



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

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## I. Syllabus

Number and name of the module Module 5 Resource Efficiency	
A module description	The Resource Efficiency module will help pupils understand the value and importance of our resources and the concept of being finite. It will help them understand the impact their waste has on the world and teach them how to maximize the utility of our resources by introducing circular economy.
Intended learning outcomes	On completion of this module you should be able to understand: <ul style="list-style-type: none"><li>• Resource efficiency and the value of resources</li><li>• Sustainability</li><li>• Circular economy</li><li>• The carbon footprint</li><li>• The effect food waste has on the world and the climate</li></ul>
Learning activities	<ul style="list-style-type: none"><li>• watching 1 presentation video and additional video</li><li>• exploring obligatory and optional reading material</li><li>• doing exercises (1–3 exercises per module)</li></ul>
Estimated duration	Total workload is 1-2 hours including: <ul style="list-style-type: none"><li>• 15 minutes for watching videos</li><li>• 30 minutes for exploring obligatory reading material</li><li>• 5 minutes for exercises (max. 5 min. per exercise)</li></ul>



## II. Learning content



The majority of the resources we make use of are finite, meaning one day we will run out of them and our only options will be to either produce more, if possible, or maximize their utility by finding other uses for them. However, this is all dependent on the pace at which the resources are being used. If we use our resources faster than we can produce them then production levels will have a hard time keeping up and eventually, all of our resources will be used up before we have time to make more. This is why it's important to be careful of how we use our resources and what we do with them after. As these modules are about food waste, we will only focus on the resources used to produce food, such as water, land, and the food itself.

To better explain use vs production levels, let's focus on strawberries. They are in season every June, which means that if you plant strawberries, they need around a year before they can be harvested around May or June. So, if we are to harvest all the strawberries this year and sell them, it is up to the buyers to decide how fast they eat them, knowing that they can't get more until next year. If they eat their bought strawberries in batches, they can enjoy them for longer, whereas if they eat them all at once, they will be out very quickly and will have to wait until the next harvest. This is a smaller scale example of how scarce our planet's resources are, especially at the pace they are being used.

This module will help you better understand what resource efficiency and sustainability is, and how to use the resources available to you in an efficient way so you can maximize their



utility through circular economy. It will also help you better understand the waste you produce and your carbon footprint, so you can identify the areas which you need to improve on and how to minimize your carbon footprint. We will start first by explaining the concepts of resource efficiency, sustainability and circular economy. Then we will see what your own personal carbon footprint is and how to reduce it.

## RESOURCE EFFICIENCY

- Resource efficiency: using the Earth's limited resources in a sustainable manner while minimising impacts on the environment
- Create more with less
- Technical/economic vs natural resources
- Technical/economic:
  - personnel, operating equipment, capital, knowledge
- Natural resources:
  - Renewable and non-renewable raw materials
  - Air
  - Water
  - Surface areas (soils with agricultural and forestry utilisation)
  - Biodiversity (diversity of species, diversity of ecological systems)



Resource efficiency means using the Earth's limited resources in a sustainable manner while minimising impacts on the environment. It allows us to create more with less and to deliver greater value with less input.

Using natural resources more efficiently, we can live healthier lives, save money, create jobs, boost our economy and respect the limits of the planet.

Resource efficiency is not only a benefit for us as we get more use out of the same resource, but it also helps the economy itself. By using fewer resources, in a more efficient manner, we are also helping Europe so it may retain its competitive edge, create green growth, sustainable jobs and better protect the environment.

Resources can be divided into technical/economic resources such as personnel, operating equipment, capital and knowledge and natural resources such as renewable and non-renewable primary raw materials like energy resources, air, water, land, and biodiversity.



We will focus mainly on the natural resources as these are essential to producing food and they are also limited, so we need to learn how to make better use of these and not use too much all at once.

Readings:

**SUSTAINABILITY**

- Sustainability: the development that meets the needs of the present without compromising the ability of future generation to meet their own needs

Intensive agriculture	Sustainable agriculture
Water pollution	Minimize water use
Soil erosion	Minimize tillage of soil
Poor soil quality	Higher soil quality
High amounts of chemical pesticides and fertilizers	Lower dependence on chemical pesticides and fertilizers

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Though there are different types of sustainability, for this module our focus will be on environmental. Environmental sustainability is responsible interaction with the environment to avoid waste or complete loss of certain resources. This will not only help us, but it will also help the environment itself. By leading a sustainable life, the people who are alive today use resources in a responsible way so that we don't compromise them for the future generation and so that they may also live a comfortable life.

One of the main resources which are affected when producing foods are soil and water, and we need a lot of land to plant as many vegetables and fruits as possible and we need a lot of water to make sure what we plant stay hydrated, just like humans. Altogether, this is called



sustainable agriculture, which is when we use farming techniques which help harvest our products but also protect the environment at the same time.

Although industrial agriculture has the ability to produce abundant amounts of food at affordable prices, the method of farming can be detrimental to the environment. Industrial agricultural methods are heavily reliant on chemical fertilizers and pesticides and put high demands on soil and water resources. Also, industrial crops are often monocrops, which involves growing a single crop year after year.

These methods can lead to water pollution when chemicals run off into waterways, deplete the water resources due to overuse, and soil erosion and poor soil quality due to aggressive planting. With sustainable agriculture, farmers minimize water use and lower the dependence on chemical pesticides and fertilizers. They also minimize tillage of the soil and rotate crop planting each year to ensure higher soil quality.

## CIRCULAR ECONOMY

- Extending the life of the product by sharing, leasing, reusing, repairing and recycling the materials
- Reducing waste to a minimum by reusing the materials of an expired product in other areas
- Take-make-consume-throw away economy (old way):
  - Large quantity of materials
  - Cheap quality
  - Easily accessible
  - Aim: limit the lifespan so consumers will have to buy it again



Circular economy in a nutshell is expanding the lifespan of products. This is done by finding other ways to use a product even after its intended purpose has been fulfilled. For example, food waste can be used to feed cattle, which keeps them strong and healthy so that they can produce milk. Or, a smaller scale, people can take the seeds of certain fruit and plant them so they can grow fruit themselves. In this way, you use one resource for multiple purposes and gain more rather than just using it once.

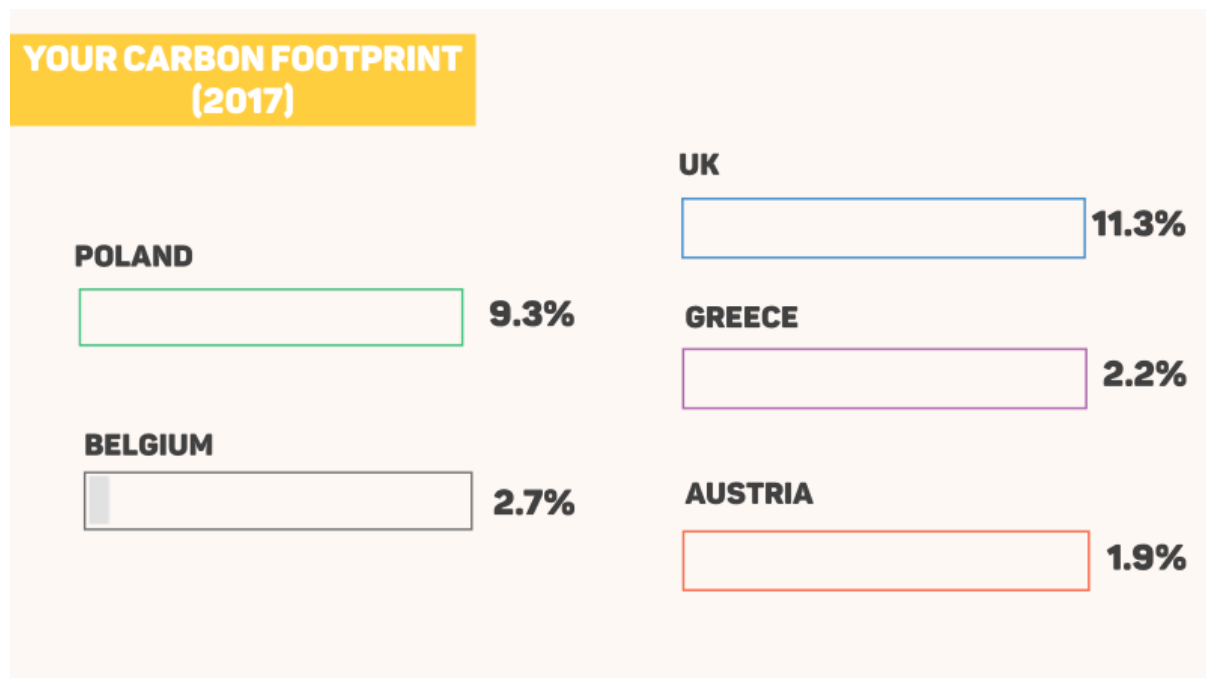


Circular economy can come in many forms such as sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products all to make use of them for as long as possible. In this way, the life cycle of products is extended.

In practice, it implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible. These can be productively used again and again, thereby creating further value.

This is different from the traditional, linear economic model, which is based on a take-make-consume-throw away pattern. This model relies on large quantities of cheap, easily accessible materials and energy.

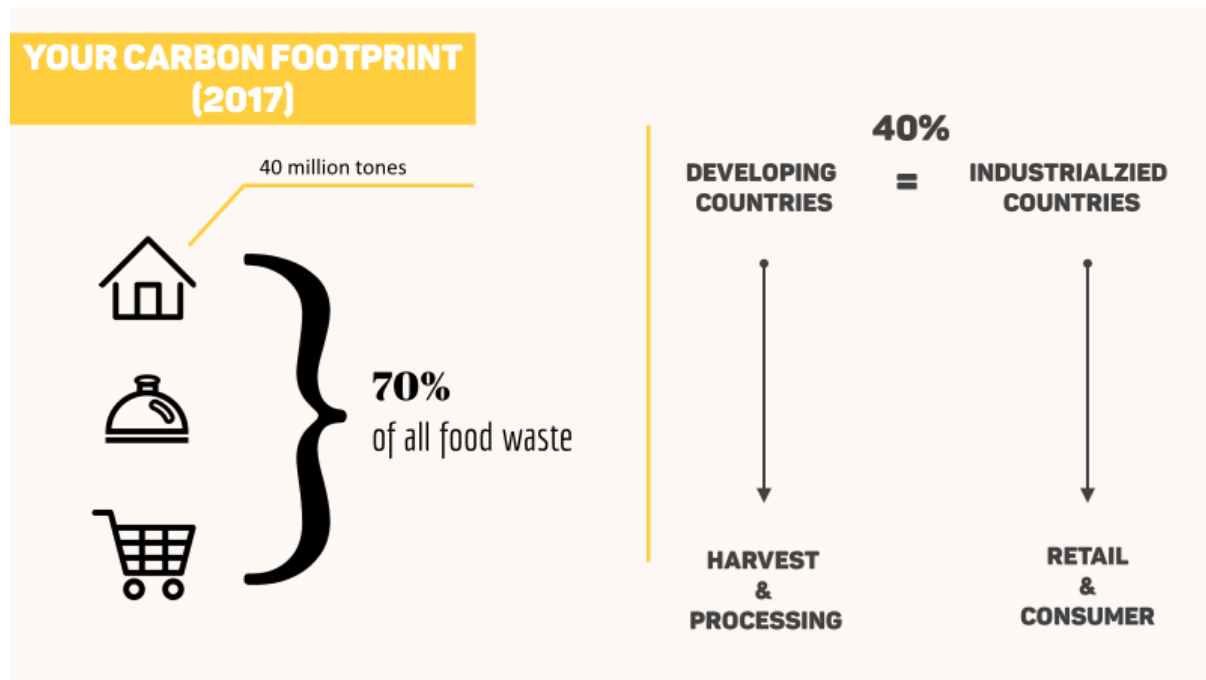
There are many other issues such as products being made for single-purpose which goes against the circular economy and instead promotes waste. However, we should push for multiple use products which can also be recycled and not only produce less waste but only help fight climate change.



Here we can see the carbon footprint some countries have. One of the factors that is important in food waste and waste in general the importance each country gives to it. Some countries are very focused on waste and set laws and fines which people can get if they do not recycle their garbage properly. This helps combat waste and allows for more products to



be recycled, therefore using resources in a sustainable way and contributing to the circular economy. Though recycling of plastic and cardboard has become mandatory in most countries, food waste is a topic which has yet to be properly addressed and tackled.



Food waste mostly comes from households, restaurants, and grocery stores and that is because we have yet to learn how to make use of our food waste or even reduce it. One of the very big problems of food waste in households is that people tend to buy too much food without planning what they will cook with it. And so, only a portion of the food bought tends to be used whereas the rest will sit in the fridge and eventually rot, leading to more food waste. Another issue, which can also be found in restaurants, is that we make food portions a lot bigger than what we will actually eat and the food which is left over is thrown away rather than saved for another time or used to make another dish. Of course, in restaurants this might be harder to do because of health and safety regulations but for us at home it is something we should pay more attention to.

One day to solve this is to always plan ahead what we will make and what is needed. This way we will only buy what is necessary and only as much food as is needed. When cooking, we should also pay more attention to how much we make and for how long we are planning to eat that dish. Try to reduce your portions to the size which you actually think will fill you up. If not, you can also buy products which you know can be used for multiple dishes and

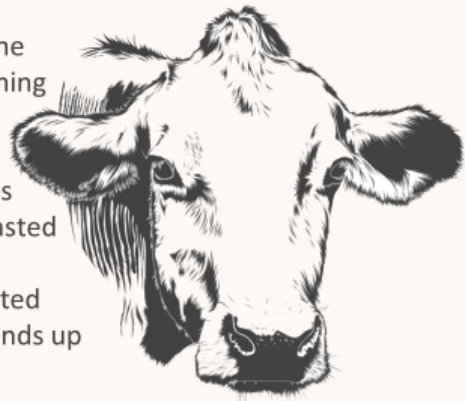




will last longer. All this will lead to less food waste and less waste of all the resources used to make our food.

## THE AFTERMATH

- Food waste in landfills produces methane -> methane absorbs earth's atmosphere and causes global warming and climate change
- 70% of water used in the world goes to agriculture
  - Waste of freshwater and ground water resources
- 1kg of beef thrown away = 50,000 litres of water wasted from producing the meat
- One glass of milk wasted = 1,000 litres of water wasted
- 1.4 billion hectares of land used to grow food that ends up wasted
  - 1/3 of all land used for agriculture
- Millions of gallons of oil wasted yearly on uneaten food



Why is it important that we reduce food waste? It is not only a waste of resources but it also negatively impacts our environment.

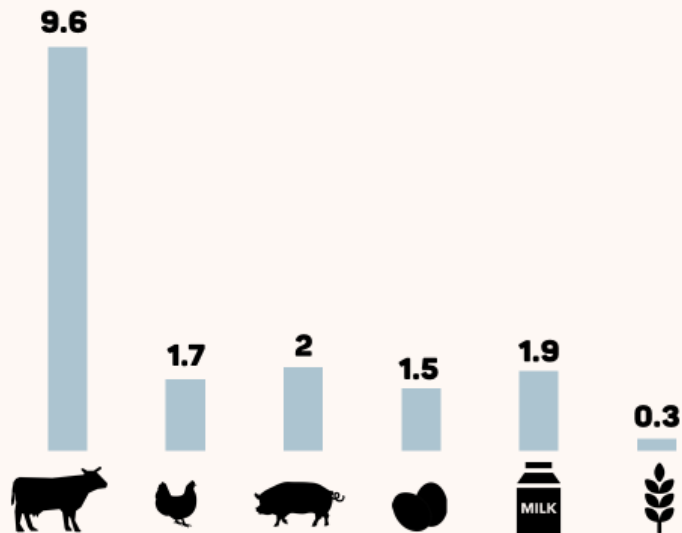
Food waste that ends up in landfills produces a large amount of methane – a more powerful greenhouse gas than even CO<sub>2</sub>. Excess amounts of greenhouse gases such as methane, CO<sub>2</sub> and chlorofluorocarbons absorb infrared radiation and heat up the earth's atmosphere, causing global warming and climate change.

With agriculture accounting for 70 percent of the water used throughout the world, food waste also represents a great waste of freshwater and ground water resources. It is said that a volume of water roughly three times the volume of Lake Geneva is used just to produce food that is not eaten. By throwing out one kilogram of beef, you are essentially wasting 50,000 liters of water that were used to produce that meat. In the same way, nearly 1000 liters of water are wasted when you pour one glass of milk down the drain.

If you look at land usage, around 1.4 billion hectares of land, which is roughly one-third the world's total agricultural land area, is used to grow food that is wasted. Millions of gallons of oil are also wasted every year to produce food that is not eaten. And all this does not even take into account the negative impacts on biodiversity due to activities like monocropping and converting wild lands into agricultural areas.



## YOUR CARBON FOOTPRINT



It is also important to pay attention to our diet, and some diets can have a bigger, negative impact on the environment than others. As we can see, diets which are heavily meat based, and especially beef, tend to have the biggest impact. This is because the bigger the demand for meat the more cows, chicken, and pigs will be bred, and these animals in particular release heavy amounts of methane.

Instead of eating meat everyday, it is best to have a balance diet of meat, dairy and wheat which will reduce your carbon footprint and minimize climate pollution.



### III. References:

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7. <http://www.fao.org/food-loss-and-food-waste/en/>
8. <https://www.nytimes.com/2017/12/12/climate/food-waste-emissions.html>
9. <https://www.refed.com/?sort=economic-value-per-ton>
10. <http://www.wastedfood.com/>



#### IV. Examples of inspiring explainer videos

Video 1	Resource Efficiency and Sustainable Development
Video Description	What is resource efficiency and sustainable development and why is it important to us and our environment
Link	<a href="https://www.youtube.com/watch?v=kC3VTg-8f0s&amp;t=76s">https://www.youtube.com/watch?v=kC3VTg-8f0s&amp;t=76s</a>

Video 2	How Can We Make the World A Better Place by 2030
Video Description	Steps we can take to help climate change by reducing waste
Link	<a href="https://www.youtube.com/watch?v=o08ykAqLOxk">https://www.youtube.com/watch?v=o08ykAqLOxk</a>



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