Geography Notes : PPA2 Revision

Climate, Vegetation and Deforestation

1) **Climate:**

With respects to reading a climograph, be able to tell what climatic region the graph represents, and be able to describe what you see on the graph. Make sure to use proper geographical terms, key terms.

a) Equatorial
b) Tropical monsoon
c) Cool temperate

Point- what you see on the graph
Descriptor word/**A**dverb
Reading from graph(stats)
Please refer to AS1 climate for all of the descriptors.

For example, temperature
P - High annual temperature
D/A - High
R - 25.1 degrees Celsius

2) Vegetation: Characteristics and Adaptations

Make sure to use proper geographical terms for describing/ explain the characteristics and adaptations.

a) Equatorial
b) Coniferous
c) Mangroves

Refer to the following handout

Know the skill PEEL and PPECS to answer this type of question.

3) Deforestation: Causes and Effects (+ve + -ve) (solutions good to know)

Know the skill PEEL and PPECS to answer this type of question.

Refer to HD1 Deforestation for the causes and effects.

Climates:

Recap from Year 1

definition of weather: specific atmospheric conditions in a short period (e.g. day/night)
definition of climate: average conditions over a long period of time (usually >30 years)

When describing the climate shown in a climograph, use the following terms: [adhere to this strictly]

a)	adjective for temperature	fluctuating / slight fluctuation / (almost) constant /		
b)	adjective for precipitation	evenly distributed / unevenly distributed / distinct wet and dry seasons / seasonal precipitation / throughout the year / some dry months		
-	specific descriptors for details :	high	moderate	low
i)	mean annual temperature (°C)	> 20	10 - 20	< 10
ii)	total precipitation (mm)	> 1000	250 - 1000	<250
iii)	annual temperature range (°C)	> 10	5 - 10	< 5
iv)	descriptor for temperature range	Large	Small	Very small

Altitude

- is not affected when below 500 m
- every 1000 m increase will result in a rough decrease of 6.5°C

Influence of Climate on Vegetation Growth

Different types of natural vegetation are found in different parts of the world. Important factors of climate that affect vegetation growth include:

- Temperature
  - Temperature influences plant growth. Most plants are unable to survive under 6°C. This explains the lack of vegetation under places with polar climates, whereby temperatures are usually sub-zero. Only plants such as moss and lichen are able to adapt to the harsh conditions of polar climate.
  - On the other hand, in places with temperatures consistently above 20°C, growth of plants, especially trees - are abundant.
- Precipitation
  - Plant growth is also highly influenced by the precipitation found in an area as it affects the photosynthesis rate of the plant. Many forests are found in areas where precipitation is high (1000mm and above per year) and grasslands are found in

areas with moderate precipitation (200mm - 1000mm) and few plants can be found in areas with little or no precipitation.

Important Things to Note when Evaluating Climographs

a) deduce climate [take note of axis when evaluating climate]
b) quote evidence (highest, lowest, distribution, precipitation, temperature)
c) explain why the evidence helps strengthen deduction [use the correct descriptors]
d) suggest type of natural vegetation likely to thrive and explain why [not so much in description questions]
e) link back by concluding that the climograph is of a certain climate

Key Characteristics of Specific Climate

Climate		
Equatorial	**Tropical Monsoon**	**Cool Temperate**
Temperature: **High** average annual temperature **Small** temperature range - High humidity level - Low latitude **Almost constant** distribution of temperature	Temperature: **High** average annual temperature Temperature range is dependent, ranging from **small to large.** **Fluctuating** temperature	Temperature: **Low** average annual temperature **Large** temperature range **Seasonal** distribution of temperature
Precipitation: **High** average annual precipitation **Even** distribution of rainfall throughout the year - High solar radiation which results in high relative humidity - Water vapour → Convection current → Rainfall - Convectional rain	Precipitation: **Moderate to High** average annual precipitation **Uneven** distribution of rainfall throughout the year **Distinct wet and dry seasons** - Convection currents	Precipitation: **Low** average annual precipitation **Relatively even** distribution of rainfall throughout the year - Precipitation may come in the form of snow due to low temperatures

Equatorial Climate:

Found:
Near the Equator
Characteristics:

Temperature Distribution:
Constant distribution
Precipitation Distribution:
Constant distribution
Mean Annual Temperature:
>25°C
Total Annual Precipitation:
1500mm-2000mm

Tropical Monsoon Climate:

Found:
Within 23°S to 23°N (Tropic of cancer and tropic of capricorn)
Temperature Distribution:
Fluctuate
Precipitation Distribution:
Unevenly distributed/Seasonal (due to monsoons)
Mean Annual Temperature:
>25°C
Total Annual Precipitation:

Cool Temperate Climate:

Found:
Between 45°S/N and 45°S/N
Temperature Distribution*:*
Fluctuate
Precipitation Distribution:
Unevenly distributed/Seasonal (due to monsoons)
Mean Annual Temperature:
>25°C
Total Annual Precipitation:

Rainforests:

Tropical Equatorial Rainforest

Equatorial rainforests are found in areas with hot, wet climate, where there is high temperature and high rainfall throughout the year. They can be found in the following regions:

- Amazon Basin of Brazil, South America
- Zaire/Congo Basin of Africa
- Central America
- South-east Asia
- Parts of western Peninsular India & Bangladesh

Characteristics

- ➢ Between 10°N and 10°S of the Equator
- ➢ About 27°C and 1500mm
- ➢ High biodiversity of flora and fauna
- ➢ Sparse undergrowth with dense emergence and canopy layers
- ➢ 5 vertical layers

Structure of a Tropical Rainforest

Emergent Layer	➢ Made up of tallest trees called scattered emergents. ➢ Grow up to 40 - 50 m
Canopy Layer	➢ Crowns here form a continuous canopy. ➢ Prevents sunlight from reaching the ground. ➢ Trees are 20 - 30 metres tall ➢ Presence of non-parasitic plants
Understorey Layer	➢ Smaller trees with narrow crowns ➢ Trees are 5 - 15 metres tall ➢ presence of some lianas & epiphytes
Shrub Layer	➢ Consists of shrubs, ferns & small young trees
Ground Layer	➢ Sparse vegetation due to lack of sunlight ➢ Saprophytes [fungus etc.], small plants & ferns

Tropical Mangrove Forest:

Mangroves are various types of trees up to medium height and shrubs that grow in saline coastal sediment habitats with low wave action in the tropics and subtropics mainly between latitudes 25°N and 25°S.

Mangrove forests are found within the tropics, covering more than 240 000 sq km of coastal land in the world.

Regions where mangrove forests are located (between 25°N and 25°S):

- Coastal districts of all insular South-east Asian countries, especially Indonesia
- Coastal districts of tropical Brazil, Venezuela and the Guianas
- Central America & the Caribbean islands. E.g. Mexico, Panama and Cuba
- Tropical African coastland, east and west Africa
- Northern Australia, southern India, Bangladesh and Sri Lanka

Mangroves grow in intertidal zones with salty, brackish water, where soil is muddy, waterlogged and deficient in oxygen. They are halophytic trees, i.e. they are salt-loving plants. There are three main communities:

Avicennia (coastal zone)

- Colonise mud banks that are usually exposed at neap tides

Sonneratia (middle/intertidal zone):

- Only come into contact with salt water when the tide comes

Bruguiera (inland zone)

- Has the least contact with salt water
- Least salt tolerant

Characteristics

- ➢ Between 23.5°N and 23.5°S of the Equator
- ➢ About 20 - 30 °C and 1000 - 2000 mm
- ➢ 4 main species of vegetation
- ➢ Sparse undergrowth → consists of root structures and young mangrove plants
- ➢ Dense cover of foliage at the crown forming a canopy
- ➢ 3 horizontal layers

Temperate Coniferous Forests

Temperate coniferous forests are almost entirely found in the northern hemisphere. Regions include North America, northern Canada Asia, extending from countries in Northwest Europe on the Atlantic Ocean eastwards into Central Europe and into coastlands of Kamchatka bordering the Pacific Ocean.

Characteristics

- ➢ Between 60°N and 70°S of the Equator
- ➢ As low as -40°C in winter and may be up to 21°C in summer
- ➢ 300 - 635 mm of precipitation

- Vegetation is of uniform in height
- Not dense with sparse undergrowth

Adaptations

When talking about Adaptations, there is a 3 step process.

- You name the adaptation.
- Explain the function of the adaptation.
- **Link back** to environmental factors. [Physical conditions]

Adaptations of Tropical Rainforest

Characteristics of Vegetation	Adaptation
Luxuriant Vegetation - Great species diversity - More than 100 species per hectare	➢ Efficient rate of utilising solar energy in photosynthesis by green plants ➢ Hot and wet climate encourages rapid growth
Evergreen - Do not shed leaves at the same time - Continuous plant growth - Germination, flowering and fruiting takes place throughout the year	➢ High and regular rainfall, little seasonal variation
Fruits and Flowers - Sweet smelling fruits - Colourful flowers	➢ To attract insects and birds → aids in pollination
Straight trunks Wide, shallow crowns in canopy layer	➢ Signs of competition for light, air, space and nutrients to obtain maximum light
Leaf Litter Large amount of litter	➢ Hot, humid climate → leads to high rate of decomposition
Hardwoods E.g. meranti, keruing, balau, kapur, chengal	
Leaves Broad and green Downward pointing drip-tips	➢ Green → More chlorophyll to trap more sunlight for higher rate of photosynthesis ➢ Broad → More surface area for more chlorophyll ➢ To allow excess water to drip off
Bark Smooth and thin	➢ Weather is hot and humid → no need for thick bark to protect the tree from the cold/dry weather
Branches and Leaves Found at top ⅓ of trees	➢ To obtain maximum light for photosynthesis

Roots Shallow	➢ Moisture from high rainfall and nutrients found in topsoil
Roots Buttress roots found in larger trees	➢ To support heavy weight of tall trees

Different layers of the Mangrove

- ➢ Coastal Zone
- ➢ Middle Zone
- ➢ Inland Zone

Adaptations of Avicennia [Furthest from coast, found in the coastal zone]

Adaptation / Feature	**Reason and Elaboration for Adaptation**
Roots Pneumatophores (Pencil/aerial roots)	➢ Due to waterlogged condition, the soil lacks oxygen. ➢ At low tide, aerial roots are exposed - allowing them to take in oxygen.
Salt Secretors Salt glands	Water is especially high in salt content. ➢ Salt content disrupts the metabolic processes, thus it is necessary to get rid of the excessive salt. ➢ Thus, excess salt is excreted by salt glands, which are then removed through evaporation or precipitation.
Buoyant Fruit	➢ Fruits of Avicennia are buoyant to allow the waves and current to transport them to new coastal locations where they take root ➢ Important as it is surrounded by water.
Leaves Thick and Leathery	➢ Due to high temperatures in the equatorial climate, surface of the leaves are thick and leathery to reduce water loss through transpiration.
Broad, Smooth, Waxy + Drip Tip	➢ May also be broad, smooth, waxy with drip tip so as to prevent accumulation of rainwater on the leaves. ➢ Accumulation of rainwater may encourage bacteria growth (disrupt photosynthesis) or cause branches to break from heavy weight.

Adaptations of Rhizophora [Middle zone]

Adaptation / Feature	Reason and Elaboration for Adaptation
Roots Prop/Stilt Roots	➢ Stilt roots anchor the tree to the ground, enhancing stability because the soil is waterlogged and the currents can be strong. ➢ When the soil is soft and muddy, stability is important so that the tree remains upright. ➢ Allows aeration as it is exposed most of the day even in high tides
Viviparous Seedlings	➢ The fruit germinates while still attached to the parent plant. It drops directing into the ground and its sharp tip anchor the fruit in the soft muddy soil so that the seedling can grow immediately. ➢ Viviparous means that embryo fully develops in the mother's womb.
Salt Secretion Shedding old leaves	➢ Excess salt absorbed is stored in the old leaves, which then fall off. ➢ This helps to regulate the amount of salt present in the tree.
Leaves Thick and Leathery Broad, smooth waxy + Drip tip	➢ Thick and leathery leaves reduce water loss via transpiration under the high temperatures of the equatorial climate. ➢ With high rainfall throughout the year, leaves are broad and have drip tips to allow water to flow off quickly. This prevents the bacterial growth because bacteria cannot grow easily on the surface without water.

Adaptations of Bruguiera [More inland part of the mangrove/middle zone]

Adaptation / Feature	Reason and Elaboration for Adaptation
Roots Kneed roots	➢ Bruguiera grows in salt water, kneed roots provide aeration and firm support in the soft muddy soil.
Flowers Bright red lantern-shaped	➢ Bright red lantern-shaped flowers help to attract pollinators (migratory birds, bees, butterflies).
Salt Secretion Shed old leaves	➢ As Bruguiera grows in salt water, excess salt absorbed is stored in the old leaves, which then fall off. ➢ This is done to regulate salt content present in the trees.

Leaves Thick and Leathery Broad, smooth waxy + Drip tip	➢ Thick and leathery leaves reduce water loss via transpiration under the high temperatures of the equatorial climate. ➢ With high rainfall throughout the year, leaves are broad and have drip tips to allow water to flow off quickly. This prevents the bacterial growth because bacteria cannot grow easily on the surface without water.

Evaluating the importance of Mangrove through PPECS:

Physical

- ➢ Ecosystem
  - Provides prey hiding spots
  - Balances the food chain
- ➢ Protect coastline
  - Slows down erosion from waves → roots from trees help to hold the soil together
- ➢ Water Quality
  - As the tide recedes, mangrove roots trap some rubbish to allow cleaner seawater.

Economic

- ➢ Livelihood
  - India fisheries by the mangroves → provide a source of income for the people
- ➢ Eco-tourism
  - Places like Sungei Buloh are a boost to the economy. (tourism/income of people)

Adaptations for Cool Temperate Climate

Adaptations of Evergreen Conifers

Adaptation / Feature	**Reason and Elaboration for Adaptation**
Conical Shape	➢ Due to the strong winds, the conifers are conifer shaped to reduce wind resistance [Similar to streamline theory] ➢ This prevents the trunk from breaking easily under the strong winds.
Evergreen	➢ The climatic conditions in the coniferous forests are only conducive for plant growth during spring. To ensure efficient plant growth and to make the most out of the limited time when the climatic conditions are conducive for plant growth, the conifers stay evergreen to ensure transpiration and photosynthesis can start immediately when spring starts.

	➢ The trees are also evergreen to allow the trees to not have to grow new leaves to allow photosynthesis to start immediately in spring to save energy → efficient plant growth ➢ The soil quality is also poor, which means the trees have to use even more energy to grow new leaves with the limited resources. Being evergreen allows the trees to not have to waste even more energy to constantly grow new leaves.
Downward Sloping Branch	➢ Due to the low temperatures, precipiation often comes in the form of snow ➢ The downward sloping branches help to prevent the accumulation of precipitation (snow/rain) to prevent the branch from not being able to sustain the weight of the precipitation and breaking ➢ Allows precipitation to be drained off to prevent accumulation of moisture → prevent mold from growing
Shallow/ widespread Roots	For plants to take full advantage of melt water in spring Allows conifers to grow in shallow soils, facilitating absorption of nutrients from the infertile, acidic podzol soil in the summer ➢ Due to the low temperatures, precipitation often comes in the form of snow in temperate coniferous forests. ➢ Snow that is accumulated on the ground melts when the temperatures increases during spring ➢ To take full advantage of the melted water, conifers have shallow but widespread roots that will absorb the melted water that is found near the ground surface ➢ Shallow roots also allow conifers to grow in shallow soils, facilitating absorption of nutrients from the infertile, acidic podzol soil in the summer.
Springy Branches	Flexible branches allow it to bend when the rain hits or wind blow. Having stiff branches will result in it snapping very easily.

Deforestation :

Stands Taken By Various Stakeholders

Environmentalists :

Against [-ve impact]

Physical:

- Animals
  - Deforestation destroys the habitats of many plant and animal species. Since trees act as a form of shelter for them and is where some obtain their food, the loss of trees threatens their survival, reducing the biodiversity of flora and fauna, which may result in the extinction of certain species.
- Nutrient Cycle:
  - Deforestation can also disrupt the nutrient cycle as natural vegetation ensures the availability of leaf litter which decomposes and decays to form humus, adding nutrients to the soil. Hence with the absence of trees, the soil becomes infertile and eventually derelict, permanently hostile to vegetation growth. Deforestation also drives climate change.
- Changing of Climate:
  - Forest soils are moist, but without protection from sun-blocking tree cover, they quickly dry out.
  - Fewer trees also alter the microclimate of the forest since it leads to reduced transpiration thus less cloud formations and less rainfall, causing droughts. Without trees, many former forest lands can soon become barren deserts.
- Floods:
  - Cutting down of trees also results in higher risks of flooding as without roots to hold the soil firmly together, soil erosion will be able to take place a lot more easily it will be washed into the river. The deposited soil will make the river bed shallower, causing water to overflow into the river banks.
- Water Quality:
  - There will also be changes in the quality of water as increased sediment levels in the rivers results in a higher pH, adversely affecting the lives of marine life which can only survive within an optimum range of pH.
  - Also, the soil that is eroded and washed into rivers pollutes the rivers, hence lowering the quality of water.
- Global Warming:
  - Trees also play a critical role in absorbing the greenhouse gas that fuels global warming. Thus fewer trees mean larger amounts of greenhouse gases entering the atmosphere - and increased speed and severity of global warming. Trees, which are the main suppliers of the oxygen we breathe—are being chewed up at an alarming rate.
- Affects Ecosystem
  - Getting rid of the forests will destroy ecosystem. Forests are the habitats to many animals and food source for humans. If the trees are destroyed, the ecosystem will be disrupted as a lot of species would go extinct.
- Biodiversity:
  - With the clearance of forests, there will be a loss of plants and biodiversity.

- ➢ Secondary Forests - Less range of plants (indonesia grows teak for reforestation)- biodiversity is compromised.

<u>Mining or timber companies / Owners of plantations / loggers/cattle ranchers :</u>
For [+ve impact and -ve impact]
Economic:
+ve

- ❖ Many companies or industries which require labourers to clear the forests actually create employment opportunities for these workers who likely have difficulty finding jobs due to their low education.
- ❖ For timber companies, employment is extended to the people who use raw lumber to make wood byproducts such as wood furniture and pencils.
- ❖ If deforestation would cease to exist many individuals would find themselves unemployed and unemployment would then be a major issue. Tropical rainforests provide many natural resources such as medicine, timber and clothing which are essential to many industries such as timber companies.

-ve

- ❖ However, although deforestation to clear land for cattle ranching or agriculture often provides the local economy with new resources and land that lures investment dollars and development, these gains are only short term and temporary. This is because rapid deforestation often destroys the rainforest faster than it can replenish itself, thus much of the supplies from rainforests which are essential to the sustainability of these industries will be quickly depleted. For example, once timber disappears, the loggers move on, and the soil also becomes less fertile, also decreasing the productivity and profitability of the land for agriculture.

Social:

- As deforestation creates jobs, it allows workers to earn income to support and sustain themselves and their family. It also raises living standards since with more money, they are able to pay for more of their necessities such as food, clothes and even better housing or educations.

<u>Tribal people:</u>
Against [-ve impact] (It is culturally and socially unjust for the tribal people)
Social:

- ❖ The indigenous people have relied on the forest as their source of survival for many years. They live in harmony with it and it is where they obtain all they need - their food, water, medicine, materials needed to build shelter. Without all these, the tribal people lose their homes and their survival are threatened.
- ❖ Tribal groups are displaced and forced to change their resource base. In some cases, they move into areas occupied by other groups, straining the region's supplies. In other cases, they were forced to relocate out of forests (and into the city), permanently altering their lifestyles to something they are not accustomed to by converting to agriculture or cash employment. (affects quality of life and happiness of the people)

    - ➢ These tribal people are unable to adapt to the busy lifestyle in the city, which is completely different as compared to the more relaxed way of life in the forests.
- ❖ Rarely are the rights of these indigenous people to the lands they occupy recognised by the authorities. Furthermore, they intimate knowledge regarding the area's natural resources and how to manage them are nearly always ignored.

Cultural:

- ❖ The displacement from their homes often cause the tribal people to disperse and their unique cultures to be lost.
- ❖ With more and more tribes getting dispersed, native speakers/tribal people are constantly decreasing → loss of heritage of the tribes
- ❖ Since the destruction of forests threaten their way of life, this also affects their traditional or even religious practices → affects their culture and traditions
- ❖ This results in a dilution of the identity of the tribal people

<u>Government:</u>

(for)

- ❖ The government prioritises the development of the country, and not the environmental aspect. Conserving the forests is not one of the government's main priorities.
- ❖ Deforestation helps to clear land, and the cleared land can be used to further develop the country
    - ➢ E.g. Land can be used to build infrastructure, which will help to increase the standard of living of the country
    - ➢ Land can also be used to build homes for the people.
        - ■ To build homes, materials, like wood etc, are also needed
- ❖ Deforestation also helps to increase the revenue of the country, which can be used by the government to implement new changes to aid in the development of the country
    - ➢ Deforestation provides people with jobs → when people have an income, they have to pay tax → money can go to the government for the development of the country
    - ➢ Since an abundance of resources (vast forests) are present, these resources should be taken advantage of to help benefit the country

<u>Consumers (e.g. cattle ranching)</u>

- Consumers prioritise their own economic benefits, instead of the environmental impacts etc.
- Deforestation provides these consumers with a job
    - E.g. clears land for cattle ranching
- From their point of view, deforestation is needed for their various industries to prosper → improve economy of country → deforestation benefits the country economically and is neccessary to ensure the country does not plunge into an economic crisis
- LDCs do not have money/resources to produce recycled paper/materials, the money spent is more even though the price of the items are the same. LDCs look at increasing profit and so turn to the most cost effective way. Deforestation offers a high profit and low losses way of getting resources.

Farmers:

- Farmers prioritise their own economic benefits. For these farmers, who are usually very poor, farming is their sole source of income → in order to profit, need more harvests
- To cultivate more crops and raise more livestock to sell for more profits, more land is needed.
    - Deforestation helps to make space for their farm to develop and for them to grow more crops and raise more livestock
    - The slash and burn technique is cheap and fast
        - Makes soil more fertile → improves plant growth
        - Clears land very fast → reduces the hassle of manually clearing forests
        - HOWEVER, the fires from slash-and-burn may sometimes get out of control due to the dry and hot weather conditions that encourage the spreading of forest fires
- Brazil resettled their farmers to the Amazon to plant their crops even with the trees. However, the rainforest plants took up all the nutrients and the soil could not sustain the crops. Thus, deforestation was carried out.

Deforestation

Refers to a massive clearing of trees in one area.

Describing trend in Deforestation

- In maps, it is good to split it into northern and southern hemisphere.
- Generally, the countries in the Northern hemisphere have a net gain in forest areas.

Describing the rate of Deforestation

- Take note of the intervals between the years/marks (E.g. one shows 2000, 2005, 2020)

Forests as a Resource [Functions of a Rainforest]

Maintain Water Supply

- ➢ Quantity of Water
    - For example, Singapore's Central Water Catchment Reserve consists of 4 water catchment areas surrounded by tropical rainforests.
    - Transpiration and Groundwater
        - More water may be lost via surface runoff or overland flow.
        - Less water is stored as groundwater because of the lowered infiltration rate.
- ➢ Quality of Water
    - Vegetation supports natural processes that filter the water.
        - Interception would lead to less overland flow which traps less soil particles and eventually lead to cleaner water.

        - Traps impurities in pore spaces → Helps attain clear water that is relatively free of other substances.

Oxygen + Carbon Sink

The forest acts as a carbon sink and provides oxygen.

- ➢ Photosynthesis
    - Remove carbon dioxide (greenhouse gas) from the atmosphere.
    - Prevents global temperature from rising and regulates temperature of the Earth

Maintain Nutrients in Soil

- ➢ Roots hold the soil together, prevent nutrients from being lost through soil erosion.
- ➢ Decomposing vegetation (leaf litter) replenishes the nutrients used up in the soil.

Habitat for Flora and Fauna

- ➢ Supports a large number of flora and fauna
- ➢ Forest Fires in 1997 - 1998 killed over more than 8 000 individual orang utans in Kalimantan.

Social / Cultural

- ➢ The forests are a home to 300 million people worldwide.
- ➢ Forests are used for leisure and recreational purposes (hiking).

Economic

- ➢ Eco-tourism
    - Provides jobs [tour guides]
    - Forests attract people from all over the world to visit the country to explore the forests
    - This helps to increase the revenue of country through tourism
- ➢ Profitable commodities derived from the plants
    - Global timber trade can clock up to $332 billion per year.
    - Indonesia obtained $8 billion from timber sales in 2002.

Source of Raw Materials

- ➢ Food
- ➢ Medicine
- ➢ Building Materials
    - Renewable resource [but trees take up to 40 years to mature]
- ➢ Fuelwood and Charcoal [Especially for LDCs]

Deforestation Statistics and General Trends

- ➢ Up to 129 million hectares of forest, equivalent to the size of South Africa, have been lost since 1990.
- ➢ Forest areas have decreased since 1990, but the rate of net forest loss has been cut by 50%.

Causes of Deforestation

What causes deforestation? Who is behind deforestation?

The forest is constantly being exploited for material uses. Population pressure causes government to have a need to take action. The population is constantly on the rise (especially in less developed countries with high birth rate and low death rate). It has to be ensured by the government that everyone is provided with a basic standard of living.

Agricultural Conversion

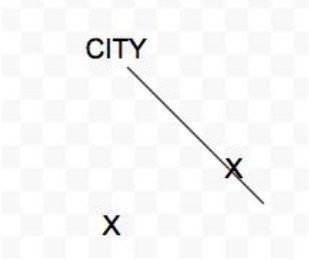
- Slash and Burn Method
    - Small farmers who are after profit practice subsistence farming of cash crops.
        - Cash crops (cocoa, rubber, oil palm) farming means that the farmer is only paid for the amount of crops he is able to provide to the suppliers.
        - Farmers want to expand their farm, and living near forests mean that cutting down trees would be the most effective way to acquire more land for more crops.
- Compaction
    - Agricultural vehicles and cattles constantly go over the land, compacts the air particles between the soil and makes it non-porous.
    - Thin platy soil structure is observed and land is no longer suitable for growing crops as it impedes infiltration.

Urbanisation

- Rural-urban migration because people from rural areas want to earn more money.
    - Ultimately leads to the expansion of the city area.
    - City expansion leads to more deforestation because they need more space for development of infrastructures etc.

Transport Network

- Sectoral development
    - People tend to want to be more connected to urbanised areas.
    - Transport networks are able to increase accessibility into the city. Thus, land is cleared to make way for the construction of transport networks.



Growth of Industries

- Emerging industries [Logging, Mining etc.]
- It provides jobs for people, LDCs are lacking in job opportunities.

- Growing population but yet having little jobs available.
- These jobs provide income, so they have no choice but to do it anyway.

RESOURCE CURSE

- ➢ Less developed countries tend to have the materials, but the well developed countries have money.
- ➢ Developed countries are superior compared to the less developed countries as they have control to a certain extent over the economy of less developed countries. Thus, in certain situation the less developed countries are exploited.
  - Nigeria Shell Oil Spill

The blame does not solely lie with the less developed countries! Consumers are also responsible.

- ➢ Consumer - Producer Relationship
  - Private companies from India and China import the forest risk commodities (timber, herbs, palm oil, paper etc) to other consumers.
    - Without demand for forest risk commodities from these companies, there will not be such a huge push for deforestation
- ➢ Politics affecting Deforestation
  - Relaxed environmental laws
    - Some companies make use of the loopholes within the law to carry out logging and deforestation.
  - Poorly enforced laws
    - Lack of manpower to prevent deforestation.
      - Few rangers employed to patrol the entire forest. Loggers take advantage of this and chop the trees.
      - Corruption and bribery within higher up officials
- ➢ Not all deforestation is intentional.
  - Climate change which is leading to higher temperatures and starting accidental wildfires.

Effects of Deforestation

Loss of Biodiversity

- ➢ Food chain is greatly disrupted.
- ➢ The ecosystem is closely related so with the extinction of just one species other flora and fauna may be affected.
- ➢ Sometimes, action taken may be too late. For example, they only claim that “Species X” is endangered when it has 50 left, and the 50 eventually becomes extinct because the protection help was rendered too late.

Enhanced Greenhouse Effect

- ➢ Forests are a carbon sink. With less trees, there will be changes in the carbon cycle and less carbon dioxide is removed from the Earth through sequestration.
  - This carbon dioxide is a greenhouse gas, which means that it traps heat efficiently and may result in global warming.

Other Environmental Changes

- Quantity of Water
  - Less transpiration from less trees→ Less precipitation
- Quality of Water
  - Increased sediment levels in the rivers results in a higher pH
    - Adversely affecting the lives of marine life which can only survive within an optimum range of pH.
    - Particles get washed into river more frequently because roots are not holding the soil together
    - Also, the soil that is eroded and washed into rivers pollutes the rivers, hence lowering the quality of water.
- Nutrient Cycle
  - Leaf Litter and Soil Leaching
    - Less vegetation is present to vanish the leaf litter.
    - Soil Leaching - Nutrients in the soil are washed down because of the precipitation.
- Indigenous People
  - Forced to vacate their homes
  - Tribes start to disperse or break into smaller tribes.
  - The people will have to adapt to a new way of living and unique culture is lost.

Natural Hazards

- Landslides
  - Less trees → less roots to hold the soil together → soil becomes looser → topsoil becomes weaker and more likely to give way
- Floods
  - Less trees → less roots to absorb water from soil
- Haze
  - Slash-and-burn → burning of trees will produce haze → affects air quality (physical)
  - With poor air quality, the comfort of people will also be affected. People may also suffer from respiratory problems, and this affects the health of people. (social)

Political Ties Strained

- Countries who are affected by the haze that is caused by slash-and-burn may get upset with the country which started the slash-and-burn → strains political relationships between the 2 countries, especially with the other country is unwilling to take action to improve the haze condition.

Is Deforestation Necessarily Evil?

Deforestation provides more land for agriculture, housing and the raising of animals, and it provides pulp for paper. Additionally, deforestation creates grazing land for cattle, room for commercial, residential and industrial development and lumber for furniture and construction.

While not sustainable or good for the environment, slash and burn agriculture (the razing of forests with fire for farming) creates land free from weeds, and the ash provides nutrients for crops.

- ➢ Roads
    - More trade and new transport networks to bridge gap between rural and urbanised areas.
- ➢ Agricultural Land
    - Meet demands for food

However, negative impacts of deforestation outweigh the benefits.