

AQA Geography GCSE

Food Resource Management Detailed Notes

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Resources across the Globe

There are many resources that humans need to live or use to enhance their living. A resource is a product that is **valuable** to living. Essential global resources can be split into three groups: **food, water and energy**.

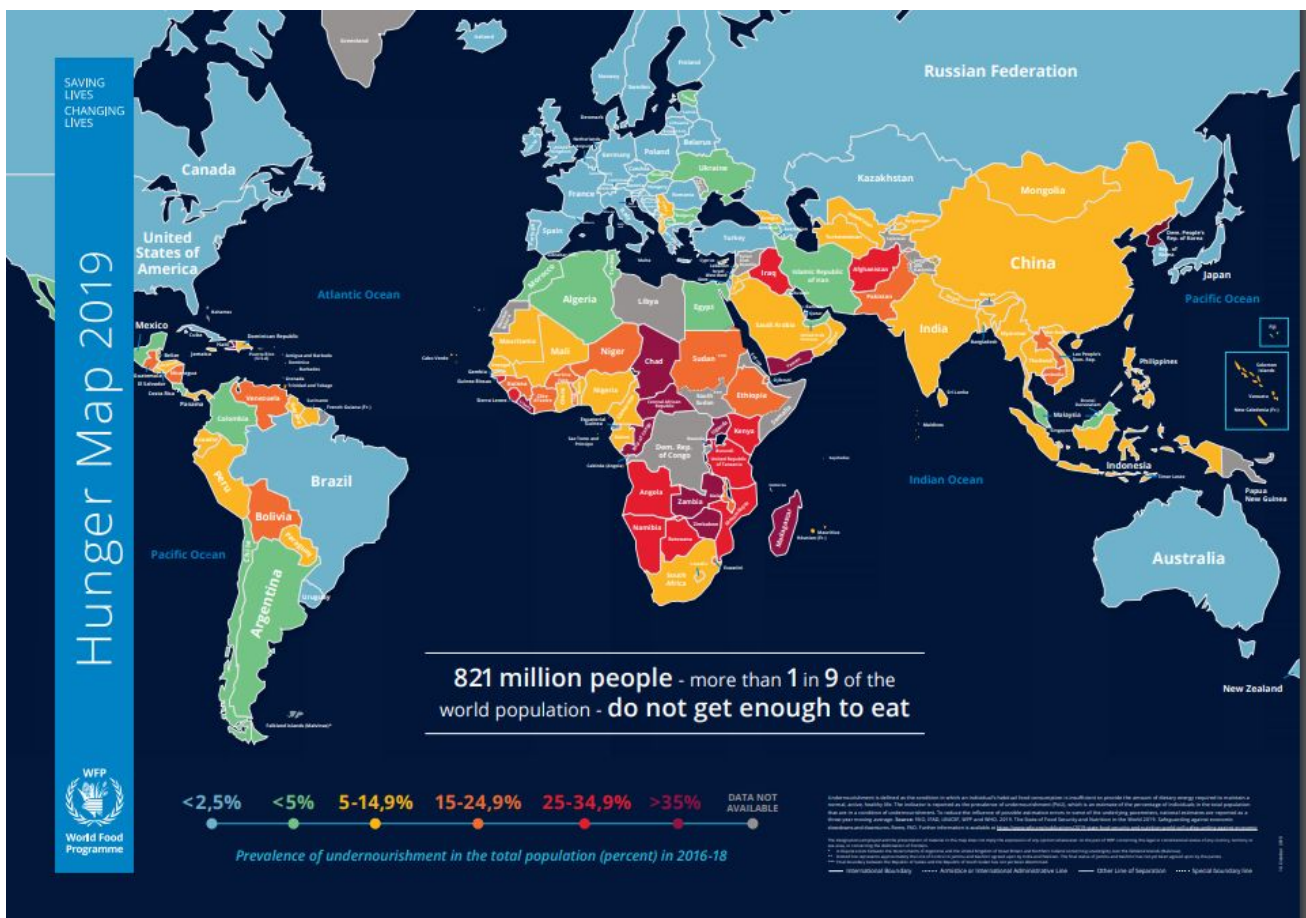
Food Distribution

We can't measure how much food we **produce**, as this would be a massive task and not all foods have the same **nutritional value** - would you be just as hungry if you ate a bag of oranges as if you ate a bag of cooked rice?

Instead, it is easier and more informative to measure the **food poverty** of a country. This means how much of a **population** suffers from **malnutrition** (eating less food than needed to sufficiently survive). Malnourishment can lead to serious health conditions:

- **Mineral and Vitamin Deficiencies**, e.g. a lack of calcium can lead to brittle bones or a lack of Vitamin A can lead to blindness
- Increased risk to **organ failure** and **infections**
- For children, malnourishment may stunt **brain development**

The trends in countries suffering from malnourishment is shown in the map below.



Source: The World Food Programme



Countries in **Africa** and **South Asia** tend to have higher rates of malnourishment (shown in yellow and red), such as Chad, Zambia, Afghanistan and Cambodia. The lowest rates of malnourishment (shown in blue) tend to be found in **Europe, North America** and **Australia**.

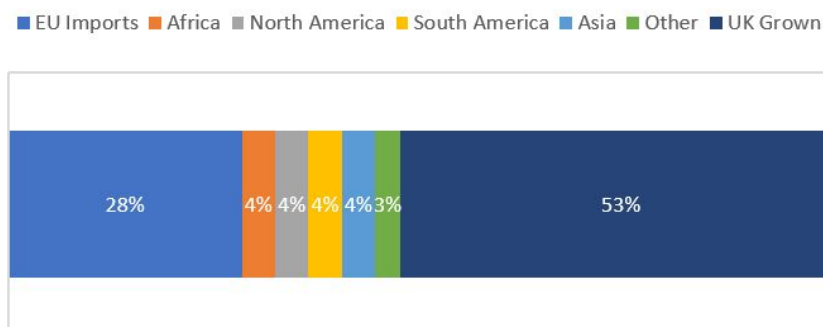
Some notable exceptions to this trend include:

- **Brazil and Uruguay** - South America has a mixed range of malnourishment rates. However, these countries have very low levels of malnourishment (less than 2.5% of its population) despite 20% of the population earning less than \$5.50 per day, falling below the poverty line.
- **Egypt, Algeria and Morocco** - These North African countries all have malnourishment rates under 5%, even though most African countries tend to have high levels of malnourishment and poverty. This may be due to recent government help; Egypt's government has made vast improvements to poverty and food distribution since 2016.

Food Supply in the UK

In the UK, we have a **varied diet** and consume many different types of food. However, not all the food that we consume can be grown here. In addition, there is **limited space** for farming and agriculture in the UK (since many farms are lost to new **housing developments** and **urban sprawl**). This means that some of our food must be imported from other countries. In 2018, **53%** of UK food was grown in the country and **47%** was imported from other countries. This means the UK is not **self-sufficient** for food.

UK GROWN FOOD VS IMPORTS



Importing Food

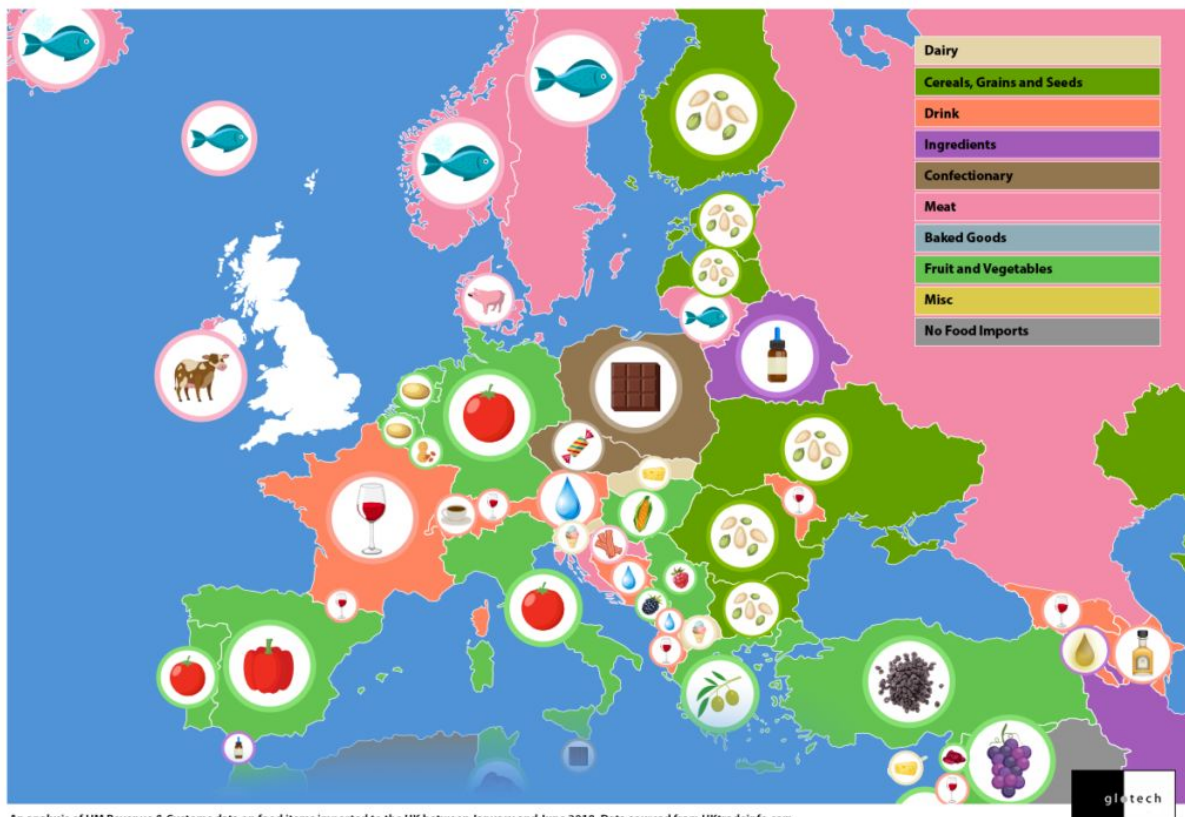
Countries may import food for a variety of reasons. However, there are impacts to importing food across the globe.

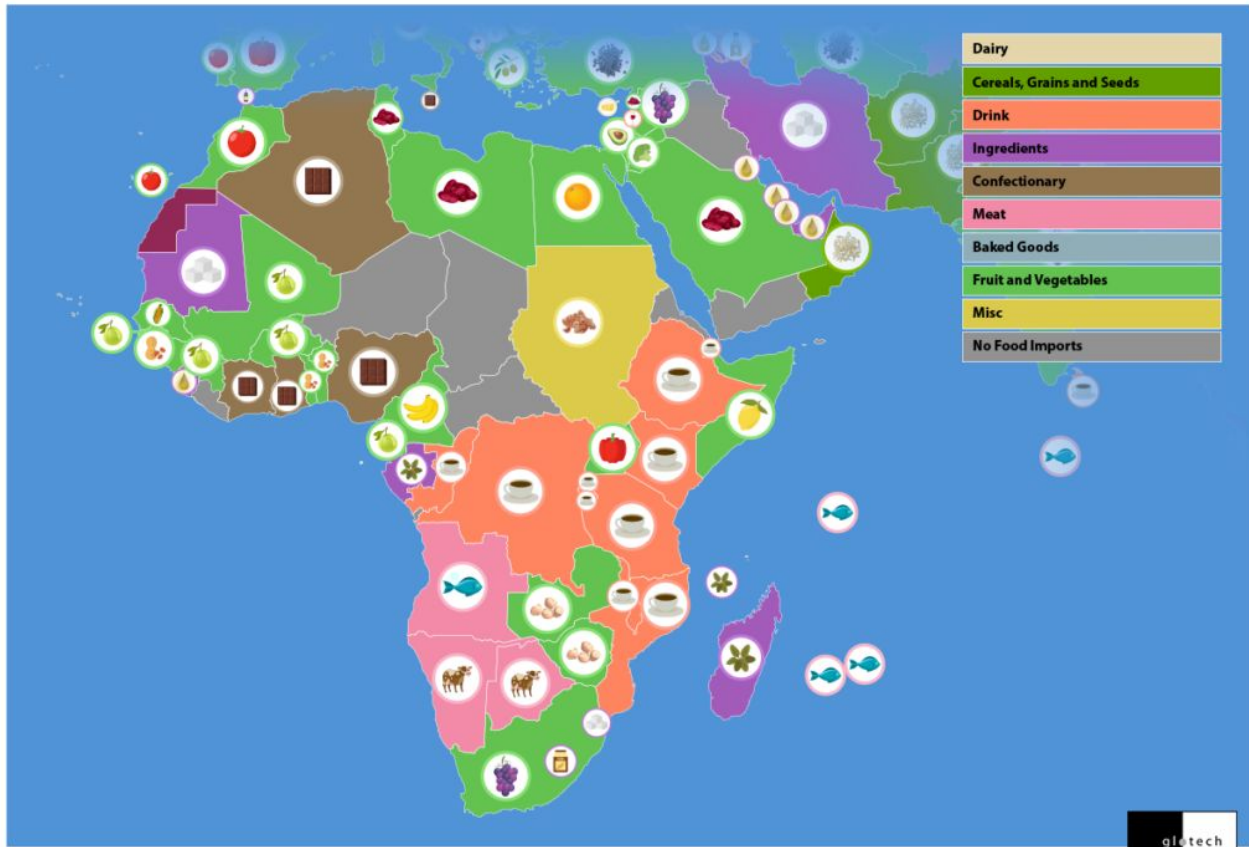
👍 Advantages	👎 Disadvantages
<ul style="list-style-type: none"> • We can get produce all year round. Seasonal products such as strawberries can be imported. • The UK is unable to feed its growing population without imports • Exotic foods such as mangos and passion fruit can be sold in the UK even though the climate isn't suitable for these crops. 	<ul style="list-style-type: none"> • Food has to travel by plane or ship to the UK which releases Greenhouse Gases into the atmosphere. • The further food travels the greater the food miles and so the greater contribution to Climate Change • Farmers abroad aren't protected by UK laws, so are underpaid and earn little profit from the crops sold to UK supermarkets

Thinking Further: UK Imports

Have a look at these maps below - what foods does the UK import, and from which countries? Would this trade be good for:

- The environment?
- The local people?
- The country on a whole?





An analysis of HM Revenue & Customs data on food items imported to the UK between January and June 2018. Data sourced from UKtradeinfo.com



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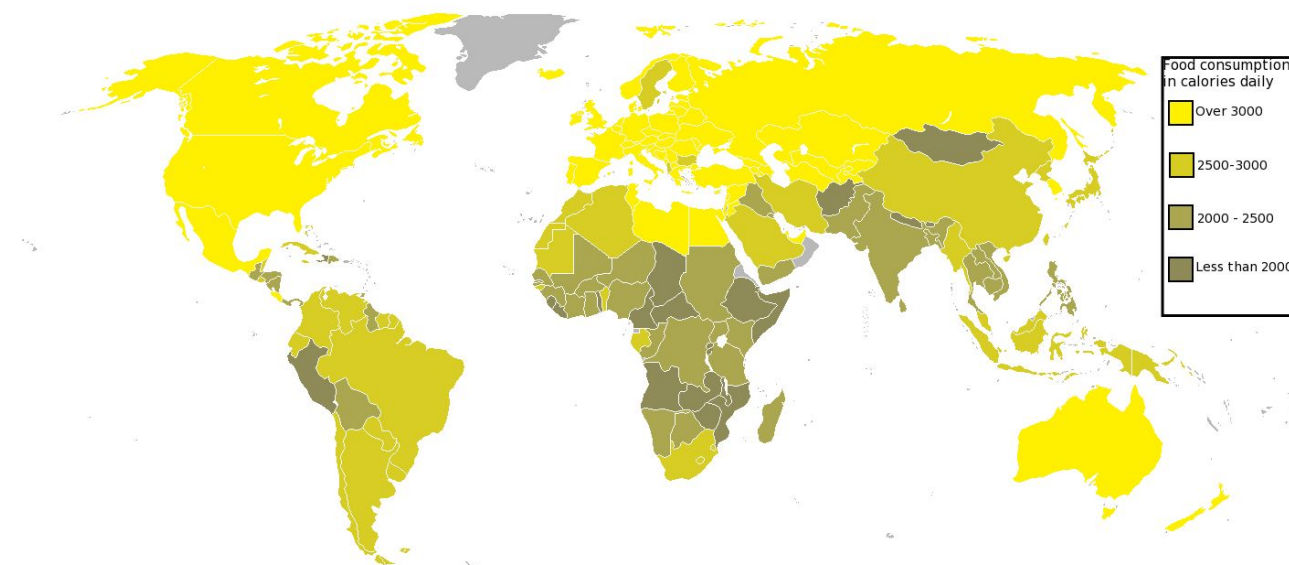
Locally Sourced Food

Over the last few years, an **awareness** of the impacts of imported foods has increased in the UK. Many households wish to purchase food from **local farms** rather than relying on **imported foods** from supermarkets. To tackle the issues faced with importing food, there are several strategies:

- **Agribusiness** - UK farms adopt more intensive farming strategies and use modern technology to improve the crop yield. Agribusiness is about maximising the profits of the farm, so it can continue to farm even after a poor crop yield.
- **Farm Shops** - To increase the profits earned by the farmer themselves, they could run a farm shop on site to sell their own produce. This means that the farmer controls the price of their produce and don't have to rely on supermarkets to sell their products. Farm shops are becoming increasingly popular in the UK.
- **Organic Crops** - Many consumers don't like the amount of chemicals and pesticides used during farming. However, to grow crops organically is often more expensive and so some people cannot afford to choose organic produce.
- **Fairtrade** - For foods that cannot be grown in the UK's climate (cocoa, coffee, bananas, etc), imports from other countries are necessary. However, to ensure foreign farmers are treated fairly and paid a fair wage, UK consumers should pay for fairtrade goods. The charity Fairtrade protects the farmer's rights and makes sure they earn a fair wage, whilst improving communities in developing countries.

Global Food Consumption

There is large inequality in the amount of food consumed in different parts in the world.



Source: coolgeography.co.uk

For example, the **highest food consumption** (shown in **yellow** on the map) can be found in the northern hemisphere and in Australia, where over 3000 calories are consumed on average per day. On the other hand, there are many countries where average consumption **falls below** the amount of calories needed to survive (2000 calories per day, countries are shown in **dark green** on the map).

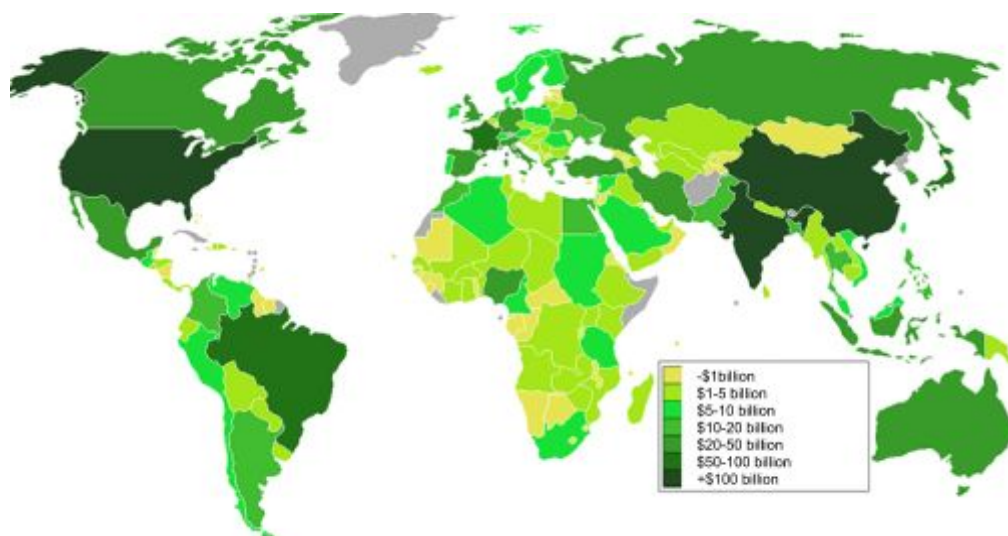


Countries such as Mongolia, Chad, Angola and Peru all have an average consumption less than 2000 calories.

However, a country is not necessarily undernourished because they don't produce enough food. Looking at the map of food production shown below, some undernourished countries produce a small amount of food whereas some undernourished countries produce a large amount of food.

For example, India has an average consumption of 2000-2500 calories (just above the level of undernourishment) but produces over \$100 billion in food and crops each year. This is because India is a major exporter of rice, vegetable saps (similar to gum and resin) and meats. India predominantly sells these exports to Saudia Arabia, the USA and the UK - all of these countries don't suffer from malnutrition, but India does.

Map shows the value of food production for each country, source: www.globalresearch.ca



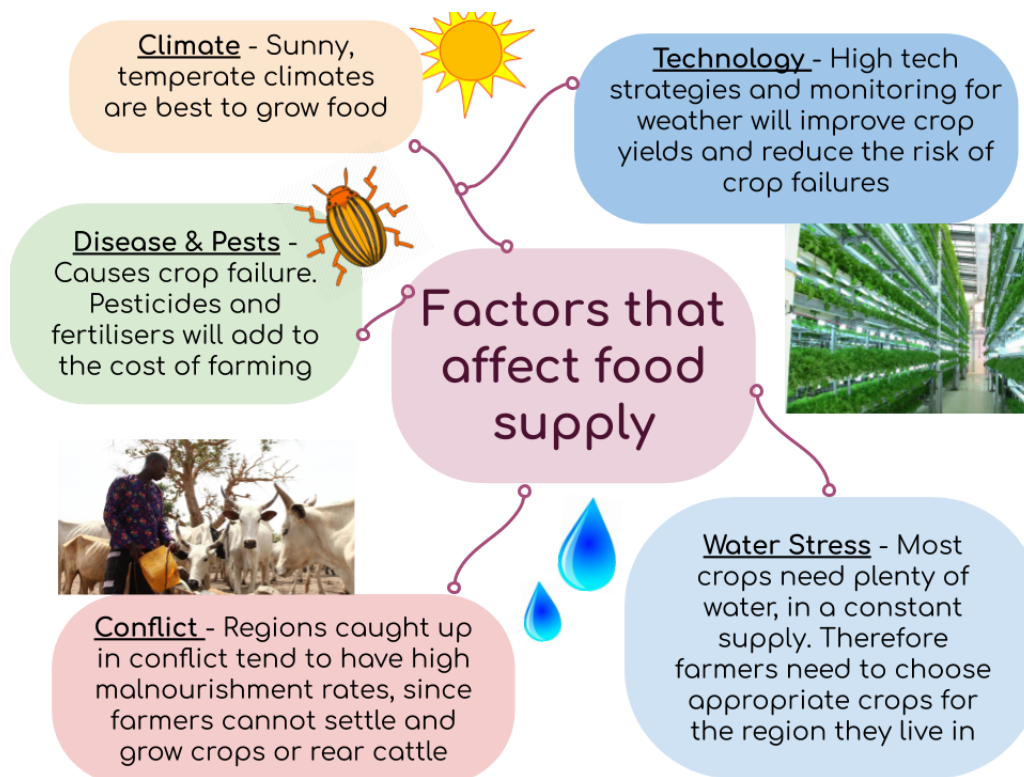
There are several reasons why consumption is growing across the world:

- Increasing **levels of development** - as a country becomes **wealthier**, the population can afford to spend more on food. In addition, more expensive or higher calorie foods become more **accessible**, and so the population consumes more calories. This is why many MEDCs suffer from **obesity and diabetes**.
- With increased **transport links** and greater connections between countries, there is a rise in importing and exporting foods. This means that on a whole, more countries are sharing and **trading food supplies**, and so fewer countries are suffering from malnutrition.

However, it seems that **LEDCs** cannot afford to import food or develop their agriculture, and so they are trapped in a **cycle of malnutrition** and limited food supplies. This is especially the case in Africa, for many countries such as Chad and Sierra Leone. These countries suffer from **food insecurity** - not growing or trading enough affordable, nutritious food to feed their population.



Factors that Affect Food Supply



- Climate** - On a whole, the best place to grow crops is somewhere **sunny** with regular **rainfall**. Therefore countries with **temperate climates** tend to grow large amounts of food. In addition, the climate cannot be too hot or too cold for cattle to live. Countries with freezing temperatures don't have many **cattle ranches**, since cows and sheep cannot live in sub-zero temperatures. Certain food types only grow in **specific conditions**, for example rice must grow underwater in rice paddies.
- Technology and Development** - The **efficiency** of farming depends on the development of a country. **Monitoring the weather** can give farmers warning of drought and extreme weather that could damage their crops. Using **modern machinery** can speed up harvesting and reduce crop wastage. Finally, the most developed countries can use **high-tech strategies** (such as **hydroponics**) to grow crops in environments they're not suited to, or to reduce land use.
- Diseases and Pests** - Crops can fail if they are attacked by diseases and pests. This would leave the farmer **without profits**, and potentially close their business. Pests and disease can be prevented by using **pesticides** and **fertilisers**, which adds to the costs of farming. However, some pesticides are damaging to the environment and can **harm other wildlife**, such as bees and insects.
- Water Stress** - The amount of water available in a region can affect the **type of farming** and amount of food produced. Plants need to be **well irrigated** (watered regularly) to survive, so crop farms require a **constant, reliable source** of water. Some crops require more water than others, therefore crops such as mangoes and olives (both crops demand a lot of water





to grow) shouldn't be grown in **unsuitable dry climates** or in areas that experience many **droughts**.

- **Conflict** - If a country has **conflict or civil unrest**, locals may not live in one location and instead **migrate** regularly to avoid fatalities. This means farmers may **lose their land** or it becomes too dangerous to stay in one village and grow their crops. This will greatly impact the amount of food available, since **crops** and **cattle** cannot be raised by migrating locals. This is why during many conflicts there are high levels of **malnourishment and poverty**.

Problems Caused by Food Insecurity

Food insecurity can have implications for the environment around and the population; there are **social, economic** and **environmental** impacts.

 <p>Social Impacts</p>	<ul style="list-style-type: none"> - Famine is the shortage of food, which can result in malnutrition illnesses and starvation. This can happen following crop failure (such as in Ireland during 1845, known as the Potato Famine) or through political conflict (30,000 Somalian refugees were dying as a result of fleeing militant groups in their country). - Undernutrition results from eating an unbalanced diet and includes vitamin deficiencies. Undernutrition can cause exhaustion and weakness, meaning people can't work. In children and pregnant women, undernutrition can be fatal. - As the population becomes hungrier, anger towards the government and those who can afford to eat will increase. This can cause social unrest and protests. The most famous of these protests happened in Mexico in 2007, where many people protested the rising cost of bread (hence these riots were called the tortilla riots!)
 <p>Environmental Impacts</p>	<ul style="list-style-type: none"> - With increased pressure to grow more crops, farmers use more intensive methods of farming. This can destroy the soil by erosion and by removing all the nutrients, which could increase the risk of crop failures in the future. This can include: <ul style="list-style-type: none"> - Overgrazing - Cattle spend too long on one piece of land, so vegetation is killed and the soil becomes trampled. - Shorter fallow periods (time where no crops are grown, to let the soil rest) and not changing the type of crops grown, so the land is stripped of nutrients. - Deforestation and slash-and-burn is used to clear land to make room for more farms. Destroying vegetation will reduce water storage and degrade the soil.





Economic Impacts

- If there is a limited amount of food available, the **price of food** will increase. This is also because the rise of farming is increasing (cost of fertilisers, machinery and food for cattle). Many **staple foods** - such as rice, wheat and soya - have increased in price in the last decade. When the price rises, it is the poorest families that are worst affected and cannot afford to feed their families anymore. This causes **inequality** between rich families who can eat and poorer families who will starve.

Increasing the Supply of Food

There are many strategies to improve the supply of food and increase the **crop yield** for farmers. These strategies can be put in place by the **government** or by **charities**, who both want to reduce the **deaths** due to **starvation** and improve the health of the countries' populations.

Irrigation



Source: MIT News

Description: Digging water channels and extracting water from aquifers to water crops.

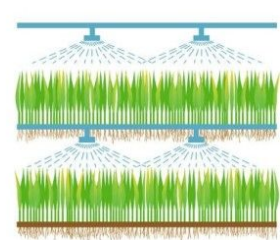
- 👍 Reduces water shortages, so reduces the risk of crop failures
- 👎 Some schemes don't teach farmers to conserve water through drip irrigation, therefore lots of water is wasted
- 👎 Dams and expensive transfer schemes don't help small-scale farmers, as they cannot afford the price of water

Aeroponics and Hydroponics

HYDROPONICS



AEROPONICS



Source: Agrifarming

Description: Growing crops in water or air, rather than soil, increases the rate that crops grow and reduces chemicals/fertilisers used.

- 👍 Maximum growth for a limited space of land
- 👍 Seasonal produce can be grown all year round, since farming takes place inside
- 👍 No pesticides and little fertilisers used, which doesn't kill wildlife elsewhere
- 👎 Costly to run, as requires energy for lights, watering systems and heating
- 👎 Less developed countries may not have access to this technology



Green Revolution



Source: Development News

Description: The Green Revolution in the 1950s increased food production using machinery. There is a modern green revolution, involving:

- Water Harvesting
- Soil Conservation

- 👍 Sustainable small changes that increase crop yield, without taking up more land or using harmful chemicals
- 👍 Reduces the amount of labour needed, therefore reducing the cost of production
- 👎 Machinery burns fuel which release greenhouse gases and so contributes to Climate Change

Biotechnology



Source: Biology Wise

Description: Genetically modifying crops so they improve growth, reduce the need for fertilisers and become resistant to disease

- 👍 Very effective in improving the crop yield
- 👍 GM crops can also be engineered to release fewer greenhouse gases and repel pests, therefore there is no need to use pesticides
- 👍 Already used in other countries, with no known side effects yet
- 👎 GM crops has faced many critics and opposition, as many fear that GM crops will affect their health or the environment as the species is 'man-made and alien'



Sustainable Food Production

To be **sustainable**, farmers must:

1. Increase their **crop yield**/ food production, to be able to feed the **growing population** in the future
2. Protect the **environment** - plant vegetation to store water and avoid **soil erosion**, so the land can continue to be farmed in the future and won't be drained of moisture and nutrients.
3. **Conserve resources** for the future, such as minimising use of non-renewable energy sources and reducing unnecessary water usage.

There are many **different strategies** that farmers can adopt to be sustainable, both on a **small scale** and **large scale**.

Organic Farming



Source: Tesco

Description: Farmers don't use chemicals during farming and food production, such as pesticides, cleaning products and non-organic fertilisers.

- 👍 Protects the environment, especially wildlife and bees needed for pollination
- 👍 Chemicals can infiltrate the water cycle and remain in the soil, which could impact future farming
- 👎 Organic produce costs more, due to the higher labour costs

Permaculture



Source: LocalOrg

Description: Trying to adapt farming approaches to the natural ecosystem around them. This includes:

- Crop rotation
- Growing a mixed array of produce, as well as raising cattle locally
- Designing the crops to grow to promote habitats for wildlife
- 👍 Good local approach to reduce food miles, they're often community schemes
- 👍 Farming is harmonious with the environment, so minimal damage
- 👎 Little profit to be earned



Urban Farming



Source: Cool Hunting

Description: Wasted urban land (rooftops, landfill sites, empty land previously built on) is converted into community allotments to grow crops

- 👍 Great use of wasted space, which can cheer up and improve the urban environment
- 👍 Urban residents can experience growing food, which they otherwise wouldn't be able to do
- 👎 This isn't a large-scale solution as there isn't enough free land to feed a city
- 👎 Cannot rear cattle in an urban farm, so meat and fish must still be farmed elsewhere

Sustainable Fish and Meat Sources



Description: Rearing fish sustainably means not over-exploiting the waters, whereas sustainable meat production involves reducing the scale and damage of cattle rearing.

- 👍 Fishing sustainably reduces the impact on the natural environment and stops fishermen using trawler nets
- 👍 Sustainable meat reduces the concentration of animals per field, so less trampling and reduced soil erosion
- 👎 Sustainable fish is widely campaigned, but sustainable meat is less known
- 👎 Not all countries adopt sustainable fish and cattle farming (Japan)



Seasonal and Local Produce



Source: Chef in my Kitchen

Description: Consumers could choose to shop at a local market, which means they buy local produce that is seasonable and hasn't been grown intensively.

- 👍 Eating seasonal produce reduces the food miles, such as only eating english strawberries in summer
- 👍 Benefits the farmer directly so they earn more profits than trading through a supermarket
- 👎 Markets only open on certain days and some towns and villages don't have markets. Therefore not everyone can choose to shop like this

Reducing Food Waste

food waste in the UK



Source: Transition

Description: If less food was wasted, less food would need to be grown which would take the pressure off food supplies. This includes refrigerating the right food, planning food shops and using rather than binning 'sell by' food in shops.

- 👍 These changes can be made by the individual, not just the businesses
- 👍 Reducing food waste can save households £466 on average each year
- 👎 Supermarkets don't give food that is passed its sell-by to food charities that can use the food, instead of binning it

