What does history teach us about humanity's ability to adapt to climate change?

Chief Scientist at Greenpeace UK, Doug Parr, said: "This is not the first generation of world leaders to be warned by scientists about the gravity of the climate crisis, but they're the last that can afford to ignore them." [1] With politicians and corporations continuing to fail to take adequate action against climate change, it can feel like the world is rapidly approaching a bleak and bitter future. The same frantic warnings are issued endlessly by scientists and subsequently ignored by those in power while we, powerless, vow to eat less meat and abandon plastic straws. Preventative measures against climate change are ostensibly at a stand-still, leaving the question of our survival to loom in the public perception. Sea levels continue to rise and more areas become unsuitable for agriculture, so we know that adaptation to climate change is now just as necessary as mitigation, but hypothetical obligations fail to sufficiently address our socio-political environment, which has proven time and time again to value profit over human lives. History, however, plants the seed of a hopeful answer for the question of our survival. This is not the first time our planet has experienced climate change, and though it has reappeared stronger than ever before, it is possible for us to adapt to living in what now seems like the world of our nightmares.

When thinking about adaptation, we tend to think in terms of the individual and the biological. In the face of a climate disaster, however, we should aim to adapt as a collective, rather than as individuals. History proves that this kind of action is not just hypothetical, but feasible and effective. For example, in 1985, scientists warned that humanity would destroy the entire ozone layer by 2050. Its destruction would lead to ecosystems and agriculture collapsing, as well as birth defects due to radiation. Soon after the public was notified, aerosol spray sales decreased and companies redesigned their products. In 1986, negotiations began in the UN for a treaty that would ban substances that reacted with ozone in the atmosphere, and by 1989, the Montreal Protocol banned the production of ozone-depleting substances. Today, it is estimated that the ozone hole over Antarctica will close in about 50 years. This was a significant and successful example of human action

preventing climate destruction, and one we can use as a guideline in dealing with climate change today.

Perhaps the most notable historical period of climate change is the Little Ice Age, occurring between the 14th and 19th centuries, during which, temperatures decreased by 0.6℃ in the northern hemisphere [2]. It is important to note the key difference between the Little Ice Age and the climate change that we are currently experiencing - the polarity and extent of temperatures involved. Where temperatures decreased before, they are now increasing, and the temperature change in the Little Ice Age is distinctly smaller than the predicted 2.4℃ rise by 2060 [3]. The Little Ice Age was devastating for the vast majority of the northern hemisphere, causing bad harvests, which, in the agrarian societies at the time naturally led to mass famine, wars and uprisings. Some of the key historical events of the 17th century can be linked back to its effects, for example when droughts and a lack of food encouraged the Qing to overthrow the Ming dynasty in China in 1644, with the Ming emperor surrendering, unable to feed his people who continued to organise uprisings. Africa experienced major droughts between 1640 and 1644, and a 1688 decree from the Qing dynasty forbade widows from killing themselves, suggesting despair was commonplace. Flooding in the Low Countries in 1643 led to cows, sheep and chickens being stuck in trees [4]. With floods, droughts, harvest failures and subsequent disease, a vicious cycle of population decline began, only further compounded by wars. Since economies were so dependent on climate at the time, the Little Ice Age was incredibly destructive.

Despite the severity of the Little Ice Age, there were societies that adapted to it successfully. The people of Nunalleq, a village situated in modern-day Alaska, managed to thrive during this period. The village was primarily occupied between 1570 and 1675 - entirely during the Little Ice Age. As life in the arctic was more unpredictable, the residents were used to change and didn't rely on a single source of food. Diets in Nunalleq consisted of fish, birds, as well as both marine and land mammals. Another group that adapted successfully was the Vikings. Initially settled in Greenland, they were forced to abandon their land in the 15th century due to the cold destroying their farms. They hunted walruses to

trade ivory for iron in Europe - a rare resource in the Arctic. They subsequently created innovative irrigation systems and began to rely on hunting seals and reindeer and less on farming. In North America, the Iroquois also adapted successfully to the cooling climate, favouring hunting over farming and setting up smaller, decentralised networks of villages that shared their resources [5]. The Little Ice Age shows that humanity is capable of adapting to challenging circumstances like climate change. We have more time to prepare than any existing historical society had for a climate disaster, so we are already at an advantage. Inventions of the past half-century like solar panels and electric cars have proven that we are willing to and capable of change.

Many cite the industrial revolution as the beginning of human activities causing climate change through accelerating the carbon emissions of any urbanised and post-industrial society. Accordingly, the causes of the Little Ice Age have been broadly concluded to be natural - a combination of decreased summer solar radiation, as well as the eruptions of volcano dust veils that cooled the planet between 1638 and 1644 [6]. A 2019 study, however, has shown that the European conquest of the Americas in the 15th century led to a substantial land vacancy, causing a 'terrestrial carbon uptake' as reforestation took place [7]. Human action, then, was partially the cause of the world's previous period of climate change, and we have been capable of creating impacts on the climate prior to the industrial revolution, as palaeontologist William Ruddiman argues. Both climate emergencies were caused by the destructive power of human ambition - imperialism and industrialisation respectively.

This raises the question of how useful history's examples actually are for us today. Our material circumstances have changed significantly since the Little Ice Age, so it could be argued that its usefulness as a case study of both successful and unsuccessful climate adaptation is therefore severely limited. We no longer have a climate-based economy, and living in a time of the greatest economic inequality history has ever seen means that the interests of those in power differ from the majority of the population. Societies that succeeded in the Little Ice Age were those which were able to successfully co-operate, and

integrate technological advancements with a respect for the natural environment. While these ideas have been touched on by designers and encouraged by a minority of politicians, it will take a severe change of priorities of those in power before we see humanity successfully adapt to climate change. This may render the ozone crisis a more useful case study, as it is more recent and therefore presents us with feasible actions we could take within our socio-political environment. A crisis was discovered, a cause was found, and a treaty was quickly created in order to avert the crisis. During this time, some companies took the approach of fossil fuel companies today - denying the science. They were fiercely met with scientists and lawyers pushing for bans on CFC aerosols. We are admittedly past the point of aversion of climate change, and so a mixture of these two approaches has to be taken, to prevent further damage and prepare humanity to thrive under new and unforgiving conditions.

On the other hand, it can be argued that history is unable to teach us about humanity's ability to adapt to climate change. After all, the current issue of climate change is more extensive and intensive than ever before. Despite having time to prepare, our leaders have still done remarkably little. Discoveries of climate change date back two whole centuries, but this has not translated quite as neatly as we might like to technological innovation. An organised disinformation campaign paid for by fossil fuel companies has been going on since the 1980s to prevent any meaningful action from taking place, and it is still profanely profitable to exhaust the earth's resources. Our foresight hasn't helped us in preventing or adapting to climate change - many global leaders and CEOs still refuse to cut down on emissions, despite the urgent timeframe we are working with. It can seem as though the lessons history has given us are futile in teaching us how to adapt to climate change.

History, however, is far from futile. It teaches us that we must not only adapt in order to survive in the individual, Darwinian sense but that we must adapt as a collective. We have been taught about climate change through the individual lens for too long - urged to take small actions to reduce our carbon footprint. These can make a difference, but when oil and

gas titans are aided by governments, the odds are stacked against us. This is what creates the sense of futility in combatting climate change. Without considerable development in all aspects of society, from food production and transport to land usage and power, future generations will inherit a world that is barely habitable. In a world ruled by the technical, the virtual and the profitable, the climate cannot go ignored. The Cree Indian proverb goes: “Only after the last tree has died and the last river been poisoned and the last fish caught will we realise we cannot eat money.”

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