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

D5.6 EDUCATIONAL CONCEPT

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LIST OF PARTNERS THAT HAVE CONTRIBUTED TO PRODUCE AND REVISE THE DELIVERABLE

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LOWINFOOD Consortium

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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	Universchwendet GmbH	UNV	Austria
13	Akademie Deutsches Baeckerhandwerknord GGmbH	ADB	Germany
14	Foresightee	FOR	Belgium
15	Leroma GmbH	LER	Germany
16	Mitakus Analytics UG	MITA	Germany
17	Kitro SA	KITRO	Switzerland
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21	Uppsala Kommun	UPP	Sweden
22	Recuperiamo srl	REG	Italy
23	Antegon GmbH	FT	Germany
24	Confederazione Nazionale dell'Artigianato e della piccolo e media impresa Associazione di Viterbo e Civitavecchia	CNA	Italy
25	Assemblee des Regions Europeennes Fruitieres Legumieres et Horticoles	ARE	France
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Summary

This is the sixth deliverable (D5.6) of WP5 in the LOWINFOOD project. The deliverable presents the innovation of task 5.4 (T5.4), which aims to reduce food waste in school canteens by involving kitchen staff and pupils in educational activities focusing on raising their awareness of the food waste issue. The deliverable describes the finalised and tested holistic educational concept including the approach to the task and the written materials and teaching aids used. The deliverable also presents how the tested concept was experienced by participants including learning outcomes from these experiences summarized at the end of this report.

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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).

This deliverable (D5.6) is part of WP5, which is dedicated to reducing food waste within household and foodservice consumption settings. Specifically, D5.6 is related to the innovation of task 5.4 (T5.4) which aims to reduce food waste in school canteens by involving kitchen staff and pupils in educational activities with focus on raising awareness on the issue of food waste. The deliverable describes the finalised and tested holistic educational concept that was applied in five schools in Sweden and 12 schools in Austria. It accounts for the approach to the task as well as the written material and teaching aids used within it. Finally, the deliverable presents how the school units experienced the finalized and tested concept as well as learning outcomes from these experiences, which are summarised as supporting notes for future application of the concept.

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Introduction to the holistic educational concept

The innovation of T5.4 is a holistic educational concept, which aims at reducing food waste in school canteens by involving pupils and kitchen staff in educational activities focused on raising awareness of the food waste issue. Since school meals are not only intended to fulfil a nutritional need but also represent a learning occasion and are a part of the pupils' education, T5.4 seeks to realize the opportunity school meals bring through developing a concept that educates pupils, and also kitchen staff, on food waste and how it can be reduced.

In educational meals, traditionally, teachers sit down and eat together with the pupils with the purpose of teaching the children and acting as role models. In some European countries, there are guidelines on how school meals can be incorporated into the teaching activities for educating the pupils on e.g. sustainable lifestyles, culture, or food production. However, these guidelines are usually not embedded in the curriculum or compulsory in their realization. Teachers do not usually have specific tools nor do they receive any formal training on how to apply the concept to work with educational meals in practise. Consequently, educational meals are seen to appear in different forms depending on where they are applied and by whom. Currently, there is no best practice on how to apply educational meals, and indicators on how to communicate to the pupils about the environmental issues related to food are lacking.

Teaching materials about food and food waste designated for educational purposes are, however, already available, but they are not specifically designed to be applied during meal times. This provides an opportunity to employ the existing material and adjust it to be suitable for educational meals in order to introduce a learning occasion on food waste during mealtime. By doing so, awareness of food waste can be raised, and the quantity of food wasted during school meals can be reduced. However, in the holistic concept of educational meals, used in this task, the mealtimes are considered just a part of the setting for the educational meals as a learning occasion as the concept was further expanded to classroom teaching activities prior to and after mealtimes.

Additionally, like teachers, kitchen staff also often lack the education, training, and tools how to integrate food waste-reducing measures into their practical work. However, there are established educational concepts on how to reduce food waste that are available for kitchen staff. These concepts present practices on how meals can be prepared with efficient and creative use of ingredients and how food waste can be prevented. Thus, there is another opportunity provided to reduce food waste in school canteens by targeting the activities in the kitchen and increasing the knowledge of the kitchen staff.

Considering this situation, T5.4 aimed at reducing food waste in school canteens by involving, in this deliverable, teachers, pupils, and kitchen staff in educational activities focusing on raising their awareness of the food waste issue.

T5.4 was carried out in five Swedish primary schools within Uppsala municipality during the spring semester of 2022, as well as 12 schools in Austria till the End of 2023. The innovations shared a common aim, however, they were adapted to the local settings and therefore carried out in different manners. The part of the holistic educational concept involving teachers and pupils consisted of educational materials that teachers incorporated into their regular teaching curricula and into the

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educational meals in the school canteens for ten consecutive weeks in Sweden. Meanwhile, in Austria, kitchen workshops were conducted for the kitchen staff and pupils providing the participants with knowledge and inspiration on how food waste can be reduced from their perspective. To evaluate the efficacy of the task, plate waste[1] quantities were measured both pre and post-demonstration with the help of the food waste tracker equipment provided by Matomatic (see T5.3) in Sweden and other dedicated scale equipment in Austria. The goal of the task was for the educational concept to be ready for application in different EU countries and to have reached a societal readiness level (SRL) of 7 after the demonstration phase.

Pre-demonstration phase

The initial subtask of the educational concept, the pre-demonstration phase, was to conduct a baseline evaluation of food waste quantities in those school canteens participating in the task, and to adapt the existing educational materials to be suitable for their upcoming operational environments. Both the measurement of food waste quantities and the adaptation of the educational materials were first carried out in Sweden and were later adopted in Austria where, however, restrictions related to the Covid-19 pandemic initially postponed the initiation of the task. More details on how the pre-demonstration phase was carried out are provided further below along with a description of the operational environments of the task in each of the two countries.

To evaluate the efficacy of the innovation, the food wasted by the guests (pupils and teachers) in the canteens was quantified. Food waste measurements were conducted with the help of the Matomatic plate waste tracker (which primarily quantified the amount of plate waste, but other fractions such as serving waste and kitchen waste was also quantified), which is another innovation demonstrated under its own task (T5.3) in the LOWINFOOD project. The plate waste tracker was placed in the canteens, where the guests leave their dishes after they are finished with their meal, and any food left on the plates is put into a bin that is placed on a scale. Figure 1 shows an example of the plate waste tracker located in a school canteen in Sweden and Figure 2 shows an example of a tracker located in a school canteen in Austria. Each time something is thrown in the bin, the scale detects the weight and displays the amount of food waste thrown away to the guests on an interactive tablet. In addition to showing the amount of food waste pupils individually wasted, the tablet gives feedback in the form of a message, for example, “Good that you don't throw away so much”. Further, the tablet displays the total amount of food that has been thrown away that day or that week comparing the amount to the amount of the previous day or week. This information is based on the final weight of each mealtime, which is recorded by the canteen staff each time the bin is emptied. The amount of guests for each mealtime is also recorded in the tablet to be able to quantify the amount of plate waste per person. Moreover, the tablet uses colours (green or red), and animated happy or sad faces to communicate whether the amount of food wasted so far is under the set targets. In addition, it also asks the guests for the reason why they wasted food, whether it depended on not liking the food, taking too much food, or not having enough time to finish their meal, which then can be analysed by the kitchen staff. The information can be used to adjust the meal or the menu that was served according to the pupils’ feedback with the aim to reduce food waste in the future. Figure 3 shows an example of the tablet display with the gamification elements that are presented to the pupils.

[1] All waste from the plates of guests, which may contain inedible parts such as bones and peels (Malefors et al. 2019).

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Figure 1. A plate waste tracker in use in a Swedish school canteen.

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Figure 2. A plate waste tracker in use in an Austrian school canteen.

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Figure 3. The tablet connected to the plate waste tracker communicates the amount of food wasted per individual guest and the total amount of food waste for the same day, the day before, and the previous week. With the help of a simple colour scheme and animations of happy or sad faces, the tablet also communicates whether the amount of food waste is under or above the set target. In addition, the guests can give their feedback with the help of the tablet to the kitchen staff regarding the reason they wasted any food.

In addition to collecting baseline information about food waste quantities, teaching material on food and food waste was prepared to become available for application during both classes and meals as well as for the kitchen staff. The teaching material was developed based on and inspired by already existing educational materials, as this is widely available from organisations working with the development of public meals. For educating the pupils, the material focused on different aspects related to food, such as food production, but also nutritional aspects related to food consumption. Thus, alongside food waste prevention, the material addressed the environmental impacts of food systems, foods contributing to good health, but also for example cultural and cooking-related aspects. For the workshops conducted for the kitchen staff, the teaching material used derived from already existing learning content and input stemming from the established wide network of stakeholders in the agri-food value chain by the partners. The contents were focused on the different stages of food production and the ways in which food loss and waste appears. Starting with a broad overview of the masses of food waste created as well as the inner workings of food-production the inputs progress towards a more in-depth analysis of the reason for food waste in each part of the value-chain and applicable solutions.

Sweden

Participants

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The participating schools in Sweden were elementary schools with pupils between the ages of 6 and 15. In total, 57 teachers, 5 teaching assistants, and 1 125 pupils participated in the intervention. In two of the schools, all students participated (n= 300; 320), and three of the schools, between 19% and 45% of the pupils participated. In Table 1, the demographic details of the participating schools in the municipality of Uppsala, Sweden are presented.

Table 1. Participating schools in the municipality of Uppsala, Sweden including their demographics.

School	Teaching staff n	Participating teaching staff n (%)	Enrolled pupils and age n (y)	Participating pupils n (%)
S1	60	2 (3)	480 (6–15)	90 (19)
S2	22	7 (32)	400 (6–12)	140 (35)
S3	32	32 (100)	300 (6–9)	300 (100)
S4	19	14 (74)	320 (6–12)	320 (100)
S5	57	12 (21)	615 (6–15)	275 (45)

Schools in Sweden are publicly funded, and the majority of all schools, including the schools participating in T5.4, are run by municipalities. A typical day in a Swedish school starts around 8 am whereby the pupils have their first lesson, which focuses on one of the seventeen main subjects included in the curriculum. During the day, the pupils have around four to six lessons depending on when the school day is finished. In the school curriculum, it is stated how many hours should be spent on each subject and what knowledge the pupils are expected to gain in each subject. Based on this, the teachers then form a curriculum on what and how to teach the pupils.

Around noon each day, the pupils go to the school canteen for lunch. In Sweden, it is stipulated in the legislation that, during school days, nutritious school meals are to be provided, for free, to all pupils attending elementary school (The Swedish Parliament 2010). It is the municipality, or if it is a private school, the school owner who is responsible for providing school meals (Swedish National Food Agency 2019). Within a municipality, the school meals are typically provided with a similar structure between schools, meaning that commonly the same type of school meal menu is served across all schools within the same municipality each day. In a typical school canteen, meals are served in a buffet style, where the guests are presented with a salad buffet followed by two, sometimes three, main meal options. Someone from the kitchen staff is usually available beside the buffet informing the guests about the food, reminding them to choose some vegetables on the plates and not to serve too much food at once, etc. Figure 4 shows an example of what a school canteen in Sweden can look like.

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Figure 4. What a regular school canteen in Sweden can look like. This was one of the participating school canteens in T5.4.

Pupils attended the canteen during lunch break for the duration of approximately 25 minutes, in an ordinary manner, however, what was different from the normal situation, was that they shared school meal with their teachers allowing the teachers an opportunity to incorporate educational elements into the mealtime. Besides helping to form good relationships between the pupils and the teachers, and practicing social skills, this can be a way to establish interest in different food-related subjects for the pupils and to provide them with insight and knowledge of, for example, different food cultures and societies. During the educational concept, teachers steered the learning opportunity on food as well as food waste prevention but also on any other related topics that the pupils might have brought up during the mealtime conversations.

Baseline measurement

In Sweden, five schools within Uppsala municipality participated in T5.4. The pre-demonstration phase took place when the baseline was measured but before the implementation of the task itself, started in each school sometime during 2021 and ended before the innovation of the educational meals was implemented as presented in Table 2. The number of days where food waste was registered differed between the schools depending their ability to participate in the task during the Covid-19 pandemic, which was a dominant factor at the time.

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Table 2. The baseline measurement periods, and the baseline results for the schools participating in Sweden.

School	Start date	End date	Number of portions	Baseline, median plate waste per portion (g)
S1	2021-10-05	2022-02-25	19.977	25
S2	2021-01-11	2022-01-14	55.941	22
S3	2021-03-22	2022-02-25	45.075	28
S4	2021-01-18	2022-02-25	39.427	17
S5	2021-11-15	2022-01-21	18.514	22

Teaching material

The pre-demonstration phase also initiated the adaptation of teaching material and planning of how the available material could be integrated into the existing curriculum. In Sweden, the teachers in the participating schools were the ones responsible for implementing the innovation in practice. To support the teachers, a joint Teams channel was created, where they could communicate with each other by sharing their experiences, questions and tips. In addition, they could access the following documents regarding the educational concept and educational materials: 1) An introduction to educational meals concept (Appendix A); 2) Subject-specific themes (Appendix B); 3) Educational materials (Appendix C).

The teaching materials applied within the innovation were derived from different online sources relating to food production, food waste, the environment, and nutrition and health. These included e.g. interactive activities such as online games (Figure 5), short films from educational platforms, and information from governmental agencies and NGOs. To get inspiration on how to embed the suggested activities and information to the different school subjects, a list with suggestions, deriving from the network *Meal Sweden* (Måltid Sverige 2022), was provided to the teachers (see examples in Figure 6, and a complete list in Appendix B).

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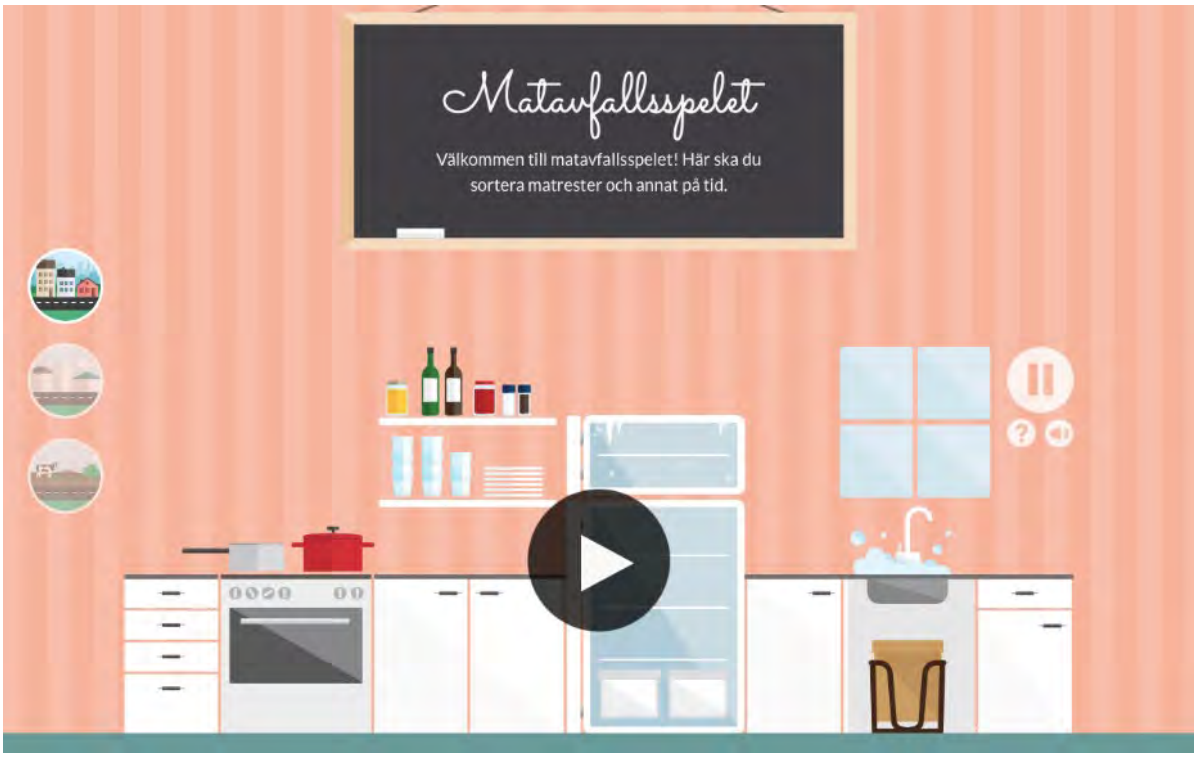

Figure 5. Online food waste game used as a teaching aid during the educational meals concept in Sweden.

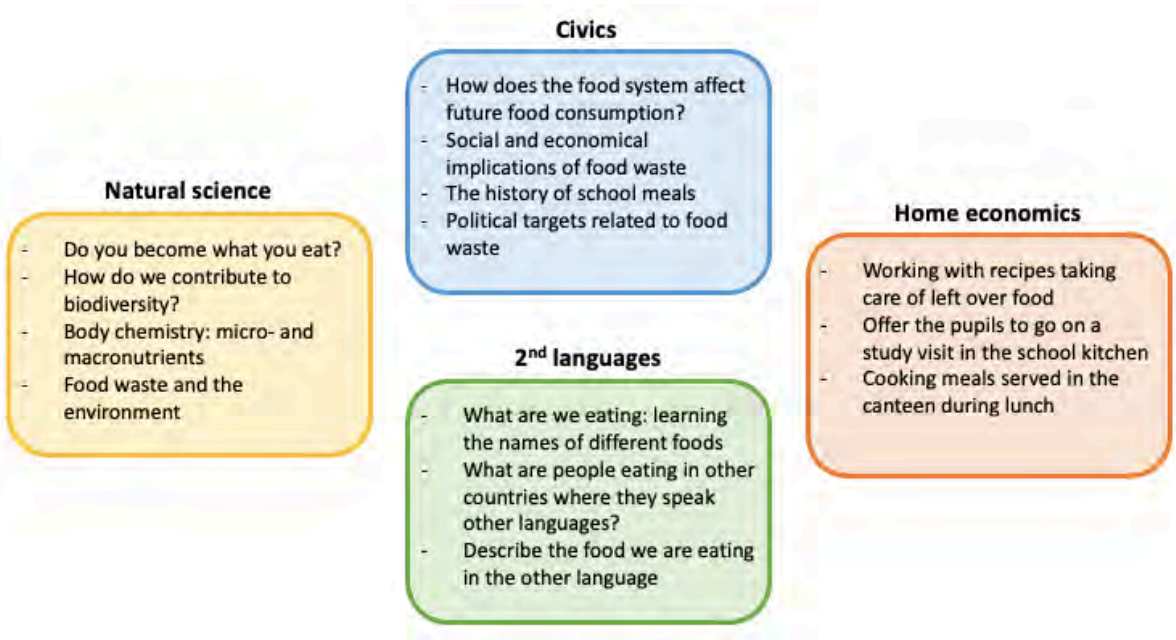

Figure 6. An example of suggested themes and topics that could be embedded in different school subjects in the educational meals concept.

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Austria

Participants

For this project 12 different schools were selected in several parts of Austria. The preferred school setup was schools that included classes for cooking and serving in their curriculum. This would ensure a basic knowledge of food preparation among the pupils and the necessary infrastructure to properly organize the planned food waste workshop. Most of these school types already considered measures against food waste (e.g. refrigerators to store surplus lunch meals for later consumption). Other types of schools were also contacted including international schools and business schools to increase the variety of pupils reached and informed.

Due to the lack of a centralized system of food supply in schools in Austria, every school had a different way of providing lunch meals for their pupils. Some schools had the meals provided by the pupils themselves for educational purposes, several other schools contracted external companies to provide lunch. A few schools were boarding schools, which had their own chefs for lunch and dinner preparation.

The students taking part in the LOWINFOOD Workshops were around 13 to 16 years old and their cooking skills ranged from very basic to intermediate. Most of them were already instructed by their teachers about the problems of food waste and participated in smaller group projects on the topic.

Baseline measurement

The participating schools were informed that they had to accumulate data about their amount of food waste at least one month prior to the date of the workshop and one month after. Due to the restrictions during the COVID-19 pandemic the Austrian project schedule had to be postponed and implementation could only start in October 2022.

All participating schools were individually responsible for the data gathering process and supported by the team of the Austrian Institute of Ecology if necessary. At the start of the process, the responsible staff got detailed instructions from the researchers of AIE. Due to the different organisational structures within each school, this task was executed slightly different in every school. Some schools included the data gathering process in a school project and the pupils were responsible for it. In other schools the teachers or the kitchen staff took over this responsibility in addition to their regular tasks.

Teaching material

Additional teaching materials were not issued beforehand but the teachers were instructed to include the topic of food waste into their curriculum, so the pupils could gather initial information about it. The Austrian team received a lot of positive feedback about this topic because several schools had already implemented measures against food waste in the school or implemented information about the topic beforehand. The opening presentation for the school workshop was then updated according to the level of education of the pupils in every different school. This would ensure that the pupils had enough knowledge about food waste and could share it properly throughout their environment (parents, friends, …). The teaching materials used in Austria can be found in the Appendix E.

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Figure 7. Delicious food cooked by using all edible parts and with as little waste as possible.

Figure 7 showcases a meal which was cooked within an Austrian LOWINFOOD workshop. Every edible part of the ingredients was utilized and eaten, to demonstrate how valuable food is. The utilization of pumpkins with edible peelings for example should encourage the participating pupils to think outside the box and gather additional knowledge concerning food preparation.

Demonstration phase

Subsequently to the pre-demonstration phase, the educational concept activities were embedded into the curriculums of the participating schools. Food waste quantities were then registered for the evaluation of the efficacy of the task. Due to differences in the organisational structure of both school education and school meals, the approaches taken to implement the educational concept in Sweden and Austria varied to some extent between the two countries. A more detailed explanation of the prerequisites for each country and of the activities carried out as part of the educational concept is provided separately below.

Sweden

In Sweden, the holistic educational concept was carried out as educational meals intervention for ten consecutive weeks, at minimum once a week (in total, a minimum of 10 teaching occasions) in each of the five schools during the spring semester of 2022. Furthermore, prior to the start of the intervention involving teachers and schoolchildren, the kitchen staff of the participating schools was invited to a workshop of their own. The workshop consisted of an online lecture and a joint discussion regarding food waste and its prevention in school canteens and was organised by two food waste researchers.

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In two of the schools, the innovation was implemented throughout all grades, whereas in the other three schools, the innovation was implemented in a few selected grades since resources could not be found to implement it in all of them (Table 1). Due to Covid-19 the teaching staff resources were limited even though primary schools were still operating in Sweden. The implementation of the innovation involved teaching pupils about e.g. food waste during regular lessons and during school meals by applying different materials and methods in workshop formats. The general approach for the teachers was to give lessons teaching about food, food waste, health, and the environment prior to mealtimes, and then link the learnings to the school meals by talking about the topics during and in class after the meals (Figure 8). Before the meals, the teachers could for instance present the menu of the day and talk about the cultural origin of the specific meal or explain how the school meal, in general, relates to the sustainable development goals (SDGs). This could then during the meals be followed up by the teachers speaking about the benefits of the school meal, and encouraging the pupils to take responsibility for their own health and the environment through their choice of food. After the meals when the pupils were back in the classroom, the teachers could ask the pupils what they thought about the meal or if any questions came up during the meal that they would like to discuss.

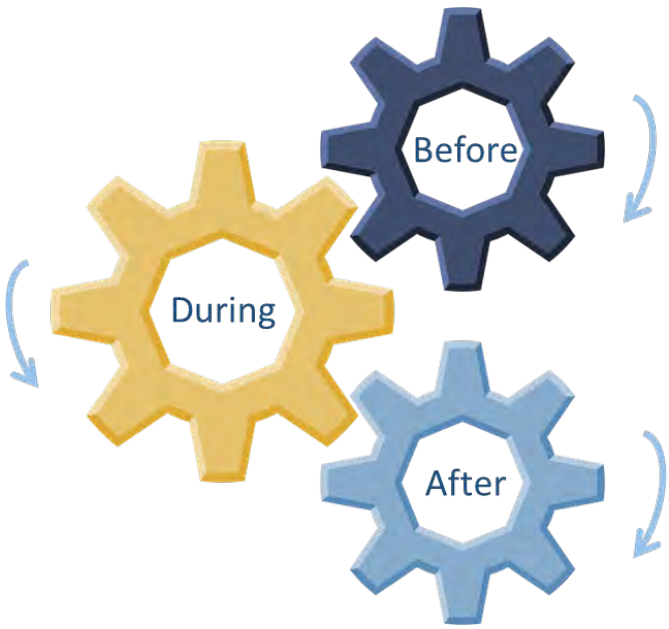

Figure 8. A general approach on how teaching was linked to school meals.

Approach and applied materials

The educational concept was integrated into the teaching primarily as a theme in a workshop format within civics, and natural science subjects, but it was also applied during e.g. lessons on second languages and home economics. Please see for example how it was applied during English lessons in Figure 9. Further examples can be found in Appendix D. To support the teachers in their planning of lessons, a joint document was created where links to different websites and teaching materials were collected as explained earlier. This included links to governmental websites, educational film clips, and

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web pages of different organisations with connections to food and food waste (Appendix C). In addition, another joint document was created with tips on more subject-specific themes, i.e., how the teachers could integrate food and food waste as a topic into the regular school subjects (Appendix B).

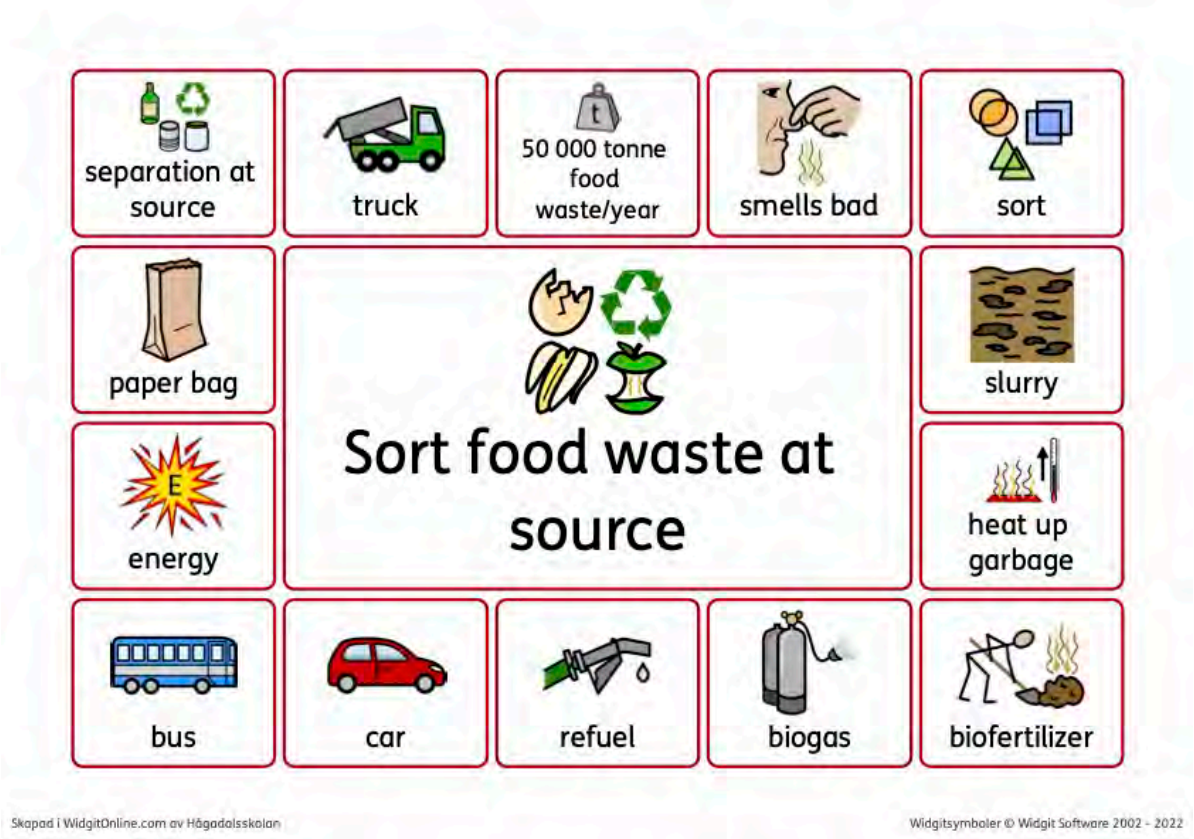

Figure 9. Example of how the educational concept was integrated into the teaching as an English lesson.

In order to keep track of the topics and themes that were taught and discussed during lessons, the teachers were asked to keep journals to document the activities they had done on each teaching occasion and what teaching aids they had used. All teachers had access to the journal via the Teams channel, and could therefore share experiences and get inspiration from what their colleagues had done and were, thus, provided with an extra possibility to get ideas and motivation for activities they could undertake themselves in their coming teaching occasions. Table 3 below provides an overview of the journal including activities performed as part of the educational meals innovation in Sweden.

Table 3. Overview of the journal notes by teachers specifying the teaching activities included in the educational meals innovation in Sweden.

School	School subject	Activity
1	Swedish as 2nd language	Worked with a newspaper article about dumpster diving
	Civics	Read and discussed 3 articles about food waste, dumpster diving and what retailers waste
	Civics	Discussed how much food is wasted in the school canteen
	Civics	Film: “Food Waste” in the series “From here to sustainability”

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	Home economics	Planned and cooked a meal with regards to sustainability + an evaluation of the meal with questions related to sustainable food consumption
	Homeroom teaching	Discussed why quite much food was wasted in the canteen when a popular meal (tacos) was served
	Civics	Study visit and workshop at *Pumphuset* (an old water pumping station)
	Swedish as 2nd language	Wrote a text and discussion about veganism
	Civics	Group work about food production
	Civics	Read and discussed a newspaper article about concrete measures for sustainable development on an individual level
	Civics	Conceptual dictionary regarding sustainable development
	Civics	Food label guidance
	Civics	Tested the climate calculator to calculate climate footprint
	Natural science/civics	PFAS and toxins in food. Why are there remains of toxins in food?
2	Natural science	Discussed the difference between food waste and food loss
	Natural science	Film: "The food we eat" + discussion
	Natural science	Film: "Buddy with the body – why you should eat fruit and vegetables" + discussion and assignment to draw your own 'five a day'.
	Natural science/civics	Film: "What happens with the recycling?"
	Natural science/civics	Film: "The farmers children" ep. 2
	Natural science	Film: "The boys from Viken ending food waste" + discussion on what new dishes you can make from left-overs and a quiz about food waste, left-overs and best-before dates
	Natural science	Watched a kids news programme about food waste + discussed food – why we need it, why sugar is bad, why breakfast is important, tips on good snacks, favourite dishes
	Natural science/civics	Film: "The farmers children" ep. 3 & 4
	Natural science/civics	Looked at the content of the website "Matsmart" (a site where food not meeting the standards of retailers' is sold at a lower cost)
	Natural science/civics	Watched and discussed 3 short films from a consumer cooperative society
	Natural science/civics	Film: "The farmers children" ep.1
3	Natural science	Film: "The boys from Viken ending food waste" + discussion about the difference between food waste and food loss
	Natural science/art/ English	Discussion about fruits and made a poster with fruits for the canteen + learning the English word for the fruits
	Natural science	Watched film clips about health + discussion about healthy and less healthy foods
	Natural science/ geography	Discussion about a balanced diet and what should be included as well as discussing lunches in other countries
	Natural science	Watched a film and discussed proteins + creating a poster about proteins to place in the school canteen

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	Natural science	Read an article about food that is reused instead of discarded and created own “apps” about food waste
	Natural science	Watched film clips about food; carbohydrates, proteins, and vitamins + drew own plates with food according to recommendations
	Natural science/art	Made vegetable and fruit portraits + a hidden words game with words discussed during the lessons related to the innovation
	Natural science	Talked about the origin of food; from fish to fish-stick, from cow to minced beef and cheese etc. What animals are usually found at the farm and from which animal comes what food?
	Natural science/civics	Talked about natural resources; how and why to stop wasting them.
4	Natural science	Film: “Buddy with the body – why you should eat fruit and vegetables” + assignment to draw your own ‘five a day’ and discussing where they come from and if they can be produced in Sweden
	Natural science	Talked about diets and macro- and micronutrients + talked about food waste in general and watched a film about how to eat climate friendly
	Natural science	Played an online game about food waste, biogas etc
	Natural science/geography	Film: “The food we eat” + discussion about food origin
	History	The school meal during the last 150 years + discussion about agricultural history
	Home economics	How much does a meal cost? Discussion about what is in your favourite meal and how much it costs
	Civics	What school meals look like around the world and how food is not a guarantee for everyone
5	Civics	Watched a film about what happens with the recycling
	Natural science	Talked about food waste in general
	Natural science	Watched a film and talked about the huge amount of bananas that gets wasted + about the wastage of food in general

Besides teaching in classes, the educational concept was, thus, also implemented in the school canteens as a teaching occasion during mealtimes in order to connect the workshops or lessons carried out in the classroom to an environment, where the food waste issue was more tangible. In the canteens, different approaches to educating the pupils on food waste were applied. To start off with, table talkers with information about food waste were placed on canteen tables and by the buffet. They included information about both quantities of food waste and measures on how food waste can be reduced (Figures 9 and 10). Since the innovation targeted pupils from the age of six, the signs were made in a simplified manner with short texts supported by illustrations that presented the information in a more tangible way for the younger pupils. The information signs in the canteens also provided a learning opportunity for pupils in those years not having the educational concept implemented in class which meant that in one way all pupils at the schools were at least somewhat involved in the innovation.

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Figure 10. Table talkers on canteen tables waiting to inform the schoolchildren about the amount of food waste generated annually.

Figure 11. Table talker on a canteen table asking the schoolchildren how much food they can eat.

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The teaching during meals also included the teachers and kitchen staff communicating with the pupils about the meals and food waste. The teachers, who sat together with the pupils during the meals, sought to continue discussions from previous lessons as a way for connecting the education to the pupils' own experiences to make the learnings more tangible.

Austria

To increase the curiosity of pupils and students and to further deepen the already gained knowledge of the topic food waste, a workshop-concept was created. This workshop consisted of two parts. The first part included a presentation, which provided theoretical information and data about food waste, how it is created and what everyone can do to decrease the accumulating masses of it. After attending this presentation all participants should have at least a basic level of knowledge gathered. The content of the presentation would also be adapted if the topic food waste was already included in the schools' learning contents to build on the different levels of knowledge. As the second part, and to make the workshop more interesting for the pupils, a several hour-long cooking seminar was included. With the support of a Michelin-Star chef, the pupils of a school would try to include the new or already existing knowledge into the cooking class. This would help to connect the gained theoretical knowledge with a practical orientation. All participants were encouraged to take part in the cooking process to learn new skills and of course have fun too. The prestige of the Michelin-Star chef helped greatly to evoke the interest of schools and the pupils. Decreasing the amount of food waste should be associated with a fun event and an unparalleled experience.

Approach and applied materials

The starting presentation of the workshop included important information about food waste. This started with the definition of food waste. As a next step the United Nations' SDG´s (Sustainable Development Goals) were included to establish a connection between this and other highly important topics. To further deepen the understanding of the huge amounts of food waste, which were produced in Austria, several figures and facts were included in the presentation. The statements were further supported by pictures of food waste in the industry or at restaurants. Several possible reasons why so much food is wasted by households, the industry and the gastronomy were also included. In addition to this information, possibilities and techniques were presented to use food less wasteful, for example, the correct understanding of the *best before* and *use by* dates of products.

Concerning the cooking part of the workshop, the participating chefs would talk about personal experiences in the gastronomy kitchens and their restaurants. This information should include actions they take to decrease the amount of food waste produced daily. Additionally, everything of the ordered basket of goods should be used in the cooking process. This included for example the bones for cooking a soup or the liquid of canned chickpea as vegan alternative to egg white. After the lesson, the pupils should enjoy the self-prepared food. If too much volume was produced the food should be taken home. This way parents, siblings and other family members can be informed about the project and about possibilities to avoid food waste. All participants are also encouraged to spread the newly gathered information to their family and friends.

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Figure 12: Chicken soup where all edible parts of the ingredients have been utilized.

Outcomes of the demonstration phase

According to the survey results that were carried out for the evaluation of innovations, the overall results from the demonstration phase of the educational concept showed that the innovation was well received by the participants. An explanation of the experiences of participants for each country is provided separately below, and a more detailed description will be provided in the deliverables of WP1.

Sweden

All of the five participating school units in Sweden succeeded to follow the plan of the task. In general, the teachers reported the innovation to be rewarding and a good tool for teaching the pupils about the food waste issue. The materials used were especially well received by the younger pupils who found the innovation and the lessons and workshops to be very interesting. Most of the participating schools reported being interested in continuing with the innovation also after its completion because of its usefulness and that it is an important subject that both pupils and teachers find interesting. However, in some of the schools, the teachers active in the implementation of the innovation explained that they probably would not like to continue with the innovation after its completion due to its requirement for extra planning and work. Although, at the same time, they also reported that they would like to see the subject of food waste, or food systems in general, incorporated into the ordinary curriculum. They

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found the subject of innovation important, and interesting to teach, and having it included in the curriculum from the start would enable them to dedicate more time to the subject.

Austria

The innovation was overall very well received. All participating schools were happily willing to introduce the topic food waste into their curriculum because they understood the importance of the topic even though it sometimes put a significant burden on their timetables. Several schools already had a main emphasis on food and food waste in their classes and wanted to deepen the existing knowledge with the LOWINFOOD workshop. The executing team from the AIE was asked several times if it would be possible to implement the workshop as a reoccurring event into the curriculum. However, some of the schools that didn´t participate stated, that they do not need the workshop because they are already aware of the food waste problem and teach their pupils in class.

Learnings and recommendations for future application

Due to societal effects following primarily the Covid-19 pandemic, the task was unfortunately inhibited to comply with the objectives regarding the number of school units involved in the task. However, despite the encountered issues, the units that did participate provided good insight into how the educational concept can be integrated into the education of elementary and secondary schools pupils as a way to reduce food waste.

The demonstration conducted in the two countries showed that although the practical activities were adapted to the local settings and therefore organized in different ways, they both contributed to the same objective providing common results.

The main challenges of implementing the innovation in Sweden were for the teachers to find time to plan for the lessons and to find time to fit the workshops into the required standard content of the curriculum. This resulted in hesitation among some of the teachers on whether they would like to continue with the innovation and whether they would recommend it to other schools, even though they found teaching the topic rewarding for its purpose. A central improvement in the application of the educational concept is therefore to make it easier for teachers to include the educational activities and workshops into the standard education. Creating a bank of complete lessons that relate to different school subjects and themes in the curriculum could therefore be a measure to implement the educational concept and workshops about food waste in an easier manner. However, the overall concern of not finding time to plan for lessons or to fit it into the regular curriculum may be difficult to solve as long as the concept is implemented as an external teaching resource.

Similar challenges were faced in Austria. Even though the contacted schools were seriously interested in the topic and the opportunity to provide a workshop with a Michelin-Star chef for their pupils, the amount of time needed to organize the project was often too high. In some cases, the teachers did not have enough capacity to integrate the workshop into their curriculum. On the other hand, several schools are already teaching about the issue of food waste, therefore the first step in the right direction has already been taken.

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Conclusion

The innovation was successfully implemented in the participating schools. However, even though the concept had a high degree of flexibility and could be adapted in terms of ambition and content for each teacher, there was still not enough time for many of the teachers to work on this topic. Therefore, the main challenge is not to produce the learning material but to actually get the concept implemented in schools that already have a curriculum with small room for adjustments.

Due to the less centralized school system in Austria as compared to Sweden, it would need ongoing cooperation with a school to leave a long-lasting impression on the pupils. The schools were very interested in passing knowledge about food waste and how to avoid it to the pupils. Nevertheless, an ongoing process would help to anchor the gained knowledge.

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Appendix A: Information regarding the educational meals concept

Information om projektet LOWINFOOD

Delprojekt: Måltidspedagogik

Bakgrund LOWINFOOD

LOWINFOOD är ett forsknings- och innovationsprojekt för att minska matförluster och matsvinn i EU genom att demonstrera innovativa lösningar som involverar flera aktörer längs hela värdekedjan.

12 länder är med i projektet däribland 27 aktörer från bland annat universitet, forskningsinstitutioner, nystartade företag, organisationer och företag inom livsmedelsbranschen.

Det huvudsakliga målet med projektet är att tillsammans med aktörer i livsmedelskedjan utforma värdekedjor med lågt matsvinn genom att stödja demonstrationer av innovationer inom frukt- och grönt, bageri, fiskeri och i privat- och offentlig konsumtion.

Projektet är uppdelat i 5 arbetspaket där varje arbetspaket har flera delprojekt.

Uppsala kommun är med i arbetspaketet nr 5, *Offentlig konsumtion,* och i delprojekten:

5.3 Matsvinnsvåg: en teknisk innovation för att öka barnens medvetenhet om matsvinn i skolrestaurangen. *Företaget bakom matsvinnsvågen är Matomatik, och medverkande är ISUN (Tyskt Universitet), SLU (Sveriges Lantbruksuniversitet), UPP(Uppsala kommun), AIE (Österrikiskt Institut)*

5.4 Ett utbildningskoncept för att minska matsvinnet i skolorna. *Projektledare är SLU, och medverkande är AIE (Österrikiskt Institut), MATO (Matomatik), UPP (Uppsala kommun).*

Läs mer på Lowinfood.eu

Bakgrund Måltidspedagogik och pedagogiska luncher

Vi börjar med att förklara begreppen pedagogisk måltid och måltidspedagogik. En pedagogisk måltid är enligt Skatteverket *”en fri eller subventionerad måltid… om personalen vid måltiden har tillsynsskyldighet för barn under skolmåltid, eller i samband med s.k. pedagogisk måltid.”*

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Måltidspedagogik är lärandet om och med mat och måltider integrerat i den pedagogiska verksamheten med stöd i såväl läroplanen som i de nationella folkhälso- och miljökvalitetsmålen[2].

Skolverket skriver istället om måltiderna som ett *pedagogiskt verktyg:*
Använd måltiderna som ett pedagogiskt verktyg
Måltiderna är ett tillfälle för elever och lärare att mötas och prata med varandra, och de kan också vara ett bra tillfälle för eleverna att lära sig saker. Till exempel kan man diskutera hur transport av livsmedel och matsvinn påverkar klimatet, vad man äter i olika kulturer och inom olika religioner, vad kroppen behöver för att må bra eller vad man äter idag jämfört med förr i tiden.[3]

Det går bra att använda sig av alla begrepp, men vi behöver ha en gemensam syn på innebörden.

Innovation: ett utbildningskoncept
Kan ett utbildningskoncept i måltidspedagogik minska matsvinnet i skolorna?

Syftet är att i Uppsala kommuns skolor testa att väva in ämnen runt mat och miljö i de ordinarie lektionerna för att öka medvetenheten hos elever kring matsvinn.

Konceptet bygger inte på ett färdigt lektionsmaterial. Tanken är att väva in ämnet i den redan planerade undervisningen, se tips i dokumentet *Ämnesspecifika teman*. I dokumentet *Utbildningsmaterial* finns tips på webbsidor där ni kan hämta inspiration och filmer/material.

Genomförande

Läraren ska vid 10–15 lektionstillfällen väva in matsvinnsrelaterade ämnen i undervisningen.

10 veckor. (start enligt överenskommelse)

Läraren ska föra loggbok över de 10-15 aktiviteterna.

Ni har tillgång till en gemensam Teams-kanal där ni kan hitta information, dokument och loggboken som vi nämnt i texten.

I Teams-kanalen kan ni även ge varandra tips i chatten, eller ställa frågor.

Måltidspersonalen kommer under projektet få utbildning i hur de kan minska matsvinnet i köket.

Bra att tänka på

Börja med att förklara begreppen matsvinn och matavfall för eleverna. Ett bra material finns på hemsidan www.smartmedmat.se

[2] Barns matvanor ur ett sensoriskt och pedagogiskt perspektiv. Hanna Sepp, Karin Höijer och Karin Wendin
[3] Skolverket

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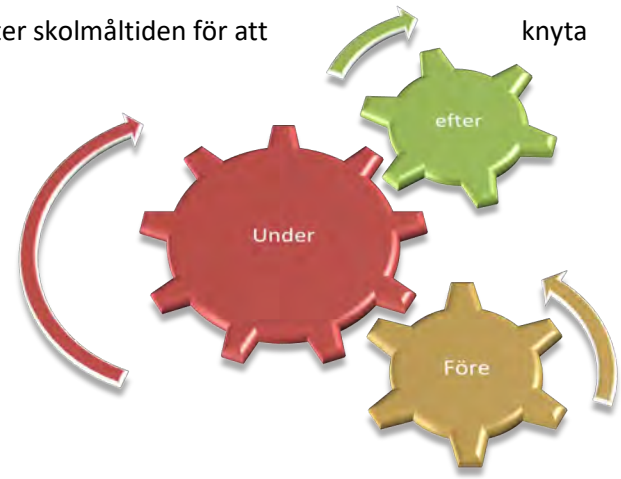
Projektet bygger på tät kontakt med köket. Från köket kan ni få senaste veckans matsvinn i kg som kan användas i bla matematiken. Ni kan även be att få visningsmaterial som frukt och grönsaker.

Före, under och efter måltiden

Prata gärna om mat och miljö innan, under och efter skolmåltiden för att knyta ihop lektionstillfällena till måltiderna.



Före

Presentera dagens meny

Medvetandegör eleven att måltiden är en del av elevens lärande

Medvetandegör eleven om hur de globala målen länkar till skolmåltiden

Meddela om klassen är borta eller behöver ändra sin lunchtid

Under

Ta ansvar för den gemensamma måltidsmiljön

Var relationsskapande och tillsynsansvarig

Prata positivt om maten och måltiden

Äta i elevernas sällskap och vara en förebild. Sitta i gemenskap, uppmuntra och inspirera.

Uppmuntra eleverna att ta ansvar för den egna hälsan och vår gemensamma miljö i valet av mat.

Efter

Fånga upp diskussioner och synpunkter knutna till måltiden.

Utse en representant till skolans Måltidsforum (fd matråd)

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Appendix B: Subject-specific themes

Historia
Vad åt man förr?
Hur producerade och tillagade man mat? Hur har samhället och människan påverkats av vad vi producerar och äter?

Naturvetenskap
Blir man vad man äter? Hur bidrar vi till biologiskmångfald? Mikronutrienter och kroppens kemi, ekologiskt perspektiv på hållbarhet, fotosyntesen, skillnaden mellan klimat och miljö.

Samhällsvetenskap
Hur påverkar livsmedelssystemet framtidens matkonsumtion? Social och ekonomiskt perspektiv på hållbarhet. Skolmåltidens konsekvenser och historia från 1800-talet till idag. Globala mål kopplat till kommunalpolitiska mål.

Matematik
Temperaturer, förhållanden, diagram, måttenheter. Vad kostar maten vi äter, hur mycket skolmat går det åt på ett år, vad kostar en måltid för varje elev? Hur mycket skulle Co2 utsläppet minska om alla skolor gemensamt minskade sitt svinn med en viss procent? Hur påverkas miljö och ekonomin om vi byter ut animaliskt protein tre dagar i veckan till växtbaserade proteiner?

Svenska
Sätt ord på dina matupplevelser, beskriv matminne, smak, namnge våra livsmedel.

Engelska
Vad är det vi äter? Hur äter man i de kulturer med engelska som modersmål?
Idrott och hälsa
Mat kopplat till prestation, våra makronutrienter – fett, proteiner, kolhydrater.

Geografi
Varifrån kommer maten, hur långt har den rest och hur kom den hit till att börja med?

Hem- och konsumentkunskap
Hem- och konsumentkunskap är det ämne som kan ämnes- integreras med alla övriga ämnen ovan. Ämnet har en unik möjlighet att integreras med måltidsuppdraget och de pedagogiska måltiderna. Låt eleverna arbeta med recept för att utveckla och/ eller laga den mat som skolrestaurangen serverar. Bjud in eleverna att göra praktik i köket och låt det bli en del i hem- och konsumentkunskapsbedömningen.

Religion och kultur
Vad skiljer oss åt, vilka seder delar vi och hur har vi påverkats av varandra?

Källa: Handbok för schemalagda måltider (Måltid Sverige)

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Appendix C: List of teaching materials applied in Sweden

Utbildningsmaterial

Matavfall och återvinning

Vad är matavfall? Vad händer med matavfallet?

Smart med mat är en webbplats för elever som handlar om mat, matavfall och hur man gör biogas på det. Inkl Lärarhandledning.

- www.smartmedmat.se

Lektionsmaterial inom miljö, hållbar utveckling, återvinning och avfallsminimering.

- Skola | Sysav – tar hand om och återvinner avfall

Uppsala Vattens skolwebb

- Skola | uppsalavatten.se

Filmer, information och skolmaterial om matsvinn

- Släng inte maten - Konsumentföreningen Stockholm (kfstockholm.se)

Material om matsvinn

- Svinnrik – material för HKK-lärare (livsmedelsverket.se)
- Tips för minskat matsvinn (livsmedelsverket.se)
- Talar du svinniska? (livsmedelsverket.se)

Naturvårdsverket Matavfall och matsvinn

- Matavfall och matsvinn (naturvardsverket.se)
- Elevhäfte: FULLTEXT02.pdf (diva-portal.org)

UR play

- Vad händer med återvinningen?: Matavfall | UR Play (F-3)
- Kjellsorterat: Matavfall | UR Play
- Hållbar utveckling & Agenda 2030 | Serietips om klimat och miljö | UR Play
- Matchocken | UR Play
- Ade och klimatpionjärerna: Skandinavien | UR Play

Från jord till bord

Följ matens väg från där den odlas/växer till tallriken. Dyk ner och se vad som händer längs vägen.

- https://www.bondeniskolan.se/

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Mat för alla sinnen

- https://www.livsmedelsverket.se/bestall-ladda-ner-material/sok-publikationer/broschyr/mat-for-alla-sinnen-sensorisk-traning-enligt-sapere-metoden

Hela världens skolmat

- Pedagogiskt material - Arlas Kundwebb
- Skolmatens historia - Stockholmskällan

Vår planet

Hur påverkar maten vi äter klimat och miljö?

- https://www.wwf.se/dokument/our-planet-skolmaterial-var-planet-pa-hallbar-vag/

Eleverna får upptäcka bin och pollinering och kopplingen till jordbruk och matproduktion.

- Tacofredag utan bin? (4-9) - Naturskyddsföreningen (naturskyddsforeningen.se)
- Klimatkocken (4-9) - Naturskyddsföreningen (naturskyddsforeningen.se)

Inflytande/ måltidsforum (matråd)

- Måltidsforum (uppsala.se)

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Appendix D: Examples of teaching material applied in Sweden

The following figures are examples of the teaching material applied during the holistic educational concept in Sweden.

Figure 1. Material for teaching on how to make meals out of leftovers (source: smartmedmat.se).

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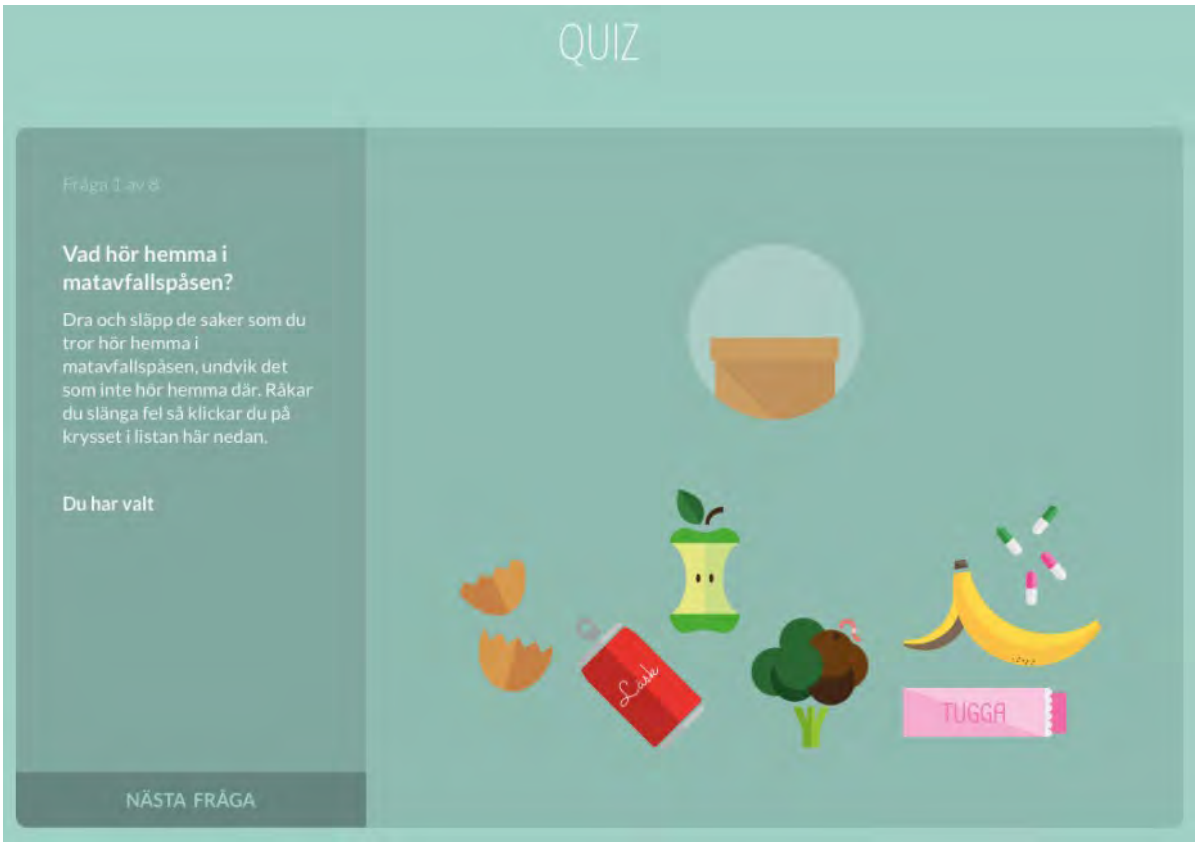

Figure 2. Quizz on items that can be disposed as biodegradable waste. Source: smartmedmat.se

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Figure 3. Educational material in healthy eating (source: ICA – "Buddy with the body").

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Kompis med kroppen!

HEJA HEJA!

Sida 2

Kan klassen säga exempel på frukt, bär och grönsaker?
Vad är skillnaden mellan dessa?

Frukter bildas ur en blomma. Efter pollination och befruktning, när delar av blomman och pistillen vissnat, växer fruktämnet. Tomater, gurka, paprika och avokado är botaniskt sett frukter, även om vi kallar dem grönsaker. De är inte lika söta som andra frukter. Många frukter växer på träd och buskar.

Grönsaker är ofta delar, till exempel roten eller blomman, av tvååriga växter, som skördas redan efter den första växtsäsongen.

Bär är en sorts frukt. Frukter innehåller en växts frön, och när växtens blommor blivit pollinerade så vissnar resten av blomman och det som blir kvar och växer sig större är frukten. Det finns många olika typer av frukter, och en av dem är bär. Skillnaden som gör att bär, som faktiskt också är frukter, inte kategoriseras tillsammans med exempelvis äpplen och apelsiner är för att de dels är fröbärande frukter som växer "utanför" blomman. Exempel på detta är gurkan. Kanske inget man plockar i skogen och bakar en paj på. Men gurkan är faktiskt också ett bär.

Sida 3

Vad är det som är så nyttigt? Frukt och grönsaker är rika på fibrer och fattiga på kalorier. De innehåller nyttiga vitaminer, mineraler och antioxidanter som behövs för att vi ska hålla oss friska och må bra. Näringen består ofta av kolhydrater (socker och stärkelse). Bönor och ärter innehåller även protein. För många frukter och grönsaker gäller att ju färgstarkare desto nyttigare.

Till skillnad från kalorifylld mat som pizza och pommes, som har fullt med snabba kalorier, ger frukt och grönsaker energi som varar längre.

5 om dan! Varför då?
Forskarnas rekommendation är att vi ska äta frukt och grönsaker minst 5 gånger varje dag. Är du under tio år ska du få i dig ca 400 gram. Och är du över 10 år räknar man med 500 gram. Som du kan dela upp hela dagen. Alltså varje måltid, inklusive mellanmålen ska alltså innehålla frukt och/eller grönsaker. Det är enkelt och lätt att komma ihåg, 5 om dan!

Så sammanlagt bör vi få i oss minst ett halvt kilo frukt och grönt varje dag, vilket motsvarar till exempel 3 nävar grönsaker och 2 frukter.

Sida 4

Syftet med denna sida är att inspirera barnen till att man kan äta frukt och grönsaker på fler än ett sätt. I maten, mixat i en juice eller smoothie eller på en macka. Fråga klassen efter fler exempel på hur man kan äta frukt, bär och grönsaker till de olika målen under en dag.

Kan klassen ge exempel på några maträtter som innehåller frukt, bär eller grönsaker? Exempel på maträtter: smoothie, bärpaj, pizza, köttfärssås, fruktsallad, falafel, linsgryta, marmelad, sylt, moussaka, lasagne.

Sida 5

Tanken här är att du ska berätta hur ni i klassen kommer lägga upp arbetet med Kompis med kroppen. Hur ni kommer att använda arbetsboken. Som att man kan göra den helt själv, tillsammans med en eller flera klasskompisar. Att ni kan gå igenom hela boken tillsammans sen.

Roliga övningar att göra med en kompis.

Sida 6

Till den här bilden kan du fråga klassen ifall de vill göra ett butiksbesök. Om de vill så bokar du ett butiksbesök på egen hand hos en närliggande ICA-butik. Fast ha i åtanke att alla butiker kanske inte har möjlighet att ta emot en hel klass.

Om ni ska göra ett butiksbesök så är det bra och roligt ifall klassen tänker ut frågor i förväg och gärna skriver ner dem. Är det svåra frågor hade det varit snällt om du skickar dem till butiken i förväg. Så de har en möjlighet att ge ett så utbildat svar som möjligt.

Figure 4. Information folder for teachers for an exercise on healthy foods (source: ICA – "Buddy with the body").

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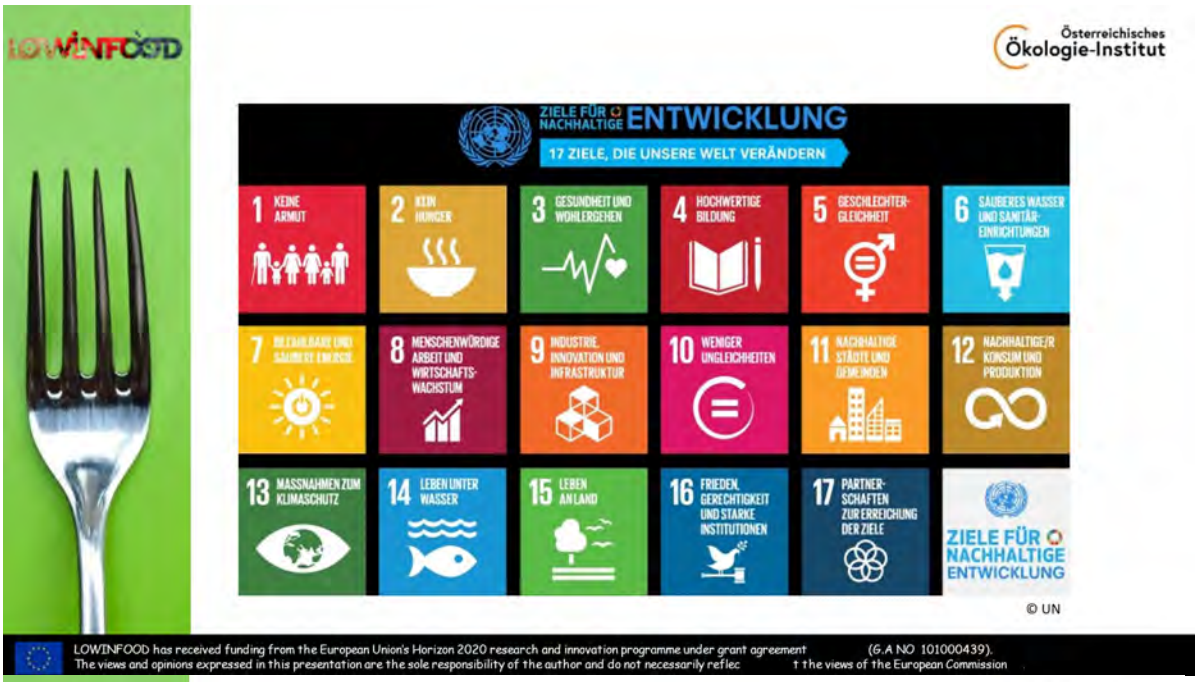
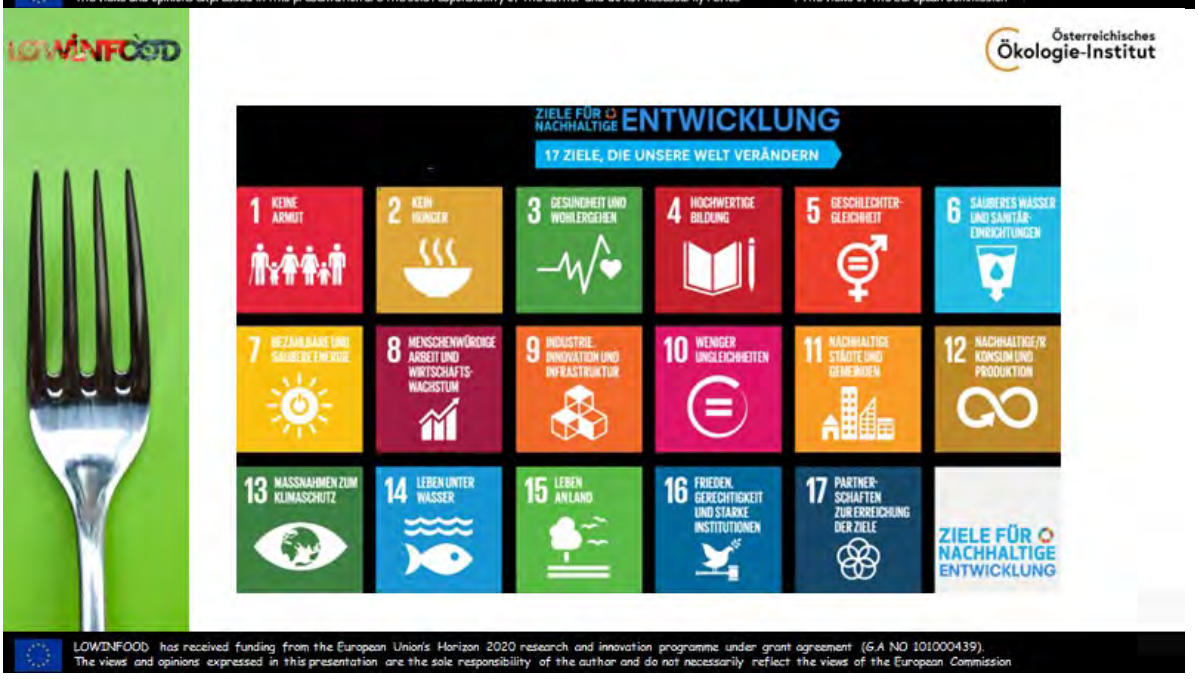
Appendix E: Examples of teaching material applied in Austria

The following figures are examples of the teaching material applied during the holistic educational concept in Austria.





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Was sind nicht vermeidbare Lebensmittelabfälle?

Nicht vermeidbare Abfälle, die entstehen und für den menschlichen Verzehr nicht geeignet sind (z.B. Knochen, Blut, Schlachtabfälle, Sauermolke, Pressrückstände, Bananenschalen, ...). Diese müssen entsprechend weiter verarbeitet, verwertet oder entsorgt werden.

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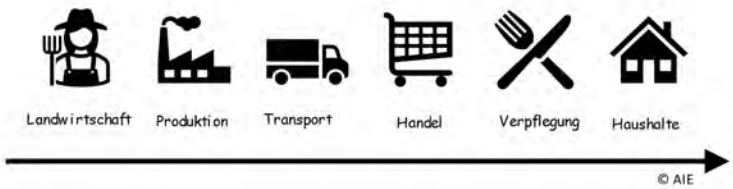
Was steckt hinter der Lebensmittel -Wertschöpfungskette?



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Der Weg unserer Lebensmittel von der Landwirtschaft bis auf unseren Teller wird als Lebensmittel-Wertschöpfungskette bezeichnet.

In jedem Schritt dieser Kette entstehen LebensmitteAbfälle.

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Zahlen:
Größenordnungen und Abschätzungen

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1,3 Milliarden Tonnen weggeworfene Lebensmittel pro Jahr weltweit

- **Ein Drittel der weltweit produzierten Menge**
- **In Europa etwa 280- 300 Kilogramm pro Person**

1.300.000.000 †

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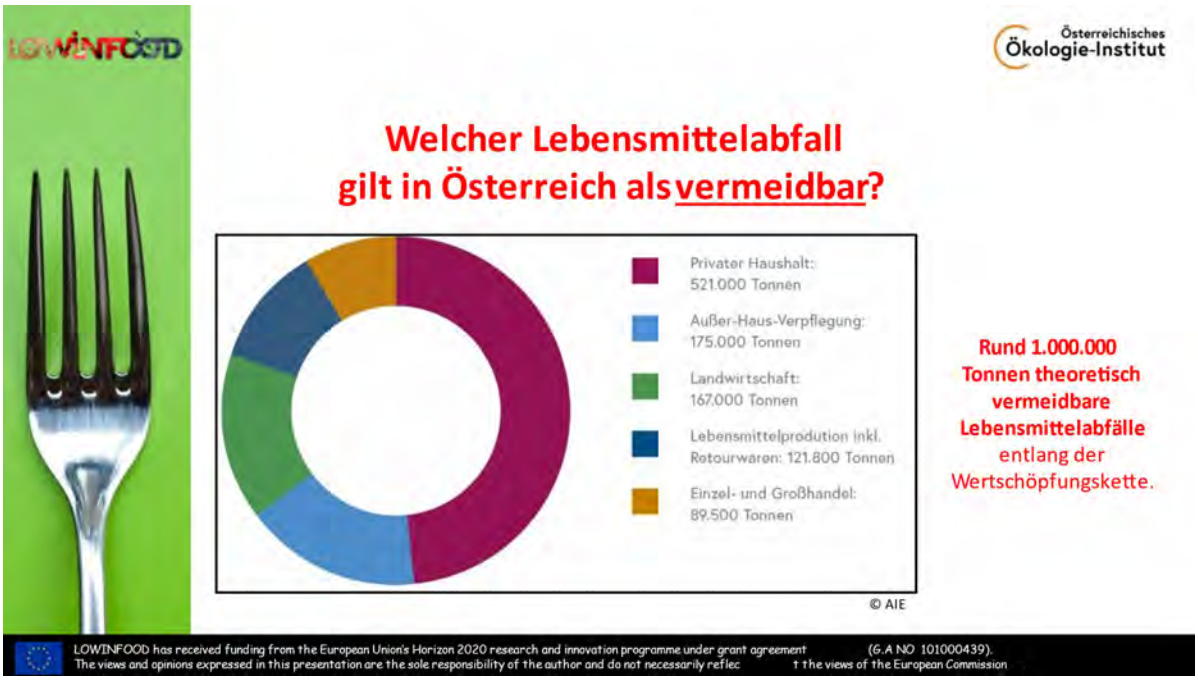

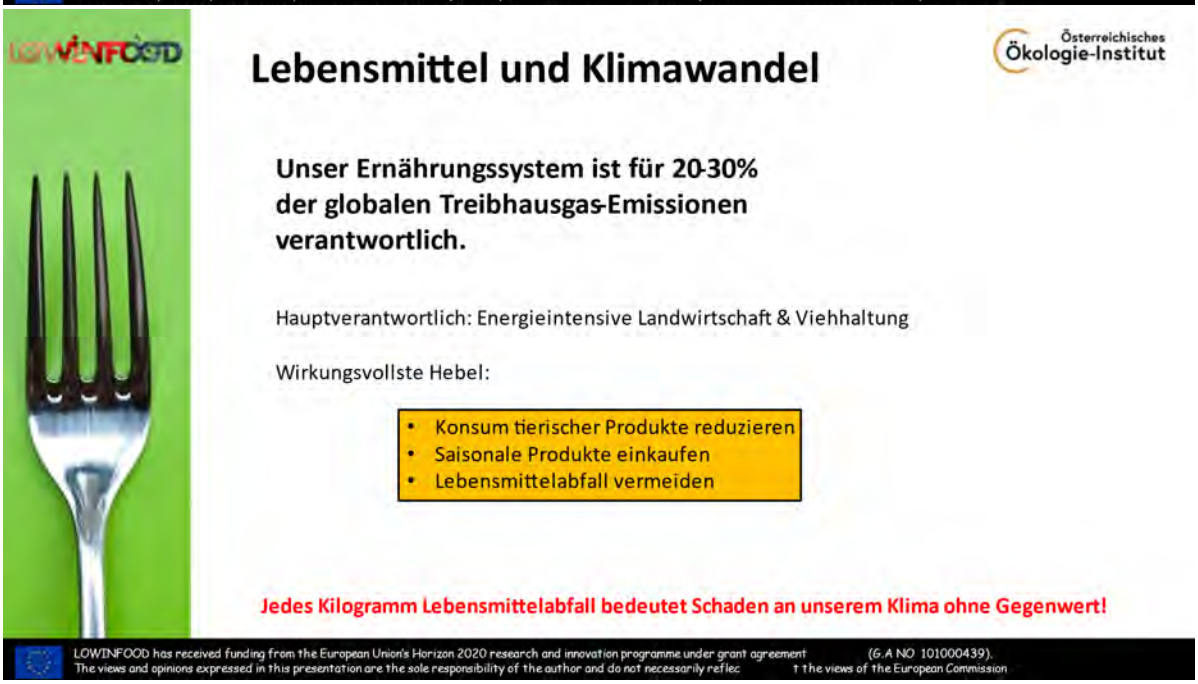

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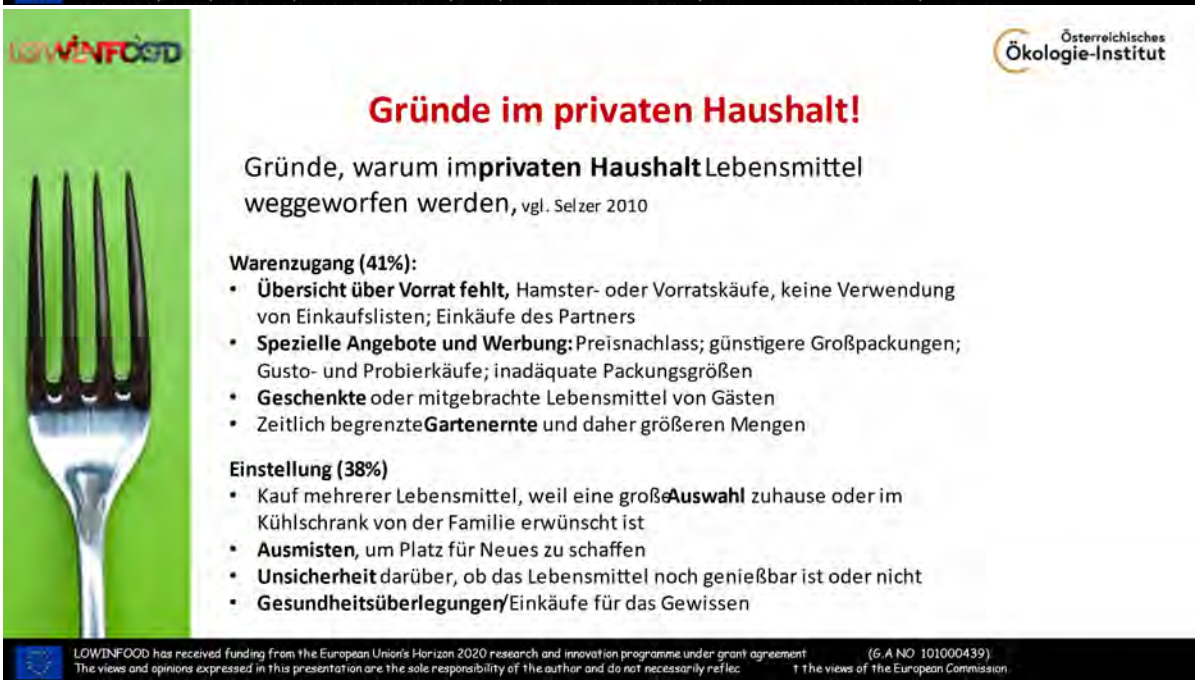

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Gründe im privaten Haushalt!

Lifestyle / Lebensgewohnheiten (11%)

- Änderung der **Lebensumstände**: Ernährungsumstellung; HH-Größe
- Flexible**Tagesgestaltung**: Essengehen
- **Portionen** für Kinder sind oft zu groß

Falsche Lagerung (3%)

- Lagerung an **unpassenden Orten**: Lagerung von Tiefkühlware im Kühlschrank; versteckte Lagerung wie z.B. ganz hinten im Kühlschrank
- **Gefrierbrand**

Sonstiges (7 %)

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Maßnahmen für den privaten Haushalt

- **Konsumverhalten** anpassen
- Einkäufe mit**Einkaufslisten** besser planen
- **Mindesthaltbarkeitsdatum** (MHD) kritisch überprüfen
- **Haltbarkeit** durch richtige **Lagerung** oder **Weiterverarbeitung** verlängern
- Rechtzeitig überschüssiges**verschenken**
- **Essensreste** kreativ verwerten

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Gründe in der Schulkantine!

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Gründe, warum in Großküchen, Gastronomie - und Beherbergungsbetriebe Lebensmittel weggeworfen werden:

Einkauf

- Zu viel Lebensmittel sind nötig aufgrund einer sehr **großen Karte**
- Kauf von zu großen **Mengen** (größeres Gebinde günstiger im Einkauf)
- **Fehlplanung beim Einkauf** (Wetter)
- Waren werden beim Transport beschädigt

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Lagerung

- Ungeeignete Lagerung (Temperatur, Licht, Feuchte, etc.)
- Hygiene am Lagerplatz

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Vorbereitung/ Zubereitung

- Lebensmittel werden falsch oder zu großzügig **geputzt** und **zurechtgeschnitten**
- **Zubereitungsreste** werden nicht weiterverwendet, landen unsortiert im Restmüll
- Küchenpersonal ist unzureichend aus- und weitergebildet bzw **sensibilisiert**

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Überproduktion

- Probleme bei der Planung und Organisation
- Mangelnde Kommunikation bei Vorbestellung
- Essen wird entsorgt obwohl hygienerechtlich unbedenklich weiterverwendbar

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Buffetreste

- Ständige Nachbestückung auch gegen Ende
- Verwendung von zu großen Gebinden oder Behältern (v.a. bei Suppen und Salaten)
- Dekoration mit Lebensmitteln

Tellerreste

- Zu große Standardportionen
- Beilagen werden nicht vollständig konsumiert
- Mangelnde Abfrage der Kundenwünsche
- Unzureichende Schulung für Ausgabegrößen

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Maßnahmen für die Schulkantine

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- Variable **Portionsgrößen** auf der Speisekarte
- Variable **Beilagenauswahl**
- Angebot, nicht konsumiertes Essen mit nach Hause zu nehmen
- kontinuierliche Überprüfung der **Lagerhaltung**
- genauere **Vorausplanung** der benötigten Lebensmittel
- flexible **Menüplangestaltung**
- Weitergabe von **Speisen an soziale Einrichtungen.**
- Mitarbeiter:innenessen(nicht serviertes Essen) oder an soziale Einrichtungen. Das Essen hat die Küche noch nicht verlassen und ist damit uneingeschränkt genießbar
- **Schulungen** für die Küchenpersonal, um eine effiziente Verarbeitung der Lebensmittel zu gewährleisten (z.B. Bewusstseinsbildung: Wert von Lebensmitteln, Umgang mit Ressourcen)
- Aufzeigen von **Verwertungsmöglichkeiten** von Zubereitungsresten (für Saucen, Suppen, etc. siehe Projekt Smart KITCHEN in Wien).

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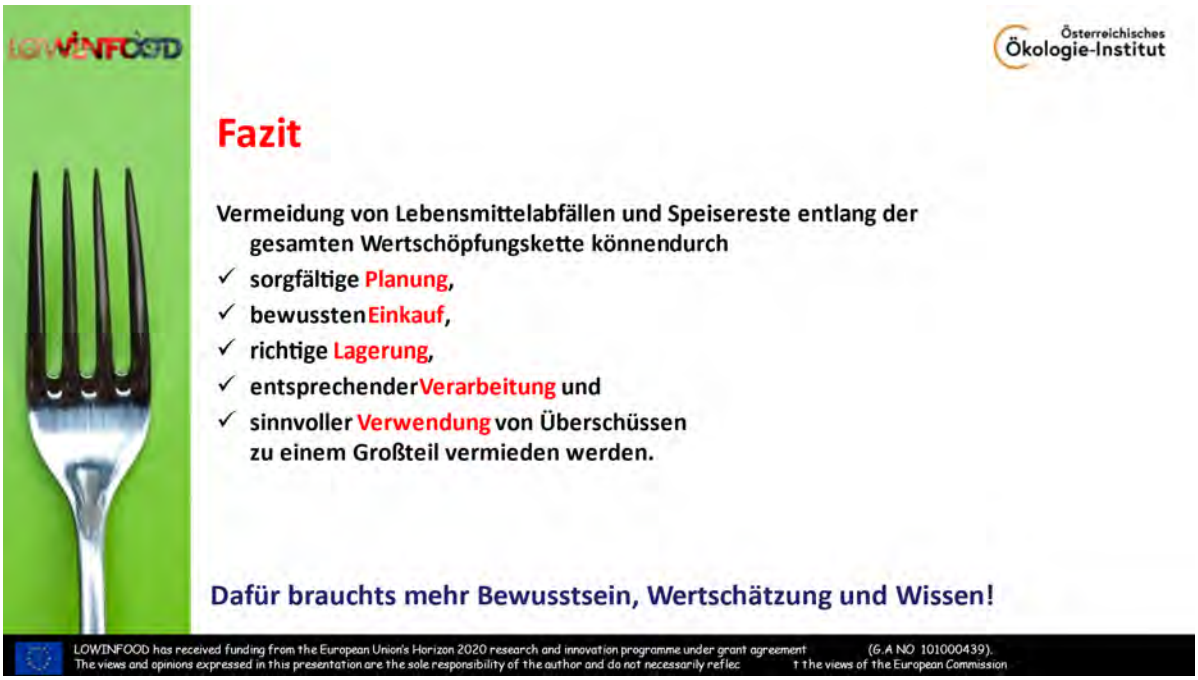

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