

**GRADE 9:**

**CHAPTER # 22**

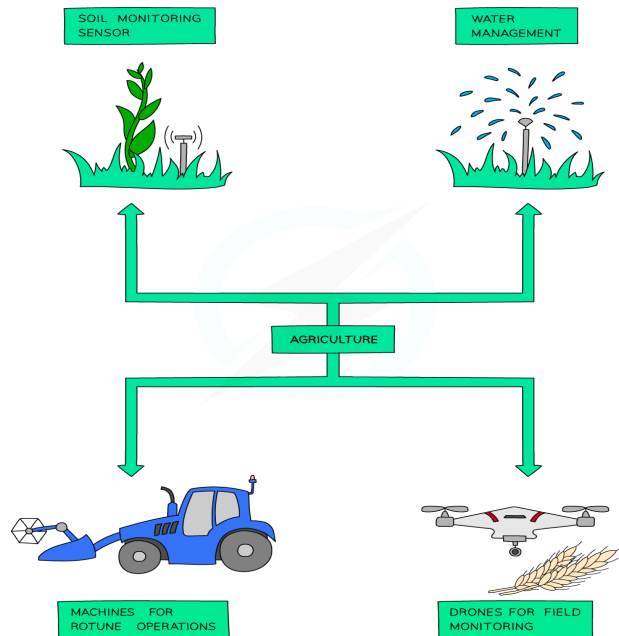
**HUMANS AND THE ENVIRONMENT**

**TOPIC :1**

**FOOD PRODUCTION**

**IMPROVEMENTS IN FARMING:** With the advancement of technology, new methods of farming have been introduced in order to maximise yield:

- **USE OF MACHINERY** - agricultural machinery can be used in the place of people. This is quicker and more efficient, thus larger amounts of land can be farmed at once.
- **CHEMICAL FERTILISERS** - fertilisers increase the amount of nutrients in the soil for plants, meaning that they can grow larger and produce more fruit, increasing the yield.
- **INSECTICIDES AND HERBICIDES** - these chemicals kill off unwanted insects and weed species. This means that there is less damage done to plants and fruit lost to insects, as well as reducing competition from other plant species.
- **SELECTIVE BREEDING** - animals and crops which produce a large yield are selectively bred to produce a large number of organisms with a high yield.



## MONOCULTURES

- Monoculture farming means that on a given area of agricultural land only one type of crop is grown (eg trees for palm oil grown in Indonesian rainforest)
- 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 (high biodiversity)
- In monocultures, biodiversity is much lower.
- 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)
- pests potentially becoming resistant to them, reducing their effectiveness.

## **GLOBAL FOOD SUPPLY**

- 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
- As the global human population increases, food production must also be increased to support the increasing population
- This is a problem as more land is required to grow crops and animals, meaning that deforestation is happening at an increasing rate, and there is also an increasing amount of greenhouse gases emitted from animal production
- Greenhouse gases cause global warming, which is a worldwide issue that leads to increased natural disasters, such as tropical storms and drought, as well as rising sea levels, which floods homes and reduces the amount of habitable land

## **INTENSIVE LIVESTOCK FARMING**

- 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.

## TOPIC #2

### REASONS FOR HABITAT DESTRUCTION

- The increasing human population of the planet is causing destruction of many habitats from rainforest to woodland to marine
- 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 reasons for habitat destruction include:

Reason	Explanation
<b>Clearing land for farming and housing</b>	<ul style="list-style-type: none"> <li>• Crops, livestock and homes all take up a large amount of space.</li> <li>• As there is an increasing population and demand for food, the amount of land available for these things must be increased by clearing habitats such as forests (deforestation).</li> </ul>
<b>Extraction of natural resources</b>	<ul style="list-style-type: none"> <li>• Natural resources such as wood, stone and metals must be gathered to make different products.</li> <li>• Therefore many trees are cut down, destroying forest habitats. In addition, some resource extraction takes up a large amount of space</li> <li>• For example: mining, which means that the land must be cleared first.</li> </ul>
<b>Marine pollution</b>	<ul style="list-style-type: none"> <li>• Human activities lead to the pollution of marine habitats.</li> <li>• In many places, oil spills and other waste pollutes the oceans, killing sea life.</li> <li>• In addition, eutrophication can occur when fertilisers from intensively farmed fields enters waterways.</li> <li>• This causes a huge decrease in biodiversity in these areas as most aquatic species living in these waterways die from lack of oxygen.</li> </ul>

## DEFORESTATION

- Deforestation is the **clearing of trees** (usually on a large scale)
- If trees are replaced by replanting it can be a **sustainable** practice
- Generally the trees are being cleared for the **land to be used in a different way** (for building, grazing for cattle, planting of monocultures such as palm oil plantations etc) and therefore it is not sustainable
- 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	Consequence
<b>Extinction / loss of biodiversity</b>	<ul style="list-style-type: none"> <li>● Forest habitats, especially tropical rainforests, have a huge range of biodiversity and as habitat is destroyed it causes the loss of large numbers of plant and animal species</li> <li>● Many of these species are only found in these areas and therefore will become extinct</li> </ul>
<b>Soil Erosion</b>	<ul style="list-style-type: none"> <li>● Tree roots help to stabilise the soil, preventing it from being eroded by rain</li> <li>● Trees will usually take up nutrients and minerals from the soil through their roots</li> <li>● Without trees, nutrients and minerals will remain unused in the soil so will be washed away into rivers and lakes by rain (leaching)</li> <li>● This loss of soil nutrients is permanent and makes it very difficult for forest trees to regrow, even if the land is not cultivated with crop plants or grass for cattle</li> </ul>

**Flooding**

- Without trees the topsoil will be loose and unstable so will be easily washed away by rain, increasing the risk of flash flooding and landslides

**Increased carbon dioxide in atmosphere**

- Trees carry out photosynthesis during which they take in carbon dioxide and release oxygen
- The removal of significant numbers of trees means less carbon dioxide is being removed from the atmosphere (and less oxygen released)
- When areas of land in forests are cleared for land use, the trees are often burned as opposed to being cut down. This releases carbon dioxide (it is an example of combustion), further increasing carbon dioxide levels in the atmosphere and contributing to global warming