

RAINFORESTS

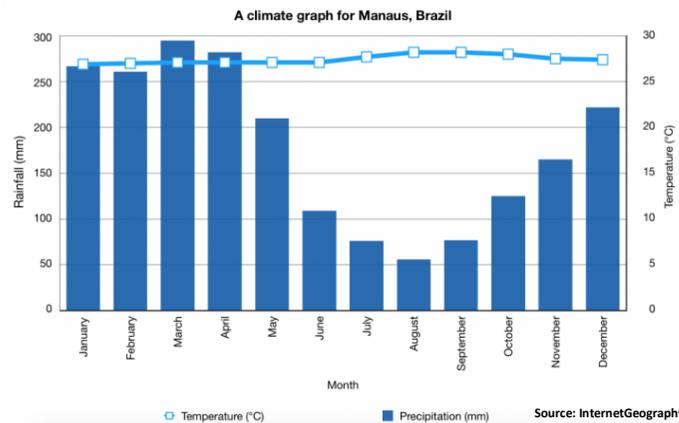
1. The location of Rainforest

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2. Rainforest Climate

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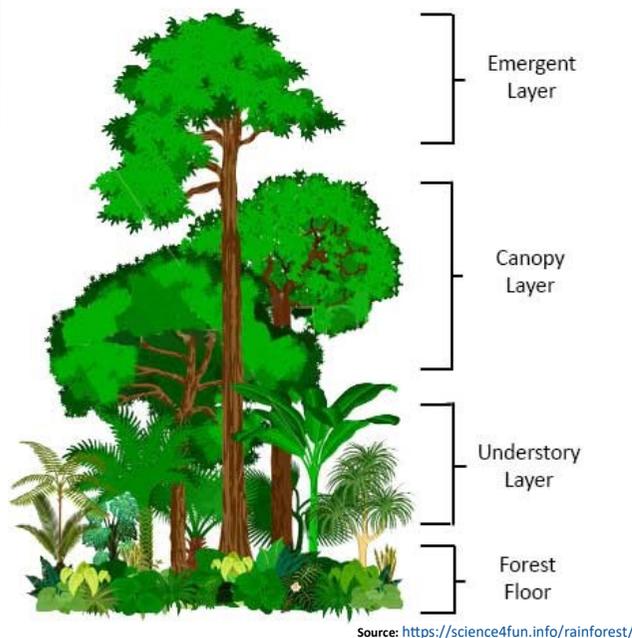
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Rainforests have high levels of **convective rainfall**—this is explained by the intense heating and high temperatures caused by the sun being overhead at the equator. The intense heating leads to low pressure as the heated air rises giving rise to high levels of rainfall.

3. Structure of a Rainforest

Rainforests have four main layers.

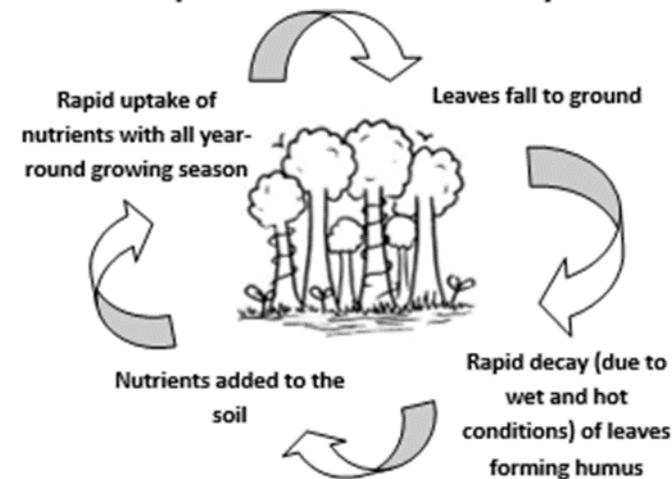


The tallest trees may be up to 50m in height. The most photosynthesis takes place in the canopy. In the lower layers of the rainforest there is less light due to the dense canopy above.

Rainforest soils have a thin humus layer, with few nutrients and they are iron rich, known as LATOSOLS. The nutrients are mainly found in the litter layer on the surface but the rapid decomposition in the warm and wet conditions mean this layer is thin.

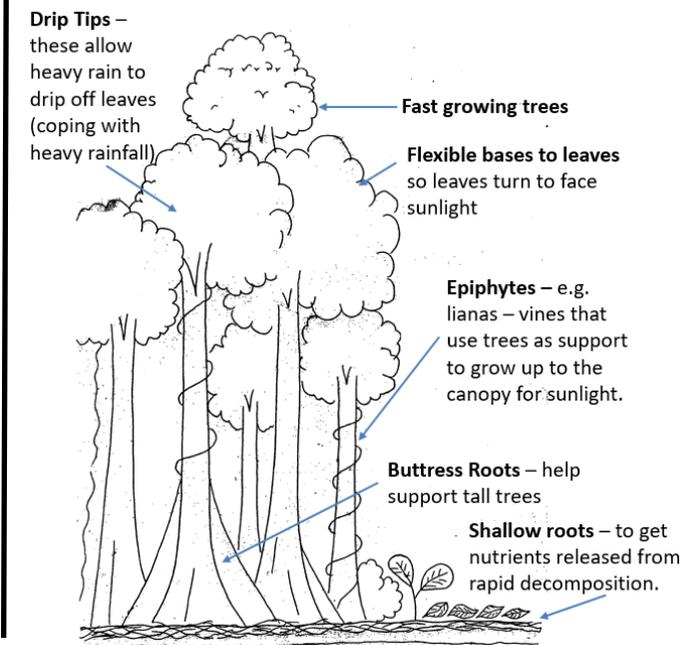
The rapid decomposition and take up of nutrients in a tight nutrient cycle helps to explain the dense vegetation and high levels of growth.

The Tropical Rainforest Nutrient Cycle



4. Plant Adaptations

The rainforests have a very high **biodiversity** with approximately 50% of the world's plant and animal species. Plants and animals are highly adapted to compete and survive in different areas of the forest. *Examples of adaptations are shown below*



Rainforests continued..

5. Animal Adaptations

Animals are also highly adapted to the rainforest with adaptations including camouflage, warning off predators, movement etc.

Examples include:

Flying Squirrels	Have evolved flaps of skin under their arms which enable them to glide from tree to tree in the canopy.
Poison Dart Frogs	Have bright colours to warn predators away
Toucan	These have an incredibly strong beak enabling it to crack open hard nuts that many other species can't.
Howler monkeys	These have developed prehensile tails (their tails act like another limb) which enables them to grip onto and swing from branch to branch in the canopy.
Sloths	Algae grows on fur to help them camouflage and they move very slowly blending in and avoiding being noticed.

6. The importance of the Rainforests

Rainforests are very important for many reasons:

- High Biodiversity**
- Water Provision** — regulate the water cycle
- Home to indigenous tribes**
- Climate Change** - rainforests are important carbon sinks taking in carbon dioxide and regulating oxygen levels.
- Medicines**—many of our medicines are derived from rainforest plants—e.g. quinine used in the treatment of Malaria and Rosy Periwinkle used in the treatment of childhood leukaemia
- Provide many valuable resources**—e.g. rubber, fruits, fibres etc.

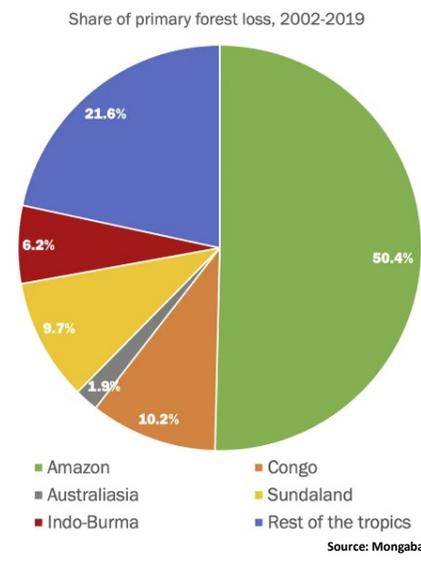
5. The Causes of Deforestation

Deforestation is the large scale cutting down of trees, often for profit making activities.

Estimations such that as much as an area of rainforest about the size of a football pitch is destroyed each second.

50.4% of forest loss is from the Amazon.

Whilst rates of deforestation in the Amazon had begun to decrease, recently by 2000, rates are increasing significantly again with 2019 levels being 30% higher than 2018!



REASONS FOR DEFORSTATION

- LOGGING**—rainforests contain valuable timber for furniture, construction etc. including hardwoods such as mahogany.
- MINERALS**— pressures minerals such as iron ore and gold are mined by cutting forests down and removing soil with high pressure hoses and chemicals.
- COMMERCIAL FARMING—CROPS** – large areas of rainforest are cut down for agricultural land for growing cash crops such as soy bean and palm oil
- COMMERCIAL FARMING—CATTLE**—with increasing demands for meat, large areas of rainforest are cut down to create cattle ranches.

5. The consequences of Deforestation

The consequences of deforestation can be divided into local and global scale.

GLOBAL SCALE IMPACTS OF DEFORESTATION



CLIMATE CHANGE—removal of trees by deforestation removes the valuable carbon sink meaning there is more carbon dioxide in the air contributing to global warming.



REDUCED BIODIVERSITY — many species are being lost forever with the loss of many potentially valuable medicinal cures.

LOCAL SCALE IMPACTS OF DEFORESTATION



SOIL EROSION — with the loss of trees there is little interception, heavy rain strips topsoil and washes it into nearby rivers, removing nutrients. Soil may build up on the river bed, resulting in flooding.



WATER POLLUTION — during mining, soil and chemicals are washed into rivers causing water pollution which can kill fish and damage the health of native people who use the river water.



CONFLICT — there is conflict between loggers, miners etc. and the indigenous people. Many have been forced from their land and some have been killed.

Icons by Nithinan Tатаh and Yu Luck, Jim Holt and Adrien Coquet from the Noun Project





Rainforests continued..

6. How can we manage rainforests sustainably

Many of the countries in which rainforests are located are countries which have a lower level of economic development and rely on resources from the rainforest to help earn money and pay off debts.

It is difficult to stop deforestation—much illegal deforestation takes place.

We therefore need to **sustainably manage** our rainforests. This means using the resources that are available whilst ensuring that the area remains protected so that there are also resources that can be used for the benefit of future generations.

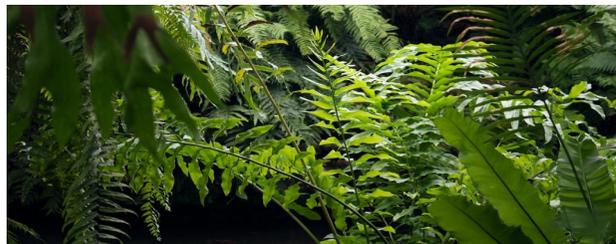
SUSTAINABLE MANAGEMENT STRATEGIES

1. SELECTIVE LOGGING—only cutting down fully grown trees, letter young trees remain to protect ground and nutrient cycle with new trees being planted to replace those taken.

2. ECOTOURISM—providing small scale tourism in the rainforest, using locals as guide and constructing sustainable accommodation which fits within the forest landscape and is constructed using old wood. Generates money and supports local communities.

3. TACKLE ILLEGAL LOGGING—governments to look at use of technologies like drones etc. to help monitor and tackle the problem.

4. CONSERVATION AND EDUCATION—setting up nature reserves and protected areas which can only be used for education / scientific research.



APPLYING YOUR KNOWLEDGE...

- Describe and explain the rainforest climate
- Explain how plants and animals have adapted to the rainforest environment.
- Explain the causes of deforestation
- Why is it difficult to tackle the problem of deforestation in rainforests?

Now Challenge yourself even further!

Explain how tackling the problem of deforestation will help tackle the issue of global warming.

Suggest what the difficulties are in trying to tackle deforestation.

Is it more valuable to use the resources in the rainforest or keep them intact? Explain your reasons.

Some ideas for finding out more...

- research the idea of “Debt for nature” swaps and see how these can be used to help protect rainforests.
- carry out some research on Ecotourism in Costa Rica and evaluate how successful it has been.
- watch this Sky New Special Report—The Amazon in Crisis <https://www.youtube.com/watch?v=rWqgrFDIX6c>

OTHER RESOURCES

KS3 Bitesize Rainforests <https://www.bbc.co.uk/bitesize/guides/zpmnb9q/revision/1>

Tropical Rainforest Quiz <https://www.bbc.co.uk/bitesize/guides/zpmnb9q/test>

Mongabay—Rainforest information <https://rainforests.mongabay.com/>

KS3 Schoology



SCAN ME

Key Term	Definition
Biodiversity	The variety of life in a place i.e. the number of species found in an area
Biome	A large scale community of organisms with a distinctive climate
Biosphere	The living part of the earth - plants and animals
Buttress Roots	Large roots above the surface supporting tall trees
Canopy	The main layer of fully grown trees in the rainforest where the most photosynthesis takes place
Commercial Farming	This may either be in the form of cattle or crops - where large areas of the rainforest are cleared for ranch lands or plantations
Deforestation	The cutting down of trees in the rainforest
Drip Tips	Funnel shaped tips on leaves to shed excess water
Ecotourism	Introduces people to the natural world, with the proceeds benefiting local communities and protecting the environment for the future
Emergent Layer	The tallest trees in the rainforest
Epiphytes	A plant that grows on another plant but doesn't damage or
Indigenous Tribes	The people who are native to the rainforest (e.g. Tikuna Tribe)
Latosol	Type of soil found in tropical rainforests with a thin humus layer, a lack of nutrients and a high iron content
Lianas	Vines that grow up trees to get towards the sunlight
Parasites	An organism that lives in or on another organism and gets its nutrients at the expense of its host (e.g. a strangler fig)
Plantation	A large scale estate for farming growing cash crops such as palm oil, sugar cane, soy
Prehensile Tail	Capable of grasping / holding on to things
Selective Logging	Where only fully trees are cut down and those with an important ecological value are left unharmed
Soil Erosion	The wearing away of topsoil by wind and water
Sustainable Management	A way of using the resources in the rainforest whilst ensuring that they are still available for the benefit of future generations.

To test yourself Read, Cover, Write, Check OR try this quizlet

<https://tinyurl.com/KS3Rainforests>