts the availability and accessibility of safe and nutritious food for human consumption.

Recovery and redistribution of safe and nutritious food for human consumption has been highlighted as an important strategy for the prevention of food waste and for contributing to urban food security. According to a MANA-FAO 2015 study, 21% of the fruits and vegetables produced (1.4 million tonnes) in Colombia are lost every year.¹ The given volumes of food losses could, however, feed 9.5 million people for one year.²

¹ <http://www.fao.org/colombia/fao-en-colombia/colombia-en-una-mirada/en/>

² <http://www.asohofrucol.com.co/archivos/biblioteca/Desperdicio de alimentos en Colombia.pdf>

Current forms of recovery and redistribution of safe and nutritious food involve a variety of stakeholders in a diverse mix of initiatives, such as: gleaning networks, food banks (warehouse, direct service, virtual, mixed form), social supermarkets and community shops, food pantries, soup kitchens and community/charitable programmes, shelters, mixed form of social protection programmes that provides food, directly or indirectly, among other services (<http://www.fao.org/platform-food-loss-waste/food-waste/food-waste-reduction/country-level-guidance/en/>). Examples from actions taken by cities include:

Ile-de-France region (the region around Paris in France) concentrates the country's largest social inequalities and highest food waste rate. The causes of food waste are: (i) products close to or over "best-before date", (ii) size or other quality criteria of the food does not fit with the industries' requirements, or (iii) overestimated orders. In response to these challenges, social supermarkets emerged in France in the 1990s that sell food and consumer products at lower prices than conventional supermarkets and that restrict access to people living below a certain income threshold. The French Social Supermarket Network (ANDES) provides its consumers fresh fruits and vegetables, amongst others through its programme *Potager de Marianne*, which supplies social supermarkets with fresh fruits and vegetables likely to be discarded by local wholesalers, distributors, and food industries.

The Municipality of Medellin (Colombia) also recognises the importance of formulating national public policy guidelines to address prevention and reduction of food loss and food waste. It supports the SACIAR Foundation, the first food bank in Medellin. SACIAR runs: (1) The REAGRO programme, which is focused on the recovery and redistribution of safe and nutritious food for human consumption through food banks and (2) The NUTRIAMOR® programme, which is focused on food waste recovery and value addition for safe and nutritious food resources in the banana export supply chain. Left-over bananas are processed into powder and used as a supplement for young children, pregnant and breastfeeding women, and the elderly, in conditions of nutrition vulnerability³.

Local governments thus need further data on the types of food that end up in the waste stream, what proportion is edible versus inedible and what proportion of food suitable for safe human consumption is actually recovered and redistributed. The World Resources Institute has developed a comprehensive "Food Loss and Waste Accounting and Reporting Standard" to facilitate the quantification of food loss and waste (FLW)⁴. This methodology is further described in the methodological guidelines for Indicator 41 (*Total annual volume of food losses & waste*).

The costs of measuring recovery and redistribution safe and nutritious food directly and regularly, for example by sampling and weighing, are often prohibitive. Calculation of the indicator should rather rely on data records kept by various actors in the food chain (producers; processors, markets) or by organisations involved (agriculture department, waste management, food banks, NGOs, other social, community and church organisations recovering and redistributing the safe and nutritious food).

Glossary/concepts/definitions used

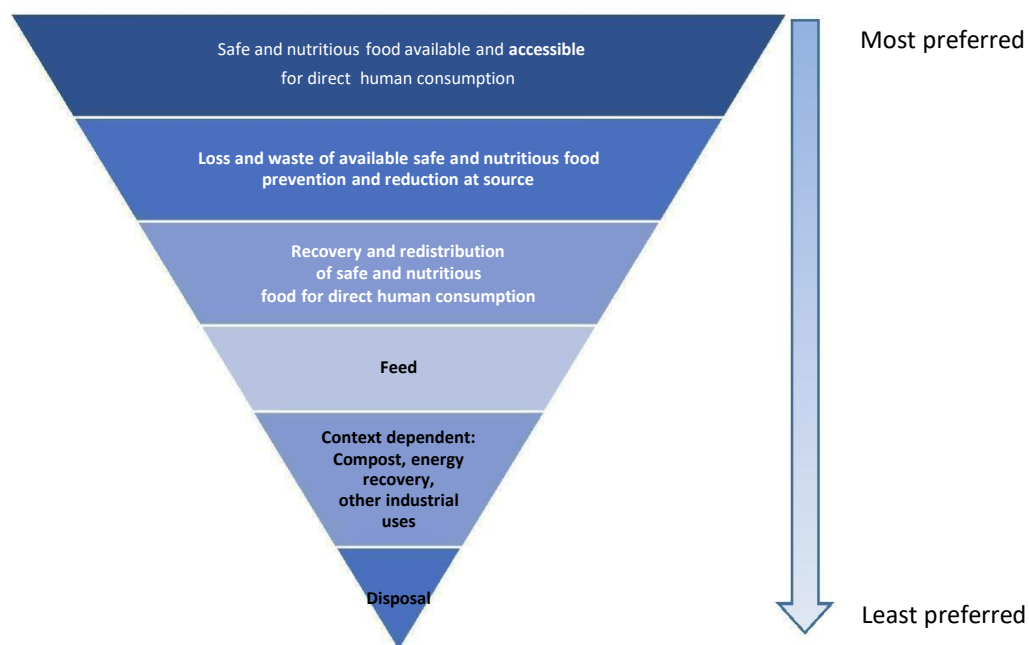
FAO (2014) defines **food loss** as 'the decrease in quantity or quality of food'. It refers to agricultural or fisheries products intended for human consumption that are ultimately not eaten by people or that have incurred a reduction in quality reflected in their nutritional value, economic value or food safety.

³ Dubbeling M., C. Bucutariu, G. Santini, C. Vogt and K. Eisenbeiß, 2016. City region food systems and food waste management- Linking urban and rural areas for sustainable and resilient development. GIZ, RUAF Foundation and UN FAO. Bonn and Eschborn. <https://ruaf.org/document/city-region-food-systems-and-food-waste-management/>

⁴ World Resources Institute (2017). Food Loss and Waste Accounting and Reporting Standard.

An important part of food loss is '**food waste**', which refers to the discarding or alternative (non-food) use of food that was fit for human consumption – by choice or after the food has been left to spoil or expire as a result of negligence (FAO, 2014).

Recovery of safe and nutritious food for human consumption is to receive, with or without payment, food (processed, semi-processed or raw) which would otherwise be discarded or wasted from the agricultural, livestock, forestry and fisheries supply chains of the food system. **Redistribution** of safe and nutritious food for human consumption is to store or process and then distribute the received food pursuant to appropriate safety, quality and regulatory frameworks directly or through intermediaries, and with or without payment, to those having access to it for food intake (FAO, 2015).

Figure 1. Food-use-not-loss-or-waste hierarchy

Source: Adapted from CFS 41, 2014 (Bucatariu, 2016)

Preparations

A meeting should be organised with all staff who will be involved in this activity to:

- Familiarise them with the methodological guidelines
- Agree on the objectives and scope of the analysis and data collection requirements
- Define sources of secondary data
- How to coordinate the activities.

Sampling

For a comprehensive assessment, it is suggested to collect data from:

- Records kept by 100% of all gleaning networks, food banks (warehouse, direct service, virtual, mixed form), social supermarkets and community shops, food pantries, soup kitchens and community/charitable programmes, shelters, mixed form of social protection programmes that provides food, directly or indirectly, among other services, working in the local government area.
- A sample (e.g. 10%) of stakeholders directly engaged in different parts of the food chain (from producers to consumers) to record direct individual/organisational food recovery and redistribution initiatives and volumes.

Note that records may be often routinely collected for reasons other than quantifying FLW (e.g., warehouse record books, social responsibility).

Data Collection and Disaggregation

Secondary data, e.g. records kept by different organisations on food waste recovery and redistribution for human consumption can be collected from:

- Municipal agriculture department;
- Municipal or national social programmes for safe and nutritious food recovery and redistribution for direct human consumption

- Records held by producers, processors, markets, retailers, caterers, and consumers directly engaged in food recovery and redistribution
- Food banks, other non-governmental social, community and church organisations engaged in food recovery and redistribution
- Social protection, food security surveys.

If no records are held by various stakeholders in the food chain, a survey can be implemented (10% sampling) to collect information on food loss and waste volumes, recovery and redistribution (either directly or through other organisations). Such a survey could then also include additional questions on opportunities and obstacles for increased recovery and redistribution of food for human consumption.

Data Analysis

Based on all data records (or surveys), total annual volumes of safe and nutritious food recovered and redistributed for direct human consumption can be calculated.

If data are available on the types of food/commodities, volumes can be transformed into dietary energy (kcal)/nutrient content. On the basis of such data and consumption requirements, the number of people that could be fed, can be calculated.

References and links to reports/tools

Bucataru in FAO. 2016 Knowledge and Information for Sustainable Food Systems. Available from <http://www.fao.org/3/a-i5373e.pdf>.

CFS. 2014. Policy recommendations. Food Losses and Waste in the Context of Sustainable Food Systems. Available from <http://www.fao.org/3/a-av037e.pdf>.

Dubbeling M., C. Bucataru, G. Santini, C. Vogt and K. Eisenbeiß. 2016. City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016> and <http://www.fao.org/3/a-i6233e.pdf>.

Various resources at: FAO. Global Initiative on Food Loss and Waste Reduction. Available from www.fao.org/save-food.

World Resources Institute (2017). Food Loss and Waste Accounting and Reporting Standard. Available from <https://www.wri.org/publication/food-loss-and-waste-accounting-and-reporting-standard>. Specifically Chapter 6 (Establishing the scope of a FLW inventory) and Chapter 7 (Deciding how to quantify FLW) are of relevance.

World Resources Institute (2017). Guidance on FLW Quantification Methods: Supplement to the Food Loss and Waste (FLW) Accounting and Reporting Standard, Version 1.0. Available from http://flwprotocol.org/wp-content/uploads/2017/06/FLW-Protocol_Guidance-on-FLW-Quantification-Methods.pdf.