

# Climate change and human behaviour



**Climate change is an immense challenge. Human behaviour is crucial in climate change mitigation, and in tackling the arising consequences. In this joint Focus issue between *Nature Climate Change* and *Nature Human Behaviour*, we take a closer look at the role of human behaviour in the climate crisis.**



In the late 19th century, the scientist (and suffragette) Eunice Newton Foote published a paper suggesting that a build-up of carbon dioxide in the Earth's atmosphere could cause increased surface temperatures<sup>1</sup>. In the mid-20th century, the British engineer Guy Callendar was the first to concretize the link between carbon dioxide levels and global warming<sup>2</sup>. Now, a century and a half after Foote's work, there is overwhelming scientific evidence that human behaviour is the main driver of climatic changes and global warming.

The negative effects of rising temperatures on the environment, biodiversity and human health are becoming increasingly noticeable. The years 2020 and 2016 were among the hottest since the record keeping of annual surface temperatures began in 1880 (ref. <sup>3</sup>). Throughout 2022, the globe was plagued by record-breaking heatwaves. Even regions with a naturally warm climate, such as Pakistan or India, experienced some of their hottest days much earlier in the year – very probably a consequence of climate change<sup>4</sup>. According to the National Centers for Environmental Information of the United States, the surface global temperature during the decade leading up to 2020 was +0.82 °C (+1.48 °F) above the 20th-century average<sup>5</sup>. It is clear that we are facing a global crisis that requires urgent action.

During the Climate Change Conference (COP21) of the United Nations in Paris 2015, 196 parties adopted a legally binding treaty with the aim to limit global warming to ideally 1.5 °C and a maximum of 2 °C, compared to pre-industrial levels. A recent report issued by the UN suggests that we are very unlikely to meet the targets of the Paris Agreement.

Instead, current policies are likely to cause temperatures to increase up to 2.8 °C this century<sup>6</sup>. The report suggests that to get on track to 2 °C, new pledges would need to be four times higher – and seven times higher to get on track to 1.5 °C. This November, world leaders will meet for the 27th time to coordinate efforts in facing the climate crisis and mitigating the effects during COP27 in Sharm El-Sheikh, Egypt.

## This Focus issue

Human behaviour is not only one of the primary drivers of climate change but also is equally crucial for mitigating the impact of the Anthropocene. In 2022, this was also explicitly acknowledged in the report of the Intergovernmental Panel on Climate Change (IPCC). For the first time, the IPCC directly discussed behavioural, social and cultural dynamics in climate change mitigation<sup>7</sup>. This joint Focus highlights some of the aspects of the human factor that are central in the adaptation to and prevention of a warming climate, and the mitigation of negative consequences. It features original pieces, and also includes a curated collection of already published content from across journals in the *Nature* Portfolio.

## Human behaviour is a neglected factor in climate science

In the light of the empirical evidence for the role of human behaviour in climatic changes, it is curious that the 'human factor' has not always received much attention in key research areas, such as climate modelling. For a long time, climate models to predict global warming and emissions did not account for it.

This oversight meant that predictions made by these models have differed greatly in their projected rise in temperatures<sup>8,9</sup>.

Human behaviour is complex and multidimensional, making it difficult – but crucial – to account for it in climate models. In a Review, Brian Beckage and colleagues thus look at existing social climate models and make recommendations for how these models can better embed human behaviour in their forecasting.

## The psychology of climate change

The complexity of humans is also reflected in their psychology. Despite an overwhelming scientific consensus on anthropogenic climate change, research suggests that many people underestimate the effects of it, are sceptical of it or deny its existence altogether. In a Review, Matthew Hornsey and Stephan Lewandowsky look at the psychological origins of such beliefs, as well as the roles of think tanks and political affiliation.

Psychologists are not only concerned with understanding and addressing climate scepticism but are also increasingly worried about mental health consequences. Two narrative Reviews address this topic. Neil Adger et al. discuss the direct and indirect pathways by which climate change affects well-being, and Fiona Charlson et al. adopt a clinical perspective in their piece. They review the literature on the clinical implications of climate change and provide practical suggestions for mental health practitioners.

## Individual- and system-level behaviour change

To limit global warming to a minimum, system-level and individual-level behaviour change is necessary. Several pieces in this Focus discuss how such change can be facilitated.

Many interventions for individual behaviour change and for motivating environmental behaviour have been proposed. In a Review, Anne van Valkengoed and colleagues introduce a classification system that links different interventions to the determinants of individual environmental behaviour. Practitioners can use the system to design targeted interventions for behaviour change.

Ideally, interventions are scalable and result in system-level change. Scalability requires an understanding of public perceptions and

behaviours, as Mirjam Jenny and Cornelia Betsch explain in a [Comment](#). They draw on the experiences of the COVID-19 pandemic and discuss crucial structures, such as data observatories, for the collection of reliable large-scale data.

Such knowledge is also key for designing robust climate policies. Three Comments in *Nature Climate Change* look at how insights from behavioural science can inform policy making in areas such as [natural-disaster insurance markets](#), [carbon taxing](#) and the assignment of responsibility for [supply chain emissions](#).

## Time to act

To buck the trend of rising temperatures, immediate and significant climate action is needed.

Natural disasters have become more frequent and occur at ever-closer intervals. The changing climate is driving biodiversity loss, and affecting human physical and mental health. Unfortunately, the conversations about climate change mitigation are often dominated by Global North and 'WEIRD' (Western, educated, industrialized, rich and democratic) perspectives, neglecting

the views of countries in the Global South. In a [Correspondence](#), Charles Ogunbode reminds us that climate justice is social justice in the Global South and that, while being a minor contributor to emissions and global warming, this region has to bear many of the consequences.

The fight against climate change is a collective endeavour and requires large-scale solutions. Collective action, however, usually starts with individuals who raise awareness and drive change. In two Q&As, *Nature Human Behaviour* entered into conversation with people who recognized the power of individual behaviour and took action.

Licypriya Kangujam is a 10-year-old climate activist based in India. She [tells us](#) how she hopes to raise the voices of the children of the world in the fight against climate change and connect individuals who want to take action.

Wolfgang Knorr is a former academic who co-founded Faculty for a Future to help academics to transform their careers and address pressing societal issues. In a [Q&A](#), he describes his motivations to leave academia and offers advice on how academics can create impact.

Mitigation of climate change (as well as adaptation to its existing effects) is not

possible without human behaviour change, be it on the individual, collective or policy level. The contents of this Focus shed light on the complexities that human behaviour bears, but also point towards future directions. It is the duty of us all to turn this knowledge into action.

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## References

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