

Consumer food waste

Fact sheet

The Netherlands Nutrition Centre informs consumers about sustainable food choices, including how to combat food waste. The total amount of food waste in the Netherlands in 2020 was around 2,811 kilotons. That is around 161 kilos per person per year.¹ This is the total amount wasted throughout the food chain: from farmer via grocery shop or catering outlet to consumer. Consumers, who generate 33.4 kg of food waste per person per year, are major contributors to this wastage.² This means that it is important to find solutions that are relevant to consumers, to enable them to avoid waste.

The amount of waste varies widely between households. Some people waste more food than others, but our research shows that every household wastes food to some extent.³ Not all consumers are convinced of this. They mainly view it as someone else's problem. Consequently, many consumers underestimate their own food waste.²

No one wants to waste food. For example, 94% of Dutch people say they do their best to waste less food.⁴ So why is food waste still a thing? Preventing food waste is a complex challenge involving many factors.²

Consumers can reduce food waste by changing their approach towards buying, cooking and storing food. Simple solutions include: checking what is in stock, using a shopping list, storing leftovers properly and eating them, and using a measuring cup or kitchen scales to determine the right portions.

This fact sheet focuses on household food waste by consumers. How much food do they waste and why? How can they prevent this waste? And how can government and the parties in the supply chain help to reduce household food waste?



Who is this fact sheet for?

This fact sheet should prove useful for professionals and chain partners involved in providing information and formulating strategies and policies to prevent household food waste at household level.

Definition of food waste

Definitions of food waste differ. According to the Netherlands Nutrition Centre's definition, food waste occurs when food intended for human consumption is not used for this purpose. We make a distinction between avoidable and unavoidable food losses. Avoidable food loss is viewed as food waste, since it involves the edible parts of food. Unavoidable food loss involves parts such as stalks, cheese rinds, eggshells, coffee grounds, used tea leaves and tea bags, and meat and fish remains (bones).² The European Union definition does include unavoidable losses. Moreover, under the EU definition, leftovers fed to animals are not considered food waste, whereas the Netherlands Nutrition Centre's definition does consider this food waste.

What are the issues at stake?

Reducing food waste is one of the key strategies to fight climate change and feed the growing world population.^{5, 6} All our food is produced, processed, transported, packaged and prepared. These activities require raw materials, labour and energy. When food is wasted, these investments are for nothing. Food waste therefore has an environmental, economic and social impact. Globally, food waste throughout the supply chain is responsible for around 8-10% of all greenhouse gas emissions.⁷ These are greenhouse gases emitted to produce food that was then never eaten. At the same time, over 750 million people suffer from hunger, and nearly 30% of the global population lives in food insecurity. This means that they do not always have access to sufficient, safe and healthy food.⁸ It is therefore vital to avoid food waste wherever possible.

Targets for reducing food waste

The Ministry of Agriculture, Fisheries, Food Security and Nature has been pursuing a policy aimed at reducing food waste since 2009. The European Union and the Dutch government have committed to the target in Sustainable Development Goal (SDG) 12.3. This is one of the SDGs developed by the United Nations.⁹ The target for SDG 12.3 is to halve food waste by consumers and supermarkets by 2030 compared to 2015 and minimise food losses that occur in the rest of the supply chain.¹⁰ Since 2020, all Member States of the European Union are obliged to monitor the volume of food waste.¹¹

The average household food waste by Dutch consumers in 2015 was estimated to be 43.3 kg of solid food per person per year. SDG 12.3 will therefore be met for consumers if household food waste is reduced to an average of around 21.6 kg of solid food per person per year by 2030.

Current state of scientific knowledge

How is food waste in Dutch households measured?

A number of studies are conducted every three years to gather information about food waste at home and various waste-related behaviours and determinants.² The Ministry of Agriculture, Fisheries, Food Security and Nature provided the Netherlands Nutrition Centre with a subsidy to carry out the research.

The volume and composition of solid food waste in organic waste (vegetable, fruit and garden waste) and residual waste were set out in detail through a waste composition analysis.³ For residual waste, a random check was carried out of 130 households in 13 municipalities. For organic waste, a random check was carried out of 110 households in 11 Dutch municipalities.

The weights of both avoidable and unavoidable food losses (see definition of food waste) were measured per household and categorised into 21 product groups, such as meat, bread, vegetables and fruit. A weighted average was then calculated for food waste in Dutch households. An online survey of 1,008 respondents was used to gather information on how much food people waste via other routes, such as down the sink, the toilet or fed to pets or other animals.¹² Together, this gives the total average amount of household food waste by consumers. Based on the above studies, several follow-up analyses were performed: the proportion of wasted versus purchased food, the environmental impact of food waste at home by product group and the financial value of household food waste.

In addition, the online survey was used to analyse various determinants and behaviours of consumers in relation to their household food waste.⁴ For example, respondents were asked about their frequency of grocery shopping, use of shopping lists and awareness of their own waste behaviour. Another study estimated the liquid waste (drinks, including thick dairy) of Dutch people at home

through the sewer system (sink and toilet). A total of 834 respondents indicated three times a day whether they had wasted liquid food and drinks in the previous part of the day (morning, afternoon or evening).

See Figure 1 below for an overview of the relationship between the studies carried out.²

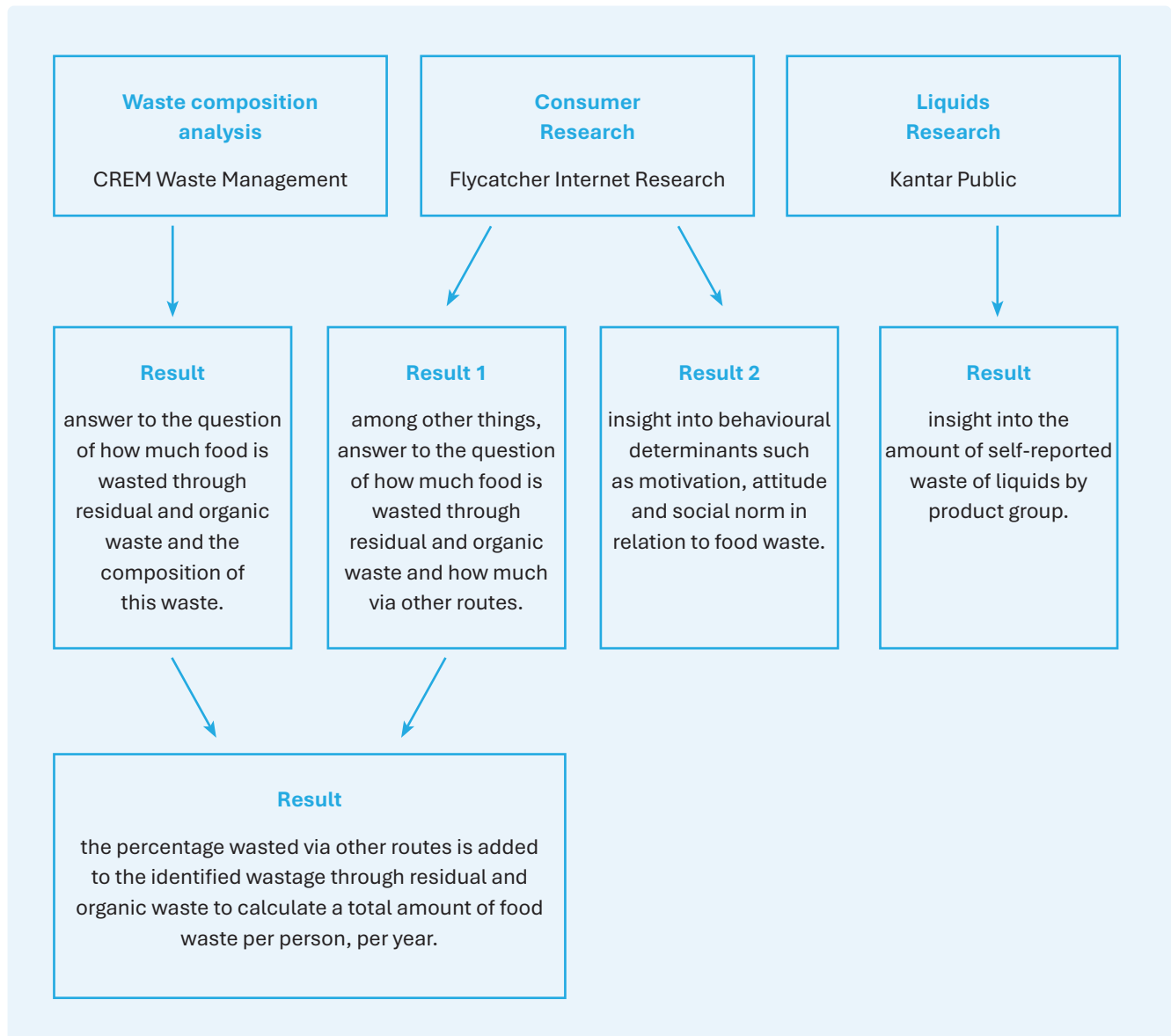


Figure 1: Overview of the three studies carried out with the anticipated results.

How much food do consumers waste at home?

Food waste has been determined on the basis of a waste composition analysis of household waste and consumer surveys. This category covers solid food (including thick dairy products such as yoghurt and oils), but not drinks. We are talking about food waste of edible parts, as described in the definition earlier in this fact sheet on page 2.

Dutch consumers wasted around 33.4 kilos of solid food per person per year in 2022.² The value of this food equates to €138 per person per year.¹³ The five most commonly wasted product groups are bread and bread-based products (6.2 kg), vegetables (4.4 kg), fruit (4.3 kg), potatoes (2.8 kg) and dairy (2.8 kg), see Figure 2. This is around 8.9% of the total amount of solid food purchased. Since 2010, this percentage of food waste in relation to the total purchased has been steadily decreasing (see Figure 3).²

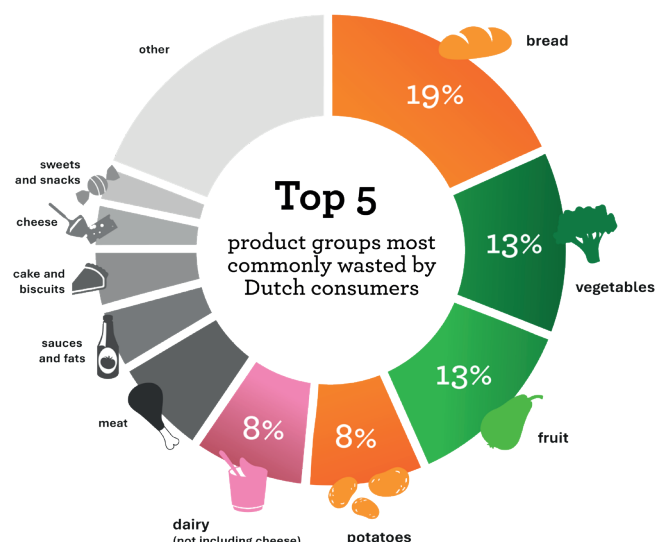


Figure 2. Top five most wasted product groups and their share of the total average household waste.

% avoidable waste relative to food purchased

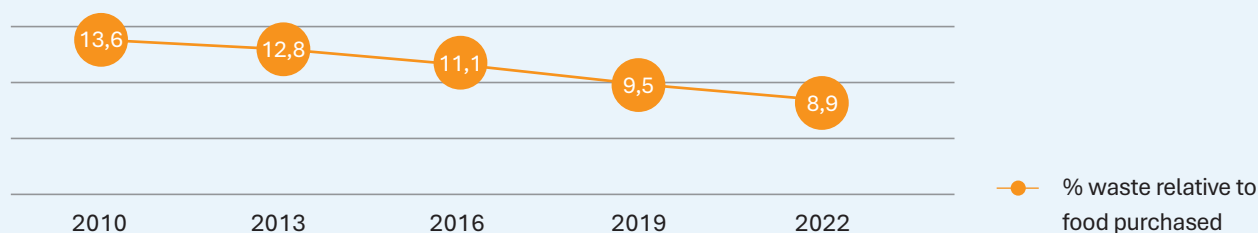


Figure 3. Percentage of avoidable food waste relative to solid food purchased (by weight).



What is the environmental impact of food waste in Dutch households? ²

By the time someone wastes food, it has already made an environmental impact. This occurs during every step in the chain of production, transport and packaging to preparation at home. The further down the supply chain food is thrown out, the greater the impact on the environment. The estimated greenhouse gas emissions from the products consumers buy but do not eat are 99 kilograms

of CO₂ equivalents per person per year. In addition, the land needed to produce this wasted food is estimated at 70 m² per person per year. And the water needed at 3 m³ per person per year. For the whole of the Netherlands, on an annual basis, this amounts to an average of 1.7 billion kilograms of CO₂ equivalents unnecessarily emitted, 1.2 billion m² of land and 50.4 million m³ of water that could have been put to another use (see also Figure 4).²

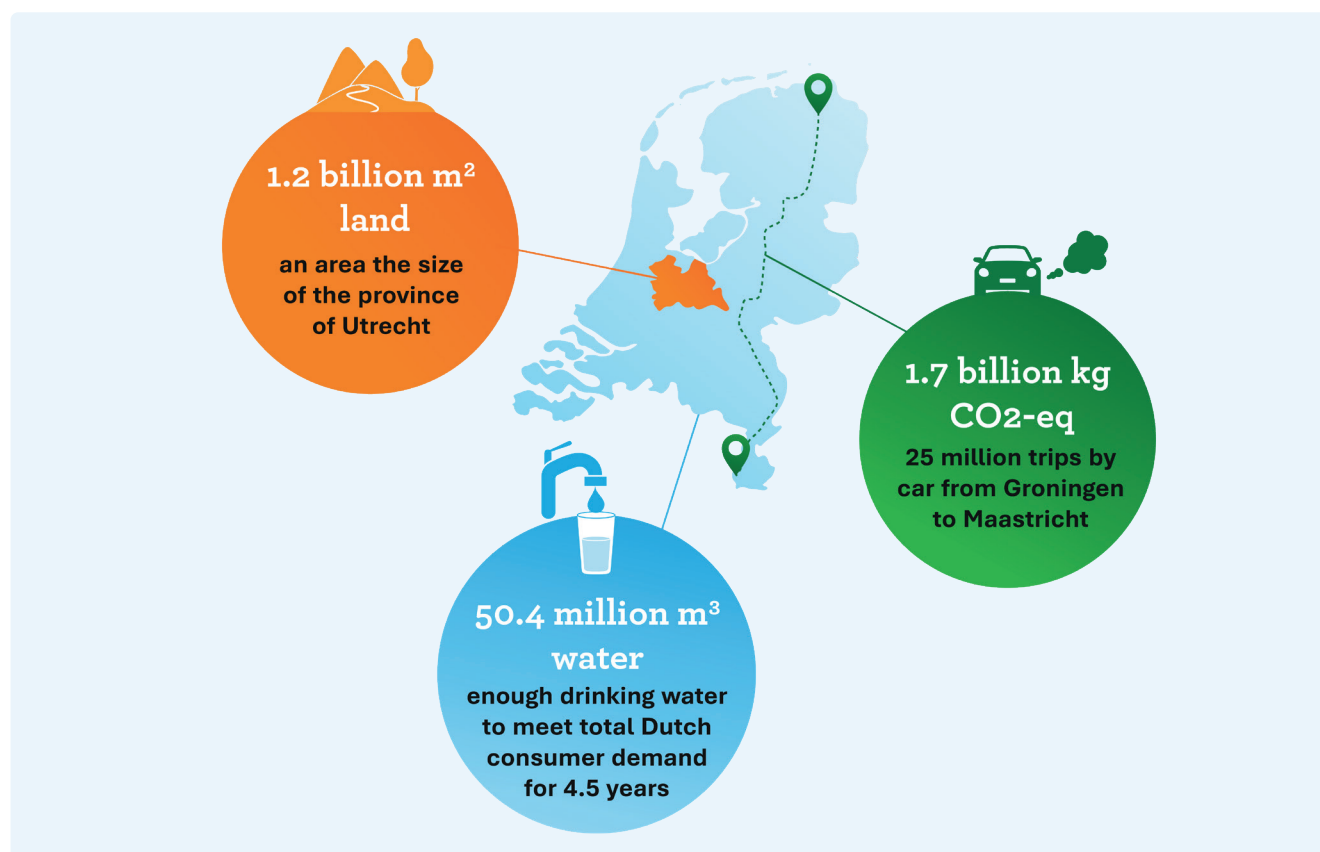


Figure 4. Potential savings if we avoid household food waste in the Netherlands.

Some of the research results are described below:

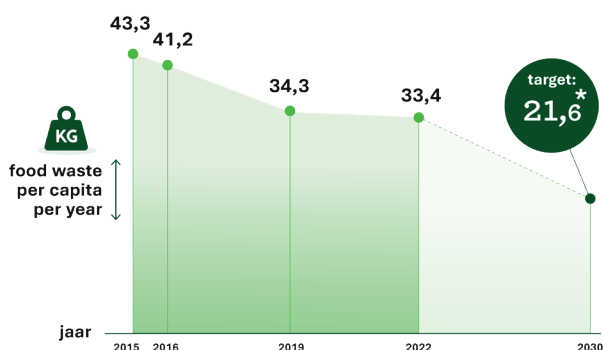
- Wasted meat and meat products account for around one third of the greenhouse gas emissions and land use that were for nothing during the production of the wasted food.
- In terms of water consumption, fruit waste plays the biggest role. Almost half of the water consumption required for wasted food was due to wasted fruit.
- Animal products such as meat, dairy, cheese and dairy drinks have a relatively high environmental impact per kilogram of product. Although wastage in kilograms is not extremely high, the environmental impact associated with wastage of animal products is considerable. It is therefore particularly important to avoid food waste in these product groups.
- Within the drinks category, the biggest environmental impact comes from wastage of coffee, tea and dairy drinks. Wastage of these beverages has a significant environmental impact. Drink wastage was monitored using a different method to solid food wastage and provides less precise data than solid food wastage. The decision was therefore made not to publish detailed environmental impact figures for this category.

Food waste in the Netherlands compared to the rest of the world

In 2024, the UN Environmental Programme published a comparative study on food waste in retail, food service and households worldwide.¹⁴ This study is based on edible and inedible food losses, because the definition of what is edible varies from culture to culture. The estimated amount of food waste varies enormously at global level. Dutch households seem to waste the same as or less than households in most other Western countries (such as European countries, North American countries, Australia and New Zealand). However, the exact figures are difficult to compare because the measurement methods used, definition and reliability of the figures can vary greatly.

Where do we currently stand in terms of the goal of halving household food waste?

By 2022, we were halfway to achieving a 50% reduction in household food waste from 2015 to 2030 (SDG 12.3). By 2022, a 23% reduction had been achieved compared to 2015 (see Figure 5).² However, the marked decline noticed since 2013 appears to have stabilised. In 2022, the actual amount of food waste was only 0.9 kilos lower than in 2019. If this stabilisation is confirmed and persists into 2025, the chance of meeting the 50% reduction target by 2030 becomes vanishingly small. Continued efforts are therefore needed to reduce household food waste.²



*As an indicator of the SDG 12.3 target to halve food waste compared to 2015

Figure 5. Trend in food waste over the years in the Netherlands in view of Sustainable Development Goal 12.3.

Which groups of Dutch people waste more?

Although relationships can be established between demographic characteristics and food waste, they explain relatively little of the amount of waste.¹⁵ A number of target groups are more often associated with more food waste in research, but the differences are small. For example, Dutch people under 34 generally waste more than people aged 55 and over,⁴ with the vast majority of studies on food waste confirming this.¹⁶

It is unclear, though, whether people over 55 waste less due to a generational effect or other factors, such as more skills, time or opportunities to reduce food waste.¹⁴ However, it is a known fact that the younger group wastes relatively more food due to a lack of skills in buying, storing and preparing food.¹⁷

Households with children are another target group consistently linked to more food waste.¹⁷ In the Netherlands as well, this group seems to waste more than households without children.⁴ Possible explanations include children's unpredictable eating patterns.¹⁴

There is no consensus on the influence of other demographic factors, such as income and household size. The amount of food waste seems to be highest among high-income households,⁴ while it was lowest among low-income households. Other studies report conflicting results when it comes to income.²⁰

In addition, there is uncertainty about the relationship between household size and the amount of food waste.¹⁷ Research suggests that, based on self-reported data, larger households waste more than households of up to two people. This also applies to Dutch households.⁴ However, when the amount is adjusted for the number of people, the waste per person is higher in single-person households.²⁰

Factors influencing consumer behaviour

Demographic factors have no direct effect on the amount of food waste, but they are likely to influence the factors underlying waste behaviour. It is therefore important to look beyond demographic characteristics and be aware of behavioural factors and the differences between large and small wasters.

Big or small wasters

This fact sheet makes several references to small and big wasters. Based on self-reported food waste, respondents were broken down into large, medium and small wasters. Each group contains around a third of the online survey respondents. Based on this breakdown, it was investigated whether there are differences in behaviour and determinants between large and small wasters.²

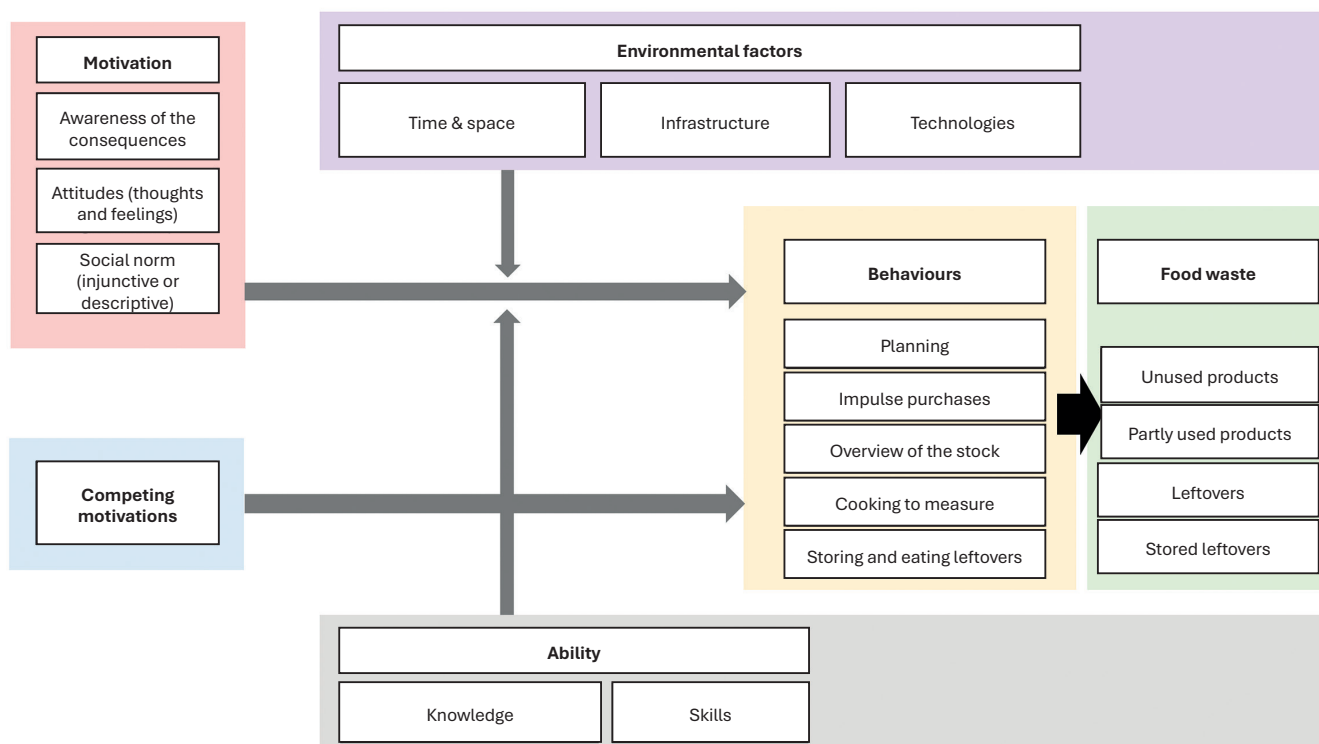


Figure 6. Wasteful behaviour by consumers is driven by motivation (awareness, attitude and social norms), ability (skills and knowledge) and opportunity. There are also motivations that compete with the motivation to waste less.¹⁹

The Consumer Food Waste Model is depicted in Figure 6.¹⁸ The model states that, when a consumer is motivated, and they have the knowledge and ability to display the desired behaviour in addition to the environment enabling them to display the desired behaviour, the likelihood of less food waste increases. Motivation on its own is not enough, nor is the ability to waste less. Below, we explain each determinant in the Consumer Food Waste Model and describe the situation in the Netherlands for these factors. We then go into further detail on competing motivations and the unconscious factors. All these aspects influence food waste.

Motivation is influenced by awareness, attitude and social norms. Dutch people say they are motivated to minimise their food waste. For instance, 94% say they do their best to waste as little food as possible.⁴ If we look at the determinants that predict motivation, we see the following:

- **Awareness:** in our own research, almost all Dutch people said they think a large or very large amount is thrown away in Dutch households (94%). They therefore seem to realise there is a problem. However, consumers generally seem to have limited awareness of their own contribution to this problem. They underestimate their own contribution, as also seen in research conducted by the Netherlands Nutrition Centre.^{4,20} In addition, they are unaware of the extent to which food waste contributes to climate change.^{4,21}

- **Attitude:** almost all consumers say they believe it is important not to waste food (95%), and 87% of Dutch people find it annoying to have to throw away food.⁴ Importantly, behaviours related to food waste are not always associated with food waste. For example, minimising food waste is not the primary aim when making a shopping list or rearranging the fridge. This means that there is not always a strong link between the attitude to waste as little as possible and these actual behaviours.²²
- **Social norms:** social norms include influences from the environment, such as the behaviour of others or written or unwritten rules. Mixed results were found on social norms. On the one hand, consumers seem to accept food waste because they view it as unavoidable. On the other hand, some studies show that food waste is considered unacceptable.¹⁹ It seems clear, in any case, that food waste is mainly viewed as someone else's problem. Dutch people generally underestimate the amount of waste that they themselves generate. Conversely, the waste generated by others is estimated as very high. In our own research, for example, we found that 81% of consumers estimate they waste less or much less than average. Only 4% of Dutch people think the average Dutch person really does their best to reduce food waste.



Dutch people therefore have a positive attitude, but there is room to improve awareness of the amount of own food waste and the social norm that everyone does their best to avoid waste. When there is sufficient motivation, sufficient knowledge and skill is required to exhibit that behaviour.²³

- **Knowledge:** the better people's understanding of how to handle food and why food waste is a problem, the less food they seem to waste.^{22,23} When it comes to food waste, the main lack of knowledge concerns the differences between the two expiry dates: best before (in Dutch: *ten minste houdbaar tot*, THT) and use by (*te gebruiken tot*, TGT).⁴ Also, few Dutch people have a good understanding of where and how best to store products.²⁴ Mixed results were found on the influence of this knowledge. For example, knowledge of storage locations seems to have mostly indirect effects on wastage behaviour²¹ and there is not always a link between knowledge of expiry dates and the amount of food waste.^{4, 15, 21} However, it does appear that communication about the desired behaviour, for example by using icons, can help prevent waste.^{25, 26} In other words: emphasising alongside the use-by date that you need to eat a product before or on the date and alongside the best-before date that you can often still eat it if it looks, smells and tastes alright.²⁶
- **Skills:** perceived sense of control (self-efficacy) also seems to play a role in consumers' waste behaviour. Consumers who are confident that they can waste less often do waste less, or at least have a strong intention to waste less.^{15, 27, 28} Consumers who are able to plan well, who cook creatively with leftovers and so on also waste less.²⁹ Our own research shows that 59% of Dutch people say they are confident they can waste even less. 55% say they find it difficult not to waste food at all and 60% find it easy to estimate how much will be eaten in

their household. The latter decreases in the case of larger households. Age has a big impact on all these figures.⁴

In addition to motivation, knowledge and skills, you also need the opportunity to minimise waste. The Consumer Food Waste Model identifies three relevant aspects: time and space, technology and infrastructure.

- **Time and space:** although some behaviours increase the likelihood of food wastage, we sometimes see such behaviour due to time constraints. For example, buying large quantities of food to avoid having to go to the supermarket again when you have guests coming. Collecting take-out or having it delivered to your home can also help save time. Furthermore, a busy lifestyle and difficulty estimating the consumption of other housemates (particularly young children) can result in food waste. People who buy pre-cut or precooked meals waste less and use take-out or delivery meals from restaurants less often. The reason for this is that these meals are easier to fit into a busy lifestyle, as the preparation time is shorter.³⁰
- **Technology:** having a poorly functioning fridge has a negative impact on waste behaviour. Although consumers are motivated in this situation, it is a lot harder for them to avoid food waste.
- **Infrastructure:** the likelihood of wastage is influenced by purchasing large or relatively large packages and poorer quality of purchased products. For example, supermarkets can have a negative influence on waste behaviour by making larger packages more attractive by pricing these relatively low. The less accessible a shop, in terms of distance or opening hours, the more likely people are to buy too much food.¹⁹

Competing motivations

Besides the motivation to prevent waste, there are often other motivations that can directly or indirectly lead to more or less waste. These may conflict with the motivation to waste less food.^{29, 31} Examples include:

- **The motivation to save time:** consumers want to waste less, but they also want to save time and experience more convenience. If the latter motivation is too strong, consumers may order food or buy something else, instead of cooking with the products that need to be used. This can encourage wastage.³¹
- **The good provider identity:** parents and partners want to take good care of their loved ones. And people want to take good care of their guests. They may want to waste less, but they also want to have happy faces at the table. Parents want their children to eat tasty and varied food, leading to more cooked food than necessary.³¹
- **Fear of disease:** some consumers are motivated to waste less food, but they still throw away food for fear of getting sick from eating or drinking it.¹⁹

The characteristics of these different motivations play an important role in their prioritisation. The goal of wasting less is an abstract one, which does not offer any immediate reward. However, when a person chooses not to cook their own food after all, or chooses to eat what they currently crave, they receive this reward straight away. Consumers tend to choose these immediate, tangible rewards rather than the abstract, non-immediate rewards.³¹ For example, ordering a delivery meal instead of cooking a fresh meal or eating leftovers.

Unconscious factors play an important role

The model in Figure 6 focuses on conscious behaviour. As mentioned earlier, 94% of Dutch people say they do their best to waste as little food as possible. And yet a large amount of food is still wasted. There appears, therefore, to be a gap between intention and desired behaviour. This gap, also referred to as the intention-behaviour gap in the literature, has a number of causes that include unconscious factors.³² Unconscious factors (such as emotions, habits and the environment) are known to typically have a major influence on behaviour. The same applies to food waste. Food waste, for example, is often a consequence of various (small) habitual behaviours, such as planning and cooking.^{19, 21}

To encourage consumers to waste less food, it is important to look at this unconscious behaviour. Factors including the food environment, such as supermarkets and catering establishments, can have a positive influence. For example, food environments can offer optimal portion sizes or encourage consumers not to overbuy. Consumers then do not need to consciously make the

choice to waste less food: instead, the environment makes that choice for them.

No single determinant or behaviour

Research by the Netherlands Nutrition Centre and others shows that no single behaviour has a very large impact on the amount of food waste. Instead, a range of behaviours appear to have a small impact on the amount of food waste. This means that it is not sufficient to focus solely on better planning or solely on behaviour related to expiry dates.^{2, 4}

There also does not appear to be a single behavioural determinant that has a major impact on the amount of food waste. Although differences between large and small wasters can be identified for determinants such as attitude, social norms, and knowledge and skills, none of these appear to have a high explanatory value with regard to the amount of food waste.^{2, 4} The report 'Household food waste by Dutch consumers in 2022' shows the differences found between large and small wasters and their behaviour and behavioural determinants. We also mention these below in the description of possible solutions in order to change behaviour.

Motives to avoid food waste

Research regularly shows that money is one of the most frequently cited motives for avoiding food waste. This is also evident from research carried out by the Netherlands Nutrition Centre in 2023. The social norm also plays a role: 'it is not acceptable' is frequently cited as a reason. Motives relating to climate change are also mentioned, but less so.^{33, 34} Despite the fact that consumers themselves more often cite financial motives, this is not logically the best angle to encourage them to change their behaviour due to the nature of the goal. Socio-scientific research seems to show that appealing to self-transcending goals (such as climate) is more likely to encourage sustainable behaviour than appealing to self-interest (such as money).³⁵

For instance, self-transcending texts on climate had a greater impact on reducing shower time and encouraging car tyre checks.^{36, 37} This idea seems to contradict the statement made earlier in this fact sheet, namely that abstract goals are less effective than goals that offer short-term rewards. The fact is: people's automatic behaviour is more likely to serve selfish purposes. However, this often conflicts with how we would like our behaviour to be. After all, we prefer to think of ourselves as climate-friendly rather than miserly. The automatic brain is therefore selfish, but the rational brain (which we encourage to change) responds better to self-transcending goals. As a result, it is possible to encourage sustainable behaviour by appealing to self-transcending goals, such as taking climate into account.

Possible solutions in order to change behaviour

As we have seen, there are many behaviours that lead to waste. Consumers can prevent waste, for example, by cooking the right amount, going to the supermarket with a shopping list or storing products in the right place. In order to encourage consumers to engage in these behaviours, it is important to consider what factors are relevant in each case. To encourage people to store products in the right place, for example, it can be effective to increase knowledge. But again, when it comes to making shopping lists, that may not be the most effective approach. The Consumer Food Waste Model along with the competing motivations and the unconscious factors are the foundation, but deciding which factors should be acted upon depends on the desired behaviour.

Below, we identify a number of priorities that professionals can focus on to prevent household food waste.

1. Stock check and shopping list

A major reason for waste is that people buy too much. 81% of Dutch people check what is already in the house before they go shopping. Only a quarter of Dutch people use a shopping list. Small wasters are more likely to report doing both. Large food wasters are more likely to say they buy too much food and are more likely to prefer having too much food in the house rather than too little, compared to small food wasters.⁴

Possible solution: continue to encourage people to make a shopping list, in addition to carrying out a stock check. To avoid buying more than necessary, it is helpful to also list the right quantities on the shopping list.

2. Preparing the right amounts

One reason for throwing away food is that people cook too much. Big wasters are more likely to say they cook too much and are less likely to say they do their best to weigh ingredients.² Half of Dutch people say they weigh or measure ingredients as much as possible when cooking. Small wasters are more likely to report doing this. Households that never weigh or measure throw away more.³⁸ Thanks to the Netherlands Nutrition Centre's '*Eetmaatje*', a measuring cup specially designed for measuring out portions, more people have started to measure, wasting less as a result.³⁹ One third of people who have an *Eetmaatje* use it regularly to always when preparing pasta, rice or couscous.⁴

Possible solution: correct knowledge of appropriate portion sizes and weighing with kitchen scales or a measuring cup or jug (such as the *Eetmaatje*).

3. Flexibility regarding the best-before date

Confusion and lack of knowledge regarding the best-before and use-by dates are viewed as an important cause of food waste.⁴⁰ Around half of Dutch people can explain the difference between the two expiry dates.



However, 76% report adopting the desired behaviour by looking, smelling and tasting when a best-before date has expired. Only then do they decide whether to eat the product or throw it away. More people reported this in 2022 than in 2019. 27% said they adopt the desired behaviour for a use-by date by throwing the product away when the date has passed. Based on self-reporting, waste due to the expiry of use-by and best-before dates is highest for eggs, sauces and fats, dairy, meat and meat products, and spreads.¹² Four-fifths of Dutch people report that they sometimes buy products that are close to their use-by or best-before date. They do this mainly because these products are cheaper.⁴

Possible solution: encourage a flexible approach to the best-before date. Explain the difference between the meaning of best-before and use-by dates. Also, stress the importance of looking, smelling and tasting on the best-before date before you decide to throw something away. In addition, icons or clarifying text on the packaging can make the difference between the best-before and use-by dates and the desired behaviour clearer for consumers.²⁶

Difference between the best-before date and the use-by date

There are two types of dates on food packaging: the best-before date (THT: *'ten minste houdbaar tot'*) and the use-by date (TGT: *'te gebruiken tot'*). Products with an expired best-before date can still be consumed under normal use without people becoming ill. This date mainly relates to the quality of the food. Products with an expired use-by date are no longer safe to eat. Consumers should eat or freeze these products by the use-by date at the latest, otherwise they may contract a food-borne disease.

4. Flexible in the kitchen

Small wasters are more likely to be households that use leftovers or use opened products in other dishes.² The reason for throwing away food when too much has been cooked is that consumers think they have too little left to store. Or they do not know what they can do with their leftovers or opened products.⁴¹ Flexible dishes, a leftovers day and other inspiration for recipes using leftovers can help reduce waste.⁴² People who used the Netherlands Nutrition Centre's *'Eerst op tape'* (Use It Up Tape) reduced their food waste by 28% on average.⁴³ The tape can be stuck on products in the fridge or store



cupboard that are about to expire. Everyone in the household can then help to eat or drink the product on time. The tape can also be used to frame a shelf in the fridge for products that need to be used up quickly.

Possible solution: recipes, apps and flexible dishes giving ideas for using leftovers and opened products. Using products in stock and leftovers as a starting point for meal planning, for example by encouraging a leftovers day. Using *'Eerst op tape'*.

5. Freezing and cooling

Frozen products will keep for a very long time. Products suitable for freezing include bread, leftovers and meat. Many fruits and vegetables, fresh herbs and leftover coffee can also be frozen (sometimes after blanching) and used later in dishes. Plastic containers, bags and stickers are very useful in this respect. Refrigeration is important for products such as dairy, meat and some vegetables. Storing these products at a temperature of 4°C extends or maintains their storage life. Smaller wasters are more likely to report checking their fridge temperature.⁴ More than half of Dutch people sometimes check their fridge temperature. 28% of Dutch people know that the fridge is best set at 4°C, but only 18% set it at the right temperature. On average, Dutch people set their fridge to 5.6 °C.⁴⁴

Possible solution: inform the public of proper freezing, defrosting and refrigeration methods and the best places for storing food. A fridge thermometer can help keep the fridge at the right temperature of 4°C. Clear storage recommendations on packaging and via an online or offline storage guide can also help.



Figure 7. Refrigerator sticker as a reminder of the correct storage location of products inside or outside the fridge.

6. Smart storage

The way a product is stored plays an important role in its shelf life and safety. Many consumers consistently fail to store some fruits and vegetables in the optimal storage place, such as the fruit bowl or the vegetable drawer in the fridge.

Possible solution: inform the public about correct storage methods. It is helpful to focus on fresh products that are often wasted and often consistently stored in suboptimal locations, such as fruit and vegetables. Figure 7 shows fruit and vegetables that people often store incorrectly and where they have the longest shelf life. Over a tenth of Dutch people have this sticker in their fridge.⁴

Looking to the future

The problem of household food waste has proven difficult to eradicate. Current efforts need to be expanded if we are to meet Sustainable Development Goal 12.3. Below, we provide a brief explanation of three opportunities to do so:^{2, 45}

1. Do not put the onus for finding solutions on consumers alone, but look for opportunities in the food chain as a whole.

Although this fact sheet is about household food waste by consumers, the problem cannot be blamed on that group alone. A key basic requirement is that consumers are well-informed and given guidance on how to prevent food waste. It is therefore important to continue and, where possible, intensify both general and target-group-specific campaigns and interventions.

Household food waste by consumers can be tackled more effectively, however, if effective food education is coupled with a food environment in which avoiding waste comes naturally. One way of doing this is if consumers, producers, retailers and governments work together. For instance, retailers and producers could discharge their responsibilities more fully by offering smaller portion sizes and packages, but also by communicating more clearly about food preservation methods and the right way to interpret expiry dates on packaging. A possible solution would be icons visualising the desired behaviour for the different expiry dates.

2. Implement policies to reduce food waste.

The Dutch government already helps parties like the foundation Food Waste Free United to take action against food waste. Among other things, this has resulted in the Waste-Free Week and various other campaigns against food waste in the Netherlands. It is vital that this work continues. Municipalities can get started with the step-by-step plan for municipalities. That said, the government could do more to combat food waste, for example by introducing legislation and regulations and exploring measures that could have a significant impact, such as a tax on food waste.

3. Make things easy for consumers.

Food waste prevention is a complex endeavour, as it requires a combination of numerous minor behavioural changes. That is why making these changes should be made as easy for consumers as possible. For example, help with tools available in the kitchen such as the 'Eetmaatje' or 'Eerst op tape'. In addition to facilitating the

desired behaviour, they are in the right spot at the right time - which is meal preparation time. However, offering smaller portions, meal kits or pre-cut vegetables in the supermarket also makes it easy for consumers to avoid wastage.

Foundation Food Waste Free United

We need to work together to reduce food waste. That is why the Nutrition Centre is a supporting organisation in the foundation Food Waste Free United (*Samen Tegen Voedselverspilling*). That is why the Nutrition Centre is a supporting organisation in the foundation Food Waste Free United (*Samen Tegen Voedselverspilling*). On behalf of this foundation, the Netherlands Nutrition Centre is responsible for providing guidance and information directed at consumers. The Netherlands Nutrition Centre also works with the foundation to reduce food waste in the food environment, such as in company catering. Finally, the foundation collaborates with the education sector to support challenges and teaching programmes.

United Against Food Waste is a foundation focusing on preventing, reducing and adding value to food waste throughout the food chain. Organisations, companies, the government and knowledge institutions work together in the foundation to fight food waste by joining forces and working towards a single common goal: 'Together, we can make the Netherlands one of the first countries in the world to reduce food waste by half.' Around 110 stakeholders have joined.

www.samentegenvoedselverspilling.nl

Netherlands Nutrition Centre: tools and resources

- Website: www.voedingscentrum.nl/minderverspillen and www.samentegenvoedselverspilling.nl/thuis
- The digital Storage Guide: www.voedingscentrum.nl/bewaarwijzer
- *Eerst op tape* (tape to let the household know what foods and drinks need to be consumed first): webshop.voedingscentrum.nl/producten/veilig-en-duurzaam/eerst-op-tape
- The *Eetmaatje*, a useful measuring cup specially designed for measuring out portions of pasta and rice: www.voedingscentrum.nl/eetmaatje
- The *Ja-Nee Koelkaststicker* (Yes/No fridge sticker), a reminder about the proper storage location of 12 products, and the *Vriezersticker* Freezer sticker): www.voedingscentrum.nl/koele-stickers
- Useful recipes (including tips for what to do with opened products and weekly menus): www.voedingscentrum.nl/recepten
- The recipe app *Slim Koken* (with easy recipes, help preparing the right amounts and smart storage): www.voedingscentrum.nl/receptenapp
- Waste-free recipe booklet: webshop.voedingscentrum.nl/producten/veilig-en-duurzaam/verspillingsvrij-receptboekje
- Teaching materials: www.samentegenvoedselverspilling.nl/educatie
- Step-by-step plan for municipalities: www.samentegenvoedselverspilling.nl/overheid



The following experts were consulted for this fact sheet:

Dr Erica van Herpen, Associate Professor with the Marketing and Consumer Behaviour Group, Wageningen University & Research

Dr Han Soethoudt, Researcher at the Agricultural Research Department (DLO), Wageningen University & Research

Dr Hilke Bos-Brouwers, Researcher at the Agricultural Research Department (DLO), Wageningen University & Research

Prof. Jenny van Doorn, Professor in Service Marketing, University of Groningen

Dr Judith Brouwer, Senior Researcher, Milieu Centraal

Olaf Janmaat, Adviser on Waste Stream Monitoring, Directorate-General for Public Works and Water Management

Toine Timmermans, Director, foundation United Against Food Waste

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Netherlands Nutrition Centre experts:

Lilou van Lieshout, MSc, Expert in Sustainable Food

Joost Knüppe, MSc, Expert in Nutrition and Behavioural Change

With thanks to:

Marjolijn Schrijnen, Food Waste Senior Project Manager

Kristel Zaal, MSc, Expert in Nutrition and Behavioural Change