

YEAR 11 UNIT 3: Rainforests

Tropical Rainforest Biome

Tropical rainforest cover about 2 per cent of the Earth's surface yet they are home to over half of the world's plant and animals.

Distribution of Tropical Rainforests

Tropical rainforests are centred along the Equator between the Tropic of Cancer and Capricorn. Rainforests can be found in South America, central Africa and South-East Asia. The Amazon is the world's largest rainforest and takes up the majority of northern South America, encompassing countries such as Brazil and Peru.



Rainforest Nutrient Cycling

The hot, damp conditions on the forest floor allow for the rapid decomposition of dead plant material. This provides plentiful nutrients that are easily absorbed by plant roots. However, as these nutrients are in high demand from the many fast-growing plants, they do not remain in the soil for long and stay close to the surface. If vegetation is removed, the soils quickly become infertile.

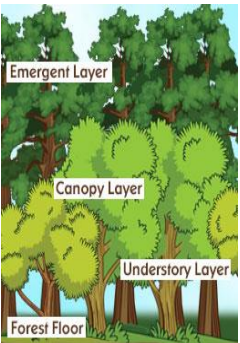
Layers of the Rainforest

Emergent - Highest layer with trees reaching 50 metres.

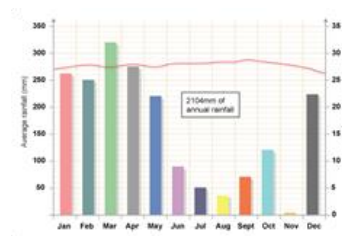
Canopy - 80% of life is found here as it receives most of the sunlight and rainfall.

Under canopy - Consists of trees that reach 20 metres high.

Shrub layer - Lowest layer with small trees that have adapted to living in the shade.



Interdependence in Rainforests - A rainforest works through interdependence. This is where the plants and animals depend on each other for survival. If one component changes, there can be serious knock-up effects for the entire ecosystem.



Rainforest Climate - Evening temps. rarely fall below 22°C. Due to the presence of clouds, temperatures rarely rise above 32°C. Most afternoons have heavy showers. At night with no clouds insulating, temperature drops.

Plant Adaptations

Tall and straight to reach the sun
Buttress roots support the tall trees
Lianas use trees to reach the sun
Drip tips so leaves don't rot
Thick waxy leaves
Smooth thin bark
Epiphytes grow on trees and get nutrients from air and water
Shade tolerant ferns



Animal Adaptations

Sloths – hook to grip branches
Parrots – sharp beak for nuts and fruit; 4 toes per foot to clamber
Long limbed spider monkey – sharp nails to peel bark to get to sap
Anteaters – long tongues; good smell and hearing; sharp claws to open ant hills

Main issues with biodiversity

More than half the world's species are found in rainforests. Human exploitation is a major threat. Many extinct and endangered species are leading to a decrease in ecosystem productivity

Amazon Rainforest

The Amazon is the largest rainforest on earth – covering an area of around 8 million km², including parts of Brazil, Peru, Colombia, Ecuador, Bolivia, Guyana, Suriname and French Guiana.

What are the causes of deforestation?

Logging



- Charcoal is a major economic driver behind deforestation while selective logging for mahogany is lucrative. An estimated 60-80% of logging is illegal in the Amazon

Agriculture



- Commercial farming – Approximately 80% of the Amazon has been lost due to cattle ranching to supply for beef and leather trading. Soybeans are one of the biggest crops exports from the region

Mineral Extraction



- Mining is common with companies seeking gold, iron and tin.
- Areas **mined** can experience **soil and water contamination**.
- Indigenous people** are becoming **displaced** from their land due to roads being built to transport products.

Tourism



- Mass tourism** is resulting in the building of hotels in extremely **vulnerable areas**.
- Lead to **negative relationship** between the government and indigenous tribes
- Tourism has **exposed animals** to human **diseases**.

Energy Development



- Energy production has resulted in some areas being flooded. The Balbina Dam for example flooded 2,400km². The construction of the dam requires roads to be built, further causing deforestation

Road Building



- Roads** are needed to bring supplies and **provide access** to new mining areas, settlements and energy projects.
- The Trans-Amazonian Highway has led to increased settlement and allow access to harder to reach areas.

Rates of Deforestation The rate is very high – roughly 300 000km² per year from 2000-2010. Overall, deforestation in Brazil and Indonesia accounted for almost half of the global total between 2001 and 2014, though Brazil has reduced its rate since 1990.

Impacts of deforestation

Economic development

- + Mining, farming and logging creates employment and tax income for government.
- + Products such as palm oil provide valuable income for countries.
- The loss of biodiversity will reduce tourism.

Soil erosion

- Once the land is exposed by deforestation, the soil is more vulnerable to rain.
- With no roots to bind soil together, soil can easily wash away.

Climate Change

- When rainforests are cut down, the climate becomes drier.
- Trees are carbon 'sinks'. With greater deforestation comes more greenhouse emissions in the atmosphere.
- When trees are burnt, they release more carbon in the atmosphere. This will enhance the greenhouse effect.

Sustainable Management of Rainforests

Agro-forestry - Growing trees and crops at the same time. It prevents soil erosion and the crops benefit from the nutrients.

Selective logging - Trees are only felled when they reach a particular height.

Education - Ensuring those people understand the consequences of deforestation

Afforestation - If trees are cut down, they are replaced.

International Agreements - UN Sustainable development goals include protection of forests. FSC – Forestry Stewardship Council.

Ecotourism - tourism that promotes the environments & conservation