

Climate change

Climate change has been a political issue for many years, and has caused much heated debate. It has affected people across the globe and has raised questions about the sustainability of life on the planet. **Peter Smith** examines some of these issues

Climate change

- A central contributor to climate change has been the rise in the emission of greenhouse gases (GHGs) that has accompanied economic growth, causing a general rise in temperatures.
- GHGs include carbon dioxide, methane and nitrous oxide (among others).
- These gases are by-products of human economic activities, such as the use of industrial plants, chemical solvents and fossil fuels (such as coal, oil and natural gas).
- As GHGs accumulate in the Earth's atmosphere, heat becomes trapped and the planet begins to warm up.

CO₂ emissions

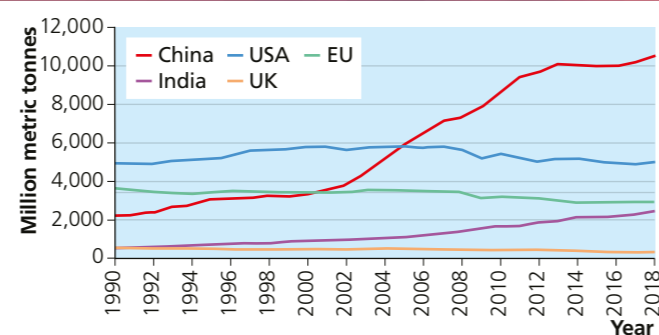
- Carbon dioxide (CO₂) is one of the most significant of the GHGs, and a focus for concern and for policy.
- Figure 1 shows CO₂ emissions from a selection of countries since 1990.
- You can see that China overtook the USA as the highest emitter of CO₂ in about 2005, although the pace of the increase has begun to level out since the early 2010s.
- Given that these countries have very different sized populations, it is also helpful to look at CO₂ emissions per person. For example, in 2018, China emitted 7.4 metric tonnes of CO₂ per person, compared with 15.2 metric tonnes in the USA.
- In the USA, lifestyle choices (for example in the use of oil products) have contributed to the substantial emissions.
- In China, the rise of emissions reflects increasing industrialisation and car ownership.

Energy usage

- The source of energy used by firms and households is an important contributor to climate change.
- Coal is especially damaging for the environment, and has been phased out in many of the advanced countries.
- However, other non-renewable sources of energy such as oil and natural gas also contribute to climate change.
- There has therefore been an increasing focus on alternative renewable sources of energy.
- Figure 2 shows the contribution made by alternative and nuclear energy in the same set of countries as in the previous figure.
- There has been a gradual build-up of these alternative sources of energy, but many commentators have argued that the pace of change has been too slow.
- There has been some resistance to the use of wind farms and some other alternative sources, the argument being that these are unsightly or damaging to the environment in other ways.

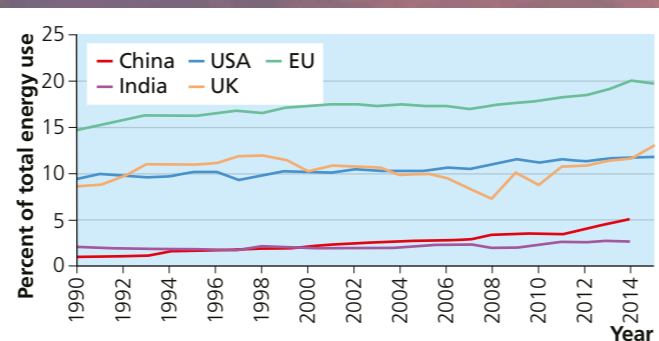
Plastics

- A particular focus of environmental campaigners has been the use of plastics in various ways.
- This issue was highlighted by the *Blue Planet* series of documentaries on TV, which revealed the extent to which plastics have been building up in the oceans, causing major environmental damage.
- The central problem here is that many plastics are not biodegradable, so do not break down over time, which means that they have to be sent to landfill sites — or remain discarded in rivers and oceans.



Source: Based on data from World Development Indicators

Figure 1 CO₂ emissions (excluding land-use change and forestry)



Source: Based on data from World Development Indicators

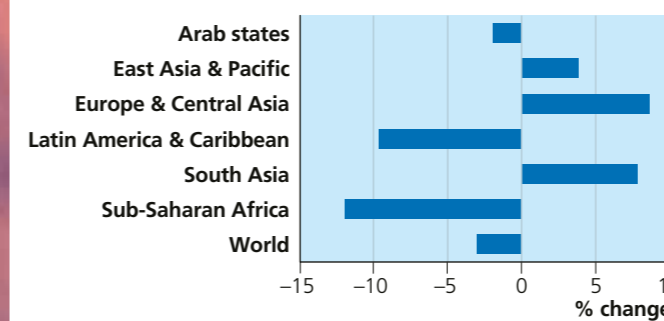
Figure 2 Alternative and nuclear energy (% of total energy use)

EconomicReviewExtras

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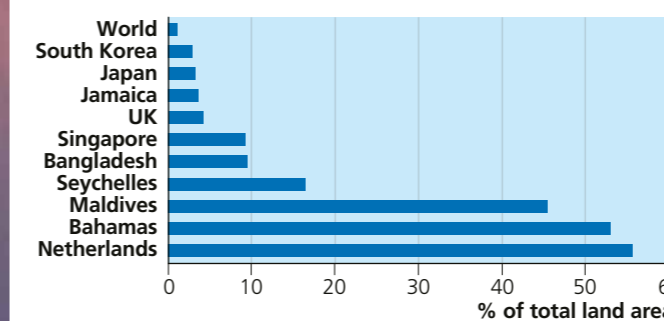
Deforestation

- The existence of forests around the world helps to mitigate the impact of CO₂ emissions, as plants can absorb CO₂.
- However, in many countries, forests are being destroyed, for timber or to release land for crops.
- Figure 3 shows the percentage change in forest area in selected regions since 1990.
- Across the world as a whole, forest area has declined by 3% over this period, with sub-Saharan Africa and Latin America & the Caribbean showing substantial reductions of 11.9% and 9.6% respectively.
- In Africa, the reduction in forests has led to hardship and to desertification in some areas. The destruction of large tracts of Amazonian rainforest has a major impact on climate change.
- The increase in forest area in some other regions only provides partial relief from overall deforestation.



Source: Based on data from Human Development Report

Figure 3 Change in forest area between 1990 and 2016



Source: Based on data from World Development Indicators

Figure 4 Land area where elevation is below 5 metres

The threat of rising sea levels

- A key impact of climate change has been in the melting of polar ice caps.
- This is leading to a global rise in sea levels.
- Figure 4 shows how this could constitute a threat to a range of regions around the world; it shows the percentage of land area that is below 5 metres in various locations.
- Island states such as the Bahamas, Maldives and Seychelles (amongst others) are especially vulnerable.
- Other countries such as Bangladesh also face major threats, with 9.6% of the land under 5 metres, on which live 8.9% of the population.
- In the Netherlands, more than half of the land is below 5 metres, so it is not only less-developed countries that face a challenge.

The threat of severe weather

- Perhaps one of the most obvious results of climate change has been changes to weather conditions.
- The incidence of storms has risen, disrupting transport and other services and causing flood damage and power outages.
- There has also been an increase in the outbreak of major fires, destroying forests and causing damage to property and to people's lives and livelihood.

Tackling climate change

- Although widely recognised as a global problem, it has proved difficult to implement policies that would help to tackle climate change.
- The consequences of climate change cross international boundaries.
- The difficulties of reaching agreement between governments of countries around the world have hindered the introduction of measures that would help to reduce the threat of climate change.
- There are also problems that result from the powerful influences of pressure groups that would prefer others to bear the costs of policies.
- Furthermore, many of the consequences of climate change are seen to threaten in the long run, making it tempting to discount them in favour of more pressing short-run issues.