



LOWINFOOD

**Multi-actor design of low-waste food value chains
through the demonstration of innovative solutions
to reduce food loss and waste**

GA No. 101000439

D1.2 ENVIRONMENTAL DATA COLLECTION PROTOCOL

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Summary

LOWINFOOD is a project committed to co-design low-waste food value chains by supporting the implementation of a portfolio of innovations in a set of value chains particularly concerned by food loss and waste (fruits & vegetables, bakery products and fish), as well as at-home and out-of-home consumption. Reducing food loss and waste (FLW) saves food for human consumption; brings savings for primary producers, companies and consumers; and lowers the environmental and climate impact of food production and consumption.

The environmental impacts are assessed following the Life Cycle Assessment approach, in particular the evaluation framework to assess the performance of FLW prevention action developed by the Joint Research Centre of the European Commission. This document describes the planning of the data collection to establish a life cycle inventory for the environmental assessment of the innovations.

LOWINFOOD's innovations can be grouped into two types of actions: food prevention at source (e.g. supply chain efficiency and consumer behaviour change), and food redistribution (e.g. valorisation of food by-products, donations to charities). For both groups of actions, the net environmental savings associated with an action are calculated considering the following elements: (A) the environmental impacts linked to producing the food no longer purchased, (B) the environmental impacts linked to the waste treatment operations that would have taken place had the food been wasted, and (C) the environmental impacts caused by implementing the action.

Introduction to the deliverable

LOWINFOOD is a project committed to co-design, together with actors of the food chain, low-waste value chains by supporting the demonstration of a portfolio of innovations in a set of value chains particularly concerned by food loss and waste (fruits & vegetables, bakery products and fish), as well as in at-home and out-of-home consumption. Each of these value chains corresponds to a single Work Package (WP) of the project.

The innovations are selected among promising solutions that have already been developed and tested by some partners of the consortium, with the aim to provide the necessary demonstration and upscale to allow market replication.

The LOWINFOOD consortium comprises 27 entities, located in 12 different countries, and ranging from universities and research institutes to start-ups, foundations, associations, and companies working in the food sector. During the 52 months of the project, the partners are committed to complete 30 tasks and to deliver 60 outputs (deliverables).

This deliverable (D1.2) describes the planning of the data collection to establish a life cycle inventory for the environmental assessment of each of the 15 innovations. It is part of WP1, which is dedicated to evaluating the efficacy of LOWINFOOD's innovations and the socio-economic and environmental benefits and efforts when implementing the innovations. The environmental impacts are assessed following the Life Cycle Assessment approach, in particular the evaluation framework to assess the performance of food loss and waste (FLW) prevention action developed by the Joint Research Centre of the European Commission. For further information on the methodology and the evaluation approach for other evaluation dimensions, it is referred to complementing deliverables within WP1 (see Figure 1), which are dedicated to methodological discussions and the application of the multi-actor approach (D1.1) as well as to the specific dimensions of the evaluation: efficacy (D1.3) and socio-economic evaluation (D1.4). Additionally, this deliverable includes a set of questionnaires addressed to affected stakeholders of each innovation to collect data for the evaluation (see ANNEX I).

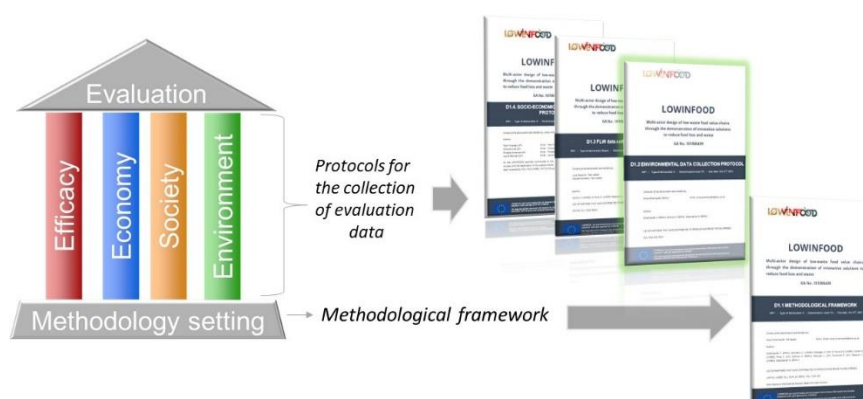


Figure 1: Dimensions of the evaluation of LOWINFOOD's innovations and dedicated deliverables within the first year of the project

1. Evaluation of environmental impacts in LOWINFOOD

The production of food demands a lot of resources and energy which results in the release of emissions, especially of greenhouse gas (GHG) emissions in the form of methane and nitrous oxide from livestock farming and the use of fertilizers. Emissions are in vain when the food is not eaten but wasted instead. It becomes apparent, reducing FLW can decrease emissions and thus preserve our environment. Scherhauser et al. (2018) estimated the environmental impacts from FLW throughout the food supply chain including FLW management. They concluded that 186 million tonnes of CO₂-equivalents (CO₂e) can be related to food wastage in the European Union, that accounts for 5% of the overall European Global Warming Impact (2019: 3610 Mt CO₂e). Emissions at food production are the determining factors for the overall environmental impacts of food (Bernstad Saraiva Schott and Cánovas, 2015). Improved tailoring of food systems is thus essential for FLW prevention, efficient use of food as a resource, and consequent global warming mitigation. The EU is committed to achieving the global Sustainable Development Goal (SDG) Target 12.3 to halve per capita FLW at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains. LOWINFOOD will support reaching this goal by demonstrating the efficacy of low-waste food supply chain (FSC). By also quantifying potential environmental benefits of low-waste food supply chains LOWINFOOD will also indicate achievements towards greenhouse gas emission reduction targets.

Life Cycle Assessment (LCA)

The environmental impacts are calculated by means of Life Cycle Assessment (LCA). LCA is a systematic methodology used to assess the potential environmental impacts of products and product systems, caused by the use of resources and the release of emissions along all stages of the supply chain, from raw material acquisition to the waste management at end of life (cradle-to-grave). LCA is a tool to identify hotspots along supply chains, unveiling trade-offs among, life cycle stages or environmental impact category (Caldeira et al., 2019). The application of the method is standardized in ISO (2006a), ISO (2006b), as well as in the ILCD handbooks of the European Commission (2010) and the Product Environmental Footprint (PEF) method of Zampori and Pant (2019).

Stages of the LCA consist of the goal and scope definition, the inventory analysis, the impact assessment and the interpretation phase (ISO, 2006a, ISO, 2006b). The scope including the system boundary of the LCA is depending on the subject and the goal of the study. The Life Cycle Inventory (LCI) analysis consists of the compilation of the input and output data with regard to the system studies. Those first two stages are part of LOWINFOODs Deliverable (D1.1) and in more detail in this Deliverable (D1.3). The impact assessment and interpretation will be conducted in future LOWINFOOD Deliverables (D1.7, D1.8).

Environmental impact categories

The environmental impact category represents “environmental issues of concern to which life cycle inventory analysis results may be assigned” (ISO, 2006a). Generally impact categories and other metrics considered to be of high relevance to the goal of the assessment shall be chosen according to the Product Environmental Footprint method (Commission Recommendation 2013/179/EU) (Zampori and Pant, 2019). The evaluation shall focus on impact categories most relevant for LOWINFOOD’s food value chains and innovations. Data availability and use of secondary data might also limit the selection of impact categories that can be included in the evaluation of individual innovations. Those impacts, identified as relevant for the assessment of LOWINFOOD’s innovations, are climate change, acidification, eutrophication, land use, water use, resource use (see the selection process in D1.1).

Environmental costs

To foster the internalization of external costs in current research, environmental costs shall be considered in the evaluation of LOWINFOODs innovations. The integration of external costs in the evaluation allows a shift of demand patterns towards more sustainable dietary choices. With regard to the prevention and reduction of FLW, this also translates into savings of external costs related to the amount of FLW prevented from being wasted. External costs consider the social cost of pollution, expressed in Euros per kilogram pollutant, and thus indicate the loss of economic welfare that occurs when one additional kilogram of the pollutant finds its way into the environment. Those costs will be collected from secondary literature (e.g. the Environmental Prices Handbook of CE Delft 2018). External costs will be added to the market prices of food products involved in LOWINFOOD’s innovations collected in the socio-economic evaluation resulting in “true costs” respectively in “true savings”.

2. Procedure of data collection

Applied assessment method

LOWINFOOD's innovations can be basically grouped into two types of actions: food prevention at source (e.g. supply chain efficiency and consumer behaviour change), and food redistribution (e.g. valorisation of food by-products, donations to charities). For both groups of actions, the net environmental savings associated with an action are calculated considering the following elements based on Caldeira et al. (2019):

- A. the environmental impacts linked to producing the food no longer purchased,
- B. the environmental impacts linked to the waste treatment operations that would have taken place had the food been wasted, and
- C. the environmental impacts caused by implementing the action.

The first two components represent a saving, while the last is a burden; therefore, the algebraic sum of the three components provides the overall net environmental impacts (see Figure 2).

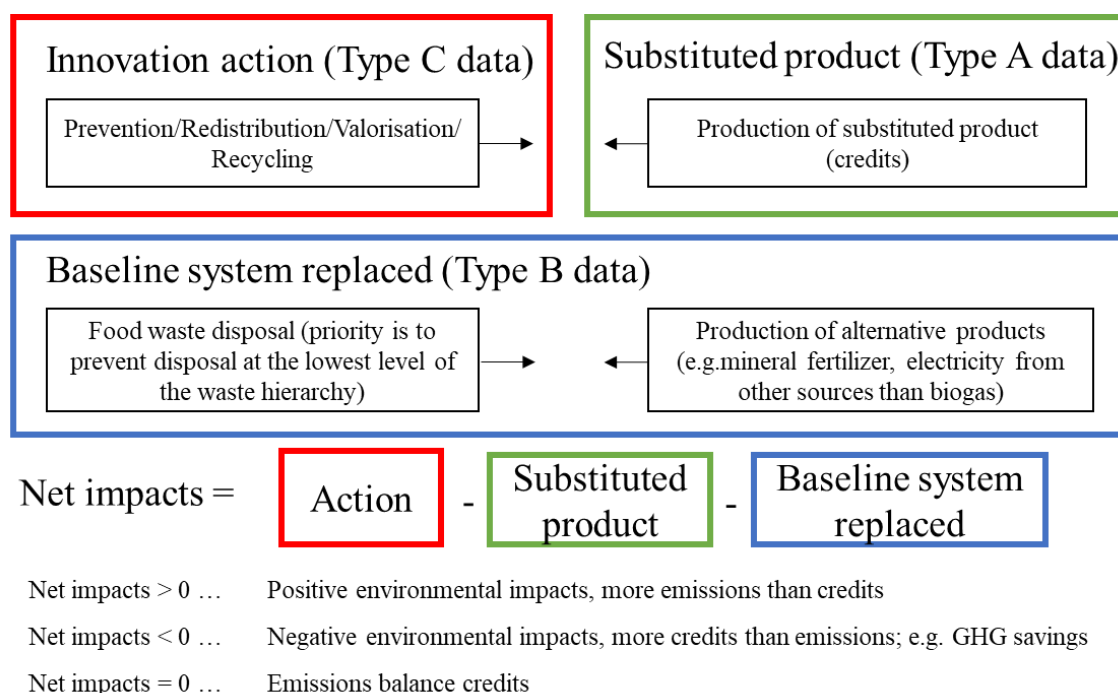


Figure 2: Modelling approach of the environmental impact assessment of FLW prevention and reduction based on Obersteiner and Scherhauser (2020) and type of data based on Caldeira et al. (2017)

Impact categories identified as relevant (see D1.1) for the assessment of the LOWINFOOD innovations are:

- Climate change
- Acidification
- Eutrophication
- Land use
- Water use
- Resource use

Type of data and data sources to establish a life cycle inventory model

Type A data covers food products diverted from being wasted and is assumed to replace food production elsewhere ("substituted product"). This assumption is not necessarily based on evidence. In fact, the extent to which preventing FLW affects food production is not known. Nevertheless, such a phenomenon is expected to take place in the long term (Caldeira et al., 2019). The type and amount of food that is replaced will be defined for each innovation based on the kind of food that is diverted from being wasted and the location in the value chain where the innovation takes place.

The calculation of the embedded impacts in food products is based on the types and amounts of food products reported and the stage of the supply chain where the FLW is avoided. The JRC (Caldeira et al., 2019) developed background data for the environmental impact for the production of 32 food commodities, representing the impacts of food consumption of an average European citizen. The background data encompasses five stages of the food supply chain (agricultural production, processing, packaging, retail and use), based on Notarnicola et al. (2017) and Omolayo et al. (2021). This background data will be applied within LOWINFOOD and extended/adapted if required.

Type B data covers FLW management practices. Environmental impacts related to FLW management practices are taken from Ecoinvent 3 database and adapted to national conditions as well as from other secondary literature, if necessary (e.g. Östergren et al. (2018)).

Type C data covers all activities related to the innovation action. The environmental impacts are estimated considering the following proxies: transport, storage or other additional treatment options, packaging, use of computer devices. This information will be provided by the user, and is then combined with the average impacts associated with 1 km of transport of 1 kg of food in a specific transport vehicle. Background data will be taken from suitable LCI databases (e.g. Ecoinvent 3 database by Ecoinvent Centre, 2019). The list of proxies might be expanded during the demonstration phase to enable a more comprehensive assessment of the action impacts. An overview of the proxy data used is provided in Table 1.

Component	Process data collected within LOWINFOOD (so-called proxy data)	Inventory data to model background system (potential sources, will be complemented during the project):
Type A data, substituted product	Food products Stage of the FSC	(Notarnicola et al., 2017) if required additional products will be modelled based on PEF agricultural model (Zampori and Pant, 2019)
Type B data, baseline system replaced	FLW treatment options	(Ecoinvent Centre, 2019) (Östergren et al., 2018) Other LCA studies
Type C data, innovation action	Transport Packaging Other activities (e.g. storage, unpacking) Use of computer devices	(Ecoinvent Centre, 2019) Other LCA studies

Table 1: Summary of proxy data used and respective data sources in the calculation of net environmental benefits.

Data quality

The required level of detail to obtain both a robust but feasible evaluation is discussed within the task team and the companies implementing the innovations. Data can be obtained from various sources, which can be linked to specific data quality aspects (see Figure 2):

- Primary data from direct quantification: Examples: packaging material and weight, type of food products.
- Primary data from records or databases: best option, Examples: type of food product, location; this data is asked to be shared and used for the evaluation.
- Primary data obtained in surveys: questionnaires are distributed to actors of the supply chain to ask for further information and data. Examples: transport distance, means of transport.
- Secondary data obtained from national studies, sectoral studies etc.: Examples: type of bread.
- Estimations obtained in surveys: Examples: share of FLW management options.
- Estimations obtained from experts: Examples: share of FLW management options, transport distances.

The collection of data can take place basically in two options:

- For each food transaction or food prevention action: if feasible, then data shall be collected for each single action (maximum requirement)
- For a set of food transaction or food prevention action; if first is not feasible, then data shall be collected for a set of action (e.g. share of FLW management options per food product, share of means of transport of all companies involved)

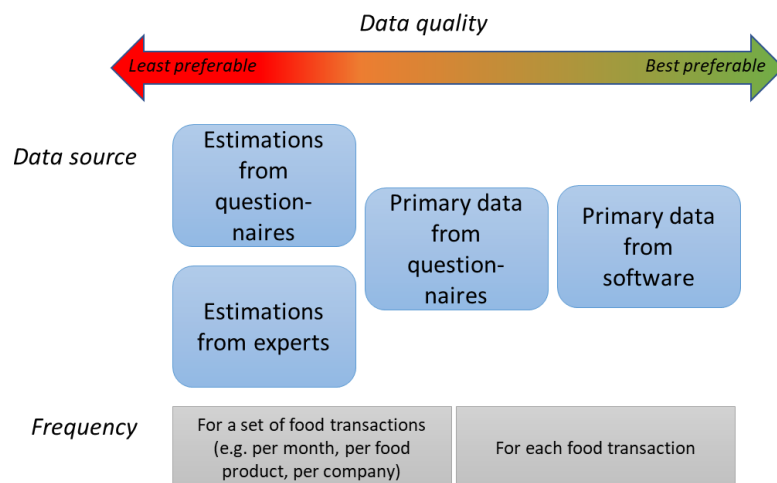


Figure 2: Data quality

3. Data needs

Food commodity (type A data)

The embedded impacts in food products are calculated based on the types and amounts of food products reported and the stage of the supply chain where the FLW is avoided. The amount of FLW and/or food products is reported in the efficacy part of the evaluation (see D1.2). The type of food products is based on food categories/commodities. For each type of food commodity covered in the innovations, specific indicator products need to be defined, either by expert consultation or by individual information from the innovation database. Direct identification of types of food products will take place in Task 3.3 and Task 5.5. Challenges are observed in identifying meals in the food service which are representative and can serve as 'indicator meals'. Table 2 shows an overview of the type of food commodity and the data source to identify indicator products.

Innovation ID (Task No.)	Innovation Title	Action group	Type of food commodity	Data source to identify indicator products
T2.1	RER Software for F&V	Redistribution	Fruits, Vegetables	Innovation database
T2.2	UNV cooperation system for F&V	Redistribution	Fruits, Vegetables	Innovation database
T2.3	Leroma B2B digital market place	Redistribution	Fruits, Vegetables	Innovation database
T2.4	FORESIGHTEE software for packed F&V	Supply chain efficiency	Fruits, Vegetables	Innovation database
T3.1	Supplier-retailer agreements	Governance	Bakery products	Expert consultation
T3.2	Stakeholder dialogue in the bread value chain	Governance	Bakery products	Expert consultation
T3.3	FT Software for bakeries	Supply chain efficiency	Bakery products	direct identification by the task team
T4.1	Stakeholder dialogue in the fish value chain	Governance	Fish products	Expert consultation
T4.2	Leroma B2B digital market place	Redistribution	Fish residues and products	Innovation database
T5.1	KITRO Innovative bin	Supply chain efficiency	Fresh or processed food (ingredients),	Innovation database
T5.2	MITAKUS Forecasting software for restaurants	Supply chain efficiency	Fresh or processed food (ingredients), prepared meals	Innovation database
T5.3	MATOMATIC Plate waste tracker	Consumer behaviour	Prepared meals	Expert consultation
T5.4	SLU/AIE Holistic educational approach	Consumer behaviour	Prepared meals	Expert consultation
T5.5	CozZo Mobile app	Consumer behaviour	ALL food commodities	Household survey and waste sorting analysis
T5.6	REGUSTO Mobile app	Consumer behaviour	Prepared meals	Household survey

Table 2: Type of food commodity per innovation and data source for the identification of indicator products (type A data).

The stage of the supply chain where the FLW is avoided is relevant to consider up-stream emissions in the environmental assessment. The supply chain encompasses five stages of the food supply chain: primary production (PP), food processing (FP), wholesale, retail and distribution (RD), food service (FS), consumer (C). They are illustrated in Table 3 for each innovation.

Innovation ID	Innovation Title	PP	FP	RD	FS	C
T2.1	RER Software for F&V					
T2.2	UNV cooperation system for F&V					
T2.3	Leroma B2B digital market place					
T2.4	FORESIGHTEE software for packed F&V					
T3.1	Supplier-retailer agreements					
T3.2	Stakeholder dialogue in the bread value chain					
T3.3	FT Software for bakeries					
T4.1	Stakeholder dialogue in the fish value chain					
T4.2	Leroma B2B digital market place					
T5.1	KITRO Innovative bin					
T5.2	MITAKUS Forecasting software for restaurants					
T5.3	MATOMATIC Plate waste tracker					
T5.4	SLU/AIE Holistic educational approach					
T5.5	CozZo Mobile app					
T5.6	REGUSTO Mobile app					

Table 3: Affected steps (in grey) of the food supply chain before FLW is prevented per innovation (type A data).

Replaced FLW management (type B data)

For the calculation of environmental impacts of the replaced FLW management, different waste treatment options need to be considered. Possible waste treatment options differ between stakeholders acting in the specific supply chains but also food commodities. While reworking or the valorisation to food products is a major focus with returned bread and bakery products at the bakery sector, this is not a focus in other sectors. Also, households will not be able to tell, if separately collected organic waste is treated in a composting or anaerobic digestion plant in the end. So, specific options were suggested as answering possibilities in the different questionnaires. In two innovations (T5.1, T5.2) an open question was formulated regarding FLW management. This is because the information only needs to be retrieved once (contrary to multiple users involved in other innovations) and a good and close relationship is given in case of any further questions. An overview can be found in Table 4.

Innovation ID (Task No.)	Innovation Title	Food donation to charities/ food banks	Re-working	Valorisation to food ingredients	Other valorisation (e.g. biobased materials, biochem. process)	Feeding to pets	Home-composting	Animal feed	Recycling (incl. Composting, ethanol prod., biogas prod.)	Composting	Anaerobic digestion	Incineration	Plough-in/not-harvested	Landfill	Sewer	Municipal or commercial solid waste collection system ('residual waste bin')	Separate collection system for organic waste ('organic waste bin')	Other
T2.1	RER Software for F&V							x	x				x			x		x
T2.2	UNV cooperation system for F&V							x		x	x		x			x		x
T2.3	Leroma B2B digital market place			x	x			x		x	x	x						x
T2.4	FORESIGHTEE software for packed F&V	x						x		x	x	x						x
T3.1	Supplier-retailer agreements	x	x	x				x		x	x	x						x
T3.2	Stakeholder dialogue in the bread value chain	x	x	x				x		x	x	x						x
T3.3	FT Software for bakeries	x	x	x				x		x	x	x						x
T4.1	Stakeholder dialogue in the fish value chain							x		x	x	x						x
T4.2	Leroma B2B digital market place			x	x			x		x	x	x						x
T5.1	KITRO Innovative bin	open question																
T5.2	MITAKUS Forecasting software for restaurants	open question																
T5.3	MATOMATIC Plate waste tracker	x								x	x	x				x	x	x
T5.4	SLU/AIE Holistic educational approach	x								x	x	x				x	x	x
T5.5	CoZo Mobile app	x				x	x									x	x	x
T5.6	REGUSTO Mobile app																	
	restaurants							x		x	x	x	x	x	x			x
	households	x				x	x									x	x	x

Table 4: FLW management options addressed for each innovation (type B data).

Activities of the innovation action (type C data)

Activities of the innovation action include transport, packaging, storage and other treatment options as well as the use of technical equipment (computer, scales etc.). Table 5 shows an overview which data proxy is considered per innovation. The information is mostly retrieved from the questionnaires (see Annex) and only in a few cases from expert consultations. Except for proxies used to assess the impacts from computer devices. Here, information from the software provider is relevant (e.g. on the type and location of server capacity). However, this information can be provided only once per innovation.

Innovation ID (Task No.)	Innovation Title	Use of technical equipment	Transport	Packaging	Storage	Other activities
T2.1	RER Software for F&V	Incl.	Incl.	Incl.	Incl.	
T2.2	UNV cooperation system for F&V	Incl.	Incl.	Incl.	Excl.	
T2.3	Leroma B2B digital market place	Incl.	Incl.	Incl.	Incl.	Unpacking, shredding, heating, hygienisation,
T2.4	FORESIGHTEE software for packed F&V	Incl.	Excl.	Incl.	Excl.	Unpacking, other
T3.1	Supplier-retailer agreements	Excl.	Excl.	Excl.	Excl.	
T3.2	Stakeholder dialogue in the bread value chain	Excl.	Excl.	Incl.	Excl.	
T3.3	FT Software for bakeries	Incl.	Excl.	Excl.	Excl.	
T4.1	Stakeholder dialogue in the fish value chain	Excl.	Incl.	Incl.	Incl.	Unpacking, shredding, heating, hygienisation,
T4.2	Leroma B2B digital market place	Incl.	Incl.	Incl.	Incl.	Unpacking, shredding, heating, hygienisation,
T5.1	KITRO Innovative bin	Incl.	Excl.	Excl.	Excl.	
T5.2	MITAKUS Forecasting software for restaurants	Incl.	Excl.	Excl.	Excl.	
T5.3	MATOMATIC Plate waste tracker	Incl.	Excl.	Excl.	Excl.	
T5.4	SLU/AIE Holistic educational approach	Excl.	Excl.	Excl.	Excl.	
T5.5	CozZo Mobile app	Incl.	Incl.	Excl.	Excl.	
T5.6	REGUSTO Mobile app	Incl.	Incl.	Incl.	Incl.*	

*only storage at households is considered here, not at restaurants.

Table 5: Possible activities of the FLW prevention actions considered for each innovation (type B data).

As many of the innovations include software programs or apps, the use of computer devices will become a prominent point regarding the activities in the innovation action. The influence on the total environmental performance is not at all clear, but looking at the impact factors of computer production (e.g. mining of precious but also critical metals) but also its usage (e.g. electricity demand) the relevance is not negligible. For this reason, data proxies on the use of computer devices are asked for:

- Type and location of server
- Server capacity
- Type of device used for the innovation
- Duration of using the device

Additionally, technical equipment such as scales (e.g. in T5.1 and T5.3) are also considered.

For the calculation of environmental impacts from transports, different means of transport need to be considered. In LOWINFOOD innovations, the following set of transport vehicles is proposed as answering possibilities to the respondents of the questionnaires:

- tractor with single trailer
- tractor with double trailer
- truck with semi-trailer 28-34t
- rigid truck 20-26t
- rigid truck 20-26t with cooling unit
- other

Stakeholders, which have direct influence on the transport activities, are also asked about the type of fuel (gasoline/diesel/vegetable oil/gas/other).

In case of consumer travel (T5.5, T5.6) the following options are considered:

- car
- bike
- bus
- train
- scooter
- by foot
- other

Innovations that consist of FLW prevention actions targeting supply chain efficiency (e.g. forecasting) and governance (e.g. stakeholder dialogue) were not adjusted with transport, as their innovation action doesn't include transport activities. Only, if stakeholder dialogue aims at specific activities on food redistribution (T4.1), then transport activities are also considered.

In case of packaging, following packaging materials are proposed for the respondents of the questionnaires:

- plastic
- bioplastic
- cardboard
- paper
- metal
- composite
- other

If the packaging is reusable or for single use only, is also addressed with specific questions; so is the specific weight of the packaging (kg/kg product).

Next to transport, packaging and the use of computers, other activities shall also be covered. Other activities include storage or packing/unpacking. In case of valorisation, also other treatment methods need to be regarded such as shredding, heating or hygienisation.

4. Outlook

Next to the collection of primary data from the innovations, additional research is necessary for generating a complete and meaningful life cycle inventory:

- Impact factors of specific food products: manual calculation of impact factors by the PEF method, if impact factors for specific food products are not available in secondary literature.
- Impact factors of materials not covered in available LCI database: e.g bioplastic
- Influence of the use of computer devices
- Environmental costs

The impact assessment and interpretation will be conducted in the upcoming years. Results will be published in future LOWINFOOD Deliverables (D1.7, D1.8). A careful distribution of work among task partners will be discussed in regular task meetings regarding:

- compilation of a life cycle inventory for each innovation
- implementation of the impact assessment for each innovation
- interpretation of results
- writing of the deliverables
- publication plans
- consolidation with evaluation results of efficacy and socio-economic impacts

The interpretation of the results will be organised in a multi-actor approach to maximize the improvement potential for innovation actions and to foster replication.

5. References

- BERNSTAD SARAIVA SCHOTT, A. & CÁNOVAS, A. 2015. Current practice, challenges and potential methodological improvements in environmental evaluations of food waste prevention – A discussion paper. *Resources, Conservation and Recycling*, 101, 132-142.
- CALDEIRA, C., DE LAURENTIIS, V. & SALA, S. 2019. Assessment of food waste prevention actions, EUR 29901 EN. In: UNION, P. O. O. T. E. (ed.) *JRC Technical Reports*. Luxembourg: Joint Research Centre.
- CALDEIRA, C., SARA, C. & SERENELLA, S. 2017. Food waste accounting. - Methodologies, challenges and opportunities, EUR 28988 EN ; Luxembourg (Luxembourg): Publications Office of the European Union; 2017; JRC109202 ; doi:10.2760/54845
- ECOINVENT CENTRE 2019. Ecoinvent database v3.6.
- EUROPEAN COMMISSION 2010. International Reference Life Cycle Data System (ILCD) handbook. General Guide for Life Cycle Assessment. Detailed Guidance. Luxembourg: Joint Research Centre - Institute for Environment and Sustainability.
- ISO 2006a. Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006). Geneva, Switzerland: International Organization for Standardization.
- ISO 2006b. Environmental management -Life cycle assessment - Requirements and guidelines (ISO 14044:2006). Geneva, Switzerland: International Organization for Standardization.
- NOTARNICOLA, B., TASSIELLI, G., RENZULLI, P. A., CASTELLANI, V. & SALA, S. 2017. Environmental impacts of food consumption in Europe. *Journal of Cleaner Production*, 140, 753-765.
- OBERSTEINER, G. & SCHERHAUFER, S. 2020. Environmental impact of food waste. In: GALANAKIS, C. (ed.) *Environmental Impact of Agro-Food Industry and Food Consumption*. London: Elsevier.
- OMOLAYO, Y., FEINGOLD, B. J., NEFF, R. A. & ROMEIKO, X. X. 2021. Life cycle assessment of food loss and waste in the food supply chain. *Resources, Conservation and Recycling*, 164, 105119.
- ÖSTERGREN, K., SCHERHAUFER, S., DE MENNA, F., CARCIA HERRERO, L., GOLLNOW, S., DAVIS, J. & VITTUARI, M. 2018. Simplified LCA & LCC of food waste valorisation. Description of standardised models for the valorisation spreadsheet tool. Report of the EU Horizon 2020 REFRESH. D5.4.



SCHERHAUFER, S., MOATES, G., HARTIKAINEN, H., WALDRON, K. & OBERSTEINER, G. 2018. Environmental impacts of food waste in Europe. *Waste Management*, 77, 98-113.

ZAMPORI, L. & PANT, R. 2019. Sugestions for updating the Product Environmental Footprint (PEF) method. Luxembourg: Publications Office of the European Union.



6. Annex: Preliminary Questionnaires – Status: Oct 31st, 2021

Please note that questionnaires below represent only a preliminary version. The discourse between partners conducting the evaluation and partners supporting the demonstration tasks has started, but has not been completed, yet (“multi-actor approach”, see also D1.1). A final set of questionnaires reaching a consensus need to be produced upon distribution or upon conducting the first interviews.

Consistency and completeness check

A consistency and completeness check was conducted by evaluation partners:

- UNIBO for efficacy related questions
- JHI for socio-economic related questions
- BOKU for environmental related questions
- ELH for gender related questions
- UNIBO; JHI; BOKU for questions related to the complete questionnaire

Feedback loops

After the consistency and completeness check, data facilitators were asked to accept or decline proposed changes and also include remarks for open discussions. This discussion process is still ongoing. So, several feedback loops will still be necessary before a consolidated version of questionnaires can be finalized.

Parts of the questionnaires which still need to be discussed or consolidated are therefore marked in grey and bold letters.

Clarifications on ‘gender equality’

We will include a gender perspective and ensure **gender equality** throughout the evaluation, disaggregating data by sex, accounting for multiple inequalities and for women’s needs.

Data will be collected disaggregated by sex using the categories *female, male, other* and *prefer not to say*. In this way different gender identities will have visibility.

The age of the participants will be another indicator to be taken into account. Both vertical and horizontal segregation will also be analysed by asking participants about the position and sector to which they belong to, and the satisfaction of each person with the questionnaire will be taken into account.

In the case of the innovation to be carried out at household level, the types of families will be analysed according to the age and sex of each member and an attempt will be made to ensure the participation of different types of families.

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T2.1: RER Software for F&V

1 Regional authorities (before implementation)

1a. Questionnaire to be filled by regional authorities at the beginning of the task

A. Regional authority identification

1. Region
2. Nation
3. Department
4. Number of employees in the Department, by gender
5. Number of POs and APOs in the Region
6. Number of charities in the Region
7. Number of ethanol producing plants in the Region

B. Use of S.I.R.: participating actors, type of products, software information

1. How many charities, ethanol producing plants, POs and APOs are participating/willing to participate in the S.I.R. software? [number]
2. Please list the range of products involved in the innovation? [qualitative information]

C. Gender and survey satisfaction

3. Age and gender of the respondent.
4. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

2 Regional authorities (after implementation)

1b. Questionnaire to be filled by regional authorities at the end of the task

A. Use of S.I.R.: costs, employment, skills, contacts

1. *What has been the total cost of implementing the innovation (e.g. additional/new capital investment, labour, training etc.)? [qualitative information + number]*
2. Have you developed any new streams of income or financial gains (i.e., new products or avoid costs) as a result of participating in the innovation? [yes/no]

- If yes, please specify their amount and typology [amount in Euro of each new stream]
- 3. Please list all employees who have been involved in the use of S.I.R. software, by gender, age and role. [department, level of responsibility, if it is a decision-making position or not]
 - Did your company need to hire new personnel (including casual workers) in order to use S.I.R. software? [yes/no]
 - If yes, how many (by gender)? [numeric information and qualitative information]
 - Is there any increase/decrease of hours worked due to the innovation? Please, if possible, disaggregated by gender [multiple choice: increase/decrease]
- 4. What is the number and type of FTE jobs created for (or lost due to) the implementation of the innovation (if this is only a share of time of one or more employees, indicate the cumulated share in FTE)? In doing this, male female and non-binary employees' hours should be recorded separately. [number and qualitative information]
- 5. Have you made any new contacts ?What is the type of new contacts you have made in and out of your own sector as a result of your involvement in the S.I.R. Software? [qualitative information]
- 6. Are you willing to continue the relationships with these new contacts? [Likert scale: from 1 "very unlikely" to 5 "very likely"]
- 7. Have you suggested or are you willing to suggest the use of S.I.R. Software to other actors? [yes, I did / yes, I will / no]
 - Number and type of actors to which you suggested to use S.I.R. software, if any. [number and qualitative information]
 - Number of those who declared to be interested in it, if possible [number]
 - Number of those who have adopted it after you informed them, if possible [number]
- 8. How would you assess the time needed to learn how to properly use S.I.R. Software? [Likert scale from 1 "very little" to 5 "too much"]
- 9. How many employees have developed new skills thanks to the use of S.I.R. software, by gender?
 - Technological (use of pc software) [number and qualitative information]

- Technical (better understanding of how to manage food transactions) [number and qualitative information]
- Social/relational (with other users of the software, if relevant) [number and qualitative information]

B. Use of S.I.R.: participating actors, type of products, software information

1. How many charities, ethanol producing plants, POs and APOs have participated in the S.I.R. software? [Number for each type of actor]
2. Could you list the range of products involved in the innovation? [qualitative information]
3. Is the type of product registered in the software? [yes/no]
4. Is the region of the POs/APOs listed in the software? [yes/no]
5. Is the region of the surplus food receiver listed in the software? [yes/no]
6. Has the software provider information about the server capacity? [yes/no]
7. *If you had to acquire a new computer to use S.I.R., please specify:*
 - *The location of the server [qualitative information]*
 - *Server capacity [quantitative information]*
 - *Amount of server capacity used for the S.I.R. software [% of total capacity];*
 - *Type of CPU [Intel Skylake/others (please specify)]*
 - *Type of device [tablet or iPad/computer/notebook/smartphone/other (please specify)]*
 - *Computer time used for operations related to S.I.R. [quantitative information]*
 - *Please specify the purposes for which you use the device other than the software, if any [qualitative information].*

C. Use of S.I.R.: software satisfaction

1. How much do you think that the participation in S.I.R. Software has improved the following aspects?
 - Trust with other stakeholders [Likert scale: from 1 “not at all” to 5 “a lot”]
 - Communication with other stakeholders [Likert scale: from “a lot” to “not at all”]
2. Has participation in the innovation met your expectations? [Likert scale from 1 “At all” to 5 “more than expected”]
3. How would you rate the S.I.R. software? [Likert scale from 1 “poorly” to 5 “very well”]

4. Are you willing to keep participating in the use of the S.I.R. software?
[yes/no]

D. Gender and survey satisfaction

1. Age and gender of the respondent.
2. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

3 RER Regione Emilia Romagna (once)

2. Questionnaire to be filled by REGIONE EMILIA ROMAGNA [only one time]

A. Regional authority identification

1. Region
2. Nation
3. Department
4. Number of employees in the Department, by gender
5. Number of POs and APOs in the Region
6. Number of charities in the Region
7. Number of ethanol producing plants in the Region

B. Use of S.I.R.: costs, employment, skills, contacts

1. Have you developed any new streams of income (i.e., new products or avoid costs) as a result of participating in the innovation of each new stream? [Qualitative information]
 - If yes, please specify their amount [quantitative information]
2. How much has been the total cost of implementing the innovation (e.g. additional/new capital investment, labor, training, etc.)? [qualitative information + number]
3. Please list all employees who have been involved in the use of S.I.R. software, by gender, age and role. [department, level of responsibility, if it is a decision-making position or not]
4. Did your company need to hire new personnel (including casual workers) in order to use S.I.R. software? [yes/no]
 - If yes, how many (by gender)? [numeric information + qualitative information]

- Is there any increase/decrease of hours worked due to the innovation?
Please, if possible, disaggregated by gender [multiple choice: increase/decrease]
- 5. What is the number and type of FTE jobs created for (or lost due to) the implementation of the innovation (if this is only a share of time of one or more employees, indicate the cumulated share in FTE)? In doing this, male, female and non-binary employees' hours should be recorded separately. [number and qualitative information]
- 6. What is the type of new contacts you have made in and out of your own sector as a result of your involvement in the S.I.R. Software? [qualitative information]
- 7. With how many of these new contacts are you willing to continue the relationship? ? [Likert scale: from 1 "none of them" unlikely" to 5 "all of them"]
- Can you specify particular reasons why you are willing or not to continue the relationship? [open question]
- 8. How would you assess the time needed to learn how to properly use S.I.R. Software? [Likert scale from 1 "very little" to 5 "too much"]
- 9. How many employees have developed new skills thanks to the use of S.I.R. software, by gender?
 - Technological (use of pc software) [number]
 - Technical (better understanding of how to manage food transactions) [number]
 - Social/relational (with other users of the software, if relevant) [number]
- 10. How many phone calls or emails has RER received due to issues and difficulties related to the use of the software and or with the redistribution of surplus food? [number]
 - Please list the typologies of issue agencies, charities, ethanol producing plants reported? (i.e. issues with the platform, issues with donations) [qualitative information]

C. Gender and survey satisfaction

1. Age and gender of the respondent
2. Level of satisfaction with the survey. [Likert scale: from 1 "very satisfied" to 5 "not at all satisfied"]

4 POs and APOs (before implementation)

3a. Questionnaire to be filled by POs and APOs at the beginning of the task

A. Producer organization/Association of producers organization identification

1. Region
2. Nation
3. Number of producers enrolled in the PO/APO in the Department, by gender
4. Number of employees, by gender

B. Food waste: awareness, attitudes and commitment

1. What is the staff's self-assessment of awareness of food waste levels in the organization? Please disaggregate by gender [Likert scale: from 1 "fully aware" to 5 "not aware at all"]
2. Attitude towards food waste: (1) how concerned/worried the respondent is about the problem of food waste in the organization. Please disaggregate by gender [Likert scale: from 1 "very concerned" to 5 "not at all concerned"]; and (2) commitment to reduce/limit food waste in their company. Please disaggregate by gender [Likert scale: from 1 "the main priority" to 5 "not at all a priority"]

C. Use of S.I.R.: surplus food, costs, employment and waste disposal before the innovation

When answering these questions, please provide data for your organization and disaggregate as much as possible the same data at farmers level

1. What are the fixed costs associated with withdrawals disposal, sales to ethanol producers, and donation to charities in the absence of innovation? Fixed costs are defined as costs that do not change with the amount transferred [qualitative information]
 - How much do these costs amount to? [quantitative information]
2. What are the variable costs with withdrawals, payments, deliveries of disposal, sales to ethanol producers, and food donation to charities in the

- absence of innovation)? Variable fixed costs are defined as costs that change with the amount of food transferred [qualitative information]
- How much do these costs amount to? [quantitative information]
3. What happened to the surplus food before? [multiple choice: A) Left on the field B) spread onto land C) animal feed D) recycling (composting, ethanol production, biogas production, etc.) E) Municipal solid waste collection F) Other: please specify]
 4. How much of the surplus food has to be disposed of through waste processors? [quantitative information]
 5. What is the unit or total cost of organic waste disposal (depending on the charging scheme of the disposal service provider)? [quantitative information + multiple choice: flat rate/fixed rate]
 6. Are you making profits from your organic waste? [yes/no]
 - If yes, how much? [quantitative information]

D. Gender and survey satisfaction

1. Age and gender of the respondent.
2. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

5 POs and APOs (after implementation)

3b. Questionnaire to be filled by POs and APOs at the end of the task

A. Food waste: awareness, attitudes and commitment

When answering these questions, please provide data for your organization and disaggregate as much as possible the same data at farmers level

1. *What is the staff's self-assessment of awareness of food waste levels in the organization? Please disaggregate by gender [Likert scale: from 1 “fully aware” to 5 “not aware at all”]*
2. *Attitude towards food waste: (1) how concerned/worried the respondent is about the problem of food waste in the organization. Please disaggregate by gender [Likert scale: from 1 “very concerned” to 5 “not at all concerned”]; and (2) commitment to reduce/limit food waste in their company. Please disaggregate by gender [Likert scale: from 1 “the main priority” to 5 “not at all a priority”]*

To which extent do you agree to the following statements? (to be answered individually by the staff members also indicating gender, position and age)

	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>Food loss and waste are major issues for the sustainability of food systems</i>					
<i>Food loss and waste are major issues in the food production sector</i>					
<i>Food loss and waste are major issues on this organization (or farm)</i>					
<i>I am concerned about the costs of food loss and waste on this farm</i>					
<i>I am concerned about the environmental impact of the food loss and waste</i>					
<i>I am committed to reduce the food loss on this farm</i>					

B. Participation in the S.I.R. software: difficulty, resources, satisfaction

When answering these questions, please provide data for your organization and disaggregate as much as possible the same data at farmers level

1. Please list all employees who have been involved in the use of S.I.R. software, by gender, age and role. [department, level of responsibility, if it is a decision-making position or not]

- Did your company need to hire new personnel (including casual workers) in order to use S.I.R. software? [yes/no]
 - If yes, how many (by gender)? [numeric information + qualitative information]
 - Is there any increase/decrease of hours worked due to the innovation? Please, if possible, disaggregated by gender [multiple choice: increase/decrease]
2. What is the number and type of FTE jobs created for (or lost due to) the implementation of the innovation (if this is only a share of time of one or more employees, indicate the cumulated share in FTE)? In doing this, male and female employees' hours should be recorded separately. [quantitative and qualitative information]
 3. How many hours per day per person were needed to participate in the platform? Please, if possible, disaggregated by gender [quantitative information]
 4. How would you assess the time needed to learn how to properly use S.I.R. Software? [Likert scale from 1 "very little" to 5 "too much"]
 5. How difficult was it to start using the innovation? [Likert scale: from 1 "not at all" to 5 "more than expected"]
 6. How many employees have developed new skills thanks to the use of S.I.R. software, by gender? [quantitative information]
 - Technological (use of pc software) [number]
 - Technical (better understanding of how to manage food transactions) [number]
 - Social/relational (with other users of the software, if relevant) [number]
 7. What is the type of new contacts you have made in and out of your own sector as a result of your involvement in the S.I.R. Software, if any? [qualitative information]
 8. With how many of these new contacts are you willing to continue the relationship? ? [Likert scale: from 1 "none of them"very unlikely" to 5 "all of them "very likely"]
 - Can you specify particular reasons why you are willing or not to continue the relationship? [open question]
 9. Have you suggested or are you willing to suggest the use of S.I.R. Software to other actors? [yes, I did / yes, I will / no]

- Number and type of actors to which you suggested to use S.I.R. software, if any. [number]
 - Number of those which declared to be interested in, if possible [number]
 - Number of those who have joined it after you informed them, if possible [number]
10. How much do you think that the participation in S.I.R. Software has improved the following aspects?
- Trust with other stakeholders [Likert scale: from 1 “not at all” to 5 “a lot”]
 - Communication with other stakeholders [Likert scale: from “a lot” to “not at all”]
11. Has participation in the innovation met your expectations? [Likert scale from 1 “At all” to 5 “more than expected”]
12. How would you rate the S.I.R. software? [Likert scale from 1 “poorly” to 5 “very well”]
13. Are you willing to keep participating in the use of the S.I.R. software? [yes/no]

C. Use of S.I.R.: costs, economic benefits, waste, transport and satisfaction

When answering questions number 1, 2, 6, 8, 9, 11, 12, please provide data for your organization and disaggregate as much as possible the same data at farmers level

1. What are the fixed costs associated with withdrawals disposal, sales to ethanol producers, and donation to charities in the absence of innovation? Fixed costs are defined as costs that do not change with the amount transferred [qualitative information]
 - How much do these costs amount to? [quantitative information]
2. What are the variable costs with withdrawals, payments, deliveries of disposal, sales to ethanol producers, and food donation to charities in the absence of innovation)? Variable fixed costs are defined as costs that change with the amount of food transferred [qualitative information]
 - How much do these costs amount to? Variable fixed costs are defined as costs that change with the amount of food transferred. [quantitative information]

3. What is the change in the annual balance (due to additional income or avoided cost) resulting from the innovation? [quantitative information]
4. What has been the total cost of implementing the innovation? (e.g. additional/new capital investment, labour, training, etc.) [quantitative information]
5. Have you developed any new streams of income (i.e., new products or avoid costs) as a result of participating in the innovation? [Qualitative information]
 - If yes, please specify their amount [quantitative information]
6. How many recoveries have you successfully completed? [number]
7. How many farmers were able to restore 100% of their production costs thanks to the platform?
 - Please disaggregate the number of farmers by gender and the total number of farmers who will participate in the innovation.
8. How many farmers were able to restore 50% of their production costs thanks to the platform?
 - Please disaggregate the number of farmers by gender and the total number of farmers who will participate in the innovation.
9. How much of the surplus food has to be disposed of through *ethanol producers/or more general waste processors*? [quantitative information]
10. What is the unit or total cost of organic waste disposal (depending on the charging scheme of the disposal service provider)? [quantitative information]
11. Are you making profits from your organic waste? [yes/no]
 - If yes, how much [quantitative information]

D. Use of S.I.R.: Transportation

1. Who organizes the transport of surplus food to charities/ethanol producing plants, i.e., seller (food surplus supplier)? [qualitative information]
2. Which type of transport is used for surplus food? A) Tractor with single trailer B) tractor with double trailer C) Truck with semi-trailer 28-34t D) Rigid truck 20-26t E) Rigid truck 20-26t with cooling unit F) Other: please specify
 - In the case of a forwarder, which forwarding agency is used? [qualitative information]

3. Which type of fuel is used to transport products to ethanol production?
[multiple choice: diesel/vegetable oil/electricity/others, please specify]
4. Is the food distributed to charities packed? [yes/no]
 - If yes, do you use reusable packaging [yes/no]
 - If yes, which type of packaging is used? [reusable/single use]
 - If yes, what is the weight of the packaging in kg per kg distributed food? [quantitative information]
5. Is the food distributed to ethanol producing plants packed?
 - If yes, do you use reusable packaging [yes/no]
 - If yes, which type of packaging is used? [reusable/single use]
 - If yes, what is the weight of the packaging in kg per kg distributed food?
6. Were there any empty returns? [yes/no]
7. Was the same vehicle used for additional orders other than charities/ethanol production plants? [yes/no]
 - If yes, please specify for which additional purposes the same transportation was used [qualitative information]
8. Can you indicate the fill rate of the vehicle? [%]
9. Was the surplus food stored before transferring to charities [Yes/No]
10. If yes, please specify: (1) the typology of storage; (2) the time of storage; (3) whether a cooling unit was required; (4) an estimate of the storage cost (electricity, etc.); (5) whether it is a cost you would have incurred regardless of this transaction

E. Gender and survey satisfaction

1. Age and gender of the respondent.
2. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

6 Charitable organizations (before implementation)

4a. Questionnaire to be filled by charitable organizations at the beginning of the task

A. Charitable organization identification

1. Region
2. Nation
3. Number of employees, by gender

4. Number of meals distributed per year
5. How do you provide food to indigent people? [Multiple choice: A) fresh food B) finished or semi-finished products C) prepare food at charity and provide meals D) others]
6. How many meals do you provide per week ?

B. Food waste: awareness, attitudes and commitment

1. What is the staff's self-assessment of awareness of food waste levels in the charitable organization? Please disaggregate by gender [Likert scale: from 1 "fully aware" to 5 "not aware at all"]
2. Attitude towards food waste: (1) how concerned/worried the respondent is of the problem of food waste in the organization. Please disaggregate by gender [Likert scale: from 1 "very concerned" to 5 "not at all concerned"]; and (2) commitment to reduce/limit food waste in their company. Please disaggregate by gender [Likert scale: from 1 "the main priority" to 5 "not at all a priority"]

C. Gender and survey satisfaction

1. Age and gender of the respondent.
2. Level of satisfaction with the survey. [Likert scale: from 1 "very satisfied" to 5 "not at all satisfied"]

7 Charitable organizations (after implementation)

4b. Questionnaire to be filled by charitable organizations at the end of the task

A. Food waste: awareness, attitudes and commitment

1. What is the staff's self-assessment of awareness of food waste levels in the charitable organization? Please disaggregate by gender [Likert scale: from 1 "fully aware" to 5 "not aware at all"]
2. Attitude towards food waste: (1) how concerned/worried the respondent is about the problem of food waste in the organization. Please disaggregate by gender [Likert scale: from 1 "very concerned" to 5 "not at all concerned"]; and (2) commitment to reduce/limit food waste in their company. Please disaggregate by gender [Likert scale: from 1 "the main priority" to 5 "not at all a priority"]

B. Use of S.I.R.: meals and storage

1. *As a result of the innovation, were you able to provide more fruits & vegetables in the meals you distribute? [Likert scale from 1 "no, we provide way less fruits and vegetables in the meals than before" to 5 "yes, we provide more fruits and vegetables in the meals than before"] Is the surplus food stored? [yes/no]*
2. If yes, where is the surplus food stored (i.e., cooling units)? [qualitative information]

C. Use of S.I.R.: costs, employment, skills, contacts, satisfaction

1. What has been the total cost of implementing the innovation (e.g. additional/new capital investment, labor, training, etc.)? [qualitative information + number]
2. Have you developed any new streams of income (i.e., new products or avoid costs) as a result of participating in the innovation? [yes/no + qualitative information]
 - If yes, please specify their amount [quantitative information]
3. Please list all the people who have been involved in the use of S.I.R. software, by gender, job grade (if he/she is volunteering), and role, level of responsibility, if it is a decision-making position or not [list with qualitative information]
4. How many hours per day per person were needed to participate in the platform? Please, if possible, disaggregated by gender [quantitative information]
5. Is there any increase/decrease of hours worked due to the innovation? Please, if possible, disaggregated by gender [multiple choice: increase/decrease]
6. How would you assess the time needed to learn how to properly use S.I.R. Software? [Likert scale from 1 "very little" to 5 "too much"]
7. How difficult was it for the charitable organization to start using the platform? [Likert scale: from 1 "not all" to 5 "more than expected"]
8. How many employees have developed new skills thanks to the use of S.I.R. software (disaggregated by gender: women, men, non-binary)? [quantitative + qualitative information]
 - Technological (use of pc software) [number]
 - Technical (better understanding of how to manage food transactions) [number]

- Social/relational (with other users of the software, if relevant)
[number]
- 9. Has the innovation met your expectations? [Likert scale from 1 “At all” to 5 “more than expected”]
- 10. How would you rate the innovation? [Likert scale from 1 “poorly” to 5 “very well”]
- 11. Are you willing to keep participating in the use of the S.I.R. software? [yes/no]
- 12. What is the type of new contacts you have made in and out of your own sector as a result of your involvement in the S.I.R. Software? [qualitative information]
- 13. With how many of these new contacts are you willing to continue the relationship? ? [Likert scale: from 1 “none of them”very unlikely” to 5 “all of them “very likely”]
- Can you specify particular reasons why you are willing or not to continue the relationship? [open question]
- 14. Have you suggested or are you willing to suggest the use of S.I.R. Software to other actors? [yes, I did / yes, I will / no]
- Number and type of actors to which you suggested to use S.I.R. software, if any. [quantitative and qualitative information]

D. Gender and survey satisfaction

1. Age and gender of the respondent.
2. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

8 Ethanol producing plants (before implementation)

5a. Questionnaire to be filled by ethanol producing plants at the beginning of the task

A. Ethanol producing plant identification

3. Region
4. Nation
5. Number of employees, by gender
6. Maximum capacity of the plant and its utilization per year

B. Activities and costs in the absence of the innovation



7. What would be the theoretical cost (unitary cost) of food waste materials you receive through RER if you had purchased these food inputs at their full market price? [quantitative and qualitative information]
8. Did you pay (and if so, how much did you pay) for this input (withdrawals) through RER? (unitary cost of surplus food * unitary amount of the surplus food). [quantitative information]
9. What are the fixed costs of arranging product withdrawals or other sources of food waste for your waste processing plant in the absence of innovation? [qualitative and quantitative information]
10. What and how much are fixed costs of input for ethanol production at your plant in the absence of innovation? Fixed costs are defined as costs that do not change with the amount of food waste transferred [quantitative and qualitative information]
11. What are variable costs of arranging product withdrawals or other sources of food waste for your waste processing plant in the absence of the RER innovation? Variable costs are defined as costs that change with the amount transferred [quantitative and qualitative information]
12. How much are the variable costs of receiving produce withdrawals and disposal e.g. if they also occur in the absence of innovation?

C. Gender and survey satisfaction

13. Age and gender of the respondent.
14. Level of satisfaction with the survey. [Likert scale: from 1 "very satisfied" to 5 "not at all satisfied"]

9 Ethanol producing plants (after implementation)

5b. Questionnaire to be filled by ethanol producing plants at the end of the task

A. Food waste: awareness, attitudes and commitment

15. What is the staff's self-assessment of awareness of food waste levels in the ethanol producing plant? Please disaggregate by gender [Likert scale: from 1 "fully aware" to 5 "not aware at all"]
16. Attitude towards food waste: (1) how concerned/worried the respondent is about the problem of food waste in the ethanol producing plant. Please disaggregate by gender [Likert scale: from 1 "very concerned" to 5 "not at all concerned"]; and (2) commitment to reduce/limit food waste in their

company. Please disaggregate by gender [Likert scale: from 1 "the main priority" to 5 "not at all a priority"]

B. Use of S.I.R. Software: activities, employment, contacts, satisfaction

17. Do you sell the ethanol to other end users? [yes/no]
 - If yes, how much does the innovation change the value of your sales, or if they charge for processing, how did it change fees? [quantitative information]
18. Does the food received via the S.I.R. software require specific processing steps before using it in the plant (e.g. unpacking)? [yes/no]
19. What is the number of FTE jobs created for (or lost due to) the implementation of the innovation (if this is only a share of time of one or more employees, indicate the cumulated share in FTE)? [quantitative information]
 - For each worker please indicate gender.
 - For each worker please indicate job grade and if he/she is a decision-making position
20. How many hours per day per person were needed to participate in the platform? Please, if possible, disaggregated by gender [quantitative information]
 - Is there any increase/decrease of hours worked due to the innovation? Please, if possible, disaggregated by gender [multiple choice: increase/decrease]
21. How would you assess the time needed to learn how to properly use S.I.R Software? [Likert scale from 1 “very little” to 5 “too much”]
22. Are there any new end users of ethanol and/or surplus suppliers with which you came into contact as a result of your involvement in the innovation? [yes/no]
 - If yes, how many? [number]
 - If yes, which typology of actors? [qualitative information]
23. With how many of these new contacts are you willing to continue the relationship? ? [Likert scale: from 1 “none of them”very unlikely” to 5 “all of them “very likely”]
 - Can you specify particular reasons why you are willing or not to continue the relationship? [open question]
24. What is the change in the content and the amount of waste processed? [quantitative information]

25. Please list other activities related to the innovation [qualitative information]
- If you answered yes to question B2: is the unpacking done manually or automatically? [multiple choice: manually/automatically]
26. Are you willing to suggest the use of S.I.R. Software to other actors? [yes, I did / yes, I will / no]

C. Gender and survey satisfaction

1. Age and gender of the respondent.
2. Level of satisfaction with the survey. [Likert scale: from 1 "very satisfied" to 5 "not at all satisfied"]

10 Researchers

Information to be retrieved both by the researchers and through the software

IN GENERAL FOR ALL ACTORS

1. What happened to the surplus food before? (if possible)
2. Where did you dispose of it? (if possible)
3. Number of Charities/POs/agencies adopting the S.I.R. software in Emilia-Romagna
4. Location of surplus food ready for redistribution [postcodes]
5. Location of charities [postcodes]

FOR CHARITIES

6. What would be the theoretical cost (unitary cost) of food provision if you had purchased these food inputs at their full market price?
7. Did you pay (and if so, how much did you pay) for the food input (withdrawals) through the software? (unitary cost * unitary amount of the food processed or donated).
8. What are the fixed costs of withdrawals and donations in the absence of innovation? (Fixed costs are defined as costs that do not change with the amount of surplus food transferred.) How much do they amount to?
9. What are the variable costs of arranging produce withdrawals and then donating to charities or delivery to waste processors if they also occur in the absence of innovation? Variable fixed costs are defined as costs that change

with the amount of surplus food transferred. How much are the variable costs amount to?

10. What are the types of fruit and vegetable that have to be withdrawn?
11. What are the unit amounts of fruit and vegetable that have to be withdrawn?
12. What is the unit or total cost of organic waste disposal (i.e. fixed rate, flat rate etc. depending on the charging scheme of the disposal service provider)?

FOR FARMERS, POs and APOs

13. What are the original market prices of fruit and vegetables the producers produce?
14. How many withdrawals occur for each type (baseline)?
15. What is the price of fruit and vegetables withdrawn for waste processors or any income is created or cost avoided through donations?

We already know answers for questions:

Have you been able to access any subsidies/other monetary benefits as a result of the innovation and resulting transaction? [yes/no]

- How much? Are these one-time, periodical, fixed, or proportional to the amount of waste avoided? [multiple choice question: one-time/ periodical/ fixed/ proportional to the amount of waste avoided]

T2.2 UNV cooperation system for F&V

11 UNV Unverschwendet

Data provided per food transaction:

1. Food waste amounts:
 - Food redistributed per action: amount in kg and type of food (or per pot, in case of herbs or per portion in case of radisch)
 - Have you been able to take over all the surplus food of the farmer? (yes/no)
 - If no, what have been the reasons, why not everything was taken over.
2. Packaging:
 - Is the food which is distributed packed? (Yes/No)
 - Do you also use reusable packaging (Yes/No)

- What is the weight of the packaging in kg per kg distributed food
- Which type of packaging is used: (plastic/bio-plastic/paper/cardboard/metal/composite)
- 3. Transport:
 - What is the postcode of the location, where the surplus food is picked up?
 - What is the postcode of the locations, where the surplus food is distributed to? (provided by delivery note)
 - Which means of transport is used for the food transaction?
 - a. tractor with single trailer
 - b. tractor with double trailer
 - c. truck with semi-trailer 28-34t
 - d. rigid truck 20-26t
 - e. rigid truck 20-26t with cooling unit
 - f. other
 - Does the transport have an empty return? (will be covered by sensitivity analysis, if information is not available)
 - What is the fill rate of the transports? (will be covered by sensitivity analysis, if information is not available)

Questions to Unverschwendet *(each quarter?):*

1. Number of actors enrolled in the collaboration system:
 - Number of food surplus providers (sellers):
 - Number of food surplus receivers (buyers):
 - Number of food surplus receivers (charities):
 - Other:
2. Number of companies who have been informed of the innovation (e.g. dialogue, platform, software etc.)
 - number of these who declared to be interested in it
 - number who have joined it
3. How many hours per day per person are needed to maintain the collaboration system?
 - Number of female persons (in FTE): __ Estimated hours per day: __
 - Number of male persons (in FTE): __ Estimated hours per day: __
4. List of people who have contributed at different tasks related to the innovation
 - transferring the product, gender and position
 - from making contacts to the delivery of the product, gender and position

Questions to Unverschwendet (once):



5. Computer use:
 - Has the software provider information to the server capacity? Where is the server located?
 - How much of the total server capacity is used for the software (in vCPU/CPU in use)?
 - Which type of CPU is used (e.g. Intel Skylake)
 - Do you need to buy new devices to run this software? Or do you use existing devices?
 - Which device do you use (tablet/Ipad; computer; notebook; smartphone)
6. Do you use the device solely for the software or do you also use it for other purposes?
7. How long do you use the device per case?

12 Food surplus supplier (after a food transaction)

1. Gender and position of the respondent
2. Area of cultivation: per food product if possible.
3. How often do you produce surplus food
 - Likert-Scale: very often, often, regularly, only occasionally, very seldom)
4. Can you estimate how much of your surplus food can be restored thanks to the collaboration system?
 - 0-10%
 - 10-50%
 - >50%
5. How difficult was it for your company to start using the collaboration system?
 - On a scale from 1 = at all to 5= more than expected,
6. How satisfied is your company with the collaboration system?
 - On a scale from 1 = at all to 5= more than expected,
7. *How many hours per day per person are needed to use the collaboration system (registration)?*
 - *Number of female persons (in FTE): __ Estimated hours per day: __*
 - *Number of male persons (in FTE): __ Estimated hours per day: __*
 - *Number of non-binary persons (in FTE): __ Estimated hours per day: __*

Or alternative question:

How do you rate the efforts of applying the collaboration system?

- On a scale from 1 = very easy to 5= very complicated,
- 8. Has the staff developed new skills thanks to the participation in the collaboration system? Which typology of new skill has been acquired thanks to the participation in the collaboration system? Please disaggregate by gender
 - communication skills: number of females/males/non-binary
 - relational skills: number of females/males/non-binary
 - technological skills: number of females/males/non-binary
 - technical skills: number of females/males/non-binary
- 9. Are there new products new income streams resulting from the innovation?
 - Yes/No
- 10. Are the variable costs covered?
 - Yes/No
- 11. Have additional costs been occurred as a result of the collaboration system?
 - Yes/No; If yes, why type of costs and how much
- 12. How much do you pay for your organic waste disposal? OR Do you pay for your organic waste disposal?
- 13. What has been the total cost of implementing the innovation (e.g. additional/new capital investment, labour, training etc.)
- 14. Please list all employees who have been involved in the use of the collaboration system, by gender, age and role. [level of responsibility, if it is a decision-making position or not]
- 15. Did your farm need to hire new personnel (including casual workers) as a result of the innovation
 - If yes, how many (by gender)? [numeric information + qualitative information]
 - Is there any increase/decrease of hours worked due to the innovation? Please, if possible, disaggregated by gender [multiple choice: increase/decrease]
 - Have you qualified for an additional funding or subsidy as a result of taking part in the innovation ?
 - Have you established new business contacts as a result of taking part in this innovation ? If yes, what kind of (upstream, e.g. sellers; downstream e.g., buyers) contacts have you made?
 - Do you plan to continue working with these new business relationships established through the UNV innovation ?

16. In the absence of UNV innovation, in what ways do you dispose of your surplus food (e.g. livestock feed, ethanol producers, waste collection)?
17. *Are you aware of the problem that we waste too much food?*
- *Likert scale from “very aware” to “not aware at all”*
18. *Are you committed to reduce food waste?*
- *Likert scale, from “a lot” to “not at all”*
19. Has the collaboration system met your expectation?
- On a scale from 1 = at all to 5= more than expected
20. How willing are you to keep using the collaboration system?
21. On a scale from 1=at all to 5=Definitely yes,
22. How satisfied are you with the survey
- Likert scale from “very satisfied” to “unsatisfied”

Staff survey:

To which extent do you agree to the following statements? (to be answered individually by the staff members also indicating gender, position and age)

	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>Food loss and waste are major issues for the sustainability of the food systems in general</i>					
<i>Food loss and waste are major issues in the food production sector</i>					
<i>Food loss and waste are major issues on this farm</i>					

<i>I am concerned about the economic costs of food loss and waste on this farm</i>					
<i>I am concerned about the environmental impact of the food loss and waste on this farm</i>					
<i>I am committed to reduce the food loss on this farm</i>					

13 Food surplus receiver (after a food transaction)

To be elaborated.

T2.3 Leroma B2B digital market place for F&V

Leroma platform – questionnaire for T2.3

The reference population for the assessment will be represented by the companies who conduct transactions on the Leroma platform. All companies that sell something will fill questionnaire 5 with the single question. The other questionnaires are intended for use in case studies with selected companies. For non-cross-border transactions, all questionnaires are filled in as part of the case studies. The companies based in different countries which are involved in a transaction with the former would only fill a specific questionnaire after the transaction: the purchaser would fill questionnaire 4 and the seller would fill questionnaire 3.

14 Platform users (upon registration)

1. Questionnaire to be filled upon registration on the Leroma platform

B. Company identification

1. Name of the company.

2. Stage of the supply chain where the company operates.
 - Primary production
 - Processing
 - Wholesale
 - Retail
 - Distribution
3. Geographical area where the company operates. [postcode]
4. Number of years of operation.
5. Average age of the employees of the company.
6. Number of employees of the company, by gender.

C. Food waste: awareness, attitudes and management

7. Awareness of food waste levels in the company. [Likert scale: from 1 “fully aware” to 5 “not aware at all”]
8. To which extent do you agree with the following statements?

Statement	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree
Food loss and waste are a major issue for the sustainability of the food systems in general.					
Food loss and waste are a major issue in our sector.					
Food loss and waste are a major issue for our company.					
I am concerned about the economic costs of food loss and waste in our company.					

I am concerned about the environmental impact of food loss and waste in our company.					
We are committed to reducing food loss and waste in our company.					

9. Waste management costs of the company during the last year.

D. Gender and survey satisfaction

10. Age and gender of the respondent.

11. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

15 Subset of platform users (at the beginning)

2. Questionnaire to be filled by selected companies as part of a case study at the beginning

A. Production: inputs, outputs and waste

1. Main Fruit & Vegetables (F&V) input used by the company (or mix of products, qualitatively described).
2. Quantity of the main F&V input purchased during the last year.
3. Average price at which you purchased your main F&V input during the last year.
4. Quantity of F&V input wasted and not recovered during the last year (avoidable, not avoidable, by-products).
5. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea, Others: please specify). [multiple answer]
6. Main F&V product(s) produced by the company.
7. Quantity of the main F&V product(s) produced and sold during the last year.

8. Average price(s) at which the main F&V product(s) was/were sold during the last year.
9. Quantity of F&V product which was wasted and not recovered during the last year (avoidable, not avoidable, by-products).

B. Gender and survey satisfaction

10. Age and gender of the respondent.
11. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]¹

16 Seller (after a food transaction)

3. Questionnaire to be filled by the seller (selected companies as part of a case study) after a food transaction

A. Product sold

1. Which product was the object of the transaction?
2. Which amount of product was the object of the transaction, and which was the unit of transaction?
3. Price at which the product was sold.
4. Price at which the product would have been sold on the market for its original use.
5. If the product sold needed to be disposed of, how much would you have spent in terms of waste management costs?

B. Procedure to sell the product

6. Where was the product located before being transferred [postcode] and where was it moved [postcode]?
7. Did/Will you (or a company hired by you) take care of the transport of the product? [yes/no]
 - If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the means of transport used;

¹ Besides this questionnaire, the staff of the companies involved in the case study who are expected to be using Leroma should fill the staff questionnaire in Appendix 2.

- Truck with semi-trailer, 28-34 t
 - Rigid truck, 20-26 t
 - Rigid truck, 20-26 t, cooling
 - Tractor, single trailer
 - Tractor, double trailer
 - Other: please specify
 - (3) if it had a cooling unit;
 - (4) the type of fuel used
 - diesel
 - vegetable oil
 - electricity;
 - (5) if there was an empty return (Yes/No);
 - (6) the fill rate of the vehicle (%).
8. Did/Will you (or a company hired by you) take care of the packaging of the product? [yes/no]
- If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the mass of packaging material for distribution (kg per kg of product);
 - (3) if the packaging is reusable (yes/no).
 - (4) the type of packaging (material)
 - Plastic
 - Bio-plastic
 - Cardboard
 - Metal
 - Paper
 - Composite
 - Others: please specify
9. How many working hours (if possible by gender) did/will your employees dedicate to this transaction?
10. Could you estimate the aggregated costs in which you incurred / will incur for making this transaction with Leroma (excluding the Leroma fee)?

C. Preparation of the product traded

11. If the product had to undergo any ad hoc treatments before being sold, please specify:

- (1) type of treatment;
 - Possible response options (multiple answers):
 - Unpacking
 - Shredding
 - Heating
 - Hygienisation
 - Other: please specify
- (2) cost (in EUR or GBP/ton).

D. Gender and survey satisfaction

12. Age and gender of the respondent.
13. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

17 Buyer (after a food transaction)

4. Questionnaire to be filled by the purchaser (selected companies as part of a case study) after a food transaction

A. Product purchased

1. Which product was the object of the transaction?
2. Which amount of the product was the object of the transaction, and which was the unit of transaction?
3. Price at which the product was purchased.

B. Procedure to acquire the product

4. Where was the product located before being transferred [postcode] and where was it moved [postcode]?
5. Did/Will you (or a company hired by you) take care of the transport of the product? [yes/no]
 - If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the means of transport used;
 - Truck with semi-trailer, 28-34 t
 - Rigid truck, 20-26 t
 - Rigid truck, 20-26 t, cooling
 - Tractor, single trailer

- Tractor, double trailer
- Other: please specify
- (3) if it had a cooling unit;
- (4) the type of fuel used
 - diesel
 - vegetable oil
 - electricity;
- (5) if there was an empty return (Yes/No);
- (6) the fill rate of the vehicle (%).
- 6. Did/Will you (or a company hired by you) take care of the packaging of the product? [yes/no]
 - If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the mass of packaging material for distribution (kg per kg of product);
 - (3) if the packaging is reusable (yes/no).
 - (4) the type of packaging (material)
 - Plastic
 - Bio-plastic
 - Cardboard
 - Metal
 - Paper
 - Composite
 - Others: please specify
- 7. How many working hours (if possible by gender) did/will your employees dedicate to the transaction?
- 8. Could you estimate the aggregated costs in which you incurred / will incur for making this transaction with Leroma (excluding the Leroma fee)?

C. Subsequent use of the product traded

- 9. If the product had to undergo any ad hoc treatment before being used, please specify:
 - (1) type of treatment;
 - (2) cost for you.

10. Which product did/will you obtain using the food traded, which quantity, and at which price did/will you sell it?

D. Gender and survey satisfaction

11. Age and gender of the respondent.
12. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

18 Seller (during a food transaction)

5. Question to be answered by the seller in the course of every food transaction

What would you have done with the goods if you hadn't been able to sell them on the platform?

- We would have sold them through the usual sales channels
- We would have sold them through other sales channels (please specify)
- We would have disposed of them
- Other (please specify)

19 Subset of platform users (at the end of the demonstration)

6. Questionnaire to be filled at the end of the task by selected companies as part of a case study

A. Food waste: awareness, attitudes and management

1. Awareness of food waste levels in their company. [Likert scale: from 1 “totally aware” to 5 “not aware at all”]
2. To which extent do you agree with the following statements?²

Statement	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree
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² All the employees who have been using Leroma should fill the staff questionnaire in Appendix 2.

Food loss and waste are a major issue for the sustainability of the food systems in general.					
Food loss and waste are a major issue in our sector.					
Food loss and waste are a major issue for our company.					
I am concerned about the economic costs of food loss and waste in our company.					
I am concerned about the environmental impact of food loss and waste in our company.					
We are committed to reducing food loss and waste in our company.					

3. Waste management costs of the company during the last year.

B. Use of Leroma: employment, costs, contacts, outcomes, satisfaction

4. Please list all employees who have been involved in the use of Leroma, by gender, age and role. [department, level of responsibility]
 - Did your company need to hire new personnel (including casual workers) in order to use Leroma, and how many (by gender)?
5. How would you assess the time needed to learn how to properly use Leroma? [Likert scale from 1 "very little" to 5 "too much"]
6. Are the procedures to use Leroma too many / too complex? [Likert scale: from 1 "not at all" to 7 "yes, a lot"]

7. How many employees have developed new skills thanks to the use of Leroma by gender? Technological (use of mobile app, pc software); Technical (better understanding of how to manage food transactions); Social/relational (with other users of Leroma, if relevant).
8. If you had to acquire a new computer to use Leroma, please specify:
 - (1) type of device;
 - (2) computer time used for operations related to Leroma.
9. Have you suggested or are you willing to suggest the use of Leroma to other companies? [yes, I did / yes, I will / no]
 - Number of companies to which you suggested to use Leroma, if any.
 - Number of those who declared to be interested in it; number of those who have used it after you informed them.
10. Did you discover new alternative use of your products and/or by-products thanks to Leroma? [yes/no]
 - Did you develop any new streams of income (e.g., new products) as a result of using Leroma? [qualitative information]
11. Were you able to access any subsidies/other monetary benefits as a result of using Leroma? How much? Are these one-time, periodical, fixed, or proportional to the amount of waste avoided?
12. To what extent did Leroma meet your expectations? [Likert scale: from 1 "completely" to 5 "not at all"]
13. Is your company willing to continue using Leroma after the project has come to an end? [yes/no]

C. Management of the products traded

14. Did some or all of the products traded on Leroma ended up as waste anyway? How often and in which proportion?
15. Concerning the storage of the products traded, please specify:
 - (1) the typology of storage;
 - (2) the time of storage;
 - (3) whether a cooling unit is required;
 - (4) whether this is a cost you would have incurred regardless of using Leroma.

D. Gender and survey satisfaction

16. Age and gender of the respondent.

17. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

20 LER Leroma (after implementation)

7. Information to be retrieved by Leroma at the end of the task

1. Number of searches made by each company on the Leroma platform.
2. Number of agreements activated and finalized through the Leroma platform by each company.
3. Number of offers uploaded on the Leroma platform by each company.
4. Number of matches reached by each company.
5. Number of inquiries made to Leroma by potential buyers and sellers from Germany and Scotland (regardless of their registration).
6. Number of companies that registered to Leroma and then dropped out / did not finalise any transaction.

T2.4 FORESIGHTEE software for packed F&V

21 Supermarket (before and after the implementation)

Data collected via sharing of store (supermarket) records

Description	Unit of measure	Period	Timeframe	Frequency
Quantity and value of F&V products wasted (by item)	kg	Baseline	3 years (2019-2021)	Monthly
Quantity and value of F&V products wasted (by item)	kg	Evaluation	5 months (2022)	Monthly
Sales of F&V products (by item)	€	Baseline	3 years (2019-2021)	Monthly
Sales of F&V products (by item)	€	Evaluation	5 months (2022)	Monthly

Stocks of F&V products (by item)	kg	Baseline	3 years (2019-2021)	Monthly
Stocks of F&V products (by item)	kg	Evaluation	5 months (2022)	Monthly
Orders of F&V products (by item)	kg	Evaluation	5 months (2022)	Monthly
Rate of unsold products out of total products purchased	% on quantity	Baseline	3 years (2019-2021)	Monthly
Rate of unsold products out of total products purchased	% on quantity	Evaluation	5 months (2022)	Monthly
Input costs (purchase price of products)	€ / unit	Baseline	3 years (2019-2021)	Monthly
Input costs (purchase price of products)	€ / unit	Evaluation	5 months (2022)	Monthly
Margins on F&V products sold	%	Baseline	3 years (2019-2021)	Monthly
Margins on F&V products sold	%	Evaluation	5 months (2022)	Monthly

Questionnaires to supermarkets

Before and after the implementation of the innovation

1. Name and location of the supermarket store

Name and location: _____

2. How many stores does the company have?

Number: _____

3. Total number of employees in this store

Men: _____

Women: _____

Other (as noted in question 14): _____



4. How many fruits & vegetables products are marketed in this store?

Total number of references: _____

Among which sold by unit: _____

Among which sold by weight: _____

5. Please list the factors that are currently considered in forecasting the sales in the fruits & vegetables department? (For example: the sales volume of last week, you then check the weather,.. to end up with a final sales forecast)

6. Please list the factors that are currently considered in ordering fruits & vegetables? For example: the sales forecast, the stock,.. to end up with a final order.

7. What are the average margins (difference between selling price and purchase cost) of the store? And in the fruits & vegetables department?

Store average margin %: _____

F&V average margin %: _____

8. Out of the total quantity of fruits & vegetables disposed, how much is due to each of the following reasons? (The total must add up to 100%)

Approaching expiration date %: _____

Spoiled %: _____

Broken packaging %: _____

Other causes (specify) %: _____

9. In what ways are the wasted fruits & vegetables disposed of before (please tick, multiple answers allowed):

donated to charities

animal feed

composting

anaerobic digestion

incineration

Others: please specify _____

Are fruits & vegetables products sold at a reduced price before discarding them? If so, what is the yearly turnover of these promotions?

In any of these ways do you sell your organic waste? If so, how much turnover can be made in each way (unit value x amount)?

10. What is the average cost of organic waste disposal for your organisation per month? Is it a fixed cost independent of the amount or does it vary with the quantity of waste disposed?

The below questions should be asked before the implementation and after the implementation

11. What is the frequency of out-of-stock? What are types of financial losses associated with out-of-stock and how much do they cost each?

12. To which extent do you agree to the following statements? (to be answered individually by each staff members also indicating their gender, position and age)

	Complete ly agree	Somewh at agree	Neutral	Somewh at disagree	Complete ly disagree
Food loss and waste are major issues for the sustainability of food systems					
Food loss and waste are major issues in the retail sector					
Food loss and waste are major issues in this store					
I am concerned about the costs of food waste in this store					

I am concerned about the environmental impact of the food wasted in this store					
I am committed to reduce the food wasted in this store					
The staff (if possible by gender) of the supermarket are concerned about the costs of the food wasted at this store					
The staff (if possible by gender) of the supermarket are concerned about the environmental impact of the food wasted at this store					
The staff (if possible by gender) of the supermarket are committed to reduce the food wasted at this store					

13. In a scale from 1 (not at all) to 5 (yes, a lot), can you rate your satisfaction for this survey?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

14. Gender of the respondent

☐ Female ☐ Male ☐ Other ☐ Prefer not to say

Additional questions to evaluate the implementation of innovation

1. Considering the implementation of the Foresightee software, to which extent do you agree with the following statements?



	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>The Foresightee platform met our expectations</i>					
<i>Starting to use the Foresightee platform was difficult</i>					
<i>The staff (if possible by gender) has developed new communication skills</i>					
<i>The staff (if possible by gender) has developed new technical skills</i>					
<i>The staff (if possible by gender) has developed new relational skills</i>					
<i>The staff (if possible by gender) has developed new technological skills</i>					
<i>This company will continue using Foresightee platform after the demonstration</i>					
<i>Trust with other actors of the chain (suppliers/customers) has increased</i>					
<i>Communication with other actors of the chain (suppliers/customers) has improved</i>					

2. How many members of the staff were involved in the implementation of the innovation?

Men (specify job grade and hours per week): _____

Women (specify job grade and hours per week): _____

Other (specify job grade and hours per week): _____

3. How many employees will need to be trained if the innovation was fully implemented in practice?

Men (specify job grade): _____

Women (specify job grade): _____

Other (specify job grade): _____

4. Will you need to hire new personnel to support the full implementation of the innovation in practice? [yes/no]

5. Will you need to buy new devices to support the full implementation of the innovation? Which device(s)?

6. To which extent do you expect that the Foresightee forecasts can actually be used to decide the quantity of F&V products to be ordered? Please estimate a % of the orders-related decision that might be based on Foresightee forecasts

7. Have you followed the indications of Foresightee? How would you rate your adherence to the recommendations of Foresightee? Has your use Foresightee led to an increase in revenue? If yes, how much in %?

8. Did you establish new contacts or agreements with other actors of the chain as a result of your involvement in the innovation? What type of contacts (e.g. downstream actors like suppliers; other retailers, others) are these?

9. If yes, how likely is that you continue these relationships, assessed on a 1 (very unlikely) to 5 (very likely) scale?

	New agreements (YES/NO)	Very unlikely	Somewhat likely	Neither likely or unlikely	Somewhat likely	Very likely
With suppliers						
With other retail						

companies						
With other actors (specify)						

10. Do you expect a change in the frequency of out-of-stock due to the implementation of the innovation? How much in %?

Management survey to be administered at the end of the demonstration

11. What is your return on investment from participating in this innovation ?

12. Has participating in the innovation led to creation of new income streams ? Please indicate each with the amount.

13. Did you establish new contacts or agreements with other actors of the chain as a result of your involvement in the innovation? What type of contacts (e.g. downstream actors like suppliers; other retailers, others) are these ?

If yes, how likely is it that you continue these relationships on a 1 (very unlikely) to 5 (very likely) scale? Please use the table below to indicate and use as many lines as necessary to indicate a new contact.

<u>Type of new contact/relationship established</u>	<u>Number of resulting agreements</u>	<u>Likelihood of continuing relationships</u>				
		<u>Very unlikely</u>	<u>Somewhat likely</u>	<u>Neither likely or unlikely</u>	<u>Somewhat likely</u>	<u>Very likely</u>
<u>Another company from the sector (a competitor)</u>						
<u>A supplier</u>						
<u>A buyer</u>						

<i>Other type of actor (specify)</i>						

22 Innovator (at the end)

Questionnaire to innovator

To be administered at the end of the demonstration

1. Total number of staff in the company

Men: _____

Women: _____

Other: _____

2. How many actors (retailers/stores) were involved in the demonstration of the Foresightee software?

Number of retailers: _____

Number of stores: _____

3. How many actors (retailers/stores) were willing to continue the implementation of the roadmap after the project?

Number of retailers: _____

Number of stores: _____

4. How many agreements did you subscribe with new retailers/stores as a result of the implementation of the software?

Number: _____

5. How many contacts (i.e., emails, phone calls) has Foresightee received due to difficulties in implementing the innovation? Which type of issue did the companies experience?

6. How many staff were involved in the implementation of the innovation during LOWINFOOD activities?

Men (specify job grade): _____
 Women (specify job grade): _____
 Non-binary or other (specify job grade): _____

7. Did the company hire new staff to support the implementation of the innovation?
 How many?

Men (specify job grade): _____
 Women (specify job grade): _____
 Non-binary or other (specify job grade): _____

8. How many companies external to the LOWINFOOD consortium have been informed of the innovation? How many of them declared to be interested in it?

9. Location of the server used by Foresightee

10. What is the server capacity? How much of it is in currently in use?

11. Which type of CPU is used to support the software?

12. Did you need to buy new devices to support the implementation of the innovation? Which device(s) were used?

13. In a scale from 1 (not at all) to 5 (yes, a lot), can you rate your satisfaction for this survey?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

14. Gender of the respondent

☐ Female ☐ Male ☐ Other ☐ Prefer not to say

T3.1 Supplier-retailer agreements

23 Stakeholders

General information:



Name of company:

Type of company (retailer, baker, single store/branch, multiple stores/branches)?

Name of contact person (s):

Number of staff (to be broken down by Male, Female, Other, specify job position)

FLW prevention and reduction (collected through company records and environmental reports)

Amount of food waste before the innovation

Amount of food waste after the innovation food product/food product mix

Type of food waste management operations

Efficacy

Replicability

- Will you promote the supplier/retailer agreements for bakery products without take back agreement to other partners and companies? (yes/no)

Utility

- Has the innovation met your expectations? (At all, to a certain extent, fully, more than I expected)
- On a scale from 1 = at all to 5= more than expected, how would you rate the innovation?
- Has the staff developed new skills thanks to the participation in the implementation of the innovation? If yes, how many people? Which typology of new skill has been acquired thanks to the implementation of the innovation? (i.e. communication skills, relational skills, technological skills, technical skills) If possible disaggregated by gender: woman, man, non-binary (or other).

User-friendliness

- Are you willing to keep participating in the agreement after the project has ended?
- Which procedures are required for your company to implement the supplier/retailer agreements for bakery products without take back agreement?
- Considering the procedures required by the supplier/retailer agreements for bakery products without take back agreement. On a scale from 1 to 5, do you think there are too many steps?
- Has your trust to other partner increased due to this innovation?
- Has your communication with other actors increased due to this innovation?
- In the absence of the innovation, in what ways do you dispose of the returned bakery products?
- Do you make a profit from this disposal route? If yes, how much per tonne in each alternative?

Socio-economy

Profitability

- "For each transfer of bakery products which could have ended as waste, please answer the following:
 - Buyer (retailers- bakery store or supermarket): theoretical cost (unitary price) at which the product purchased would have been purchased at its full retail price on the market.
 - Seller (baker): theoretical cost at which the product would have been sold on the market if it could be sold before becoming surplus/waste.
 - Buyer and seller: price at which the product was purchased/sold, if any."
- "For each transfer of bakery products which could have ended as waste, please answer the following:
 - Buyer (retailers- bakery store or supermarket): theoretical cost (per day + total) of storing, transporting and handling the product purchased if this was purchased on the retail market (cumulated cost, including electricity, etc.).

- Buyer (retailers- bakery store or supermarket): cost (per day + total) of storing, transporting and handling the product from its purchase until its final use (cumulated cost, including electricity, etc.).
- Seller (baker): theoretical cost (per day + total) of storing the product if this was sold normally on the market (cumulated cost, including electricity, etc.)."
- "Buyer (retailers- bakery store or supermarket): theoretical cost of obtaining one unit of the bakery product purchased if it was purchased on the market (cumulated cost, including electricity, labour, etc.).
 - Buyer (retailers- bakery store or supermarket): cost of managing the bakery product from its acquisition until its sale (cumulated cost, including electricity, labour, transport, planning etc.).
 - Seller (baker): theoretical cost of one unit of the bakery product transferred if it was sold through the usual channels (cumulated cost, including electricity, labour, etc.). Seller (baker): cost of producing the product transferred (cumulated cost, including electricity, labour, etc.)."
- "For each transfer of bakery products which could have ended as waste, please answer the following:
 - Seller (baker): theoretical fixed costs incurred to dispose of the products transferred in case it ended up as waste and needed to be disposed.
 - Seller (baker): theoretical variable costs incurred to dispose of the products transferred in case it ended up as waste and needed to be disposed.
 - Buyer (retailers- bakery store or supermarket): fixed costs incurred to dispose of the products purchased in case it ended up as waste anyway and needed to be disposed."
 - Buyer (retailers- bakery store or supermarket): variable costs incurred to disposed of the products purchased in case it ended up as waste anyway and needed to be disposed."
- The same as Change in total value of sales of the product(s) involved (the number of units sold x unit price)
- Are there new products or income streams resulting from the innovation? If yes, what and how much are each new streams of income created or costs avoided as a result of participating in the innovation?

- What is the change in the annual balance (due to additional income or avoided cost) resulting from the innovation? What has been the total cost of implementing the innovation (e.g. additional/new capital investment, labour, training etc.)
- Are there any subsidies/other monetary benefits received as a result of waste reduction> If yes, please list each (in Euros) specify if these are one-time, periodical, fixed or proportional to the amount of waste).
- What are the overall expenses (e.g. labour, new equipment purchase etc.) that resulted from participating in this innovation?

Scale

- "For each transfer of bakery products which could have ended as waste, please answer the following:
 - Buyer (retailers- bakery store or supermarket): Value (unitary price + quantity) at which the product received was sold on the market after transformation.
 - Buyer (retailers- bakery store or supermarket): Theoretical value (unitary price + quantity) at which the same quantity of the same product could have been sold on the market if it was normally sourced on the market"
- "For each transfer of food products which could have ended as waste, please answer the following:
 - Seller (baker): hours of work (for male, female and non-binary employees separately) for managing the product transferred, from making the contact to its delivery to the buyer etc.
 - Seller (baker): theoretical hours of work (for male, female and non-binary employees separately) for managing the product transferred in case it was ending up as waste.
 - Buyer (retailers- bakery store or supermarket): hours of work (for male, female and non-binary separately) for managing the product received from making the contact until its withdrawal and inputting in the production process.
 - Buyer (retailers- bakery store or supermarket): theoretical hours of work (for male, female and non-binary separately) for managing the same product in case it was purchased normally on the market."

- Number and type of new buyers with which they came into contact as a result of their involvement in the innovation + willingness to continue the relationship (assessed on a Likert scale from “very likely” to “very unlikely”).
- Number and type of new buyers and sellers (i.e., downstream, upstream, horizontal; from the sector, out of the sector) with which they came into contact as a result of their involvement in the innovation + willingness to continue the relationship (assessed on a Likert scale from “very likely” to “very unlikely”).

Competitiveness

- "For each transfer of bakery products which could have ended as waste, please answer the following:
 - Buyer (retailers- bakery store or supermarket): quantity (piece) of product to be sold on the market derived from the product transferred.
 - Buyer (retailers- bakery store or supermarket): theoretical quantity (piece) of product to be sold on the market derived from a unit of product similar to the one transferred but sourced from the standard source.
 - Seller (baker): quantity (piece) of food inputs used to derive the product transferred.
 - Seller (baker): theoretical quantity (piece) of food inputs used to derive a unit of the product transferred (assuming that this was still in condition to be used for its original goal)."

Behavior

- Self-assessment of awareness of the food waste problem (Likert scale from “very aware” to “not aware at all”) by the respondent and by each of the employees involved in managing the food product transferred.
- Self-assessment of concerns for, and commitment to, food waste reduction (Likert scale, from “a lot” to “not at all”) by the respondent and by each of the employees involved in managing the food product transferred.
- To which extent do you agree to the following statements? (to be answered individually by the staff members also indicating gender, position and age)

	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>Food loss and waste are major issues for the sustainability of the food systems in general</i>					
<i>Food loss and waste are major issues in the [insert the name of your sector here]</i>					
<i>Food loss and waste are major issues [insert here the type of your organisation]</i>					
<i>I am concerned about the economic costs of food loss and waste in [insert here the type of your organisation]</i>					
<i>I am concerned about the environmental impact of the food loss and waste in this [insert here the type of your organisation]</i>					
<i>I am committed to reduce the food loss in this [insert here the type of your organisation]</i>					

Creation of local jobs?

- All participants: number and type of full time equivalent (FTE) jobs created to manage the food products transferred (if this is only a share of time of one or

more employees, indicate the cumulated share in FTE). In doing this, male, female and non-binary employees' hours should be recorded separately.

Spill-over effects

- Number of companies who have been informed of the innovation (e.g. dialogue, platform, software etc.) + number of these who declared to be interested in it + number who have joined it.

Environment:

- How are the surplus bakery products managed? Please estimate the share of used valorisation/disposal pathways.
 donation to charities, food bank (%)___
 reworking (e.g. manufacturing process) (%)___
 valorisation to other food products (e.g. bread crumbs) (%) ___
 animal feed (%)___
 composting (%)___
 anaerobic digestion (%)___
 incineration (%) ___
 discards on land/at sea (%) ___
 Others: please specify (%) ___

T3.2 Innovating supplier-retailer interactions through stakeholder dialogue

24 Data collection (company records from bakeries)

Data collected via sharing of company records

Description	Unit of measure	Period	Timeframe	Frequency
Bread losses and waste (3 main	Kg	Baseline	6 months	Monthly

bakery products)				
Bread losses and waste (3 main bakery products)	Kg	Evaluation	6 months	Monthly
Surplus bread produced (3 main bakery products)	Kg	Baseline	one year	Monthly
Surplus bread produced (3 main bakery products)	Kg	Evaluation	one year	Monthly
% surplus bread on total monthly bread production (3 main bakery products)	%	Baseline	one year	Monthly
% surplus bread on total monthly bread production (3 main bakery products)	%	Evaluation	one year	Monthly

25 Bakeries (before and after implementation)

Questionnaires to bakeries

Before and after the implementation of measures against food waste

1. Name and location of the company

Name and location: _____

2. How many production branches does the company have?

Number: _____

3. How many own stores does the company have?

Number: _____

4. Total number of employees



Male (specify job grade): _____

Female (specify job grade): _____

Other (specify job grade): _____

5. How many types of bakery products does the company produce? Can you list the 3 main (in terms of quantity produced)? And what percentage each has in the overall quantity produced?

Number: _____

Name of main bread types (%): _____

6. How much of each bakery product does the company typically produce in one day?

Product 1: kg _____

Product 2: kg _____

Product 3: kg _____

7. Through which channels are sold these products (please add % of quantities, considering the average over 1 year)?

Product	% own store	% supermarkets	% other retailers	% other channels (specify)
---------	-------------	----------------	-------------------	----------------------------

1)

2)

3)

8. How many vehicles does this company use for the distribution of the products?

Number: _____

9. For each vehicle, can you list the type, fuel, capacity, average km per year?

Vehicle	Type	Fuel	Capacity (kg)	km/year
---------	------	------	---------------	---------

1)

2)

3)

...

10. Can you estimate the average fill rate of your vehicles during their trips?

*Delivery: % fill rate*_____

*Return: % fill rate*_____

*Empty return: % on total trips*_____

11. What is the unitary amount of **input costs** for producing the main bakery products (possibly broken down by cost categories)?

*Product 1: Euro per unit (or kg)*_____

*Product 2: Euro per unit (or kg)*_____

*Product 3: Euro per unit (or kg)*_____

12. What is the unitary amount of **other variable costs** (such as labour, electricity etc. that change with the amount of production) for producing the main bakery products (possibly broken down by cost categories)?

*Product 1: Euro per unit (or kg)*_____

*Product 2: Euro per unit (or kg)*_____

*Product 3: Euro per unit (or kg)*_____

13. What is the unitary amount of **fixed costs** (such as equipment rent etc. that do not change with the amount of production) for producing the main bakery products (possibly broken down by cost categories)?

*Product 1: Euro per day*_____

*Product 2: Euro per day*_____

*Product 3: Euro per day*_____

14. What is the average selling price of the main bakery products (Euro)?

Product	own store	supermarkets	other retailers	other channels (specify)
---------	-----------	--------------	-----------------	-----------------------------

1)

2)

3)

15. What is the rate of return on investment of the company during the year?

Rate %: _____

16. What is the quantity of material inputs used to derive 1 kg of each product?

Product 1: kg of inputs per 1 kg of product _____

Product 2: kg of inputs per 1 kg of product _____

Product 3: kg of inputs per 1 kg of product _____

17. What is the weight of the packaging for the main bread products?

Product 1: kg of packaging per 1 kg of product _____

Product 2: kg of packaging per 1 kg of product _____

Product 3: kg of packaging per 1 kg of product _____

18. What material is used to pack each product?

Product 1: _____

Product 2: _____

Product 3: _____

19. To which extent do you agree with the following statements? (to be asked from each staff member involved in the innovation disintegrated by their age, gender, position and department in the company, education)

	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree

<i>Food loss and waste are major challenges for the sustainability of food systems</i>					
<i>Food loss and waste are major issues in the bakery sector</i>					
<i>Food loss and waste are major issues in this company</i>					
<i>I am concerned about the costs of the food wasted during the company's operations</i>					
<i>I am concerned about the environmental impact of the food wasted during the company's operations</i>					
<i>I am committed to reduce the food wasted during the company's operations</i>					
<i>The employees (if possible by gender) are concerned about the costs of the food wasted during the company's operations</i>					
<i>The employees (if possible by gender) are concerned about the environmental impact of the food wasted during the company's operations</i>					

<i>The employees (if possible by gender) are committed to reduce the food wasted during the company's operations</i>					
--	--	--	--	--	--

20. How are the wasted / surplus bakery products managed/ disposed of? Please estimate the share of used valorisation/disposal pathways.

- donation to charities, food bank (%)__
- reworking (e.g. manufacturing process) (%)__
- valorisation to other food products (e.g. bread crumbs) (%) __
- animal feed (%)__
- composting (%)__
- anaerobic digestion (%)__
- incineration (%) __
- discards on land/at sea (%) __
- municipal waste management/private waste management company (%) _____
- Others: please specify (%) ____

Do you make a profit from this disposal route ? If yes, how much per tonne in each alternative?

21. What is the cost of disposal? Is it fixed or does it vary with the quantity of waste disposed (per tonne)?

22. On a scale from 1 (not at all) to 5 (yes, a lot), can you rate your satisfaction for this survey?

- ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

23. Gender of the respondent

- ☐ Female ☐ Male ☐ Other ☐ Prefer not to say

Additional questions to evaluate the implementation of the roadmap against food waste (2023)

1. Considering the roadmap against food waste that has been elaborated as part of the LOWINFOOD project for the bakery sector, to which extent do you agree with the following statements? (to be asked from each staff member involved in the innovation disintegrated by their age, gender, position and department in the company, education)

	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>The roadmap against food waste met my expectations</i>					
<i>The roadmap is too complex (e.g. there are too many actions)</i>					
<i>The staff (if possible by gender) has developed new communication skills</i>					
<i>The staff (if possible by gender) has developed new technical/operational skills</i>					
<i>The staff (if possible by gender) has developed new relational skills</i>					
<i>The staff (if possible by gender) has developed new technological/digitalization skills</i>					
<i>This company will continue using the roadmap after the project</i>					
<i>Trust with other actors of the chain</i>					

<i>has increased</i>					
<i>Communication with other actors of the chain has improved</i>					
<i>I will promote the Roadmap to other partners/companies</i>					

2. How many hours per day did the implementation of the roadmap require? How many staff were involved?

Male (specify job grade): _____

Female (specify job grade): _____

Other (specify job grade): _____

3. Are there new products or income streams resulting from the innovation? Which ones and how much gain is achieved in each stream?

4. What is the change in the annual balance (due to additional income or avoided cost) resulting from the innovation?

5. What has been the total cost of implementing the innovation (e.g. additional/new capital investment, labour, training etc.)

6. Did you get subsidies or other monetary benefits (in Euro) to implement the roadmap? If yes, please specify the amount and type (one-time, periodical, fixed or proportional to the amount of waste)

7. Did you establish new agreements with other actors of the chain as a result of your involvement in the innovation? If yes, how likely is it that you continue the relationship, assessed on a 1 (very unlikely) to 5 (very likely) scale?

	<i>New</i>	<i>Very</i>	<i>Somewhat</i>	<i>Neither likely or</i>	<i>Somewhat</i>	<i>Very likely</i>
--	------------	-------------	-----------------	--------------------------	-----------------	--------------------

	<i>agreements</i> <i>(YES/NO)</i>	<i>unlikely</i>	<i>likely</i>	<i>unlikely</i>	<i>likely</i>	
<i>With suppliers</i>						
<i>With buyers</i>						
<i>With other bakeries</i>						

26 CNA and research partners (questionnaire)

Questionnaire to innovator

To be administered after the end of the stakeholder discussion (2022)

1. How many actors (bakeries/retailers) were involved in the stakeholder dialogue?

Number: _____

2. How many actors (bakeries/retailers) were willing to continue the implementation of the roadmap after the project?

Number: _____

3. Which actions are required by companies in order to implement the shared roadmap?

4. How many bakeries decided to quit the innovation due to the difficulty in implementing the actions defined in the shared roadmap?

Number: _____

5. How many staff were involved in the stakeholder discussion?

Male (specify job grade): _____

Female (specify job grade): _____

Other (specify job grade): _____

6. On a scale from 1 (not at all) to 5 (yes, a lot), can you rate your satisfaction for this survey?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

7. Gender of the respondent

☐ Female ☐ Male ☐ Other ☐ Prefer not to say

T3.3 FT Software for bakeries

27 User (before, mid-term, at the end)

Questionnaire for the data collection for the sustainability assessment of the innovation FoodTracks

Date of interview:	Carried out by (ISUN):
<p>Explanations to the survey</p> <p>The survey is conducted in the form of a personal interview with the persons responsible for the project as the users and as the project partners. Some of the questions will be presented to the interview partners in written form so that they can gather the necessary information in a flexible manner.</p> <p>There are three survey periods:</p> <ul style="list-style-type: none"> • Before using FoodTracks (project beginning) • While using FoodTracks (mid-term) • At the ending of the project (project ending) <p>The questions (blocks) marked in yellow must be answered at the middle and end of the project, all other questions must also be answered before using FoodTracks.</p>	

Privacy statement (will be added if required)

Part 1: General data on the organisation

• Name of the organisation:			
• Contact:			
• Number and gender of employees - total: thereof: - Administration: - Production: - Logistics: - Management: - Cleaning: - Sales staff:	female	male	diverse
Description of the bakery in which FoodTracks will be implemented (number of sales stores, integration of cafés/bistros, production site, etc.)			

Part 2: Questionnaire for users

Waste disposal

1. Do returned goods go to other distribution channels ~~or are they disposed of~~? If yes, can you estimate the share of used pathways?

Food donation to charities/food banks (%)

Reworking (%)

Valorisation to other products (e.g bread crumbs) (%)

Animal feeding (%)

Composting (%)

Anaerobic digestion (%)

Incineration (%)

Other (%): please specify

2. If so, what product groups are involved and in what quantities? Where are they sold?

Product Group of returned goods	Quantity (in units)	Distribution channel

3. Do you make a profit from any of the utilized distribution channels? If yes, how much € per unit in each product group?

Prerequisites for implementing FoodTracks

4. What resources were necessary to use FoodTracks?
- technical infrastructure (new PC, tablet, etc.) - type of computer device
 - Qualification of employees
 - Staff deployment (in hours and EUR) necessary for implementation (*by gender and position*)
 - Staff deployment (in hours and EUR) necessary for daily usage (*by gender and position*)
5. Did you have to train staff to use FoodTracks in your bakery? If yes, how extensive was the training (staff involved, duration)

Impact of FoodTracks on the business and the employees

6. How has the production planning process changed since you started using FoodTracks?
7. Do you buy less raw materials since you started using FoodTracks? *If yes, how much less in amount? and how much did you save in costs financially as a result ?*
8. Has the production process changed as a result of using FoodTracks (e.g. more baking in the shop or starting work later)?
Are there any other processes in your company that have changed due to the application of FoodTracks?
9. *Are there new subsidies and/or other monetary benefits received as results of food waste reduction after the innovation? If you answered yes to the previous question, please indicate their value .*
10. *Have there been changes in the selling price of your products since the introduction of FoodTracks, has the use of FoodTracks had an impact on this? If so, please indicate which product and how much per unit.*
11. *Have there been changes in the number of different products produced since the introduction of FoodTracks, has the use of FoodTracks had an impact on this? If so, please indicate which product and how many units.*
12. *Did the use of FoodTracks lead to the creation of additional jobs or the loss of jobs/shares (if yes, share in FTE by gender)?*
13. Are there employees who have acquired new competences through the use of FoodTracks? Please disaggregate by gender
 - *Technological (use of pc software) [number and qualitative information]*
 - *Technical (better understanding of how to manage food transactions) [number and qualitative information]*
 - *Social/relational (with other users of the software, if relevant) [number and qualitative information]*
14. Are there non-financial improvements and advantages through the use of FoodTracks (e.g. better agreements between sales and production staff, higher motivation, PR effects, increased trust with raw material supplier, improved communication with internal or external partners e.g. supplier)? On a scale of 1-5, how do you rate these benefits (1-low, 5-high)

15. Have other sources of income arisen for you through the use of FoodTracks? If yes, which ones?

16. Have new business contacts resulted for you through the use of FoodTracks (other bakeries, sales outlets, new distribution channels, etc.), if yes, which ones?

17. Has your clientele changed through the use of FoodTracks (are there new / different customer groups)?

18. How has your awareness of food waste changed through the use of FoodTracks? (open question + scale 1-5: 1-no change, 5-strong change)?

To which extent do you agree with the following statements? (to be answered individually by the staff members also indicating gender, position and department, education and age)

	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>Food loss and waste are major issues for the sustainability of the food systems in general</i>					
<i>Food loss and waste are major issues in [insert the name of your sector here]</i>					
<i>Food loss and waste are major issues in [insert here the type of your organisation]</i>					
<i>I am concerned about the economic costs of food loss and waste in [insert here the type of</i>					

<i>your organisation]</i>					
<i>I am concerned about the environmental impact of the food loss and waste in [insert here the type of your organisation]</i>					
<i>I am committed to reduce the food loss in [insert here the type of your organisation]</i>					

19. How has your behaviour changed? Has FoodTracks helped you to waste less food (open question + scale 1-5: 1-no change, 5-strong change)?

20. How has the behaviour of your production and sales staff changed? Has FoodTracks contributed to them wasting less food (open question + scale 1-5: 1-not a change, 5-significant change (less wastage)?

21. Have you saved costs by using FoodTracks? How high are the savings and to which cost types can they be attributed (e.g. use of goods, energy, personnel, cleaning, disposal of food waste, storage costs, other fixed costs, other variable costs, etc.)?

User-friendliness of FoodTracks

22. How satisfied are you with the following features of FoodTracks (scale 1-5: 1-barely, 5-very satisfied)?

- Answering questions
- Functions of the application
- Ease of use of the application

23. What features or design elements would you change or add to FoodTracks?
(Free text)

Evaluation of FoodTracks

24. Will you continue to use FoodTracks after the end of the project?

25. What were your expectations regarding the use of FoodTracks (e.g. cost savings, food waste reduction)? Were these fulfilled?

26. Have you talked to other institutions about FoodTracks? Have they expressed interest in implementing FoodTracks?

27. Would you recommend FoodTracks to other companies?

28. Please rate the level of difficulty for implementing FoodTracks (scale 1-5, 1-easy, 5-very difficult).

Other questions

29. What is your motivation for using FoodTracks? Please sort the possible reasons in order of decreasing importance (first mentioned most important - last mentioned least important). *(ask only at project beginning)*

- ☐ Other bakeries also participate.
- ☐ We can reduce the workload of the sales staff.
- ☐ We can optimise our ordering process.
- ☐ We are interested in participating in a scientific project.
- ☐ The costs for FoodTracks are partly covered by the project.
- ☐ We can reduce costs in the business.
- ☐ We can reduce food waste.
- ☐ We can act in an environmentally friendly way.
- ☐ Other:

30. Did you get access to further funding through participation in the project (e.g. food waste reduction funding)?

31. Please list job title, gender, task of the persons (without names) who were involved in the project (from the first meeting, background activity, implementation, PR, etc.).
32. How satisfied are you with this survey (*by gender, scale 1-5, 1-very satisfied, 5 not at all satisfied*).

28 FoodTracks, ADB Nord, ISUN

Part 3: Questions to the partners FoodTracks, ADB Nord and iSuN

Specific questions for FoodTracks related to the bakery _____

Production volume (Data collection period tbd)

1. Which articles were produced in the bakery during the survey period (baseline, mid-term, monitoring) and in what quantities?

Quantity of food wasted (Data collection period tbd)

2. What number of units per item was not sold during the survey period (returns / overproduction)?
overproduction = (units produced – units sold)*weight per unit

Socio-economic impact

3. What are the prices of the items produced and sold (for the calculation of sales)?

Application of FoodTracks in the bakery

4. How many decisions were made through FoodTracks?
5. How many of the suggestions were used as a decision-making basis for production planning?
6. How much time did the bakery spend working with FoodTracks during the data collection period?

General questions for FoodTracks

7. What are the regular costs of implementing FoodTracks?
8. Location of the servers

9. Server capacity
10. Type of CPU in use (e.g. Intel Skylake)
11. In how many bakeries has FoodTracks been implemented so far?
12. List of persons (without names), job title, gender, task, who were involved in testing FoodTracks in LOWINFOOD (acquisition, implementation, support, evaluation, etc.).

General questions for ADB Nord

Calculation the costs in the bakeries

13. What are the costs of the items produced? What are the proportions (a-h) in relation to the total costs per item?
 - a. *Cost of raw material*
 - b. *Energy*
 - c. *Personnel*
 - d. *Cleaning*
 - e. *Waste disposal (does this refer to food waste only or waste in total?)*
 - f. *Storage*
 - g. *Other fixed costs*
 - h. *Other variable costs*
14. List of persons (without names), job title, gender, task, who were involved in testing FoodTracks in LOWINFOOD (acquisition, implementation, supervision, evaluation, etc.).

Calculation of the quantities produced and wasted in the bakeries

15. What are the standard weights of the different bakery products produced?

General questions for iSuN

16. Gender of the interviewee(s) ISUN
17. List of persons (without names), job title, gender, task, who were involved in testing FoodTracks in LOWINFOOD (acquisition, implementation, supervision, evaluation, etc.).

T4.1 Stakeholder dialogue

The questionnaires were reviewed by the partners in charge of evaluating the efficacy, the socio-economic impact, and the environmental impact of the innovations in Lowinfood WP1, to ensure that all the relevant indicators identified are covered. They will be used both in Scotland by JHI, and in Germany by ISUN. To ensure comparability, the same questionnaires will be used in the two countries; however, they might undergo slight revisions after the initial tests (e.g. removal of problematic questions) to optimise data collection given specific country and supply chain conditions.

Questions in *italics* can be removed with priority. Questions in **red** can be asked only to the buyer or to the seller of food products, or only to the part who bore the costs (in the case of transport and packaging).

29 Stakeholder dialogue participants (upon registration)

Initial questionnaire

To be filled when the company joins the dialogue

A. Company identification and expectations

1. Name of the company.
2. Stage of the supply chain where the company operates (primary production, primary processing, processing (for human consumption), processing (by-products, not for human consumption), wholesale, retail, distribution, food service, other(s): please specify). [multiple answers]
3. Geographical area where you operate (postcode).
4. Number of years of operation (or years of activity of the respondent)
5. Age and gender of the respondent.
6. What do you expect from the dialogue? (qualitative description)
7. Which type of stakeholders would you like to get in touch with?

8. List the people who will attend activities of the dialogue (if known), by gender, age, and role in the company (department, level of responsibility).

B. General economic characteristics of the company

9. Turnover of the company during the last year. [ranges to be provided]
10. Fixed costs of the company during the last year. [ranges to be provided]
11. Variable costs of the company during the last year (excluding waste management costs). [ranges to be provided]
12. Waste management costs of the company during the last year.

C. Production: inputs, outputs and waste

13. Main fish input used by the company (or mix of products, qualitatively described). [not for fishing companies]
14. Quantity of the main fish input purchased during the last year. [not for fishing companies]
15. Average price at which you purchased your main fish input during the last year. [not for fishing companies]
16. Do you know the quantity of fish input which was wasted and not recovered during the last year (avoidable, not avoidable, by-products)? If not, could you provide an approximate estimate? [not for fishing companies]
17. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea, other(s): please specify). [multiple answers]
18. Main fish product(s) produced by the company.
19. Quantity of the main fish product(s) produced and sold during the last year.
20. Average price(s) at which the main product(s) was/were sold during the last year.

21. Do you know the quantity of fish product which was wasted and not recovered during the last year (avoidable, not avoidable, by-products)? If not, could you provide an approximate estimate?
22. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea, other(s): please specify). [multiple answers]

D. Employment in the company

23. Number of employees of the company, by gender.
24. Number of hours worked in an average week by the company's employees, by gender.
25. Number of full time equivalent jobs in the company, by gender.
26. Number of local households that are supported by jobs in the company.

E. Food waste: awareness, attitudes and management

27. Awareness of food waste levels in their company. [Likert scale: from 1 "totally aware" to 5 "not aware at all"]
28. To which extent do you agree with the following statements?³

Statement	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree
Food loss and waste are a major issue for the sustainability of the food systems in general.					
Food loss and waste are a major issue in our sector.					

³ If the company has more than 10 employees, all the employees who are expected to be involved in the stakeholder dialogue should fill the staff questionnaire in Appendix 2.

Food loss and waste are a major issue for our company.					
I am concerned about the economic costs of food loss and waste in our company.					
I am concerned about the environmental impact of food loss and waste in our company.					
We are committed to reducing food loss and waste in our company.					

29. Are you already implementing any measures to reduce food waste on a regular basis, namely the trading of fish product(s) removed from the supply chain for human consumption? [yes/no]

30. If yes, please specify:

- The type of product. [qualitative]
- If the product had to undergo any ad hoc treatment before being sent / after being received, please specify: (1) type(s) of treatment (unpacking, shredding, heating, hygienisation, other(s): please specify) [multiple answers]; (2) cost for you (Euro/ton).
- Location(s) the buyers/sellers. [postcode(s)]
- Means of transport generally used to transfer the product: (1) type (truck with semi-trailer, 28-34 t; rigid truck, 20-26 t; rigid truck, 20-26 t, with cooling; tractor, single trailer; tractor, double trailer; other(s): please specify); (2) type of fuel (diesel/vegetable oil/electricity); (3) if there are empty returns (yes/no/don't know); (4) fill rate of the vehicles (%); (5) if other products are transported apart from the product in focus (yes/no/I don't know); (6) who pays for it (you / the other party).
- Storage conditions before sending / after receiving (with cooling unit/without; time of storage).

- If the transferring of the product required packaging, please specify:
(1) the mass of packaging material (kg per kg of product); (2) whether reusable packaging was used (yes/no); (3) the type of packaging (plastic, bio-plastic, cardboard, paper, metal, composite, other(s): please specify) [multiple answers]; (4) who paid for it (you / the other party).

F. Survey satisfaction

31. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

30 Stakeholder dialogue participants (before final event)

Final questionnaire

To be filled before the ‘final stakeholder events’

Company identification

- A. Name of the company.
- B. Age and gender of the respondent.

General economic characteristics of the company

- C. *Turnover of the company during the last year. [ranges to be provided]*
- D. *Fixed costs of the company during the last year. [ranges to be provided]*
- E. *Variable costs of the company during the last year (excluding waste management costs). [ranges to be provided]*
- F. Waste management costs of the company during the last year.

Production: inputs, outputs and waste

- G. Did you experience any significant changes in the following aspects compared to the initial year of the dialogue? If yes, please specify.

- a. Main fish input used by the company (or mix of products, qualitatively described). [not for fishing companies]
- b. Quantity of the main fish input purchased during the last year. [not for fishing companies]
- c. Average price at which you purchased your main fish input during the last year. [not for fishing companies]
- d. Do you know the quantity of fish input which was wasted and not recovered during the last year (avoidable, not avoidable, by-products)? If not, could you provide an approximate estimate? [not for fishing companies]
- e. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea, other(s): please specify). [multiple answers]
- f. Main fish product(s) produced by the company.
- g. Quantity of the main fish product(s) produced and sold during the last year.
- h. Average price(s) at which the main product(s) was/were sold during the last year.
- i. Do you know the quantity of fish product which was wasted and not recovered during the last year (avoidable, not avoidable, by-products)? If not, could you provide an approximate estimate?
- j. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea, other(s): please specify). [multiple answers]

Employment in the company

- H. Number of employees of the company, by gender.
- I. Number of hours worked in an average week by the company's employees, by gender.
- J. *Number of full time equivalent jobs in the company, by gender.*
- K. Number of local households that are supported by jobs in the company.

Food waste: awareness, attitudes and management

- L. Awareness of food waste levels in their company. [Likert scale: from 1 "totally aware" to 5 "not aware at all"]

M. To which extent do you agree with the following statements?⁴

Statement	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree
Food loss and waste are a major issue for the sustainability of the food systems in general.					
Food loss and waste are a major issue in our sector.					
Food loss and waste are a major issue for our company.					
I am concerned about the economic costs of food loss and waste in our company.					
I am concerned about the environmental impact of food loss and waste in our company.					
We are committed to reducing food loss and waste in our company.					

Participation in the dialogue: employment, costs, contacts, outcomes, satisfaction

⁴ All the employees who have been involved in the stakeholder dialogue and/or related food exchanges should fill the staff questionnaire in Appendix 2.

- N. Please list all employees who have been involved in activities of the dialogue, by gender, age and role (department, level of responsibility).
- Did your company need to hire new personnel in order to deal with the dialogue and deriving activities, and how many (by gender)?
 - How many hours did you dedicate yearly/monthly/weekly to the dialogue and deriving activities on average?
- O. How many employees have developed new skills thanks to the dialogue (by gender)? Technological (use of mobile app, pc software); Technical (better understanding of how the food supply chain works); Social/relational (with other participants in the dialogues).
- P. Could you estimate the costs in which you incurred due to your participation in the dialogue? (Please exclude the costs relative to food transactions if any, which were already measured in ad hoc questionnaires; only include day-to-day costs, e.g. travel for attending events)
- Q. How many new contacts were generated by the dialogue, divided into buyers, sellers, and partners at the same level of the chain?
- Willingness of these contacts to continue the relationship. [Likert scale: from 1 “very likely” to 5 “very unlikely”]
- R. How much do you think that the dialogue improved the following aspects?
- Trust with other stakeholders. [Likert scale: from 1 “a lot” to 5 “not at all”]
 - Communication with other stakeholders. [Likert scale: from 1 “a lot” to 5 “not at all”]
 - Interactions and transactions with other stakeholders. [Likert scale: from 1 “a lot” to 5 “not at all”]
- S. Did you involve or are you willing to involve other companies in the dialogue (i.e. sharing contacts, joint discussions)? [yes, I did / yes, I will / no]
- Number of companies who have been informed of the dialogue by you.
 - Number of companies who declared to be interested in it; number of those who have joined it after you informed them.
- T. Did you discover new alternative forms of food use thanks to the dialogue? [yes/no]
- Did you develop any new streams of income (e.g., new products) as a result of participating in the dialogue? [qualitative]

- U. Are the procedures to participate in the stakeholder dialogue too many / too complex? [Likert scale: from 1 “not at all” to 7 “yes, a lot”]
- V. In which specific participatory activities of the dialogue did you take part? [list of the activities implemented and multiple answers]
- W. Have you been able to access any subsidies/other monetary benefits as a result of the dialogue and resulting transaction? How much? Are these one-time, periodical, fixed, or proportional to the amount of waste avoided?
- X. To what extent did the dialogue meet your expectations? [Likert scale: from 1 “much better than expected” to 5 “much worse than expected”, plus 6 “I did not have particular expectations”]
- Y. Is your company willing to continue “using” the dialogue after the end of the project? [yes/no]

Survey satisfaction

- Z. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

31 Seller (at each food transaction)

Questionnaire for sellers

To be filled by the stakeholders who sell or somehow deliver a food product

Company identification

1. Name of your company
2. Age and gender of the respondent
3. Did you purchase/acquire a product that could otherwise become waste (buyer), or did you sell/deliver it (seller)? *[filtering question: depending on the answer, the stakeholder will either proceed with this questionnaire or continue with the buyer one below]*

4. Could you confirm that this transaction was facilitated by the dialogue (e.g. because you got in touch with the buyer during the dialogue)?

Product exchanged

5. Which product was the object of the transaction?
6. Which amount of product was the object of the transaction, and which was the unit of transaction?
7. Which amount of fish input is required to derive the amount of product object of the transaction?
8. Theoretical price at which the fish product / the by-product would have been sold on the market before becoming waste (when its original use was still an option); and after becoming waste (when its original use was not an option anymore), if it could be sold.
9. If the product sold/delivered needed to be disposed of, how much would you have spent in terms of waste management costs?
10. If the product had to undergo any ad hoc treatment before being sold/delivered, please specify: (1) type(s) of treatment (unpacking, shredding, heating, hygienisation, other(s): please specify) [multiple answers]; (2) cost for you (Euro/ton).
11. Price at which the product was sold, if any.

Procedure to transfer the product

12. Where was the product located before being transferred (postcode) and where was it moved (postcode)?
13. Concerning the means of transport used to transfer the product, please specify: (1) the means of transport (truck with semi-trailer, 28-34 t; rigid truck, 20-26 t; rigid truck, 20-26 t, with cooling; tractor, single trailer; tractor, double trailer; other(s): please specify); (2) the type of fuel used (diesel/vegetable oil/electricity); (3) if there was an empty return (yes/no/don't know); (4) the fill rate of the vehicle (%); (5) if other products were transported apart from the

product in focus (yes/no/I don't know); (6) who paid for it (you / the other party).

14. Concerning the storage of the product before sale/delivery, please specify: (1) the typology of storage; (2) the time of storage; (3) whether a cooling unit was required; (4) an estimate of the storage cost (electricity, etc.); (5) whether it is a cost you would have incurred regardless of this transaction.
15. If the transferring of the product required packaging, please specify: (1) the mass of packaging material (kg per kg of product); (2) whether reusable packaging was used (yes/no); (3) the type of packaging (plastic, bio-plastic, cardboard, paper, metal, composite, other: please specify) [multiple answers]; (4) who paid for it (you / the other party).

Additional inputs needed

16. How many working hours (by gender) did you require for managing the product sold/delivered from making the contact to its preparation, until its delivery? To how many FTE jobs do these correspond?
17. How many working hours (by gender) would you have required for managing the product if it was ending up as waste?
18. *Did you have to create one or more positions (including casual workers) to carry out this transaction? Was this position taken by a woman? Would you have created this job even in the absence of the dialogue? (yes/not)*
19. Have you received any subsidies/other monetary benefits (not related to market transactions) as a result of this transaction, and how much?
20. Could you estimate the aggregated costs in which you incurred for making this transaction (communication, transport, staff time, etc.)?

Survey satisfaction

21. Level of satisfaction with the survey. [Likert scale: from 1 "very satisfied" to 5 "not at all satisfied"]

32 Buyer (at each food transaction)

Questionnaire for buyers

To be filled by the stakeholders who purchase or somehow acquire a food product

Company identification

1. Name of the company.
2. Age and gender of the respondent.
3. Did you purchase/acquire a product that could otherwise become waste (buyer), or did you sell/deliver it (seller)? *[filtering question: depending on the answer, the stakeholder will either proceed with this questionnaire or continue with the seller one above]*
4. Could you confirm that this transaction was facilitated by the dialogue (e.g. because you got in touch with the seller during the dialogue)? [yes/no]

Product exchanged

5. Which product was the object of the transaction?
6. Which amount of product was the object of the transaction, and which was the unit of transaction?
7. Theoretical price (unitary) at which the fish product transferred would have been purchased on the market.
8. Total price at which the product was purchased, if any.

Procedure to acquire the product

9. Where was the product located before being transferred (postcode) and where was it moved (postcode)?
10. Concerning the means of transport used to transfer the product, please specify: (1) the means of transport (truck with semi-trailer, 28-34 t; rigid truck, 20-26 t; rigid truck, 20-26 t, with cooling; tractor, single trailer; tractor, double trailer; other(s): please specify); (2) the type of fuel used (diesel/vegetable oil/electricity); (3) if there was an empty return (yes/no/don't know); (4) the fill

rate of the vehicle (%); (5) if other products were transported apart from the product in focus (yes/no/I don't know); (6) who paid for it (you / the other party).

11. Concerning the storage of the product after purchase/acquisition and before use, please specify: (1) the typology of storage; (2) the time of storage; (3) whether a cooling unit was required; (4) an estimate of the storage cost (electricity, etc.); (5) whether this is a cost you would have incurred regardless of this transaction.
12. If the transferring of the product required packaging, please specify: (1) the mass of packaging material (kg per kg of product); (2) whether reusable packaging was used (yes/no); (3) the type of packaging (plastic, bio-plastic, cardboard, paper, metal, composite, other: please specify) [multiple answers]; (4) who paid for it (you / the other party).

Additional inputs needed

13. How many working hours (by gender) did you require for managing the transaction (from making the contact until its withdrawal and inputting in the production process)? To how many FTE jobs do these correspond?
14. Did you have to create one or more positions (including casual workers) to carry out this transaction? Was this position taken by a woman? Would you have created this job even in the absence of the dialogue? [yes/no]
15. Have you received any subsidies/other monetary benefits (not related to market transactions) as a result of this transaction and how much?
16. Could you estimate the aggregated costs in which you incurred for making this transaction (communication, transport, staff time, etc.)?

Use of the product

17. If the product had to undergo any ad hoc treatment before being sold/delivered, please specify: (1) type(s) of treatment (unpacking, shredding, heating, hygienisation, other(s): please specify) [multiple answers]; (2) cost for you (Euro/ton).

18. Which final product did you obtain using the product object of the transaction?
Did it include other inputs? [qualitative]
19. Which quantity of final product did you obtain using the food object of the transaction? At which price did you sell it?
20. If the product obtained through the transaction replaced a similar product sourced through your standard source, was the rate of transformation into output the same as the standard product?
21. If some or all of the product purchased/acquired ended up as waste anyway, please specify: (1) the amount; (2) related waste management costs.

Survey satisfaction

22. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

T4.2 Leroma B2B digital marketplace for fish

Leroma platform – questionnaire for T4.2

The reference population for the assessment will be represented by the companies who conduct transactions on the Leroma platform and that are based in either Germany or Scotland (or the UK, if the region cannot be identified). All companies that sell something will fill questionnaire 5 with the single question. The other questionnaires are intended for use in case studies with selected companies. For non-cross-border transactions, all questionnaires are filled in as part of the case studies. The companies based in different countries which are involved in a transaction with the former would only fill a specific questionnaire after the transaction: if a product from Germany or Scotland is sold in other countries, the purchaser would fill questionnaire 4; if a product from other countries is sold in Germany or Scotland, the seller would fill questionnaire 3.

33 Platform users (upon registration)

Questionnaire to be filled upon registration on the Leroma platform

A. Company identification

1. Name of the company.
2. Stage of the supply chain where the company operates.
 - Primary production
 - Primary processing
 - Processing (for human consumption)
 - Processing (by-products, not for human consumption)
 - Wholesale
 - Retail
 - Distribution
 - Food service
 - Other(s) (please specify)
3. Geographical area where the company operates. [postcode]
4. Number of years of operation.
5. Average age of the employees of the company.
6. Number of employees of the company, by gender.

B. Food waste: awareness, attitudes and management

7. Awareness of food waste levels in the company. [Likert scale: from 1 “fully aware” to 5 “not aware at all”]
8. To which extent do you agree with the following statements?

Statement	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree
Food loss and waste are a major issue for the sustainability of the					

food systems in general.					
Food loss and waste are a major issue in our sector.					
Food loss and waste are a major issue for our company.					
I am concerned about the economic costs of food loss and waste in our company.					
I am concerned about the environmental impact of food loss and waste in our company.					
We are committed to reducing food loss and waste in our company.					

9. Waste management costs of the company during the last year.

C. Gender and survey satisfaction

10. Age and gender of the respondent.

11. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

34 Subset of platform users (at the beginning)

Questionnaire to be filled by selected companies as part of a case study at the beginning

A. Production: inputs, outputs and waste

1. Main fish input used by the company (or mix of products, qualitatively described). [not for fishing companies]
2. Quantity of the main fish input purchased during the last year. [not for fishing companies]
3. Average price at which you purchased your main fish input during the last year. [not for fishing companies]
4. Quantity of fish input wasted and not recovered during the last year (avoidable, not avoidable, by-products). [not for fishing companies]
5. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea, Others: please specify). [multiple answer]
6. Main fish product(s) produced by the company.
7. Quantity of the main fish product(s) produced and sold during the last year.
8. Average price(s) at which the main fish product(s) was/were sold during the last year.
9. Quantity of fish product which was wasted and not recovered during the last year (avoidable, not avoidable, by-products).
10. Ways in which the above waste was used (animal feed, composting, anaerobic digestion, incineration, discards on land/at sea). [multiple answer].

B. Gender and survey satisfaction

11. Age and gender of the respondent.

12. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]⁵

35 Seller (after a food transaction)

Questionnaire to be filled by the seller (selected companies as part of a case study) after a food transaction

A. Product sold

1. Which product was the object of the transaction?
2. Which amount of product was the object of the transaction, and which was the unit of transaction?
3. Price at which the product was sold.
4. Price at which the product would have been sold on the market for its original use.
5. If the product sold needed to be disposed of, how much would you have spent in terms of waste management costs?

B. Procedure to sell the product

6. Where was the product located before being transferred [postcode] and where was it moved [postcode]?
7. Did/Will you (or a company hired by you) take care of the transport of the product? [yes/no]
 - If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the means of transport used;
 - Truck with semi-trailer, 28-34 t
 - Rigid truck, 20-26 t
 - Rigid truck, 20-26 t, cooling

⁵ Besides this questionnaire, the staff of the companies involved in the case study who are expected to be using Leroma should fill the staff questionnaire in Appendix 2.

- Tractor, single trailer
 - Tractor, double trailer
 - Other: please specify
 - (3) if it had a cooling unit;
 - (4) the type of fuel used
 - diesel
 - vegetable oil
 - electricity;
 - (5) if there was an empty return (Yes/No);
 - (6) the fill rate of the vehicle (%).
8. Did/Will you (or a company hired by you) take care of the packaging of the product? [yes/no]
- If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the mass of packaging material for distribution (kg per kg of product);
 - (3) if the packaging is reusable (yes/no).
 - (4) the type of packaging (material)
 - Plastic
 - Bio-plastic
 - Cardboard
 - Metal
 - Paper
 - Composite
 - Others: please specify
9. How many working hours (if possible by gender) did/will your employees dedicate to this transaction?
10. Could you estimate the aggregated costs in which you incurred / will incur for making this transaction with Leroma (excluding the Leroma fee)?

C. Preparation of the product traded

11. If the product had to undergo any ad hoc treatments before being sold, please specify:



(1) type of treatment;

Possible response options (multiple answers):

- Unpacking
- Shredding
- Heating
- Hygienisation
- Other: please specify

(2) cost (in EUR or GBP/ton).

D. Gender and survey satisfaction

12. Age and gender of the respondent.

13. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

36 Buyer (after a food transaction)

Questionnaire to be filled by the purchaser (selected companies as part of a case study) after a food transaction

A. Product purchased

1. Which product was the object of the transaction?
2. Which amount of the product was the object of the transaction, and which was the unit of transaction?
3. Price at which the product was purchased.

B. Procedure to acquire the product

4. Where was the product located before being transferred [postcode] and where was it moved [postcode]?
5. Did/Will you (or a company hired by you) take care of the transport of the product? [yes/no]
 - If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;

- (2) the means of transport used;
 - Truck with semi-trailer, 28-34 t
 - Rigid truck, 20-26 t
 - Rigid truck, 20-26 t, cooling
 - Tractor, single trailer
 - Tractor, double trailer
 - Other: please specify
 - (3) if it had a cooling unit;
 - (4) the type of fuel used
 - diesel
 - vegetable oil
 - electricity;
 - (5) if there was an empty return (Yes/No);
 - (6) the fill rate of the vehicle (%).
6. Did/Will you (or a company hired by you) take care of the packaging of the product? [yes/no]
- If yes, please specify:
 - (1) if this was carried out by you, or you had to involve another company;
 - (2) the mass of packaging material for distribution (kg per kg of product);
 - (3) if the packaging is reusable (yes/no).
 - (4) the type of packaging (material)
 - Plastic
 - Bio-plastic
 - Cardboard
 - Metal
 - Paper
 - Composite
 - Others: please specify
7. How many working hours (if possible by gender) did/will your employees dedicate to the transaction?
8. Could you estimate the aggregated costs in which you incurred / will incur for making this transaction with Leroma (excluding the Leroma fee)?

C. Subsequent use of the product traded

9. If the product had to undergo any ad hoc treatment before being used, please specify:
 - (1) type of treatment;
 - (2) cost for you.
10. Which product did/will you obtain using the food traded, which quantity, and at which price did/will you sell it?

D. Gender and survey satisfaction

11. Age and gender of the respondent.
12. Level of satisfaction with the survey. [Likert scale: from 1 "very satisfied" to 5 "not at all satisfied"]

37 Seller (during a food transaction)

Question to be answered by the seller in the course of every food transaction

What would you have done with the goods if you hadn't been able to sell them on the platform?

- We would have sold them through the usual sales channels
- We would have sold them through other sales channels (please specify)
- We would have disposed of them
- Other (please specify)

38 Subset of platform users (at the end of the demonstration)

Questionnaire to be filled at the end of the task (selected companies as part of a case study)

A. Food waste: awareness, attitudes and management

1. Awareness of food waste levels in their company. [Likert scale: from 1 "totally aware" to 5 "not aware at all"]

2. To which extent do you agree with the following statements?⁶

Statement	Completely agree	Somewhat agree	Neutral	Somewhat disagree	Completely disagree
Food loss and waste are a major issue for the sustainability of the food systems in general.					
Food loss and waste are a major issue in our sector.					
Food loss and waste are a major issue for our company.					
I am concerned about the economic costs of food loss and waste in our company.					
I am concerned about the environmental impact of food loss and waste in our company.					
We are committed to reducing food loss and waste in our company.					

3. Waste management costs of the company during the last year.

B. Use of Leroma: employment, costs, contacts, outcomes, satisfaction

⁶ All the employees who have been using Leroma should fill the staff questionnaire in Appendix 2.

4. Please list all employees who have been involved in the use of Leroma, by gender, age and role. [department, level of responsibility]
 - Did your company need to hire new personnel (including casual workers) in order to use Leroma, and how many (by gender)?
5. How would you assess the time needed to learn how to properly use Leroma? [Likert scale from 1 “very little” to 5 “too much”]
 - Are the procedures to use Leroma too many / too complex? [Likert scale: from 1 “not at all” to 7 “yes, a lot”]
6. How many employees have developed new skills thanks to the use of Leroma? Technological (use of mobile app, pc software); Technical (better understanding of how to manage food transactions); Social/relational (with other users of Leroma, if relevant) if possible by gender.
7. If you had to acquire a new computer to use Leroma, please specify:
 - (1) the location of your computers;
 - (2) server capacity;
 - (3) type of CPU;
 - (4) type of device;
 - (5) computer time used for operations related to Leroma.
8. Have you suggested or are you willing to suggest the use of Leroma to other companies? [yes, I did / yes, I will / no]
 - Number of companies to which you suggested to use Leroma, if any.
 - Number of those who declared to be interested in it; number of those who have used it after you informed them.
9. Did you discover new alternative use of your products and/or by-products thanks to Leroma? [yes/no]
 - Did you develop any new streams of income (e.g., new products) as a result of using Leroma? [qualitative information]
10. Were you able to access any subsidies/other monetary benefits as a result of using Leroma? How much? Are these one-time, periodical, fixed, or proportional to the amount of waste avoided?
11. To what extent did Leroma meet your expectations? [Likert scale: from 1 “completely” to 5 “not at all”]

12. Is your company willing to continue using Leroma after the project has come to an end? [yes/no]

C. Management of the products traded

13. Did some or all of the products traded on Leroma ended up as waste anyway? How often and in which proportion?

14. Concerning the storage of the products traded, please specify:

- (1) the typology of storage;
- (2) the time of storage;
- (3) whether a cooling unit is required;
- (4) whether this is a cost you would have incurred regardless of using Leroma.

D. Gender and survey satisfaction

15. Age and gender of the respondent.

16. Level of satisfaction with the survey. [Likert scale: from 1 “very satisfied” to 5 “not at all satisfied”]

39 LER Leroma (after implementation)

Information to be retrieved by Leroma at the end of the task

1. Number of searches made by each company on the Leroma platform.
2. Number of agreements activated and finalized through the Leroma platform by each company.
3. Number of offers uploaded on the Leroma platform by each company.
4. Number of matches reached by each company.
5. Number of inquiries made to Leroma by potential buyers and sellers from Germany and Scotland (regardless of their registration).
6. Number of companies that registered to Leroma and then dropped out / did not finalise any transaction.

T5.1 KITRO Innovative bin

40 User (before, mid-term, at the end)

Questionnaire for the data collection for the sustainability assessment of the innovation Kitro

Date of interview:	Carried out by (ISUN):
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Explanations to the survey

The survey is conducted in the form of a personal interview with the persons responsible for the project as the users and as the project partners. Some of the questions will be presented to the interview partners in written form so that they can gather the necessary information in a flexible manner.

There are three survey periods:

- **Before** using Kitro (**project beginning**)
- While using Kitro (**mid-term**)
- At the ending of the project (**project ending**)

The questions (blocks) marked in **yellow** must be answered at the middle and end of the project, all other questions must also be answered before using Kitro.

Privacy statement (will be added if required)

Part 1: General data on the organisation

• Name of the organisation:			
• Contact:			
• Number and gender of employees - total: thereof: - Administration: - Production: - Management: - Cleaning: - Service staff:	female	male	diverse
Please describe the organisation in which Kitro is used:			

- **Catering system** (regeneration kitchen, cook & chill, cook & hold, etc.)

- **Serving system** (free-Flow, Buffet, Portion sizes etc.)

- **Menu** (e.g. number of menu lines, menu cycles, options to choose menu components)

- **Guests** (average number and deviations, target groups)

- **Other characteristics**

Part 2: Questionnaire for users

Production of food (data collection period tbd)

7. Please send us the menus for the survey periods.



8. Were there any deviations in the dishes actually prepared (e.g. dishes produced at short notice)? (*entered into the ERP system?*)
9. How many guests were served daily during the data collection period?
10. What quantities (in kg) were produced (production quantity)?

Production figures from ERP system? □

*Production volume (in kg) = Units of dished produced*weight per unit*

11. How many guests did you cater for daily during the survey period?
12. What was your turnover during the survey period? Is this a regular period or was it affected by unusual events?
13. What is the cost of the prepared dishes? (*can there be a breakdown by dishes/components here or is there an average value?*)
14. Can you provide information on the individual cost items?
15. What are the proportions (a-h) in relation to the costs per dish? Which of the costs would you consider as variable, i.g. changing with the number of dishes produced?
 - a. *Raw material*
 - b. *Energy*
 - c. *Staff*
 - d. *Cleaning*
 - e. *Waste disposal (Do these refer to food waste only or to total waste?)*
 - f. *Storage*
 - g. *Other fixed cost*
 - h. *Other variable cost*

Food waste (data collection period tbd)

16. Are there any bins other than those documented by Kitro through which food waste is disposed of?

17. If so, how many are the other bins and what is the proportion of the organic waste that goes to these ?
18. Waste disposal costs: What is the amount of waste disposal costs? What proportion of this is due to food waste? How is food waste disposed of (per tonne, per container, etc.)?
19. Which disposal company collects the waste? Can you provide information on what happens to the waste after collection?

Implementing and using Kitro

20. Which resources were required to use Kitro?
 - e. technical Infrastructure (new computer, tablet, etc.)
 - f. Qualification of staff
 - g. Staff deployment (in hours and EUR) required for the implementation *(by gender)*
 - h. Staff deployment (in hours and EUR) for the daily usage of Kitro *(by gender)*
21. Did you have to train staff to use Kitro? If yes, how extensive was the training (staff affected and duration of training)?

Kitro's impact on business operations and employees

22. Has your production planning process changed since you started using Kitro? *If so, please explain in which regard.*
23. Do you buy less raw materials since you started using Kitro? *If there is a change in the raw material purchase, how much is it for each ingredient after the innovation?*

How has your input-output productivity changed as a result of the innovation ? Please indicate these figures for before and after the innovation

unit of each raw material purchased (the unit could something like kg per week)

unit of each raw material disposed (the unit could something like kg per week)

number of each dishes produced

24. Are there certain dishes / menu components for which you plan production quantities more specifically since you started using Kitro / receive suggestions for changes from Kitro?

Has the production process of your dishes changed since you started using Kitro? If so, please explain this change.

25. Are there any other processes in your company that have changed since you started using Kitro? *If so, please explain which processes are these.*

26. If there have been price changes for your items since Kitro was introduced, has the use of Kitro had an impact on this? Could you list the dishes whose selling price has changed and how much per dish ?

27. Have you always used the values suggested by Kitro during the survey period as a basis for your production planning? If not, how many of the suggestions did you use?

28. *How many employees have developed new skills thanks to the use of KITRO, by gender?*

- *Technological (use of pc software) [number]*
- *Technical (better understanding of how to manage food transactions) [number]*
- *Social/relational (with other users of the software, if relevant) [number]*

Are there non-financial improvements and benefits through the use of Kitro (e.g. better agreements in the team, higher motivation, PR effects)? On a scale of 1-5, how would you rate these benefits (1 low, 5 high)?

Are there new income streams resulting from the innovation? If you answered yes to the previous question, please indicate the type of new income streams and their value in Euros.

Are there new subsidies and/or other monetary benefits received as results of food waste reduction after the innovation? If you answered yes to the previous question, please indicate their value in Euros.

If you received any subsidies and/or other monetary benefits as results of waste reduction, please specify whether these are (multiple choices possible):

One-off; Periodic; Fixed; Proportional to the quantity of waste; Other (please specify)

29. How has your awareness of food waste changed through the use of Kitro?
(open question + scale 1-5: 1-no change, 5-strong change)?

*How has the awareness of the issue of food waste of the employees (if possible by gender) in production and service changed through the application of Kitro?
(To be filled in by each employee; open question + scale 1-5: 1 - no change, 5 - strong change)?*

To which extent do you agree with the following statements? (to be answered individually by the staff members also indicating gender, position and department, education and age[SP1])

	<i>Completely agree</i>	<i>Somewhat agree</i>	<i>Neutral</i>	<i>Somewhat disagree</i>	<i>Completely disagree</i>
<i>Food loss and waste are major issues for the sustainability of the food systems in general</i>					
<i>Food loss and waste are major issues in [insert the name of your sector here]</i>					
<i>Food loss and waste are major issues in [insert here the type of your organisation]</i>					

<i>I am concerned about the economic costs of food loss and waste in [insert here the type of your organisation]</i>					
<i>I am concerned about the environmental impact of the food loss and waste in [insert here the type of your organisation]</i>					
<i>I am committed to reduce the food loss in [insert here the type of your organisation]</i>					

30. How has your behaviour changed? Has Kitro helped you to waste less food (open question + scale 1-5: 1-no change, 5-strong change)?
31. How has the behaviour of your production and service staff (if possible by gender) changed? Has Kitro contributed to them wasting less food (open question + scale 1-5: 1-not a change, 5-significant change (less wastage)?
32. Have you saved costs by using Kitro? How high are the savings and to which cost types can they be attributed (e.g. use of goods, energy, personnel, cleaning, disposal of food waste, storage costs, other fixed costs, other variable costs, etc.)?
33. Have other sources of income arisen for you through the use of Kitro? If yes, which ones?
34. Have new business contacts resulted for you through the use of Kitro (other suppliers, new distribution channels, etc.), if yes, which ones?

User-friendliness of Kitro

35. How satisfied are you with the following features of Kitro (*scale 1-5: 1-hardly satisfied, 5-very satisfied*)?

- a. *Quality of the service*
- b. *The dashboard of the innovation*
- c. *The features of the innovation -*
- d. *Ease of use for managers -*
- e. *Ease of use for kitchen staff -*

36. What features or design elements would you change or add to Kitro? (*open question*)

Evaluation of Kitro

37. Will you continue to use Kitro after the end of the project?

38. What expectations did you have when using Kitro with regard to reducing food waste? Were they fulfilled?

39. Have you talked to other institutions about Kitro? Have they expressed interest in implementing Kitro? How likely do you think they are to implement Kitro? (*Scale 1-5, 1-very unlikely, 5-very likely*)

40. Would you recommend Kitro to others?

41. Please rate the degree of difficulty for implementing Kitro:
(*Scale 1-5, 1-easy, 5-very difficult*)

Other questions

42. What is your motivation for using Kitro? Please sort the possible reasons in order of decreasing importance (first mentioned most important - last mentioned least important). (*ask only at project beginning*)

- ☐ Other restaurants also participate.
- ☐ We can reduce the workload of the staff.
- ☐ We can optimise our production planning process.
- ☐ We are interested in participating in a scientific project.
- ☐ The costs for Kitro are covered by the project.
- ☐ We can reduce costs in the business.

- ☐ We can reduce food waste.
- ☐ We can act in an environmentally friendly way.
- ☐ Other:_____

43. Did you get access to further funding through participation in the project (e.g. food waste reduction funding)?

44. Please list job title, gender, task of the persons (without names) who were involved in the project (from the first meeting, background activity, implementation, PR, etc.).

45. How satisfied are you with this survey (*by gender, scale 1-5, 1-very satisfied, 5 not at all satisfied*).

41 Kitro

Part 3: Questions to the partners Kitro and iSuN

Questions for Kitro

Determining the amount of food waste (Data collection period tbd)

1. At which points in the production and serving process are the Kitro measuring systems placed? What type of waste is collected (*storage, production, serving losses/overproduction, leftover plates*)?
2. How many photos were taken during the data collection period?
3. How did the use of Kitro/the resulting Kitro suggestions change the waste for certain food waste categories? *Please indicate the quantity and type of food waste*
4. How long does it take users to use Kitro on average each day?

Weitere Fragen

5. What are the costs of implementing Kitro?

6. List of persons (without names), job title, gender, task, who were involved in the project.
7. Computer: Location of the server
8. Computer: Server capacity
9. Computer: Type of CPU in use (e.g. Intel Skylake)
10. Technical equipment: Scale (number per user, lifetime)
11. Technical equipment: Type of bin (lifetime, number per user, size, weight, material)
12. Technical equipment: Camera (lifetime, number per user)
13. Business model: Who is the owner of the Kitro devices? Are the devices only used once per restaurant or are they reused again?

42 ISUN

Questions for ISUN

1. *List of persons (without names), job title, gender, task, who were involved in the project.*
2. *Gender of the interviewee(s)*

T5.2 MITAKUS Forecasting software for restaurants

43 User (before, mid-term, at the end)

Questionnaire for the data collection for the sustainability assessment of the innovation Mitakus

Date of interview:	Carried out by (ISUN):
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Explanations to the survey

The survey is conducted in the form of a personal interview with the persons responsible for the project as the user and as the project partners. Some of the questions will be presented to the interview partners in written form so that they can gather the necessary information in a flexible manner.

There are three survey periods:

- **Before** using Mitakus (**project beginning**)
- While using Mitakus (**mid-term**)
- At the ending of the project (**project ending**)

The questions (blocks) marked in **yellow** must be answered at the middle and end of the project, all other questions must also be answered before using Mitakus.

Privacy statement (will be added)



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Part 1: General information about the organisation (user)

• Name of the organisation:			
• Function of interviewee(s):			
• Number and gender of employees	female	male	diverse
- total:			
- thereof:			
○ Administration:			
○ Production:			
○ Service staff:			
○ Management:			
○ Cleaning:			
○ Other Functions:			
<p>Please describe the organisation in which Mitakus is used:</p> <ul style="list-style-type: none"> - Catering system (regeneration kitchen, cook & chill, cook & hold, etc.) - Serving system (free-Flow, Buffet, Portion sizes etc.) 			

- **Menu** (e.g. number of menu lines, menu cycles, options to choose menu components)

- **Guests** (average number and deviations, target groups)

- **Other characteristics**

Part 2: Questionnaire for users

Production of food (data collection period tbd)

1. Please send us the menus including prices for the survey periods.
2. What are the unit weights for each menu / dish?
3. What quantities (units or kg) were produced (production quantity)?
Production figures for all main menus and side dishes/ other meal components from ERP System □
Production volume (in kg) = Units produced unit weight*
4. Were there any deviations in the dishes actually prepared (e.g. other quantities or other dishes produced at short notice)? (*entered into the ERP system?*)
5. How large is the deviation between conventional production planning and planning with Mitakus?

Food waste (data collection period tbd)

6. What quantities (number or kg) of dishes produced were not sold (overproduction)? *Sales figures from ERP system*

*Overproduction (in kg) = (production quantity – units sold) *unit weight*

7. Which quantities of overproduction were reused, which were thrown away (food waste)?

Food waste = overproduction - food reused

8. Data to determine relative indicators (waste per guest): number of guests (*does the number of transactions documented in the system correspond to the number of guests?*)

Implementing and using Mitakus

9. What resources were necessary to use Mitakus?
- Technical infrastructure (new computer, tablet, etc.)
 - Qualification of the MA
 - Staff input (in hours and EUR) necessary for implementation (by gender)
 - Staff input (in hours and EUR) for daily use (by gender)
10. Did you have to train staff to use Mitakus? If yes, how extensive was the training (staff involved, duration)?

Cost of food prepared and waste disposal

11. What is the cost of the dishes prepared? (can a breakdown by dish/component be given here or is there an average value?)
12. Can you give details of the individual cost items? What are the proportions (a-h) in terms of cost per dish?
- Cost of raw materials*
 - Energy costs*
 - Personnel costs*
 - Cleaning costs*
 - Waste disposal costs (do these relate to food waste only or waste in total?)*

- f. *Storage costs*
- g. *Other fixed costs*
- h. *Other variable costs*

13. Waste disposal costs: What is the amount of waste disposal costs? What proportion of this is caused by food waste? How is the disposal of food waste accounted for (per tonne, per container, etc.)?

Impact of Mitakus on business operations and employees

- 14. How has your production planning process changed since you started using Mitakus?
 - 15. Has the amount of raw materials purchased changed since you started using Mitakus (*how has it changed*)?
 - 16. Has the production process of your dishes changed since you started using Mitakus?
 - 17. Are there any other processes in your company that have changed since you started using Mitakus?
 - 18. If there have been price changes for your meals since the introduction of Mitakus, has the use of Mitakus had an impact on this?
 - 19. Have you always used the values suggested by Mitakus as a basis for your production planning during the data collection period? If not, how many of the suggestions did you use?
 - 20. Are there employees who have acquired new competences through the use of Mitakus (e.g. technological, technical, communication skills)? *By gender*
 - 21. Are there non-financial improvements and benefits through the use of Mitakus (e.g. better agreements in the team, higher motivation, PR effects)?
- Open question + On a scale of 1-5, how would you rate these benefits (1 low, 5 high)?*
- 22. How has your awareness of food waste changed as a result of using Mitakus/participating in the project?

Open question + scale 1-5: 1 no change, 5 strong change

23. How has the awareness of the issue of food waste of the other employees (if possible by gender) who work with Mitakus changed through the use of Mitakus?

Open question + filling in per MA; scale 1-5: 1 no change, 5 strong change

24. How has your behaviour changed? Has Mitakus contributed to you wasting less food?

At work, in private - open question + scale 1-5: 1 no change, 5 strong change

25. How has the behaviour of your employees (if possible by gender) changed? Has Mitakus contributed to them wasting less food?

Open question + scale 1-5: 1 no change, 5 strong change

26. Have you saved costs by using Mitakus? How high are the savings and to which items can they be attributed (e.g. waste disposal costs, energy, personnel costs, use of goods)?

User-friendliness of Mitakus

27. How satisfied are you with the following features of Mitakus?

Scale 1-5: 1 hardly satisfied, 5 very satisfied

- a. The dashboard of the innovation
- b. The features of the innovation -
- c. Ease of use for managers -
- d. Ease of use for kitchen staff -
- e. Quality of service
- f.

28. Which functions or design elements would you change or add to Mitakus?
(Free text)

Evaluation of Mitakus

29. Will you continue to use Mitakus after the end of the project?

30. What expectations did you have when using Mitakus with regard to reducing food waste? Were they fulfilled?
31. Have you talked to other institutions about Mitakus? Have they expressed interest in implementing Mitakus?
32. Would you recommend Mitakus to others?
33. Please rate the level of difficulty for implementing Mitakus
Scale 1-5, 1-easy, 5 very difficult

Other questions

34. What is your motivation for using Mitakus? Please sort the possible reasons in order of decreasing importance (first mentioned most important - last mentioned least important). *(ask only at project beginning)*
 - ☐ Other restaurants also participate.
 - ☐ We can reduce the workload of the staff.
 - ☐ We can optimise our production planning process.
 - ☐ We are interested in participating in a scientific project.
 - ☐ The costs for Kitro are covered by the project.
 - ☐ We can reduce costs in the business.
 - ☐ We can reduce food waste.
 - ☐ We can act in an environmentally friendly way.
 - ☐ Other: _____
35. Did you get access to further funding through participation in the project (e.g. food waste reduction funding)?
36. Please list job title, gender, task of the persons (without names) who were involved in the project (from the first meeting, background activity, implementation, PR, etc.).
37. How satisfied are you with this survey?

By gender, scale 1-5, 1-very satisfied, 5 not at all satisfied

38. Which disposal company collects the food waste? Can you provide information on what happens to the waste after collection?

44 Mitakus

Part 3: Questions for the partners Mitakus and iSuN

Questions for innovation partner Mitakus

1. What quantities (units or kg) of dishes produced were not sold (overproduction)? *Sales figures from ERP system* □
*Overproduction (in kg) = (production quantity – units sold) *unit weight*
2. What are the costs of implementing Mitakus?
3. List of persons (without names), job title, gender, task, who were involved in the project.
4. *How many times has Mitakus been integrated in the user system?*
5. *What is the number of companies that started using Mitakus at the piloting test?*
6. Location of the server
7. Server capacity
8. Type of CPU in use (e.g. Intel Skylake)
9. Type of computer device

45 ISUN

Questions ISUN

10. *List of persons (without names), job title, gender, task, who were involved in the project.*
11. *Genders of the person/s interviewed*

T5.3 MATOMATIC

46 User

General information

Name of Kitchen:

Name, position and gender of contact person (s):

Number of staff by gender and position if possible:

Data related to food waste quantities and environmental impact will be collected from company records.

Efficacy

Replicability

- Would you like to continue to use the innovation after the project? (yes/no)
- How many in the staff have been involved in using the innovation? by gender, by role
- Will you promote the innovation to other kitchens? (yes, will / yes, already have/ no)

Utility

- Are you satisfied with the innovation from matomatic?
- How much do you think matomatic helped your activity in reducing the FW?
- How many employees have developed new skills thanks to the use of Matomatic, by gender?
- Technological (use of pc software) [number]

- Technical (better understanding of how to manage food transactions) [number]
- Social/relational (with other users of the software, if relevant) [number]
- Do you think your purchasing habits have changed since your using matomatic

How useful do you think this innovation is for your kitchen?

User-friendliness

- Which is the investment needed to purchase the innovation?
- Which is the average working hour cost in your company?
- Did you have to hire new personnel in order to use matomatic? Please provide a short demographic: age, gender, position
- Who in your company is in charge of dealing with MATOMATIC innovation? Please provide a short demographic: age, gender, position
- Has your trust in other partners increased due to this innovation?
- Has your communication with other actors increased due to this innovation?
- How often do you contact matomatic for issues with their innovation? eg.: every day; once a week; once per month; once every six months; once a year
- How much do you agree with the following statements?
 - The dashboard of the innovation is good
 - I like the features of the innovation
 - The innovation is easy to use for managers
 - The innovation is easy to use for kitchen staff
 - I am satisfied with the service offered by matomatic
- Open question: What are the features of the innovation you would change or add?
- How difficult was it to start using the innovation on a 1= at all to 5= very difficult scale?

- Hours you dedicate weekly to use matomatic innovation/Total weekly hours?

Socio-economy

Profitability

- What is the (daily weekly/monthly?) expenditure of the school canteen for meal ingredients?
- What are the fixed costs of food management other than buying the food itself ? (e.g. buying an operating a larger fridge, staff time)
- What are the variable costs of food management other than buying the food itself ? (e.g. packing, electricity and water for dishes and other purposes)
- What are the cost, charge structure and mode of disposing organic waste for an educational unit?
- What is the change in the annual balance (due to additional income or avoided cost) resulting from the innovation? What has been the total cost of implementing the innovation (e.g. additional/new capital investment, labour, training etc.)?

Behaviour

- Has there been a change in awareness in the staff (if possible by gender) and management? Self-assessment of awareness of the food waste problem (Likert scale from “very aware” to “not aware at all”) by the respondent and by each of the employees involved in managing the food product transferred.
- Has there been a change in attitude in the staff (if possible by gender) and management? Self-assessment of concerns for, and commitment to, food waste reduction (Likert scale, from “a lot” to “not at all”) by the respondent and by each of the employees involved in managing the food product transferred.

Environment

- How do you manage your food waste? Can you estimate a share of used pathways?

Food donation to charities/food banks (%)

Directly to Composting (%)

Directly to Anaerobic digestion (%)

Directly to Incineration (%)

Municipal or commercial solid waste collection system ('residual waste bin') (%)

Separate collection system for organic waste ('organic waste bin')(%)

Other: Please specify (%)

Matomatic

To ask Matomatic once

- Could you provide us with information of the technical equipment used in the innovation? (Type and number of equipments, picture of the equipment, ...)
- Who is the owner of the devices? Are the devices only used once or are they re-used?
- Do you use a server for your programme?
- Has the software provider information to the server capacity? Where is the server located?
- How much of the total server capacity is used for the software (in vCPU/CPU in use)?
- Which type of CPU is used (e.g. Intel Skylake)
- Do you need to buy new devices to run this software? Or do you use existing devices? Which device do you use (tablet/Ipad, computer, notebook, smartphone)

T5.4 SLU/AIE Holistic educational approach

47 User (before and after the implementation)

Questionnaire to evaluate the current situation of food waste at your school

To be able to measure the effectiveness of various innovative approaches to food waste avoidance in schools, the situation before and after the planned activities should be surveyed. The data are not published and are only used to determine whether and to what extent the implementation of the educational concept affects behaviour and the amount of waste generated during lunch.

General Information

Name of the school:

Name, position, and gender of the contact person (s):

Number of students at the school by gender:

Number of students at the buffet by gender:

Number of teachers by gender and position:

Number of administrative staff by gender and position:

Kitchen staff / canteen staff by gender and position:

Type of food preparation:

(Cooked on site, delivered freshly cooked, cook & chill ...)

Contact:

Type of food serving:

(Serving by kitchen staff, buffet operation, handing out of the ready-made plate, serving of the ready-made plate ...)

Contact:

How does the ordering system work (order time, electronic, rejections, changes ...)?

Date of the survey:

Carrying out the survey:

Notes: *yellow = after application of the innovation, gray = still to be clarified, pink = not to be answered by the schools, green text = internal and for the interviewer*

Collection of data BEFORE implementation of the educational concept (baseline collection)

Socio-economic considerations

Q1. What is the average expenditure in the school canteen on groceries? (daily / weekly / monthly costs for the purchase of goods; per serving) *or*

What are the average expenses of the school maintainer for meals? (daily / weekly / monthly cost of meals; average cost per serving)

Q2. What are the fixed costs of managing food apart from the cost of the food itself? (e.g. : procurement, storage, employee costs) -> *important for comparing the effort*

Q3. What is the variable cost of food management other than the cost of the food itself? (e.g. : packaging, electricity and water for dishes and other purposes) -> *important for comparing the effort*

Q4. What are the disposal costs for excess food and plate scraps for your educational institution? (Differentiation between lunch and general leftovers possible, e.g., buffet, school snacks?) -> *important for the comparison of the effort*

Q5. How many meals are sold / served each week? (If possible, please specify the type of food / menu composition: number of starters / soups, number of main dishes including side dishes, number of desserts; total number of menus) -> *possible submission of documents*

Please select the appropriate option:

Q6. What is the cost structure for the disposal of kitchen waste, surplus food, and leftover plates? (Costs for certain collection intervals, container volume, weight; bearer of the costs?)

- Q7. What are the costs of a meal for the students? (How are the costs made up? Does the school / municipality specify a standard price for meals?) *Is there a correlation between the cost and type of certain meals and leftover plates?*
- Q8. What are the costs of a meal for the school or the school-maintaining organization / municipality? (How are the costs made up? Does the school / municipality specify a standard price for meals?) *Is there a correlation between the price and type of certain meals and leftover plates?*
- Q9. What subsidies / other cash benefits (in euros) do you receive for reducing waste? (Stating whether these are one-off, periodic, fixed, or proportional to the amount of waste) **□ AFTER application of the EDUCATIONAL CONCEPT;** *Asked about the future: ... can be expected due to the reduction in waste?*
- Q10. Has the introduction of the educational concept resulted in cost savings? If so, by how much (in EUR) and in what form (less food ordered, less energy used for cooling, ...)? **□ AFTER application of the EDUCATIONAL CONCEPT**
- Q11. How big is your commitment to reducing food waste? *(Likert scale from “very large” to “not available / not yet ...”) (to be answered by the interviewee and all employees (if possible by gender) who are involved in food management.)*
- Q12. Has the personnel / hourly workload changed due to the introduction of the educational concept (if possible by gender)? How many jobs (by gender) in full-time equivalents (FTE) were created or cut as a result of the introduction of the educational concept? (If it is only a part of the time of one or more employees, please state the entire proportion of FTEs) **□ AFTER application of the EDUCATIONAL CONCEPT**
- Q13. Have other **organizations / schools been informed of the testing and implementation of the educational concept?** If yes, how many? *Total of all organizations / schools informed*
 How many of them said they were interested?
 How many of them would like to use the EDUCATIONAL CONCEPT? **□ evaluate at the end of the project? Time of the survey - after the demonstration? Later?**

Efficiency & Effect **□ after application of the EDUCATIONAL CONCEPT**

- Q14. Who is responsible for the educational concept at your school? If possible, please indicate the number, age, gender, and area of responsibility.
- Q15. Would you like to continue using the educational concept at your school?
Yes / No / Maybe
- Q16. How did you get starting the educational concept? Were there any difficulties? What did you like and what didn't you like? *Open question!*
- Q17. How often was something unclear during the use of the educational concept? Are you satisfied with the way you have been helped with occurring problems? Will you recommend the educational concept to other schools?
- Q18. How many students have been involved in the educational concept in total? If possible, please indicate the number (per day or per week), age, and gender.
- Q19. How many teachers were involved in the educational concept? *(informed the class, supervised during lunch ...)* If possible, please indicate the number, age and gender.
- Q20. How many kitchen workers were involved in the educational concept? If possible, please indicate the number, age and gender.
- Q21. How much additional work do you estimate was required (in h, euros, or number of people) for the educational concept?
- Q22. Did you have to organize / hire additional staff (if possible by gender) for the educational concept?
- Q23. Has your trust to other partner increased due to this innovation?
- Q24. Has your communication with other actors increased due to this innovation?
- Q25. Was the educational concept received well by the students during the period (use interval)? Please explain your answer (why was the educational concept well received or why not?) *Definition of the intended usage intervals!*
- Q26. *Did you continue to use educational concept at your school after completing the survey? How many students (if possible by gender) were involved at the educational concept after completing the survey?*

- Q27. How useful do you think is the educational concept for your school?
- Q28. Were additional purchases or procurements necessary for the implementation of the educational concept? *What was necessary to do/get before starting with the application of the EDUCATIONAL CONCEPT?*
- Q29. Are you willing to promote the educational concept to other partners?
[yes/no]

Environmental Factors

Although our work mainly deals with plate leftovers, it is important for us to record other food waste along the value chain in order to find out whether food waste has been shifted to other stages and to prove overproduction if applicable.

- Q30. How aware are you of the food waste issue? (Please answer the question for the whole team if possible, disaggregate by gender if possible)
- Q31. Is food waste separately collected from other solid waste fractions (e.g. packaging or other residual waste)? Yes/No
- Q32. How is organic waste currently being disposed of? (*Feeding, composting, biogas plant, thermal utilization, sewage treatment plant?*) *Please select the appropriate option:*
- Q33. How and in which area of the kitchen (plate-leftovers, serving-leftovers / buffet-leftovers, other places) have the leftovers changed due to the use of the EDUCATIONAL CONCEPT (in kilograms)? *Asking for the quantities of the reduction as well as looking at waste-accumulation points in the kitchen!* **□ AFTER use of the EDUCATIONAL CONCEPT**
- Q34. Has your ordering / buying behaviour for lunch changed since implementing the educational concept? Yes, ...; No, because... **□ AFTER use of the EDUCATIONAL CONCEPT**
- Q35. Has the educational concept resulted in less food being ordered overall? If so, by how much? (In kilograms per month) **□ AFTER use of the EDUCATIONAL CONCEPT**

Thank you for your help in collecting the data! You have made a valuable contribution to reducing food waste.

On behalf of the project team of the Austrian Ecology Institute,

Philipp Hietler

Daniel Orth

If you have any further questions, please do not hesitate to contact us at the following email addresses:

hietler@ecology.at

orth@ecology.at

T5.5 CozZo Mobile app

48 Households (before implementation)

I Baseline questionnaire for households (before the innovation)

Background information of the member of the household who is in charge of food management (shopping, cooking etc.) OR who will most likely use the CozZo app the most.

1. Gender:
 - Male
 - Female
 - Other
 - I prefer not to say
2. Age: Year of birth _____
3. Household composition:
 - One adult
 - One adult + one child
 - One adult + two children
 - One adult + three or more children

- Two persons/adults without children
- Two persons/adults + one child
- Two persons/adults + two children
- Two persons/adults + three or more children
- Three or more persons/adults without children
- Three or more persons/adults + one child
- Three or more persons/adults + two children
- Three or more persons/adults + three or more children

4. Optional: Please specify gender and age of other household members:

5. Total household income (gross income per month in total):

- Less than 1.000 €
- 1.000 €–1.999 €
- 2.000 €–2.999 €
- 3.000 €–3.999 €
- 4.000 €–4.999 €
- 5.000 €–5.999 €
- 6.000 €–6.999 €
- 7.000 €–7.999 €
- 8.000 €–8.999 €
- 9.000€ or more
- I prefer not to say

6. Which of the following describes your current work life situation the best?

- Employed full-time
- Employed part-time
- Unemployed or laid off
- Student
- Stay-at-home parent
- On long-term sick leave
- Retired
- Other: please specify _____

Relative indicators:



7. Household food wasted before the innovation: Frequency of disposal and amount of food wasted
(In addition to self-assessment, waste amounts are collected by researchers by using separate bins.)

Please indicate the food group and estimate the frequency and amount wasted per each food group in your household:

Food groups:

fruits and berries
vegetables, legumes and fresh herbs
potatoes and potato products
pasta, rice and corn products
meat
fish
eggs
dairy products
bread and rolls
sweet and savoury bakery products
home-made meals
fresh convenience meals
processed vegetable and fruit products
spices
cooking residues and plate/pot waste.
Other, please specify: _____

Frequency (for each food group):

6–7 times per week
3–5 times per week
1–2 times per week
2–3 times per month
about once per month
less often or never

Amount of waste (one portion = about one handful of food):

more than 3 portions
2–3 portions
about 1 portion

½ portion and less or nothing.

8. Do you collect food waste separately from other solid waste fractions?

(Yes/No)

If yes, together with garden and yard waste (Yes/No)

Which options do you use for your food waste disposal?

- Redistributing to other people (e.g. family, friends, neighbours)
- Feeding to pets (or wild animals)
- Home-composting
- Municipal solid waste collection system ('residual waste bin')
- Separate waste collection system ('organic waste bin')
- Other: please specify

9. Cost of weekly household food purchasing before the innovation (€)

- a. Estimate (in euros), how much money does your household spend on food weekly (for a regular week, not including e.g., holidays or parties). Please make the estimation by calculating from your shopping receipts or debit/credit card statements.

Behaviour

10. Reasons for food waste:

- a. In your household, how often does food end up wasted due to the following reasons? (Likert scale 1-5: 1=never due to this, 5=very often due to this)
- The date in the date label has passed.
- The packaging size of the food I bought does not meet my needs and food is left over.
- The food has spoilt (e.g. rotten or become moldy) before I manage to use them.
- I have prepared too much food for one meal.
- I am not sure whether I can still eat the food and I throw it away just to be safe.
- I don't want to eat the same kind of food for several days at a time.
- I/we didn't like the taste of the food.
- Children leave food uneaten.
- I buy ingredients for a recipe and part of them are left unused.

I buy food that I later do not fancy eating.
I/we have bought too much food.

11. Self-assessment of awareness of the food waste problem:

- a. How aware do you consider to be of the food wasted (amount, composition) in your household? (Likert scale 1–5: 1 = not aware at all, 5 = very aware)

12. Self-assessment of concerns for, and commitment to food waste reduction:

- a. How committed to food waste reduction do you consider to be? (Likert scale 1–5: 1=not at all, 5=very committed)
 - b. How much effort have you taken towards reducing food waste in your household? (Likert scale 1–5: 1=no effort at all, 5=a lot of effort)
 - c. Please list the kinds of efforts / methods that you have taken towards reducing food waste in your household:
-

Consumer habits

13. Frequency of purchases in brick-and-mortar stores

- a. How often do your household members go grocery shopping in brick-and-mortar stores?
 - several times a day
 - 6–7 times per week
 - 3–5 times per week
 - 1–2 times per week
 - 2–3 times per month
 - once per month or less

14. Consumer travel for purchases

- a. Which mean of transport do your household members primarily use for their grocery shopping trips?
 - car
 - bike
 - bus
 - train
 - scooter

by foot

other, please specify_____

15. Frequency of online purchasing

a. How often do your household members buy groceries online?

several times a day

6–7 times per week

3–5 times per week

1–2 times per week

2–3 times per month

once per month

5–6 times a year

2–3 times a year

less than 2 times a year

never

16. Frequency of eating out or ordering take-away

a. How often do your household members eat out (e.g., in restaurants) or order take-away food from restaurants?

several times a day

6–7 times per week

3–5 times per week

1–2 times per week

2–3 times per month

once per month

5–6 times a year

2–3 times a year

less than 2 times a year

never

Satisfaction with the survey:

17. On a scale from 1 (not at all satisfied) to 5 (very satisfied), can you rate your satisfaction for this survey?

49 Households (after implementation)

II Monitoring questionnaire for households (after the innovation)

Background information of the respondent (preferably the same person who has filled the baseline questionnaire):

1. Gender:

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ I prefer not to say

2. Age: Year of birth _____

3. Household composition:

- ☐ One adult
- ☐ One adult + one child
- ☐ One adult + two children
- ☐ One adult + three or more children
- ☐ Two persons/adults without children
- ☐ Two persons/adults + one child
- ☐ Two persons/adults + two children
- ☐ Two persons/adults + three or more children
- ☐ Three or more persons/adults without children
- ☐ Three or more persons/adults + one child
- ☐ Three or more persons/adults + two children
- ☐ Three or more persons/adults + three or more children

4. Optional: Please specify gender and age of other household members:

5. Total household income (gross income per month in total):

- ☐ Less than 1.000 €
- ☐ 1.000 €–1.999 €
- ☐ 2.000 €–2.999 €

- ☐ 3.000 €–3.999 €
- ☐ 4.000 €–4.999 €
- ☐ 5.000 €–5.999 €
- ☐ 6.000 €–6.999 €
- ☐ 7.000 €–7.999 €
- ☐ 8.000 €–8.999 €
- ☐ 9.000€ or more
- ☐ I prefer not to say

6. **Work life situation:** Which of the following describes your current work life situation the best?

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Unemployed or laid off
- ☐ Student
- ☐ Stay-at-home parent
- ☐ On long-term sick leave
- ☐ Retired
- ☐ Other: please specify _____

Relative indicators:

7. Household food wasted after the innovation: Frequency of disposal and amount of food wasted
(In addition to self-assessment, waste amounts are collected by researchers by using separate bins.)

Please indicate the food group and estimate the frequency and amount wasted per each food group in your household:

Food groups:

- fruits and berries
- vegetables, legumes and fresh herbs
- potatoes and potato products
- pasta, rice and corn products
- meat
- fish
- eggs
- dairy products

bread and rolls
 sweet and savoury bakery products
 home-made meals
 fresh convenience meals
 processed vegetable and fruit products
 spices
 cooking residues and plate/pot waste.

Other, please specify: _____

Frequency (for each food group):

6–7 times per week
 3–5 times per week
 1–2 times per week
 2–3 times per month
 about once per month

less often or never

Amount of waste (one portion = about one handful of food):

more than 3 portions
 2–3 portions
 about 1 portion
 ½ portion and less or nothing.

8. Cost of weekly household food purchasing before the innovation (€). *This amount excludes occasions of eating out or ordering take-away by household members.*

a. Estimate, how much money does your household spend on food weekly (for a regular week, not including e.g., holidays or parties) (in euros)?

Behaviour:

9. Reasons for food waste:

a. In your household, how often does food end up wasted due to the following reasons? (Likert scale 1-5: 1=never due to this, 5=very often due to this)
 The date in the date label has passed.
 The packaging size of the food I bought does not meet my needs and food is left over.

The food has spoilt (e.g. rotten or become moldy) before I manage to use them.

I have prepared too much food for one meal.

I am not sure whether I can still eat the food and I throw it away just to be safe.

I don't want to eat the same kind of food for several days at a time.

I/we didn't like the taste of the food.

Children leave food uneaten.

I buy ingredients for a recipe and part of them are left unused.

I buy food that I later do not fancy eating.

I/we have bought too much food.

10. **Self-assessment of awareness of the food waste problem:**

- a. How aware do you consider to be of the food wasted (amount, composition) in your household? (Likert scale 1–5: 1 = not aware at all, 5 = very aware)

11. **Self-assessment of concerns for, and commitment to food waste reduction:**

- a. How committed to food waste reduction do you consider to be? (Likert scale 1–5: 1=not at all, 5=very committed)
- b. How much effort have you taken towards reducing food waste in your household? (Likert scale 1–5: 1=no effort at all, 5=a lot of effort)
- c. Please list the kinds of efforts / methods that you have taken towards reducing food waste in your household:

Consumer habits:

12. Frequency of purchases in brick-and-mortar stores

- a. How often do your household members go grocery shopping in brick-and-mortar stores?
 - several times a day
 - 6–7 times per week
 - 3–5 times per week
 - 1–2 times per week
 - 2–3 times per month
 - once per month or less

13. Consumer travel for purchases

- a. Which mean of transport do your household members primarily use for their grocery shopping trips?

car

bike

bus

train

scooter

by foot

other, please specify _____

14. Frequency of online purchasing

- a. How often do your household members buy groceries online?

several times a day

6-7 times per week

3-5 times per week

1-2 times per week

2-3 times per month

once per month

5-6 times a year

2-3 times a year

less than 2 times a year

never

15. Frequency of eating out or ordering take-away

- a. How often do your household members eat out (e.g., in restaurants) or order take-away food from restaurants?

several times a day

6-7 times per week

3-5 times per week

1-2 times per week

2-3 times per month

once per month

5-6 times a year

2-3 times a year

less than 2 times a year

never

User-friendliness:

(NB! In addition to these questions, qualitative, open ended questions about user-friendliness of the CozZo app will be included in the same survey; those questions will be decided later)

16. Number of enquiries made for issues with the innovation:

- a. Have you contacted either LOWINFOOD researchers or CozZo customer support about issues related to the use of CozZo app? (Yes/No)
- b. How often have you contacted them?
 - Every day
 - Few times a week
 - Once a week
 - Few times a month
 - Once a month
 - Never

17. Perceived difficulty in the start

- a. How difficult was it to start using the CozZo on a scale from 1 to 5? (Likert scale 1-5: 1=Very difficult, 5 = Very easy)

18. Number of hours spent in using the app:

- a. Please choose all household members who have used the CozZo app and provide background information for all of them (see 12b)
 - adult 1
 - adult 2
 - adult 3
 - adult 4
 - child 1
 - child 2
 - child 3
 - child 4
 - child 5
 - other, please specify_____
 - other, please specify_____
- b. For each of the household members above, please provide this background information: gender (female, male, other, no prefer not to say), age: birth year, role: mostly in charge of food purchases (yes/no), mostly in charge of

cooking (yes/no), participates in food purchasing (yes/no), participates in cooking (yes/no)

- c. Please evaluate, how many minutes a day (on average) each above family member has dedicated to the use of the CozZo app?

Utility:

19. Weekly savings on consumers' food purchase:

- a. Since you started using the CozZo app, has your household's weekly food purchase cost:
 - 1=diminished
 - 2=slightly diminished
 - 3=stayed the same
 - 4=slightly increased
 - 5=increased?

20. Number of shopping lists created in the app:

- a. How many shopping lists have your household members created on the app?

21. Number of recipes created in the app:

- a. How many recipes have your household members created on the app?

22. Time spent in grocery shopping:

- a. Since you started using the CozZo app, has the time your household members spend for grocery shopping:
 - 1=diminished
 - 2=slightly diminished
 - 3=stayed the same
 - 4=slightly increased
 - 5=increased?

23. Share of households saying that the innovation met their expectations, and average rating:

- a. How much do you think the CozZo app has helped your household in reducing food waste? (Likert scale 1–5: 1= not at all, 5=a lot)
- b. Do you think your purchasing habits have changed since you started using the CozZo app? (Yes/No)

☐ if Yes: ☐ open question: Please describe how they have changed:_____

- c. How useful do you think the CozZo app is for improving your household's purchasing habits (e.g., planning, checking inventory etc.)? (Likert scale 1–5: 1=not at all, 5=very useful)

24. Assessment of new skills thanks to the implementation of the innovation.

- a. Please evaluate how much the following skills you have improved thanks to the use of the CozZo app on a scale from 1 to 5. (Likert scale 1–5: 1=no improvement at all, 5= improved a lot)
- i. Technological skills, such as the use of mobile apps
 - ii. Better understanding of food management at home (e.g., planning, buying, cooking, storing)

Profitability:

25. Change in direct input costs (food inputs):

- a. How much you consider your household has saved in their weekly food budget as a result of using the CozZo app? (Likert scale 1–5: 1=no savings at all, 5=saved considerable amount)

26. Change in fixed costs due to the innovation (e.g., storage space):

- a. Have your household members made purchases related to food storage as a result of using the CozZo app (e.g., food containers, freezer or fridge)? (Yes/No)

☐ If Yes: Open question: please describe in more detail.

Replicability:

27. Share of adopting users that are willing to continue applying the innovation:

- a. Do you think you will keep using the app? (Yes/No)

28. Number of users willing to promote the app:

- a. How likely are you to recommend the use of CozZo app to your family, friends, etc. on a scale from 1 to 5? (Likert scale 1–5: 1 = Very unlikely, 5 = Very likely)

Satisfaction with the survey:



29. On a scale from 1 (not at all satisfied) to 5 (very satisfied), can you rate your satisfaction for this survey?

Information to be retrieved from COZZO:

Number of downloads

App compatibility with iOS and Android

Number of subscriptions after downloads

App rating in Google Play/App Store

Number of COZZO users keeping interacting with the app after the end of demonstration.

T5.6 REGUSTO Mobile app

50 Restaurants



Questionnaire(s) to be used for the survey on Restaurant Survey

1. Information on the restaurant

I.1. Restaurant name: _____

I.2. Location (province and municipality): _____

Please describe your restaurant activity:

I.3. Main type of cuisine in the restaurant (max 2 choices)

- ☐ Meat based
- ☐ Fish
- ☐ Vegetarian
- ☐ Ethnic cuisine
- ☐ Pizzeria
- ☐ Café/Bar
- ☐ Other (please specify): _____

I.4. Year in which the restaurant activity started:

I.5. Number of employees by gender and position:

I.6. Number of seats:

I.7. Annual Turnover (Year 2019):

- ☐ Less than 50,000 Euro
- ☐ Between 50,000 and 150,000 Euro
- ☐ More than 150,000 Euro

Focusing on the respondent to the questionnaire:

I.8. Please indicate your job position within the restaurant for which you are conducting the survey (i.e. restaurant owner, restaurant manager, restaurant director, etc.):

Job position _____

I.9. Gender

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to say

I.10. Please indicate your age:_____

I.11. Level of Education:

- ☐ Early childhood education ('less than primary') or no education
- ☐ Primary education
- ☐ Lower secondary education
- ☐ Upper secondary education
- ☐ Short-cycle tertiary education
- ☐ Bachelor's or short-cycle degree
- ☐ Master's degree
- ☐ Doctoral/PhD or equivalent level

51 Users (before implementation)

2. The situation before the introduction of REGUSTO innovation

2.1. How aware are you of food waste related issues? Please consider the following scale with 1= not at all aware and 5: extremely/completely aware.

Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Extremely aware
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

2.2. Please indicate your level of agreement with the following statement:



“You and your employees involved in food management are committed to reducing food waste”.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly agree

2.3. Please provide your best estimate on the monthly amount (in kg) of the overall food production in your restaurant

Amount _____ in kg per month

2.4. Please provide your best estimate on the total amount (in kg) of food waste generated monthly in your restaurant’s kitchen (kitchen waste)

Amount _____ in kg per month

2.5. Please provide an overall estimate of the percentage of leftovers made by your clients that are thrown into the trash each month compared to the food produced (client waste)

In total _____ %

2.6. Please indicate what is your average food storage period before the introduction of REGUSTO Innovation. Please distinguish your response among the three categories specified in the table.

FRESH/FRIDGE PRODUCTS	FROZEN PRODUCTS	PANTRY PRODUCTS
<input type="checkbox"/> Less than 1 day	<input type="checkbox"/> Less than 1 day	<input type="checkbox"/> Less than 1 day
<input type="checkbox"/> 1-2 day	<input type="checkbox"/> 1-2 day	<input type="checkbox"/> 1-2 day
<input type="checkbox"/> 2-3 day	<input type="checkbox"/> 2-3 day	<input type="checkbox"/> 2-3 day
<input type="checkbox"/> 4-6 day	<input type="checkbox"/> 4-6 day	<input type="checkbox"/> 4-6 day
<input type="checkbox"/> More than 1 week	<input type="checkbox"/> More than 1 week	<input type="checkbox"/> More than 1 week

2.7. Please provide, approximately, the monthly overall amount of the fixed costs before the introduction of the REGUSTO Innovation

Amount _____ in Euro per month

2.8. Please provide, approximately, the monthly overall amount of the variable costs before the introduction of the REGUSTO Innovation

Amount _____ in Euro per month

2.9. Please indicate the modes of disposing organic waste in your restaurants (more than one answer choice is possible)

- ☐ Sort it as organic waste
- ☐ Undifferentiated garbage
- ☐ Composting
- ☐ Animal feed
- ☐ Anaerobic digestion
- ☐ Incineration
- ☐ Discards on land/at sea
- ☐ Plough-in/not harvested
- ☐ Landfill
- ☐ Sewer
- ☐ Other (please specify): _____

2.10. Taking into consideration the disposal mode(s) indicated in the previous question, please indicate which is, approximately, the total cost (per month) of organic waste disposal in your restaurant

Amount _____ in Euro per month

52 Users (after implementation)

3. The situation after the introduction of REGUSTO innovation

3.1. After the introduction of Regusto APP within your restaurant, how aware are you of food waste related issues? Please consider the following scale with 1= not at all aware and 5: extremely/completely aware.

Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Extremely aware
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1

2

3

4

5

3.2. Please indicate your level of agreement with the following statement:

"You and your employees involved in food management are committed to reducing food waste after REGUSTO Innovation?"

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly agree

3.3. Please indicate the monthly amount (in kg) of the overall food production in your restaurant

Amount _____ in kg

3.4. Please indicate (in kg) the total amount of food waste generated monthly in your restaurant after the introduction of REGUSTO Innovation (kitchen waste)

Amount _____ in kg

3.5. Please provide an overall estimate of the percentage of uneaten food that each month on average was thrown into the trash compared to the food produced after the introduction of REGUSTO Innovation (client waste)

In total _____ %

Please provide an overall estimate of the percentage of how many transactions were for take-away/for delivery.

3.6. Please indicate what is your average food storage period after the introduction of REGUSTO Innovation? Please distinguish your response among the three categories specified in the table.

FRESH/FRIDGE PRODUCTS	FROZEN PRODUCTS	PANTRY PRODUCTS
<input type="checkbox"/> Less than 1 day	<input type="checkbox"/> Less than 1 day	<input type="checkbox"/> Less than 1 day

<input type="checkbox"/> 1-2 day	<input type="checkbox"/> 1-2 day	<input type="checkbox"/> 1-2 day
<input type="checkbox"/> 2-3 day	<input type="checkbox"/> 2-3 day	<input type="checkbox"/> 2-3 day
<input type="checkbox"/> 4-6 day	<input type="checkbox"/> 4-6 day	<input type="checkbox"/> 4-6 day
<input type="checkbox"/> More than 1 week	<input type="checkbox"/> More than 1 week	<input type="checkbox"/> More than 1 week

Now, we ask you to provide us with some information on costs incurred or avoided after the introduction of REGUSTO innovation and how these have affected the overall budget of the restaurant

3.7. Please provide, approximately, the monthly overall amount of the fixed costs after the introduction of the REGUSTO Innovation:

Amount _____ in Euro

3.8. Please provide, approximately, the monthly overall amount of the variable costs after the introduction of the REGUSTO Innovation:

Amount _____ in Euro

3.9. Consider your situation after the introduction of REGUSTO Innovation: please specify the mode(s) of disposing organic waste in your restaurants. If necessary, it is possible to indicate more than one choice.

- | | |
|---|--|
| <input type="checkbox"/> Sort it as organic waste | <input type="checkbox"/> Incineration |
| <input type="checkbox"/> Undifferentiated garbage | <input type="checkbox"/> Discards on land/at sea |
| <input type="checkbox"/> Composting | <input type="checkbox"/> Plough-in/not harvested |
| <input type="checkbox"/> Animal feed | <input type="checkbox"/> Landfill |
| <input type="checkbox"/> Anaerobic digestion | <input type="checkbox"/> Sewer |
| | <input type="checkbox"/> Other (please specify): _____ |

3.10. Taking into consideration the disposal methods indicated in the previous question, please indicate which is, approximately, the total cost (per month) of organic waste disposal in your restaurant, after the introduction of REGUSTO Innovation?

Amount _____ in Euro per month

3.11. Please indicate what are theoretical costs incurred (divided into fixed costs + variable costs) to dispose of the food sold on REGUSTO in case it ended up as waste and needed to be disposed by customers

Fixed costs: amount _____ in Euro per month

Variable costs: amount _____ in Euro per month

3.12. Are there new income streams resulting from the REGUSTO Innovation?

- ☐ Yes
☐ No

3.13. If you answered yes to the previous question, please indicate an approximate amount and the type of new income streams.

New income streams, approximate amount per month: _____ (in Euro)

Type of Income streams: (please specify) _____

3.14. Are there new avoided costs resulting from the REGUSTO Innovation?

- ☐ Yes
☐ No

3.15. If you answered yes to the previous question, please indicate an approximate amount and the type of avoided costs.

Avoided costs, approximate amount per month: _____ (in Euro)

Type of avoided costs (please specify): _____

3.16. What is the change in the monthly balance (due to additional income or avoided cost) resulting from the innovation?

In total _____ %

3.17. Please indicate what has been, approximately, the total cost of implementing the innovation (e.g. additional/new capital investment, labor, training etc.)

Amount _____ in Euro

3.18. Are there new subsidies and/or other monetary benefits received as results of waste reduction after the REGUSTO innovation?

- ☐ Yes
☐ No

3.19. If you answered yes to the previous question, please indicate in Euros the subsidies and/or other monetary benefits received as results of

waste reduction (specifying whether these are one-off, periodic, fixed or proportional to the quantity of waste)

Amount _____ in Euro

- ☐ One-off
- ☐ Periodic
- ☐ Fixed
- ☐ Proportional to the quantity of waste
- ☐ Other (please specify)

Now, we ask you to focus on the use of the application during the training period

3.20. How many discounted meals, on average, are sold daily?

Open answer _____

3.21. How much does the selling price of products involved change compared to selling them without innovation? Please indicate a positive variation with "+" (i.e. +5% if the price has increased by 5%) and a negative variation with "-" (i.e. -5% if the price has decreased by 5%)

Change: _____%

Now, we ask you some information about the implementation of the innovation

3.22. Is the person in charge of the Regusto implementation different from the respondent to this questionnaire?

- ☐ Yes
- ☐ No

If you answered YES to the previous question, please answer the question below:

3.23. Who in your Restaurant is in charge of dealing with REGUSTO activity/ innovation?

Please indicate the following information

Gender:

- ☐ Male
- ☐ Female

- ☐ Other
☐ Prefer not to say

Age: _____

Job Position: _____

3.24. Did your restaurant need to hire new staff to tackle innovation?

- ☐ Yes
☐ No

3.25. Please indicate, disaggregated by gender, the number of Full-Time Equivalent jobs created for (or lost due to) the implementation of the Regusto innovation (if this is only a share of time of one or more employees, please indicate the change in total hours worked)

	Number of FTE jobs created	Number of FTE jobs lost	Change in total hours worked
Female			
Male			
Other			

3.26. Please indicate the list of people who have contributed at different tasks related to the innovation (e.g. transferring the product, from making contacts to the delivery of the product) and for each person please indicate gender, company sector and job grade

Open answer _____

3.27. What is the average number (per month) of new buyers (clients or customers if possible by age and gender) with which you came into contact as a result of your involvement in the Regusto innovation?

- ☐ Numbers: _____
☐ Type of buyers (open response) : _____

3.28. Do you think there is a willingness to continue the relationship with these new buyers?

- ☐ Extremely unlikely
- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ likely
- ☐ Extremely likely

3.29. Did you have to buy new technological devices to use the Regusto innovation?

- ☐ Yes
- ☐ No, we used the existing devices

3.30. Which kind of electronic devices do you use to use REGUSTO? (More than one answer possible)

- ☐ Tablet / iPad
- ☐ Computer
- ☐ Notebook
- ☐ Smartphone
- ☐ Other (please specify): _____

3.31. Did you use these devices solely for REGUSTO innovation?

- ☐ Yes
- ☐ No, I also use it for other purposes (please specify the additional purposes:_____)

3.32. How long did you use these devices for each single order?

- ☐ Less than 5 minutes
- ☐ 5-7 minutes
- ☐ 8-10 minutes
- ☐ More than 10 minutes

3.33. How many hours per week are dedicated to use REGUSTO Innovation?

- ☐ Less than 5 hours
- ☐ 6-10 hours
- ☐ 11-25hours
- ☐ 25-40 hours
- ☐ More than 40 hours

☐ Other (please specify): _____

4. Your satisfaction towards the innovation

4.1. How would you rate your level of satisfaction with the Regusto Innovation?

- ☐ Very dissatisfied
- ☐ Dissatisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Satisfied
- ☐ Very satisfied

4.2. Please indicate your likelihood of continuing using the Regusto App:

- ☐ Extremely unlikely
- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ likely
- ☐ Extremely likely

4.3. How much are you likely to promote the use of this app to your partners/friends, family etc...?

- ☐ Extremely unlikely
- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ likely
- ☐ Extremely likely

4.4. What are the features of the innovation you would change or add?

Please specify here your response:

4.5. For each of the following statements, we kindly ask you to indicate your degree of satisfaction by selecting the modality that best represents your position (1 = strongly disagree; 5 = strongly agree):

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree

					(5)
The dashboard of the innovation is good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like the features of the innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The innovation is easy to use for managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The innovation is easy to use for kitchen staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.6. How difficult was it to start using the Regusto innovation? Please reply below by considering the scale 1 to 5 where 1= very difficult and 5= very easy

Very difficult	Difficult	Neutral: Neither difficult nor easy	Easy	Very easy
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

4.7. Considering one week of using the Regusto APP in your restaurant: how often did you contact the Regusto customer service for the app/platform's issues?

- ☐ Every day
- ☐ Three to four times a week
- ☐ Twice a week

- ☐ Once a week
- ☐ Never
- ☐ Other frequency (please specify_____)

4.8. If you contacted the Regusto customer service, have they been able to help you with your problem?

- ☐ Yes, completely
- ☐ Yes, partially
- ☐ No, not at all

4.9. For each of the following statements, we kindly ask you to indicate your degree of satisfaction by selecting the modality that best represents your position (1 = strongly disagree; 5 = strongly agree)

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
The Regusto app was important in my activity for reducing FW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Regusto app was useful for my company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technological skills (use of mobile app, pc software) have been improved thanks to the use of Regusto innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical skills (better understanding of how the FSC works) have been improved thanks to the use of Regusto innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.10. Please indicate your degree of satisfaction with the present survey

- ☐ Very dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Neither satisfied nor dissatisfied

- ☐ Somewhat satisfied
- ☐ Very satisfied

4.11. Comments and suggestions:

Households

Questionnaire to be used for the survey on consumers/households

I. Information on the use of REGUSTO bag

1.1. What is the name and location of the restaurant service (restaurant, bar, café, etc.) that supplied you with the Regusto bag?

Name and location (municipality and province): _____

1.2. Which transport did you use for your visit to the restaurant?

- ☐ Walking
- ☐ Bicycle
- ☐ Car
- ☐ Motorcycle
- ☐ City bus
- ☐ Metro/Tram
- ☐ Other (please specify)

1.3. What kind of food did the Regusto bag contain? (possible multiple responses)

- ☐ Appetizer
- ☐ First course
- ☐ Second course
- ☐ Side dish
- ☐ Sandwich
- ☐ Sweet
- ☐ Pizza
- ☐ Other (please specify): _____

1.4. During which meal did you use the Regusto bag?

- ☐ Breakfast
- ☐ Lunch
- ☐ Snack/aperitif
- ☐ Dinner
- ☐ Other (please specify:_____)

1.5. The use of the Regusto bag comes from a take-away meal or from a leftover of a meal consumed in the restaurant?

- ☐ Take away
- ☐ Leftover from a meal in the restaurant
- ☐ Other (specify):_____

1.6. In case it comes from a leftover, what was the main reason that caused it? (only 1 possible response)

- ☐ The portions were too big
- ☐ I was not hungry
- ☐ I ordered too much food
- ☐ I did not like the meal
- ☐ Other (please specify):_____

1.7. How much food was in the Regusto bag when it was given to you by the restaurant?

Please take a photo and weigh the amount of food in the Regusto bag, just taken from the restaurant, before being consumed. We kindly ask you to take the photo from the top of the bag Regusto at the time of its withdrawal, in order to frame all the bag and the food contained inside.

In total _____ grams

1.8. For how long the food remained in the Regusto bag before being consumed?

- ☐ 6 hours from the time of purchase
- ☐ 6 to 12 hours from the time of purchase
- ☐ 24 hours from the time of purchase
- ☐ I never consumed it again

Where did you store the food remaining in the Regusto bag?

- ☐ in the fridge
- ☐ in the freezer

- ☐ at room temperature
- ☐ other

1.9. After using the Regusto bag, how much was the uneaten food remained in the bag without being consumed?

- ☐ All
- ☐ About half
- ☐ ¼ of the meal
- ☐ Less than ¼ of the meal
- ☐ All the food was eaten

1.10. How many people ate the food in the Regusto bag?

- ☐ 1 person
- ☐ 2-3 people
- ☐ 4-6 people
- ☐ More than 6 people

1.11. In case a part of the food has not been consumed, please take a photo and weight the amount of food remained in the Regusto bag before throwing it away

In total _____ grams

1.12. In case a part of the food has not been consumed, what was the reason?

- ☐ I was not sure about the hygienic conditions in which I kept it/food safety reasons
- ☐ I forgot it
- ☐ I preferred to eat something else
- ☐ I tried to eat the food that was taken away, but the taste was no longer the same
- ☐ Other (please specify): _____

1.13. *Where did you dispose the food that was uneaten from the Regusto bag?*

1.14. Please specify if you (and your family) usually carry out any of the following food waste management practices (multiple answers possible):

- ☐ pet feeding
- ☐ home-composting
- ☐ municipal solid waste collection – residual waste bin

- ☐ municipal solid waste collection - organic waste bin
- ☐ other: please specify_____

II. Customer satisfaction section

2.1. Please indicate your likelihood of continuing using the Regusto App:

- ☐ Extremely unlikely
- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ Likely
- ☐ Extremely likely

2.2. How would you rate your experience with the Regusto Innovation?

- ☐ Very dissatisfied
- ☐ Dissatisfied
- ☐ Neutral: Neither dissatisfied nor satisfied
- ☐ Satisfied
- ☐ Very satisfied

2.3. Please indicate the degree of likelihood of the following questions by considering the scale with 1= not at all aware and 5: extremely/completely aware

- (1) Extremely unlikely
- (2) Unlikely
- (3) Neither likely nor unlikely
- (4) Likely
- (5) Extremely likely

How much are you likely to promote the use of this app to your partners/friends, family etc...?

- ☐ Extremely unlikely
- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ Likely
- ☐ Extremely likely

How much would you be willing to reuse the app?

- ☐ Extremely unlikely

- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ Likely
- ☐ Extremely likely

Do you think you saved money from your food purchasing costs thanks to the Regusto innovation?

- ☐ Extremely unlikely
- ☐ Unlikely
- ☐ Neither likely nor unlikely
- ☐ Likely
- ☐ Extremely likely

2.4. If you think you saved money from your food purchase costs thanks to Regusto innovation, please indicate how much, approximately, you think you have saved for each Regusto bag purchased.

Amount _____ in Euro

Do you think this amount met your expectation on food purchase savings through Regusto?

2.5. How difficult was it to start using the Regusto innovation? Please consider the following scale with 1= very difficult and 5 very easy

- ☐ 1. Very difficult
- ☐ 2 Difficult
- ☐ 3 Neither difficult nor easy
- ☐ 4 Easy
- ☐ 5 Very easy

2.6. Please indicate the degree of satisfaction with the survey

- ☐ Very dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Somewhat satisfied
- ☐ Very satisfied

2.7 Comments and suggestions:

III. Socio-demographic information

3.1. Gender

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to say

3.2. Please specify your age: _____

3.3. Please indicate your nationality.

- ☐ Italian
- ☐ Other European country (please specify.....)
- ☐ Non-European country (please specify.....)

3.4. Please indicate your residence

Province: _____

Municipality: _____

3.5. Employment status

- ☐ Permanent employment
- ☐ Fixed-term employment
- ☐ Looking for a job
- ☐ Retired
- ☐ Student
- ☐ Housewife
- ☐ Other professional condition (please specify.....)

3.6. Please indicate your level of education

- ☐ Early childhood education ('less than primary') or no education
- ☐ Primary education
- ☐ Lower secondary education
- ☐ Upper secondary education

- ☐ Short-cycle tertiary education
- ☐ Bachelor's or short-cycle degree
- ☐ Master's degree
- ☐ Doctoral/PhD or equivalent level

3.7. Which of the following categories best describes your monthly and familiar NET income?

PERSONAL MONTHLY NET INCOME	NET HOUSEHOLD MONTHLY INCOME
.. Less than 500 Euro	.. Less than 500 Euro
.. 500-1,000 Euro	.. 500-1,000 Euro
.. 1,001-1,500 Euro	.. 1,001-1,500 Euro
.. 1,501-2,000 Euro	.. 1,501-2,000 Euro
.. 2,001-3,000 Euro	.. 2,001-3,000 Euro
.. More than 3,000 Euro	.. More than 3,000 Euro

3.8. Please indicate the number of members (by gender and age if possible) in your family (household size). Include yourself in the calculation

Open numeric answer _____

3.9. Please indicate if there are children (under 14 years old) in your family and the corresponding age

- ☐ 1 Age:
- ☐ 2 Age:
- ☐ 3 Age:
- ☐ 4 Age:
- ☐ Other (please specify) Age:

Questions to be retrieved from REGUSTO

App compatibility with Android and iOS

Number of downloads

Number of subscriptions after downloads

Who is paying the bag? (consumer/restaurants/provided by Regusto for free)

Has the software provider information to the server capacity? Where is the server located?

How much of the total server capacity is used for the software (in vCPU/CPU in use)?

Which type of CPU is used (e.g. Intel Skylake)

Questions to Households?

Share of users saying that the innovation met their expectations and average rating

Difficulties in starting using the innovation

Use of the app by gender

Share of users that are willing to continue applying the innovation

Share of users that are willing to promote the use of the innovation

How would you rate your level of satisfaction with the Regusto Innovation?

What are the features of the innovation you would change or add?

Which means of transport do you use for your restaurant visit?

For each of the following statements, we kindly ask you to indicate your degree of satisfaction by selecting the modality that best represents your position (1 = strongly disagree; 5 = strongly agree):

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
The dashboard of the innovation is good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like the features of the innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The innovation is easy to use for managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The innovation is easy to use for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

kitchen staff					
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