Tropical Rainforests and Deciduous Woodlands

Biotic and abiotic features	
Tropical Rainforests	**Deciduous Woodlands**
4 stratified distinct layers of vegetation (emergent, canopy, under canopy, understory)	3 main layers – canopy, under canopy and shrub layer.
Deciduous trees – but lose leaves at different points throughout the year.	Deciduous trees – lose leaves dependent on season to cope with less light and lower temperatures.
Trees can extend over 40 metres	Trees range between 20-30 metres
Trees have shallow root systems as nutrients are found on the top layer of the soil	Vegetation flowers in spring to maximise sunlight that will be limited when trees flourish in summer
Chemical weathering takes place here due to large amounts of rainfall/hot temperatures	Trees have deep root systems to access groundwater/nutrients.
Large biomass store due to the perfect climatic conditions for life (rain & sun consistently throughout the year)	Biological weathering takes place as tree root systems break up rock
Soil is a small store of nutrient as heavy rainfall results in plenty of leaching.	Biomass largest store (although not as large as TRF). Plenty of rain and sun.
Litter very small store as hot/humid temperatures result in rapid decomposition	Soil also a large store – very nutrient rich due to thick layer of humus as leaf litter adds lots of nutrient.
Soils very deep 30-40 metres – nutrients trapped deep in bed rock.	Litter smaller as nutrient cycled up quickly by soil and biomass
Complex food web	Soil shallower as less old biome.
Food found mostly in the canopy	More simple food web
	Food found mostly in the shrub layer

Goods and Services	
Tropical Rainforests	**Deciduous Woodlands**
Goods	
Medicines are created from the vegetation in TRF 25% of global medicines found in the rainforests. E.g. Rosy Periwinkle used to treat a form of Cancer (Leukaemia).	**Timber -** deciduous woodlands have historically been used as a source of timber.
Oxygen – vast abundance of trees/vegetation referred to as 'lungs of planet'. Take in Carbon Dioxide, release Oxygen.	**Fuel –** for wood burning and for stoves.
Timer – wood is used for many products such as furniture and fuels.	**Non-timber forest products –** forest moss (used by florists), edible fungi, venison (deer), game shooting.
Water – trees transpire (take in rain and release water vapour) which increases moisture in air.	
Food – many indigenous peoples e.g. the Kayapo rely on the Amazon Rainforest for their food.	
Services	
Biodiversity – provides the perfect habitat for the most species on earth.	**Recreational activities –** such as in New Forest National park where cycling, walking, dog walking can take place.

Carbon capture – trees absorb carbon dioxide. The Amazon Rainforest alone absorbs two times more carbon dioxide than the UK emits a year.	**Carbon capture –** trees absorb carbon dioxide
Settlement – home to a number of indigenous groups.	**Conservation of wildlife –** many deciduous woodlands are national parks that protect many rare/threatened animal species.

How is climate change impacting these biomes?	
Tropical Rainforests	**Deciduous Woodlands**
Increasing global temperatures are increasing dry periods in the TRF.	Seed germination triggered by distinct changes in temperature. Seed germination may decline (less vegetation) if seasons become less distinct.
This results in decreased vegetation cover. This increases surface run off of litter/waste into the Amazon Rainforest which pollutes water sources.	Colder winter temperatures may mean native deciduous trees are outcompeted by coniferous
TRF turn to tropical grasslands where the canopy declines. This increases carbon dioxide in the atmosphere.	Droughts in summer can lead to collapse of habitats. Beech trees especially vulnerable to drought conditions.
Less rainfall in surrounding areas as trees are not 'cloud stripping'	Forest fires results in loss of vegetation and habitats. Native species outcompeted by better adapted vegetation to forest fires.
Biodiversity struggles to tolerate drier conditions and temperature fluctuates results in a decline in biodiversity e.g. loss of flying fox due to temperature increases.	Animals unable to migrate away from seasonal differences in weather.
Increase in pests and diseases	
Trees migrate to higher altitudes.	

Why is deforestation occurring in these biomes?	
Tropical Rainforests	**Deciduous Woodlands**
Palm oil – palm trees grow well in TRF climates. Large areas of TRF are being deforested to make way for palm trees to obtain palm oil which is used in all kinds of everyday products	Historical reasons – deforestation took place largely after world war 1 – the government needed a reserve of timber. Farming was also prominent – in total 5% of woodland areas were left.
Population growth – areas of land cut down to accommodate growing numbers of people. In Brazil in 1980, populations were 119m, in 2020 it is expected to increase to 213m. Houses, roads, hydroelectric dams needed.	Non native species have been introduced to woodland areas. Deciduous trees have been cut down to plant Coniferous trees. These supply soft wood and are faster growing which results in more money.
Logging – cutting down trees for construction/manufacturing products illegally. Contributes $10-15 billion a year to global economy (shows extent of problem)	Agriculture – pesticides used in modern farming techniques have degraded woodland areas.
Subsistence farming – farming to eat 'slash and burn' results in areas of the TRF being burnt to the ground.	Population growth – more homes are needed as the UKs population grows. Developers want to extend onto the greenbelt do accommodate the growing number of houses needed.

Cattle ranching (agriculture) – 80% of deforested areas in the Amazon are used for grazing cattle.	Increase in cars – larger roads are needed e.g. dual carriageways and motor ways to accommodate growing number of cars on the road.

How do we manage these biomes sustainably?	
Tropical Rainforests	**Deciduous Woodlands**
International organisations such as the World Wildlife Fund are increasing pressure on governments that home TRFs to manage them more sustainably such as the WWF campaign to encourage the government of Brazil to increase national parks.	New Forest National Park - £500 million in economic activity, 15 million visitors a year – cleaner activities introduced e.g. walk ways and cycle routes directed away from vulnerable areas. Tour buses instead of individual cars driving around the park, education activities to encourage the preservation of the national park, promote the use of local products and industry, local land owners given grants to help improve and protect biodiversity.
Grassroots organisations such as the Munduruku people have campaigned locally to end deforestation e.g. protesting the building of a hydroelectric dam	Coniferous trees cut down are replaced by native deciduous trees.
Indigenous people have been applying 'counter-mapping' meaning they clearly define their protected areas of the TRF to ensure that illegal loggers do not deforest their land.	Decrease in pesticide use by farmers.
Tropical Timber Organisation – a global initiative with 71 member countries. Wood products that are sourced legally and sustainably are coded to ensure that what is being bought hasn't been sourced illegally and harmfully.	
Eco tourism – defined as 'responsible travel to natural areas that help to support and sustain the local populations and wildlife'.	