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Lesson 1
Food value chains

Where does your food come from?

A food value chain shows the movement of a food product along the supply chain and identifies the actors and their value added activities.

The process of how food ends up on our plate is called the food supply chain. It encompasses all the different stages that food is going through along this path.
Where does your food come from?

Production & Harvest

Transportation

Wholesale

Processing

Packing

Retail

Export

Consumption

Resources represent an asset or wealth that can be used by countries, organizations, communities or people to produce benefits.
But in general we can classify resources as the following:

**Natural resources:** Land, forest and water and the assets coming from the land, such as soil, plants and animals.

**Human resources:** People who contribute through work, knowledge and experience.

**Capital resources:** Money, infrastructure, and equipment.

Resources can be used by a person or organization in order to function effectively. In the food value chain, resources are used to grow, process, handle, and distribute food so that it functions effectively to deliver safe and nutritious food to people.

The following are some of the resources used to produce any food:
Food value chain:
the movement of a food product along the supply chain and identification of the actors and their value added activities.

Food supply chain:
the process of how food ends up on your plate, which includes all the different stages that food goes through along this path.

Resources:
Represent an asset or wealth that can be used by countries, organizations, communities or people to produce benefits.

Natural resources: Land, forest and water and the assets coming from the land, such as soil, plants and animals.

Human resources: People who contribute through work, knowledge and experience.

Capital resources: Money, infrastructure, and equipment.
Lesson 2
Food loss and waste

**Food loss** is food that is spilled or spoiled before it reaches the final product or retail stage. This may be due to problems in any of the value chain stages. It could also be due to problems in markets, institutions and policy frameworks.

Any food that is fit for human consumption, but is not consumed because it is left to spoil or is discarded by retailers or consumers is considered **food waste**. Food waste is a behavioral problem. It comes from our habits, customs and traditions, and behavior. Significant amounts of waste take place during religious holidays, wedding ceremonies and family gatherings, and in restaurants and hotels.
What about the food that is thrown out to poultry, left in your school desk, or thrown out in your homes or restaurant? This is considered food waste.

Of all food produced is lost or wasted = 1.3 billion tons of food lost or wasted
What is the percentage of food loss and waste in the Near East and North Africa region?

- 26% of roots and tubers
- 14 to 19% of grains
- 16% of oilseeds and pulses
- 45% of fruits and vegetables
- 13% of meats
- 28% of fish and seafood
- 18% of dairy products

What is the price of food loss and waste?

In the food supply chain, food moves from producer to consumer via the process of production, processing, distribution, retailing and consumption, thus food moves from farmer to consumer in a domino like fashion. At the same time, money that consumers pay for food moves from consumers to producers in the reverse process, again like dominoes from consumer to retailer to distributor to processor to farmer.
Do you think consumers pay a higher price when food is lost and wasted along the value chain?

All the resources used along the food value chain are wasted when food is wasted!

How does food loss and waste affect the environment?

1. Greenhouse gas emissions
2. Climate change
3. Water
4. Land occupation
5. Biodiversity

NPR, 2018
Greenhouse gas emissions

A huge amount of greenhouse gases (such as CO2, methane and nitrogen) are emitted each year in the production, processing, storage and transportation of food that ends up thrown away and then decomposes in landfills, where it also produces greenhouse gases.

What are greenhouse gases?

The earth is wrapped in different layers of what we call greenhouse gases. Together these make up the atmosphere. The earth's atmosphere stops it from cooling off in space: It lets some rays of the sun in but stops some of the heat from leaving the earth again. Greenhouse gases occur naturally, and without them, there would be no life on Earth. However, humans have been producing more and more greenhouse gases! The greenhouse gases we produce have unbalanced the natural atmosphere and contributed to climate change: too much of these gases are in the atmosphere and not all of the heat that should leave the earth can escape into space.

Climate change

Climate change is about the long-term changes in the Earth's air and land. Today, the climate is warming up faster than any time in Earth's history known to scientists. This is called climate change.

Climate change makes our planet warmer than it should be. If we continue producing such high amounts of greenhouse gases, a lot of the ice on Earth will melt, the sea level will rise and there will be less land for people and animals to live on. Climate change can also lead to water shortages, droughts and desertification in many places on Earth. The weather will become more extreme. Some animals and plants will not survive the new temperatures, and it will become more difficult for a lot of people to grow food and to find places to live.
The amount of land that is used to grow food that is later wasted is the land occupation footprint. Food that is later wasted is grown on about 1.4 billion hectares of land.

If we compare this area to the surface of the largest countries on earth, it is second only to the total land area of the Russian Federation.
Water is a scarce and precious resource, and many countries like Egypt are already using more water than it has available. At the same time, food production accounts for the vast majority of water used in the world today. But when we waste food, we also waste the water used to produce food. A quarter of all the water we use for agriculture is used to grow food that later ends up as waste.

These are some of the foods in your kitchen; let us look at how much water is needed to produce one of each:

- **13 liters of water** needed to produce 1 tomato
- **185 liters of water** needed to produce 1 potato
- **135 liters of water** needed to produce 1 egg
- **25 liters of water** needed to produce 1 bag of chips
Biodiversity

Biodiversity is the variety of life on Earth at all levels, from genes to microbes, animals to ecosystems. All species and organisms contribute something to their common environment so it is very important to interfere as little as possible with functioning ecosystems.

One example of interference is when forests are cut down to make space for crop fields. Through this process, a lot of animals lose their habitat and are ultimately threatened by extinction.

Biodiversity is very important also for ensuring sustainable food system approach and delivering healthy diets comprising of local species and varieties that are nutritious and essential for preserving culture and tradition.

By reducing food loss and waste, you are also reducing climate change which makes our planet warmer than it should be. If we continue producing such high amounts of greenhouse gases, a lot of the ice on Earth will melt, the sea level will rise and there will be less land for people and animals to live on.
You are a food waste advocate

1. Ask for smaller portions!
   a. Decrease the size of your plate (i.e. use the dessert plate).
   b. Serve smaller portions on your plate and go back for more.
   c. Do not force big portions on a guests plate, the right way to do it is offer smaller portions more frequently.

2. Practice proper storage!
   a. Make sure you understand the proper storage methods (described later) for each food product.
   b. Increase the shelf life of food by freezing it the right way.

3. Do not throw away your leftovers
   a. Take your leftovers home, do not throw out your sandwich.
   b. Ask your parents to recycle their leftovers into new meals.
   c. Practice proper storage for your leftovers so we reuse them later.

4. Shop smart
   a. Do not buy in bulk or give in to offers!
   b. Plan your meals and use grocery lists to avoid over buying.
   c. Never go shopping on an empty stomach.
Do not throw away irregular shaped fruits and vegetables
a. As long as your fruits and vegetables did not go bad, then you should always use them no matter what shape they are in.

Always check your fridge
a. Make sure your fridge is always cold; temperature should not exceed 1 to 5 degrees Celsius.
b. Do not over stuff your fridge as it is more likely for food to be forgotten.

Practice FIFO: First In, First Out
a. After purchasing new products, make sure you rotate your cupboards, fridge and freezer to make sure you use the older products first.
b. Always use older products first, or products closer to expiry.

Understand date labels on your products
a. Understand the difference between expiry and best before, and which products could be used for a longer period.

Sharing is caring
a. Always give to the needy any food that will not be used or recycled. Avoid throwing any good food in the bin.
Proper storage tips

Depending on the type of food, you will need to store it in the fridge, freezer or in containers you keep in cupboards or on shelves. Storage is important as it keeps the food safe so that it is still good to eat or cook later. It is keep the nutritional value of foods, as foods get spoiled but also their nutritional quality deteriorates by time.

Proper storage is key to avoiding waste!

Ready to eat food
such as dairy products, yoghurts & cream

Ready to eat food
such as cream cakes, butter, cooked meats, leftovers & other packaged food

Raw meat, poultry & fish
always cover & keep in sealed containers

Salad, fruit & vegetables
keep ready to eat fruit and vegetables in sealed bags or containers, always wash before use

The order you arrange your food in the refrigerator is important, as the refrigerator airflows in a specific manner. Minimize opening of the refrigerator too often to ensure the right temperature.

You can safely store food in the freezer for years, as long as it stays frozen the whole time and is stored in tightly sealed containers. However, the taste and texture of food changes if it is frozen for too long. Freezing is an important storage method, as it stops/slowsthe wastage of food. Reheating frozen food should be done wisely, as it could end up contaminated. After reheating the frozen food, the food should not freeze again.
Many types of food do not require refrigeration to be kept safe for consumption, dry food such as rice, pasta, flour, many types of drinks, tinned food and unopened jars can be stored outside the refrigerator or freezer in a dry area. However, it is still crucial to take care how your dry food is stored.

In order to store dry food in a proper and safe manner, precautions have to be considered:

- Keep food in sealed bags or containers as this helps keep food fresh and stops anything falling into the food by accident.

- Ensure no water drops and or humidity gets into jars.

- Keep away from direct sunlight and in cool dark place to ensure the quality of product.

- Do not store food or drinks near cleaning products or other chemicals.

- Do not use old food containers to store household chemicals, and do not store food in containers that have been used for other purposes.
Vocabulary learned

**Food loss:**
Any food that is spilled or spoiled before it reaches the final product or retail stage.

**Food waste:**
Any food that is not consumed because it is left to spoil or is discarded by retailers or consumers.

**Climate change:**
Climate is the long-term changes in the Earth’s air and land, climate change is the change in climate as seen today.

**Biodiversity:**
The variety of life on Earth at all levels, from genes to microbes, animals to ecosystems.
Lesson 3
Nutrition

Nutrition is about eating a healthy and balanced diet. The key to eating healthy is to enjoy a variety of nutritious foods from each of the Five Food groups. Simple way to keep and remember, is also use more varieties of colors on the plate.
Vegetables and legumes

Vegetables come from the different parts of the plant, including leaves, roots, tubers, flowers, stems, seeds and shoots. Eating more vegetables is important for health and growth. Legumes on the other hand, are the seeds of the plant like green peas, beans, lentils and chickpeas. Eating regularly legumes will help with digestive system and are high in dietary fiber. Many different legumes are also high in vitamins and essential minerals.

Fruits

Adding different fresh fruits to your daily diet enhances your health, protects your body from different diseases. However, consuming fruits is fresh form is recommended rather than regularly consuming fruits juices that are high in sugar, so avoid drinking too much fruit juice.
Grains

This food group is mostly made from wheat, oats, rice, rye, barley, quinoa and corn. The different grains can be cooked and eaten whole, ground into flour to make a variety of cereal foods like bread, pasta and noodles, or made into ready-to-eat breakfast cereals. Be careful, of over consuming products made of highly refined grains and high in sugar (such as cakes or biscuits) can be high in added sugar, fat and sodium.

Proteins

This food group includes all kinds of lean meat and poultry, fish, eggs, nuts and seeds and legumes/beans. Integrating proteins sourced food in the diet of growing school child is important.

Dairy

Milk, yoghurt, cheese and any other types of dairy products that are highly recommended and are essential part of the diet. The dairy products build strong bones and teeth, and help growing children.
The perfect meal should consist of ingredients from the five food groups. Half of your plate should be vegetables, with lots of color and variety. Fruits should also be included in this half. A quarter of your plate should be whole grains and the remaining quarter should be proteins, keeping in mind that you should limit processed meat. Healthy plant oils should be used in moderation and it is important to reduce sugary drinks and limit fruit juice. It is essential to drink plenty of drinking safe water during the day, at least eight cups a day.

Let us look at the perfect healthy eating plate:
Components of a healthy eating plate

**Proteins**
Choose fish, poultry, legumes and nuts. Limit your intake of red meat and cheeses. Also, avoid cold-cuts and processed meats.

**Healthy oils**
Use healthy oils (such as olive oil) when cooking, in your salad, and on your dining table. Limit your use of butter and avoid saturated and trans fats.

**Whole grains**
Consume a variety of whole grains (such as whole grain bread and pasta, and brown rice). It is important to limit your intake of processed grains (such as white rice and bread).

**Water**
Drink water, coffee or tea (limit or remove the sugar). It is also important to limit milk (1 - 2 portions per day), fruit juice (small cup per day), and sweetened drinks.

**Fruits**
Consume a variety of fruits in different colors.

**Vegetables**
It is recommended to consume a variety of different colored vegetables. Potatoes and French fries are not included in this recommendation.

**Dairy products**
Choose unflavored milk, plain yogurt, small amounts of cheese, and other unsweetened dairy products. Dairy products are a good source of calcium and Vitamin D.
Did you know?

Salt
Most of us are eating more salt than we should, even without realizing it. It is not only the salt that we add to our cooking or in our meals, but also the salt that is already in the different foods that we buy. Too much salt can put you at risk of high blood pressure and heart diseases later on in their lives. Reducing salt and eating in moderate can help avoid problems with health.

How about sugar?
You are consuming nearly 3 times more sugar than you should! These sugars are obtained from fizzy drinks, juice drinks, cakes, pastries, chips, biscuits, yoghurts, sweets, chocolate and ice cream. Consuming too much sugar can lead to the build-up of harmful fat on the inside that we cannot see, which can cause weight gain and serious diseases in the future. Another result of sugar is that it could lead to tooth decay.

Saturated fats
Many foods can contain too much saturated fats! A lot of saturated fat comes from butter, cheese, meat, cakes, pastries, chocolate, biscuits, sausages, and pizza. Too much saturated fat can lead to a harmful build-up of fat in our bodies, which can cause serious diseases in the future and weight gain. Therefore, it is highly recommended to limit and reduce foods that may contain high levels of saturated fats.

Because you are older than 11, you should be having maximum 1 teaspoon of salt a day!

Because you are older than 11, the maximum sugar intake cannot exceed 5 teaspoons each day! That is not only the sugar you add to your food, but also all the refined sugar in your foods consumed daily.
Vocabulary learned

Nutrition:
is eating a healthy and balanced diet. The key to eating healthy is to enjoy a variety of nutritious foods from each of the Five Food groups.

The five food groups:
Vegetables and legumes, fruits, protein, grain, and dairy. Every food group is important as it provides essential nutrients and energy that supports normal growth and good health.
### Activities

#### Food saver diary

The diary will help you keep track of your efforts to reduce food waste and introduce the topic to your families. You are encouraged to keep the diary for a week.

<table>
<thead>
<tr>
<th>I THREW AWAY</th>
<th>BECAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Food Saver Diary**
Activity
Storage after consumption

Refrigerator

Kitchen closet

Working station
Activity
Storage after consumption

- Raw meat
- Cooked chicken
- Cooked rice
- Cooked pasta
- Cheese
- Banana
- Dry pasta
- Flour
Activity
Proper storage in the refrigerator
(after consumption)
Activity
Proper storage in the refrigerator (after consumption)
Activity

A healthy eating plate
Crossword puzzle
2. ........................ makes our planet warmer than it should be.

4. An important tip to reduce food waste at home is to ........................ by not buying in bulk and avoiding over shopping.

6. If food gets spoiled in your refrigerator because you did not eat it in time and had to throw it out instead, this is called .........................

8. Any food that is spilled or spoiled before it reaches the final product or retail stage is .........................

10. One of the tips of reducing food waste at home is practicing proper ................. methods.

12. A food .................... shows the movement of a food product along the supply chain and identifies the actors and their value added activities.

13. A healthy plate consists of three components. A quarter of your plate should be ................, which includes lean meat, poultry, fish, eggs and nuts.

1. Food waste occurs at the ........................ stage of the value chain.

3. A huge amount of ......................... gases (such as CO2, methane and nitrogen) are emitted each year in the production, processing, storage and transportation of food that ends up thrown away and then decomposes in landfills.

5. When food is lost or wasted, all the ....................... used for production is wasted as well.

7. The maximum intake for ................ is one teaspoon daily.

9. ................ is eating a healthy and balanced diet.

11. A healthy plate consists of three components. .................... should make up half your plate. Aim for color and variety, and make sure you add fruits to your plate as well.

14. A healthy plate consists of three components. A quarter of your plate should be ................, which includes wheat, oats, rice, quinoa, and corn.
References:

Food loss and waste
and value chains