Contents- Forests under threat

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8: How can the taiga wilderness be protected?

Section 1. What are rainforests like?

1. Define the following terms;

Tropical rainforest:

Equatorial climate:

Abiotic:

Ecosystems:

Biotic:

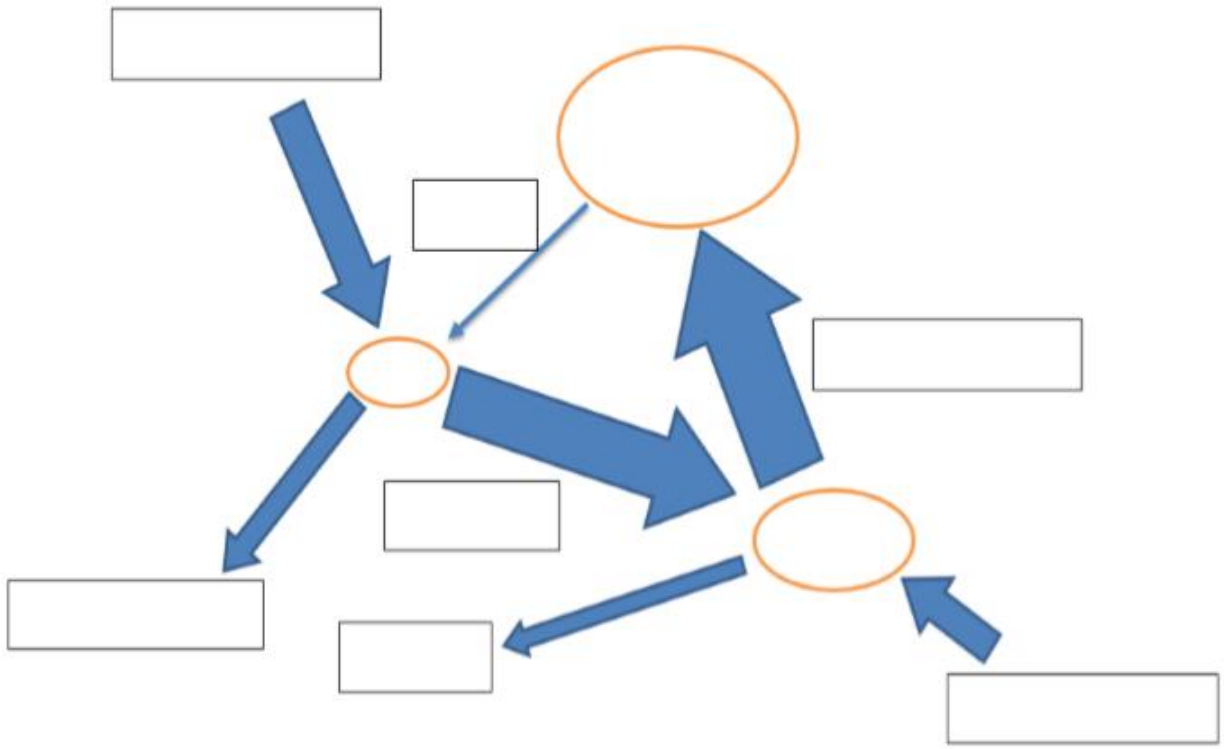
Nutrients/soil/litter/biomass (in relation to the nutrient cycle):

Leaching:

Biodiversity:

The nutrient cycle

2. Complete the following image to outline what the nutrient cycle is like in the **tropical rainforest**.



The Nutrient Cycle in rainforests:

- **Larger biomass store** – Layers of vegetation and huge trees store large amounts of nutrients.
- **Smaller litter store**, and **larger decay transfer** – In hot, wet conditions bacteria and fungi decay dead matter quickly, returning nutrients to the soil.
- **Larger growth transfer** –Plants grow all year, so draw nutrients up from the soil rapidly.
- **Larger weathering input** – Chemical weathering processes (e.g. solution) are faster in hot wet climates, so release nutrients into the soil from rocks.
- A **larger leaching output** – Heavy rainfall throughout the year brings in nutrients, but the constant flow of water through the soil removes them (leaching).

3. Plant and animal adaptations

Complete the table by describing what the feature is and how it adapts to a tropical climate (equatorial climate).

Plant adaptations	Animal adaptations
Buttress roots	Sloth
Lianas	Primates
Drip tip leaves	Big cats
Epiphytes	Birds

Explain two ways plants are adapted to conditions in the tropical rainforest (4 marks).

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Section 2. How does the taiga reflect the subarctic climate?

Use page 266 to help answer the following questions:

1. What is the taiga?

2. What is the climate like in the taiga?

3. How is biodiversity and productivity in the taiga different to that in the tropical rainforest?

4. Draw a diagram showing what the nutrient cycle is like in the taiga.

5. Why can the soil in the taiga not support a large biomass?

6. Are there lots or few animals in the taiga? Explain why.

7. Explain how the interrelation of abiotic and biotic components leads to taiga soils having low nutrient levels.

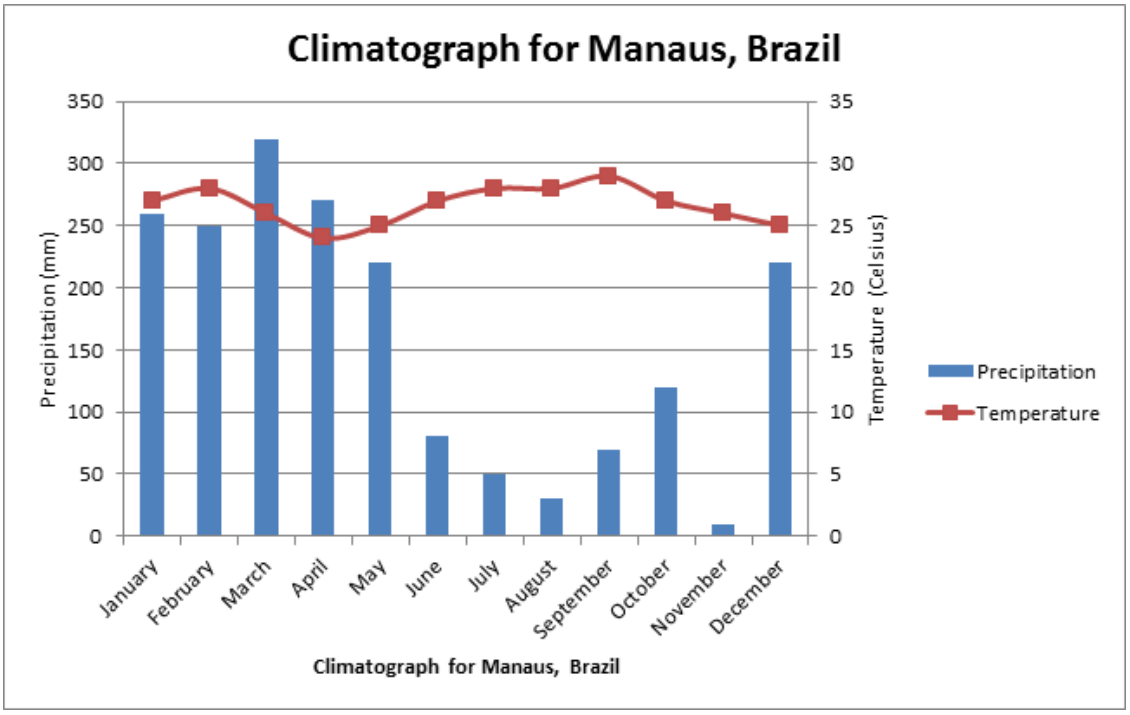
8. Plant and animal adaptations in the taiga.

Complete the table by describing what the feature is and how it adapts to a subarctic climate.

Plant adaptations	Animal adaptations
Needle shaped leaves	Birds
Conifer trees (consider density and shape)	Hibernation
	Winter camouflage

Section3: How different are the climates of the tropical rainforest and the taiga?

1.



What month had the highest temperature? (State the temperature too). The lowest?

_____

_____

2. Calculate the range _____

3. Describe the climate shown in the graph above for a tropical rainforest.

_____

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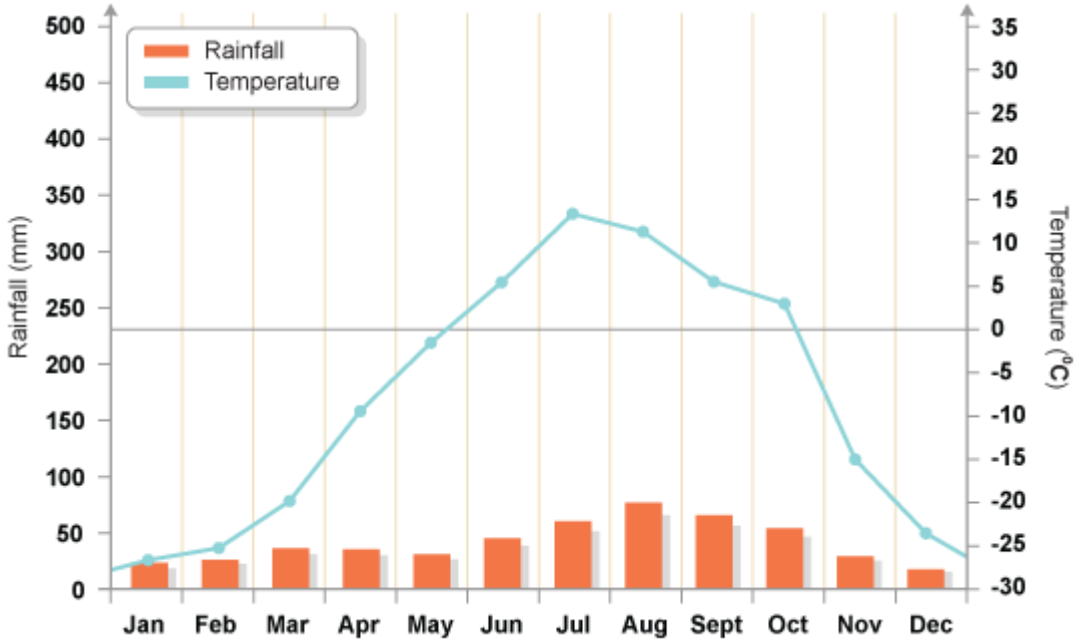

4. Now study the graph above. What month had the highest temperature? (State the temperature too). The lowest?

_____

_____

5. Calculate the range _____

6. Describe the climate

_____

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7. Describe 3 differences between the two climates.

_____

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Section 4: Food webs

Food webs are a type of diagram used to show who eats what in an ecosystem. They are useful for comparing ecosystems.

Study these 2 diagrams then decide whether the statement is describing a tropical rainforest ecosystem or a taiga ecosystem.

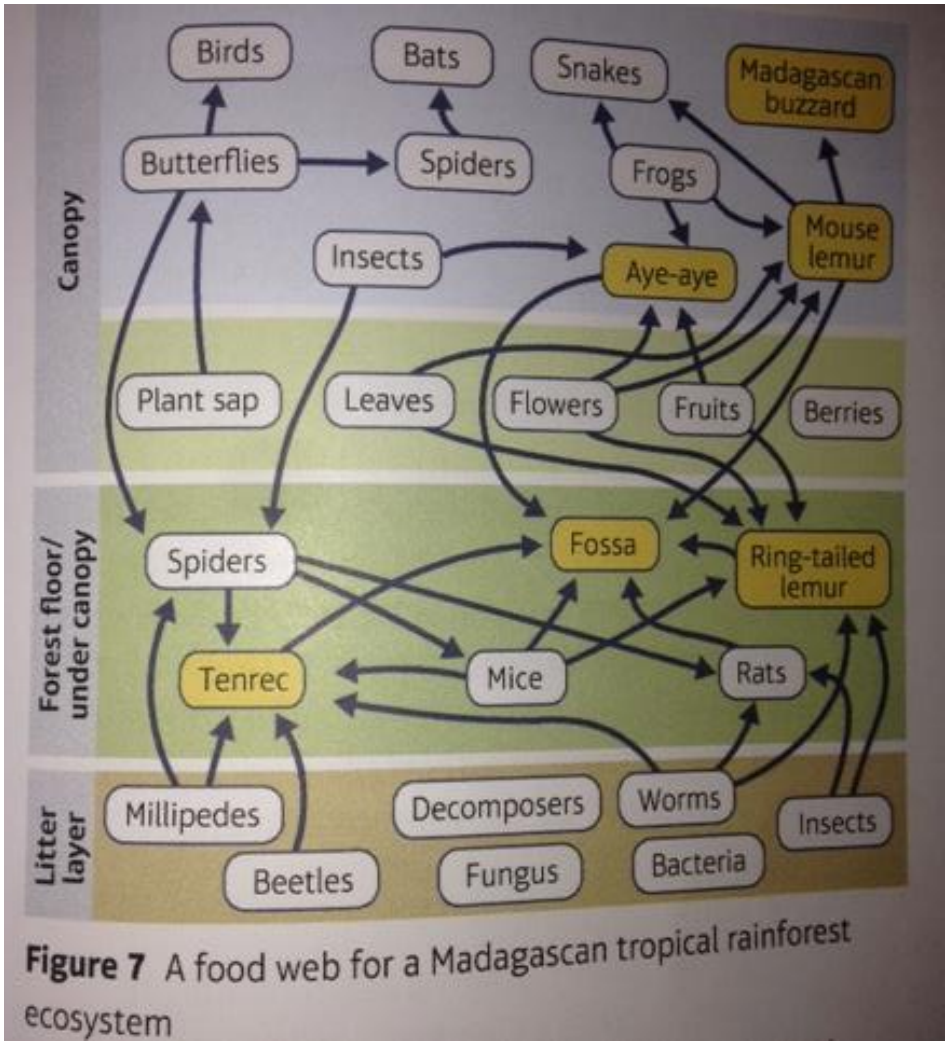

Figure 7 A food web for a Madagascan tropical rainforest ecosystem

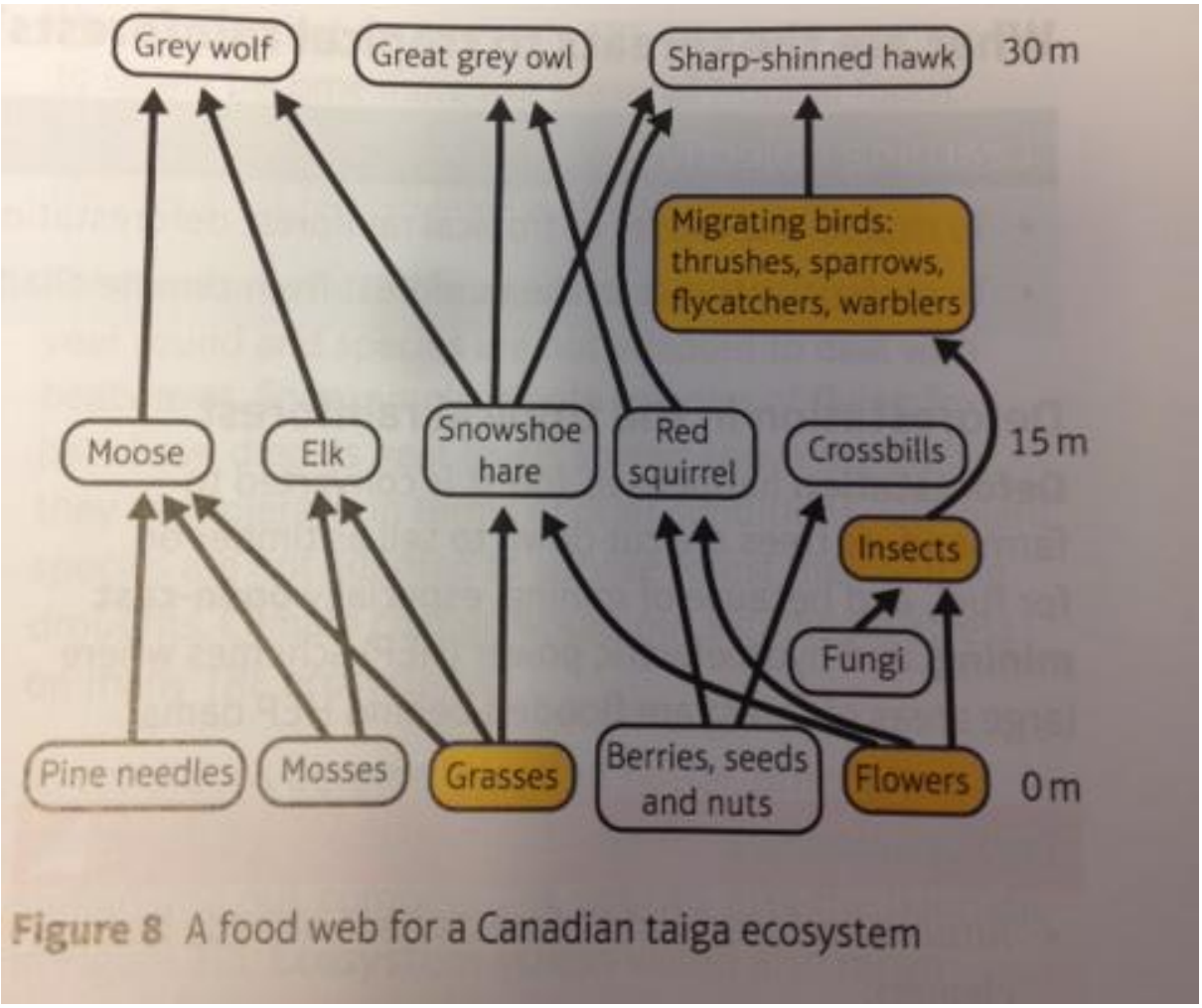

Figure 8 A food web for a Canadian taiga ecosystem

Description	Tropical rainforest or Taiga ecosystem?
Food webs for this ecosystem are much simpler. This is because the climate conditions of the subarctic produce much lower biodiversity.	
Food webs for this ecosystem are highly complex because of the high biodiversity in this ecosystem. There are hundreds of thousands of species.	
This ecosystem is made up of only a few species of slow-growing coniferous tree and they do not have the same layers of forest as the other ecosystem as the trees are all roughly the same height.	

This ecosystem has different layers, from the dark forest floor to the canopy layer and up to the emergent layer. Each layer is like a mini ecosystem.	
There are few amphibians and reptiles in this ecosystem as it is too challenging for cold-blooded animals.	
There are big mammals in this ecosystem. They have very large territories and spend the summer eating as much as possible to help them survive the winter months.	

1. State one piece of evidence from figure 8 that shows that food webs are affected by seasonality in the taiga forest (2 marks).

_____

_____

_____

2. Explain why food webs in the tropical; rainforest are more complex than food webs in the taiga forest. (4 marks).

_____

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3. Research the 5 layers of the rainforest. What are they called?

1=

2=

3=

4=

5=

4. What types of tree of characteristic of the taiga? (1 mark).

_____

5. The taiga ecosystem is described as 'highly seasonal'. What does this mean?

_____

_____

_____

6. How does the taiga ecosystem being 'highly seasonal' affect biodiversity in this ecosystem?

_____

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Section 5: What are the threats to tropical rainforests?

What is a direct threat? (Use the textbook glossary if you're unsure).

_____

_____

What is an indirect threat?

_____

_____

Read and highlight the next 2 pages of literature before attempting to answer the following question.

Explain ways in which the tropical rainforest is threatened (6 marks)

Success Criteria:

6 marks – 3 developed points highlighting both direct and indirect aspects with an explanation as to why it causes a threat.

4 marks – A variety of descriptive points with little explanation as to why the tropical rainforest is threatened.

2 marks – Little/no attempt at giving points which either describe or explain why the tropical rainforest is threatened.

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What is ecosystem stress?

See the graph on the previous page. Describe the trend of deforestation in the Amazon rainforest from 1988 to 2013 (3 marks).

Section 6: What are the threats to the taiga?

Read and highlight the two pages of literature that follow this page.

1. Why is illegal logging of the taiga more damaging than authorised logging?

2. Climate change is an indirect threat to the tropical rainforest. Which of the threats to the taiga could be made worse by rising global temperatures?

3. The taiga is sometimes called the 'Amazon of the north'. What do you think this phrase means? Explain your idea.

4. 'Assess the severity of the threats to the taiga biome' (8 marks)

First all off consider ranking the following threats in terms of which you think is the most severe. Remember there is no right or wrong answer- it's all about your justification. Think in terms of whether it is a long/short term threat. Add the threats in the box below to your opinion line.

Least severe ⟷ Most severe

- Commercial development (logging)
- Forest fires
- Access to natural resources i.e. oil and gas
- Pests and diseases
- Acid precipitation

Now you have a choice. Either write your opening paragraph to the question at the top to demonstrate you understand how to assess….or even better write your entire answer. Remember no conclusion is needed if you've assessed throughout your answer. Don't forget there are also 4 marks available for SPAGST.

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Section 7: How can the tropical rainforest be protected?

1. What does conservation mean? (1 mark)

_____

_____

International organisations have tried to create international agreements to protect the rainforest. By signing up to these agreements, member countries receive aid and assistance. Two examples are CITES and REDD.

CITES – Conversation on International Trade in Endangered Species

2. Underline the key facts/figures from this paragraph to help describe what CITES does. (There is no figure 2).

The Convention on International Trade in Endangered Species (CITES) is an international treaty. It came into force in 1975 and is adopted by 180 countries. CITES lists 34 000 endangered species of animal (5000) and plants (29 000), including 1200 that are most threatened and in need of protection, e.g. red pandas, most rhino species, tigers, chimps and parrots. CITES bans cross-border trade in listed species. By stopping the buying and selling of endangered species, the hope is that illegal hunting and collecting will stop. However, this approach to conservation has advantages and disadvantages (see Figure 2).

3. Categorise the following statements into either positive or negative outcomes of using CITES as the global method to conserving the tropical rainforest.

Many countries have signed up and countries co-operate on the trade of animal species	Works well for species which are considered high profile and draw attention. E.g. Snow Leopard.
Global warming can undermine the success it has	Species need to be under threat before action is taken, but it might be too late to make a difference by that point
Relies on countries setting up, monitoring and funding the project, which many LIC's cannot afford	Protected species include a wide variety of species geographically, and by type
Success in reducing the ivory trade and halting the decline of the African Elephant	Protect species, not ecosystems, therefore does not prevent deforestation

Explain how CITES has brought both positive and negative impacts to the tropical rainforest. (4 marks).

REDD – Reducing Emissions from Deforestation and forest Degradation.

REDD is a United Nations scheme that advises governments on how to reduce the rate of deforestation and replant forest areas. It uses **remote sensing** to monitor deforestation rates. It arranges very large sums of money to fund these schemes from sources such as the World Bank. For example, a REDD scheme in Brazil has a US $1 billion fund behind it.

What is remote sensing?

_____

_____

_____

_____

A second global approach to conservation is REDD – Reducing Emissions from Deforestation and forest Degradation. It is a United Nations project whose purpose is to stop deforestation, which is the main cause of global warming – 20% of all carbon dioxide (CO_2) emissions come from deforestation.

The aims of REDD are:

- Reduced emissions from deforestation and forest degradation.
- **Conservation** and enhancement of forest carbon stocks.
- Sustainable management of forests.

It works through governments and transnational corporations (TNCs) in developed countries funding projects to conserve forests in developing countries. Their motive is to offset their own CO_2 emissions and thus meet their emission reduction targets. Critics argue that offsetting is an easy way for developed countries to appear to reduce their CO_2 pollution, without actually reducing it.

Compare the aims and successes of REDD with those of CITES (4 marks)

Deforestation rates

Tackling deforestation remains very challenging in most rainforest areas of the world. There is too much money to be made from commercial development of rainforest land, or too much pressure from rapidly growing populations requiring farmland, for local people and businesses to stop deforestation unless some other way of making a living is provided for them.

However, national and international schemes to reduce the rate of deforestation can work, if enough money and enough political backing for the scheme is provided.

What is commercial development?

_____

_____

_____

Why might national governments not support a scheme to reduce the rate of deforestation?

_____

_____

_____

_____

_____

_____

_____

One example of an area where deforestation was slowed is in the Amazon rainforest in Brazil. There are several different actions which explain why the rate of deforestation slowed in Brazil between 1994 and 2013. Complete the gaps below using the words in the word bank.

1) Deforestation before 2005 was _____ because of rising global _____ for _____ beans. However, in 2005, the international _____ for soya crashed.
2) Transnational corporations (TNCs) using soya came under _____ from environmental campaigners to only use soya from _____ who protected the rainforest. This led to TNCs changing who they bought soya from.
3) The Brazilian _____ increased its commitment to rainforest _____, helped by a billion dollar REDD fund set up by _____. Protected areas of rainforest were

expanded and _____ against deforestation were enforced by government officials and the police.

Word box			
Rapid	Demand	pressure	government
Soya	price	farmers	protection
Norway	laws		

The challenge of sustainable rainforest management

What does sustainable management mean?

_____
_____
_____
_____

What does ecotourism mean?

_____
_____
_____
_____

Study the graph on the next page which shows deforestation rates in the Brazilian Amazon rainforest. State which of the following is the amount of deforestation recorded in 2004.

a) 28km^2
b) 28,000km^2
c) 280,000km^2

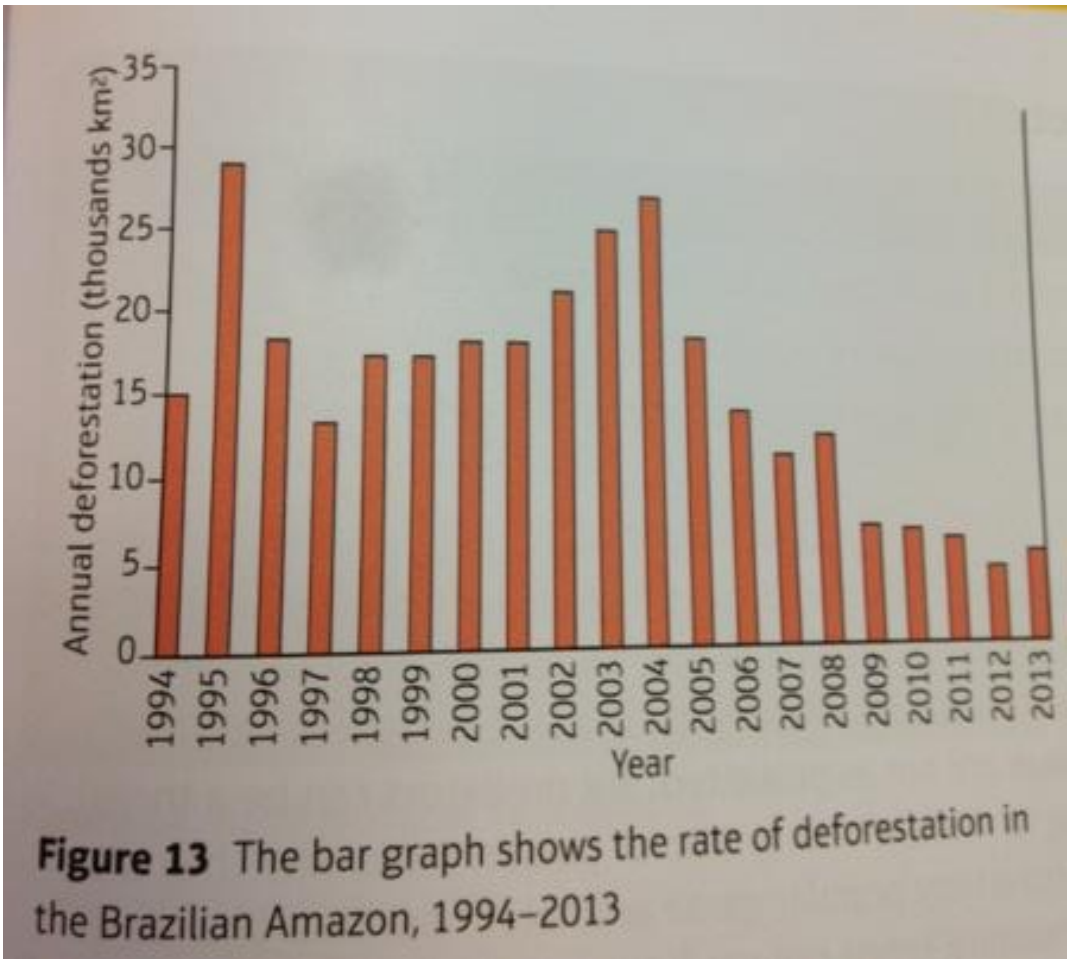

Figure 13 The bar graph shows the rate of deforestation in the Brazilian Amazon, 1994–2013

Read the following text and then answer these questions.

State 3 advantages of ecotourism.

1.

2.

3.

State 2 examples of sustainable management schemes.

1.

2.

supply and mining.

One alternative is **sustainable rainforest management**. Sustainable management of the rainforest aims to prevent damage to the rainforest in a way that helps benefit local people. This has worked best in areas where **ecotourism** can be combined with sustainable forest management. Ecotourism creates jobs for local people, such as working as forest guides and in hospitality and catering services for tourists. Tourists also spend money in the area on local handicraft products. For those people benefitting from tourism, it makes economic sense to protect the forest from poachers and illegal logging.

Often, sustainable forest management schemes include a sustainable agriculture training programme. This involves teaching local people about farming techniques that keep fields fertile for longer, and types of crops that give higher yields (more food). This means new plots do not need to be cleared from the forest and, instead, land that has already been cleared can support more people.

In the end, however, these sustainable management techniques almost always require financial support from government or international agencies to survive. They also work best in rainforest areas that are already well protected by government, such as national parks and forest reserves.

Section 8: How can the taiga wilderness be protected?

Read and highlight the text on the next few pages.

1. Summarise in no more than 25 words why the taiga needs protecting.

_____
_____
_____
_____
_____

2. List 5 challenges facing national parks:
   -
   -
   -
   -
   -

Of these challenges which do you think is the most serious and why?

_____
_____
_____
_____
_____

3. What is sustainable forestry?

_____
_____
_____

4. Categorise the groups below into either people who want to conserve or exploit the Taiga.

- Environmentalists
- Businesses
-Local government
- Indigenous people
-Other residents
-Many scientists

Conserve the Taiga's biodiversity	Exploit the Taiga's resources

Categorise the statements linked to either conserving or exploiting the Taiga.

Conservation ☐ **Exploitation** ☐

The Taiga is one of the last untouched biomes.	Brings jobs and income to isolated and remote areas.	Some exploitation is renewable. E.g. Hydro-electric power and replanted forests.
Exploitation causes deforestation, degradation and pollution.	Exploitation only affects a tiny fraction of the vast biome.	The forests are vital global carbon sinks to help combat global warming.
Resources can be exported, boosting national GDP (Gross Domestic Product)	They are culturally important to many indigenous peoples.	

5. Complete the following matrix to include the main conflicting groups in the taiga.

Indigenous people (traditional hunting, herding and use of forest resources)						
	Environmental groups					
		National park and wilderness and managers				
			Climate and biodiversity scientists			
				Visitors and tourists		
					Oil, gas and mineral extraction companies	
						HEP companies

Key:

☹☹ – Major conflict

☹ – Minor/manageable conflict

☺ – No conflict

6. Explain two reasons why different groups have contrasting views on conserving or exploiting the taiga **(4 marks)**.

_____

_____

_____

_____

_____

_____

_____

_____

_____

7. Which do you think is in more need of protection: the taiga forest or the rainforest? Give reasons.