

GCSE GEOGRAPHY

CASE STUDY

KNOWLEDGE BOOK



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Tropical rainforest case study: Malaysia

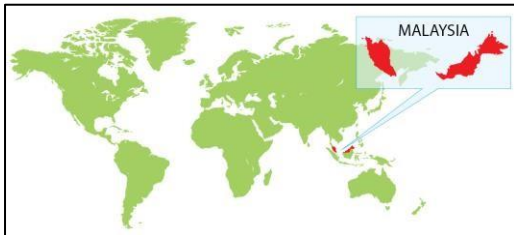
TROPICAL RAINFOREST CASE STUDY: MALAYSIA AQA GCSE

This is an important case study and you will have an assessment on the information below. You need to know the following for your case study in Malaysia:

Causes of deforestation:

- subsistence farming
- commercial farming
- logging

Location



- road building
- mineral extraction
- energy development
- settlement and population growth

Impacts of deforestation:

- economic gains and losses
- soil erosion
- loss of biodiversity
- contribution to climate change

Value of rainforests to people and the environment

Strategies used to manage rainforests sustainably

- selective logging and re-planting
- conservation and education
- ecotourism and international



agreements about the use of tropical hardwoods □ debt reduction

MALAYSIA: CAUSES OF DEFORESTATION



- *Malaysia is in South-East Asia*
- *It is made up of Peninsular Malaysia and East Malaysia, which is part of the island of Borneo*
- *67% of Malaysia is covered by the natural tropical rainforest vegetation*

Subsistence and commercial farming

Indigenous (native) tribes practice **subsistence farming**, however increasingly land is being cleared for **commercial farming by large companies** – crops and cattle. Malaysia is the biggest exporter of **palm oil** in

the world. Huge areas of rainforest have been converted since the 1970's. **10 year tax incentives** for plantation owners encourage further development.

Logging

Hardwood trees such as **mahogany** and **teak** are highly valued for furniture and other uses. Smaller trees are used for fuel, paper or charcoal. Malaysia is one of the **world's largest exporters of tropical wood** – much of it involves **clear felling** (cutting everything down). About **80% of deforestation in Malaysia is due to logging**. Recently clear felling has been replaced by '**selective logging**' where only fully grown trees are cut down and trees with important ecological value have been left unharmed.

Road building

Roads give access and supplies to new mining areas, new settlements and energy projects. In Malaysia, logging companies use an extensive network of roads for heavy machinery and to transport wood; for example road construction and logging are occurring in **Sarawak, East Malaysia (island of Borneo)**

Mineral extraction

Tin mining is common in **Peninsula Malaysia** and it also has lots of **copper and gold**. Drilling for **oil and gas** has recently started in Borneo. **Coal** is an important source of energy, with **99% of Malaysia's supply in Borneo**.

Energy development

High rainfall areas create ideal conditions for **hydroelectric power dams (HEP)** and there are several large dams and reservoirs in Malaysia. For example the **Bakun Dam in Sarawak, completed in 2011 is 205 metres high**

(highest in Asia – aside from China) and flooded over **700km²** of forest and farmland. It supplies energy for the industries in Peninsula Malaysia. Drilling for oil and gas has also started in Borneo.



Settlement and Population Growth

In the past, poor urban people were encouraged to move into the countryside from the rapidly growing cities – this is called **transmigration**. Between **1956 and the 1980's about 15,000 hectares** of the rainforest was felled for migrants. Many of these set up plantations. Furthermore settlements have grown to service those who work in commercial farming and mineral extraction which has further driven population growth.

MALAYSIA: IMPACTS OF DEFORESTATION

Economic Development

Economic Gains	Economic Losses
Development of land for farming, mining and energy will lead to jobs both directly (construction, farming) and indirectly (supply and support industries)	Plants that could bring huge medical benefits and high profits become extinct
Companies will pay taxes to the government as will workers – can be used to improve public services such as education and water supply	Climate change could have economic costs as people have to adapt to living in warmer conditions and may destroy crops such as tea, fruit and flowers
Improved transport infrastructure opens up new areas for industrial development and tourism	Number of tourists could decrease as biodiversity decreases
Products such as palm oil and rubber provide raw materials for processing industries	
HEP will provide cheap and plentiful energy	
Minerals such as gold are very valuable	

Soil Erosion

Huge issue in Malaysia – once the land is exposed there is no protection (interception) from the canopy layer. The soil is also not held together by tree roots. When the heavy rain comes down the soil is easily washed away into local rivers (sedimentation). This can lead to flooding and disruption of aquatic life and also leave behind infertile soil (as there are no new trees to continue the nutrient cycle)



Loss of biodiversity

Habitat destruction and the subsequent negative chain reaction will result in a reduction of biodiversity. The **Main Range**, Peninsular Malaysia, is an upland region stretching for 500km and is really important because:

- it is the largest continuous forest left in Peninsula Malaysia
- it is really rich in biodiversity with over 600 species
- highland forests are home to over 25% of all plant species found in Malaysia
- there are still undiscovered plants that have medicinal qualities that could provide cures for diseases

Contribution to climate change

Trees **remove carbon dioxide** out of the atmosphere via **photosynthesis** and emit oxygen. By absorbing carbon dioxide trees help reduce the rate of global warming. Deforestation can affect climate because:

- trees give off moisture by transpiration and trap water by interception thus keeping water locked into an area; deforestation reduces air moisture resulting in a drier climate
- the process of evaporation uses heat up and cools the air; if trees are cut down, the cooling stops and temperature rises

THE VALUE OF TROPICAL RAINFORESTS TO THE PEOPLE AND ENVIRONMENT

Value to people	Value to the environment
Resources – wood, nuts, fruit and minerals. bananas, cocoa, sugar, nanilla and spices.	Water – TRF are important sources of freshwater. About 20% of the world’s freshjwater comes from the Amazon Basin
Medicine – about 25% of all medicines comes from rainforest plants. 2000+ have anti-cancer properties. Less than 1% of rainforest plants and trees have been tested by scientists for their medicinal qualities	Biodiversity – TRF contain 50% of the worlds plants and animals including 1000’s of different species
Indigenous tribes – thousands live in the rainforest doing it no harm. For example, Achuar tribe in Peru number over 11,000, living in small communities relying on the TRF for food, building material and fuel.	Climate – ‘lungs of the world’; TRF contribute 28% of the worlds oxygen. Moisture emitted through transpiration ensures the air does not become too dry and evaporation helps cool the air.
Energy – HEP can provide light and power for local people and/or industries	Climate Change – trees absorb CO2 which helps reduce the rate of global warming
Employment – tourism, constrcution, mining, farming, HEP	Soil erosion – rainforests shelter and bind together the soil preventing harmful soil erosion which can silt up and pollute rivers

SUSTAINABLE MANAGEMENT OF TROPICAL RAINFORESTS

Sustainable management involves establishing an environmental balance, enabling the rich resources of the rainforest to be used without causing long-term damage to the ecosystem. Why bother?

- to ensure the TRF remain a lasting resource for future generations
- to allow valuable resources to be used without causing long term damage to the environment or local people

Selective logging and replanting

Clear logging or clear felling means just cutting great chunks of the forest down – it clears the forest and destroys the ecosystem – it is the **most damaging** way of logging. With **selective logging** experts choose the trees and manage their progress and regeneration carefully

1. Audit of trees and selected by professionals and planned logging to minimise damage, need a licence to fell
2. Survey and monitor - then plan to repair forest, plant and regenerate and repeat cycle as long as 30-40 years after original felling



Malaysia's Selective Management System was introduced in **1977** is set out below:

- **2 year before felling:** Pre-felling study to identify what is there
- **1 year before felling:** Trees marked for felling. Arrows painted on trees to indicate direction of felling to avoid damage to other valuable trees
- **Felling:** Only by licence holders
- **3-6 months after felling:** Survey to check what has been felled. Prosecution may result from illegal felling
- **2 years after felling:** Treatment plan drawn up to restore forest
- **5-10 years after felling:** Regeneration work by state forestry officials. Replacement trees planted.
- **30-40 years:** Cycle begins again

Conservation and Education

Rainforest can be protected in areas such as national parks or nature reserves. These areas can be used for education, scientific research and tourism. A recent trend is large international businesses supporting conservation projects in exchange for carrying out scientific research or the provision of raw materials. An example is the **Swiss company Givaudian (perfume company)**, it works with **Conservational International** and aims to protect 148,000 hectares of the rainforest in Venezuela in exchange for using Tonka beans, used in the production of perfume.

Several charities (NGO's – non-governmental organisations), including the **WWF**, Birdlife International and Fauna International. support conservation and education programmes, training conservation officers and promoting rainforest conservation in schools.

WWF-Malaysia's protected areas (PA) programme is divided into two areas (*from website*):

Peninsular Malaysia

Our vision for the Peninsular Malaysia PA programme is the establishment and maintenance of a network of protected areas based on Peninsular Malaysia's most threatened and biologically significant ecosystems, that contributes to human well-being and species conservation.

Sabah and Sarawak

Our vision for Sabah and Sarawak is that the forest ecosystems are protected and managed through protected areas in the most threatened and biologically significant regions of the two states by 2020.



Ecotourism

Malaysia have promoted their rainforests for **ecotourism**. Ecotourism aims to introduce people to the natural world, to benefit local communities and protect the environment for the future. Through income generated by ecotourism, local people and governments benefit from retaining and protecting their rainforest trees – a more sustainable option than cutting down trees for short term profit. An advert for Malaysia's ecotourism industry is below:

Sungai Yu Forest Reserve, Pahang: For the Wildlife Advocate

Forming part of a tiger corridor connecting Taman Negara and Titiwangsa Mountain Range is the **Sungai Yu Forest Reserve**. As part of a **conservation project**, visitors can camp with the semi nomadic Batek tribe, join a local cave excursion team, trek across the jungle and witness breath-taking mountain views.

Along the way, you will help to collect animal tracks and presence data, which are in turn analysed by researchers in the effort to reduce poaching. In other words, you're helping to protect the wildlife in the area! Find out more here.



International Agreements: hardwood use

There are two key international agreements to control the use of hardwoods. This is important because it can take over 150 years for a mahogany tree to reach maturity

1. **Forest Stewardship Council (FSC)** is an international organisation that promotes sustainable forestry and **ONLY** products sourced sustainably carry the **FSC mark**. The FSC try to educate manufacturers and consumers about the need to buy sustainable hardwoods like mahogany (which takes 150 to reach maturity) and it aims to reduce the demand for rare and valuable hardwoods.
2. **The International Tropical Timber Agreement (2006)** restricts trade in hardwoods by **ONLY** marking timber with a registration mark if it is from a sustainably managed forest.



The mark of responsible forestry



Debt Reduction

Most countries with tropical rainforests are less developed (LIC's or NEE's). To promote development, some have taken large loans, which they now find hard to repay. Some HIC's have agreed to write off debts (so the LIC's/NEE's do not owe any money = **debt reduction**) in return for the rainforests being protected.

For example, in **2010 the USA agreed to convert a Brazilian debt of £13.5 million** into a fund to protect areas of the rainforest – this is called ‘**debt for nature swapping**’.

EXAM QUESTIONS TO THINK ABOUT

1. Why are tropical rainforests suitable for the development of HEP?
2. Explain the impacts of deforestation.
3. Explain why deforestation can contribute towards climate change.
4. Explain how tropical rainforests are valuable for medicines, climate and energy.
5. Define the term ‘sustainable management’ in relation to tropical rainforests.
6. How is selective logging and replanting a good example of sustainable management.
7. Explain how ecotourism can be an effective strategy in the sustainable management of tropical rainforests.
8. With reference to a case study, to what extent do the economic benefits outweigh the losses?
9. To what extent is the tropical rainforest of more value to people than the environment?
10. With reference to a case study, assess the view that mineral extraction is the main cause of deforestation.
11. *‘Countries that need money to develop should be allowed to use the tropical rainforest resource however they want’*. Do you agree with this statement? Justify your view.
12. *‘International co-operation is the only way to protect rainforests in the future’*. Do you agree with this statement. Justify your view.