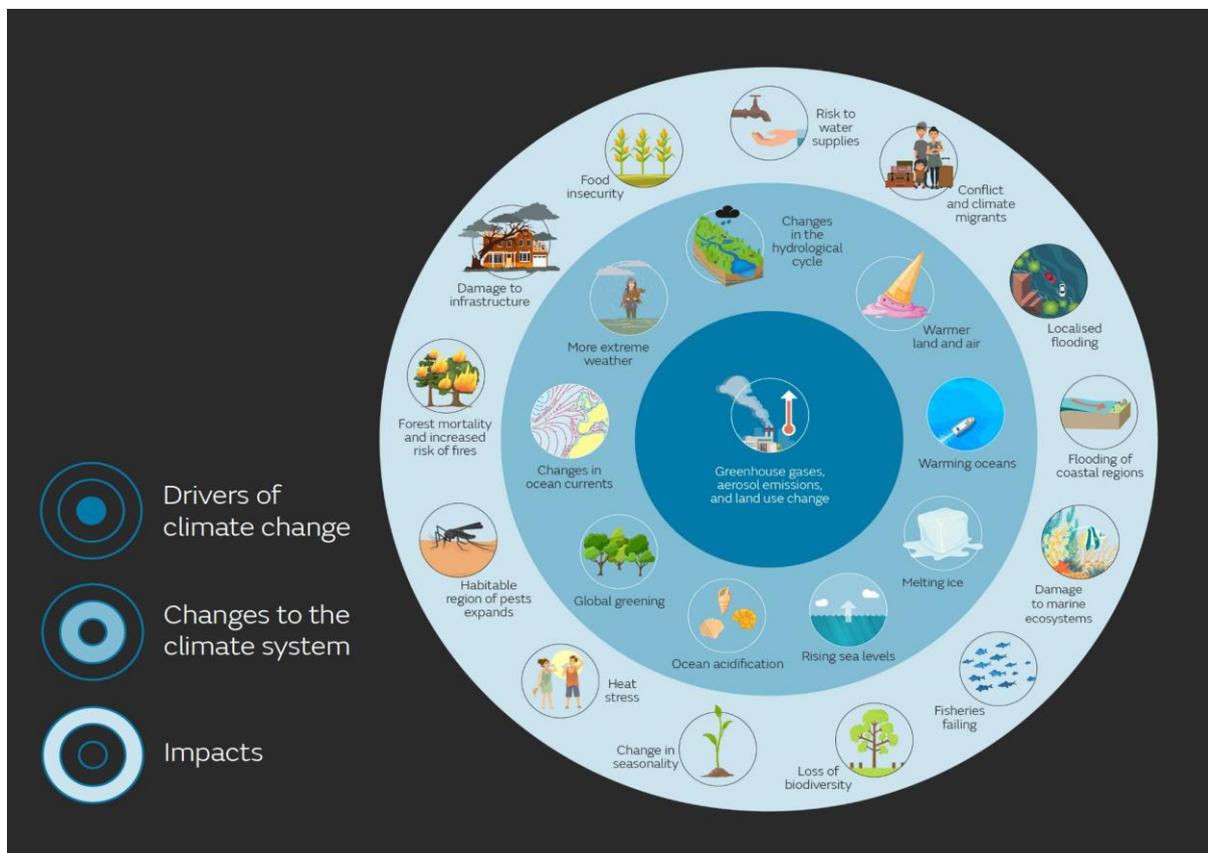


## You, me and climate change.

You'll agree that we are going through a tough and testing time right now. It would be understandable to think that we have never experienced anything like this before. The truth is though that the human race has been through multiple devastating episodes in our existence going back at least 300,000 years. Going back just 11,000 years, humans had to cope with an ice age. But please note that the difference in average, annual global temperature between then and the turn of the 21st century was only about 5 degrees C. So a difference of only 5°C had an immense effect on the planet. Consider now that according to our Met Office since towards the end of the nineteenth century, the average, annual global temperature has risen by 1.2°C and is likely to rise by 2°C within the next 30 years if we do nothing to reduce our carbon footprint.<sup>1</sup> If we allow those temperatures to rise any further the effects could be devastating and will affect every species, including our own. In addition, the temperature rise across the planet is by no means uniform, with some regions already experiencing average annual temperature rises of up to 4°C, again with devastating effects. The European Earth observation programme, Copernicus, released data showing that 2020 was the joint hottest year on record when the average temperature for that year rose by 0.6°C above the 1981 – 2010 average.<sup>2</sup> The plain truth behind these changes is that the world will experience effects at least and probably more catastrophic than the current pandemic. We must not be complacent about climate change. It WILL affect us all. We must, as we have learned in the current pandemic, work together as communities on local, regional and worldwide levels to avert the worst excesses of climate change. But how will climate change affect us in Marple, you may ask? Here are just a few of the ways in which climate change will affect you:



*The above image illustrates some of the drivers of climate change and the impacts they could cause.*

## **Severe Weather**

- We will experience wetter winters. This effect will increase and undoubtedly lead to considerably more flooding. At times it may seem like a winter monsoon.
- Summers will be warmer and winters milder. Sadly, although this sounds appealing, it may put pressure on our water resources. Heatwaves in the UK like those experienced in 2003 are expected to become the norm in summer by the 2040s.<sup>3</sup>
- The 'urban heat island effect', will push temperatures higher in cities as large buildings and asphalt streets absorb, store and radiate heat. This means that in large cities such as Manchester, summer temperatures may reach as much as 40°C.<sup>4</sup>
- Severe weather events are likely to increase, such as flooding, droughts, heat waves, severe gales and snowfall. The jet stream, a high altitude, fast flowing current of air which plays a key role in determining weather is already fluctuating uncharacteristically and if this coincides with changes in the Atlantic Meridional Overturning Circulation (AMOC), better known as the Gulf stream, then climate models suggest that the AMOC will weaken over the 21<sup>st</sup> Century as greenhouse gases increase. This is because as the atmosphere warms, the surface ocean beneath it retains more of its heat. Meanwhile, increases in rainfall and ice melt mean it gets fresher too. All these changes make the ocean water lighter and so reduce the sinking in the 'conveyor belt', leading to a weaker AMOC. So the AMOC is very likely to weaken, but it's considered very unlikely that large, rapid changes in the AMOC, as seen in past times, will happen in the 21<sup>st</sup> Century. The effect of a weaker AMOC is included when making projections of future climate change for the UK. A weaker AMOC will bring less warm water northwards, and this will partly offset the warming effect of the greenhouse gases over Western Europe. For the gradual weakening that is likely over the 21<sup>st</sup> Century, the overall effect is still a warming.<sup>5</sup>

## **Agriculture**

- Food shortages may develop due to farmers and producers being unable to grow certain crops. Just think of the food we regularly eat which has travelled hundreds or even thousands of miles to get here. They may not be available in the future. Even at home, farmers are now beginning to experience the effects of climate change on their ability to grow certain crops. Changes are likely to be more severe in future decades. There is the potential for domestic production to increase in a warmer climate but this will be constrained unless more action is taken to address the declining quality of soils and projected water deficits in the most productive UK regions, particularly where potatoes and cereals are grown. Climate change is expected to reduce the amount of water in the environment that can be sustainably withdrawn, whilst increasing the demand for irrigation during the driest months. Even low population growth and modest climate change scenarios

suggest severe water supply deficits. More water storage reservoirs need to be constructed.

## **Wildlife**

- Some birds, fish and land animals are under threat as their environment changes due to temperature changes. This, in addition to human generated habitat loss will mean that some of these species will not be able to adapt to these changes. A significant number of species may migrate further north, especially marine wildlife.
- The plants, trees and shrubs that can grow in the UK will change.
- Isabella Tree from the Knepp rewilding project has reported that species are already being recorded as moving their range northwards by as much as 10Km per year.<sup>7</sup>
- Hotter summers and milder winters will bring with them arrival of species which, prior to climate change, could not survive our former climate, such as mosquitos.

## **Health**

- The food we eat and the water we drink will be affected by the climate.
- We will be more at risk from heat and cold related illnesses, such as skin cancers, malaria and heat stroke.
- The elderly and very young will be most vulnerable to temperature changes.

## **Homes and Lifestyle**

- The cost of living will increase, as prices for food, fuel and insurance are driven up.
- Your home may be damaged by extreme weather events such as floods and gales. As a result, home insurance costs will increase markedly.
- Extreme weather may affect where you work as well as schools and transport links.

## **Infrastructure**

- Electricity sub-stations, road and rail networks, water treatment works, ports and airports and fixed line and mobile communications assets will all be exposed to increased flood risks.
- We will also face more risks from sewer failure and consequential flooding.

## **Human migration**

- There are also uncertain but potentially very significant international risks arising from climate-related human displacement, and the possibility of violent inter-state conflict over scarce natural resources.
- Immigration by people escaping regions where life was becoming unbearable was publicised very negatively by pro Brexit campaigners prior to the vote on remaining in the EU in 2016. The numbers of people migrating from regions where the climate has become too harsh or from violent conflict will rise hugely in

decades to come. These people on the whole, usually from poor countries, have the least influence on climate change but will sadly suffer the most. They will be forced to migrate to countries where climate change has not made living conditions unbearable. This undoubtedly will include the UK. As a nation we must be willing to accept some of these climate migrants into our communities. Considering that we in the UK have caused a significant release (close to one billion tonnes) of CO<sub>2</sub> since we introduced the industrial revolution in the nineteenth century, we have a moral, ethical and humanitarian duty to do so.

## Relevance of personal equity

- Holding to a 2°C temperature rise is partly an issue of equity and it is essential that wealthy nations make adjustments to their lifestyle.
- The figures are quite startling, showing that the richest 10 % of global population produce 50% of all CO<sub>2</sub> emissions, while the richest 20% of people in the world generate 70% of emissions.
- If the richest 10% of the global population reduced their CO<sub>2</sub> emissions to the same level as the average European citizen, total emissions would be cut by a third!
- There is some good news; more people bought electric cars in 2020. The bad news however is that SUVs continued to grow in popularity. The fall in oil consumption due to the first trend was completely cancelled out by the second. The growing popularity of SUVs is making it even harder to cut carbon dioxide emissions and meet climate goals. There are a number of reasons for this trend. Car manufacturers heavily advertise SUVs as they make more profit. Rising prosperity has led to more people being able to afford them and some people see them as status symbols. We need to persuade consumers to choose smaller and more efficient cars. One of the key, and most difficult, tasks is to make this a reality. No amount of conservation work or energy strategies will be meaningful if world temperatures reach plus 3°C or more, which is the trajectory we are on at present. It is vital that we cut emissions at least 6% year on year if we are to have any hope in meeting the targets needed to stay between 1.5 and 2 °C, which necessitates persuading the wealthy that it is in their interest to make changes

As Professor Kevin Anderson, Director of the Tyndall Climate Centre at the University of Manchester said, *“If we were serious about this crisis we could do this in a year – if we were really serious we could do it in a month, but we are not and our emissions just keep rising.”*

I began this article by referring to data collected from geological records. To end with I will return to records from the past; records which should make us very worried about the future. Dr. R Jones, a consultant oceanographer for the North Wales Naturalist Trust, has argued that information and evidence gleaned from research into events in the Earth’s geological past has largely been ignored.<sup>6</sup>

So how do carbon dioxide levels during the last interglacial period at around 110 thousand years ago, compare with current levels? In that period, CO<sub>2</sub> levels were around 270–280

ppm. This compares with CO<sub>2</sub> levels of approximately 410ppm in 2020. Therefore, we now have CO<sub>2</sub> levels 130ppm higher (approximately 50% higher) than in the last Interglacial when sea levels were more than 6 metres higher than they are now. Past modelling has suggested that sea level rises will be of the order of 1 metre per hundred years. So the question is, are these models and predictions correct? Further data from the study of coral reef cores has shown that in the period following the last glaciation, there have been three major periods of accelerated sea level rise resulting in a rise of five metres in just 100 years. Should we be worried? To link data obtained from the past with present observations, Greenland lost a record amount of ice in 2019 - 15% more than in 2012.

Remember that the above predictions do not take account of the much higher level of CO<sub>2</sub> levels already in the atmosphere now, so they are more likely to be an underestimate. The last time CO<sub>2</sub> levels were as high as they were in 2019 was three million years ago during the Pliocene era, when a variety of plants, including beech trees, were recorded to have grown at Oliver Bluffs, only 330 miles from the South Pole.

As of 2021, the current CO<sub>2</sub> levels are 415 ppm, the highest recorded for 14 million years and these are likely to rise further!!!

Should we be worried? It's inconvenient but yes we should be worried, very worried.

### References

- 1 <https://www.metoffice.gov.uk/weather/climate-change/effects-of-climate-change>
- 2 <https://www.copernicus.eu/en>
- 3 <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf>
- 4 <https://www.climaterealityproject.org/blog/how-climate-change-affecting-uk>
- 5 <https://www.metoffice.gov.uk/weather/learnabout/weather/oceans/amoc>
- 6 personal correspondence
- 7 <https://knepp.co.uk/>