



Best practice measurement of household level food waste

Milestone No. 2



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1 Introduction

1.1 Aim of Work Package

This report is part of the EU research project REFRESH, which aims to contribute to the goal of reducing food waste across Europe. The current report is output of the work package that focuses on consumer behaviours related to food waste. It aims to consolidate existing and new consumer understandings at the in-home level into a research framework and methodology that allows comparison across countries.

1.2 Description of related Task

One of the important objectives within REFRESH is to develop practical and easy to implement approaches for food waste measurement at different stages of the consumption life cycle. One might argue that to measure food waste and gain insights into why it is generated, "waste composition analysis" could serve as a golden standard. However, such an approach is impractical across larger samples (Lebensorger & Schneider 2011). Prior scientific research has provided suggestions for the development of practical measures, including ICT tools, surveys, diaries and combinations of these (Langley et al. 2010), without necessarily reaching consensus on their validity and practicality in large scale household level applications.

REFRESH researchers have conducted an extensive research to identify an appropriate measurement approach to quantify food waste at different stages of the consumption life cycle at home. It includes an extensive review of the scientific literature, a review of expert practitioners' views, and two pilot studies that were instrumental to the development of a measurement method. In the main study, key approaches to food waste measurement in the household (i.e., a survey on general food waste, kitchen caddies, food waste diaries, photograph coding, and a specific pre-announced survey on measurement of overall waste per food category in the past week) were systematically compared to assess their validity. The findings of this research are reported in Van Herpen et al. (2016), "Consumption life cycle contributions; assessment of practical methodologies for in-home food waste measurement" (available at: <http://eu-refresh.org/consumption-life-cycle-contributions-assessment-practical-methodologies-home-food-waste-measurement>).

The milestone contains the REFRESH best practice measurement of household level food waste, which will be implemented in REFRESH's quantitative research stage aimed at the determinants and boundary conditions that determine household level food waste. This quantitative research will be conducted in Germany, Hungary, Spain and The Netherlands. It is a first step to formalise the measurement of household level food waste, distinguished to the phases in the consumption life cycle (approximated through states in which the wasted foods occur).

The research methodology as presented here is developed in such a way that it can be applied across different countries as part of the Community of Experts initiative of REFRESH's Framework of Action approach. It describes the conditions and the specific survey to measure household level food waste.

Through this milestone report the methodology is made available to broader audiences. Beyond the four countries where the methodology will initially be applied (and hence the household food waste levels assessed), we would strongly recommend future national studies to use this particular methodology to ensure that the national research applications can be aggregated to build together a true European level measurement of household level food waste, distinguished to the different stages of the consumption life cycle to maximum potential.

We strongly recommend translating the questionnaire into the national language. Please pay close attention to the exact wordings when translating the questions.

2 Procedure

The procedure consists of four elements:

1. Ethical / privacy check
2. The pre-announcement
3. The questionnaire
4. Guidelines on how to calculate total household food waste in grams from the reported units

In the following sections, the procedure of the household level food waste measurement methodology will be described in further detail.

2.1 Ethical / privacy procedures

The first step is to check ethical and/or privacy procedures that need to be acknowledged before the implementation of the study. Please be aware that personal information of the respondents will be gathered during the research. Therefore, ethical procedures according to national and/or institutional regulation must be followed. This usually includes gaining ethical clearance from an ethical committee, providing the respondents with a consent form prior to the study and removing any linkages between the data and the identity of the respondents. The research that has been conducted with the use of these protocols in REFRESH has gained ethical clearance of the social sciences ethical committee of Wageningen University. You can use your own organisation's procedures. If they are absent, we advise to make use of the standard ICC / ESOMAR guidelines which can be found on: https://www.esomar.org/uploads/public/knowledge-and-standards/codes-and-guidelines/ICCESOMAR_Code_English_.pdf

2.2 The pre-announcement

The rationale behind the pre-announcement is that most consumers are not very aware of the amount of food they are wasting at home on a daily or weekly basis. Therefore, questioning them on their amount of food waste without a prior 'heads up' can lead to unreliable data. To mitigate this effect, a pre-announcement to the respondents can make them more aware about their food waste levels and will consequently lead to more reliable data.

Please be aware that although this method increases the validity of the measurement data, it also increases the awareness of the respondents on their waste behaviour. Thus, when this measurement methodology is used in combination with an investigation into respondents' current level of awareness, such awareness questions should be addressed beforehand. The questionnaire is sent (typically) one week after the pre-announcement.

The text of the pre-announcement is included in box 1.

Box 1: Text pre-announcement

Welcome to this research and thank you for participating! In this research we would like to know how food is handled in your household. Next week, we will send you a questionnaire with questions about food products that are bought with the intention to be eaten by your household, but which remained unconsumed and are disposed of. Therefore, we would like to ask you to pay close attention to the food products you dispose of in the upcoming week. This questionnaire is only about food scraps that are or were edible. Thus, bones, peels, seeds, stumps do not count, as they are not edible. However, products that you disposed of because they were spoiled or were past the expiration date do count and should be included in your answers. Regarding these food products, it does not matter if the products are disposed of in the general trashcan, food waste container, compost heap, are given to an animal (pet, birds, et cetera) or otherwise, it is all included. The questions only refer to food and drink products that are disposed of at home. Thus, it does not include food and drink products that are disposed of when eating in a restaurant or canteen. Thank you very much in advance!

2.3 Explanation of the questionnaire

The questionnaire contains questions on the respondents' food waste amounts in the past week, specified over 22 food product categories and 4 food waste states which are connected with the stages of the consumption life cycle in which

consumers discard their food (planning, provisioning, storing, preparing, and consuming).

“Food”, for the purpose of this questionnaire, is defined as edible fractions of food products that are intended to be eaten by humans. This excludes inedible fractions, such as bones, peels, seeds, stumps, etc.

The first question, in which respondents indicate whether their household disposed of food for each of 22 food categories, is answered by all respondents. Only for those food categories in which their household disposed of food, respondents answer two follow-up questions: (a) how much was disposed of in the past week, and (b) in which state was the majority of the disposed of food. In other words, questions 2 to 45 are only asked if the food category that the question refers to was ticked in question 1.

Questions in which multiple answer options can be ticked by respondents are indicated by the use of squares for the answer options, whereas questions in which only one answer option can be ticked are indicated by the use of circles.

2.4 The questionnaire

Introduction

This questionnaire is about food and drink products that are bought with the intention to be consumed, but remain unconsumed and are disposed of. It does not matter if you disposed of the food in the general trashcan, food waste container, compost heap or gave it to an animal (pet, birds, et cetera), it is all included. This questionnaire is only about food scraps that are or were edible. Thus, bones, peels, seeds, stumps do not count, as they are not edible. However, products that you disposed of because they were spoiled or were past the expiration date do count and should be included in your answers. The questions only refer to food and drink products that are disposed of at home. Thus, it does not include food and drink products that are disposed of when eating in a restaurant or canteen.

Question 1: Please tick the boxes of the products that are disposed of in your household in the past week.

- Fresh vegetables
- Non-fresh vegetables (jar / canned / frozen)
- Fresh fruit
- Non-fresh fruit (jar / canned / dried / frozen)
- Potatoes
- Potato products (fries, chips, baby or precooked potatoes, et cetera)
- Pasta
- Rice and remaining carriers (including wraps, couscous, et cetera)
- Meat / meat substitute
- Fish

- Bread toppings (meats, cheese, sweet topping, et cetera)
- Bread
- Cereals (muesli, granola, oat, brinta, et cetera)
- Yoghurt, custard, et cetera
- Cheese (cheese cubes, French cheese, sprinkle cheese. Excluded: cheese as bread topping)
- Eggs
- Soup
- Sauce (ketchup, mayonnaise, cocktail sauce, et cetera)
- Candy (sweets, chocolate bars, et cetera) / cookies
- Crisps / nuts
- Non-alcoholic beverages (milk, juice, soda. Excluded: water, tea, coffee, diluted syrup)
- Alcoholic beverages

Food waste states

We split food waste into several categories, which are explained below. Please read this carefully as these categories will be used in the next questions.

Food waste can be categorised into:

- 1) Completely unused foods: food that is disposed of which is not used at all. For instance, unopened packages, moulded apples, dried leek, complete bread.
- 2) Partly used foods: food that is disposed of after it has been partly used. For instance, a few bread slices, halve a package of meat cuts, halve an onion or halve a package of milk.
- 3) Meal leftovers: leftovers that are disposed of after these were left on the plate, pots or pans. For instance, potato mash or rice that is left on the plate or in the pan, sandwiches that were not eaten during lunch.
- 4) Leftovers after storing: meal leftovers that are disposed of after these were stored in the fridge or freezer to be eaten at a later moment. For instance, a frozen pasta portion of last week.

You will receive several questions about different type of food and drink products you have disposed of in the past week. First, we ask how much of a certain product your household disposed of in the past week. Next, we ask to which category (unused, partly used, meal leftovers, leftover after it was stored) the majority of the disposed of food product belonged when it was disposed of. Please pay attention to which food product it refers!

Question 2: Fresh vegetables.

In your household, how much fresh vegetables were disposed of in the past week?

- Less than one serving spoon
- 1 to 2 serving spoons
- 2 to 4 serving spoons
- 4 to 6 serving spoons
- More than 6 serving spoons

Question 3: To which category did the (majority) of the disposed of fresh vegetables belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., a leek)
- Partly used foods: food that is disposed of after it is partly used (e.g., half an onion)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: Meal leftovers that are disposed of after these were stored

Question 4: Non-fresh vegetables (jar / canned / frozen).

In your household, how many non-fresh vegetables (jar / canned / frozen) were disposed of in the past week?

- Less than one serving spoon
- 1 to 2 serving spoons
- 2 to 4 serving spoons
- 4 to 6 serving spoons
- More than 6 serving spoons

Question 5: To which category did the (majority of) disposed of non-fresh vegetables belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., unopened frozen / canned spinach package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half used frozen / canned spinach package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: Meal leftovers that are disposed of after these were stored

Question 6: Fresh fruit.

In your household, how many fresh fruits were disposed of in the past week? *One apple or banana is one piece of fruit. In case of small fruits, such as strawberries or grapes, one small bowl is considered 'one piece'.*

- Approximately one fourth of a piece of fruit or less
- Approximately half a piece of fruit
- Approximately 1 piece of fruit
- 2 to 4 pieces of fruit
- More than 4 pieces of fruit

Question 7: To which category did the (majority of) disposed of fresh fruit belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., an apple)
- Partly used foods: food that is disposed of after it is partly used (e.g., half an apple that is not used in a dish)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans (e.g., half eaten apple)
- Leftovers after storing: Meal leftovers that are disposed of after these were stored

Question 8: Non-fresh fruit (jar / canned / dried / frozen).

In your household, how many non-fresh fruits (jar / canned / dried / frozen) were disposed of in the past week? One pear or peach from a can is one piece of fruit. In case of small fruits, as blueberries or tangerine wedges, one small bowl is considered 'one piece'.

- Approximately one fourth of a piece of fruit or less
- Approximately halve a piece of fruit
- Approximately 1 piece of fruit
- 2 to 4 pieces of fruit
- More than 4 pieces of fruit

Question 9: To which category did the (majority of) disposed of non-fresh fruit belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., unopened fruit can)
- Partly used foods: food that is disposed of after it is partly used (e.g., half full fruit can)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: Meal leftovers that are disposed of after these were stored

Question 10: Potatoes

In your household, how many potatoes were disposed of in the past week?

- Less than one serving spoon
- 1 to 2 serving spoons
- 2 to 4 serving spoons
- 4 to 6 serving spoons
- More than 6 serving spoons

Question 11: To which category did the (majority of) disposed of potatoes belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete potato package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a potato package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 12: Potato products (fries, baby potatoes, precooked potatoes, et cetera).

In your household, how many potato products (fries, precooked potatoes, et cetera) were disposed of in the past week?

- Less than 10 fries / baby potatoes / pieces
- 10 to 25 fries / baby potatoes / pieces
- More than 25 fries / baby potatoes / pieces (approximately half a package of 750 gram)
- Full package (750 gram) fries / baby potatoes / pieces
- More than a package (750 gram) fries / baby potatoes / pieces

Question 13: To which category did the (majority of) disposed of potato products belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete potato fries package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a potato fries package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 14: Pasta

In your household, how much pasta was disposed of in the past week?

- Less than one serving spoon
- 1 to 2 serving spoons
- 2 to 4 serving spoons
- 4 to 6 serving spoons
- More than 6 serving spoons

Question 15: To which category did the (majority of) disposed of pasta belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete pasta package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half pasta package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 16: Rice (including wraps, couscous, et cetera).

In your household, how much rice (including wraps, couscous, et cetera) was disposed of in the past week?

- Less than one serving spoon
- 1 to 2 serving spoons
- 2 to 4 serving spoons
- 4 to 6 serving spoons
- More than 6 serving spoons

Question 17: To which category did the (majority of) disposed of rice belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete rice package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half rice package)
- Meal leftovers: meal leftovers that are disposed of after it was left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after it was stored

Question 18: Meat / meat substitutes.

In your household, how much meat / meat substitutes were disposed of in the past week?

A portion refers to one chicken breast, one steak or two vegetarian burgers, et cetera. In case of smaller pieces, as minced (vegetarian) meat, try to estimate it in whole pieces of meat (e.g., one package of minced vegetarian meat is equal to two portions).

- Approximately half a portion or less
- Approximately one portion
- 2 to 3 portions
- 4 to 5 portions
- More than 5 portions

Question 19: To which category did the (majority of) disposed of meat / meat substitutes belong?

Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., sausage package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a sausage package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 20: Fish.

In your household, how much fish was disposed of in the past week?

A portion refers to one fish filled, one piece of salmon, et cetera.

- Approximately half a portion or less
- Approximately a complete portion
- 2 to 3 portions
- 4 to 5 portions
- More than 5 portions

Question 21: To which category did the (majority of) disposed of fish belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete fish package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a fish package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 22: Bread toppings (meats, cheese, sweet topping, et cetera).

In your household, how much bread toppings (meats, cheese, sweet topping, et cetera) were disposed of in the past week?

One portion is what is used on one slice of bread / sandwich / portion of baguette.

- Approximately half a portion or less
- Approximately a complete portion
- 2 to 3 portions
- 4 to 5 portions
- More than 5 portions

Question 23: To which category did the (majority of) disposed of bread toppings belong?

Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete package with meat slices)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a package with meat slices)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 24: Bread.

In your household, how much bread was disposed of in the past week?

A (raisin) bun, portion of baguette or sandwich is similar to one slice of bread.

- Less than one slice of bread
- One or a few slices of bread
- Approximately half a loaf
- Approximately one loaf
- More than one loaf

Question 25: To which category did the (majority of) disposed of bread belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., whole loaf)
- Partly used foods: food that is disposed of after it is partly used (e.g., slices of bread)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans (e.g., bread crusts)
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 26: Cereal (muesli, granola, oat, porridge, et cetera).

In your household, how much cereal (muesli, granola, oat, porridge, et cetera) was disposed of in the past week?

A portion is the amount of cereals used for one bowl of breakfast.

- Less than half a portion
- A half to one and a half portion
- Multiple portions (approximately half a package)
- Approximately a complete package
- Multiple packages

Question 27: To which category did the (majority of) disposed of cereals belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete cereal package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a cereal package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 28: Yoghurt, custard, et cetera.

In your household, how much yoghurt, custard, et cetera was disposed of in the past week?

A portion is a small bowl with yoghurt / custard / et cetera.

- Less than half a portion
- A half to one and a half portion
- Multiple portions (approximately half a litre package)
- Approximately a complete litre package
- Multiple litre packages

Question 29: To which category did the (majority of) disposed of yoghurt, custard, et cetera belong?

Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete yoghurt package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a yoghurt package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 30: Cheese (cheese dices, French cheese, sprinkle cheese; excluded: cheese as bread topping).

In your household, how much cheese (cheese dices, French cheese, sprinkle cheese; excluded: cheese as bread topping) was disposed of in the past week?

A handful of cheese can be seen as a dice of cheese.

- Less than one dice of cheese
- Approximately one dice of cheese
- 1 to 3 cheese dices
- 4 to 5 cheese dices
- More than 5 cheese dices

Question 31: To which category did the (majority of) disposed of cheese belong? *Please tick the category that occurred the most.*

You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete French cheese)
- Partly used foods: food that is disposed of after it is partly used (e.g., partly used French cheese)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 32: Eggs.

In your household, how many eggs were disposed of in the past week?

- Less than 1 egg
- 1 egg
- 2 to 3 eggs
- 4 to 5 eggs
- More than 5 eggs

Question 33: To which category did the (majority of) disposed of eggs belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete eggs)
- Partly used foods: food that is disposed of after it is partly used (e.g., egg white)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 34: Soups.

In the household, how much soup was disposed of in the past week?

- Less than half a ladle
- Half to one and a half ladle
- Multiple ladles (approximately half a litre)
- Approximately 1 litre
- More than 1 litre

Question 35: To which category did the (majority of) disposed of soup belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete soup package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a soup package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 36: Sauces (ketchup, mayonnaise, cocktail sauce, et cetera).

In your household, how much sauce (ketchup, mayonnaise, cocktail sauce, et cetera) was disposed of in the past week?

- Less than a table spoon
- 1 to 3 table spoons
- Multiple table spoons (approximately half a jar / bottle)
- Approximately one whole jar / bottle
- More than one jar / bottle

Question 37: To which category did the (majority of) disposed of sauces belong? *Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.*

- Completely unused foods: food that is disposed of which is not used at all (e.g., complete sauce jar)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a sauce jar)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 38: Candy (sweets, chocolate bars, et cetera) / cookies / snacks.

In your household, how much candy (sweets, chocolate bars, et cetera) / cookies / snacks was disposed of in the past week?

A portion is a handful of sweets, small chocolate bar, a cookie, et cetera.

- Approximately half a portion or less
- Approximately one portion
- 2 to 3 portions
- 4 to 5 portions
- More than 5 portions

Question 39: To which category did the (majority of) disposed of candy belong?
Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., one cookie package)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a cookie package)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 40: Crisps / nuts.

In your household, how much crisps / nuts were disposed of in the past week?

A portion is a handle of crisps or nuts.

- Approximately half a portion or less
- Approximately one portion
- 2 to 3 portions
- 4 to 5 portions
- More than 5 portions

Question 41: To which category did the (majority of) disposed of crisps / nuts belong?

Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: food that is disposed of which is not used at all (e.g., bag of crisps)
- Partly used foods: food that is disposed of after it is partly used (e.g., half a bag of crisps)
- Meal leftovers: meal leftovers that are disposed of after these were left on the plate, pots or pans
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 42: Non-alcoholic beverages (milk, juice, soda; excluded: water, tea, coffee, diluted syrup).

In your household, how much non-alcoholic beverages (milk, juice, soda; excluded: water, tea, coffee, diluted syrup) was disposed of in the past week?

- Less than half a glass
- A half to one and a half glass
- Multiple glasses (approximately half a litre)
- Approximately one litre
- More than one litre

Question 43: To which category did the (majority of) non-alcoholic beverages belong?

Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: drinks that are disposed of which are not used at all (e.g., a milk package)
- Partly used foods: drinks that is disposed of after it is partly used (e.g., half a milk package)
- Meal leftovers: beverage that is left in the glass
- Leftovers after storing: meal leftovers that are disposed of after these were stored

Question 44: Alcoholic beverages.

In your household, how many alcoholic beverages were disposed of in the past week?

- Less than half a beer glass
- Half to one and a half beer glass
- Multiple beer glasses (approximately half a litre)
- Approximately one litre
- More than one litre

Question 45: To which category did the (majority of) alcoholic beverages belong? Please tick the category that occurred the most. You can tick more than one box if multiple categories occurred in the same amount.

- Completely unused foods: drinks that are disposed of which are not used at all (e.g., a bottle of wine)
- Partly used foods: drinks that are disposed of after it is partly used (e.g., half a bottle of wine)
- Meal leftovers: beverage that is left in the glass
- Leftovers after storing: beverage leftovers that are disposed of after these were stored

Thank you very much for completing this questionnaire. In case you of any comments, you can type these in the space below.

2.5 Guidelines unit of analysis

For the purpose of the household food waste amount measurement methodology, the amount is preferably expressed in total grams per week. Within the questionnaire, the indicated amounts of disposed of food vary per food product category, e.g., spoons, pieces, slices, units, litres, et cetera. These units are converted into grams using the “recalculation table for units into grams” as explained below.

Table 2 provides the basic information on the assumed amount of grams per unit that can be used for this. It also includes the source of reference for the estimation. Table 3 shows the specific values that are used based on the answer options in the questionnaire. For answer options in which a range is provided (e.g., 1 to 2 serving spoons), the mean value is used in the calculation (in this case, 1.5 serving spoons). For open ended answer options (e.g., more than 6 serving spoons) one unit is added to the provided number in the calculation (in this case, 7 serving spoons). Exceptions are the categories of bread, soup, sauces, and beverages, where “more than one litre / loaf / jar” is calculated as 1.5 units. Summarizing the recalculated amounts per food product category leads to the estimation of the total amount of food waste per household per week. It is possible to also examine the amount of food waste (in grams) for each of the 22 categories separately, or for overarching categories (e.g., grams of wasted vegetables by summing across fresh and non-fresh vegetables).

NB. It should be noted that food waste amount is on household level, not per capita. For research looking into per capita household food waste amounts, household composition should be taking into account, as well as number of persons that joined for dinner during the (measuring) week.

Table 1: Basis for calculating units into grams

Category	Unit	Grams	Reference
Fresh vegetables	Serving spoon	50	Smakelijketenzonderzout.nl
Non-fresh vegetables	Serving spoon	50	Smakelijketenzonderzout.nl
Fresh fruit	Piece	100	Smakelijketenzonderzout.nl and ah.nl
Non-fresh fruit	Piece	80	Ah.nl
Potatoes	Serving spoon	60	Smakelijketenzonderzout.nl and ah.nl
Potato products	10 fries	50	Smakelijketenzonderzout.nl
Pasta	Serving spoon	50	Voedingscentrum.nl
Rice	Serving spoon	60	Voedingscentrum.nl
Meat	Portion	150	Ah.nl
Fish	Portion	150	Ah.nl
Sandwich filling	Portion	20	Ah.nl
Bread	Slice	35	Ah.nl and wijvallenaf.nl
Bread	Whole bread	800	Ah.nl
Cereals	Portion	40	Ah.nl
Cereals	Pack	500	Ah.nl
Yoghurt et cetera	Portion	150	Ah.nl
Yoghurt et cetera	Pack	1000	Ah.nl
Cheese	Cube	10	Ah.nl
Eggs	Egg	60	Favv.be and test-aankoop.be
Soups	Ladle	150	Own measurement
Soups	Litre	1000	Ah.nl
Sauces	Spoon	20	Smakelijketenzonderzout.nl
Sauces	Bottle	450	Ah.nl
Candy	Portion	20	Wijvallenaf.nl
Crisps / nuts	Portion	20	Wijvallenaf.nl
Non-alcoholic beverage	Glass	250	Zelfmaakrecepten.nl
Non-alcoholic beverage	Litre	1000	Ah.nl
Alcoholic beverage	Beer glass	300	Ah.nl
Alcoholic beverage	Litre	1000	Ah.nl

Table 2: Recalculation of units into grams, based on the answer options

Category	1	2	3	4	5
Fresh vegetables	25	75	150	250	350
Non-fresh vegetables	25	75	150	250	350
Fresh fruit	25	50	100	300	500
Non-fresh fruit	20	40	80	240	400
Potatoes	30	90	180	300	420
Potato products	25	87.5	375	750	1000
Pasta	25	75	150	250	350
Rice	30	90	180	300	420
Meat	75	150	375	675	900
Fish	75	150	375	675	900
Sandwich filling	10	20	50	90	120
Bread	17.5	70	400	800	1200
Cereals	10	40	250	500	1000
Yoghurt et cetera	37.5	150	500	1000	2000
Cheese	5	10	20	45	60
Eggs	30	60	150	270	360
Soups	37.5	150	500	1000	1500
Sauces	10	40	225	450	675
Candy	10	20	50	90	120
Crisps / nuts	10	20	50	90	120
Non-alcoholic beverage	62.5	250	500	1000	1500
Alcoholic beverage	75	300	500	1000	1500

Note: The numbers 1 to 5 refer to the 5 answer options that are provided in the questions for each product category