Human Influence on Ecosystem

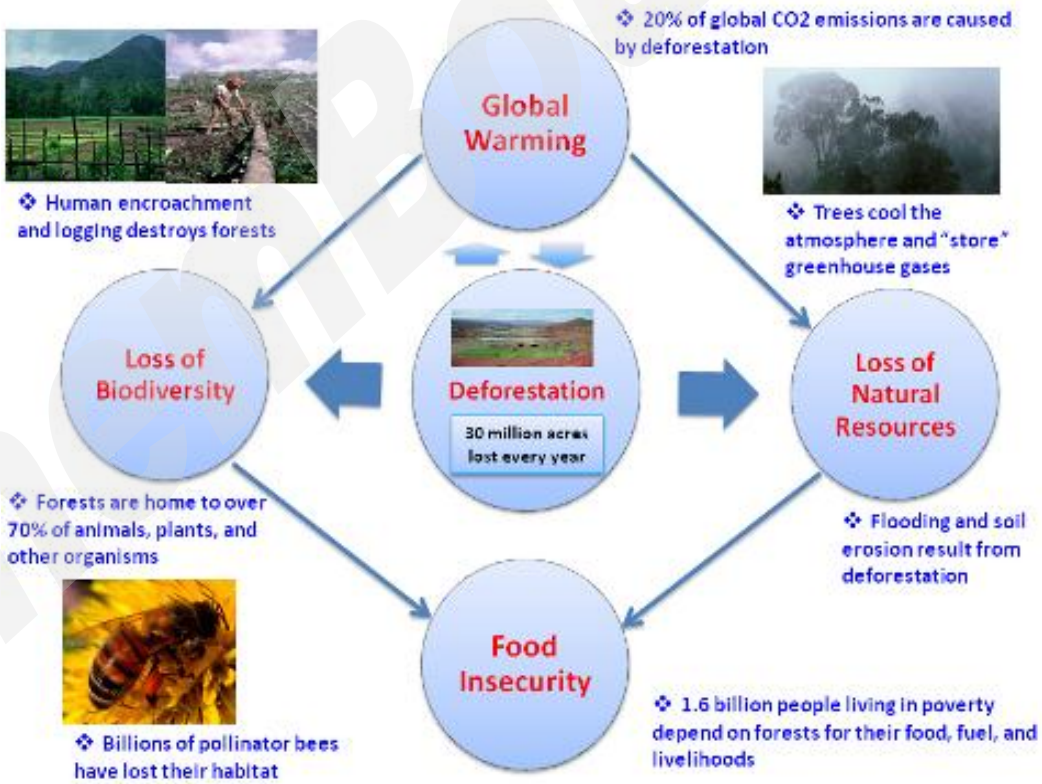
(IGCSE Biology Syllabus 2016-2018)

Food Supply

- Food production has **increased**:
  - Improved machinery
  - Fertilizers
  - Insecticides: kill insects
  - Herbicides: kill weeds
  - Artificial selection and genetic modification: e.g. cows produce more milk, crops can resist insects and cold weather
- World Food Supplies
  - Famine (wide spread scarcity of food) due to:
    (a) Fast increase in population
    (b) Increasing use of crops for biofuel
    (c) Decrease of farming → climate change and urbanization
    (d) Soil erosion and desertification
    (e) Unequal distribution of food
    (f) Drought
    (g) Flood
- **Monoculture**: continuous production of **one type of crop** that is often genetically uniform
  - **Negative impact**:
    (a) If a natural disaster were to occur, the whole crop could be wiped out
    (b) If pest and disease attack, the crop could harm easily
    (c) Using large fields and pesticides/herbicides could reduce the variety of species → reduce biodiversity
- Negative impacts of **intensive livestock production**:
  - Disease can spread easily among them
  - Waste can pollute land and waterways nearby

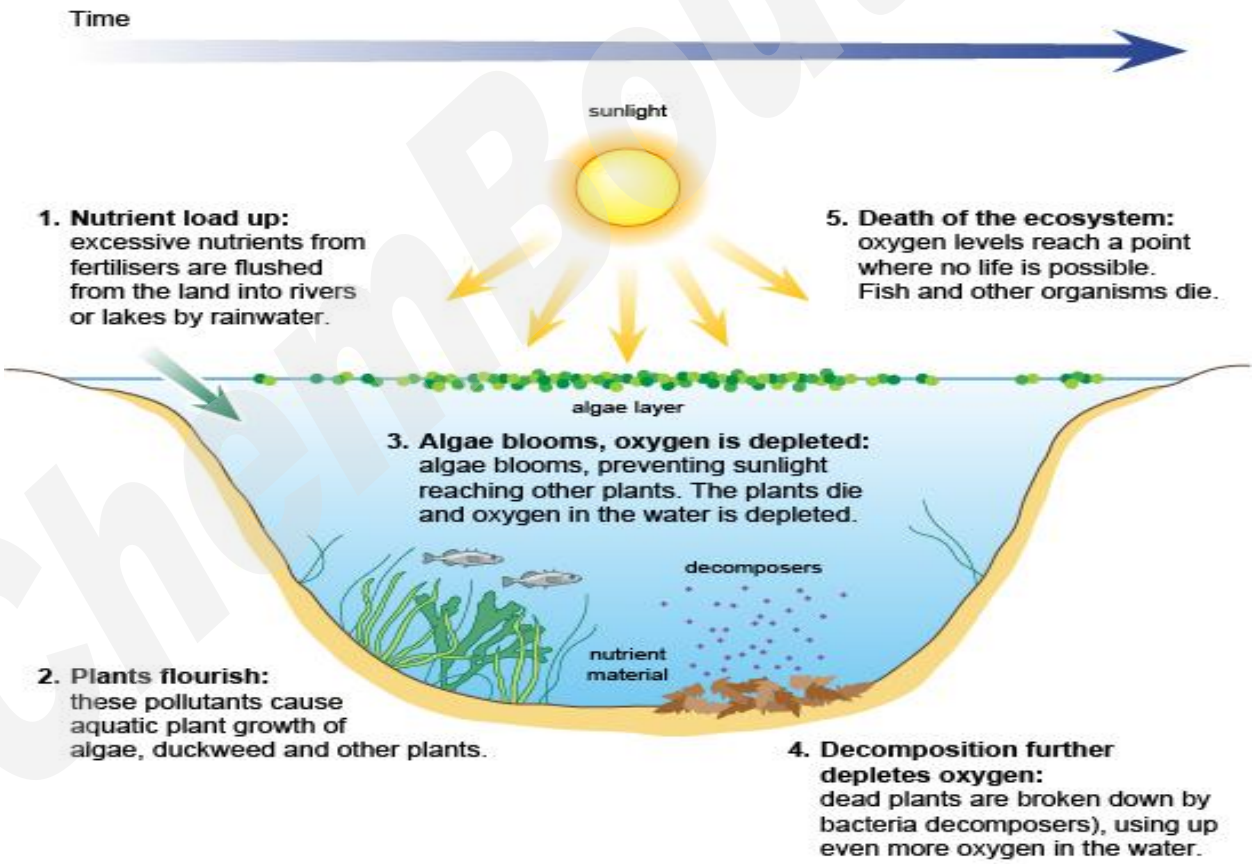
Habitat Destruction/Deforestation

- **Causes**:
  - Increased area for food crop growth, livestock production and housing
  - Extraction of natural resources
  - Marine pollution
- **Consequences**:
  - Reduced biodiversity
  - Extinction
  - Increased in carbon dioxide concentration → global warming
  - Soil erosion: tree roots cannot retain soil, soil goes into rivers making te water dirty and causes blockages, soil becomes less fertile
  - Flooding



Pollution

- Water and air pollution:
  - **Eutrophication**
    i. Excessive nutrients from fertilisers are flushed from land into river/lake by rainwater
    ii. These nutrients cause growth of algae
    iii. Algae blooms, preventing sunlight reaching other plants. The plants die and oxygen in the water is depleted
    iv. Dead plants are broken down by decomposers (bacteria), using up even more oxygen in the water
    v. Oxygen level reduces to a point where no life is possible. Fish and other organisms die.



- **Acid Rain**
  - sulphur dioxide dissolves in rain, causing acid rain which increases acidity of lakes and leaches aluminium out of the soil causing:
    - ✓ the fishes' gills are damaged, eventually killing them (can be fixed by adding slaked lime)
    - ✓ destroys top of trees and aluminium damages tree roots = dead tree, important nutrients leached away
    - ✓ sulphur dioxide → health hazards for humans (asthma)
    - ✓ damages limestone buildings and sculptures
    - ✓ fewer crops can be grown on acidic field (can be fixed by adding lime)

- **Pesticides/herbicides**
  - Pesticides: can kill other useful insects such as bees (pollinators) or by bio-accumulation (the increase in dose of toxin from one level of the food chain to the next)
  - Herbicides: can be harmful to animals which eat the plants
- **Nuclear fall-out**
  - Radioactive particles are sprayed into the atmosphere in a nuclear accident or bombing
  - These particles "rain" back to earth from clouds, sometimes far from the accident site
  - The radioactivity damages DNA and causes cancer and radiation illness at every level of the food chain
- **Non-biodegradable plastics**
  - Choke birds, fish and other animals
  - Fill up the animals' stomachs so that they can't eat food
  - Collect in rivers, and get in the way of fish
- **Global warming**
  - Increase in average temperature of the Earth
  - Due to: increase in carbon dioxide and methane concentrations in the atmosphere cause an enhanced greenhouse effect that leads to climate change
  - Reduced sperm count in men and feminisation of aquatic organisms

Conservation

- **Sustainable resource**: one which is produced as rapidly as it is removed from the environment so that it does not run out
- **Sustainable development**: development providing for the needs of an increasing human population without harming the environment
- **Natural resources**:
  - Water: need to be conserved as it is used to grow food, provide power, control fires and drink.
  - Fossil fuels: need to be conserved as they will soon run out and therefore shall be replaced with green forms of energy
- **Recycling**:
  - Water: water from sewage can be returned to environment for human use by sanitation and sewage treatment
  - Paper: it is pulped to make raw materials for industry
  - Plastic: bottle → fleece clothing
  - Metal
- Species and habitats need to be conserved:
  - Value to medicine
  - Genetic resources (genetic resources are lost when species extinct)
  - Each species has its role in its food web and ecosystem
- Endangered species
  - Causes: climate change, habitat destruction, hunting, pollution and introduced species
  - Can be conserved by:
    (a) Monitoring and protecting species and habitats
    (b) Education
    (c) Captive breeding programmes
    (d) Seed banks