



acting now for
the **FUTURE**

Erasmus + program KA229
“Acting now for the future”

3rd Mobility

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THEME

“FOOD WASTE”

1



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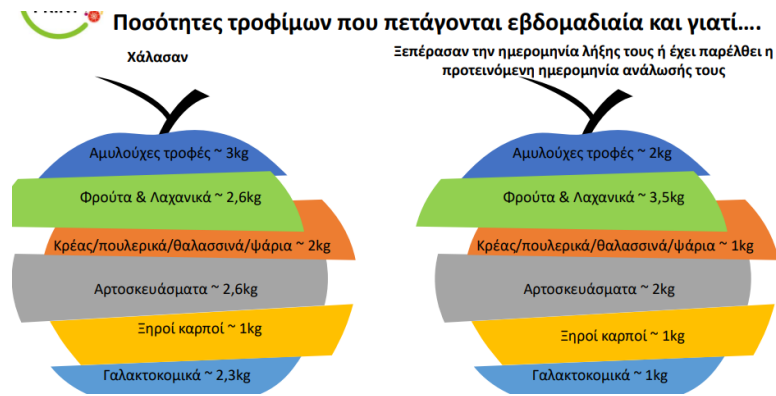
Section 1: Description of "food waste" A '

1. What does "food waste" mean, definitions, concepts, boundaries.
2. In what kind of products and in what quantity is it mainly observed? What about food that is "thrown away"?
3. What ages behave how about? E.g. do older people tend to waste food?
4. In which places is it observed? E.g. houses, restaurants, canteens, etc. What happens at our school? What do the leftover restaurants do?
5. Historical background: since when is it observed, what was the evolution of the phenomenon?
6. Current situation: what is the extent of the phenomenon?
7. How does the Russo-Ukrainian war today affect our food management habits, that is, its provision and distribution to the people?
8. What prospects seem to exist regarding "food waste"?

Food loss and waste is food that is not eaten. The causes of food waste or loss are numerous and occur throughout the food system, during production, processing, distribution, retail and food service sales, and consumption. Overall, about one-third of the world's food is thrown away. A 2021 metaanalysis that did not include food lost during production, by the United Nations Environment Programme found that food waste was a challenge in all countries at all levels of economic development. The analysis estimated that global food waste was 931 million tonnes of food waste (about 121 kg per capita) across three sectors: 61 per cent from households, 26 per cent from food service and 13 per cent from retail (A grocery store).

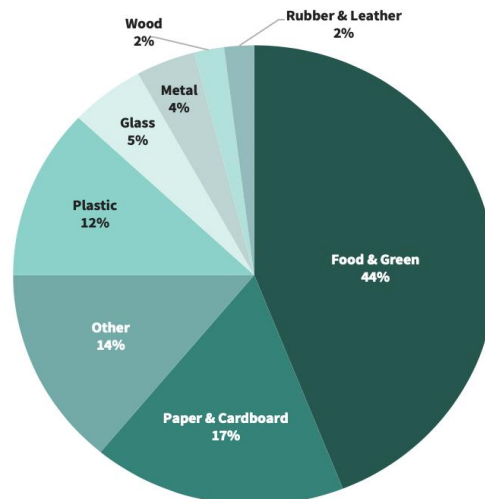
Food loss and waste is a major part of the impact of agriculture on climate change (it amounts to 3.3 billion tons of CO₂ emissions annually) and other environmental issues. Moreover, food waste that is not handled or reclaimed properly, can have many negative environmental consequences. For example, landfill gas from anaerobic digestion of organic matter is a major source of the greenhouse gas methane, and unreclaimed phosphorus in food waste, leads to further phosphate mining. Moreover, reducing food waste in all parts of the food system is an important part of reducing the environmental impact of agriculture, by reducing the total amount of water, land, and other resources used.





HOW DO WE QUANTIFY IT?

We are currently accumulating a huge mountain of waste! 44% of global waste consists of food and greens, of which a significant portion is food waste.



In terms of weight:

More than one third of the food produced in the world for human consumption every year gets lost or wasted — approximately 2.5 billion tons (WWF Report, 2021)

That means within a year, we waste around 51 tons every second (BCG, 2018)

Food waste will rise by a third by 2030, when 2.1bn tons will either be lost or thrown away, equivalent to 66 tons per second (BCG, 2018).



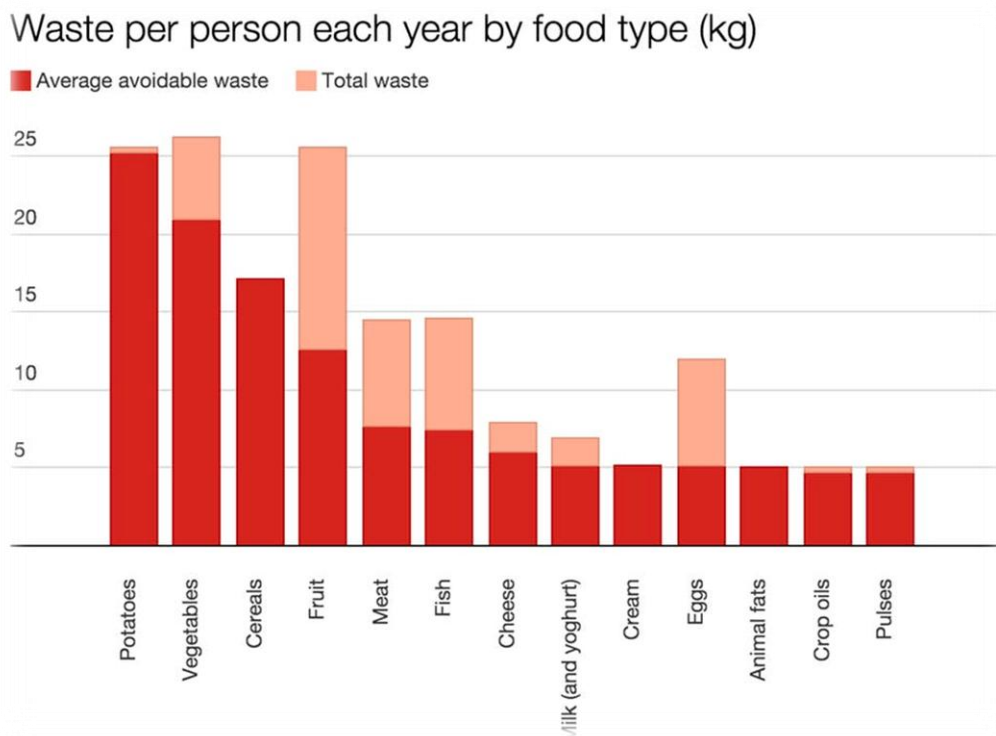
There is obviously a lot to unpack within the “history of food waste.” Interestingly, Americans have succeeded in restraining unnecessary food consumption since the early 19th century, while Europe took measures for the phenomenon for the first time in 2016. In particular, in 2016, the Council made a political commitment to a number of initiatives such as improving the monitoring of food waste, raising public awareness, improving the understanding and use of the expiry date (including among consumers) and facilitating the donation of unsold food to charities. Three years later, in December 2019, the Commission gave new impetus to addressing the issue of losses and food waste by presenting the European Green Deal.



However, although the European Union took action on the phenomenon, a United Nations research, that took place in 2019, showed that about 931 million tons of food, or 17% of the total amount of food available to consumers worldwide, ended up in the trash of households, restaurants and other services in 2019, without being consumed, according to the study. 61% of discarded food came from households, 26% from various food services and 13% from catering establishments. It is estimated that, per head globally, one person throws away 121 kg of food in the trash every year, with 74 kg of it being thrown away by the household sector. Based on a research that took place in 2021, one of the worst performances in the world is recorded by our country, Greece, in food waste according to the results of the most recent relevant survey of the United Nations. It is estimated that, per head globally, one person throws away 121 kg of food in the trash every year, with 74 kg of it being



thrown away by the household sector. However, in our country, Greece, waste seems to be higher than the global average, since it is estimated that per inhabitant, per year, 142 kilos of available food are thrown away by Greek households that is not consumed, as well as another 7 kilos per head each year from the catering sector. The above data place Greece third in the world ranking of the worst performance. Nigeria and Rwanda (189 kg/inhabitant, 164 kg/inhabitant, respectively) are the worst performers than our country, respectively, a fact that is mainly attributed to the poor conditions of food storage and transport.

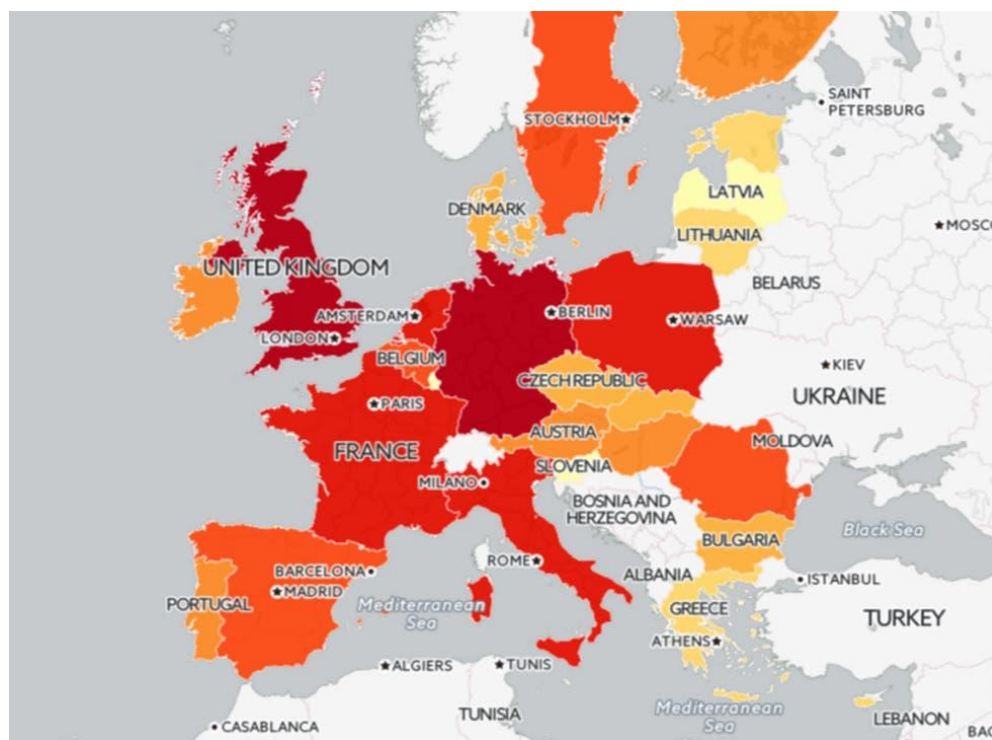


In order to restrict this phenomenon, the commission is:

- i. Elaborating a common EU methodology to measure food waste consistently in co-operation with EU countries and stakeholders
- ii. Operating a multi-stakeholder platform involving both EU countries and actors in the food chain in order to help define measures needed to achieve the food waste SDG, facilitate inter-sector co-operation, and share best practice and results achieved
- iii. taking measures to clarify EU legislation related to waste, food and feed and facilitate food donation and use of food no longer intended for human consumption in animal feed, without compromising food and feed safety



iv. examining ways to improve the use of date marking by actors in the food chain and its understanding by consumers, in particular “best before” labelling.



Examining food waste in Greece is a difficult task due to the lack of extensive and thorough research on the issue and the almost complete lack of public debate on this important social problem. There is a study from Harokopeio University, but it is limited in terms of the qualitative and quantitative scope of the study¹. The public debate on the phenomenon of food waste in Greece, practically non-existent until a few years ago, is almost exclusively caused by citizens' initiatives (mainly Non-Governmental Organizations) and academic institutions and not centrally and coordinated by the state, as is the case in many developed countries. There, food waste has been tackled for many years with the help of NGOs and has become an important issue of public debate with remarkable results, as in Great Britain.

For many years, the focus on food waste has been mainly on the less economically developed countries, where the phenomenon of hunger and malnutrition is most prevalent. However, in the last two decades, the



phenomenon has also started to be addressed in developed countries as public opinion about resource waste in general is gradually changing, and as more and more people in rich countries are forced to seek support for their food needs.

In contrast, in economically developed countries, including Greece, food waste is concentrated at the last links in the food chain, with the largest share (53%) being in households. This is why efforts to reduce waste in developed countries should aim at changing people's habits about what and how they shop and at finding efficient ways to use what they have left over food.

In most developed countries, food waste is usually approached as a phenomenon from the perspective of significant environmental impacts. For example, according to a study by the European Commission, if the necessary measures are not taken immediately, food waste in the EU, due to population growth and disposable income, will increase to 120 metric tons of waste in 2020, compared to 89 metric tons in 2006.

In contrast to other developed countries, in Greece, due to the economic crisis of recent years, the phenomenon is usually approached from the humanitarian perspective of the problem the contradiction of food waste when many of our fellow human beings are food insecurity. This is a logical consequence of the very high unemployment in Greece in recent years and the reality that almost 1/3 of the population lives below or close to the poverty line. Another consequence of the crisis is the reduction of food waste, but only indirectly, i. e. through the proven reduction of all household waste, which is another indicator of the reduction of disposable income and consumption.

7

Section 2: Causes of “food waste”

1. What factors favor / allow “food waste”? E.g. economic, social, cultural, etc.
2. Why are these factors developing? What conditions allow it?
3. What is the relationship between the economic and humanitarian crisis and the phenomenon of "food waste"? Have our habits changed our mindsets or not? Why in the end?
4. How is today's lifestyle related to "food waste"? Why; At what level?



As it happens with many products in the market, food is being consumed, used and can end up in the rubbish. The amount of food being thrown away is so great, especially in developed countries such as Greece, which means that the pores used to make the food are also thrown away. Part of the creation of food waste is owed to the legislature that often establishes protection of human health. There has to be done an analysis that is focused on all different causes in order for them to decrease food waste. The causes of food waste are the same for both households and enterprise, since from one hand they include size portion, branding and storage issues and on the other hand the sensitization of the public regarding issues of consumerism, preference, programming and other economical and social characteristics of the people.

Reasons for food waste in households and in the catering sector;

Sizes of packaged food portions

Here there is a dilemma between packing individual portions but wasting more packaging supplies or packing multiple portions which is more likely to waste food.

Problems with product labels

Large quantities of food are being wasted due to the tendency of consumers to treat the various labels on product labels as the same, for example the difference between "expiration date" and "preferably before consumption". Due to the confusion in Greece about these labels, a significant opportunity has recently been lost to reduce food waste in retail trade on past-conservation products.

Packaging problems

Special packages could significantly extend the shelf life of products, such as fivefold the duration of vegetables that contain a large percentage of water if wrapped in a special film

Storage problems

As noted above, this problem is one of most importance in the least economically developed countries, but even in the developed ones it plays an important role. It is estimated that in the UK 2 million tonnes of food are not stored properly each year.



Lacking information

While more and more people in developed countries are now aware of the phenomenon of food waste, few have changed their habits or are actively trying to reduce their personal waste. In Greece there is a gap compared to other European countries regarding the information of the citizens about the phenomenon.

Preferences

Large quantities of food are wasted due to the dietary preferences we have as consumers, the waste of the peel of a potato or an apple, the crust of bread etc. This food waste factor is considered according to studies to be one of the most difficult to change.

Design

The planning of a household's groceries is considered an important factor of food waste, especially in a country like Greece, whose population only in recent years shows signs of mature consumer behavior due to the economic crisis.

Socio-economic factors

Changes in the social structure of recent decades in developed countries, most notably the growth of individual households, play a role in increasing food waste, as individual households have a stronger tendency to waste than households of most people. This trend can also be observed in Greek society.

In the processing and wholesale sectors the main reasons for food waste are focused on logistical reasons, transportation and storage problems.

Some indicative figures of global food waste

- \$ 1.3 billion tons of food are wasted annually, worth \$ 750 billion, almost as much as the domestic product of the 18th richest country in the world (Turkey).
- Obesity has become a global scourge as it affects 1.7 billion people, but at the same time about 870 million people are malnourished.



- 9 million children die of hunger every year when food production is enough to feed the entire population of the earth.

- On an annual basis, 88 million tons of food in the EU end up in the garbage, excluding this amount of food that is discarded in agricultural production and sorting.

- EU households throw away € 100 billion worth of food, roughly equivalent to the turnover of Nestle, the world's largest food company.

- The annual food waste in the US is 40 million tons of food, enough to keep every single malnourished person worldwide fed.

- Through new technologies leftover bread from bakeries ,up to 20% of the production, can be used as fuel ,it has almost the same efficiency as wood, and it has been calculated that if all bakeries in Germany used this method the energy produced would be equal to that of a nuclear plant.

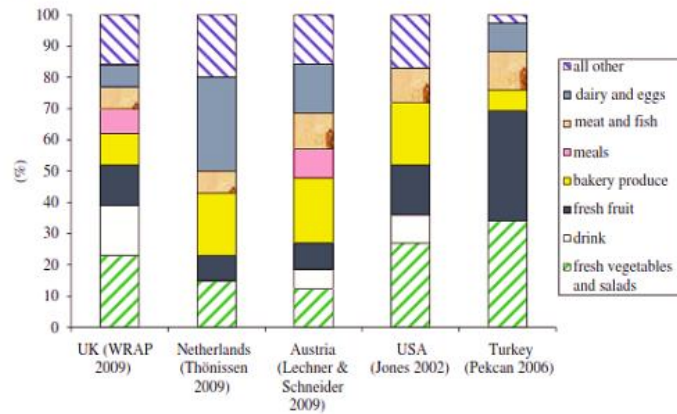
First and foremost, there is the issue of demand. Retailing can be unpredictable and inaccurate since it's greatly influenced from the weather, the season, the appearance of new products etc. Additionally, the means of retailing are becoming more complicated by the day, for example online shopping is at its prime. Furthermore, many a times the food doesn't fulfill the market's demands. Especially fruit and vegetables ought to have a specific color, size and weight, whereas the ones that lack to be as demanded are thrown away, when there is absolutely nothing wrong with them, except for their appearance. Incorrect forecasting of demand by retailers, invalid inventory renewal and mismanagement of product offerings are also significant causes of loss. The supply policy pursued by large supermarkets can encourage overproduction of food while advertising often encourages consumers to buy more food than they need.

Fast food restaurants have become very popular nowadays, as an easy and accessible solution for everyone, especially employees. However, as its name suggests, these are stores that offer cooked food in specific time frames (10-20 minutes), which food if not consumed in this time frame will be thrown away. Finally, financial comfort, consumer attitudes, the confusion between when a food can be consumed or not based on the expiration date, food safety concerns and the short shelf life of fresh products after it, are factors that increase consumer waste.



γάλακτος, το 36% των προϊόντων αρτοποιίας και πάνω από το 50% των πράσινων σαλατών, απορρίπτονται (Parfitt, 2010).

Στο παρακάτω διάγραμμα, παρουσιάζεται μία περίληψη των αποβλήτων τροφίμων που παράγονται στα νοικοκυριά χωρών όπως η Αγγλία (στοιχεία 2009), η Ολλανδία (στοιχεία 2009), η Αυστρία (στοιχεία 2009), οι ΗΠΑ (στοιχεία 2002), και η Τουρκία (στοιχεία 2006).



Διάγραμμα 5: Τύποι και ποσότητες αποβλήτων τροφίμων που παράγονται σε Αγγλία, Ολλανδία, Αυστρία, ΗΠΑ & Τουρκία (Πηγή: WRAP, 2009)

Section 3: Consequences of “food waste”

1. What are the consequences of "food waste" at the social, moral, political, cultural level, etc.?
2. What new form of "consumer" behavior has been formed in recent years regarding "food waste"?
3. What is the relationship between "food waste" and hyperconsumption?
4. What are the effects of "food waste" at the environmental level? Why;

The phenomenon of food waste has social, economic and environmental consequences.

Starting with the social impact, 1/3 of the food produced ends up in the trash, 868,000,000 people worldwide can not meet their daily food needs, while the amount of food wasted could meet four times their food needs . In Europe, 50% of food is wasted by supermarkets, restaurants and households, while at the same time 79,000,000 Europeans live in poverty and 16,000,000 of our fellow citizens are directly dependent on food aid provided by charities.

Regarding the economic consequences of the problem of food waste, one way in which the economic impact of food waste can be measured refers to the cost of producing them, ie the financial resources that are



necessary to produce food that is not consumed in the end. A second approach has to do with food prices which are linked to the forces of supply and demand. According to market rules, the shortage of food will lead to an increase in their prices, which mainly affects the pockets of the economically weaker.

- **Γαλακτοκομικά προϊόντα**
Δεν καταναλώνεται το **33%** της μερίδας
- **Ξηροί καρποί**
Δεν καταναλώνεται το **25%** της μερίδας
- **Αρτοσκευάσματα**
Δεν καταναλώνεται το **45%** της μερίδας
- **Ψάρια**
Δεν καταναλώνεται το **70%** της μερίδας
- **Θαλασσινά (μαλάκια/μύδια/καβούρια)**
Δεν καταναλώνεται το **55%** της μερίδας
- **Κρέας**
Δεν καταναλώνεται το **37%** της μερίδας
- **Φρούτα & Λαχανικά**
Δεν καταναλώνεται το **50%** της μερίδας
- **Αμυλούχες τροφές**
Δεν καταναλώνεται το **40%** της μερίδας

We can also mention the high cost of waste management given the huge quantities of edible food that are eventually discarded. These costs include the maintenance of landfills, transportation costs, maintenance costs of machinery and mechanical equipment, etc.

Therefore, food waste means wasting money at all levels and along the entire food supply chain.

Finally, in terms of environmental impact, we report that food waste is directly linked to the waste of valuable natural resources, such as land, water, nutrients and energy. The main environmental impact of the problem of food waste is the emission of gases which aggravate its phenomenon.



Atmospheric consequences of Food Waste

The discarded food is transported to landfills, where it is decomposed. During the process of decay, they emit large amounts of carbon dioxide, carbon dioxide and methane, a gas that is 25 times more harmful than carbon dioxide to the greenhouse effect. Large tonnes of gases are estimated to be emitted annually, estimated at 3.3 billion tonnes of greenhouse gases, or 7% of total emissions.

Water consequences of Food Waste

Food waste is not only negatively impacted through gas emissions. Crops use 70% of the water used worldwide, so wasting food results in a great loss of fresh water and groundwater resources.

Territorial consequences of Food Waste

At the same time, food waste has detrimental consequences for the soil. Food production uses 34% of the land. Its salinity increases, which makes it impossible for normal plant growth. Also, soil erosion is favored, with the result that the soil is stripped bare and ends up in a stony area, with the area being deserted. Urbanization, over-consumption and the ever-increasing demand for food are leading to the expansion of industrial zones related to meeting our nutritional needs. This means that forest areas are being deforested and wild areas are being exploited and converted into agricultural areas to meet our needs. Thus, biodiversity, plant ecosystems are destroyed and the animal chain is disrupted.

13

Section 4: Suggestions for dealing with “food waste”

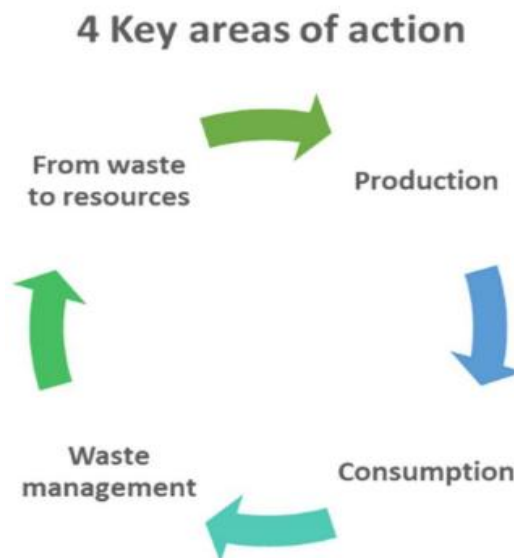
1. What is the legal framework for dealing with “food waste”?
2. How effective were the relevant laws?
3. What has been proposed so far to address "food waste"?
4. Practically what could be done in places like home, work, school etc?

It is true that, one of the most devastating problems that we face all over the world nowadays, especially here in Greece, is food waste. The situation is getting worse, day by day so the law took some measures in order to reduce the dimensions of it. More specifically, the EU and its member states have introduced measures to prevent food loss and waste. Only where this is not possible do they take steps to use again, recycle or



use food for other purposes. The guiding principles, by cooperating and communicating with the EU, calls on member states to:

- 1) *Reduce the amount of food lost during production and distribution*
- 2) *Reduce food waste in households*
- 3) *Encourage food donation*
- 4) *Monitor and assess the implementation of the EU's food waste prevention measures*



14

Some easy steps that anyone of us can do, to reduce food waste around him

- 1) We shop "in moderation" - We plan our meals. We use lists for our shopping and avoid impulsive shopping. The extra food we would buy often ends up in the trash.
- 2) Choose the "weird" fruits and vegetables - We buy fruits and vegetables that may not be the "right" size, color or shape, because otherwise they often end up in the trash. They are just as delicious and healthy as the ones that look "perfect".
- 3) Find out when food really "spoils" - We learn when food really "spoils". Most foods are safe even a few days after their recommended date of consumption.
- 4) We tidy up our fridge - We organize the food in our fridge properly and we consume first what is to "spoil" soon. We place the products on the right shelves-cases.



- 5) We use our freezer - We can preserve food in the freezer and in this way, keep it safe for a longer period of time.
- 6) We ask for smaller portions of food - When we are in a restaurant / tavern we can ask if it is possible for them to give us a smaller portion than normal. We try, whenever we are given the opportunity to be served, to place smaller portions of food on our plate and if we want to take a supplement.
- 7) We take the leftover food with us when we eat out - Do not forget to ask the restaurant / tavern to put the leftover food in a package, to eat it later or to preserve it in the fridge / freezer.
- 8) We make fertilizer for our plants - We use food scraps to make fertilizer.
- 9) We spread the "smart" consumption of food - We spread the message "No portion of food lost!", To friends and relatives and we become a model of consumer behavior.
- 10) We donate the leftover food - Foods that are in excellent condition and we have not touched them, we can donate them to institutions, meals and social services in our area.

Other measures aimed at reducing food loss and waste include the repurposing of surplus food products, for example as animal feed or compost. The council have also suggested to monitor the waste of food, to make people more pleased about the whole issue and tried to make some donates of the food that people didn't consume, to charities.

Although the measures that the council and the EU took are really ambitious, the result is not what we were hoping for, as 1.3 billion tons of food all over the world end up in landfills every year and the money that all that food cost is more than huge (143 billion euros). By watching at the results, we all think that we should take more action in order to reduce this problem, by suggesting some other ways to prevent it. Some of the are:

- 1) People should try not to buy more food than needed
- 2) Making a program of the week's food would really help
- 3) Calculating the amount of the food that we are about to make
- 4) Keeping the food safe so it will not decay
- 5) Checking the expiration date



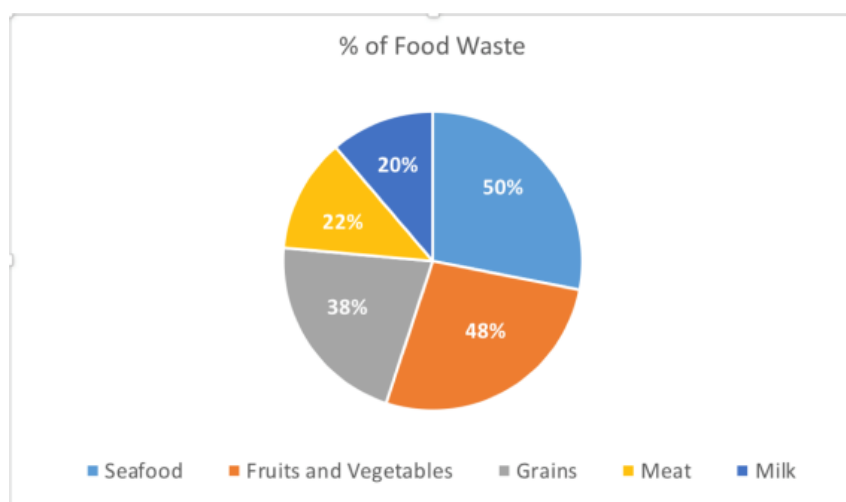
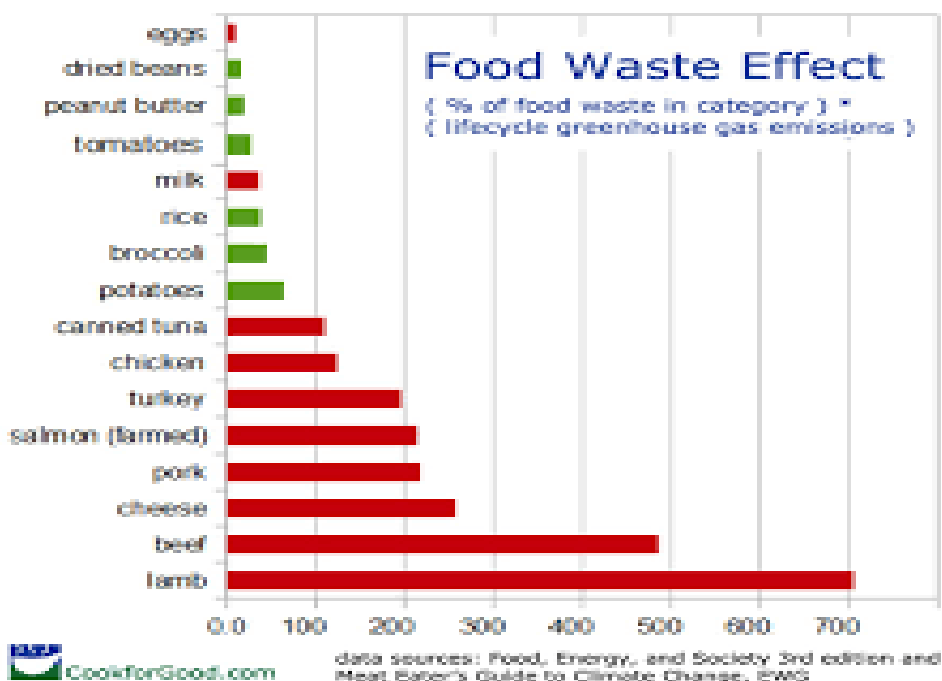
These “extra” suggestions will make the situation much better, but there are some other things that every person can do from school, work, or from the house to make things even better. More specifically, The principals of the schools can talk with the local government, and make some programs like giving all the food being left every day to an organization that takes care of homeless people or orphan children. They can also encourage the children of the school to keep the food left from their homes, and bring it school the next day, so the principal will give it to someone that really needs it. Furthermore, nothing will be successful without people’s cooperation from their homes. They can help in many ways. For example, It’s only a bargain if we can use the food in time! Be aware that our schedules can be busy and unpredictable. ‘Buy-one-get-one-free’ and other bulk deals lead to buying more than we need, shifting the waste from the store to our home. In food waste terms, it’s wise not to buy more than needed. Moreover, Make sure food doesn’t disappear in the cupboards or fridge by applying the first-in-first-out principle. Fresh groceries go behind products nearer to expiry dates which move closer and more visible. Organise the fridge by keeping ready to eat foods such as leftovers on the top shelf and sealed raw meat and fish on the bottom shelf to avoid dripping. Reserve a separate drawer for fruit and vegetables. Last but definitely not least, If mould appears, whether we can still ‘rescue’ the food depends on what it is. The following general rules can help us know what to do. Hard foods should be safe to consume once the mouldy part is removed along with the surrounding area. This includes hard cheeses, hard cured meats (such as salami and ham) and firm fruits and vegetables (such as cabbages bell peppers, root vegetables). Soft foods should be thrown out once they start to mould. This includes cooked leftovers, soft cheeses, yoghurts and other dairy products, bread, jams and soft fruits and veggies (such as cucumbers, peaches, tomatoes, berries and so on).³ This is because mould can spread in soft foods (and we might not even see it). If all of this measures be implemented, the food waste in Greece and all over the world will be reduced in a really fast pace and this will help almost everyone. But, in order to make it, all of us have to take care of what I just said.



CONCLUSION

The phenomenon of food waste is very large worldwide and in Greece, but after the first steps of recognizing the problem, now come the next steps of changing the approach of the phenomenon, informing the public, changing mentalities and the obvious activism of state and transnational mechanisms, but also many NGOs such as We Can, composing an optimistic message that the current situation can be drastically improved in the near future for the benefit of people and the environment.

GRAPHICS AND STATISTICS





LINKS:

- <https://www.consilium.europa.eu/el/policies/food-losses-waste/>
- <https://www.reloopplatform.org/el/getting-tough-on-food-waste/>
- <https://www.e-fresh.gr/el/simvoules/7-tropoi-meiwshs-ths-spatalhs-faghtoy>
- https://www.eufic.org/en/food-safety/article/how-to-reduce-food-waste-at-home?gclid=CjwKCAjwopWSBhB6EiwAjxmqDeVgZXigFVGyKWmb1djuhSZizfWh_uTNWyTzv7Wyn-IHRve6GvxIRoCqCgQAvD_BwE
- https://www.boroume.gr/i-spatali-trofimon-stin-ellada/?fbclid=IwAR0c5O_YjhiVhyNMafWFaauEhW1DqCaZlpBSxQ39GbHfdzfvIHazhHgymGY
- <https://estia.hua.gr/file/lib/default/data/18594/theFile>
- https://www.researchgate.net/profile/Theofanis-Zacharatos/publication/332037882_Food_waste_phenomenon_causes_and_factors_Greek/links/5c9ca3b6a6fdccd4603f5249/Food-waste-phenomenon-causes-and-factors-Greek.pdf
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- https://www.foodprintcy.eu/wp-content/uploads/parusiasi_erevvas.pdf

