

4 Household behaviour and waste practices

Growing volumes of municipal solid waste threaten environmental quality and pose environmental safety hazards. Food waste is an important component of household waste, contributing to between 8-10% of total greenhouse gas emissions. This chapter presents observations from the third round of the OECD Survey on Environmental Policies and Individual Household Behaviour Change (EPIC) on households' waste-related practices: their use of collection services for recyclables and mixed waste, their food waste habits, and actions to reduce waste by reusing and repairing. It also analyses the impact of waste charging and collection policies on households' waste behaviour.

Key findings

- **Households act to reduce waste by engaging in low-effort activities, but struggle to change their consumption habits.** Overall, 83% of households report frequently using reusable shopping bags and over half report frequently repairing damaged items and buying less environmentally harmful products. However, considerably fewer buy second-hand (37%), or rent or borrow items (22%). Households concerned about the environment are more likely to reduce consumption, suggesting that environmental concern can be leveraged in efforts to reduce waste generation, for example through targeted communication efforts.
- **Household engagement in recycling can be improved by making it more convenient.** Average reported recycling rates for all materials range from 34% in Israel to 71% Switzerland. These rates are generally lower for food waste separated for composting, ranging from 26% in Israel to 58% in Sweden. The availability of recycling collection services is associated with less mixed waste generation. Households with services that collect recycled waste from their residence generate 42% less waste than households with no such service. This share falls to 26% for households that take their recycling to drop-off centres. Households report that greater financial incentives (43%), the option to have waste collected at home (37%) and more accessible collection or drop-off services (39%) would encourage them to separate a greater share of their waste for recycling or composting.
- **Expanding charging schemes for mixed waste disposal could be considered for improving waste management.** Households charged for the amount of mixed waste they generate report composting 55% of their food waste, while those that are not charged report composting 35% of their food waste. However, 19% of respondents – and up to 41% in Israel – report that they are not charged for disposal services. The expansion of charging schemes for mixed waste disposal is therefore a priority for reducing waste generation.
- **Better information could yield additional reductions in waste generation and increases in recycling.** For example, on average 14% of households report still disposing of electric and electronic waste along with mixed waste (up to 27% in Israel). Households also indicate that they throw spoiled food away primarily because they forgot about it (36%) or cooked or bought too much (22%). Many households cited a lack of space (27%) and that they perceived composting as unpleasant (17%) as the main reasons for not composting more. Clarifying and standardising expiration date labels (e.g. distinguishing between “expiry” and “best-before” dates) and providing information on how to safely store food were identified as helpful tools for reducing food waste.

4.1. Introduction

Demographic change, economic growth and the accompanying lifestyle changes are the main factors contributing to growing material use and solid waste (OECD, 2019_[1]; Diaz-Farina, Díaz-Hernández and Padrón-Fumero, 2020_[2]; Karri, Ravindran and Dehghani, 2021_[3]). While the material intensity of economies is projected to decrease over time with improved technology and a shift in economic activity towards less resource-intensive sectors, there are still numerous environmental consequences related to the extraction and processing activities required to obtain resources, use and dispose of them (OECD, 2019_[1]).

Sustainable material use has been a political priority for decades (UNEP, 2022_[4]; UN, 1992_[5]; OECD, 2008_[6]; UN, 2015_[7]). This has contributed to a political focus on reducing waste generation and enhancing the resource efficiency of economies and the circularity of materials use, commonly referred to as circular economy (OECD, 2022_[8]). Related policy measures include those that address individual or household waste generation by encouraging recycling, reuse and repair, as well as improved product durability and enhanced or extended product use. Shared economy approaches such as car sharing and purchasing items second-hand are examples of enhanced or extended product use.

The management of solid waste nonetheless remains a challenge. Definitions of municipal solid waste vary, but in general the term refers to the waste generated, collected, transported and disposed of within a municipality (Periathamby, 2011_[9]). Across country contexts, this may include waste generated by households and commercial, transportation, industrial, health and service sectors. The focus in this chapter is on solid waste produced by households, including biodegradable food waste, mixed waste, and electrical and electronic waste.

Global municipal solid waste was estimated at just over 2 billion tonnes in 2016,¹ a third of which was dumped, i.e. it was uncollected, thrown in waterways, burned or treated by other methods, or not accounted for by any disposal method (Kaza et al., 2018_[10]). By 2050, global municipal solid waste could increase to 3.4 billion tonnes, outpacing projected population growth (Kaza et al., 2018_[10]). Although the projected pace of growth in municipal solid waste is more than twice as high in middle-income countries than in high-income countries, there is no established relationship between economic growth and waste generation.²

Average waste generation per capita in OECD countries was over 530kg in 2020³ (OECD, 2022_[11]). Of this waste, 37% was recycled, composted or recovered; 43% was buried in landfills, and 20% was incinerated and energy recovered from the process. Between 2000 and 2020, the share of waste in OECD countries that was diverted from the waste stream and transformed into products with potential economic or ecological benefits increased from 27% to 37%. Over the same period, the share buried in landfills declined from 56% to 43%, while incineration with energy recovery increased from 17% to 20% (OECD, 2022_[11]).

When not managed properly, municipal solid waste adversely affects environmental quality and poses environmental safety hazards. Globally, mismanaged waste is the main source of leakage of macroplastics such as plastic bottles and packaging into the environment (OECD, 2022_[12]). In 2019, an estimated 22 million tonnes of plastic leaked into the environment. Macroplastics accounted for 88%, primarily attributed to inadequate waste collection and disposal.⁴ The leakage of plastic waste into the environment doubled between 2000 and 2019, with non-OECD countries accounting for 86% (OECD, 2022_[12]). Mismanaged waste can also adversely affect human health and social equity (Khatiwada et al., 2021_[13]). Landfilling, for example, can contribute to underground water and marine pollution due to the leaching and run-off of organic, inorganic and other substances, as well as to air pollution due to the suspension of particles and release of odours (Siddiqua, Hahladakis and Al-Attiya, 2022_[14]).

Food waste is an important component of household waste, and one that has been receiving increasing attention in recent years (Dou and Toth, 2021_[15]). Global estimates suggest that as much as one-third of food produced for human consumption is lost or wasted every year (UNEP, 2021_[16]). Between 2010 and

2016, global food loss and waste was responsible for 8-10% of total greenhouse gas emissions (IPCC, 2022_[17]). In Europe, 65% of total food waste has been attributed to households and food service entities (Stenmarck et al., 2016_[18]); in the United States, households account for about 40% of total food waste generation (EPA, 2023_[19]). Food loss and waste is in part due to supply-side determinants (e.g. the amount of food produced), but demand-side determinants (e.g. consumer choices, preservation and use) are also important drivers (Verma et al., 2020_[20]).

Measures to promote a more circular economy reduce the need for new production and support demand for more sustainable products (CISL, 2022_[21]; Material Economics, 2018_[22]). In the European Union context, evidence indicates that such measures have the potential to reduce carbon dioxide (CO₂) emissions by as much as 296 million tonnes (or 56%) per year by 2050 (Material Economics, 2018_[22]). Policy mixes to promote a more circular economy should include economic instruments, regulations and information-based and voluntary approaches. This includes ensuring affordable waste collection services, product taxes, deposit-refund schemes, disposal fees, and environmental labelling⁵ (OECD, 2021_[23]). The successful design and implementation of such measures requires an understanding of households' current engagement in, and contributions to, waste generation and disposal.

This chapter provides an overview of the data gathered from the third round of the OECD Survey Environmental Policies and Individual Behaviour Change (EPIC) on a variety of household decisions related to waste generation and management.⁶ It explores in particular, households':

- actions to reduce, reuse and repair
- the coverage of mixed waste and recycling collection services, and charging schemes
- generation of mixed waste and recyclable waste
- food waste.

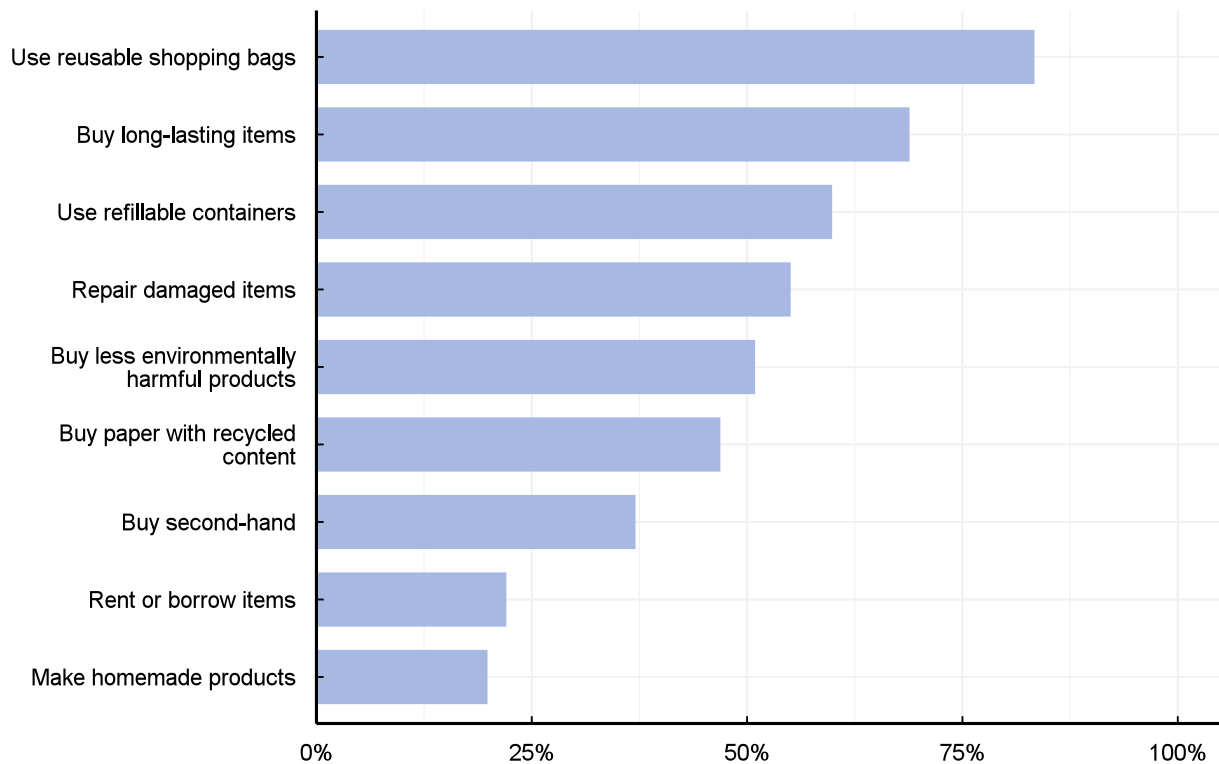
For each of these areas, the chapter uses representative country samples to analyse differences in respondents' behaviours and attitudes across relevant variables, including income level, residence type and location, ownership status and level of environmental concern.

4.2. Reduce and reuse behaviour

Household actions to reduce waste (e.g. reducing consumption and reusing or repairing when possible) are an important component of waste management. The EPIC Survey asked households how often they engage in nine actions to reduce waste (Figure 4.1). Using reusable shopping bags was the most common action, with 83% of households reporting doing so frequently. Over half report using refillable containers (60%), repairing damaged items instead of buying new ones (55%), and buying products that are less environmentally harmful (51%). However, fewer households report acting to reduce waste upstream of the point of disposal, such as by buying second-hand (37%), renting or borrowing items (22%) and making homemade products (20%). Using reusable shopping bags is most common in the United Kingdom, where 93% of households report often or always doing so, and least common in the United States, where 70% report doing so. Regular use of refillable containers is practised by between 47% of respondents in Israel and 73% in Switzerland, and buying second-hand items is practised by between 20% of respondents in Israel and 44% in the United Kingdom. Respondents report making homemade products least in the Netherlands (11%), and most in the United States (28%).

Figure 4.1. Certain waste reduction practices are more common than others

Percentage of respondents often or always engaging in the following waste reduction practices (bars) and minimum and maximum country-level engagement (line)



Note: This survey item asked respondents: "How often does your household do the following?" For each item, respondents selected never, occasionally, often, always or don't know. The bar represents the percentage of respondents across all countries engaging in the practice and the blue line shows the range of country-level engagement.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

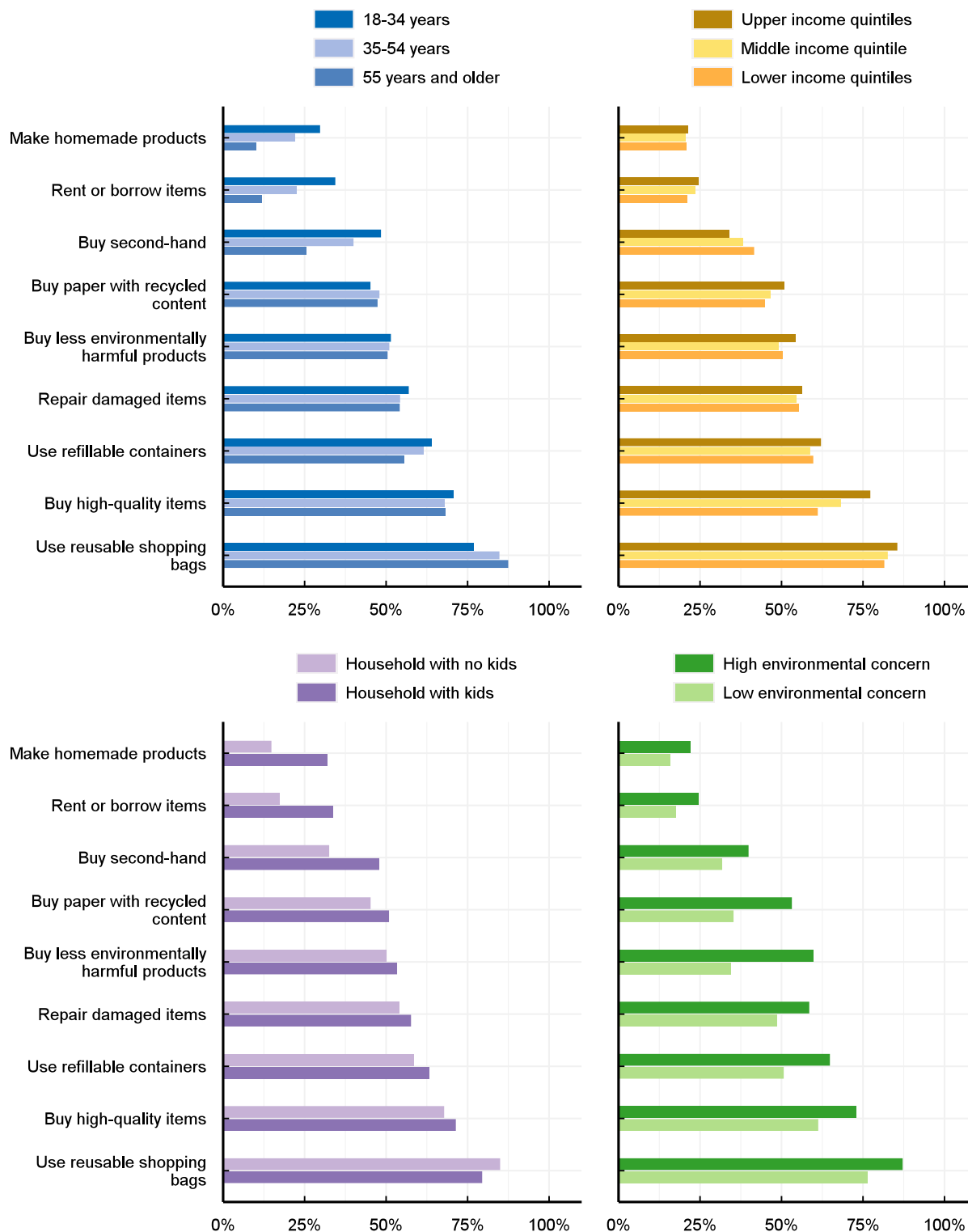
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Households' waste reduction practices were analysed against several characteristics (age, income level, having children in the household and level of environmental concern) (Figure 4.2). While older respondents report using reusable shopping bags slightly more than younger respondents, they engage less in other reduce and reuse behaviours such as renting or borrowing items, making homemade products and buying second-hand. Households with children report greater engagement in buying second-hand, renting and borrowing, and making homemade products than households without children. Compared with low-income households, high-income households more frequently report that they buy high-quality items that will last, but they buy second-hand items less frequently.

Environmental concern appears to be associated with increased engagement in all types of behaviours, but is most strongly associated with buying products that are less environmentally harmful (e.g. cleaning products) and products with recycled content. These findings point to the potential impact of targeted communication efforts to further encourage such behaviour among those who are environmentally concerned (Heo and Muralidharan, 2017^[24]; Grimmer and Woolley, 2014^[25]). Concern for plastic pollution has no significant impact on waste reduction practices.

Figure 4.2. Households concerned about the environment are more likely to reduce and reuse

Percentage of respondents indicating that their household often or always engages in waste reduction practices



Note: This survey item asked respondents: "How often does your household do the following?" For each item, respondents selected never, occasionally, often, always or don't know.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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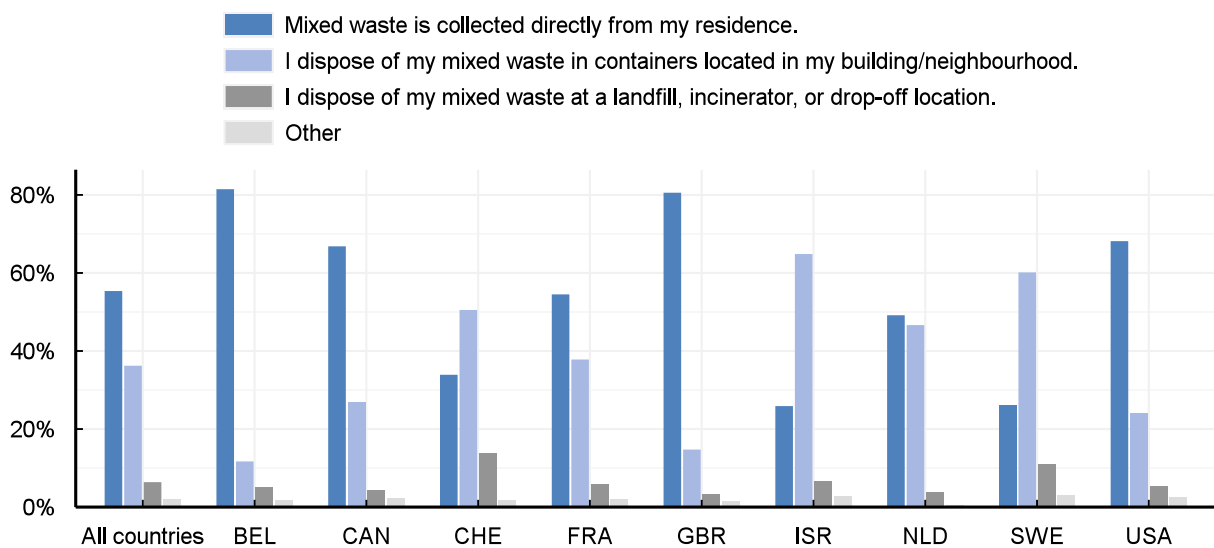
4.3. Waste collection services and charging schemes

4.3.1. Waste and recycling collection services

There is significant variation in the waste collection services available across countries (Figure 4.3). Overall, 55% of households report that mixed waste is collected directly from their residence and 36% of households report that it is collected from containers located in their building or neighbourhood. In Belgium and the United Kingdom, a majority of households (81% in both countries) report that their waste is collected at their place of residence; in Sweden and Israel, only 26% of households report kerbside collection.

Figure 4.3. Collection of mixed waste directly from residences is not systematic across countries

Percentage of households primarily using each disposal method



Note: This survey item asked respondents: "How do you dispose of your mixed (non-recyclable, non-compostable) waste? Please select your primary method of disposal."

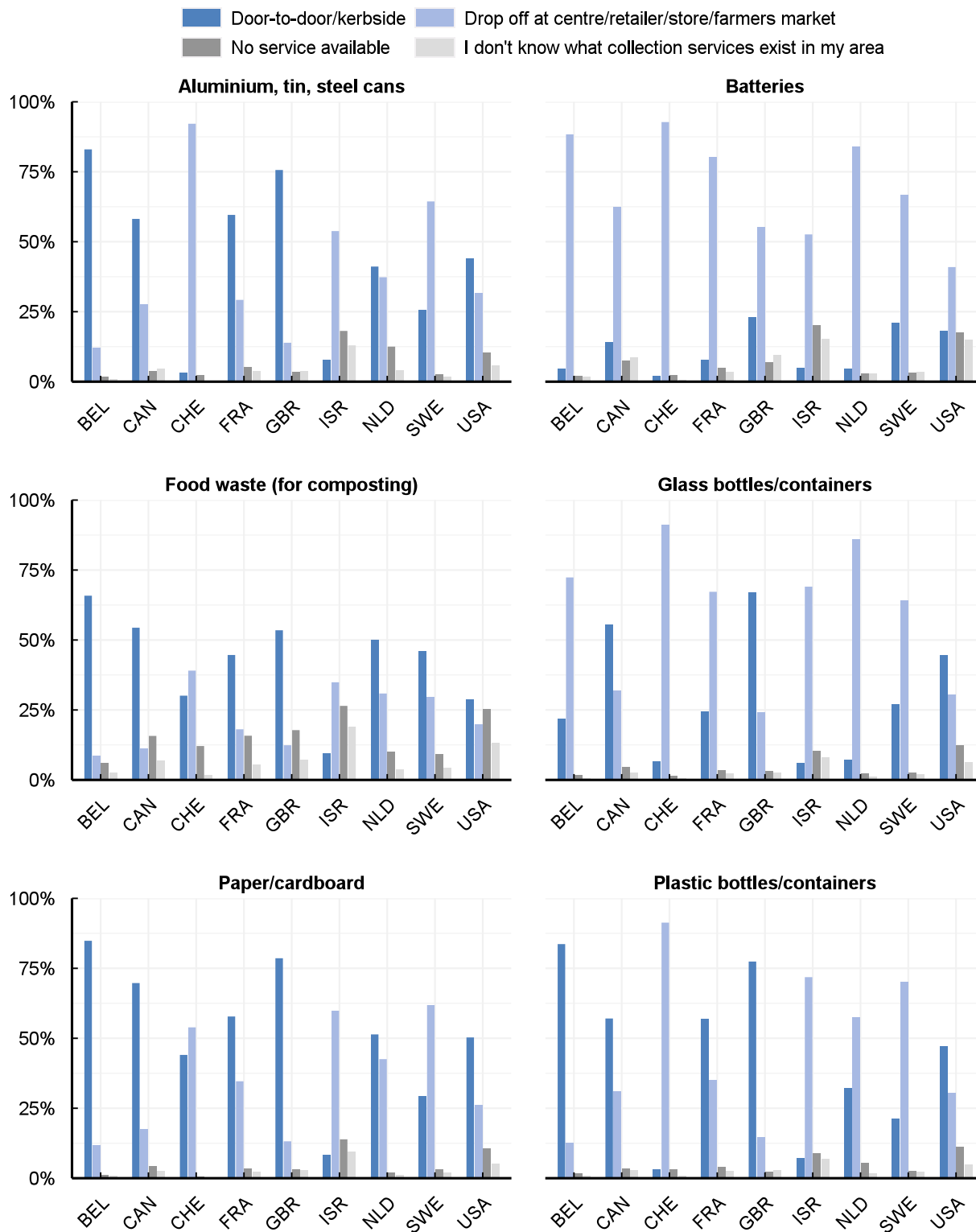
Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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Across the sample, the vast majority of households report using either services that collect waste from their residence or from drop-off collection sites for most types of recyclable materials (Figure 4.4). The relative use of these services varies by country and the type of material considered, and there are no striking differences in collection services between urban and rural locations. Most households in Belgium, Canada, France and the United Kingdom, for example, report recycling aluminium, tin and steel cans at the kerb, whereas most households in Switzerland, Israel and Sweden report using drop-off centres. Among households that report separating batteries from mixed waste, most dispose of them at drop-off centres. Services for collecting separated food waste appear to be the least provided overall, with an average of 15% of respondents across countries reporting that there are no collection or drop-off services available in their area (reaching 25% and 26% in the United States and Israel, respectively). Overall, a lack of knowledge of the existence of disposal and composting services is highest for food waste and batteries.

Figure 4.4. Food waste and batteries often lack suitable disposal services

Percentage of households primarily using each disposal method



Note: This survey item asked respondents: "What is the main waste collection service you use to dispose of the following?" For each recyclable material, respondents could also indicate that they did not generate that type of waste.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

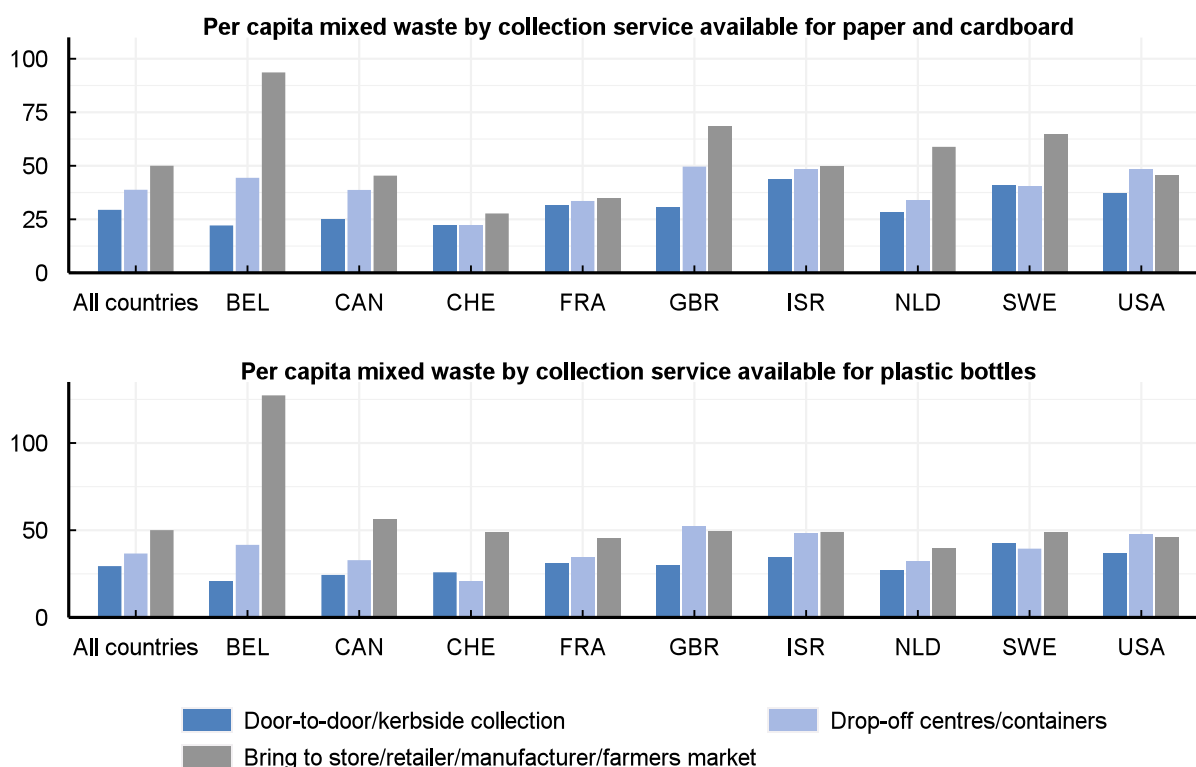
Some changes over time in the coverage of collection services for mixed and recyclable waste are noted in countries participating in both the second (2011) and third (2022) rounds of the EPIC Survey.⁷ In France, responses indicate that there has been a modest increase in kerbside collection services for metal, but a decrease in drop-off sites for food waste, paper and cardboard. In the Netherlands, kerbside collection of plastic and other recyclables, and drop-off and kerbside collection services for metals, appear to have become somewhat more widespread as well. In Sweden, survey results suggest that kerbside collection services have become more available for paper and cardboard, glass, plastic, metal and food waste.⁸ In Switzerland, the collection of paper and cardboard has shifted away from kerbside collection towards drop-off services. However, considerable proportions of the sample report not knowing what collection services exist, indicating some uncertainty regarding the actual coverage of different types of waste collection services (see Box 4.1 in Section 4.3.2).

The presence of a recycling collection service is associated with less mixed waste being generated per capita (Figure 4.5). Households with kerbside recycling collection generate 42% less mixed waste than households without a collection service. Households that only have drop-off recycling collection services produce 26% less mixed waste than households without a collection service. Households with no reported access to recycling collection services for plastic bottles generate on average 50 litres of mixed waste per capita per week, while those with drop-off services and kerbside collection services available generate 37 and 29 litres, respectively. Results are similar for paper and cardboard recycling collection services.

In addition, households with kerbside collection for plastic packaging recycle 62% of plastic waste, compared to 54% for households that take their plastic waste to a collection site. Similar observations are apparent for glass and plastic bottles, paper and aluminium (Figure 4.6). These results indicate that the provision of collection services for recyclable materials is an important component of policy approaches to reduce mixed waste generation and increase recycling. Overall, these results are in line with findings from the 2011 EPIC Survey, which showed that the availability of door-to-door or drop-off services was associated with approximately 28% to 45% less mixed waste in 8 of the 11 countries surveyed. However, less of a difference was observed in mixed waste generation for kerbside versus drop-off collection services in 2011 compared to 2022 (OECD, 2014_[26]).

Figure 4.5. Household engagement in recycling can be improved by making it more convenient

Average mixed waste generated each week (litres per capita)



Note: This survey item asked respondents: "On average, how many of the following bags/bins of mixed waste (i.e. non-recyclable and non-compostable waste) does your household generate each week?". The graphs group respondents by their recycling service for paper and cardboard and for plastic bottles. The number of respondents with no recycling service available for paper is as follows: BEL: 6, CAN: 32, CHE: 6, FRA: 28, GBR: 25, ISR: 115, NLD: 15, SWE: 23, USA: 167. The number of respondents with no recycling service available for plastic bottles is as follows: BEL: 12, CAN: 24, CHE: 22, FRA: 30, GBR: 19, ISR: 78, NLD: 48, SWE: 19, USA: 180.

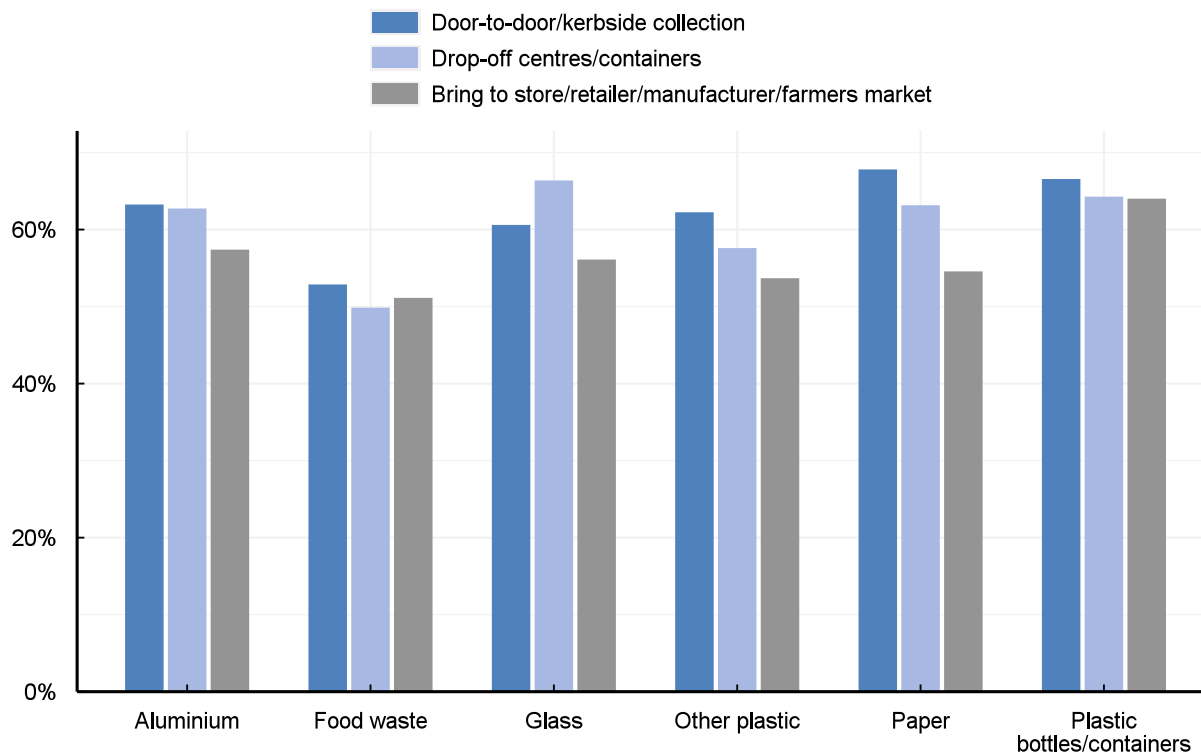
Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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In addition to their impact on reducing mixed waste, services that collect waste from households' residences appear to be associated with slightly higher recycling rates than services requiring households to return materials to a collection site. Households with kerbside collection for plastic packaging recycle 62% of plastic waste compared to 54% for households that bring their plastic waste to a collection site. Similar observations are apparent for glass and plastic bottles, paper and aluminium (Figure 4.6).


Figure 4.6. Kerbside and door-to-door recycling collection services encourage more recycling

Average percentage of waste separated for recycling or composting



Note: This survey item asked respondents: "Please indicate approximately what percentage of each of the following items your household recycles or composts". Response options were: less than 10%, 25%, 50%, 75%, more than 90%, I don't recycle/compost these items (0%), I don't produce this kind of waste and don't know. The averages displayed in this figure are calculated using the frequency of response types excluding respondents who don't produce this type of waste or responded don't know and assuming values of 5% and 95% for the response categories less than 10% and more than 90%.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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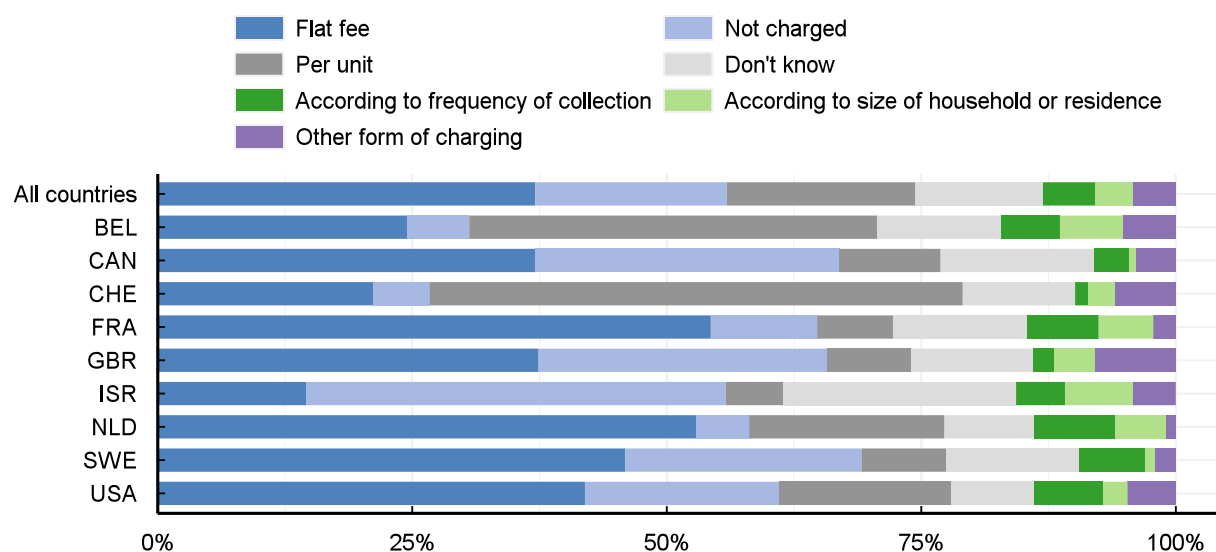
4.3.2. Waste charging schemes

A significant proportion of respondents (19%) report not being charged for waste disposal (Figure 4.7). This proportion is highest in Israel (41%), followed by Canada (30%) and the United Kingdom (28%). Across countries, the most common arrangement is a flat fee for waste disposal (37% of households), reaching 54% in France and 53% in the Netherlands. Another 19% of households are charged per unit of waste, with this being most common in Switzerland (52% of households). It should be noted that 13% of respondents across countries report that they do not know what waste charging scheme is in place. For example, if flat fees are incorporated into municipal taxes, respondents may not know how they are charged for mixed waste disposal.

Some changes in waste charging schemes are apparent between 2011 and 2022. Although the use of flat fees appears to have decreased in Israel, results suggest that they have become more prevalent in the Netherlands. Slight increases in the use of per-unit charges are observed in Canada and the Netherlands. In Israel and Sweden, fewer households report being charged in 2022 than in 2011.

Figure 4.7. A flat fee for mixed waste disposal is the most common charge overall

Percentage of respondents indicating their household is subject to different types of charges for mixed waste disposal



Note: This survey item asked respondents: "How is your household charged for the collection of mixed (non-recyclable, non-compostable) waste at your primary residence? Please select the most relevant option."

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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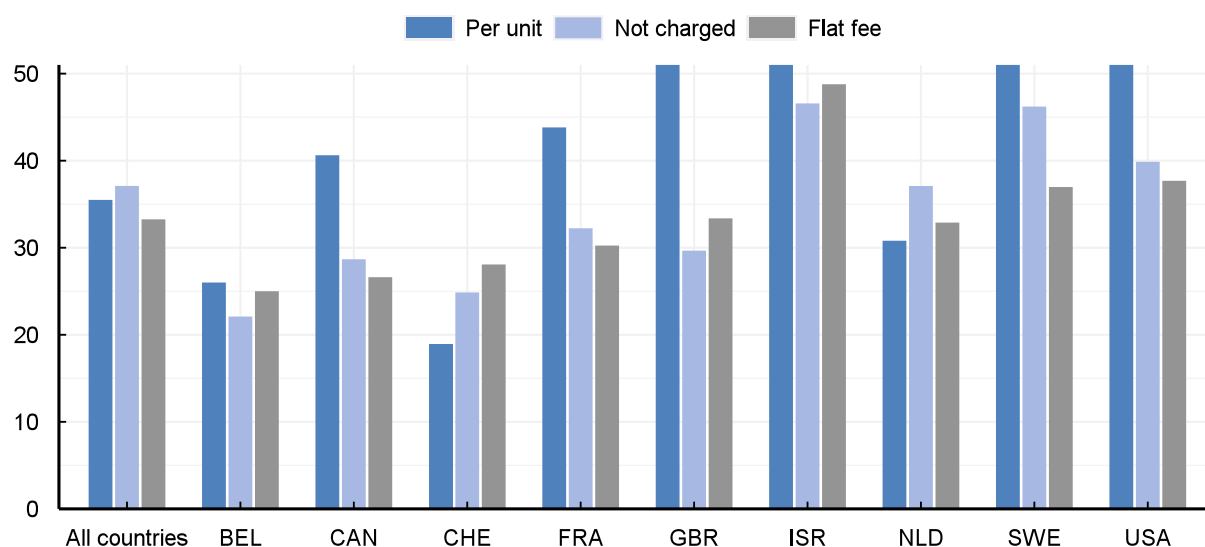
Charging schemes for mixed waste are designed to reduce mixed waste generation by internalising the costs of waste disposal. The effectiveness of such schemes is likely to depend on a number of factors, such as the level of charges imposed and the characteristics of the communities in which they are implemented. Evidence suggests that the most effective policy strategies may involve a combination of measures aimed at both mixed and recyclable waste, such as combining door-to-door recycling collection services with per-unit charges for the disposal of mixed waste (Montevecchi, 2016^[27]; Allers and Hoeben, 2009^[28]).

In five out of nine countries in the sample, households that report they are charged a flat fee for waste disposal appear to generate less mixed waste (33 litres) than households that are not charged at all (37 litres) (Figure 4.8). Results for the effect of per-unit charges on waste generation are less conclusive. Per-unit charges require households to pay a fee proportional to the amount of mixed waste they generate. These charges are only associated with lower waste generation in two countries in the sample: the Netherlands (17% less) and Switzerland (24% less). These findings are consistent with other research examining the impact of per-unit charges in the two countries (van Beukering et al., 2009^[29]; Pfister and Mathys, 2022^[30]). In other countries, however, per-unit charges are associated with greater waste generation. This counter-intuitive result is not conclusive and warrants further analysis to take into account additional factors that may impact waste generation (e.g. household size, residential location, type of unit charge).

At least two considerations are important when interpreting these results. First, it is possible that some respondents may not be fully aware of the collection services and waste charging schemes in their area (Box 4.1). Between 8% of respondents (in the United States) and 23% (in Israel) report not knowing how they are charged for their waste collection. Second, these mixed results do not control for a variety of context-specific variables – such as frequency of collection, income or residential location – which could also affect waste generation. The data suggest the possibility of an inverted U-shaped relationship between income and waste generation in some countries, whereby those in the lowest and highest income quintiles generate less waste per capita than those in the middle-income quintile. Further analysis controlling for additional factors will be necessary to better isolate the impact on waste generation of individual variables such as socioeconomic characteristics, collection service provision or waste charging schemes.

Figure 4.8. The impact of charging schemes on mixed waste generation is unclear

Average per capita mixed waste generated each week (in litres)



Note: This survey item asked respondents: "On average, how many of the following bags/bins of mixed waste (i.e. non-recyclable and non-compostable waste) does your household generate each week?". The graph groups respondents by their collection charge for mixed waste. The sample sizes for collection charges in each country are the following: BEL Flat fee 225, BEL Not charged 58, CAN Flat fee 334, CAN Not charged 250, CHE Flat fee 194, CHE Not charged 56, FRA Flat fee 483, FRA Not charged 89, GBR Flat fee 343, GBR Not charged 238, ISR Flat fee 128, ISR Not charged 359, NLD Flat fee 474, NLD Not charged 37, SWE Flat fee 397, SWE Not charged 188, USA Flat fee 687, USA Not charged 314.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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Box 4.1. Differences in reported and actual services and charging schemes for mixed and recyclable waste in the survey

The availability of collection services, charging schemes for mixed waste and incentives for recycling differs across countries included in the sample. There is also considerable variation within countries, as solid waste policies are often implemented at the subnational level. Reported recycling collection service coverage in the EPIC Survey differs in some cases from information on the actual measures that were in place in 2015, as reported by the European Commission (European Commission et al., 2015_[31]):¹

- **In Belgium**, door-to-door collection services for paper were reported by the European Commission to be available to 100% of households in 2015. In the EPIC Survey, 85% of respondents from Belgium reported that this was the case in 2022. In contrast, reported availability of door-to-door collection services for glass appears to align with actual availability, as 20-30% of households in Belgium had such services available in 2015, and 22% report this as being the case in 2022.
- **In the United Kingdom**, 94% of households were estimated to have access to door-to-door collection services for mixed recyclables (paper, cardboard, plastic and metal) in 2015, but only 67-70% of households report this service for metals, glass and plastic recyclables in the EPIC Survey.
- **In the Netherlands**, less than 18% of households had door-to-door collection services available for food waste in 2015, while 50% of households surveyed reported them as available in 2022.
- **In Sweden**, 12% of households were estimated to have collection services available in 2015, while 46% of households report them being available in 2022.

In Belgium and the United Kingdom, this difference may be due to a lack of awareness rather than a decline in service availability, whereas in the Netherlands and Sweden, this difference may reflect in part an increase in service availability between 2015 and 2022.

National statistics on charging scheme coverage at the country level are difficult to find given that waste is managed at various municipal levels by both private and public service providers. There is evidence here of some discrepancy between actual and self-reported coverage of charging schemes in place. In the United Kingdom, for example, 54% of households report some type of charging service (either a flat fee, per-unit charges or some other type) for the disposal of their mixed waste. However, variable charging for mixed waste disposal is prohibited under the 1990 Environmental Protection Act in the United Kingdom. The discrepancy between collection service availability as reported in the EPIC Survey and actual availability could indicate a lack of household awareness regarding the presence and type of charges in place for mixed waste disposal.

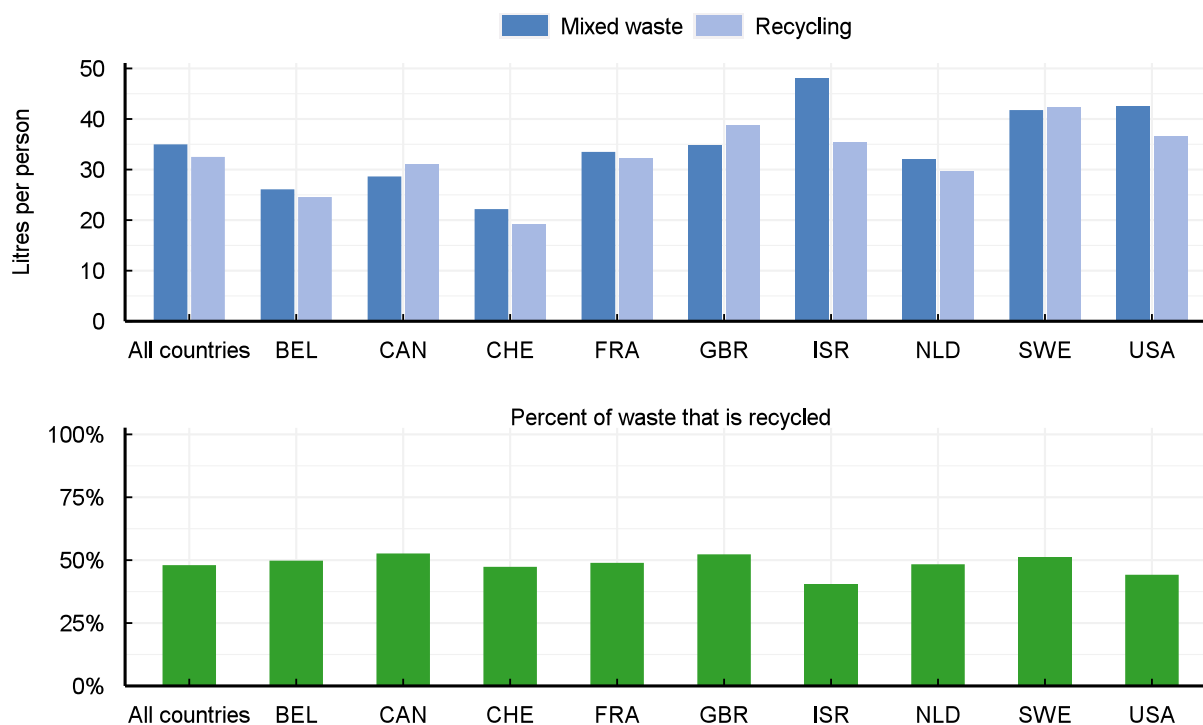
1. This is the most comprehensive recent data available on the coverage of waste services for many of the countries in the sample.

4.4. Household volumes of mixed waste and recycling

Across the nine countries surveyed, households report generating an average of 34 litres of mixed waste and 32 litres of recyclable waste per person per week (Figure 4.9).⁹ Respondents in Switzerland report generating the least amounts of both mixed and recyclable waste (22 and 19 litres per person respectively). Respondents in Israel report generating the most mixed waste (48 litres per person), while those in Sweden report recycling the most waste (42 litres per person). Recycling rates, i.e. the percentage of total waste that is recycled, calculated using the reported amounts of mixed and recyclable waste generated, vary between 40% (in Israel) and 53% in the United Kingdom.

Figure 4.9. Average weekly waste generation

Litres per person of mixed waste and recycling, and percent of household waste that is recycled



Note: For each respondent the proportion of waste that is separated for recycling is calculated as the household's weekly per capita recycling waste divided by household per capita mixed waste plus household per capita recycling waste. The table reports country averages of this proportion calculated at the household level.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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The most commonly recycled materials across the sample are plastic bottles and containers (62%), and paper and cardboard (61%). Recycling rates for metal and glass are slightly lower (57% and 59%, respectively). An average of 51% of respondents across the sample reports separating batteries from mixed waste (Figure 4.10), while overall 12% of households report that they never separate batteries from mixed waste (highest in the United States, at 27%). In addition to the volume of waste generated per week, respondents were also asked to estimate the percentage of their waste that they separate for recycling or composting (Figure 4.10). Households in Israel and the United States report sorting a lower percentage of their waste than other countries (33% and 43%, respectively). Respondents in the remaining seven countries report sorting an average of 62% of their waste for recycling or composting. In all countries, food waste is sorted least (44% of food waste is separated, ranging from 26% in Israel to 58% in Sweden). It is worth noting that while 27% of the sample reports separating over 90% of their food waste for composting, for 36% of the sample, the share separated is less than 50%. Another 19% of the sample report that they do not separate food waste at all. Section 4.5 presents further results regarding food waste and composting.

Figure 4.10. Plastic and paper/cardboard are separated for recycling most often

Average percentage of waste separated for recycling or composting



Note: This survey item asked respondents: "Please indicate approximately what percentage of each of the following items your household recycles or composts".

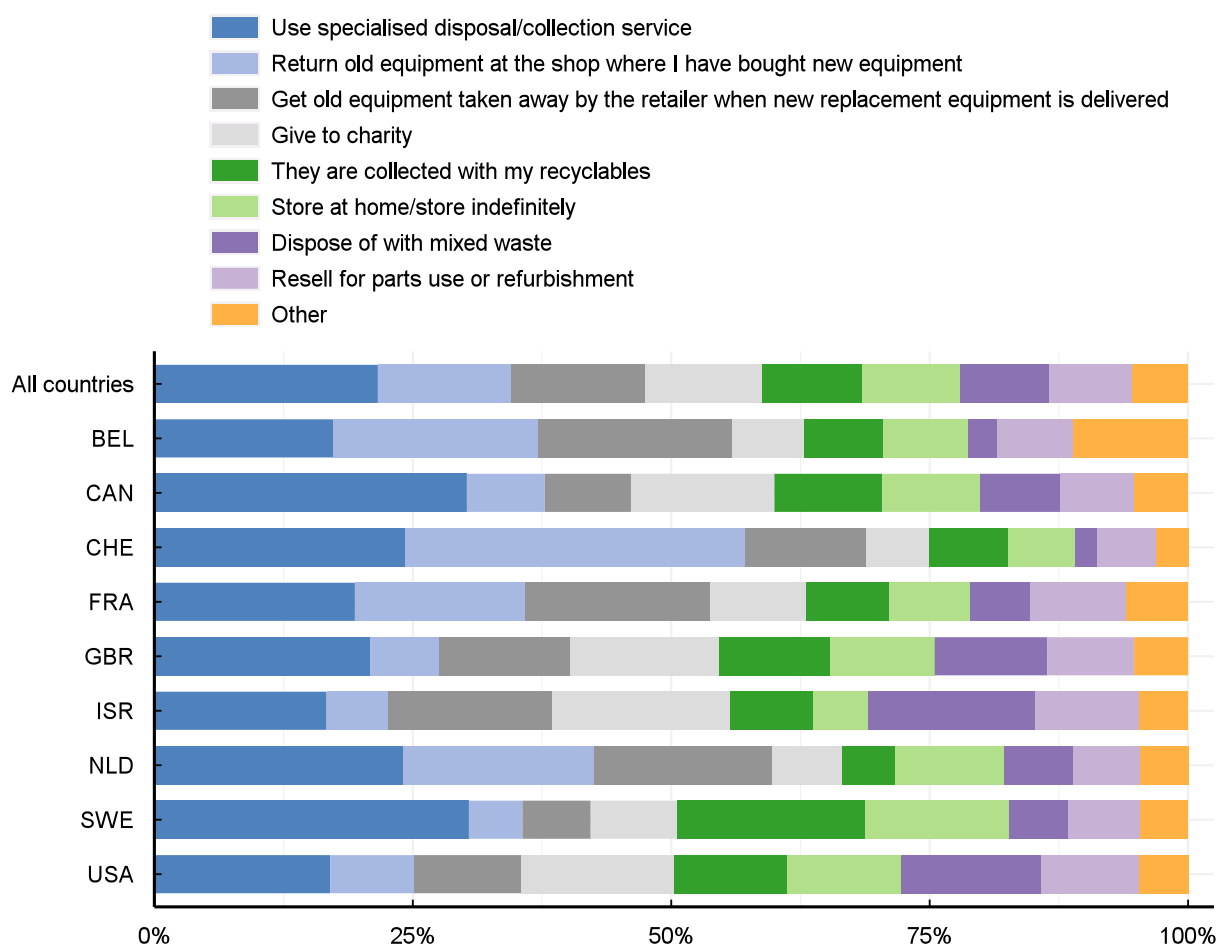
Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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All countries in the sample are characterised by a diverse mix of disposal methods for old or broken electronic equipment, with no one method dominating in any country (Figure 4.11).¹⁰ Households report using a specialised disposal or collection service most often, accounting for 22% of total responses. Other common disposal methods are having old equipment taken away by a retailer when new equipment is delivered (13%) and returning old equipment to the retailer (13%). Disposing of electronic equipment along with mixed waste accounted for 9% of the total responses given. This is a significant improvement compared to the 2011 round of the survey, when 34% of respondents reported disposing of electronic equipment with mixed waste. The shares of respondents that report doing so are greatest in Israel, the United States and the United Kingdom, where 16%, 14% and 11% of households respectively report disposing of electronic equipment with mixed waste in 2022.


Figure 4.11. A minority of households dispose of old or broken electronic and electric equipment with mixed waste

Relative proportion of each reason cited



Note: This survey item asked respondents: "In general, how do you dispose of old or broken electronic and electric equipment? Please select all that apply." The values reported reflect the proportion of times that a given reason was cited out of the total number cited.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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Overall, households in the third EPIC Survey report generating less mixed waste than households in the second round of the survey in 2011 (OECD, 2014^[26]). In France, for example, average reported weekly household mixed waste generation per capita was approximately 40 litres in 2011, compared to approximately 34 litres in 2022. In Israel, respondents reported generating upwards of 60 litres of mixed waste per capita per week in 2011, compared with 48 litres in 2022. The impact of the COVID-19 pandemic on self-reported waste generation is presented in Box 4.2.

Box 4.2. Implications of Covid-19 for waste behaviours

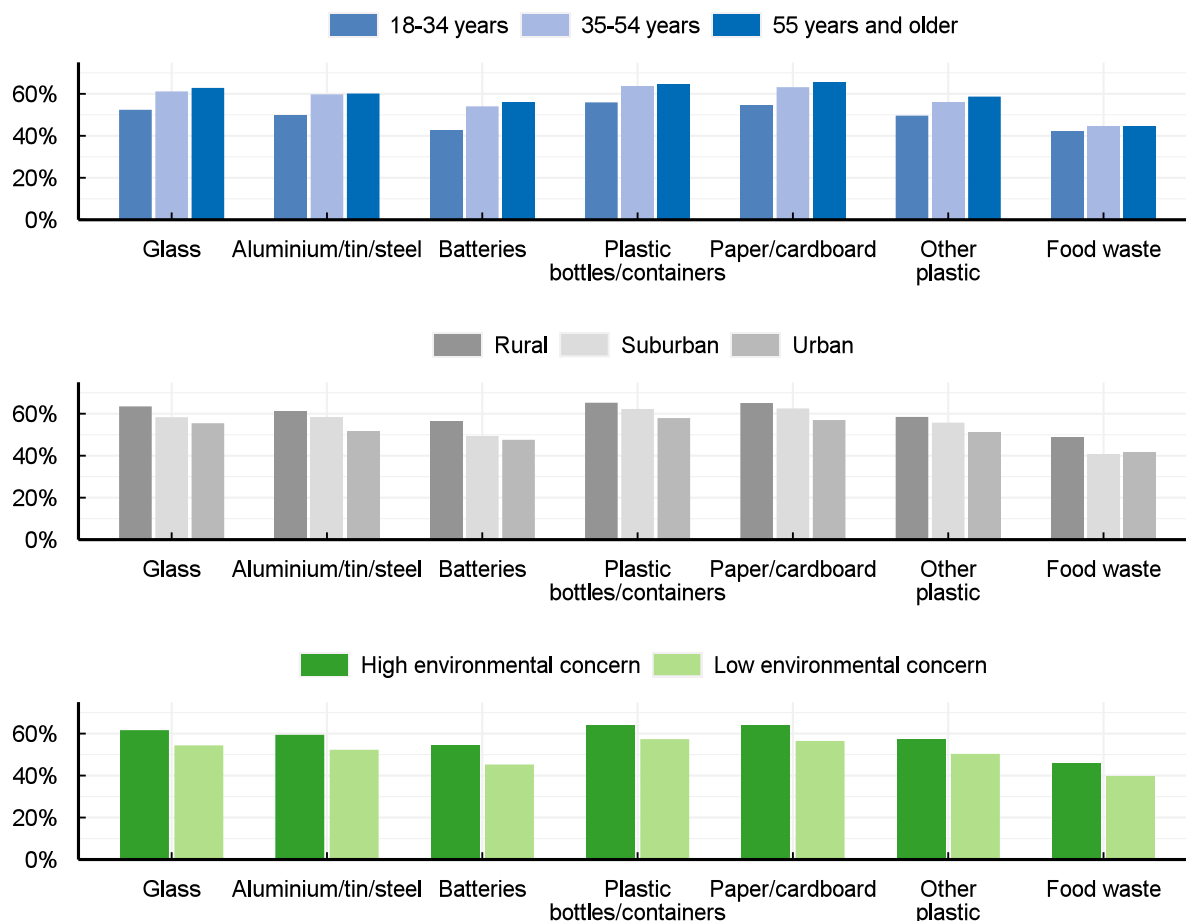
Evidence indicates that increased time teleworking can lead to both increased as well as decreased rates of waste generation, depending on the amount of teleworking a household engages in (Amicarelli et al., 2022^[32]). When asked about changes in the amount of waste generated over the course of the COVID-19 pandemic, households overwhelmingly reported that the amount of mixed and recyclable waste that they generate did not change. This finding is consistent with evidence indicating that although the pandemic decreased plastic use in the short term due to reduced economic activity, it does not appear to have affected the long-term trend of increasing plastic use (OECD, 2022^[12]).

Age, residential location and level of environmental concern appear to be associated with high recycling rates, while there is no strong association with education (Figure 4.12). Respondents aged 55 or over report recycling 9% more of their recyclable waste on average than respondents aged 18-34. Respondents who live in rural areas also report recycling a slightly greater share than those in suburban and urban areas. A potential explanation for this result is that urban residents may face greater space constraints for storing recyclable material (Timlett and Williams, 2009^[33]). They may also be more likely to live in apartment buildings with diffused responsibility for waste sorting (Slater, 2019^[34]). Finally, smaller households also appear to generate more waste and recyclable material per capita (Figure 4.13).¹¹

While environmental concern appears to be associated with the choice to sort or not sort household waste, it does not appear to affect the amount of waste that gets separated (Figure 4.12). Households that are highly environmentally concerned are roughly twice as likely to recycle at least some materials, but among households that sort, those that are environmentally concerned report separating 58% of their recyclable waste, while those that are not report separating 51%.

Figure 4.12. Age, a rural location and high environmental concern are associated with greater recycling and composting

Percentage of waste separated for recycling or composting by age, residential location and environmental concern



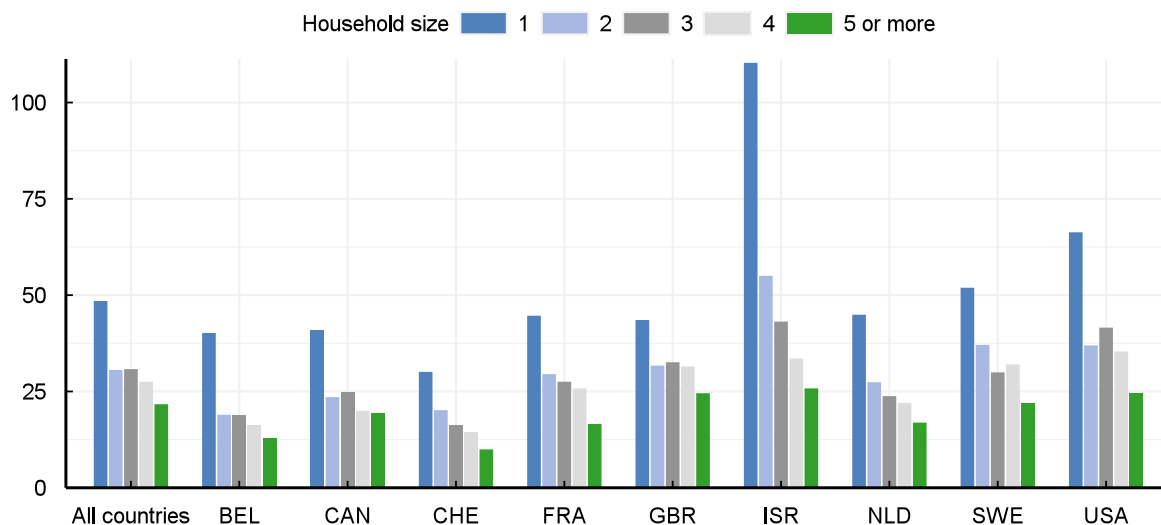
Note: This survey item asked respondents: "Please indicate approximately what percentage of each of the following items your household recycles or composts". Response options were: less than 10%, 25%, 50%, 75%, more than 90%, I don't recycle/compost these items (0%), I don't produce this kind of waste and don't know. The averages displayed in this figure are calculated using the frequency of response types excluding respondents who don't produce this type of waste or responded don't know and assuming values of 5% and 95% for the response categories less than 10% and more than 90%.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

StatLink  <https://stat.link/5m8397>

Figure 4.13. Smaller households produce more waste per person on average

Litres per person of mixed waste per week



Note: This survey item asked respondents: "On average, how many of the following bags/bins of mixed waste (i.e. non-recyclable and non-compostable waste) does your household generate each week?".

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

StatLink <https://stat.link/do7jib>

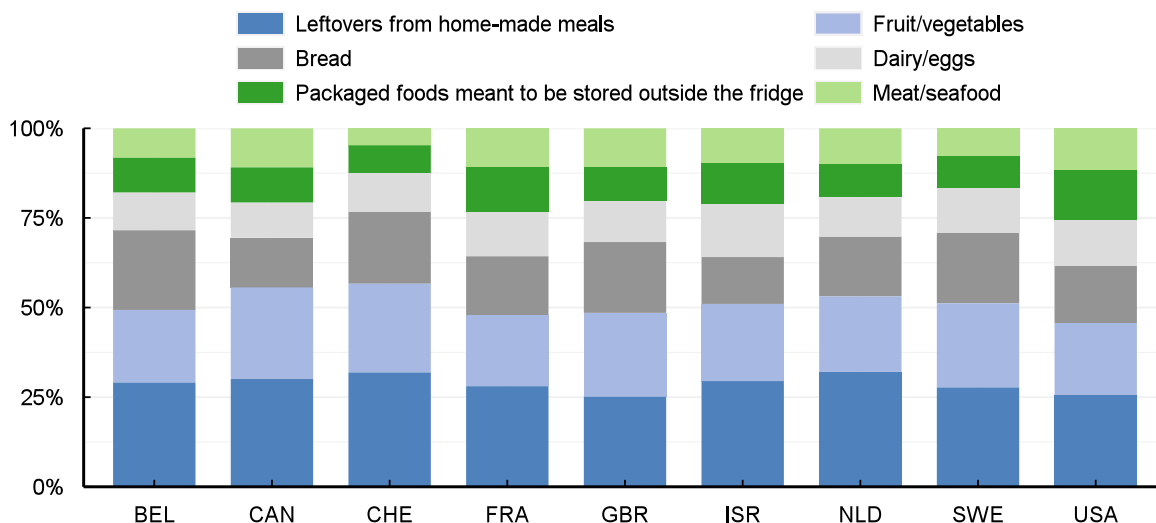
4.5. Food waste

4.5.1. Food waste by households

Most respondents in the sample indicate that their household sometimes throws edible food away. The main types of food that households throw away are leftovers from homemade meals, fruit and vegetables, and bread (Figure 4.14). Dairy and eggs, packaged food, and meat and seafood are less frequently thrown away.

Figure 4.14. Leftovers, fruit and vegetables and bread are most likely to be thrown away

Relative proportion of types of food wasted



Note: This survey item asked respondents: "What type of food does your household usually throw away? Please exclude non-edible parts of food, e.g. peels or apple cores."

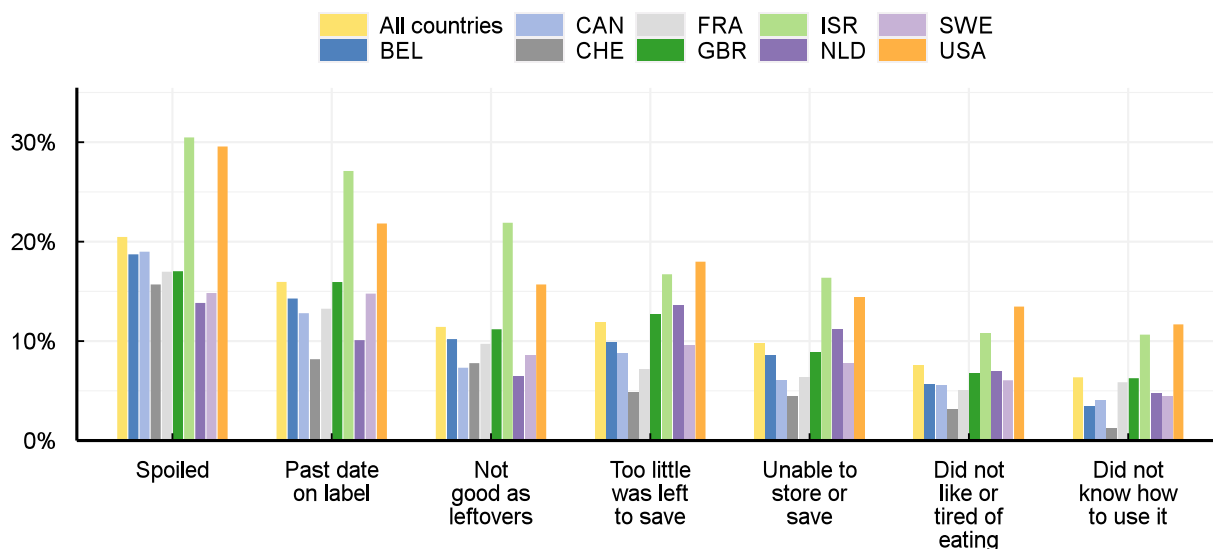
Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

StatLink <https://stat.link/ifj5w3>

The main reasons that households give for throwing food away include that the food has spoiled (20% of households), and that it is past the expiry date (16% of households) (Figure 4.15). Households mostly attribute spoilage to having forgotten about the food or buying or cooking too much food. Higher numbers of households in France and Switzerland attribute spoilage to being too busy to prepare it.

Figure 4.15. Most food is thrown away because it is spoiled or past its expiry date

Proportion of respondents often or always throwing away food for specific reasons



Note: This survey item asked respondents: "How often do you throw away food (e.g., discard it in the trash, garbage disposal, compost, etc.) for the following reasons?" This question was asked of households that indicated that they throw food away. The sample sizes in each country are the following: BEL: 506, CAN: 533, CHE: 444, FRA: 395, GBR: 570, ISR: 734, NLD: 565, SWE: 553, USA: 1144.

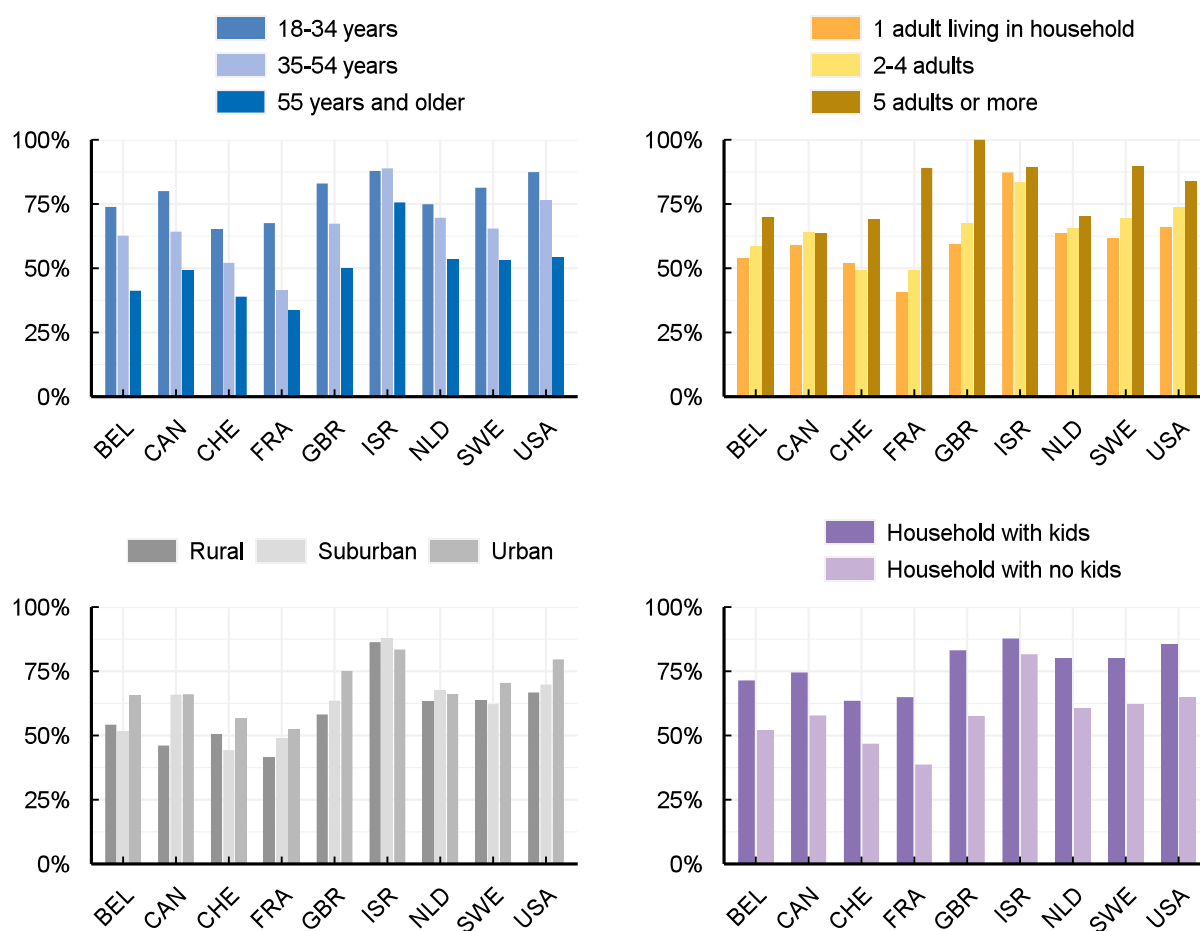
Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

StatLink  <https://stat.link/yacu5e>

In addition to reducing the amount of food that is disposed of with mixed waste, environmental policies also aim to reduce the amount of food that becomes spoiled and is thrown away. The highest proportions of households reporting that they waste food (i.e. dispose of edible or spoiled food with mixed waste) are in Sweden, the United States and Israel. Wasting food is associated with several socio-economic characteristics (Figure 4.16). The presence of children in the household, for example, significantly increases the likelihood of throwing food away. Whereas 58% of households without children report wasting food, 79% of households with children report doing so. Across countries, 57% of households in rural areas waste food compared to 71% of households in urban areas. There also appears to be an association with the number of adults in a household. In most countries in the sample, households of five adults or more and high-income households are most likely to waste food, a finding confirmed by other research (Everitt et al., 2022^[35]; Hermanussen, Loy and Egamberdiev, 2022^[36]). In most countries, those in rural areas are more likely to report that they never throw away food than those in urban areas.


Figure 4.16. Households that are smaller, with older members, in rural areas and without children are less likely to throw away food

Percentage of households wasting at least some food



Note: This survey item asked respondents: "What type of food does your household usually throw away? Please exclude non-edible parts of food, e.g. peels or apple cores." The figure shows the percentage of respondents who did not respond: "My household never throws away any food".

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

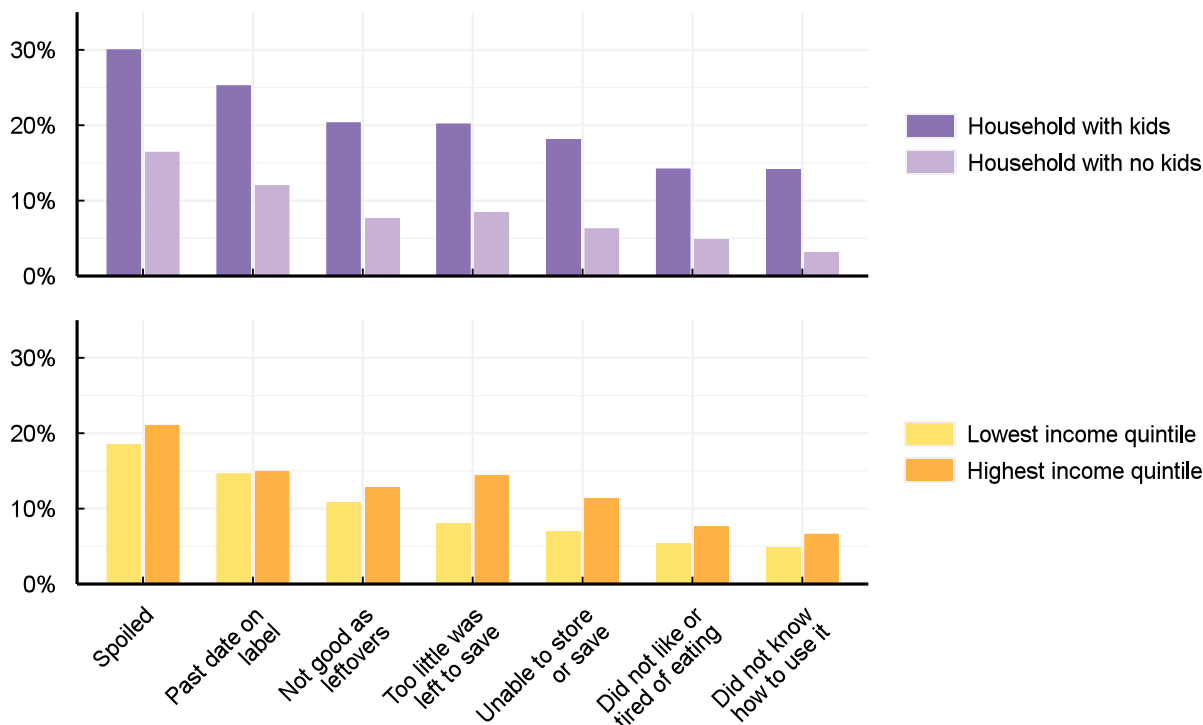
StatLink  <https://stat.link/f19asn>

Additionally, the reasons given for wasting food vary by the type of household: households with children are more likely to report that food has spoiled because they made too much (Figure 4.17). Households with children face challenges in portion planning and time management. This points to the potential role of information on shopping portions and meal planning. Wealthier households are also more likely to report that they waste food. The main reasons these households cite for wasting food is that it spoiled or was past the date on its label.

Households indicate that several different types of information would be helpful in enabling them to reduce the amount of food that they throw away. Information on what can be frozen and for how long was cited by the greatest proportion of households. Shopping or portion plans, information on how to store food and information on what foods are dangerous when spoiled (rather than simply unappealing) were also highlighted as useful.

Figure 4.17. Higher-income households and those with children are more likely to waste edible food

Percentage of household often or always wasting edible food



Note: This survey item asked respondents: "How often do you throw away food (e.g. discard it in the trash, garbage disposal, compost, etc.) for the following reasons?". For each reason respondents could select never, rarely, sometimes often or always. The question was asked of respondents who throw away any type of food. Sample sizes are the following: BEL: 506, CAN: 533, CHE: 444, FRA: 395, GBR: 570, ISR: 734, NLD: 565, SWE: 553, USA: 1144.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

StatLink  <https://stat.link/b8e6d4>

4.5.2. Composting of food waste

Households report separating an average of 44% of their food waste for composting, ranging from 26% in Israel to 58% in Sweden (refer back to Figure 4.10). Composting here refers to the production of compost from vegetable matter, either at home or at a collective facility. While some households have a high level of engagement, others do not engage in composting at all. While 27% report separating over 90% of their food waste for composting, 36% report separating less than 50%, and 19% report not separating food waste at all. Of households separating their food waste for composting, 53% across countries compost at home while the remainder dispose of separated food waste in a collection facility.

Wealthier and more environmentally concerned households compost the most. The average percentage of food waste composted (rather than disposed of with mixed waste) is 46% for those with high environmental concern and 40% for those with low environmental concern (refer back to Figure 4.12). On average, high-income households compost 48% of their food waste, compared with 40% for low-income households. Exceptions are France, the United Kingdom and Israel, where there appears to be no strong relationship between reported income and the percent of food waste that is composted. This could reflect the influence of a number of factors, including the availability of collection services.

The availability of collection services is an important determinant of composting behaviour. Younger respondents and those living in detached houses consider unpleasantness and a lack of knowledge on the topic as more significant barriers to composting than a lack of space. Those living in apartments or

semi-detached houses, however, report that a lack of space is the most significant barrier. Households with children indicate a lack of knowledge, unpleasantness and the amount of organisation as the most significant barriers. Lack of knowledge on the subject figured among the top reasons for respondents in Israel and the United States.

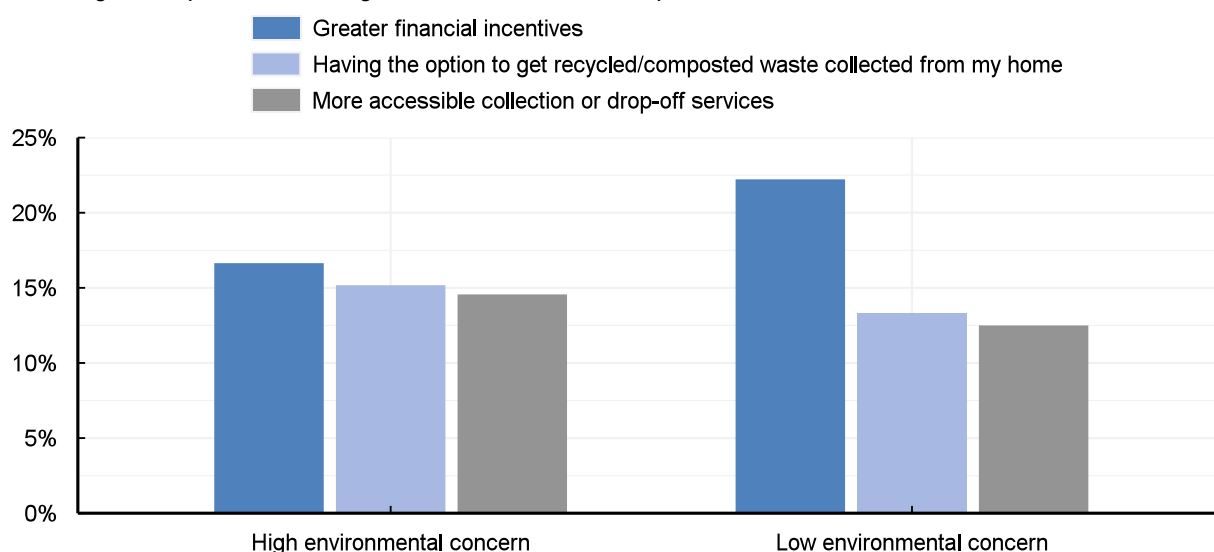
The survey further suggests that the type of collection charge imposed for mixed waste may have an impact on the amount of food waste that is separated for composting. For example, households being charged a per-unit fee for mixed waste on average report separating 55% of their food waste for composting, while those that are not charged report separating 35% of their food waste.

Respondents across the sample consistently cite greater financial incentives (i.e. either saving or receiving more money), and having compostable waste collected kerbside, as the top measures that would encourage them to recycle or compost more. More accessible collection or drop-off services are also cited as a top factor in most countries in the sample. Simpler requirements for recycling and composting figured among the top three reasons in Canada and the United Kingdom; having more space available at home was cited as a top reason in Sweden.

These factors are similar across income levels, age and residential locations. Although the top reasons cited by those with high and low levels of environmental concern do not differ, those with low environmental concern cite greater financial incentives relatively more often than those with high environmental concern (Figure 4.18). Even households that report having no access to recycling collection services are more likely to report that greater financial incentives rather than the provision of collection services would encourage them to recycle more.¹² This is consistent with existing evidence that shows that the presence of a deposit-refund system increases plastic recycling rates (Colelli et al., 2022^[37]; Laubinger et al., 2022^[38]). If the charging schemes that households report being in place in the survey are deposit-refund systems,¹³ these findings could indicate that there may be scope to increase the refund rates of these systems in order to more effectively incentivise households to sort their recyclable waste.¹⁴

Figure 4.18. Financial incentives to recycle/compost are more motivating to those with lower environmental concern

Percentage of respondents ranking a measure as the most important



Note: This survey item asked respondents: "Please rank up to three most important factors from 1 (most important) to 3 (third most important) that would encourage your household to recycle or compost more". Nine possible reasons were provided. The three most frequently chosen measures per group are displayed.

Source: OECD (2022), Environmental Policies and Individual Behaviour Change Survey.

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Notes

¹ In this estimate, municipal solid waste includes residential, commercial, and institutional waste.

² See e.g. Magazzino, Mele and Schneider (2020^[40]) for a review of the literature.

³ The definition of municipal waste in this calculation includes household waste and similar waste originating from households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings), as well as selected municipal services (e.g. waste from park and garden maintenance and street cleaning services if managed as waste).

⁴ The remaining 12% were microplastics, i.e. polymers with a diameter smaller than 5mm coming from sources such as tyre abrasion, brake wear and textile washing (OECD, 2022^[12]).

⁵ Examples of labelling schemes include the Nordic Swan Ecolabel (Denmark, Finland, Iceland, Norway, Sweden), Blauer Engel (Germany), the EU Ecolabel, and the EU Energy Label, as well as EPEAT (United States).

⁶ See Annex B on the design and implementation of the EPIC survey and on the quality of the panel of respondents.

⁷ Differences in sample representativeness and survey item formulations across rounds prevents making direct comparisons of quantitative results. However, large differences in results across surveys can indicate possible broad trends over time.

⁸ For paper, cardboard, glass, plastic and metal, collection services apply to packaging rather than all materials.

⁹ Waste generation was measured in volume. As such, differences in weight (e.g. induced by volume-based charging schemes) are not reflected in the results presented. Volume is nevertheless a useful indicator of waste generation, as it is easier for households to estimate.

¹⁰ When identifying how they dispose of old or broken electronic equipment, households were able to list multiple disposal methods.

¹¹ Single-person households in Israel report particularly high levels of waste generation, for reasons which are unclear. Israel has the smallest number of single-person households, a number of whom report very high levels of waste generation. These respondents almost exclusively report incomes in quintiles 1-3 and have a higher average age than the general sample from the rest of the country.

¹² Although respondents report that financial incentives would be effective in encouraging them to recycle more, this does not necessarily mean that they would prefer financial incentives over other measures, such as the provision of collection services. A reliance on financial incentives, e.g. a deposit-refund scheme, alone may also raise equity concerns in the presence of unequal access to return sites. In this case, unequal access to deposit sites would lead to an unequal ability to participate in the program and access its benefits. The provision of kerbside collection services, in contrast, can facilitate more widespread access to recycling insofar as it eliminates the need for the means and time to travel to a return site.

¹³ Deposit-refund schemes were not addressed in the EPIC Survey.

¹⁴ The feasibility of deposit-refund systems, for example, relies on selecting material coverage, deposit level and collection mechanisms that yield return rates that enable the system to be cost-effective (OECD, 2015^[39]).



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