Briefing
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European Parliament

Tackling food waste
The EU's contribution to a global issue

SUMMARY

In spite of the availability of food, there is still malnutrition in the world. Food is lost or wasted throughout the supply chain, from initial agricultural production down to final consumers. In developed countries, a significant amount of food is wasted at the consumption stage, meaning that it is discarded even though still suitable for human consumption. In developing countries food is lost mostly at the farmer-producer end of the food supply chain; much less food is wasted at consumer level.

Experts assert that the largest part of food waste in developed countries is produced by households and is linked mainly to urbanisation, changes in the composition of diets, and large-scale mass distribution. Food losses and waste have negative environmental and economic impacts and their existence raises questions for society.

Overall, on a per-capita basis, much more food is wasted in the industrialised world than in developing countries. In the EU, food waste has been estimated at some 88 million tonnes, or 173 kg per capita per year. The production and disposal of this food waste leads in turn to the emission of 170 million tonnes of CO_2 and consumes 261 million tonnes of resources.

The EU is contributing to reducing food waste mainly through its commitment to halve the disposal of edible food in the EU by 2020. Various national initiatives also aim to attain this goal. In June 2016, EU agriculture ministers adopted conclusions in which they pledged to improve data-gathering and awareness-raising on food losses and waste. In addition, they urged the European Commission to remove the legal and practical barriers so that it becomes easier to donate food.

This briefing is an update of an earlier one, of January 2014.

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Background

Food is essential to life. Yet, there are nearly 1 billion malnourished people in the world. Each year, about 4 billion metric tonnes of food are produced, but due to poor practice in harvesting, storage and transport, as well as market and consumer wastage, 30-50 % of it (or 1.2-2 billion tonnes) is wasted.

Experts argue that access to food will be even more difficult for the poor in future, due in particular to price volatility, access constrains, the interdependence of commodity markets, and the impact of climate change on food production systems.

Feeding a projected population of 9.6 billion people by 2050 will be an unprecedented challenge for humankind and will require a multifaceted and integrated global strategy. Increasing food production is only one among many ways to meet this challenge. Researchers argue that one strategy to improve food availability would be simply to reduce waste. This, in turn, could help moderate the need for increased food production to meet growing food demand, which would alleviate the pressure on resources and help lower greenhouse gas emissions (for which the EU has made a commitment of a 20 % reduction by 2020 compared to 1990 levels).

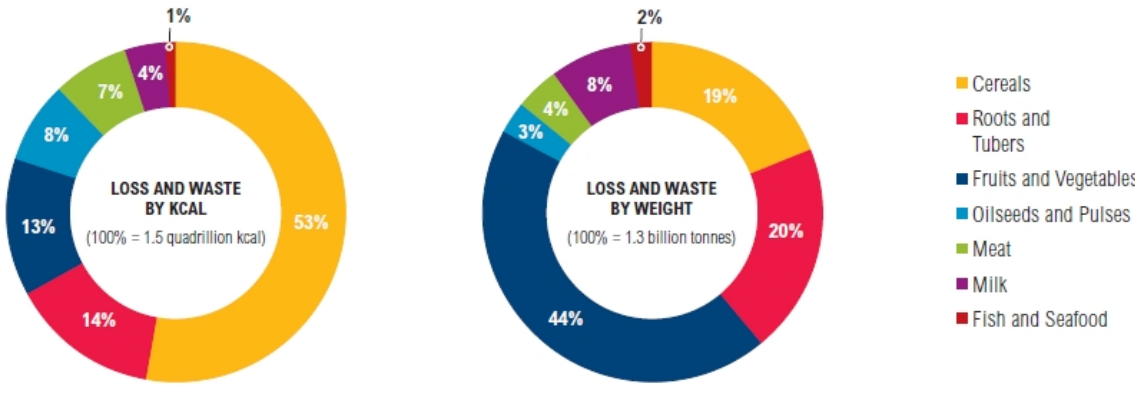
Food waste: features and causes

A possible definition

There is no single definition of food waste, in either public policy or scientific communities. The Food and Agriculture Organisation (FAO) distinguishes between food losses and food waste.[1] Food losses refer to losses that occur upstream of the food supply chain, mainly during sowing, cultivation, harvesting, processing, preserving, and the first agricultural transformation stages. Food losses resulting from negligence of retailers or consumers, or a conscious decision by them to throw edible food away at the end of the food chain are usually called food waste.

FAO data are based on weight. In weight terms, a tonne of grain is the same as a tonne of fruit, or a tonne of meat. However, experts warn that food types vary widely in terms of their water and caloric content per kilogram (kcal/kg, see Figure 1). For instance, a kilogram of wheat flour on average contains 3 643 kcal (12 % water) whereas a kilogram of apples on average contains 587 kcal (84 % water). Consequently, it is worth noting that measuring by weight does not consistently reflect the energy in food products that could have been consumed by people, but in most cases these are the only data available.

Figure 1 - Share of global food loss and waste by commodity, 2009



Data source: Reducing food loss and waste, World Resources Institute, 2013.

Patterns of occurrence

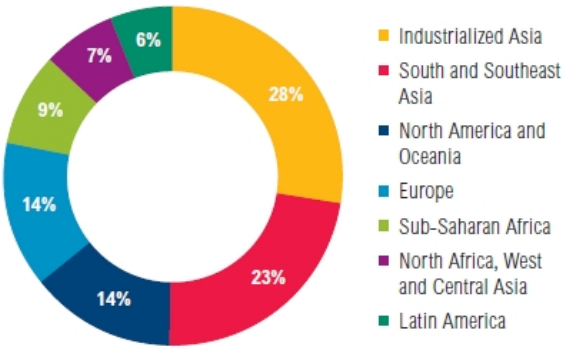
Experts identified three main population groups across the world – based on characteristics associated with economic development – where food waste occurs.

In **late-stage developing** nations that are currently industrialising rapidly, (e.g. China) and in **newly developing** countries that are beginning to industrialise, (i.e. mainly in Africa) wastage tends to occur primarily at the farmer-producer end of the supply chain, due to weather and soil conditions, weeds, pests, bacteria and storage.

In **fully developed**, post-industrial societies, such as those in Europe, more-efficient farming practices and better transport, storage and processing facilities allow a larger proportion of the food produced to reach markets and consumers.

Regionally, about 56 % of total food loss and waste occurs in developed countries (e.g. in North America, Oceania, Europe, and the industrialised Asian nations of China, Japan, and South Korea) while developing countries account for 44 % of losses (see Figure 2). On a per capita basis, however, North America and Oceania (1 520 kcal per person per day) total twice as much as Europe (748 kcal) or industrialised Asia (746 kcal).

Figure 2 - Share of global food loss and waste, (100 % = 1.5 quadrillion kcal)

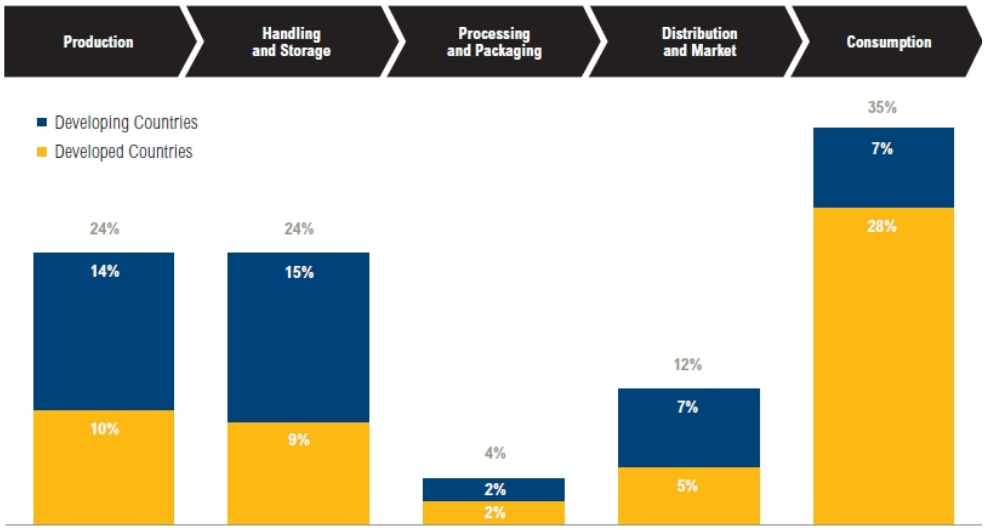


Data source: Reducing food loss and waste, World Resources Institute, 2013.
Note: Number does not sum to 100 due to rounding.

Main causes at consumer level

Experts assert that the largest part of food waste in developed countries is produced by households (see Figure 3) and is spurred by three global trends. The most important of these is **urbanisation**, which has resulted in the gradual extension of the supply chain in order to satisfy the food requirements of city dwellers. Increasing remoteness between the place of production and that of final consumption requires food to be transported

Figure 3 - Share of total food loss and waste by stage in the value chain, 2009 (100 % = 1.5 quadrillion kcal)



Data source: Reducing food loss and waste, 2013.
Note: Number does not sum to 100 due to rounding.

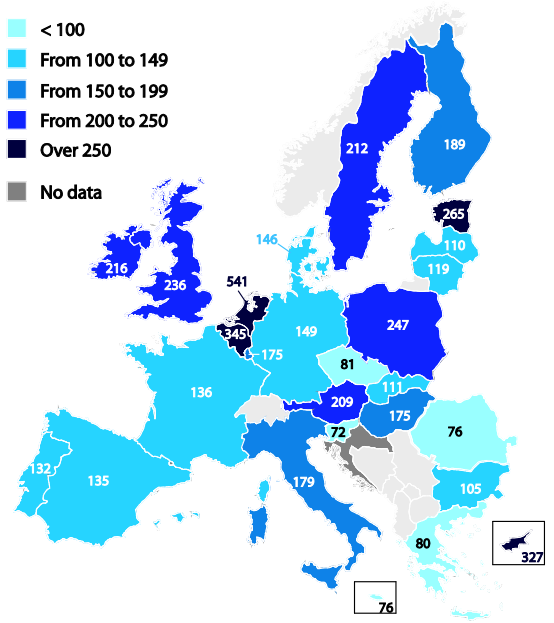
over greater distances, with the consequent need to improve transport, storage, and sale infrastructure to avoid additional losses.

The second element is **changes in the composition of diets**, linked to the increase in disposable income. This is particularly the case for economies in transition such as Brazil, Russia, India, and China, and involves a shift from starchy diets to diets increasingly consisting of meat,[2] fish, and fresh produce, such as fruits and vegetables, all of which perish more quickly.

The third element consists of the **increasing globalisation of commerce** and the rapid diffusion of **large-scale mass distribution** in many emerging countries. Supermarkets have become the dominant intermediaries between farmers and consumers, replacing traditional retailers in many countries in Africa, Asia, and South America, and enabling greater diversification of diets. In addition, the need for higher quality products and safety standards for consumers and the increase in the volume of food products marketed, have an impact on the levels of waste generated.

Finally, a number of characteristics associated with modern consumer culture also account for food wasted through retail practices (i.e. precise aesthetic standards for the size and appearance of fruit and vegetables, see box)[3] and customer behaviour[4] (i.e. preparation of over-generous portions, purchase of excessive quantities induced by sales promotions, and use of confusing wording for expiry dates[5]).

Figure 4 - Estimated total food waste in the EU, 2010 (kg per capita)



Data source: Technology options for feeding 10 billion people, STOA 2013.

Food waste for aesthetic reasons

In his book, *Waste – Uncovering the Global Food Scandal* (2009), Tristram Stuart reveals that every day, an average of 13 000 slices of bread are wasted by suppliers of sandwiches because the standards imposed by the British distribution chain Marks & Spencer specify that the end slices and the crusts of sandwich loaves should not be used. This results in the waste of approximately 17 % of the raw material. The author also explains that one of the major suppliers of the British supermarket chain ASDA rejects 25-30 % of all carrots processed and sets them aside for animal feed. About half of these are rejected due to wrong shape or size; the other half is rejected for being broken or having clefts or blemishes.

Food waste in the EU

In the EU, food waste along the supply chain has been estimated at approximately 88 million tonnes, or 173 kg per capita per year, and is expected to rise to about 126 million tonnes a year by 2020,[6] unless action is taken. Households produce the largest share of EU food waste (53 %), followed by agriculture/food processing (19 %).[7] These two sectors account for over two thirds (72 %) of EU food waste. The rest is attributed to food service/catering (12 %), primary production (11 %) and retail/wholesale (5 %). The

average per capita waste level obscures high variation amongst EU countries (see Figure 4).

According to a 2013 study, the highest food waste generators, expressed as kg per capita are the Netherlands (541 kg), Belgium (345 kg), Cyprus (327 kg) and Estonia (265 kg); the lowest are Slovenia (72 kg), Malta and Romania (both 76 kg), followed by Greece (80 kg) and the Czech Republic (81 kg). Overall, the EU-15 countries tend to waste more food per capita than the EU-12 countries.

Analysis from the same source suggests that total estimated food waste has been steadily diminishing in recent years, falling by 23 % from 2004 to 2010. However, over the same period, the amount of potential food waste generated (per capita) by households appears to have been growing, increasing by nearly 58 % between 2004 and 2010 (see Table 1).

Table 1: Variation in food waste, EU-27, 2004-2010

Year	Household food waste, kg/capita	Total food waste, kg/capita	Total, million tonnes
2010	52	184	92.2
2008	48	195	96.9
2006	43	235	116.2
2004	33	240	117.5

Source: Technology options for feeding 10 billion people, STOA 2013.

The impact of food waste

Food loss and waste have negative environmental and economic impacts, and their existence raises questions for society (see Figure 5).

Environment

Throwing food away means energy, water and land having been consumed to no avail. And in addition to the waste of resources, there are also the consequences of having to manage a large quantity of waste, part of which could have been avoided.

Figure 5 - Environmental impact of food waste

Data source: BCFN, Defeating the paradox of food waste, 2013.

To illustrate the extent of the wastage of resources, energy, and money associated with food waste, in 2011 American researchers analysed tomato supplies. They observed that about 377 000 tonnes of tomatoes were lost or wasted along the supply chain in the United States in 2008. This amount of tomatoes is equivalent to having unnecessarily consumed about 90 square kilometres of land and 57 billion litres of water, and having wasted an average of 7 million working hours. Disposal of the tomatoes thrown away cost about €12.3 million, and caused 312 000 tonnes of greenhouse gas emissions. According to the study's authors, avoiding wasting these tomatoes would have reduced greenhouse gas emissions by an amount equal to that obtained by taking 55 000 cars off the road for one year.

The production and disposal of EU food waste leads to the emission of 170 million tonnes

of CO_2 and consumes 261 million tonnes of resources. Experts argue that reducing food waste at consumer level in developed countries by 30 % could save roughly 400 000 square kilometres of cropland by 2030.

Economy

Food loss and waste represent fruitless investment, which can reduce farmers' incomes and increase consumers' costs. For example, food waste at the consumption stage costs an average of €1 160 per year for a family of four in the United States, and €797 per year for the average household in the United Kingdom. Annually, over €23 billion worth of food is thrown away in China. In sub-Saharan Africa, where many farmers earn less than €1.50 a day, post-harvest losses are valued at up to €3 billion per year.

Experts estimate the total benefit to society of reducing food waste to be €183 billion globally in 2030. However, they stress that ensuring global food security is a complex task and will require more than just reducing food waste, including addressing the issues of income distribution and dietary preference.

Society

On a global scale, farmers are able to produce the equivalent of 4 600 kcal per capita per day, of which only 2 000 kcal are actually consumed. Research (2011) shows that the quantity of food wasted at consumer level in industrialised countries (222 million tonnes) is nearly equal to food production in all sub-Saharan Africa (230 million tonnes).

The role of women in reducing food loss and waste

Experts stress that women play an important role in reducing food waste in both developing and industrialised countries since they interact with food at each stage of the value chain. At the farm, women represent 41 % of the agricultural workforce in the world and form the majority of agricultural workers in South Asia and sub-Saharan Africa. At home, women are responsible for 85-90 % of the time spent on household food preparation. Researchers highlight that the increasing employment of women also has an impact on food handling. Multiple burdens due to work and family reduce the time available for daily shopping. Thus, larger quantities are bought to last a whole week, increasing the probability that some food items will be wasted.

In spite of the availability of food, malnutrition continues to be found in the world. The reason for this resides mainly in the high levels of poverty and/or the presence of conflicts in particular countries or regions. Experts claim that there is a strong correlation between areas with high percentages of extremely poor people, dry climate and poor availability of water, and high malnutrition levels. Activists assert that less waste means less drain on resources in the producer countries and less upward pressure on prices.

Limiting food waste in the EU

EU actions and initiatives

The EU is contributing to reducing food waste in a number of ways. Research shows that the potential for reducing the life-cycle environmental impact of biodegradable waste through waste prevention is biggest with food waste prevention. Under the Waste Framework Directive (2008) EU countries are required to develop waste prevention plans by 2013. As part of these plans they should set mandatory reduction targets for food waste. These programmes are currently being implemented and their effects are being monitored.

The economic crisis and food waste

According to a survey conducted in October 2013, 73 % of Italians have reduced their food waste due to the economic crisis. Among the measures taken were: shopping more wisely, reducing the quantity of food purchased, increasing the use of leftover products, and paying more attention to expiry dates.

In January 2013, the European Commission announced a Retail Action Plan which would support actions to reduce food waste, and work on developing a long-term policy on food waste.

Food waste prevention is also an integral part of the Commission's new Circular Economy Package (2015) which sets out a concrete programme of action, with measures covering the whole cycle – from production and consumption to waste management and the market for secondary raw materials, thus closing the loop.

In 2015, in the framework of the 2030 Sustainable Development Goals, the United Nations General Assembly adopted a target of halving per capita food waste at the retail and consumer level, and reducing food losses along production and supply chains. The EU is committed to meeting this target. In this respect, the Commission pledged specifically to:

- introduce a common EU methodology to measure food waste consistently across EU countries;
- create a new platform – EU Platform on Food Losses and Food Waste – encompassing both EU countries and actors in the food chain, to help define measures needed to prevent food waste, share best practice and evaluate progress;
- clarify EU legislation related to waste, food and feed and facilitate food donation and the use of foodstuffs and by-products for feed production, without compromising food and feed safety; and
- examine ways to improve the use of date marking and its understanding by consumers, in particular 'best before' labelling.

The EU-funded Fusions project established a European Multi-Stakeholder Platform to generate a shared vision to prevent food loss and waste across the supply chain. It set out to develop a framework that can contribute to both the development of reliable information sources and statistics, and the harmonisation of food waste monitoring.

Refresh is another EU research project taking action against food waste. It brings together 26 partners from 12 European countries and China to contribute towards halving per capita food waste at the retail and consumer level, minimising waste management costs, and maximising the value from unavoidable food waste and packaging materials.

European Parliament

Parliament has consistently backed the reduction of food waste. In a 2016 resolution on enhancing innovation and economic development in future European farm management, Parliament stressed the need to tackle all forms of food wastage, and called for a legal framework consistent with the circular economy principle, whereby clear rules are laid down on by-products, the use of raw materials is optimised, and residual waste is reduced as much as possible.

In 2015, in the framework of their discussion on resource efficiency, Members urged the Commission to put forward instruments to combat food waste efficiently, including by setting a binding food waste reduction target of at least 30 % by 2025 in the manufacturing, retail, distribution, and food service sectors. Members also prompted the Commission to promote the creation of conventions facilitating the distribution of unsold products to charities.

In a 2012 own-initiative report on strategies for a more efficient food chain, Parliament suggested that EU countries should introduce school and college courses explaining how to store, cook and dispose of food. Other ideas included dual-date labelling showing until when food may be sold (sell-by date) and until when it may be consumed (use-by date), food packaging in a range of sizes enabling consumers to buy just the amounts they need, discount offers on foods close to their expiry dates and damaged food products, and redistribution of leftover food to poorer people or food banks free of charge.

In addition, the Commission is analysing, in close cooperation with industry, consumer organisations, food sector experts and national policy experts, how to reduce food waste without compromising food safety. Through its dedicated expert group on food losses and food waste – bringing together national organisations and experts from EU countries – the Commission aims to identify and prioritise actions to be taken at EU level and to remove any legal barriers and/or loopholes, which can lead to food waste. While the expert group may discuss and recommend policy options, it is the relevant working groups of the Standing Committee on Plants, Animals, Food and Feed which could take these issues further.

It is estimated that a considerable share of household food waste could be linked to food labelling due, amongst other things, to consumer misunderstanding of the meaning of the dates indicated. This has prompted the Commission to consider possible options to simplify date marking on foodstuffs. One possibility would consist of extending the list of foods which are exempt from the obligation to include a 'best before' date in food labelling (as required in Annex X of Regulation No 1169/2011). At present, the list includes non-perishable foods such as vinegar, sugar or salt but could be extended in the future to other such foods for which removal of date marking would not pose a safety concern. Another option would consist of finding an alternative and better understood wording for 'best before' labelling.

Indeed, the results from a 2015 Eurobarometer assessment show that the meaning of date labelling is poorly understood. Just under half (47 %) of respondents grasp the correct meaning of 'best before' and somewhat fewer (40 %) are aware of the meaning of 'use by'. In both cases, at least a quarter of respondents think, incorrectly, that the meaning of date labels differs according to the type of food for which it is used.

In its recent communication on a sustainable European future (November 2016), the Commission indicates it will consider more effective date marking on food, as well as targeted action to facilitate food donation and the safe use of food not suited for human consumption for production of animal feed.

In June 2016, EU agriculture ministers adopted conclusions in which they pledged to improve data-gathering and awareness-raising on food losses and waste. In addition, they

Committee of the Regions

In its opinion on food waste voted in 2016, the Committee of the Regions set out its recommendations on how local and regional authorities can help reduce food waste. Among other things, the opinion called for sustainability criteria in public procurement; the use of local, regional and seasonal products in catering services; and for schools to include the issue of food-waste reduction as part of the curriculum, for instance through thematic days, study visits and students learning programmes. The Committee also advocated a common methodology and measurements at EU level to gauge the extent of food waste and assess progress towards a common, harmonised reduction goal across the EU.

European Economic and Social Committee

In 2013, the EESC discussed civil society's contribution to the prevention and reduction of food waste in an opinion calling for a coordinated strategy at European level, combining EU-wide and national measures, to improve the efficiency of the food supply and consumption chains and to tackle food wastage as a matter of urgency.

The EESC recommended developing platforms for exchanging experience on combating food waste, and passing on existing examples of good practices. Actions already successfully implemented in some EU countries and regions include channelling of products from the food retail and catering sectors to food banks, initiatives on taxation, discharge of liability for donors, and removal of administrative constraints.

urged the European Commission to include a number of targets in future 'fitness checks' of EU legislation, such as waste prevention, waste recycling and minimisation of negative consequences of legislation on waste reduction. In addition, following on from recently adopted national laws – for example, in France – agriculture ministers called on the Commission to remove the legal and practical barriers that lead to food losses and waste so that it is easier to make food donations, for instance. Foodstuffs that cannot be sold but which are fit for consumption would, then, be given (mainly by supermarkets) more systematically to associations, thereby considerably reducing wastage.

Food donation in the EU

A study published in 2014 highlighted the key barriers related to food donation in the EU. Indeed, food donors frequently discard surplus food instead of distributing it to food banks or charity organisations, to avoid risks associated with liability for donated food. Currently, under the EU's General Food Law, food operators have to ensure that foods or feeds satisfy the requirements of food law which are relevant to their activities. In some EU countries, food donors fear putting at risk their reputation in the unfortunate case of food poisoning. To alleviate this type of concern, countries such as France, Greece, and Italy have passed legislation transferring responsibility from donors to recipients. The study authors recommend that such a system be considered at EU level.

Similarly, there is a general misunderstanding about the potential to donate food that has passed its 'best before' date. The marketing of products (including donation of food) which are no longer within their 'use by' date limit is forbidden. However, there are no EU rules regarding donation of food past its 'best before' dates. Such legislation was introduced in Greece in 2012, but was finally withdrawn due to media criticism over providing the needy with products of inferior quality. In contrast, Belgian authorities have set up guidelines for assessing the additional lifetime of food after its date of minimum durability has been reached or exceeded. Again, the study authors argue in favour of such guidelines at EU level in order to facilitate food surplus redistribution.

Only two EU countries offer fiscal incentives to food donation. In France and in Spain, food donors benefit from a tax credit on their corporate income tax of respectively 60 % and 35 % of the value of donated goods. Similarly, Portugal allows for an enhanced tax deduction, meaning that donors can deduct 140 % of the value of the food at time of donation, provided that it will be used for a social purpose (such as supplying food banks).

Last but not least, the Waste Framework Directive (2008) introduced a waste management hierarchy through prevention, preparing for re-use, recycling, recovery and disposal. However, there is no specific EU guidance on a food-use hierarchy, prioritising food redistribution to humans over feeding animals, and energy or nutrient recovery. In some EU countries, such as the United Kingdom, it is still more expensive to donate surplus food than to use it for energy recovery.

National initiatives

At country level various public and private bodies are developing initiatives ranging from awareness-raising campaigns to concrete actions aimed at the reduction of food waste and/or recuperation of food products. Between 2010 and 2015, the UK-based non-profit organisation **WRAP** (Waste & Resources Action Programme) reduced CO2 emissions by nearly 50 million tonnes, waste by 4 million tonnes, water consumption by 856 million cubic litres, and diverted 29 million tonnes of waste from landfill. Between 2015 and 2020, WRAP will concentrate on three key areas where resource management can make a difference: food and drink, clothing and textiles, electricals and electronics. In order to succeed, WRAP works with manufacturers and distributors, offers consumers suggestions on how to reduce food waste, and promotes actions for food waste reduction in the hotel, tourist, and public administration sectors. The **Feeding the 5 000** initiative, initiated in London (UK) in 2009, demonstrated it was possible to offer a free meal to 5 000 people,

using only food that would otherwise have been discarded. **Last Minute Market** is an Italian project active in over 40 Italian towns, addressing the recovery of food products, collecting surpluses from business and manufacturing activities, vegetables that were not harvested and remained in the fields, and ready-made meals recovered from the food service channel, such as schools and businesses. The French National Association for the Development of Solidarity Groceries (**ANDES** Association Nationale de Développement des Épiceries Solidaires) was set up as a reaction to food waste and the growing number of needy people. The solidarity shops offer low-income consumers food products at about 10-20 % less than their normal retail price. Inspired by an independent documentary, the German **'Food sharing' movement**, seeks to collect and offer excess food. Through its website, it connects people who have surplus food with people searching for food. The website informs about the location of 'food baskets' and what is in them. **Stop Wasting Food** (*Stop Spild Af Mad*) is the largest private consumer movement in Denmark committed to stopping food waste. It inspired the retail chain Rema 1 000 to drop quantity discounts in its 200 stores and introduced 'doggy bags' in Danish restaurants. In collaboration with renowned Danish chefs, the movement produced a cookbook explaining how to reuse leftovers to cook new dishes.

Main references

World Resources Institute, Reducing food loss and waste, Washington, May 2013.

STOA, Technology options for feeding 10 billion people, Brussels, July 2013.

Endnotes

[1] This accounts for the diverging estimates of the volumes of food losses and waste from one source to the other.

[2] Much of the food production needed can be traced back to increased meat consumption, either the meat itself or the crops required to feed livestock. To produce animal products requires 4 to 40 times the calories that they provide in nutrition when eaten, mainly due to the crops consumed. If all of the crop production currently allocated to animal feed were directly consumed by humans, global food production would increase by some 2 billion tonnes and food calories would increase by 49 %. This becomes more important when considering the projection that, barring any change in diets, worldwide meat consumption could increase 40 % by 2050 (from a 2000 baseline).

[3] Experts argue that in the UK only, retailers generate 1.6 million tonnes of food waste annually in this way.

[4] It has been estimated that 30 % to 50 % of what has been bought in developed countries is thrown away.

[5] The fact that many products bear two or more dates can create confusion: one date relates to the expiry of the period during which the merchandise can be displayed and sold ('sell by'), one indicates the period during which it should be consumed ('use by'), and still another the period during which the product will be optimal ('best by'). Researchers argue that ambiguous labelling is a major factor leading to food waste. In 2011, the UK Department for Environment, Food and Rural Affairs presented new guidelines for the use of labels, encouraging the use of either 'best by' for canned food, snacks and cookies or 'use by' for perishable foods (cheese, meat, eggs, etc.).

[6] From a baseline of 89 million tonnes in 2006.

[7] High uncertainty surrounds the estimate for the processing sector (17 million tonnes ± 13 million tonnes).

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