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

D1.5 Webinars fact sheet

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LIST OF PARTNERS THAT HAVE CONTRIBUTED TO REVISE THE DELIVERABLE

UNITUS, ELH

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LOWINFOOD Consortium

N.	Full name of the organisation	Short name	Country
1	Università degli Studi della Tuscia	UNITUS	Italy
2	Alma Mater Studiorum Università di Bologna	UNIBO	Italy
3	Sveriges Lantbruksuniversitet	SLU	Sweden
4	FH Munster University of Applied Sciences	ISUN	Germany
5	The James Hutton Institute	JHI	United Kingdom
6	Universitaet Fuer Bodenkultur Wien	BOKU	Austria
7	Tampereen Korkeakoulusaatio SR	TAU	Finland
8	Charokopeio Panepistimio	HUA	Greece
9	Osterreichisches Okologieinstitut	AIE	Austria
10	Elhuyar Fundazioa	ELH	Spain
11	Matomatic AB	MATO	Sweden
12	Unverschwendet GmbH	UNV	Austria
13	Akademie Deutsches Baeckerhandwerknord GGmbH	ADB	Germany
14	Foresightee (terminated on 30/01/2023)	FOR	Belgium
15	Leroma GmbH	LER	Germany
16	Mitakus Analytics UG	MITA	Germany
17	Kitro SA	KITRO	Switzerland
18	Regione Emilia Romagna	RER	Italy
19	Pianeta Cospea srl	PICO	Italy
20	Cogzum Bulgaria OOD	COZ	Bulgaria
21	Uppsala Kommun	UPP	Sweden
22	Recuperiamo srl	REG	Italy
23	Antegon GmbH	FT	Germany
24	Confederazione Nazionale dell'Artigianato e della piccola e media impresa Associazione di Viterbo e Civitavecchia	CNA	Italy
25	Assemblee des Regions Europeennes Fruitieres Legumieres et Horticoles	ARE	France
26	L.V.L Anonymi Emporiki Toyristiki Kksenodoxeiaki Kataskevastiki Etaireia	BLU	Greece
27	Iridanos-Inabelos Anonymi Etaireiatouristikes Ksenodoxeiakes Kai Agrotikes Epixeiriseis	THA	Greece

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Table of contents

Summary

The deliverable includes a summary of two webinar series conducted in May 2021 and September 2022. The webinars were organized to enable feedback from all actors of the food supply chain involved in LOWINFOOD on “Indicators for the evaluation” (webinar series no.1) and on “Experiences of data collection” (webinar series no.2). The participants were divided in four to five groups by the type of waste they address in the first webinar series and on the innovation type in the second innovation series. A separate webinar was delivered to each group in both webinar series to create a comfortable environment for sharing their needs and problems in the process of data collection and evaluation. Both presentations and joint discussions were included in the agenda of all webinars. Participants beyond the project consortium, with exception of the External Advisory Board and the Innovation Platform Members, were not included in the webinars due to protecting the privacy of each participant when sharing sensitive information but including them is foreseen later on in the project when conducting webinars on results in 2024.

Webinar series no.1 helped sensitize all participating parties, researchers, and innovators, both on the necessary data and on data availability to conduct an evaluation. Webinar series no.2 identified barriers and solutions to data collection and shaped the focus on methodological aspects to be explored further. The webinars clearly helped multi-actor collaboration. Together with additional meetings on a bilateral level and intensive e-mail communication, these webinar series were an appropriate and effective tool for developing a common strategy for the evaluation.

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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).

Deliverable 1.5 (D1.5) contains the structure, contents and learnings of the webinar series conducted in May 2021 and September 2022 as part of WP1. The webinars served as an important component in developing a common strategy for the evaluation of the innovations in a multi-actor approach. Their objectives were to enable feedback from all actors involved in the project "Indicators for the evaluation" (webinar series no.1) and on "Experiences of data collection" (webinar series no.2). All findings were illustrated in webinar fact sheets in ppt. format (see Annex). This document can serve as supplementary material to the webinar fact sheets.

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1. Introduction

The evaluation will help to improve the performance of LOWINFOOD's innovations and will trigger replication to move towards the common goal to generate low-waste food chains. For a successful and meaningful evaluation, the cooperation of all actors involved in the innovation is of upmost importance, as the actors working in the food supply chain are the experts when it comes to the implementation in practice. Webinars are organized to enable feedback from all actors as well as the External Advisory Board of the project.

2. Webinar strategy in LOWINFOOD

In addition to general project meetings, regular WP or task meetings and other bilateral meetings, webinars were and still are important tools to foster collaboration. The webinar series developed in May 2021 as well as in September 2022 were designed to inform and interact with project partners about specific aspects of the methodology setting and implementation. During both webinar series, the participants were divided into smaller groups to allow more room for discussions. The groups were different in each webinar series in order to allow everyone to interact with more participants, which in turn enabled interaction among the whole LOWINFOOD consortium (see Table 1).

Table 1 – Online webinar series on the evaluation of innovations in LOWINFOOD

N.	Webinar title	Groups	Date
1	Indicators to evaluate the efficacy, social, economic and environmental impacts	*classified by type of the food and step of the food supply chain:* • Fish waste • Food waste at food service • Food waste at households • Bread waste • Fruit & vegetable waste	 10th May 2021 12th May 2021 20th May 2021 26th May 2021 27th May 2021
2	Experiences in data collection	*classified by type of innovations:* • Social/managerial • Technological (behaviour) • Organisational • Technological (forecasting)	 19th Sept 2022 21st Sept 2022 22nd Sept 2022 27th Sept 2022

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The webinars in the first series, conducted in May 2021, had each a duration of 90 minutes and were held either in the morning (10.30 to 12.00 a.m. CET) or in the afternoons (2.00 to 3.30 p.m. CET). It was decided to classify the groups by type of food waste and step of the food supply chain (similar to the LOWINFOOD work package structure, but splitting the larger group of WP5 in two groups).

The second webinar series took place in September 2022 and had each webinar had a duration of 90 minutes (2.30 to 4.00 p.m. CET) per webinar. The individual webinars of the series were classified by type of innovations as it was assumed that similar innovations have similar experiences and problems with data collection which is helpful in discovering common barriers and identifying common solutions.

The third webinar series is foreseen to be dedicated also to stakeholders beyond the project (e.g., food processors, food producers or other actors of the supply chain who are interested to use the innovations, participants from sister projects) and it will presumably take place in spring 2024.

3. Structure of the webinars

Webinar series No. 1 "Indicators"

Prior to the webinar series no. 1, a background document was distributed to the participants. This document contained explanations of the indicators and the applied method for each evaluation dimension (see Annex). Each webinar within the webinar series no.1 was conducted based on the same agenda, shown in Table 2.

Table 2 – Agenda of the webinar series No.1 "Indicators"

Agenda		
Welcome	BOKU	10 min.
Introduction and Creation of a Value Chain Map	BOKU, UNIBO	10 min.
Consultation with innovators	Joint discussion with all participants	10 min.
Efficacy	UNIBO	10 min.
Q&A	All	5 min.
Break		5 min.
Socio-economic impacts	JHI	10 min.
Q&A	All	5 min.
Environmental impacts	BOKU	10 min.
Q&A	All	5 min.
Wrap-up and next steps	BOKU	10 min.

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The webinar presentation slides were distributed to the participants after the webinar (see Annex). The value chain maps are not attached in the Annex, as they were only preliminary versions and have been adapted for deliverable D1.1, which was submitted in October 2021.

Webinar series No. 2 "Experiences"

Prior to the webinars, the WP1 task leaders' team (BOKU, JHI, UNIBO) prepared open questions and lists of problems identified so far during data sharing and processing and reflected on potential solutions. This preparatory served as a basis for the discussion session.

Each webinar was conducted based on the same agenda, shown in Table 3.

Table 3 – Agenda of the webinar series No.2 "Experiences"

Agenda		
Welcome and introduction	BOKU	10 min.
Overview on the status of data collection (prepared by WP1 team)	BOKU, JHI, UNIBO	20 min.
Experiences in data collection – Open discussion (all, via zoom whiteboard)	Joint discussion with all participants	50 min.
Wrap-up and next steps	BOKU	10 min.

After each webinar, the participants received the presented slides from the webinar. The slides also included a screenshot of the mutual work at the zoom whiteboard as well as a summary of the discussion about the needs/problems and possible solutions in table format.

The results of the zoom whiteboard are not included in the annex due to protecting the privacy of participants.

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4. Content of the webinars

Objectives and target groups

The objectives of the webinar series No. 1 were:

- to inform about indicators on efficacy, economy, society and environment relevant for LOWINFOOD's innovations, and
- to discuss the compilation and quantification of input data for the evaluation.

Webinar series No. 2 had the following targets:

- to exchange experiences of project partners in data collection, and
- to identify barriers in data collection and discuss how to overcome them.

Both webinar series were not disclosed to the public so that partners were not hindered to mention any problems ("uncomfortable knowledge"). All LOWINFOOD participants were invited to the webinars. The external advisory board of LOWINFOOD was invited and participated where appropriate.

Presentations

Webinar series no. 1 included introductory presentations both on a general level and for each evaluation dimension: efficacy, social and economic and environmental. After the introduction about the needs of evaluation, the goals of the webinar, the strategy for the methodology setting as well as the evaluation framework, a joint discussion was started with the participants on their respective value chain in the food sector. After the discussion of the value chain maps, each evaluation dimension was introduced by the task leaders explaining the indicators and the data needs and raising practical questions in a Q&A session.

In the wrap-up, the next steps were explained to the participants and further exchange per e-mail was announced.

In Webinar series no. 2, first the profiles of each innovation that is part of the webinar group was introduced (task leader, participants, country, type of food loss and waste, involved actors). Then, the status quo of the data collection process was shown for each innovation. The applied methods of data collection as well as the number of collected datasets so far were discussed one by one for each innovation. The aim of this process was to ensure that all actors (researchers and practitioners) had the same knowledge and understanding of the data. Then experiences were exchanged in a short discussion with the help of a Zoom whiteboard.

By the end of the meeting, important issues when it comes to data collection were introduced, such as the roles of the data collector, the data facilitator and the data users, the transcriptions and encryption process of raw data. Special attention was given to the application of the informed consent form and the use of common criteria when sharing data.

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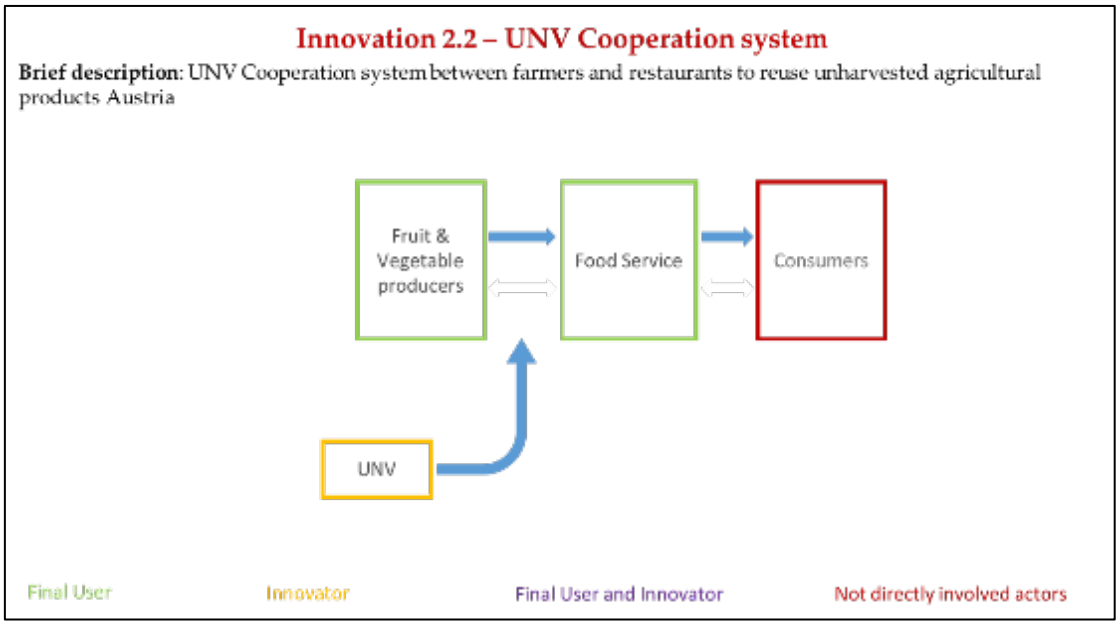
Participants were instructed to keep in touch and to collaborate to share data and to ensure data quality.

Joint discussions

In webinar series no. 1, a joint discussion was kicked off by introducing value chain maps. The WP1 team created value chain maps for each innovation. The involved steps, processes and actors were confirmed by the innovators or adapted where appropriate. The actors were divided into final users of the innovation, innovators themselves and actors who are not directly involved such as consumers (who may be affected from the innovation but are not contributing).

Figure 1 – Example of a value chain map to kick-off a discussion in webinar series no.1



Additionally, after the introduction of each evaluation dimensions, specific questions were raised in the webinar in a Q & A session:

Evaluation of efficacy:

- Duration of measurements
- Is it possible to provide data on the food loss and waste per year before the innovation?
- Is it possible to gather data on the processed food in terms of weight?

Social and economic evaluation:

- What are the possible risks or sensitivities during data collection?

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- How much of the required information is already being collected for company accounts and could be disclosed?
- How many new information items related to company operations needs to be collected to construct the baseline figures before implementation?
- How can we ensure the reliability of the data collected through staff and management surveys for the social impact analysis?
- How can we make the project delivery easier for each other within our powers and budgets?
- Each participant shall reflect on challenges/open issues to clarify in terms of data collection!

Environmental evaluation:

- Which activities and infrastructure are required to implement the innovation?
- Where and how was the food waste previously disposed of?
- Is the input data available? Which efforts need to be taken to get the input data? Who is collecting the data? Is something missing?

In the webinar series no. 2, the overall goal was to exchange experiences gained so far during data collection and especially problems during data collection. The objective was to find solutions to solve these problems. For this, each participant reflected on challenges/open issues to clarify in terms of data collection. Each issue was written on a sticky note in a Zoom whiteboard.

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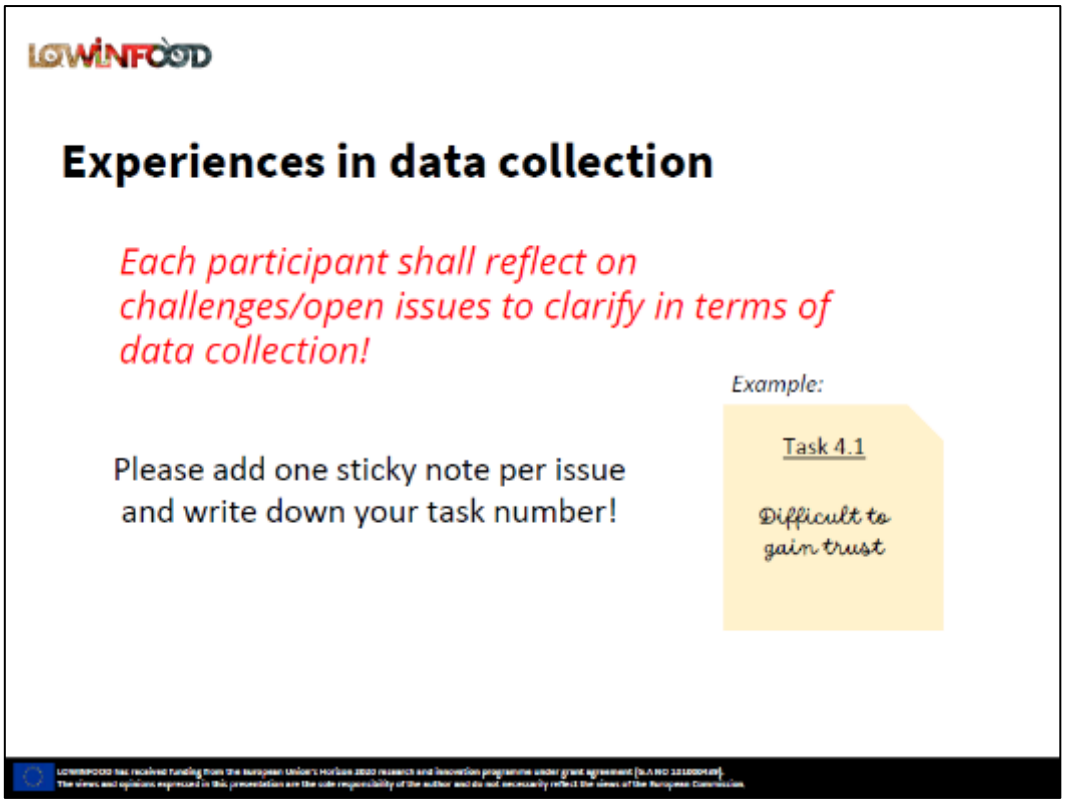
Figure 2 – Instructions for the joint discussion at Zoom whiteboard – webinar series no.2



5. Learnings

In webinar series no.1, pre-created **value chain maps** were used to stipulate the discussion process with innovators. WP1 task leaders developed value chain maps with the involved processes and actors for each single innovation and in some cases even for different countries before the webinars. These were then used during the webinar to save time and provide a good starting point to further elaborate the involved activities and actors. Having the same knowledge on people and processes involved in the innovations is the very basis for the evaluation and necessary to enable discussions about data collection methods. Different types of actors required different types of data collection methods. Finding the right method was therefore the key for a successful data collection process.

The **Q & A session for the different evaluation dimensions** enabled an exploration of specific barriers when applying selected indicators. A summary of the issues discussed is provided in Tables 4 to 6. Potential threats and difficulties were raised by the participants. This open and honest discussion was beneficial as it showed ways to better apply the indicators in practice.

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Table 4 – Summary of the results of the Q & A sessions in the webinar series no.1 "Indicators" – Evaluation of the efficacy

Key words	Explanation
Duration of measurements	Only a one-time measurement, in case of innovations that distribute food surplus Not all innovations need to have the same duration of measurements; it depends on the type of innovation and type of users (seasonality in hotels, particular weekdays for restaurants).
Absolute and relative indicators	Relative indicators are expected to be more difficult to measure, but will be clearer when adhering the innovation
Disclosure of "negative/bad" data/Doubts on the willingness to share information	Companies are not open to give us data about any waste related problems and they do not want to make it public. Possible to include proxy numbers gathered from sectorial associations
Definition of food waste	Borderline between waste, surplus, by-products, food for feed etc. Our focus is to make use of all side-streams of the food supply chain We need to stick to the European Commission's definition of food waste.
Pinpoints between supplier and consumer that cause FW	Disaggregation of FW data could gain more insights but also additional questions at interviews, or relativizing the FW to regional food waste levels
CAP mechanism	Farmers are not really aware of it. Awareness is high in the case of POs and APOs that coordinate CAP on farmers behalf
Weighting the food products	Necessary, if only records on pieces are available. To consider efforts for weighting (certain products whose weight will always be the same; support from research partners in weighting the products are required)
Direct measurement	Preferable through direct weighting Some companies do not have records on FW amounts; measurement before the implementation is necessary. All data need to be reported by hand, it is time demanding but can be done. At household (HH) level: Researchers weighting the HH bins is a good approach. The best option is the third party assessment through waste audit, so the households do not decrease the amount of their food waste when feeling observed. However, it is not clear if this can be done with the pandemics. Support from research partners in direct measurements.
Disaggregation level	Potentially: avoidable and unavoidable; food waste by source, suppliers and location, step of the chain The more disaggregated the data on food waste the better it is for our objectives, but of course this depends on how the particular innovation works.
Use of diaries	Less reliable than waste audit; but might be the only feasible in some approaches.
Estimating the weight based on pictures	If it is not reasonable for consumers to weigh their food, making pictures would also be an option.

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Table 5 – Summary of the results of the Q & A sessions in the webinar series no.1 "Indicators" – Social and economic evaluation

Key words	Explanation
Challenging data collection	We will have to rely on case studies because we will not be able to achieve statistical representativeness for the whole value chain
Anonymise data	Possibly an agreement with some companies, so that they are aware of what will be shared/published. In this case they would be aware if we need something they consider sensitive etc. Address companies that already have a sustainability manager so that they are more open to participate in the project
Common strategy to approach companies	It is key to show companies that we are not just asking them to give us data, but we can help them achieve their corporate social responsibility (CSR) goals.
Qualitative information as a complement	Additional questionnaire for staff and/or manager
Time saving	The time that can be saved due to the innovation's achievements would be an interesting indicator for companies. Time saving is a big added value for companies.
Acceptance of the innovation	Aspect of acceptance of the innovation should be integrated in the replicability or in the utility indicator. KPIs on utility, user-friendliness and replicability include a few indicators on the willingness to both promote the innovation and to keep using the innovation after the pilot.
Waste fee	Waste management costs are not always proportional to the waste produced; the cost is then charged to the municipality in charge of waste management, the cost saving does not benefit the company but the municipality: we can calculate the savings, but it will not represent a plus for the company. It is a plus for the municipality (or anyway the administration dealing with waste).
Common ground of data collection	Questionnaires should be as similar as possible.
Aggregation/disaggregation level	Companies' data can be shared in an aggregated form and not disaggregated in case there are confidentiality and competitiveness concerns.
Cost savings	In the absence of records, only perceptions on the savings are possible to report.
Some indicators are not relevant for HH level	List of relevant indicators will be adapted during the data collection process.
Records from innovators to share with research partners	Some historical data on purchases etc. can be shared.
Bias in the sample	Random samples, possibly only more environmentally conscious organisations and HHs gets involved in testing innovations

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Table 6 – Summary of the results of the Q & A sessions in the webinar series no.1 "Indicators" – environmental evaluation

Key words	Explanation
Assumptions	Expert opinions/assumptions are legitimate as well, e.g., on the approximate transport distance, or the generally used means of transport.
Large transport distances	If we can save food and consequently reduce production due to increased FW prevention, this also reduces transport distances
Trade-offs	Sometimes it makes sense from an environmental point of view but not from an economic point of view, sometimes the other way round, we need to interpret data

Webinar series no.1 helped to sensitize all parties, researchers and innovators, on the one hand on data needs to theoretically conduct an evaluation and on the other hand on data availability to realize the evaluation.

In the webinar series no. 2, it was all about experiences and many experiences were shared honestly. Some of the **needs and problems** addressed the methodological framework in general and some were specific to the innovations. Some general examples are provided below:

Table 7 –Summary of the reported needs/problems and possible solutions from the joint discussion in the webinar series No.2 "Experiences"

Needs/problems	Possible solution
Motivation/engagement of stakeholders	Using secondary data if primary data cannot be collected; but it is important to find a balance because measurement on only proxies is also difficult to establish; Increase the value of participation in the project (by highlighting benefits for companies, incentives, etc.) Avoidance of the term „waste" when engaging stakeholders, maybe this is an obstacle
Not all data points are possible to obtain	Necessary to know which data points cannot be covered and why for further adaptations of the evaluation strategy (e.g., using secondary data)
External factors (war, covid, energy crisis) decreases further participation rate	To provide assistance and support to companies motivated to collaborate with LOWINFOOD
Increased frequency of dialogue between data facilitators and WP1 team	Both sides need to be proactive
Separation of efficacy, socio-economic and environmental data	As some data points are relevant for more than one, better to share all together and not split.
Difficulty in recruiting participants	More advertisement (a budget issue) Monetary incentives are implemented by some partners Specific interest groups (such as those interested in sustainability) are contacted Threat: potential bias in the sample due to overrepresentation of specific interest groups

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Potential bias in the sample	When recruiting participants from a specific group When recruiting participants with monetary incentives Need to be considered when results are interpreted
Higher response rate with personal interviews compared to questionnaires	If resources available, very welcome Combination of methods (questionnaires with guidance/assistance via web/phone) works well
Targeted response rate	Reaching a 50% response rate across all samples would be very satisfactory
Timing of questionnaires (before and after) – worst case: only one set of data is provided	Rethink of different ways to evaluate the before/after situation, suboptimal alternatives for analysis
Not enough time and resources for comprehensive data collection	Priority should be given to the collected food waste amounts Details from not each single user, but from some, are necessary
Increase in awareness/reduction of food waste due to participation/observation but not due to innovation	Collection of qualitative insights when evaluating innovations Evaluation of motivation for food waste reduction Questions to evaluate behavioural change were elaborated together with environmental psychologists at JHI. Data analysis will show if there is any behavioural change
Qualitative information is not collected systematically	Not possible to generate general findings To be discussed in WP1 team
Some participant questionnaire questions were perceived to be irrelevant and difficult to understand	Reason why some data is not obtained need to be noted down → feedback loop between data collectors and data users Personal interpretation and local language translations of the questions can be possible shortcomings in the survey formulation. Environmental psychology expertise is missing in the project team.
Raw data is not clean	Need for processing of datasets (looking for outliers, aggregate data on pre-defined levels e.g., not strawberry cakes, but cakes) Processing of datasets is conducted by data facilitators
Big efforts for processing the raw data	A lot of manual work, but LOWINFOOD allows this A lot of quality data, try not to lose details
Aggregation level	Provision of data by macro categories
Interest in testing innovation vs. filling questionnaire	Priority should be given to implementing the innovations when communicating with users, staff etc. Then we should ask for evaluation data step by step.

Webinar series no.2 identified barriers and solutions and shaped the focus on what to explore further. The needs and problems identified during the webinars were further elaborated and discussed within the WP1 task leader team, specifically on:

- Systematic collection of descriptive information – possible? How is this implemented now?
- Timing of questionnaires/no before and after datasets – Where is this relevant? Which alternative?
- Macro-categories for food waste amounts → feedback loop necessary?
- Increase in awareness/decrease of food waste due to participation/observation but not due to innovation – Defining factors which influence results?
- Reason why some data is not obtained need to be noted down: feedback loop, how to proceed?

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- Sampling: Quality? Representativeness?
- Aggregation level of data: to find best solutions to make comparisons when data is shared

The webinars clearly helped to collaborate with multi-actors. Together with additional meetings on bilateral level and intensive e-mail communication, these webinar series were appropriate tools for developing a common strategy for the evaluation.

6. ANNEX

Webinars fact sheets (p. 17-19)

Background document for the Webinar series No. 1 "Indicators" (p.20-32)

Slides of the Webinar series No. 1 "Indicators" (value chain maps are not included. Final versions were submitted in D1.1) (p. 33-45)

Slides of the Webinar series No. 2 "Experiences" (zoom whiteboard is not included due to protecting privacy of participants) (p. 46-52)

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Webinars fact sheets

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

LOWINFOOD

WEBINARS

For more information on the webinar structure and contents please scan this QR code

LOWINFOOD's webinar series have proven to be an important component in the **collaboration of multi-actors** to develop a methodology for evaluation of the innovations against food waste.

PRESEN-TATIONS + **JOINT DISCUSSIONS** = **LEARNINGS**

*Fictious weighting, only for illustrative reasons

Two webinar series were conducted in 2021 and 2022 (learn more below)

Come and join the webinars in 2024!

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WEBINAR SERIES #1
„Indicators for the evaluation"

For more information on the webinar structure and contents please scan this QR code

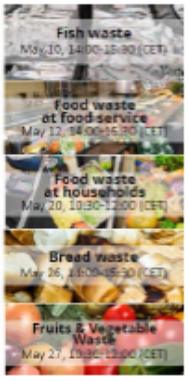
MAY 2021

Invitation to the Webinar series on the **Evaluation of Innovations**

Aims of the webinar

- To inform about indicators on efficacy, economy, society and environment relevant for LOWINFOOD
- To discuss the compilation and quantification of input data for LOWINFOOD's evaluation

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					



Evaluation is necessary for taking informed decisions!

FIVE webinars, one per value chain, with 22-26 participants each

...with Q & A sessions for each evaluation dimension

OBJECTIVES

Set a common understanding of **WHAT to evaluate** is the very basis for selecting appropriate data collection methods!

Four-dimension evaluation for each innovation

An honest exchange on **HOW to evaluate** is crucial to find the balance between robust methodology and feasibility in practice!

VALUE CHAIN MAPS

Type of **ACTORS** involved in the innovations

Teachers, Kitchen staff, Fisheries, Start-up company, App provider, Bakeries, Students, Restaurants, Associations, Consumers

Type of **PROCESSES** involved in the innovation

Production → Processing → Consumer

INNOVATION

LEARNINGS

*Fictitious weighting, only for illustrative reasons

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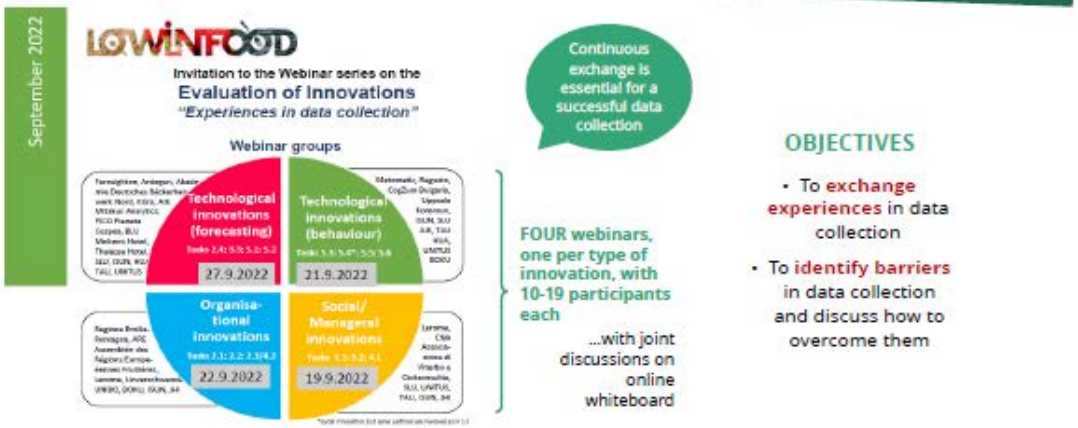

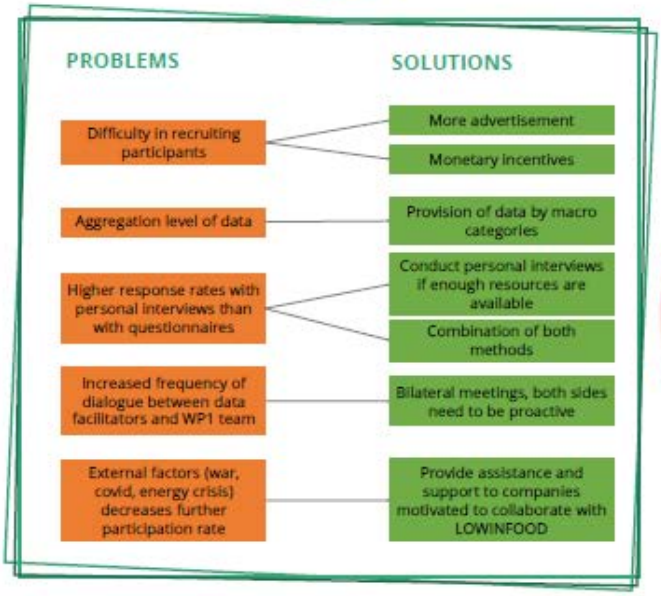

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WEBINAR SERIES

on the
Evaluation of Innovations
May 2021

Background document (1st edition)

Indicators to evaluate the efficacy, social and economic impacts as well as environmental impacts

Contact of the webinar's lead beneficiary:

Silvia Scherhaufer, WP1-leader — BOKU. Email: silvia.scherhaufer@boku.ac.at

Contact of the specific evaluation dimensions:

Efficacy of innovations: Claudia Giordano — UNIBO. Email: claudia.giordano4@unibo.it

Socio-economic impacts: Nazli Koseoglu — JHI. Email: nazli.koseoglu@hutton.ac.uk

Environmental impacts: Silvia Scherhaufer — BOKU. Email: silvia.scherhaufer@boku.ac.at

ALL PARTNERS ARE PART OF WP1 EVALUATION. SO, LET'S DO IT TOGETHER.

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LOWINFOOD's webinar series on the evaluation

The evaluation shall help to improve the performance of LOWINFOOD's innovations and shall trigger replication to move towards our common goal to generate low-waste food chains. For a successful and meaningful evaluation, your cooperation is of upmost importance, as you are the experts when it comes to the implementation in practice. Webinars are organized to enable feedback from all actors as well as the External Advisory Board of the project.

The aims of the webinar series of April/May 2021 are to:

- inform about indicators to evaluate efficacy, impacts on society and economy and on the environment.
- discuss the compilation and quantification of input data for the evaluation.

Target audience

The webinar is targeted to each group of innovation; classified by the type of food and step of the Food Supply Chain (FSC):

- **Fish waste**
  (May 10, 2:00 - 3:30 PM)
- **Food waste at food service**
  (May 12, 2:00 - 3:30 PM))
- **Food waste at households**
  (May 20, 10:30 - 12:00 AM)
- **Bread waste**
  (May 26, 2:00 - 3:30 PM)
- **Fruits & Vegetable waste**
  (May 27, 10:30 - 12:00 AM)

Each webinar will see the participation of at least one representative for each task dealing with an evaluation dimension (efficacy, socio-economic, environment), the Work package leaders of the innovations as well as the companies and organisations introducing the innovations.

Agenda of each webinar

Welcome (10')

- Introduction and Creation of a Value Chain Map (10')
- Consultation with innovators (10')
- Efficacy (10')
  Q&A (5')

Break (5')

- Socio-economic impacts (10')
  Q&A (5')
- Environmental impacts (10')
  Q&A (5')

Wrap-up and next steps (10')

Link to the webinars:

https://bokuvienna.zoom.us/j/93722076422?pwd=emlSOTFlZUgxZm83Sm94cWo2dDllZz09

or https://zoom.us/join and

Meeting ID: 937 2207 6422

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EVALUATION OF INNOVATIONS

A solid evaluation is the basis for taking informed decisions. We need to know where we are in order to know where to go. In LOWINFOOD we decided to define a robust and practical methodology for the evaluation in a multi-actor approach. We will look at the following pillars: efficacy of innovations, socio-economic as well as environmental impacts of the innovations.

What we want:

- ✓ Close the gap between science and practice for mutual benefit
- ✓ Identify feasible and practical methods to assess the benefits of innovation
- ✓ Enable harmonized and efficient data collection
- ✓ Present the results on aggregated level
- ✓ Handle data with care (awareness of confidential data)
- ✓ Exclude possible shift of burdens

What we don't want:

- x Judge the efficiency of single companies and publishing disaggregated data
- x Compare innovations (they are too diverse to compare, however experiences from one innovation can be used for another, e.g. experiences in data collection, …)
- x Overload companies with data collection (emails, inquiries, etc.)

How can we support each other?

- ➢ Manpower/resources to actively support data collection/observations
- ➢ Help to identify synergies between data collection needs and production/processing activities
- ➢ Exchanging views and experiences (think outside the box)

What we want to evaluate:

Impacts of innovations for food waste prevention and reduction on specific evaluation dimension by comparing:

- Conventional Food Supply Chain (**baseline);** the system before implementation of innovation and
- Low-waste Food Supply Chain (**innovation**); the system after the implementation of innovation

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STRATEGY FOR THE METHODOLOGY SETTING

Basic information and general requirements for data collection are detailed to mobilise discussions on the practicability of the assessment with innovators and companies. Guidelines for a harmonized data collection for each evaluation dimension are provided to minimize the efforts for companies and task leaders of the innovations.

Iterative process

The strategy for setting the methodology in the first project year is illustrated in Fig. 1. The process of defining the goal and scope for evaluation including the selection of indicators is seen as an iterative process. Hence, it will be continuously adapted during the elaboration of a common methodology for the evaluation.

Indicators

Indicators should be attainable, clear, comparable, comprehensible, cost-effective, up to date, measurable, redundant, relevant, reliable and sensitive. Pre-selected indicators are presented for each evaluation dimension below.

Input data for the evaluation

The compilation and quantification of input data for the evaluated systems requires a careful elaboration.

1. **Type and unit of input data** need to be clarified; a first set is presented in these webinar series (see also ANNEX).
2. **Source for the input data**. After the webinars, we will define data sources, quantification method and frequency of the input data in small groups or bilateral discussions.
3. **Input data collection**. Data shall be collected in from of protocols provided in Nov 2021.

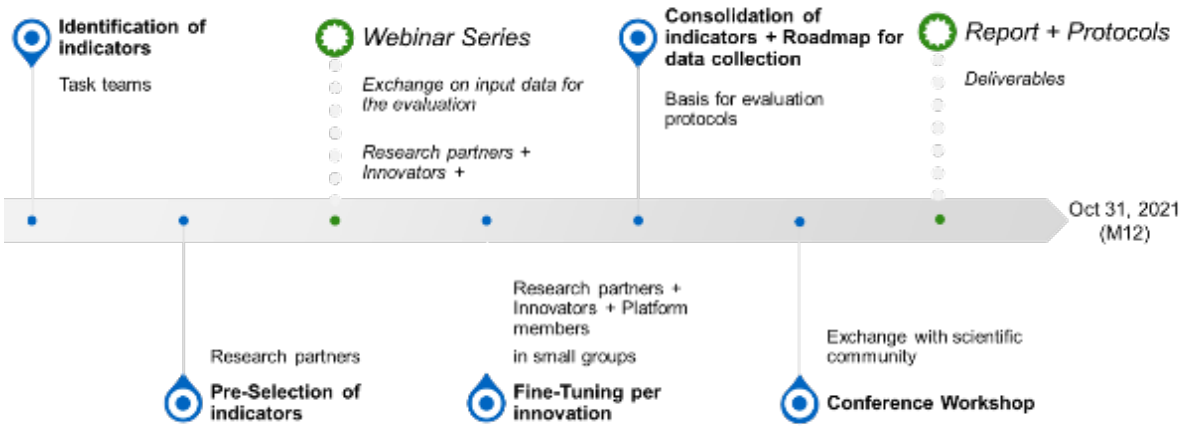

Figure 1: Timeline for the methodology setting in a multi-actor approach (M1-M12)

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Scope of the evaluation

In the process for setting the methodology it is furthermore relevant to generate a common understanding of terms and definitions used within the evaluation, as well as the specific scope and boundaries (what is included, what is excluded from the assessment). For this, **a value chain map** shall be created during the webinar illustrating processes and actors involved in the innovation.

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.

Sensitivity issues

In addition to concerns around data collection and disclosure, there are also concerns about some indicators that could lead to a potentially reduced uptake and lower quality of responses as a result. Another issue to clarify are the expectations around the allocation of responsibilities in data collection, and agreement of its frequency and timeline; both for indicators drawing from financial accounts, and for the implementation of surveys.

Sensitive points to be discussed:

- *Is anything unclear about the description of the indicators or data collection tasks?*
- *Is there any type of data listed in Annex 1 that you will be unable to collect or disclose?*
- *Do you foresee any risks or sensitivities (e.g. busy periods inconvenient for data collection)?*
- *Is there any relevant aspect which is not covered in Annex 1?*

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EVALUATION OF THE EFFICACY

Measuring the efficacy of innovations is of primary relevance to proof success of the innovation actions and to foster replicability. A set of indicators were pre-selected, but need to be defined and adapted for each innovation.

Pre-selected indicators

Following our primary goal of food waste prevention and reduction, the major indicator for evaluating the efficacy is

- The amount of Food Loss and Waste (FLW) prevented thanks to the LOWINFOOD's innovations

An 'absolute' indicator will address the amount of FLW avoided thanks to the innovation by looking at FLW before and after the innovation. Furthermore, each innovation will be evaluated according to 'relative' indicators aiming at assessing the FLW rate over the amount of food processed (see Fig. 2).

A further list of indicators will then address the innovation performance in terms of:

- **Replicability**: how much can the innovation be applied to other contexts?
- **User-friendliness**: is the innovation easy to use? Does it require technical expertise to be performed?
- **Utility**: is the innovation useful and profitable?

Method

The efficacy indicators will be calculated by applying (for appropriate innovations) direct measurements, mass balances, questionnaires and interviews, coefficients and production statistics, counting, scanning, waste composition analysis and/or diaries.[1] Further indicators will be addressed both through questionnaires with innovators and final users as well as through secondary data.

Sensitive points to be discussed:

- *Duration of measurements*
- *Is it possible to provide data on the FLW per year before the innovation?*
- *Are all innovators able to provide data on the food processed in terms of weight?*

[1] Methods suggested in Annex III of the Commission Delegated Decision (EU) 2019/1597.

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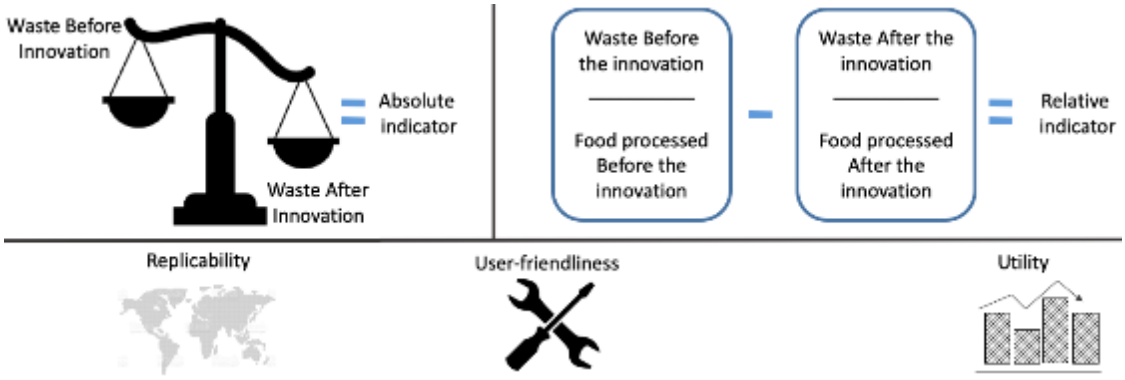

Figure 2: Indicators for measuring the efficacy of innovations

SOCIO-ECONOMIC EVALUATION

In the socio-economic evaluation, we will assess the social and economic impacts of food waste reduction though the innovations. While some outcomes can be strictly economic such as changes in costs, scale, market competitiveness and profitability at the level of the company implementing the innovation, others focus on the wider societal context; namely; if and how the company's staff, its community, or its value chain are influenced as a result of the adoption of the innovation and the resulting waste or loss reduction.

Pre-selected indicators

Drawing from a literature review and various rounds of consultation between the research partners involved in the task, socio-economic impact indicators were categorised as:

- Economic indicators at company level (e.g., reduction the cost of food inputs)
- Social indicators at company level (e.g., change of awareness)
- Community- (society-) level indicators (number of jobs generated)
- Community- (supply chain-) level indicators (spill-over effects)
- Gender-specific indicators (involvement in the implementation by gender)

After discussing a preliminary list of 43 indicators with research partners, we selected a final list of 21 indicators which will represent the basis for discussion during the webinars and is provided in Annex 1 for reference.

Consultation with industry stakeholders will enable us to both improve the description of the indicators and co-develop the most suitable data collection strategy to mitigate potential risk and sensitivities around data collection (comparability, representativeness and missing data) from the start.

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Method

While some indicators (e.g. economic indicators at company level) require quantitative evidence from company accounts, others require qualitative and quantitative data collected via surveys or interviews conducted with the company's management (e.g., social indicators at company level).

For each indicator, a baseline, i.e. the situation prior to the adoption of the innovation, must be established by collecting the necessary data. Then, the same data will be collected at different points in time after adoption, to be compared over the duration of the LOWINFOOD project.

Appropriate calculation methods will be defined to obtain each indicator from data. For economic indicators, relevant equations have already been defined. For indicators relying on survey data (e.g., number of employees involved in implementing the innovation), descriptive statistics will be calculated. For purely qualitative indicators (e.g., level of satisfaction with the innovation), we will use Likert scale-based measures and define assessment structures accordingly.

Sensitive points to be discussed:

- *What are the possible risks or sensitivities for data collection?*
- *How much of the required information is already being collected for company accounts and could be disclosed?*
- *How many new items of information related to company operations needs to be collected to construct the baseline figures before implementation?*
- *How can we ensure the reliability of the data collected through staff and management surveys for the social impact analysis?*
- *How can we make the project delivery easier for each other within our powers and budgets?*

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ENVIRONMENTAL EVALUATION

Impacts on natural resources, human health and environment of food waste prevention and reduction activities from the innovations are determined. The method of Life Cycle Assessment (LCA) is applied being a structured, comprehensive and internationally standardised method for the quantification of all relevant emissions and resources consumed that are associated with any goods or services ("products").

Method

The method for the evaluation of environmental impacts follows the rules for LCA based on ISO 14044 and the handbook and guidelines from the International Reference Life Cycle Data (ILCD) System as well as the food waste related assessment approaches developed by the H2020 project REFRESH and Interreg Central Europe STREFOWA.

Innovation action: The evaluation includes all activities directly associated with the innovation. LOWINFOOD's innovation actions can be grouped into the following steps of the food waste hierarchy: 1. FW prevention at source (via e.g. forecasting systems, educational concepts) and 2. Food redistribution (surplus food to other stakeholders).

Avoided production: based on the assumption that food consumption stays constant, food waste prevention increases the efficiency of the supply chain and hence decreases the amount of food required to be produced to satisfy the same demand. Environmental benefits arising from this avoided production are evaluated within the scope of the assessment. Avoided production needs to be evaluated for each innovation.

Baseline system replaced: The baseline covers the system before the innovations are implemented, and includes the current waste management system (e.g. food waste currently ends up at residual waste bin), as this system is replaced by the action when food is no longer wasted or properly recycled

Pre-selected indicators

Selected indicators are based on the Environmental Footprint (EF) packages. Those identified as relevant for the assessment of the FSC and food waste are:

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

Central questions are:

- *Which activities and infrastructure is required to implement the innovation?*
- *Where was the food waste previously disposed of?*
- *Is the input data available? Which efforts need to be taken to get the input data? Who is collecting the data? Is something missing?*

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ANNEX I. PRELIMINARY INPUT DATA FOR THE EVALUATION

DIMENSION	INDICATOR/INPUT DATA	UNIT
EFFICACY		
	FLW prevention and reduction	
	FLW Quantification at baseline	kg waste
	FLW Quantification after innovation	kg waste
	Key performance indicators	
	Main actors and stakeholders	number
	Amount of food processed/served dishes etc. …. Reference unit	kg
	Other:	
	Replicability	
	Use-friendliness	
	Utility	
SOCIO-ECONOMY		
	Economic indicators at company level	
	Profitability	
	Change in direct input costs (food inputs)	% (Possibly qualitative with ranking)
	Change in fixed costs due to the innovation (e.g., storage space)	% (Possibly qualitative with ranking)
	Change in variable costs due to innovation (e.g., energy, water)	% (Possibly qualitative with ranking)
	Change in organic waste management costs	% (Possibly qualitative with ranking)
	Change in the selling price of the product(s) involved	% (Possibly qualitative with ranking)
	Creation of new income streams	Qualitative data
	Rate of return on investment	%

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DIMENSION	INDICATOR/INPUT DATA	UNIT
	Change in access to subsidies and/or other financial benefits	Qualitative data
	Scale	
	Change in total value of sales of the product(s) involved	%
	Change in total hours worked, disaggregated by gender	%
	New partnerships upstream and horizontally	Qualitative data
	Downstream diversification (e.g., number and type of buyers)	Qualitative data
	Competitiveness	
	Change in the productivity of material inputs or input-output ratio	%
	Social indicators at company level	
	Behaviour	
	Change of awareness in the staff and management of the food waste problem	Qualitative data
	Change of attitude in the staff and management towards the reduction of food waste	Qualitative data
	Community-(society-) and supply chain level indicators	
	Creation of local jobs	
	Change in the number of jobs, disaggregated by gender	Number of jobs created or lost and households affected
	Spill-over effects	
	Technological change in other companies	Qualitative data
	Gender related indicators	
	Vertical segregation	
	Share of different genders involved in implementing the innovation, by job grade	Qualitative data (%)
	Horizontal segregation	

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	Share of different genders involved in implementing the innovation, by company sector	Qualitative data (%)
	Share of genders interviewed	
	Share of different genders interviewed out of the total number of people interviewed	Qualitative meta data (%)
	Survey satisfaction	
	Share of female and male interviewees who assess the survey positively	Qualitative data (%)
	Others:	
DIMENSION	INDICATOR/INPUT DATA	UNIT
ENVIRONMENT		
	General information on type of food waste and on baseline	
	food product/food product mix	Qualitative
	Type of food waste management operations	%
	Activities related to the innovation	
	Transport	
	Transport for distribution	km
	Means of transport for distribution	vehicle type (with cooling unit, without)
	Empty returns	Yes/No
	Energy use for storage of distributed food	MJ/cal
	Electricity use for storage of distributed food	kWh/cal
	Computer devices	
	Time for using the device	h
	Type of computer device	device type
	Packaging	
	Mass of packaging material(e.g. for doggy bag)	kg
	Type of packaging	packaging material
	Others:	

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Slides of the Webinar series No. 1 “Indicators”

LOWINFOOD’s WP1 is

… on how to create a solid evaluation for taking informed decisions

“You need to know where you are in order to know where to go”

Aims of the evaluation:

- To demonstrate innovations’ success and feasibility
- To determine improvement potentials
- To provide evidence and basis for communication

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Aims of the webinar

- To inform about indicators on efficacy, economy, society and environment relevant for LOWINFOOD
- To discuss the compilation and quantification of input data for LOWINFOOD‘s evaluation

Agenda of each webinar

Welcome (10’)
- Introduction and creation of a **Value Chain Map**
- Consultation with companies (10’)
- **Efficacy** (10’)
- Q & A(5’)
- **Socio-economic impacts** (10’)
- Q & A (5’)
- **Environmental impacts** (10’)
- Q & A (5’)
- Wrap-up and next steps (10’)

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Webinar series
Dates and Topics

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

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Evaluation framework
Goal and scope

Scope of the evaluation:

- Impacts of innovations for food waste prevention and reduction on specific evaluation (sustainability) dimensions by comparing:
  - **Conventional FSC (baseline):** the system before implementation of innovation
  - **Low-waste FSC:** the system when innovation is implemented

FSC =Food supply chain

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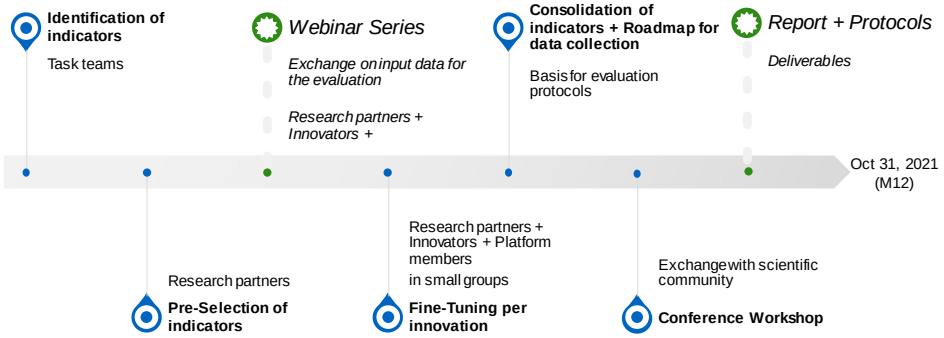
Strategy for the methodology setting
First year



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Input Data for the Indicators
Minimum and optional requirements

1. **Type and unit of input data** need to be clarified!
   A first set is presented in these webinar series (see also ANNEX of the webinar documents).
2. **Source for input data: survey, com pany records etc.**
   After the webinars, sources are defined in small groups or bilateral meetings.
3. **Collection of input data**.
   As a minimum two rounds are necessary: Data collection for the baseline and for the innovation. Optional also a mid -term data set.
   This data shall be collected in from of **protocols** provided in M12.

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Central questions for this webinar

1. *Which steps/processes are included in your innovation?*
2. *Which type of food waste is addressed in your innovation?*

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Efficacy of innovations

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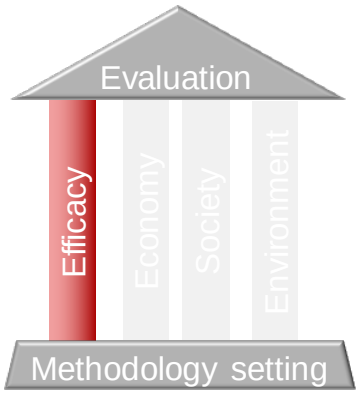

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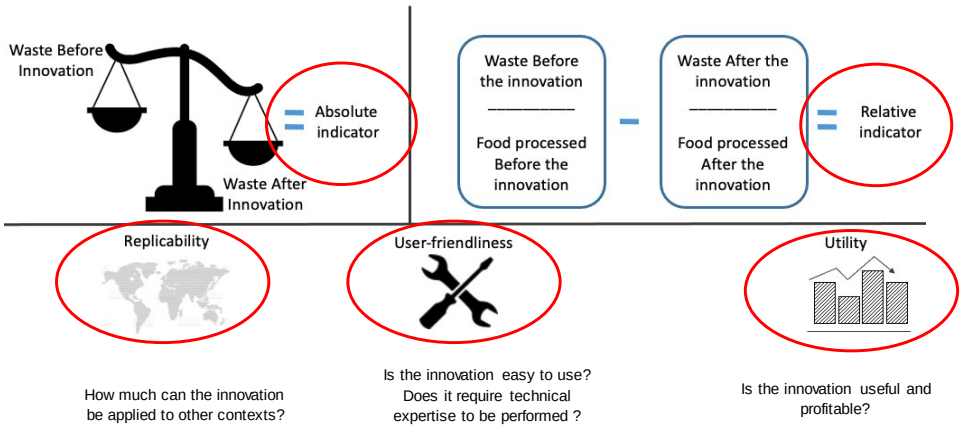
Indicators



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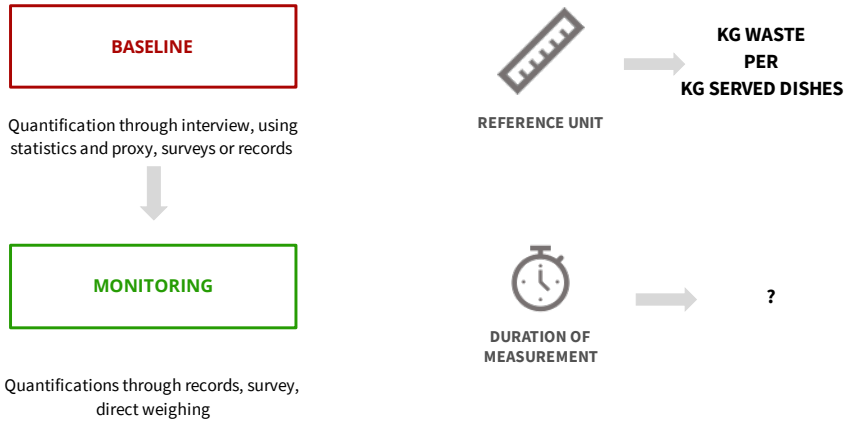
Data Source and Methodology



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Q & A

Practial questions to solve in the upcoming months:

- *Duration of measurements*
- *Is it possible to provide data on the FLW per year before the innovation?*
- *Is it possible to gather data on the food processed in terms of weight?*

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Socio-economic impacts of innovations

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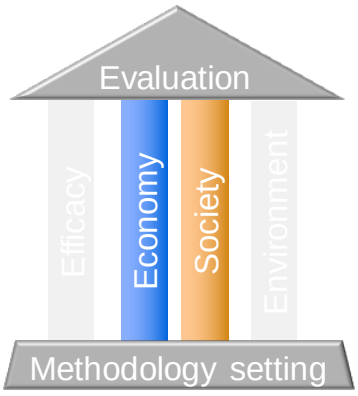

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Socio-economic impacts of innovations
Indicators and method

1. Economic indicators at company level
2. Social indicators at company level
3. Community (society or supply chain) level indicators
4. (Gender-specific indicators)

- Baseline before adoption + change after adoption + new assessment at different points in time until the end of the project
- All indicators calculated as absolute level and as change

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Socio-economic impacts of innovations
Data needs-1

Economic indicators at company level

- Has the innovation improved the company's profitability / competitiveness?
- Has the innovation allowed a change in the scale of production?
- Mix of quantitative (company accounts) and qualitative information (marked with *)

Profitability	Change in **direct input costs** (food inputs)
	Change in **fixed costs** due to the innovation (e.g., storage space)
	Change in **variable costs** due to innovation (e.g., energy, water)
	Change in organic **waste management costs**
	Change in the **selling price** of the product(s) involved
	Creation of new **income streams***
	Rate of return on investment
	Change in access to **subsidies** and/or other financial benefits*
Scale	Change in total value of **sales** of the product(s) involved
	Change in total **hours worked**, disaggregated by gender
	New **partnerships** upstream and horizontally*
	Downstream **diversification** (e.g., number and type of buyers)*
Competitiveness	Change in the **productivity** of material inputs, or input-output ratio

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Socio-economic impacts of innovations
Data needs-2

Social indicators at company level

Behaviour	Change of **awareness** in the staff and management of the food waste problem*
	Change of **attitude** in the staff and management towards the reduction of food waste*

Community-(society-) and supply chain level indicators

Creation of local jobs	Change in the number of **jobs**, disaggregated by gender*
Spill-over effects	**Technological change** in other companies*

Gender related indicators

Vertical segregation	Share of genders involved in implementing the innovation by job grade*
Horizontal segregation	Share of genders involved in implementing the innovation, by sector*
Share of genders interviewed	Share of genders interviewed out of the total number interviewees*
Survey satisfaction	Share of genders in interviewees who assess the survey positively*

N.B. The indicators refer to the companies using the innovation, which in some cases are not Lowinfood partners

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Q & A

Practical questions to solve in the upcoming months:

- *What are the possible risks or sensitivities for data collection?*
- *How much of the required information is already being collected for company accounts and could be disclosed ?*
- *How many new items of information related to company operations needs to be collected to construct the baseline figures before implementation?*
- *How can we ensure the reliability of the data collected through staff and management surveys for the social impact analysis?*
- *How can we make the project delivery easier for each other within our powers and budgets?*

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Environmental impacts of innovations

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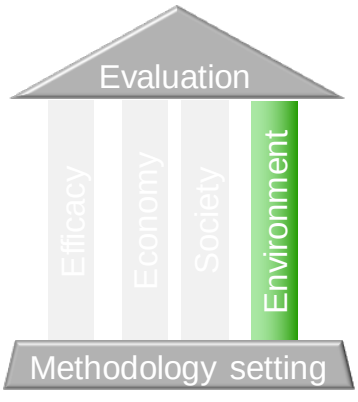

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Environmental impacts of innovations
Indicators and method

- Climate change, fossil and biogenic
- Acidification
- Eutrophication, terrestrial and freshwater
- Land use (sqm)
- Water use
- Resource use, minerals and metals, fossils

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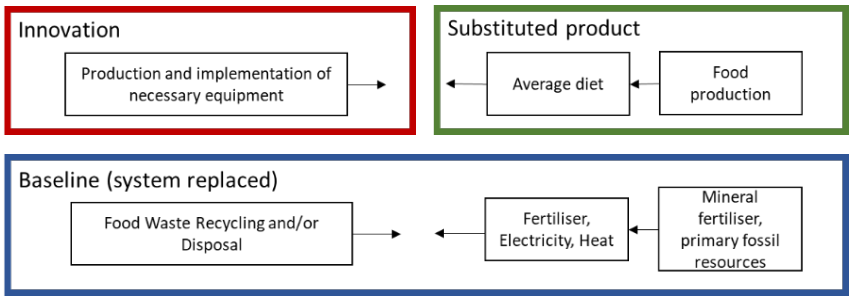
Environmental impacts of innovations
System boundary



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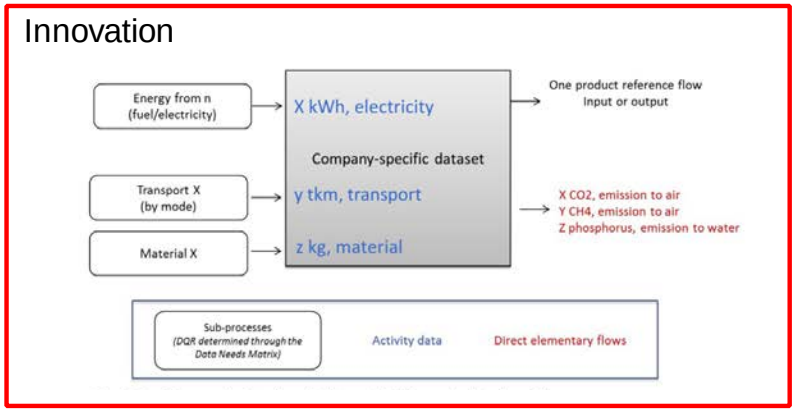
Environmental impacts of innovations
Data needs



Source: Zampori L. and R. Pant (2019). Sugesstions for updating the Product Environmental Footprint (PEF) method. Luxembourg, Publications Office of the European Union **EUR 29682 EN**.

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Q & A

Practical questions to solve in the upcoming months:

- *Which activities and infrastructure is required to implement the innovation?*
- *Where was the food waste previously disposed of?*
- *Is the input data available? Which efforts need to be taken to get the input data? Who is collecting the data? Is something missing?*

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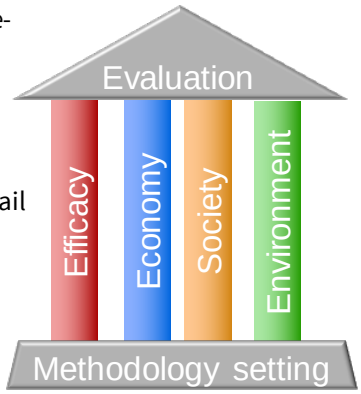
Wrap-up and next steps

Next steps for WP1 evaluation:

- Next months (May-Aug) are dedicated to fine-tune indicators and input data together for **each** innovation
- Working procedure

1. Exchange of indicator/input data list per e-mail
2. Roadmap for the data collection
3. Agenda point within your next task meeting (when your innovation starts!)



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Thank you!

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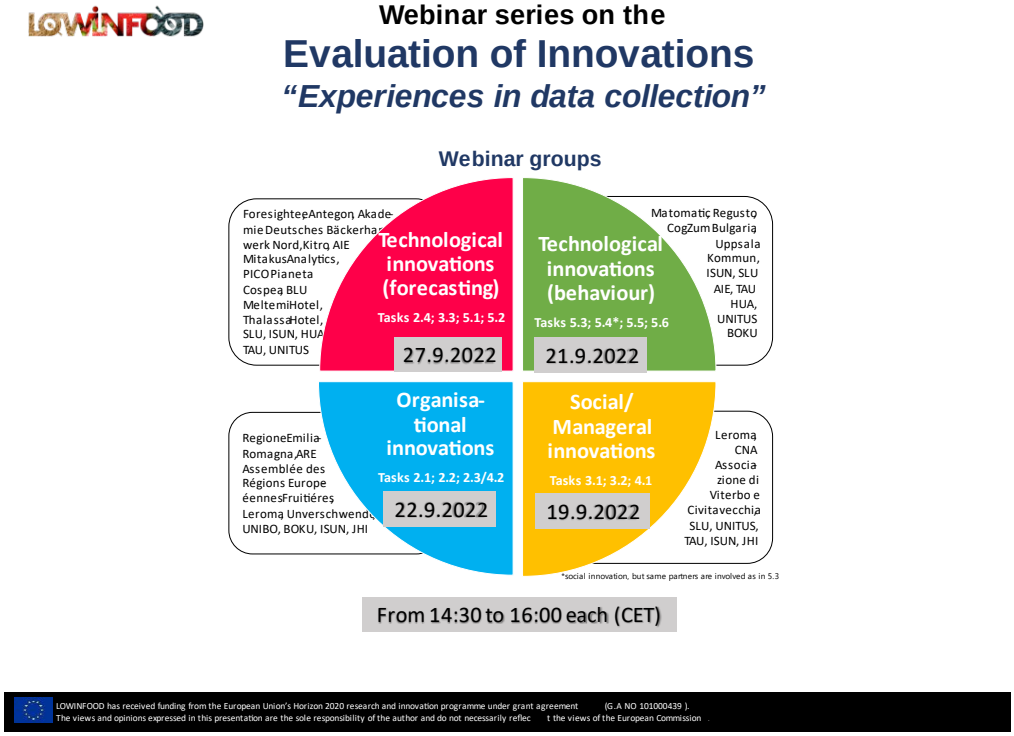
Slides of the Webinar series No. 2 “Experiences”



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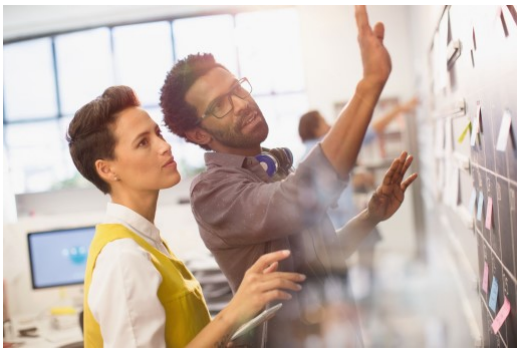
Aims of the webinar

- To exchange experiences in data collection
- To identify barriers in data collection and discuss how to overcome them



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Agenda of the webinar

2.30 Welcome and introduction

2.40 Overview on the **Status of data collection** (prepared by WP1 team)

3.00 **Experiences in data collection** – Open discussion (all, via zoom whiteboard)

Each participant shall reflect on challenges/open issues to clarify in terms of data collection!

3.50 Wrap-up and next steps

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Innovation profiles

Status Quo of data collection process

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Experiences in data collection

Each participant shall reflect on challenges/open issues to clarify in terms of data collection!

Please add one sticky note per issue and write down your task number!

Example:

Task 4.1

Difficult to gain trust

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Data exchange loop

Data collector:

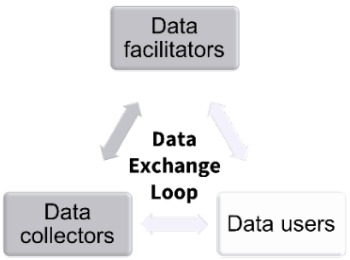
- receives the raw data retrieved from questionnaires, surveys, or from the innovation databases.
- can be shared by both a research partner and an innovation partner.

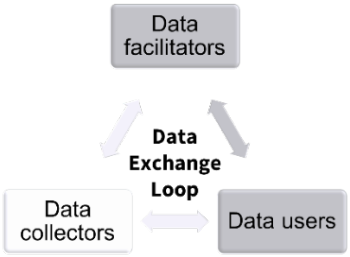
Data facilitators

- represent the link between the innovation partners in WP2-5 and the evaluation partners in WP1.

Data users:

- WP1 task teams of efficacy (T1.2), socio-economy (T1.3) and environment (T1.4)
- conduct the data analysis and the provision of results





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ATTENTION TO

- ✓ Informed consent forms must be filled out when personal data is collected at users
- ✓ Raw data shall be transcripted before sharing (but not aggregated)
- ✓ Personal raw data must be encrypted before sharing.
- ✓ Ensure traceability of the coding system in case of questions
- ✓ Please use common criteria when sharing data
- ✓ It is recommended to make first a trial interview/survey, then adapt the questionnaire and the process of data sharing

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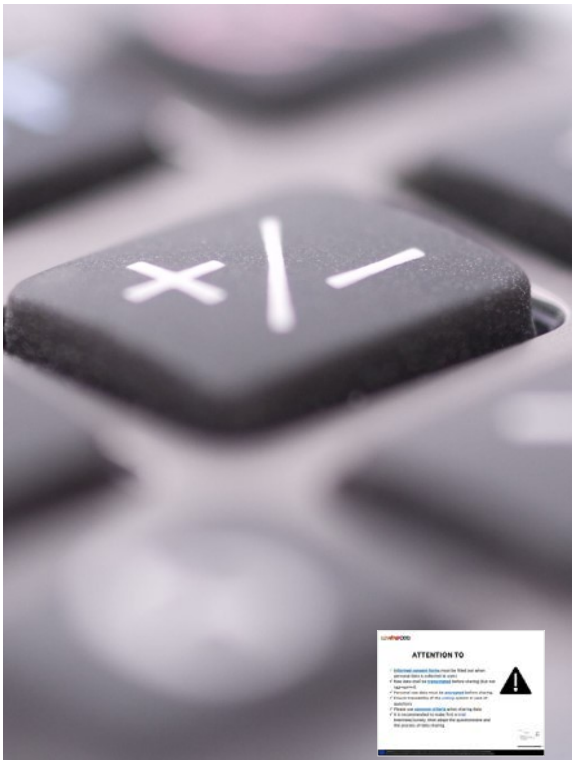
Transcription of raw data

- The **transcription** of raw data
- refers to manual (in case of personal interviews) or automatic transcription (in case of online surveys) from filled out questionnaires to files, which can be shared and further processed.
- This processing of results also includes the translation into English language, as questionnaires might be filled out in national language.



Encryption of raw data

- **Encryption** of the personal information aims at making the **data unintelligible to any person who is not authorised to access it.**

- The encryption procedure will be implemented by assigning to each individual (human subject or family) **a unique identifier (UID)** made of 11 characters (see D8.2).

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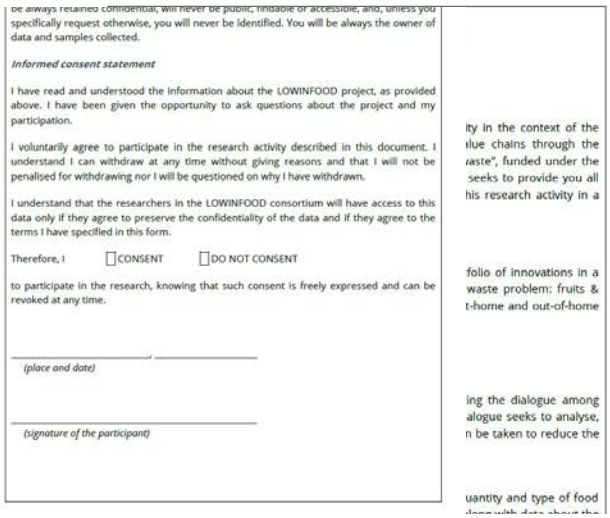
Informed consent form

See D8.1



be always retained confidential, will never be public, findable or accessible, and, unless you specifically request otherwise, you will never be identified. You will be always the owner of data and samples collected.

Informed consent statement

I have read and understood the information about the LOWINFOOD project, as provided above. I have been given the opportunity to ask questions about the project and my participation.

I voluntarily agree to participate in the research activity described in this document. I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor I will be questioned on why I have withdrawn.

I understand that the researchers in the LOWINFOOD consortium will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.

Therefore, I ☐ CONSENT ☐ DO NOT CONSENT

to participate in the research, knowing that such consent is freely expressed and can be revoked at any time.

(place and date)

(signature of the participant)

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Common criteria

Please use the following criteria for the data exchange:

Zeroes	0
Missing data (not available)	na
Not queried data, because …	
…it is not relevant for the innovatio	mr
…it is (or will be) provided by other collection method (records etc.) (tbc.)	tbc
Name of variables	Use full names or full questions as provided in the surveys

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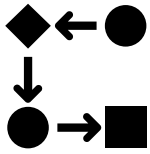
Next steps



- Keep in touch!
- Collaboration to share data
- Collaboration to ensure data quality (e.g. sampling)

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Thank you!

Smile for a picture!

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