

Human Causes

Learning Objective:

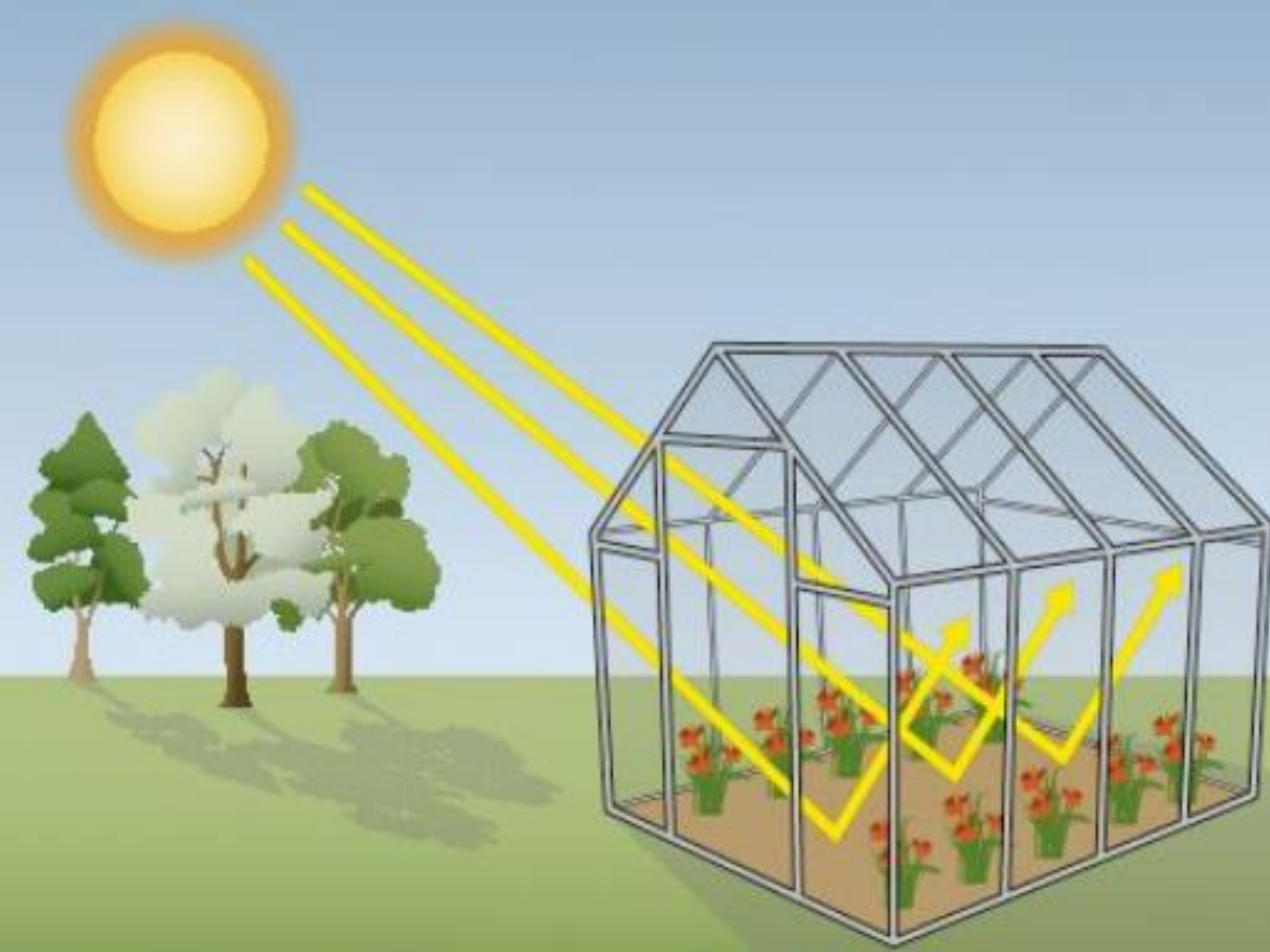
- **Analyse** human causes for climate change



Learning Outcomes:

- **Sequence** the greenhouse effect
- **Analyse** data on CO² emissions
- **Assess** the human causes of climate change





Greenhouse effect in action

Greenhouse gases (able to absorb heat)

- Carbon dioxide
- Methane
- Nitrous oxides

Atmosphere

- Particles (e.g. dust)
- Gases (e.g. nitrogen)
- Liquids (e.g. water)

Long-wave radiation from Earth absorbed in the atmosphere

Reflection and scattering

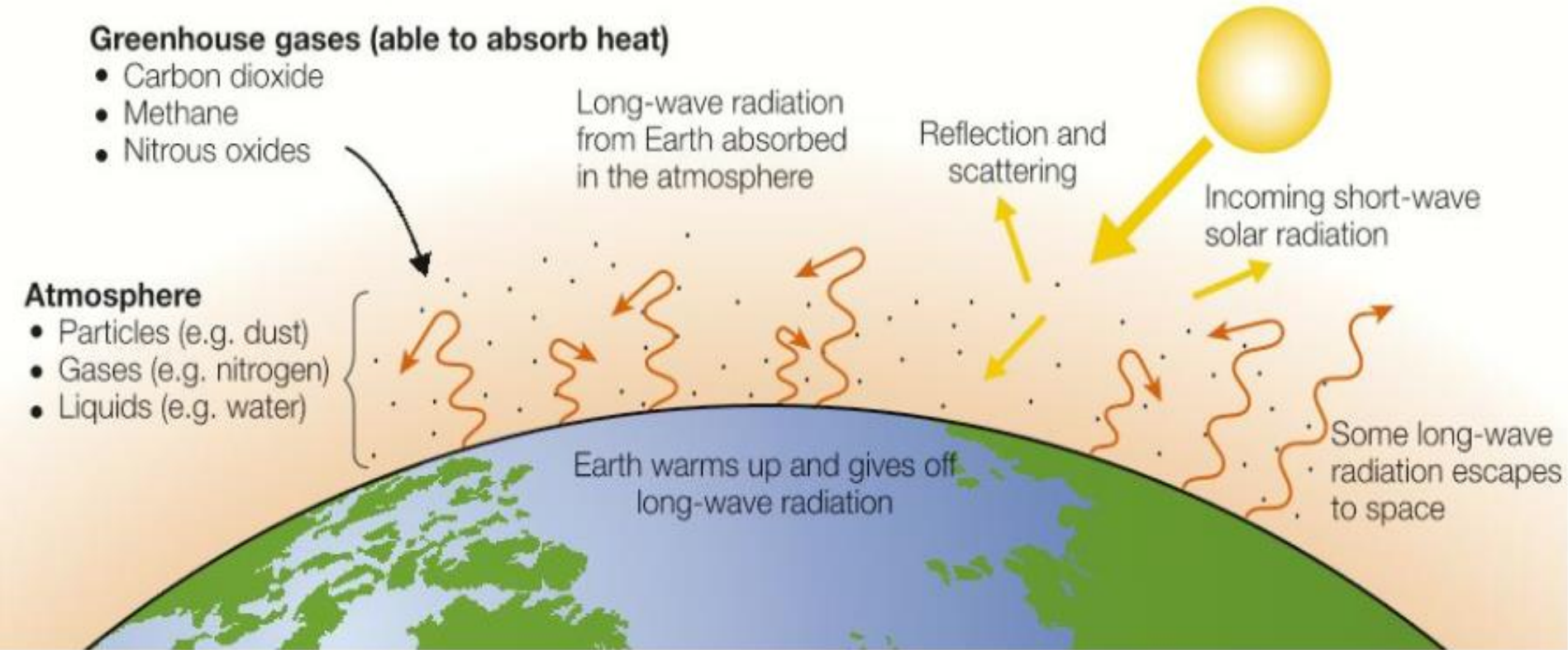
Incoming short-wave solar radiation

Earth warms up and gives off long-wave radiation

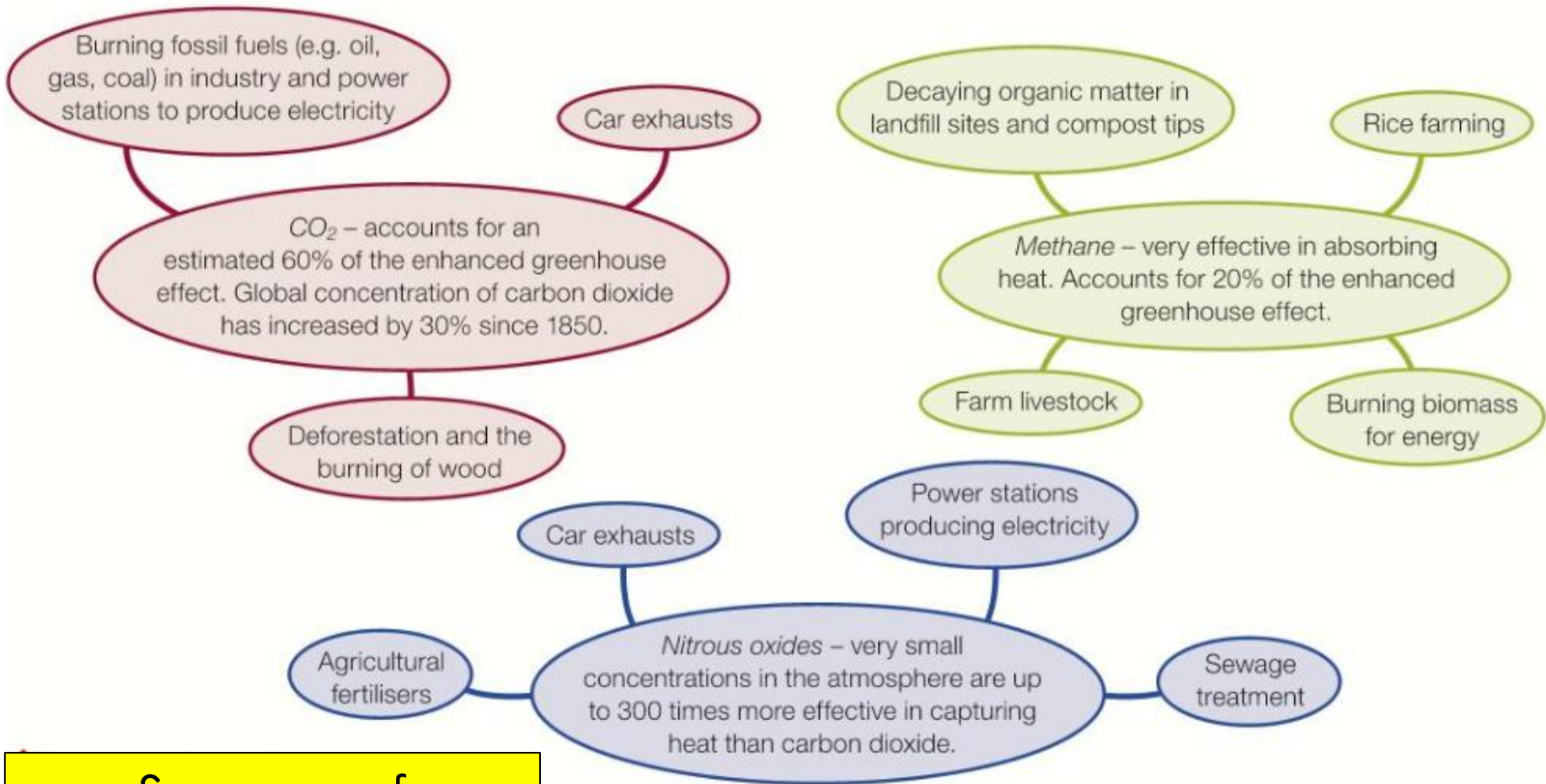
Some long-wave radiation escapes to space

← Short-wave solar radiation

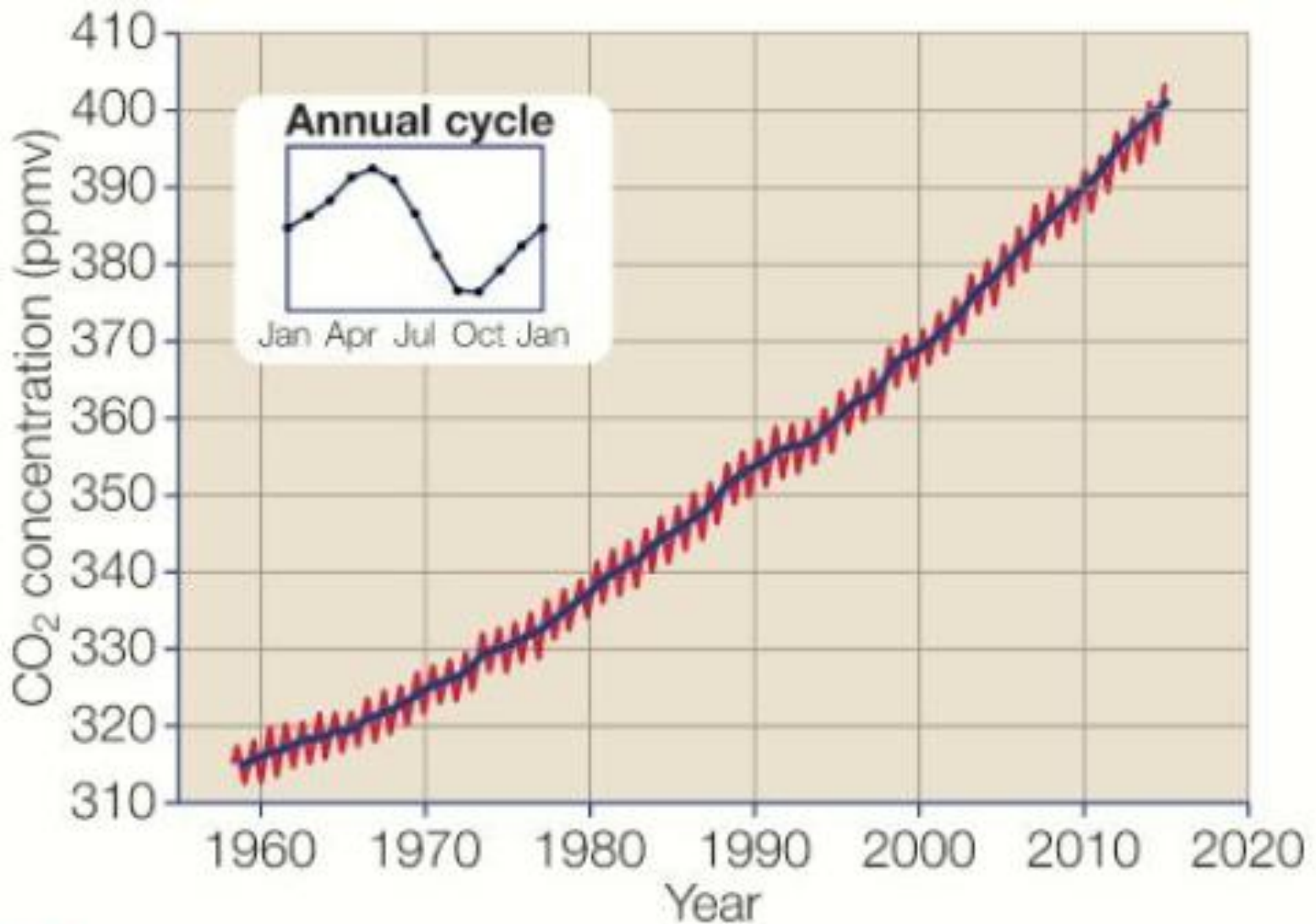
↻ Long-wave Earth radiation



BBC Animation on Greenhouse effect

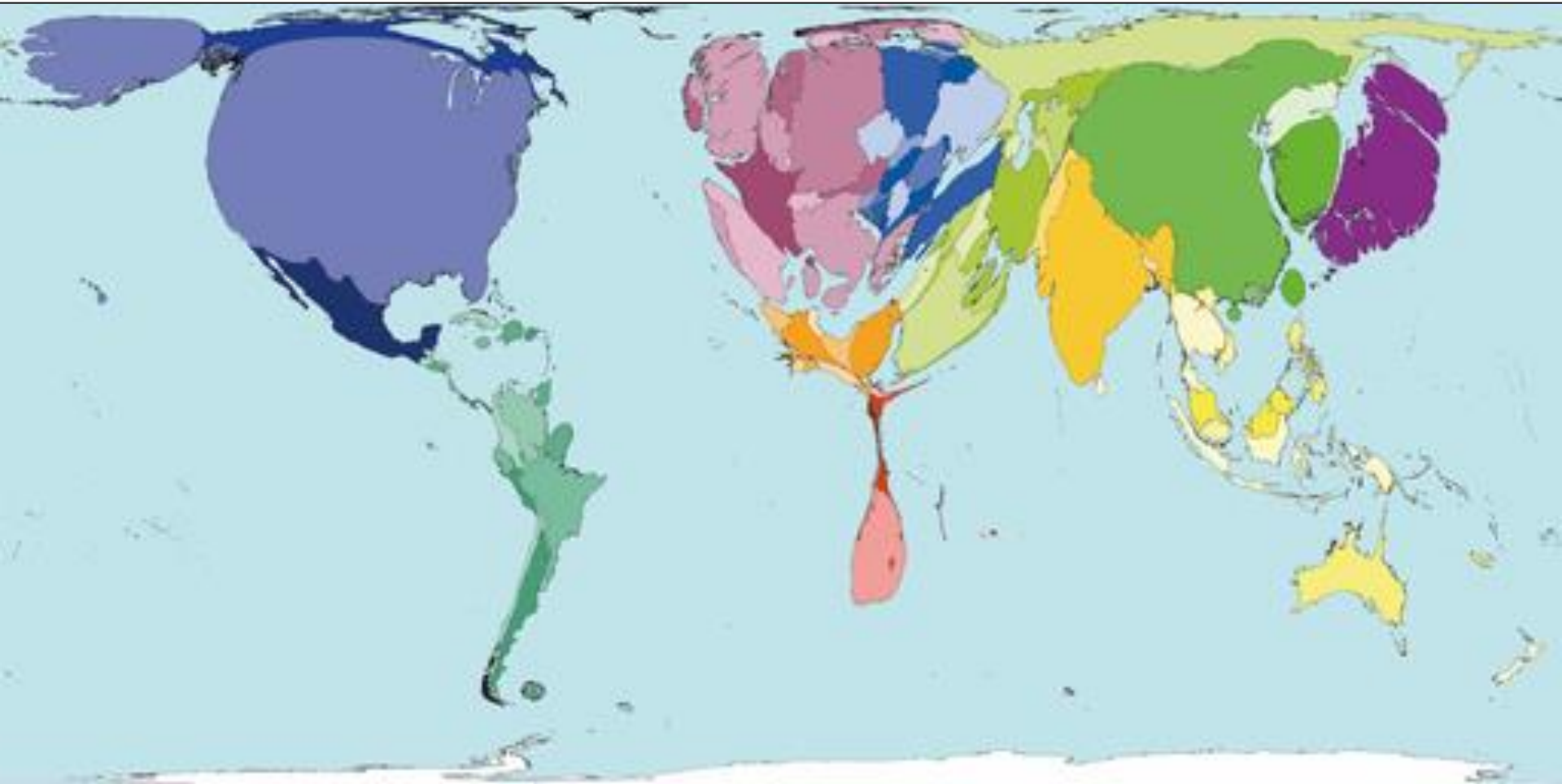


Sources of greenhouse gases

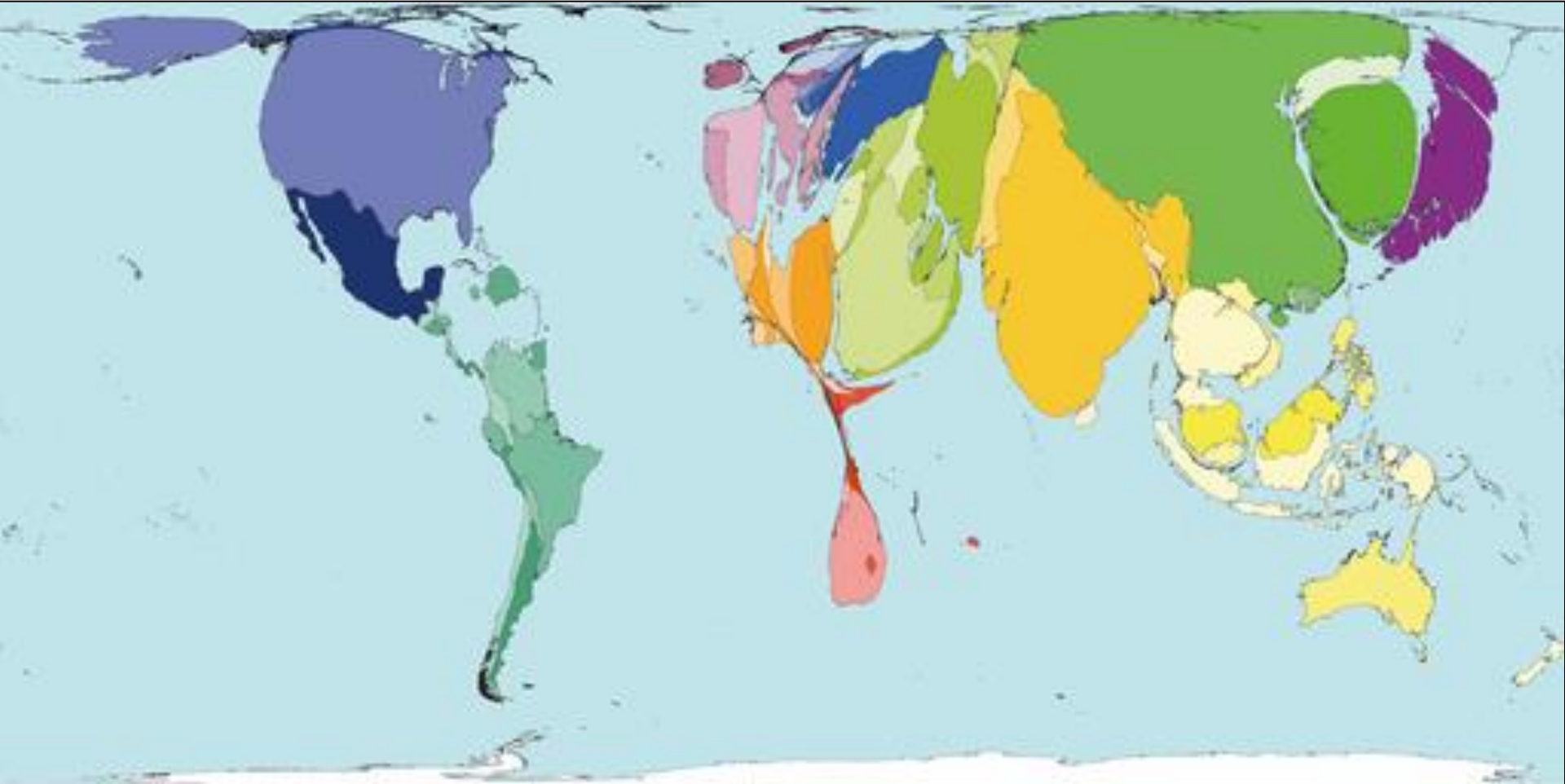


Increase in CO₂ recorded at the Mauna Loa observatory

CO₂ emissions by country - 1990



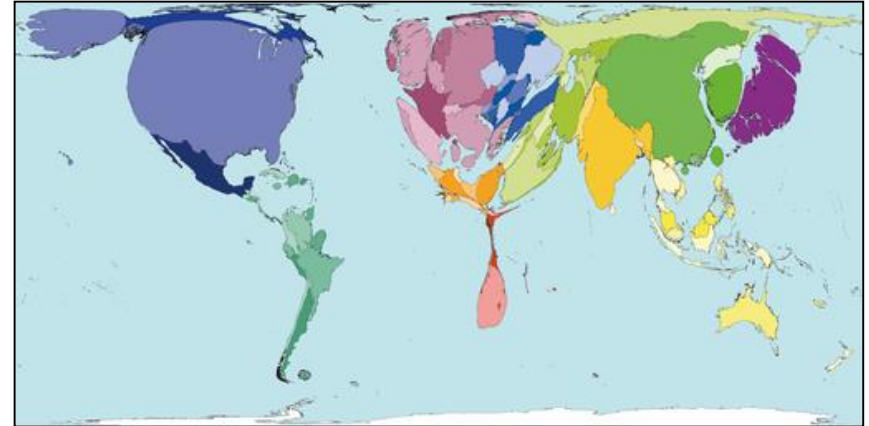
CO₂ emissions by country - 2009



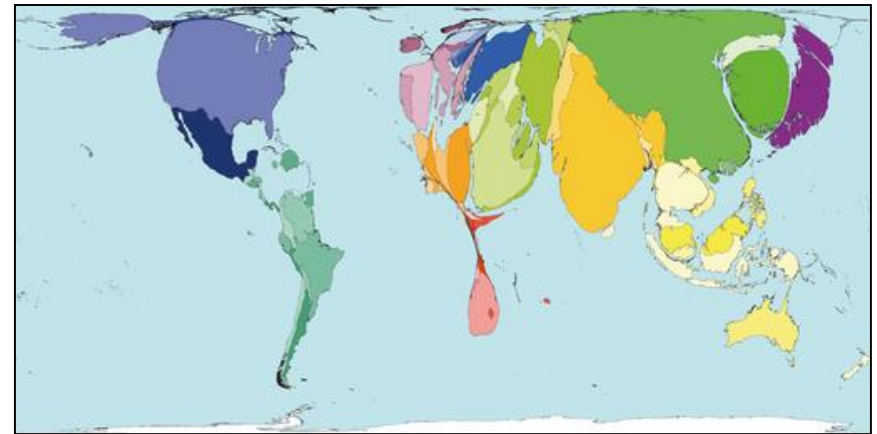
CO₂ emissions by country, 1990-2009

- Which countries are now producing less CO₂ emissions? Why do you think that is?
- Which countries are now producing more CO₂ emissions? Why do you think that is?

1990



2009



Exam Q: Give two reasons why the amount of CO₂ from using fossil fuels has increased in recent years. (2)

How are Fossil Fuels adding to climate change?

When fossil fuels are burned - by industry, in power stations and by vehicles and planes – gases (such as CO₂) enter the atmosphere. These gases have always been present in the world's atmosphere, but their amount is slowly increasing as more and more fossil fuels are burned. This adds to the green house effect as they can trap more of the sun's energy in the earth's atmosphere which is leading to the planet getting warmer.

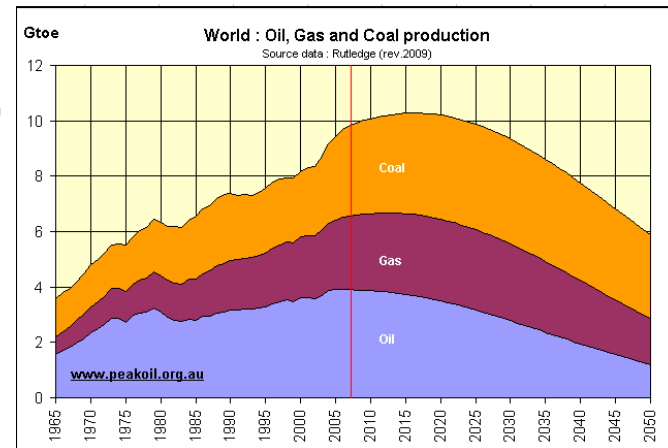


Fossil Fuels

How are Humans using Fossil Fuels to make the climate worse?

Fossil fuels are used to fuel cars and airplanes, power electricity plants, heat our homes and make plastics

As the population grows/as people get richer we require more of the above products and uses/can afford more which means more fossil fuels are burnt.

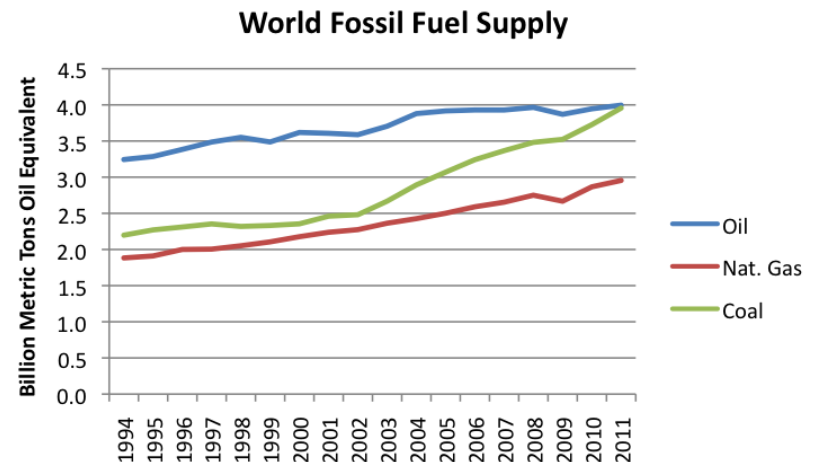


What are Fossil Fuels?

The fossil fuels are **coal, oil and natural gas**. They are fuels because they **release heat energy** when they are burned.

Left: The machine is called a pump jack is designed to bring oil to the surface

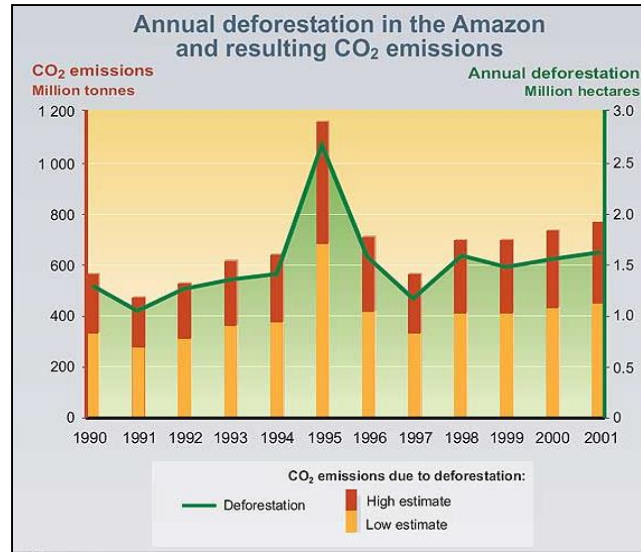
Right: A graph showing the production of three main fossil fuels since 1994.



How does deforestation lead to climate change?

Deforestation one of the main causes of climate change. Trees can store carbon (which if realised would make the green house effect worse). The deforestation of trees reduces the amount of carbon stored in trees and it also releases the carbon stored into the air. This is because when trees die, they release the stored carbon.

Deforestation

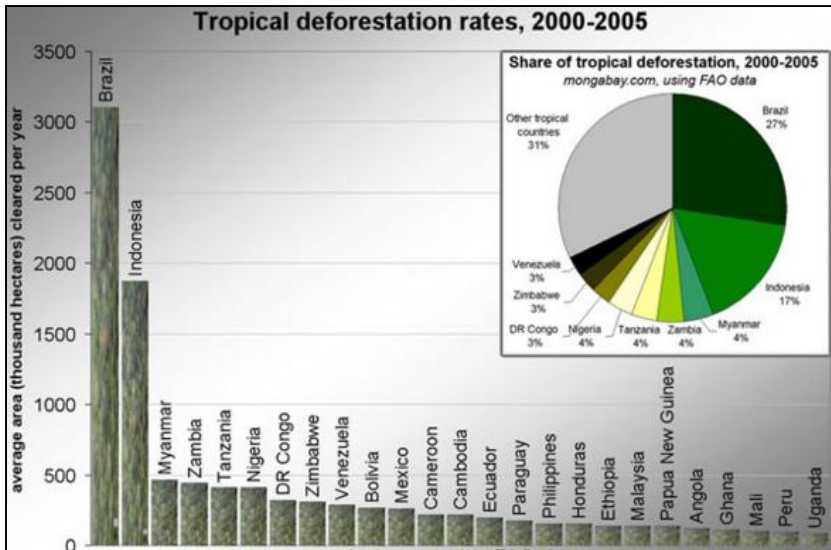


Why are humans causing deforestation?

The main causes are:

1. To make more land available for housing and cities.
2. To collect timber (wood) to create new items.
3. To create ingredients that are worth a lot of money
4. To create room for cattle farms. This cattle is then used as food.

As the worlds population gets bigger/richer, more people require the above needs which increase the amount of deforestation that takes place.



Above: This graph is showing the amount of deforestation in the Amazon and the amount of CO₂ that is released as a result.

What is deforestation?

Deforestation is the permanent destruction of forests in order to make the land available for other uses.

Above: this shows the amount each country contributes towards deforestation each year.

How are humans causing climate change through agriculture?

Humans love to eat. As a result more and more land is needed for farming which then releases more gases into the atmosphere.

Agriculture contributes to greenhouse gas increases through land use in four main ways:

1. CO₂ releases linked to deforestation
2. Methane releases from rice cultivation
3. Methane releases from enteric fermentation in cattle
4. Nitrous oxide releases from fertilizer application

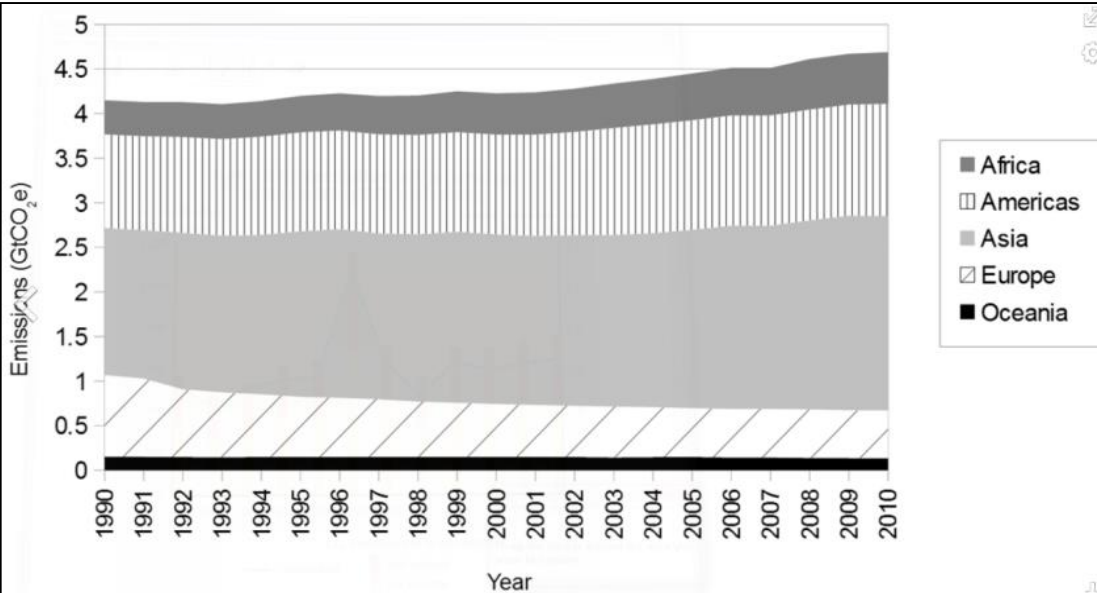
Livestock contribute to climate change as well with:

1. 9% of global carbon dioxide emissions
2. 35–40% of global methane emissions
3. 64% of global nitrous oxide emissions

Agriculture

How does agriculture lead to climate change?

Agriculture contributes to climate change by (1) releasing greenhouse gases (GHGs), and (2) by the conversion of farming land (e.g., forests) into farming land.



What is agriculture?

Agriculture is the farming of animals, plants, fungi, and other life forms for food, fiber, biofuel and medicines

Left: This shows the Greenhouse gas emissions from agriculture, by region, 1990-2010

Outline two reasons why human activities effect the concentration of CO₂ in the atmosphere. (4 marks)

Point-marked for two developed points. 2 x 2 marks (AO1)

- The burning of fossil fuels for industry and transport and heating our homes releases greenhouse gases such as CO₂ into the atmosphere
- Clearing of rainforests means there is less vegetation to absorb CO₂ from the atmosphere and release oxygen. There is also reduced capacity for vegetation to act as 'carbon sinks' to naturally absorb excess CO₂ from the atmosphere.