



The FOOD-AWARE Project “Training materials and visual learning tools for early education on environmental sustainability and responsible food consumption”

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Table of content:

1 - SYLLABUS	1
2 - LEARNING CONTENT	2
2.1 - Presentation - Power Point Presentation (attachment) + Introduction – reading text)	Błąd! Nie zdefiniowano zakładki.
2.2 – Reading	Błąd! Nie zdefiniowano zakładki.
2.3 - Additional Reading (in English and in national language)	Błąd! Nie zdefiniowano zakładki.
3 – ATTACHEMENT – POWER POINT/PDF PRESENTATION OF THE MODULE	BŁĄD! NIE ZDEFINIOWANO ZAKŁADKI.





1 - Syllabus

Module 3: Food waste	
A module description	The Food Waste Module will help pupils to better understand the concept of Food Waste, the problems that this causes to the sustainability and also it will provide them with information and ways to reduce food waste with simple ways applied in their everyday life.
Intended learning outcomes¹	On completion of this module you should be able to: <ul style="list-style-type: none"> • Understand the term food waste • Learn in which stages of food supply chain and how food wastage occurs • Read the food labels and comprehend the differences between 'best before' and 'use by'.
Learning activities	<ul style="list-style-type: none"> • watching 1 presentation video and additional videos • exploring obligatory and optional reading material • doing exercises (1–3 exercises per module)
Estimated duration	Total workload is x hours including: <ul style="list-style-type: none"> • 5 minutes for watching videos • 5 minutes for exploring obligatory reading material • 5 minutes for exercises (max. 5 min. per exercise)

¹ Intended learning outcomes address what a learner should be able to do after engaging this module. Use one verb (or at most two) for each outcome. (Cf. curriculum and make amendments you find necessary)



2 - Learning content

Introduction

Food wastage is a decrease in the quantity or quality of food. Any food is wasted - any food that is thrown away, burned or otherwise disposed of along the food supply chain, from harvest, slaughter to the retail level (but excluding the retail level), and not reintroduced into any other production use (such as feed or seed).

Less food loss and food waste would lead to more efficient use of agricultural land and better water management, with a positive impact on climate change.

Food waste

Food loss and Food waste

What is food waste?

- Food waste vs food loss
- UN: *"Food loss is any food that is lost in the supply chain between the producer and the market. Food waste is recognized as a distinct part of food loss because the drivers that generate it and the solutions to it are different from those of food losses."*
- UN: *"Food waste, on the other hand, refers to the discarding or alternative (non-food) use of food that is safe and nutritious for human consumption."*

Other types of food loss

Food Waste

Food Loss

Food is wasted in many ways and by various techniques. Fresh products which deviate from what is considered to be the standard, as optimal (in shape, size and colour), are often thrown out of the supply chain during sorting operations. Also, foods that are close to their expiry date are often rejected. Very large quantities of healthy and good edible food are often unused or left behind. Such food is then thrown away from home kitchens, catering establishments, processing plants, etc.

According to data provided by the Food and Agriculture Organization of the United Nations (FAO), about one third of the food produced worldwide is wasted each year.



Thanks to increasing public awareness, food loss and waste have indeed become an issue of great social importance.

According to the Food and Agriculture Organization of the United Nations (FAO), the greatest losses are in fruit, vegetables, roots, bulbs and fish and seafood. The least food is wasted by dairy, meat and oil plants. Differences in the amount that something is wasted to a greater or lesser extent are mainly due to the shelf life of individual food products and their price. This affects the amount of expenditure that actors in the supply chain and consumers take on to protect food from throwing away.

Whatever the type of food, there is a clear link between a country's wealth and food wastage.

In poorer or less developed countries, higher food waste is recorded in the production and distribution of food than in richer and more developed countries. This is mainly due to lower agricultural productivity in less developed countries as well as poorer infrastructure and a less developed sales network.

In more developed countries, on the other hand, more food is wasted at the stage of consumption. This results from the fact that the losses in food wastage incurred by wealthier countries are relatively less painful for them than in poorer countries, so their motivation to reduce food wastage is much weaker.

Food supply chain

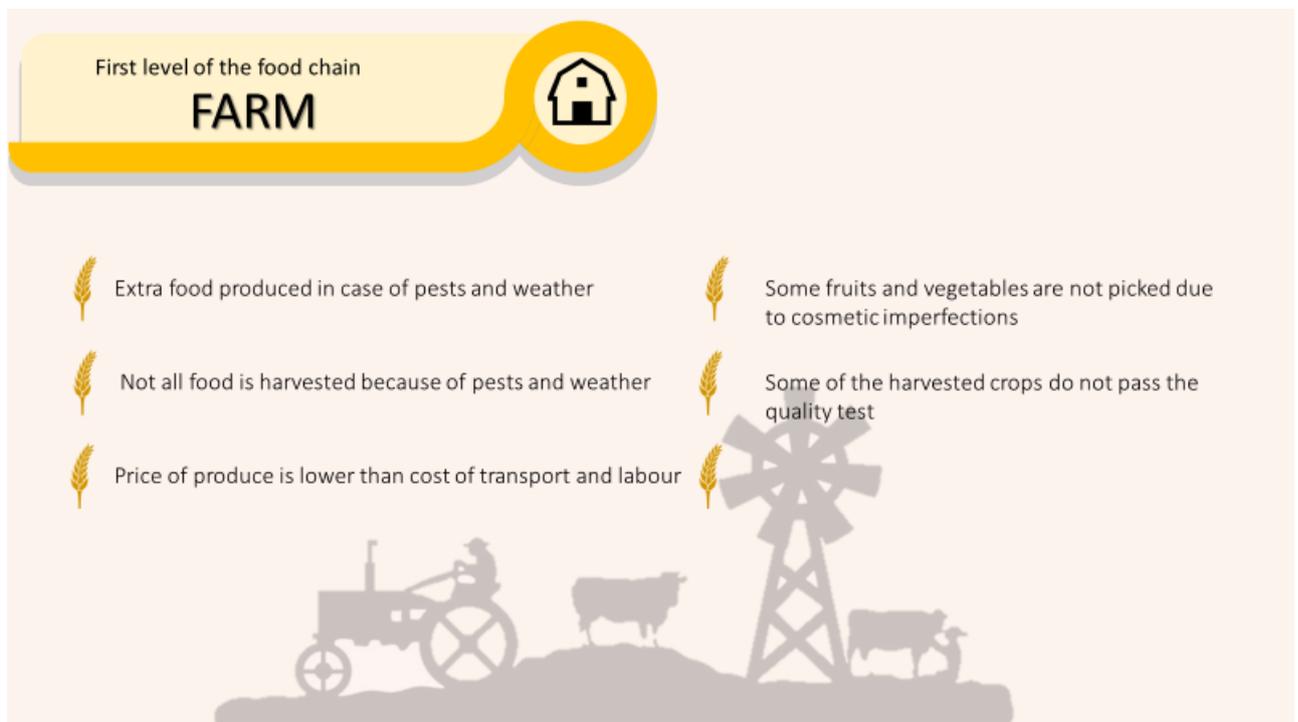




The food supply chain refers to processes that describe how food obtained on the farm reaches consumers.

The entire process of delivering food to the consumer includes production and or collection, processing, distribution, consumption, and disposal. The food we eat arrives through the food supply chains from producers to consumers. The money that every consumer spends on food goes to people who work at different stages of the food supply chain in the opposite direction. Each stage of the food supply chain obviously requires human or natural resources.

Food chain – Farm



The estimate of total food surpluses and food waste is around 3.6 million tonnes per year, representing 7.2% of the total food harvest. A small part of this wasted human value is recovered by selling food for processing, for example for animal feed.

The food waste component referred to above is estimated at 1,6 million tonnes per year. This amounts to about 3.2% of all food collected. By product type - food waste, horticultural crops account for almost 54% of the total, cereals for about 30%, livestock for about 8% and milk for about 8%.



According to the research team, about 33% of the grown food is either not harvested or left in the field because the growers suspect that it may not meet their buyers' specifications.

The amount of surplus food - i.e. food that was at risk of being wasted but instead goes to redistribution, to animal feed or becomes biological material - is estimated at about an additional 2.0 million tonnes per year (about 4.0% of all food collected).

Food chain - Processing



Food processing means any method that has been used to turn fresh goods into food products. It can be one simple process or many complex ones including washing, cooking, chopping, freezing, packaging, pasteurising, fermenting, and many more. Moreover, food processing indicates adding ingredients to food, for instance to longer the shelf life or improve the taste. Food processing technology developed significantly in the 19th and 20th centuries at most to serve military needs. Initially expensive and partly hazardous due to the use of cans, canned goods became a staple of the modern world. Nowadays, products such as dried instant soups or reconstituted fruits and juices are nothing new and we are used to buying it and using every day.



Benefits of food processing:

- toxin removal, preservation
- less susceptible to early spoilage than fresh foods
- reducing the incidence of food-borne disease
- improving the taste of food

Drawbacks of food processing:

- decreasing nutritional density
- use of some food additives
- left over material from a previous operation

Food chain - Transport

third level of the food chain

Transport

- Improper transport conditions
- Rejected shipment due to safety regulations
- Rejection by buyer due to cosmetic imperfections, expiry date,

The efficiency of the goods transport process is determined by many factors. These include:

- selection of the right type of packaging for transport, type and technical condition of transport,
- location and protection of goods in transshipment,
- the availability of transshipment equipment and its condition,
- storage space infrastructure, as well as



- select the means of transport and adjust the speed and driving tactics to the type of food being transported.

Lack of necessary restrictions may result in a reduction in the quality of the food products transported or a delay in their delivery. This often involves shortening the shelf life of the food.

One of the causes of losses during transport is of course the human factor. Appropriate qualifications and high level of knowledge and experience of employees make them capable of action, including making difficult decisions, which may include decisions to reduce the level of losses. An important element in the process of reducing the risk of losing food or making mistakes is also the observance of the work procedures in force and continuous improvement of people who deal with such transportation/logistics.

The second identified category of causes of food losses and waste at the stage of its logistics is the environment. Transport, including above all the time of delivery of food products, must be carried out in such a way as not to reduce their durability and shelf life.

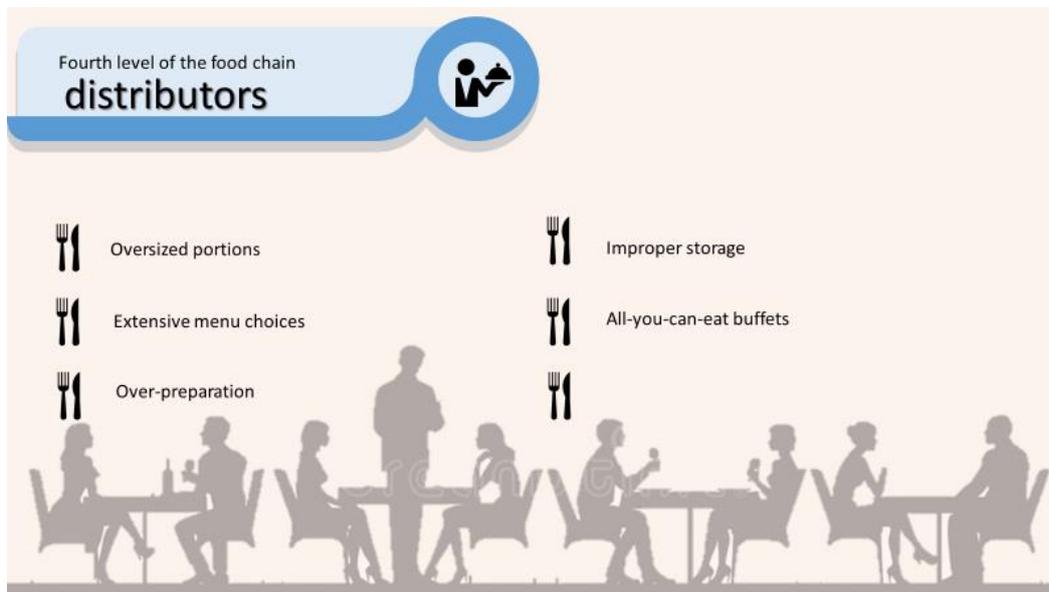
Another very important factor, potentially determining the loss of food at the stage of its transport, is the broadly defined management. Inadequate logistics management processes have an impact on the quality of food delivered to the final recipient. The quality of transporters' work depends on trainings and improvements conducted by relevant institutions, as well as on the policy of the country or region in this respect. In order to minimise losses at the food transport stage, it is important to organise well-functioning loading and unloading processes for the transported cargo. It is very important to adjust the route of the journey accordingly, as improper distribution of goods together with high vibrations during road transport causes mechanical damage to packaging or directly to products.

The processes of transport and storage of food are closely related, as the transport of food over long distances requires the prevention of food spoilage. Therefore, progress in transport technology plays a very important role in the entire food logistics process. Due to spatial heterogeneity (often different types of routes) it is necessary to secure food products and minimize errors made during cargo transport. It is primarily a matter of proper loading and proper adjustment of speed and driving dynamics.



The food should be evenly distributed on the pallet and additionally protected, wrapped in foil to prevent spillage. Inadequate driving dynamics of the food vehicle and lack of safety precautions lead to damage which can be caused by the movement of the load and often also by a vehicle accident on the road.

Food chain - Distributors



There will always be a certain level of food waste associated with the food distribution sector. In order to minimise food wastage at this stage, the main types of food wasted and the reasons for it should be identified.

The causes will be different for different catering activities:

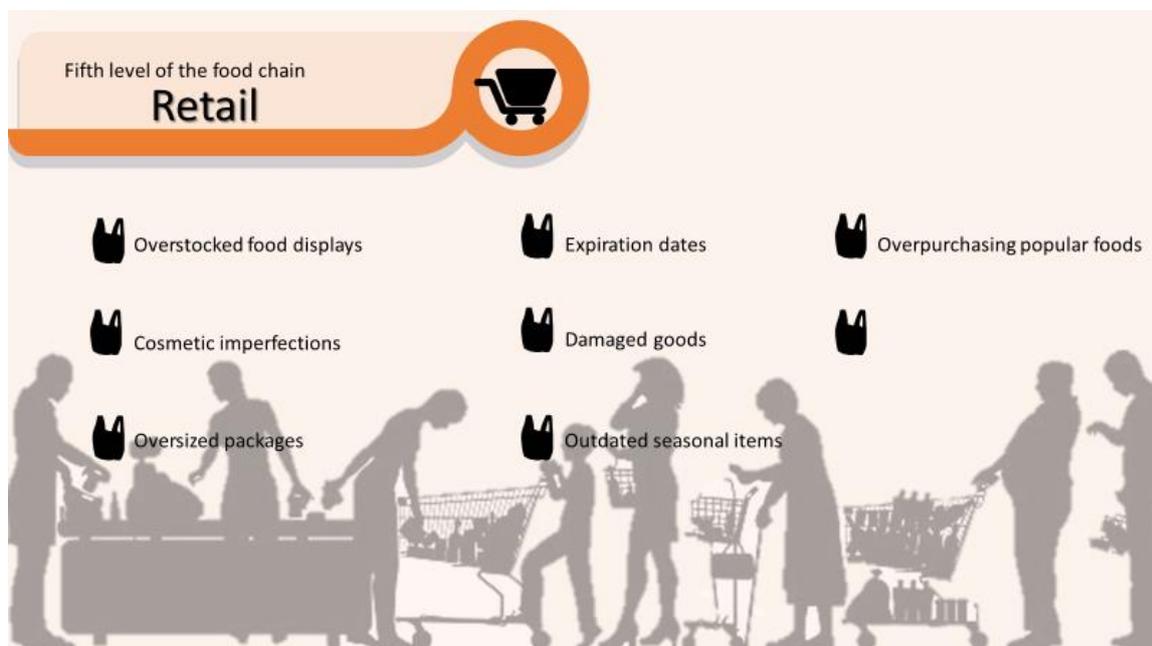
- Excessive portions
- Excessive ordering of food by customers
- Stock control problems leading to food spoilage
- Excessive ordering of food by kitchen staff, for example, just in case
- Poor menu planning in relation to the season, location of the premises
- Inappropriate food storage
- Lack of internal and customer communication
- Poor food preparation practices



Some types of food waste at the distribution and retail stages are:

- Product withdrawn from circulation
- Damaged food (mechanical)
- Non-sale of food, e.g. promotional and/or seasonal campaigns
- Short-term product that breaks down after a short time

Food chain - Retail



Retail is an industrial sector that brings together plants that buy very large quantities of products from producers and then, without transforming the product, sell smaller quantities to consumers for profit.

In retail, food waste refers primarily to products that are no longer marketable, but must be disposed of, thrown away or recycled. Food waste at the retail stage is therefore a major commercial problem.

Food waste in the retail sector represents a shift away from sales and embodies the costs of shop management and waste disposal.

The fresh produce sector is the largest contributor to food waste in the retail sector, and bulky, seasonal products pose an additional challenge when shops experience large losses. To



improve the situation, retailers need to better understand the costs of food waste, as well as how management strategies can influence these costs.

Recent trends in consumer preferences require healthier food options and varied fresh produce, value-added products and year-round availability.

Food chain - Households



According to the Food and Agriculture Organization of the United Nations, fresh fruit and vegetables contribute to nearly 50% of food waste produced by households in the European Union. Households less often plan meals in advance. Households are choosing ready food.

Most people do not realize how much food they throw out on a daily basis. Food that we throw into the trash goes to landfills. By managing food sustainably and limiting the food we squeeze into the bin, we can save money, provide help in our communities for those who are not fed up with food, and save resources for future generations.

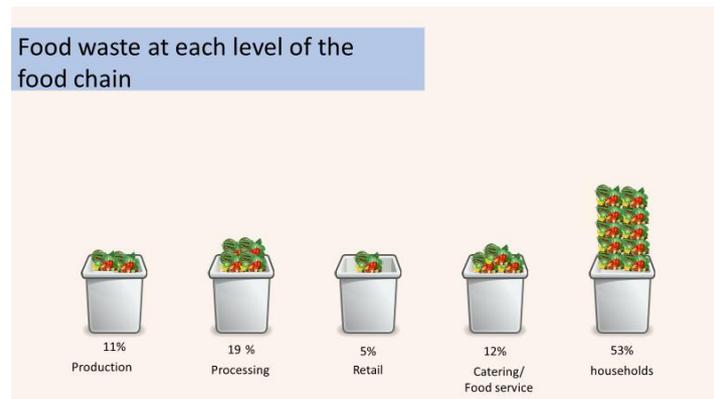
By planning meals a week in advance, we can save money and time, and eat healthier and fresher meals. If we buy only as much as we expect to eat, we are more likely to keep freshness and use everything that has been bought in the grocery store.

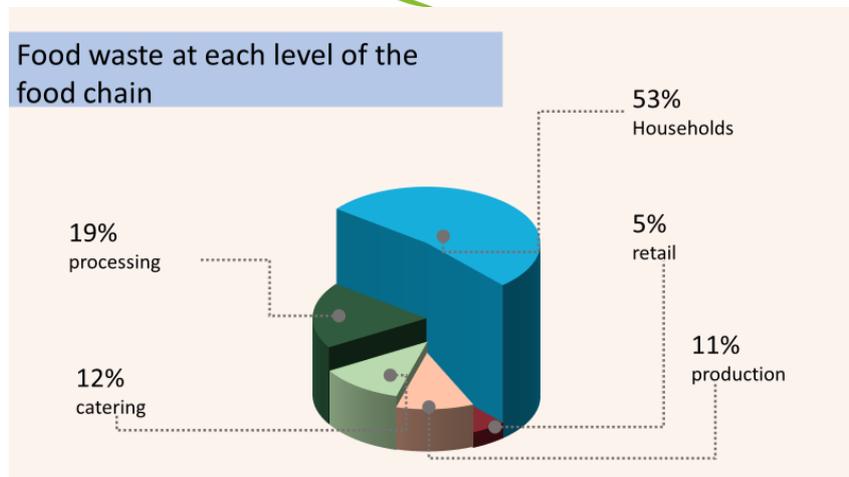


How people can stop wasting food:

- Keeping a list of meals, planning the menu in advance.
- Planning meals at least a week before shopping.
- Shopping only really needed food.
- Including quantities on your shopping list, paying attention to how many meals we will make with each product to avoid overfilling.
- Buying really only what we need and we are sure that we will use it.

Food waste at each level of the food chain





Reducing food loss and food waste is attracting increasing public attention at international, regional and national levels. It is widely recognized that greater awareness in this area contributes to addressing sustainability challenges such as food security. Climate change and drinking water shortages are also taken into account. The level of food loss varies at different stages of the food supply chain. The differences result depending on the type of crop, the level of economic development of the region, as well as social and cultural practices in the region or country. For fruit and vegetables, according to the Food and Agriculture Organization of the United Nations (FAO) study, harvest and sorting losses dominate in industrialized regions. This is probably mainly due to discards during sorting to meet the quality standards set by retailers. In developing regions, losses during harvesting and sorting are also high, but the losses during processing are much higher than in developed regions. The clear difference shows the need to improve the technology for processing perishable products in developing regions.



Food waste kg/person



1/3

Food produced is **wasted** while 9.6% EU population can't afford a quality meal every other day

170 million

tones of CO2 emission every year, making up for 8% of the **global carbon footprint**

1 billion

Hungry people could be fed on less than ¼ of the food wasted in the UK, US and Europe

25%

OF THE WORLD'S **FRESH WATER** SUPPLY IS USED TO GROW FOOD THAT IS NEVER EATEN





Global food production can be divided into three main categories:

- production losses,
- consumer waste,
- food consumed.

If we divide food supply into different food groups and divide food by population, we can estimate what the average person on earth consumes, loses and wastes.

On average, each person wastes about 50 kg of edible food each year. As you can easily imagine, food wasted by a rich man is very different from people living in poverty.

According to the food sustainability index in 2017, the countries with the lowest production of food waste per capita were Greece and China (44 kg of food per year), followed by India (51 kg of food per year). The countries with the highest waste are Australia (361 kg of food per year), followed by the USA (278 kg of food per year). The United Kingdom, however, records 74.7 kg of food wasted annually.

The reasons for food waste in a given country obviously also apply to local conditions. In general, the Food and Agriculture Organization of the United Nations (FAO) has identified a pattern. In developed countries, losses are higher down the food chain. In developing countries, food is lost or wasted in the upper part of the supply chain, which is primarily in the post-harvest period and in the early stages of the supply chain.

The Food and Agriculture Organization of the United Nations believes that these differences are closely related to variables such as quality standards, infrastructure, consumer behavior and habits. In regions with low income, people focus around restrictions on harvesting techniques, storage and transport infrastructure. High-income regions have higher loss rates at the lower levels of the supply chain (especially at consumer level). Waste in these rich regions results from stringent quality and appearance standards in the supply chain. This is also due to consumer behavior. Insufficient attention to shopping planning and excessive concern about expiry dates contribute greatly to excessive food waste in households.



Expiration dates

Expiration dates



Use by:
DD-MM-YYYY

The 'Use By' tag refers to the date by which the food should be consumed or frozen before it becomes unhealthy to eat



Best before:
DD-MM-YYYY

The 'Best Before' tag refers to the date until which the food will maintain its best quality. It is still edible after the date though it might not have the **'best taste'**

Everyone has a slightly different approach to handling food safely. Consumers waste food because very often they unfortunately do not understand the meaning of expiry dates on food labels.

The "best before" and "sell through" labels are intended to indicate when food may begin to experience reduced freshness or quality. This is not a date indicating the final best before date, which may break down or become a potential source of food-borne diseases. Scientists who specialize in the study of food say that prematurely rejecting this food, consumers are contributing to the problem of food waste.



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Examples of inspiring explainer videos

Title of a video	The world's food waste problem
A Video Description	Global food waste is a far-reaching problem with severe environmental, financial and ethical costs. Statistics show that we waste nearly 1.6 billion tonnes of food every year.
Link	https://www.youtube.com/watch?v=3m2KglQuevo
Title of a video	Food waste is the world's dumbest problem
A Video Description	This is the fourth episode of Climate Lab, a six-part series produced by the University of California in partnership with Vox
Link	https://www.youtube.com/watch?v=6RlxySFrkIM
Title of a video	Food wastage footprint
A Video Description	Video made by Food and Agriculture Organization of the United Nations
Link	https://www.youtube.com/watch?v=loCVrkcaH6Q