

FACTSHEET - Evaluation of food waste prevention measures

The European Platform on Food Losses and Waste (FLW), and more particularly its Subgroup on action and implementation, is currently working on a framework for evaluating food waste prevention actions. The present factsheet builds on and was inspired by this ongoing work, and combines elements to both quantitatively and qualitatively assess food waste prevention measures being implemented within the context of the ELoFoS project¹.

A short descriptive summary of the elements taken up in the factsheet is given here below; more details can be found in the following meeting documents of the EU Platform of FLW²:

- Collection and assessment of food waste prevention actions. 19.03.2018.
- Framework for the assessment of food waste prevention actions. 01-02.10.2018.
- Collection and evaluation of food waste prevention actions. 18.03.2019.

For questions on the factsheet and the methodology applied, please contact
yanne.goossens@thuenen.de

Description of measure

Short description of the implemented measure, including details on the stage of the food supply chain the measure focusses on, classification of the action, its complexity and frequency, the country of application and scale, and its duration.

Food waste reduction

- Overview of types of food products that are no longer being wasted and whether or not quantification was made of the food waste reduction.
- Details on the waste treatment that would have taken place had the food been wasted, as well as information on its waste handling and collection process.

Descriptive evaluation

- Quality of the action design: identification of the problem; definition of aims and objectives (including targets); definition of the baseline against which progress is to be measured; definition of Key Performance Indicators (KPIs); details on the monitoring.
- Effectiveness: degree to which desired result (objectives/targets) was achieved.

Sustainability evaluation

The **quantitative evaluation** lists the actual amounts of food waste prevented. Next, the effect of the measure across all three sustainability dimensions (economic, environmental and social) is assessed. For the economic and environmental dimension, we take into account the avoided embodied cost or life cycle impacts related to the food that is no longer wasted complemented with the avoided costs and impacts associated with the waste disposal stage that no longer takes place. Additionally, for all three dimensions, all used resources and resulting benefits inherent to the implementation of the measure itself are taken into account. More information on (quantitative) sustainability evaluation and the state of the art of the extent to which food waste prevention measures have been evaluated so far in literature, can be found in Goossens et al. (2019)³.

For its **qualitative evaluation**, the factsheet takes into account the number of people reached by the measure (outreach) and behavioural change brought about by the action. Additionally, it provides for a rating (high/medium/low) of the feasibility of implementing the measure by looking at implementation efforts (extent of procedural updates, staff training and systems needed⁴) and the willingness to implement the measure.

Taking the measure into the future

The following questions will help in taking the measure into the future: Is there a long term strategy (e.g. organisational support to ensure continuity of the action and sustainability over time? Were transferability (possibility of being implemented in another context or place) and scalability (ability to be applied on a different scale, e.g. to be made larger) considered in the design of the measure? Is there inter-sectorial cooperation and how is this organised? What were the key success factors and barriers for this measure?

Data quality of the data collected/provided

What is the data quality (based on clearness and completeness) for the data collected or provided to assess each of the elements above?

¹ "Efficient Lowering of Food waste in the Out-of-home Sector", <https://elofos.de>

² https://ec.europa.eu/food/safety/food_waste/eu_actions/action-implementation_en

³ Goossens, Yanne; Wegner, Alina; Schmidt, Thomas (2019): Sustainability Assessment of Food Waste Prevention Measures: Review of Existing Evaluation Practices. In *Front. Sustain. Food Syst.* 3, p. 33. DOI: 10.3389/fsufs.2019.00090.

⁴ ReFED (2018): Restaurant Food Waste Action Guide. Rethink Food Waste Through Economics and Data, US

MEASURE

“Monitoring of food waste resulting from buffet leftovers”

DEMO factsheet containing fictitious data*

Description of measure - incl. background, aim and method

At the end of buffet service, leftovers are taken back to the kitchen. Most buffet leftovers are not allowed to be re-used at a later stage as they have been on display and are thus thrown. The present measure aims at getting an insight in the actual amount of food that returns from the breakfast buffet. Using a digital/smart scale (“Resource manager-Food”) all buffet returns (excl. drinks) are measured before being thrown. The scale is provided to the clinic at no cost as part of an ongoing research project (<https://elofos.de/>). At the start of the measurement period, the kitchen team was shortly instructed on how to use the scale.

The software enclosed in the scale is adjusted to the specificities of the company and includes all products (and product groups) available on the breakfast buffet. The scale is equipped with a touch screen, allowing users to select the product (organised within product groups) that is thrown.

The scale provides direct feedback to its users on the amounts that are thrown on a daily basis, and shows how this evolves over time. This direct feedback is expected to create more awareness to its users on the issue of food waste and, more importantly, on the magnitude of what is currently thrown. Hence, behavioural and operational changes in the kitchen might occur, resulting in fewer food wastes.

Stage of the FSC	<input type="checkbox"/> Primary production <input type="checkbox"/> Manufacturing <input type="checkbox"/> Distribution and retail <input type="checkbox"/> Consumption – Private households <input checked="" type="checkbox"/> Consumption - Food service
Classification (See Slide 35, EU Platform FLW, 18.03.2019))	Supply chain efficiency - Digital tools for supply chain efficiency
Complexity of the action	<input checked="" type="checkbox"/> Single action <input type="checkbox"/> Combined action <input type="checkbox"/> Multiple action
Frequency of the action	<input checked="" type="checkbox"/> isolated event <input type="checkbox"/> isolated but long lasting <input type="checkbox"/> recurring
Country of application	DE
Scale	Spa/rehab clinic “Mediclin” (location:)
Duration of measure	6 weeks (.././2019 - .././2019)

Food waste reduction		
Types of food items saved	<input checked="" type="checkbox"/> All food products within action radius of company or household <input type="checkbox"/> Specific food product or product group: ...	
Quantities of food items saved	<input type="checkbox"/> No quantification was made <input checked="" type="checkbox"/> Quantification was made: see “Efficiency evaluation”	
Avoided waste treatment	<input type="checkbox"/> Landfill <input type="checkbox"/> Composting <input type="checkbox"/> Incineration <input type="checkbox"/> Anaerobic digestion <input type="checkbox"/> Wastewater <input checked="" type="checkbox"/> I do not know	
Waste collection and handling	<input checked="" type="checkbox"/> Organic waste is collected separately in my company/household <input type="checkbox"/> Organic waste is disposed of together with other waste fractions	
	Name of specialised waste handling company	ReFOOD
	Costs for (organic) waste disposal (€/kg or €/bin with bin volume = ...)	€ 20,50 per bin, with bin volume of 240 L

Descriptive evaluation

Quality of the action design

Problem identification; definition of aims, objectives and baseline against which to measure progress; define KPIs; monitoring

The overarching goal is to get an insight in the amounts of buffet leftovers being thrown, using a digital scale. Additionally, the monitoring is expected to create awareness by the personnel, which is further expected to lead to fewer buffet leftovers.

Aims:

1. Measure food waste resulting from buffet leftovers
2. Create personnel awareness
3. Decrease buffet/service leftovers and subsequent FW

Objectives:

- No targets were set for personnel awareness
- No targets were set on the food waste reduction to be achieved
- Baseline: FW (per product(group)) at 1st day of monitoring

Key performance indicators (KPIs):

For each product(group): daily amount of food waste returning from the breakfast buffet, expressed in absolute # kg per day and in # kg per guest per day

Effectiveness

Degree to which desired result (objectives/targets) was achieved

Aim 1 and 3 are achieved: FW quantities are measured, and buffet returns decreased both in absolute value as well as in amounts of FW per guest. No survey was performed to assess changes in personnel awareness (Aim 2). Nevertheless, informal conversations with staff have shown that personnel is now better aware of the magnitude of the problem, and that they feel more involved and concerned.

Sustainability evaluation

RESOURCES

	Implementation-related inputs
Economic <i>Fixed & variable costs and efforts: e.g. investments, labour costs, operating costs, food procurement</i>	Investment in or leasing of scale = €0 Time spent for weighting (12 min.; 2 times/day; during 2 weeks; labour costs €20/h) = € 56
Environmental: Climate change (kg CO ₂ eq) <i>e.g. use of materials, impacts of food production</i>	/
Social <i>e.g. employment of volunteers, meals donated, jobs created</i>	/

Implementation effort	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Willingness to implement the measure	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low

RESULTS - SAVINGS

Food waste prevented

The monitoring data is expected to provide both absolute FW quantities (kg FW) as well as quantities expressed per guest (kg FW per guest); complemented with cumulative savings throughout measuring period as well as total FW/day at start & end of measurement

Embodied value or impact of avoided FW	Avoided FW disposal	Implementation-related outputs and savings	NET BENEFITS AND SAVINGS
The purchasing value of the food that is no longer thrown = € ... (purchasing prices for each product: based on inventory management system)	Disposal of food waste = €0,09/kg Total = € ...	Avoided time spent on preparing food that is later thrown (7 min./d; during 2 weeks; labour costs €20/h) = € 32,67	€ ...
Total = ... kg CO ₂ eq (product-specific impacts gathered throughout the entire life cycle, up until moment of wastage, excl. disposal stage; based on literature or ecoinvent databases)	Composting = 0,103 kg CO ₂ eq/t FW (Manfredi et al., 2016) Total = ... kg CO ₂ eq	Avoided energy use for preparing/cooking the food = 4,88 g CO ₂ eq/Min. (Reynolds, 2019) Total = ... kg CO ₂ eq	... kg CO ₂ eq
		/	/

Outreach and behavioural change	In all three locations, the monitoring helped increase awareness of the kitchen and food service personnel. Furthermore, it helped to realise how much food is wasted and showed staff they also had the power to make changes.
--	---

Taking the measure into the future	
Sustainability over time	
<i>Long term strategy to ensure continuity? (e.g. organisational support, economic sustainability)</i>	
The use of the scale has led to a decrease in FW. It is at this stage not possible to make any statements on the magnitude of FW reductions to be expected following continued use of the scale. A stagnation can however be expected.	
The monitoring is done using a digital scale which has for now, as part of a research project, been provided at no cost. Costs for continued use of the scale outside of the research project will highly affect the willingness to further use the scale. If the use of the scale is discontinued in the future, personnel are no longer reminded on a daily basis of the issue of FW. This could lead to staff reverting back to old habits, possibly leading to increased levels of FW.	
Transferability and scalability	
<i>Possibility of being implemented in another context or place; ability to be applied on a different scale, e.g. to be made larger</i>	
The use of a smart scale for tracking FW in the hospitality sector can easily be transferred and up-scaled within the sector	
Inter-sectorial cooperation	
Not applicable	
Key success factors and barriers	
At the start of the monitoring process, several staff members opposed to the additional time required to perform the measurements, and willingness to implement the measure was rather low. After a few days, measurements took up less time and became part of the routine. After realising the potential for FW reduction in their working environment, staff felt more engaged to do better and their willingness to measure increased considerably. Additionally, they realised they returned fewer full plates and containers from the buffet, which saved them effort and time in cleaning the buffet at the end of service.	
One of the main barriers for implementation is thus the initial negative feeling of kitchen staff towards the digital scale. Proper training of staff at the start of the waste monitoring is therefore indispensable. Additionally, management may need to think about creating incentives for staff in order to compensate for the additional time spent at measuring FW on top of the already existing time pressure within the gastronomy sector.	

Quality of the data provided/collected		
<i>Rating score:</i>		
<i>(++) enough and clear</i>		
<i>(+) enough but unclear</i>		
<i>(-) incomplete</i>		
<i>(--) not provided/not available</i>		
Food waste reduction		
Quantities of food items saved	++	
Descriptive evaluation		
Quality of the action design	++	
Effectiveness	++	Data not available yet; but will be when monitoring data comes in
Sustainability evaluation		
Economic	++	
Environmental	++	
Social	--	
Outreach	++	
Implementation effort	++	
Willingness to implement	++	
Taking the measure into the future		
Sustainability over time	++	
Transferability and scalability	++	
Inter-sectorial cooperation	++	
Key success factors and barriers	++	

Additional comments

** As food waste monitoring and subsequent evaluation of food waste prevention measures are still ongoing within the ELoFoS project, the present factsheet for now only provides preliminary, and partially fictive, data to illustrate its use.*