22.1 FOOD PRODUCTION

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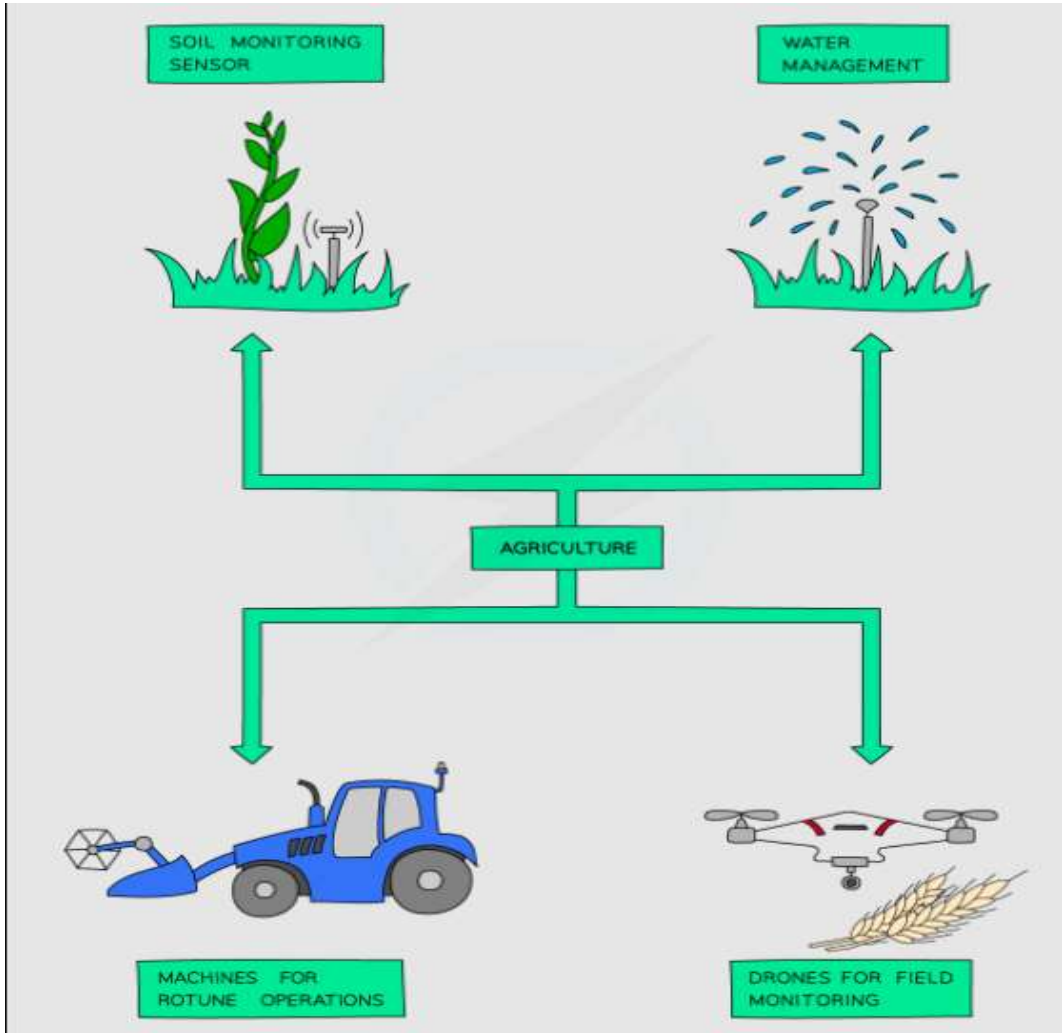
Increasing food production

Modern technology has increased food supply substantially in the following ways:

- **Agricultural machinery** has replaced humans and **improved efficiency** due to the ability to farm **much larger areas** of land.
- **Chemical fertilisers improve yields** – Fertilisers increase the amount of nutrients in the soil for plants, meaning that they can grow larger and produce more fruit.



Increasing food production

- **Insecticides and herbicides** – These chemicals kill off unwanted insects and weed species, meaning that there is **less damage done** to plants and fruit lost to insects (insecticides), as well as **reducing competition** from other plant species (herbicides).
- **Selective breeding** – animals and crop plants which produce a large yield are selectively bred to produce breeds that **reliably produce high yields.**

Impacts of monocultures

Monoculture is the agricultural practice of growing a single crop variety in a large area. This is done to maximize efficiency and simplicity.

However this large scale growth of a single variety of plant **does not happen naturally** in ecosystems, where there are **usually many different species of plants** growing which, in turn, **support many species of animals** and we say that there is a high biodiversity. In monoculture, biodiversity is low, so only a few species can live where the crop is growing.

Impacts of monocultures

- Another issue with monocultures is the **increase in pest populations** – If a particular pest feeds on a crop, farming it in large areas repeatedly means there is an ample supply of food for the pest, causing the population to increase.
- Often farmers will spray **insecticides** onto crops in order to control the pests. This leads to:
  - harmless insects being killed as well
  - pollution by pesticides (which are often **persistent chemicals** which accumulate in food chains)
  - in many instances where they are used repeatedly for specific pests, the pests may eventually become **resistant** to them, reducing their effectiveness
- Farmers use different method to control insect pests. One way is to use mixed cropping, where only fairly small areas of ground are covered with the same crop at the same time of year.

Intensive livestock production

- In developed countries, **large numbers of livestock** are often kept in an area that would **not normally be able to support more than a very small number**
- They are often fed **high energy foods**, regularly given medication such as **antibiotics** as a preventative measure against disease and kept in **artificially warm temperatures** and small spaces that **do not allow for much movement**
- Ecological issues with intensive farming include:
  - **reduction in biodiversity** in areas where large amounts of land are used to graze cattle (as only grass is grown so in effect it becomes a monoculture)
  - overgrazing can lead to **soil erosion**
  - large numbers of cattle produce large amounts of **methane**, a greenhouse gas

World food supplies

- When people do not receive enough food, **famine** occurs.
- This can be caused by a variety of factors, including **natural disasters, such as drought and flooding, increasing population, poverty,** and **unequal food distribution.**
- When the world becomes aware that an area is suffering from famine, other countries are usually very willing to donate food supplies to people.

HABITAT DESTRUCTION

22.2

Habitat destruction

- Many habitats are destroyed by humans to make space for other economic activities, or by pollution from these activities, and this **reduces the biodiversity** of these areas.
- This interrupts food chains and webs, meaning that more species may die because their prey is gone.
- The main causes of habitat destruction are:

- We cut down **native vegetation** to make land available for growing crops, for farming livestock, for building houses and factories and roads.
- We damage habitats when we **mine for natural resources** such as metal ores or fossil fuels.
- We add pollutants to land and water, which can **kill the plants** that normally live there, and so change the habitat.

Deforestation

- The destruction of large areas of forest is called **deforestation**.
- Most concern about the loss deforestation has been about the **loss of tropical rainforests.**
- As the amount of the Earth's surface covered by trees decreases, it causes increasingly negative effects on the environment and is a **particularly severe example of habitat destruction.**
- Undesirable effects of deforestation include:
  - **Extinction** of species
  - Loss of **soil**
  - **Flooding**
  - Increase of **carbon dioxide** in the atmosphere
  - Effect on the **water cycle**.

Consequences of deforestation

- A rainforest is a very special place, full of many different species of plants and animals. We say that rainforest has a **high species diversity**. So, when habitat is destroyed, it causes the loss of large numbers of plant and animal species.
- Many of these species, only found in these areas, therefore become **extinct.**
- When an area of rainforest is cut down, the soil under the tree is exposed to the rain. The soil of rainforest is very thin. It is quickly washed away once it loses its cover of plants. This **soil erosion** may make it very difficult for the rainforest to grow back.
- The soil can also be washed into rivers, silting them and causing **flooding.**

Consequences of deforestation

- The loss of so much trees can also affect **the water cycle**. While trees are present and rains falls, a lot of it is taken up by the trees, and transported into their leaves, it then evaporates, and goes back into the atmosphere in the process off transpiration. If the trees have gone, then the rain simply runs of the soils and into rivers. Much less goes back into the air as vapour. The air becomes drier, and less rain falls. This can make it much more difficult for people to **grow crops and keep livestock.**
- Trees absorb CO_2 from the atmosphere during photosynthesis. If there are fewer trees, less CO_2 is absorbed, thus there is more in the atmosphere. This increases **global warming**.