Battle for the Biosphere

Outline of the Topic

- What is the value of the biosphere – distribution of global biomes.
- Taking a closer look – The effect of climate and local factors on vegetation.
- A life-support system – a provider of goods and services.
- Conflicts of interest. – different demands on the biosphere.
- Threats to the biosphere – direct and indirect degradation.
- Are we heading for mass extinction? – our role in species extinction and the impact of climate change.
- How can we conserve the biosphere? – conservation strategies.
- Is sustainable management the way ahead? – sustainable management

What is a Biome and how are they distributed?

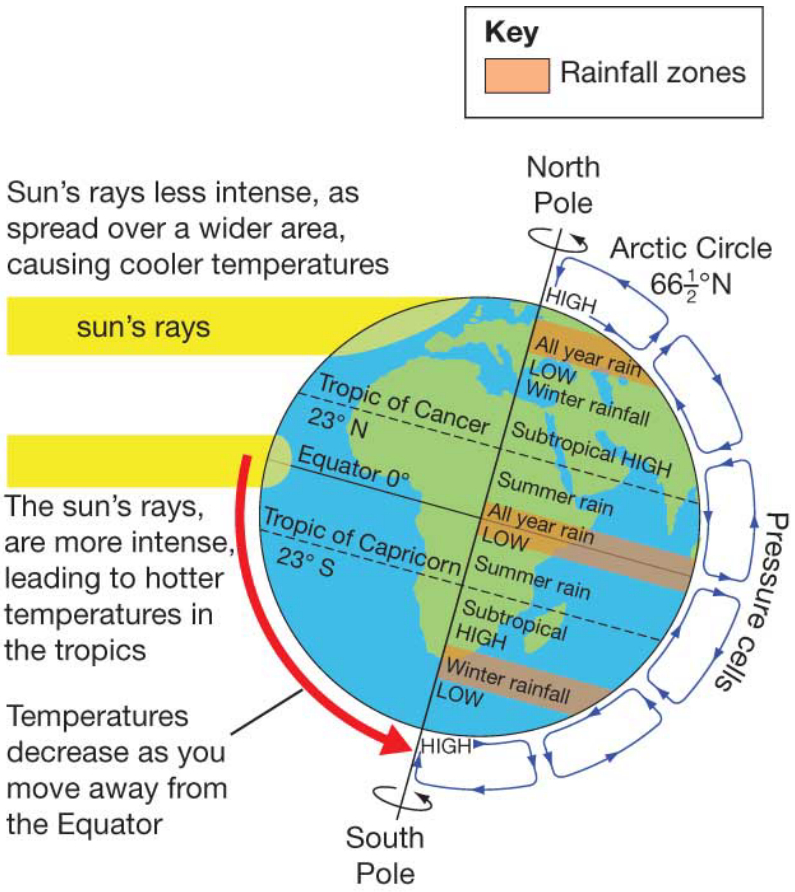
A biome is a large plant and animal community covering a large area of the Earth's surface.

Deciduous Forest, UK found in temperate climates in mid latitudes.

Tropical Rainforests are found in tropical climates between the Tropics of Capricorn and Cancer

Tundra, Alaska- Tundra is found in areas of polar climate.

Taking a Closer Look- What are the Factors affecting the distribution of biomes?



How climate changes from the Equator to the higher latitudes (see above diagram)

In the tropics the sun's rays are at a high angle providing a lot of heat and sunlight so plants grow well. In polar areas the sun's rays are less concentrated so plants are stunted.

Low pressure zones causes high precipitation (Equator and mid latitudes) Biomes such as tropical rainforests and deciduous forests are found here.

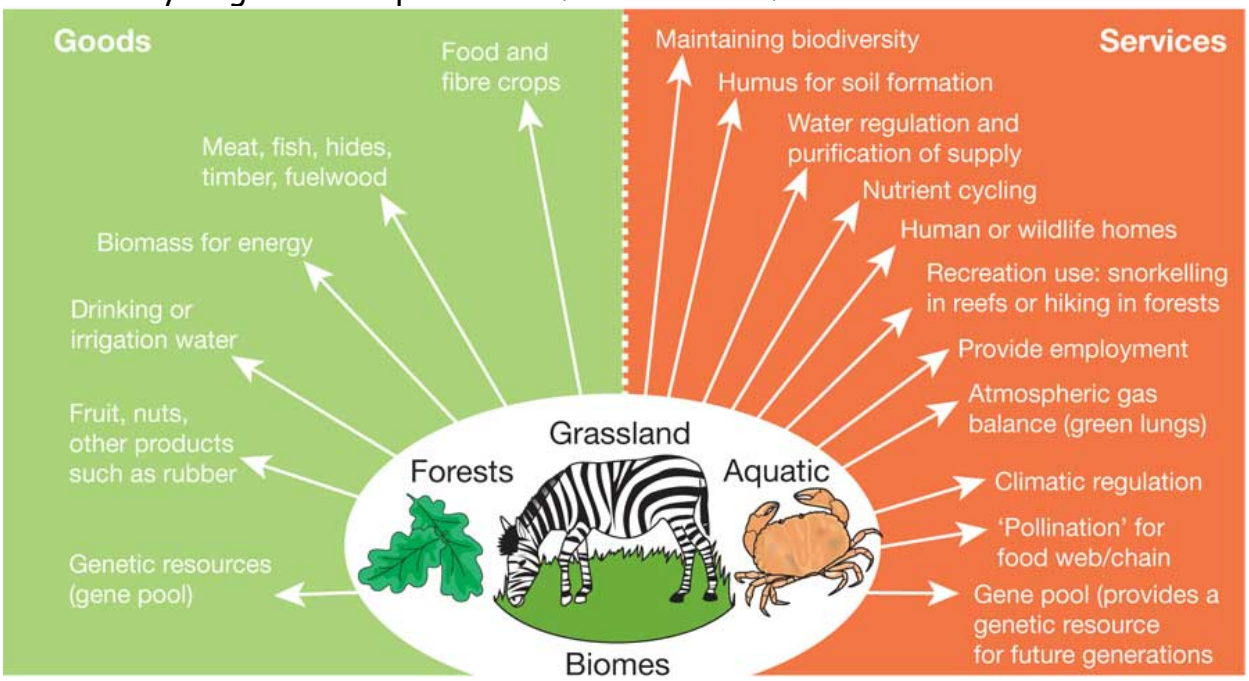
High pressure zones cause dry conditions e.g. deserts and polar areas.

- Climate is the main factor that affects the location of biomes. Tropical rainforests are found in low latitudes (close to the equator) where there are high temperatures and high precipitation. Deciduous forests are found in higher latitudes (further from the equator) where the Sun's rays are less concentrated and temperatures are cooler.
- Local Factors will cause variations at a local level. Local factors include: Altitude and Continentality.
  Altitude causes temperatures to decrease so biomes will change if the altitude increases.
  Continentality (how close to the coast a biome is) also affects climate. Coastal areas tend to have wetter climates and inland areas tend to have less precipitation.

A life-support system – the biomes as a provider of goods and services.

Biomes provide a large variety of goods and services for our survival and for commercial uses. They regulate the atmosphere, maintain the soil and regulate water.

Tropical Rainforests can be used as a case study.
Green Lungs- Forest remove carbon dioxide from the atmosphere and give out oxygen.
Water Control- Forests protects watersheds from soil erosion and intercept precipitation reducing flooding.
Nutrient Cycling- Forests provide leaf litter which form humus and add nutrients to the soil.



Conflicts of interest – different demands on the biosphere.

The problem is that different groups want to use biomes in different ways causing conflicts of interest. One example of conflicts of interest is between indigenous peoples and trans-national corporations (TNCs).

For *indigenous* peoples e.g. the Kayapo in Amazon Rainforest, the biome provides everything they need e.g. fuel-wood, food, building materials and medicines. They can grow subsistence crops. *Trans National Corporations* exploit the forest by logging, mining and for commercial planting e.g. palm oil and cocoa.

Threats to the biosphere – direct and indirect degradation.

The biosphere is being degraded by human activity. A number of species are under threat of extinction. The threats to the biosphere can be classified as:

- Immediate causes e.g. logging, overfishing and pollution.
- Root causes such as rapidly expanding populations and economic development which causes other problems.

Certain parts of the world are particularly under threat. These include 25 *hotspots* which have the greatest concentration of *biodiversity.*

Threats to the biosphere	Impacts	Examples
Deforestation	Deforestation from commercial logging, mining and settlement affects rates of flooding, humus formation and soil erosion as well as removing habitats and reducing biodiversity.	Deforestation in the Amazon rainforest.

Case Study- The Cerrado in Brazil is an example of a biodiversity hotspot under threat from human activity.

The Cerrado region of Brazil, comprising 21 percent of the country, is the most extensive woodland-savanna in South America. With a pronounced dry season, it supports a unique array of adapted plant species and surprising numbers of bird species. Large mammals such as the giant anteater, giant armadillo and the jaguar also still survive here but are competing with the rapid expansion of Brazil's agricultural frontier, which focuses primarily on soy and corn. Ranching is another major threat to the region, as it produces almost 40 million cattle a year.

Are we heading for mass extinction? – Our role in species extinction and the impact of climate change

In the past, ecosystems have changed and species become extinct as a result of natural events. In the future human activities may cause *mass extinction* of species and global warming may cause a number of impacts of the biosphere.

The reduction of sea ice makes hunting difficult for polar bears and they sometimes resort to cannibalism

Rising ocean temperatures means that krill numbers have fallen by 25% in 25 years.

Climate change will have many impacts on the biosphere:

- Habitats will be increasingly fragmented (broken up)
- Extreme weather events such as storms and floods could become more common.
- Species face extinction as they can't migrate quickly enough.
- A 3°C rise will cause the disappearance of glaciers, oceans to become more acidic and droughts in the Amazon rainforest.

How can we conserve the Biosphere?

Act Global

Countries can act together to develop wildlife treaties. One example of this is CITES- The Convention of International Trade in Endangered Species signed in 1973 by 166 countries. The CITES Treaty:

- List endangered species.
- Aims to stop trade in products from endangered species such as elephant ivory and crocodile skins.

Act Local

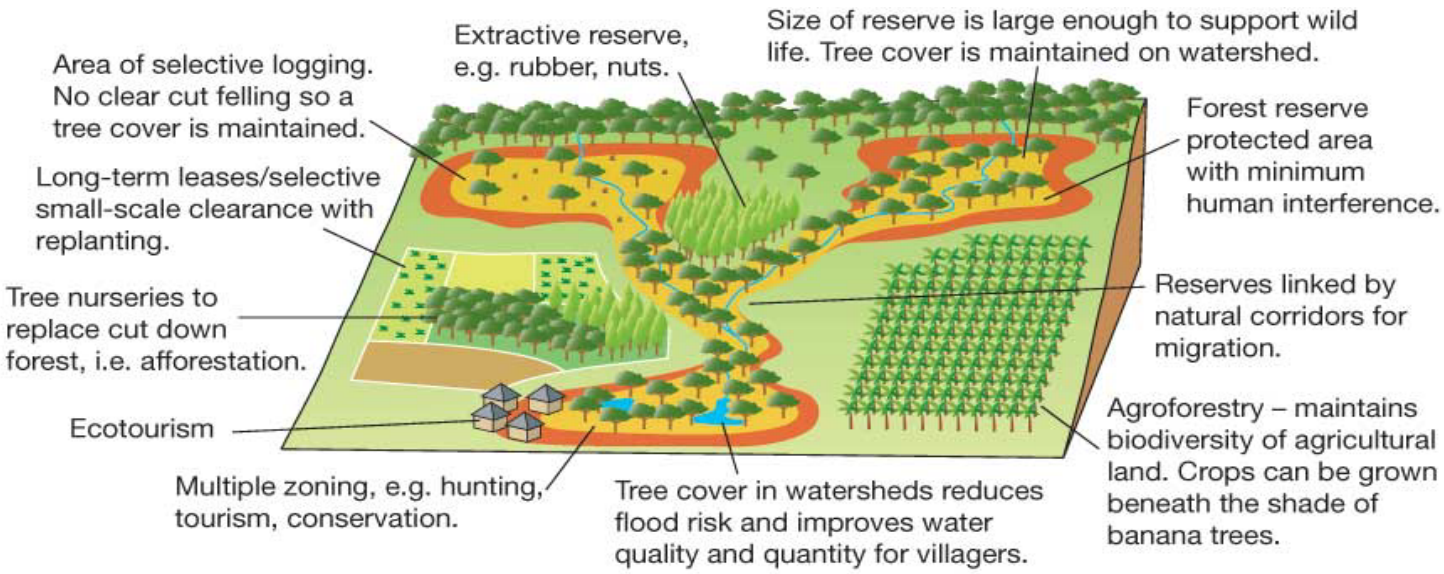
National policies such as National Parks and Community Forests help to conserve biodiversity in the U.K.

Is Sustainable Management the way ahead?

Sustainable management involves:

- Conserving the ecosystems for future generations. This can be done by *zoning.*
- Local people so they can be involved in decision making and can use the resources to provide a living. They are the most important *stakeholders.*
- Being environmentally friendly by having human activities that will support biodiversity and not degrade the environment.

An example of sustainable management is the forest reserve in Kilum in the Cameroon Republic, Africa.



Key terms in Battle for the Biosphere

Continentality – The effect on the climate of distance from the sea.

Biodiveristy – The range of animal and plant life found in an area.

Hotspots – Areas with high levels of biodiversity.

Players- Different groups of people who want to use the biosphere in different ways leading to conflict of interest.

Indigenous Peoples – Peoples who originated in and have lived in a region for many generations.

Transnational companies – Giant companies operating in many countries on a worldwide scale.

Mass Extinction – The extinction of a large number of species within a short space of geological time.

Keystone species – An important species in a food web as many other organisms rely on it.

Stakeholders – The groups of people who have an interest in a decision being made in a local area.

Sustainable Management – meeting the needs of people now and in the future, and limiting harm to the environment.

Practice Exam Questions

A climate graph for an area of tropical rainforest

1) Look at the graph above. Which month is the:

a driest ?

b wettest?

(2 marks)

2) For the biosphere to be protected, global action needs to be taken. Name one global conservation treaty and outline how it works.

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3) The destruction of some forests has made us more aware of the benefits they can provide. Explain the value of a biome you have studied.

Name of biome_____

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4) Suggest **two** reasons why many rainforest areas are being cut down (deforestation).

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