

**Climate Change, the Ecological Crisis and why they matter**

## 1. Title

## PART 1 CLIMATE CHANGE

2. What's going on in the earth's atmosphere. It protects the earth - without it the average temperature of the earth would be -18°C instead of +15°C. The atmosphere acts like a greenhouse, trapping solar radiation, with gases, not glass.
3. We are adding to these gases - this shows the enhanced greenhouse effect of different gas emissions caused by human activities (*John Houghton - Global Warming p33.2*). CO<sub>2</sub> accounts for 77% of greenhouse gases. Over 90% of greenhouse gases are carbon based.
4. There has been an unprecedented & rapid increase of CO<sub>2</sub> in the atmosphere over the last 200 years - the concentration of CO<sub>2</sub> reached 414 ppm in May 2019. Pre-industrial levels ranged between 200 and 300 ppm.
5. There is a close correlation between temperature rise and atmospheric CO<sub>2</sub> concentration. A 2017 UN report said the 2015 Paris Climate Change agreement (CoP 21) only covered a third of the emission reductions needed. The Paris agreement set the target of limiting average global temperature rise to well below 2°C and to pursue efforts to limit the rise to 1.5°C. Despite the agreement, global CO<sub>2</sub> levels are still going up, at about 2%pa. The IPCC issued a report in Oct 2018 giving details of the impacts of a rise of 1.5°C <https://www.ipcc.ch/sr15/>
6. The World Meteorological Organization (WMO) reported that the global average temperature in 2019 (Jan-Oct) was ~1.1°C above the pre-industrial level. We're on track to reach +1.5°C by 2030. WMO Secretary-General Petteri Taalas said last month (19/12/20) "*If we do not take urgent climate action now, then we are heading for a temperature increase of more than 3°C by the end of the century, with ever more harmful impacts on human wellbeing. We are nowhere near on track to meet the Paris Agreement target.*"

## WHY DOES THIS MATTER?

7. **More extreme weather events** - increased severity of hurricanes/ typhoons. Eg Typhoon Haiyan in PH Nov 2013 - 6m/20ft tidal wave, ~6000 deaths, 3m people displaced.
8. **Bigger hurricanes** - 93% of extra heat energy from global warming is absorbed by oceans.
9. **Changes in ocean currents in N Atlantic** - caused (partly at least) by melting of Greenland ice. Effects on UK climate uncertain, but may cool it! <http://nsidc.org/greenland-today/>
10. **Sea levels rising** - Increased ocean temperatures and land-based ice melt have resulted in sea levels rising about 20 cms/8" since 1880, and the IPCC 2014 report projected further rises of between 45 and 75 cms by 2100. Rising sea level is causing increased salinity in the soil in places like Bangladesh; coastal erosion; increased spread of disease; and of course flooding:
11. **Flooding** - 300 million people face annual coastal flooding by 2050, especially in Asia. Huge impacts on Bangkok, Bangladesh, Manila, Jakarta, Florida etc, caused by rising sea levels, and by more severe sea surges & tropical storms; and also excessive groundwater extraction & hence land sinkage. Likely disappearance of some Pacific and Indian Ocean island states.
12. **Drought and flash floods, delayed rains** - China - has 22% of the world's pop. but only 7% of its fresh water. Loss of glaciers (Himalayas etc) causing floods and drought in CN & India. More erratic weather: delayed monsoons in S Asia. World Meteorological Organisation 2019: "*One of the main impacts of climate change is more erratic rainfall patterns. This poses a threat to crop yields and, combined with population increases, will mean considerable food security challenges for vulnerable countries in the future.*" (Zambia, E Africa etc).
13. **Deserts growing** - in China, Africa etc
14. **Climate refugees** - more than 10 million new internal displacements were recorded worldwide between January and June 2019, 7 million from events such as Cyclone Idai in SE Africa, Cyclone Fani in south Asia, Hurricane Dorian in the Caribbean, flooding in Iran, the Philippines and Ethiopia, generating acute humanitarian needs. Estimates of worldwide climate refugees in 2050 range from 140-200 million.
15. **Tipping points** - But it's not just about 'one-off events' - we have the problem of climate change leading to tipping points - by definition these are irreversible, because of self-reinforcing feedback loops.
16. Tipping point 1 - Arctic ice melt causing albedo effect (ice reflects most solar radiation)
17. Tipping point 2 - forest fires (irreversible loss of rainforests & biodiversity. Methane fires from melting permafrost). Large areas of smoke pollution.
18. Tipping point 3 - non-linear impact of rising temperatures on staple crop yields.

19. Countries most at risk from climate change. Climate change is a justice issue - the rich cause most of the problem, the poor suffer - including those who have no choice where they live, in flood-plains etc.

## PART 2 THE ECOLOGICAL CRISIS

20. Climate change is only part of a much greater and more complicated crisis that is impacting much of the earth's fauna and flora - what has been called 'the ecological crisis'. My experience of suddenly seeing something in a new way - the ecological devastation in the Philippines - beginning to understand its scale and significance - its connections with the way I and millions of people like me live - the unsustainable consumerist global economy.
21. Then learning about the consequences of deforestation - soil erosion, landslides, flooding of river valleys, even destruction of coral in the ocean - all impacting local communities in different ways, not least their houses and food supplies, often leading to enforced migration.
22. Going to a remnant forest/seeing/especially hearing the difference - the abundant life that has been lost from so much of the land - in PH, but also in UK and many other parts of the world.
23. Deforestation in Borneo etc - not just the Amazon - to make space for soya, palm oil etc.
24. Fires in Australia - total area of fires = ~ 2/3 of Scotland - estimated loss of 100m's animals. Various causes - need for controlled burns - but exacerbated by climate change.
25. Loss of species/ biodiversity in many parts of the world. 60% decline in wildlife populations (mammals, birds, fish & reptiles) 1970-2020. <https://www.wwf.org.uk/updates/living-planet-report-2018> . We are now in the 'Anthropocene' and at the beginning of the '6th mass extinction'. The impacts on plants/animals of loss of habitat/climate change - loss of species & biodiversity/ potential medicine etc. [https://wwf.panda.org/our\\_work/biodiversity/biodiversity/](https://wwf.panda.org/our_work/biodiversity/biodiversity/) Not all animals/plants can respond adequately to climate change.
26. Species loss in CN - conservation of 'trophy' species (panda bears etc). Some winners, not all welcome (invasive species). New pests: Greylag geese in Orkney. Aedes mosquitos transmitting dengue virus in new areas. ~ half world's population now at risk of infection.
27. Coral destruction - caused by acidification of oceans from increased atmospheric CO<sub>2</sub>; by pollution and unsustainable fishing.
28. Pollution caused by mining of minerals and 'rare earths' needed for our mobile phones etc. Also atmospheric and water-bourn pollution - huge health impacts, and loss of wildlife.
29. For instance - the Golden Bellied Gerigone, now grey because of toxic water - the canary in the coal-mine.
30. The problems of waste and pollution - not just plastic, but medication/ antibiotics/ contraceptives, excessive run-off of fertilisers, heavy metals in the food chains etc. And we export many of our problems - our dirty recycling & manufacturing/ carbon footprint.

## SEVEN CHALLENGES THAT MAKE IT HARD FOR US TO RESPOND

31. The Ecological Crisis
1. Challenge 1: complexity - our problems are so much greater and more diverse than just climate change
  2. Challenge 2: the tragedy of the commons - no one country etc can fix this - CoP25 ended in deadlock. "It's not my problem", or "what I can do won't make a difference."
32. Challenges of perception
1. Challenge 3 (not) looking over the horizon - not seeing the connections between my lifestyle and its impacts on 'my neighbours' who share the same biosphere as me, but who are out of sight, so out of mind. Our limited worldview. Sound-bite news.
  2. Challenge 4: tipping points - hard to believe that change can be irreversible.
  3. Challenge 5: we're not very good at detecting, and therefore responding to gradual change including 'slow violence'. The story of the frog in slowly boiling water.
  4. Challenge 6: shifting baselines - the young assume that "it has always been like this."
  5. Challenge 7: delayed reaction/ drag - full impacts (climate change, species extinction etc) will only become apparent gradually, long after we are able to prevent them.