

## **O Level Elective Geography**

### **Chap 5: Case Study of Deforestation in Kalimantan**

#### **Deforestation**

- 1) Deforestation is the permanent clearing and destruction of forests due to human activities like creating land for settlements, agriculture and industries.
- 2) The main cause of rapid deforestation in the world is the growing world population. More people are dependent on forests as a resource, and due to the increased land demand, forests are being cleared to create land for human activities like settlements, agriculture and industries.

#### **Case study: Deforestation in Kalimantan**

##### **3) Causes of Deforestation in Kalimantan**

Main cause: Rapid deforestation in Kalimantan is due to the significant increase in its population and hence human activities.	
Cause 1	<b><u>Increased agriculture land use demand</u></b> <ul style="list-style-type: none"><li>• Owing to the resettlement of Indonesians in Kalimantan to ease overcrowding, Kalimantan's population and subsequently its agricultural activities has increased.</li><li>• The new settlers establish farms converted from cleared forests to grow cash crops like rice and vegetables. Some even clear more forested areas to extend their farmland for higher profits.</li><li>• Plantation companies are also acquiring forest land to grow cash crops like oil palm. Large expanse of the Kalimantan rainforests has been cleared to meet these needs.</li></ul>
Cause 2	<b><u>Urbanisation</u></b> <ul style="list-style-type: none"><li>• In Kalimantan, people are resettling from rural to urban settlements for better employment opportunities.</li><li>• This leads to urbanisation where rainforests are cleared for the expansion of towns and cities.</li><li>• An example is the expansion of Balikpapan which led to the destruction of the forest ecosystem.</li></ul>
Cause 3	<b><u>Improved transport networks</u></b> <ul style="list-style-type: none"><li>• Roads and railway tracks cutting through forests, like the Trans-Kalimantan Highway, have been constructed to improve accessibility and access to previously remote areas.</li><li>• However, this has made destruction of larger parts of the rainforests easier.</li></ul>
Cause 4	<b><u>Industrial development</u></b> <ul style="list-style-type: none"><li>• Industrial activities like logging and mining has led to forest destruction.</li><li>• Trees are logged and sold as timber. The heavy logging in Kalimantan is the result of the rapid pace at which wood is processed and exported.</li><li>• In mining, vegetation is cleared to expose the underneath ground, causing large rainforest expanse to be cleared.</li></ul>
Cause 4	<b><u>Forest fires</u></b> <ul style="list-style-type: none"><li>• Forest fires are deliberately set by people to clear large forest areas for oil palm plantations and agriculture.</li><li>• This is cheaper than employing labour to cut down trees and is the traditional agricultural method for shifting cultivators.</li></ul>

### Problems caused by deforestation in Kalimantan

Main problem: Negative impacts in environment arisen through deforestation	
Problem 1	<b><u>Loss of biomass</u></b> <ul style="list-style-type: none"><li>• Biomass refers to the stored energy of all organisms on Earth.</li><li>• Tropical rainforests have the highest biomass of all vegetation types. With Kalimantan rainforests forming a significant proportion of Earth's biomass, deforestation in Kalimantan will reduce Earth's biomass and hence its ability to support life as biomass represents the total amount of food available on Earth.</li><li>• The loss of biomass will adversely affect the entire food chain threatening its survival.</li><li>• Reduction of biomass also affects the nutrient cycle and thus limits vegetation growth.</li></ul>
Problem 2	<b><u>Loss of biodiversity</u></b> <ul style="list-style-type: none"><li>• Deforestation destroys the natural habitats of plant and animal species, reducing the biodiversity of forests.</li><li>• This eventually leads to the endangering and extinction of certain species. The Proboscis monkey is an example of an endangered animal from the Kalimantan forest.</li></ul>
Problem 3	<b><u>Changes in nutrient cycle</u></b> <ul style="list-style-type: none"><li>• Forest vegetation ensures leaf litter which decomposes to release nutrients into the soil. The loss of vegetation results in the consequent reduction of the soil's fertility.</li><li>• Soils are also leached due to absence of roots where rainwater absorption is reduced.</li><li>• This causes the soil to become infertile and its ability to support vegetation growth is reduced.</li></ul>
Problem 4	<b><u>Changes in quality of water</u></b> <ul style="list-style-type: none"><li>• Fewer trees lead to less transpiration and the consequent reduction in cloud formation and hence rainfall, causing droughts.</li><li>• Removal of forest vegetation can also trigger floods. Soil will be eroded easily and washed into the rivers without roots to hold onto the soil. The deposited soil makes the river bed shallower, causing it to overflow its banks.</li></ul>
Problem 5	<b><u>Changes in quantity of water</u></b> <ul style="list-style-type: none"><li>• Increased sediment level in rivers turns the water acidic. This pH change adversely affects aquatic life and turns freshwater unsafe for consumption.</li><li>• In deforested areas, soil is eroded and washed away easily by rain into nearby rivers, without roots to hold onto the soil. This increases the sediment level of rivers turning the water quality poor.</li></ul>
Problem 6	<b><u>Air pollution</u></b> <ul style="list-style-type: none"><li>• Forest fires release dust and smoke into the air, causing air pollution and haze.</li><li>• Prolonged haze can cause health problems like eye and throat irritations.</li><li>• This indirectly affects tourism industry as people may avoid visiting affected countries.</li></ul>

### Managing rainforests in Kalimantan

1. Ministry of Forestry
  - Ensure balance between generating income through forest resources and conservation.
  - Issues licenses to timber companies and to monitor illegal activity
2. Community involvement
  - Locals including local government, native people and villagers to assist MOF in managing Kalimantan rainforests.
3. Sustainable management
  - The careful use of resources such as forests to allow people to continue using the resources in the future.

MOF policies for sustainable management of Indonesian rainforests

Policy 1	<p><b><u>Afforestation and Deforestation</u></b></p> <p><i>Measures</i></p> <ul style="list-style-type: none"> <li>• Afforestation, the planting of trees in areas not covered with forests before, is carried out on agricultural lands abandoned by farmers.</li> <li>• Reforestation, the replanting of trees in deforested areas, is carried out by locals and timber companies who work together. Commercially valuable trees like teak are commonly planted as it is fast growing (5 years) to speed up reforestation.</li> </ul> <p><i>Success</i></p> <ul style="list-style-type: none"> <li>• Significant restorations of forests have been made possible.</li> </ul> <p><i>Limitations</i></p> <ul style="list-style-type: none"> <li>• The deforestation rate is still faster than the rate at which forests are restored, as incentives awarded to locals are unattractive.</li> <li>• Only teak trees are planted to restore an entire area of forest, resulting in a loss of the original biodiversity of tropical rainforests. A plantation of teak trees alone cannot support the variety of flora and fauna species of the original rainforests.</li> </ul>
Policy 2	<p><b><u>Controlled logging</u></b></p> <p><i>Measures</i></p> <ul style="list-style-type: none"> <li>• Controlled logging involves careful management of forests that are being logged.</li> <li>• Selective cutting is a logging method involving the removal of commercially valuable trees only. It is considered as a method of sustainable management as it involves only a small area of the forest leaving a large area of non-valuable trees being undisturbed, and is encouraged to minimize damage caused by logging.</li> </ul> <p><i>Success</i></p> <ul style="list-style-type: none"> <li>• Enabled forests to regenerate</li> <li>• Minimizes soil erosion as much of the forest vegetation is retained.</li> </ul> <p><i>Limitations</i></p> <ul style="list-style-type: none"> <li>• Illegal logging still occurs undetected due to insufficient monitoring and manpower.</li> <li>• Selective cutting may be as damaging as clear cutting as a significant variety of plant species could be damaged in the process.</li> </ul>
Policy 3	<p><b><u>Conservation</u></b></p> <p><i>Measures</i></p> <ul style="list-style-type: none"> <li>• Conservation refers to the careful use of forests to prevent them from destruction.</li> <li>• Protected nature reserves have been allowed in many areas where logging is banned.</li> </ul> <p><i>Success</i></p> <ul style="list-style-type: none"> <li>• Conservation is effective as it preserves the original biodiversity of forests.</li> <li>• A nature reserve in west Kalimantan has been protected and sustainably managed.</li> </ul> <p><i>Limitations</i></p> <ul style="list-style-type: none"> <li>• Illegal logging can be difficult to monitor and control due to size of nature reserve, remoteness of logging sites and lack of manpower.</li> <li>• There is a limit to the amount of reserves as a balance between conservation and economic needs are required.</li> </ul>
Policy 4	<p><b><u>Controlling forest fires</u></b></p> <p><i>Measures</i></p> <ul style="list-style-type: none"> <li>• A policy that makes clearing forests by burning illegal has been implemented.</li> <li>• Awareness campaigns are organised discouraging locals from burning forests for land.</li> </ul> <p><i>Limitations (success N/A)</i></p> <ul style="list-style-type: none"> <li>• Plantation companies continue to burn forests as it is the cheapest way to clear forests compared to employing labour to cut down trees.</li> <li>• Shifting cultivators continue to do so as it is their traditional agriculture method.</li> </ul>