"Is the UK on track to adapt to climate change?"

Adaptation Conference – 13-14 October 2020

Conference Hosts:

Committee on Climate Change
National Centre for Atmospheric Science
SPF Climate Resilience Champions at the University of Leeds

Summary Note

The climate is changing. The UK's annual temperature has already warmed by over 1°C since pre-industrial levels, and around another half a degree by the mid-2050s is largely inevitable. Global efforts to reduce greenhouse gas emissions will dictate the amount of climate change for the UK. Current pledges by governments to reduce emissions are not yet enough to keep global temperature rise below 2°C, and the COP26 UN Climate Conference next year will be crucial to increasing ambition. At present, the world could be heading for a global average temperature increase of 3°C or more.

A two-day conference was held by the National Centre for Atmospheric Science, the Strategic Priorities Fund UK Climate Resilience Champions at the University of Leeds, and the Committee on Climate Change to examine if the UK is on track to adapt to climate change. Over 300 invited participants debated the climate science and impacts of 3°C+, how far current and planned adaptation efforts go to manage the risks, and what more would need to be done to prepare. Below are ten key reflections that emerged from those discussions.

1. The changes to the UK's climate that have already happened at 1°C of warming are significant. A 3°C+ rise in global temperature would lead to systemic alterations to our society and environment.

What used to be extreme is becoming normal. Heatwave events that would occur twice a century in the early 2000s are now expected to occur twice a decade, and this is causing premature mortality; there were 900 heat-related deaths in summer 2019 for instance. Met Office modelling suggests the chances of exceeding daily temperatures of 40°C are now around 1 in 100, when they used to be 1 in 1000. There has been a 60% increase in heavy rain days since 1900 and Met Office modelling estimates further increases in the future, but we also saw record dry months in 2020. The natural world is changing; Red-Listed species are already threatened and are also more at risk from climate change. Globally, there is evidence in places that the rate of change is starting to outpace the background level of adaptation.

Looking to the future, Antarctic ice melt that has already started could lead to 2m of sea level rise at 2°C of warming. At over 3°C the contribution of Antarctica to global sea level rise would increase substantially, and sea levels would keep rising well beyond 2300. In the UK, we expect to experience more floods, and more droughts; the higher the level of global warming, the worse these will be. In a 3°C+ world, heavy rain events (number of days per year over 50mm) could increase by another 85% over today's level by 2100. Hot spells (two days or more exceeding 30°C) could be 16 times more frequent by the 2070s over southern parts of the UK. At this higher level of warming, some species would become extinct in the UK.

2. The UK is not just at risk from direct climate impacts; it is vulnerable to indirect effects from climate change overseas, which may be more severe than the direct UK impacts.

Climate change is affecting every part of the world. Over the past five years, more evidence has accumulated to show how climate change is disrupting supply chains and food security. These global risks affect the UK through a series of cascade effects. The impacts are hard to model, and in a 3°C+ world they could increasingly affect trade, conflict, finance, and ultimately global stability. The Covid-19 pandemic shows how these complex risk chains can materialise very suddenly and have a large range of knock-on impacts on the economy and society.

Essential for improving resilience is maintaining flexibility. 'Just in time' supply chains with maximum efficiency do not support this. The world is becoming increasingly 'TUNA' (turbulent, unpredictable and uncertain, novel and ambiguous). The complex risk cascades we will experience however require coordinated action from across UK Government departments and the devolved administrations. The UK needs more stress testing, more stockpiles, more system redundancy, more diversification and 'substitutability'.

3. Climate science has become increasingly sophisticated, though key evidence gaps remain.

Climate models are critical to quantify hazards and inform us about impacts that we have not yet experienced. But no model can predict every possible climate outcome. Climate scientists are experimenting with newer, high resolution models, which are projecting a higher frequency, intensity and duration of weather extremes such as heatwaves and storms in a 3°C+ world. In this world, we are in increasingly unchartered territory and the chances of abrupt changes in the climate system also increase. These might lead to further increases in the rate of warming, shifts in patterns of winds and rainfall, or rapid changes in ecosystems. We cannot define precisely what the 'worst case' looks like, and will need to find better language for talking about uncertainty in political spheres, without it becoming an excuse for inaction.

4. Understanding climate hazard is only half of the story; there remains deep uncertainty about future vulnerability and exposure. We need better ways to incorporate socio-economic scenarios and be ready for surprises.

There is poor evidence on the range of possible future scenarios for vulnerability and exposure, which will be dictated by socioeconomic trends as well as changes in climate hazards. For example, demand for water for irrigation and household use will rise in hot dry weather, at the same time as supplies dwindle. Socio-political responses, such as export bans and panic buying, can also amplify rather than dampen risks. These future states are subject to 'radical uncertainty'. We need to make better use of storyline approaches that set out plausible scenarios to understand the range of risks. We also need indicators to measure changing attitudes, changing behaviour, and willingness to pay to reduce the risk of different impacts.

5. We are making improvements in some areas of adaptation response in the UK, though there is still a lot to learn, including better monitoring and join-up between climate science, impact and adaptation research and practice.

Climate change mitigation seeks to limit climate hazards by slowing down global temperature increase and eventually stopping it. Adaptation focusses on vulnerability and exposure to reduce the impacts from hazards and exploit opportunities. There have been some improvements in managing UK vulnerability and exposure, such as reducing water use and leakage and improving flood defence spending. Regulators are joining up, and more stress testing is happening, for example by banks. There is a need for much greater private and public finance for resilience to support these activities. There are great opportunities for innovation here; for new models of insurance, public-private-partnerships, and risk sharing.

More research is needed across all these disciplines however, from fundamental climate science to assessing the economics of adaptation to understanding people's behaviour. We need improved monitoring and modelling of how the earth system, which includes natural and human dimensions, is changing, so that adaptation can be continually informed by emerging new knowledge. Evidence sharing needs to be part of better governance arrangements.

Monitoring and data analysis are fundamental to understanding our risk and could benefit from more join up across the UK, alongside better digitisation of past records. Further efforts should be taken to make the evidence we have more usable for decision makers through co-design of research programmes. Part of this should be a one-stop shop for anyone to access UK and regional climate change indicators.

6. The UK is not yet resilient to the minimum level of climate change we are experiencing. A delay in acting now will result in higher costs and much harder choices later.

Climate change will increasingly affect all of society and the environment; our soils, water, food supply, health, infrastructure, businesses, the economy, and wildlife. Across all of these areas, we are not in a good place in the UK to plan for a 3°C+ scenario. The scale of adaptation is insufficient to manage the risks we are likely to experience at even 2°C of warming, let alone more. But as global temperatures and extreme weather increase, transformational changes to society are more and more likely to be required to prevent unacceptable impacts. At the same time, trying to keep society and the environment as they are now is unlikely to be an option. The concept of 'zero vulnerability' is not used in current policy today, and is also unlikely to be achievable in response to future climate change, or even desirable given the potential costs involved. Whether there are limits to adaptation in the future needs further consideration based on the types of limits (physical, financial, technological) and whether acceptance or retreat are defined as adaptation options.

7. Public support for strong government action has increased.

Public perceptions of the risks from climate change are changing. Understanding of the risks from climate change has improved dramatically over the past ten years, particularly the risks from extreme heat. There is strong public support for policies to build more water storage, tighten building regulations, invest in flood defences, diversify supply chains, help communities to move, and protect and extend natural habitats. Actions that have multiple benefits, such as increasing and maintaining urban greenspace, are particularly important to be doing now.

8. We already know a lot about actions that can have big effects in reducing climate risks, and pockets of excellence exist, but these actions are not yet happening at scale.

The UK needs more action to: (i) reduce the probability of impact (e.g. changing what crops are grown or where): (ii) increase robustness to absorb shocks (e.g. building redundancy into infrastructure networks); (iii) improve advance warning of impacts (such as flood and storm warnings); and (iv) system changes (such as improving governance and capacity for the public to act). To enable adaptation, the UK Government needs to put back a supporting framework of advice, tools and information for businesses and local government, which has been stripped away over the past ten years. The level of resource for coordination of adaptation policy and action across Government also needs to be increased substantially in order to be effective.

9. A national conversation is needed about what the UK should look like in the future as the climate changes.

The Government must articulate what its vision of a well-adapted UK looks like. This vision needs to be measurable and championed at the highest levels in Government. Alongside this, there should be a national conversation - supported through a dedicated citizen's assembly - about national adaptation objectives, acceptable levels of risk, desired resilience standards, how to address inequalities, and responsibilities across society. Indicators should then be monitored to see how well the UK is transitioning to a state of improved resilience.

10. Whilst the challenges of adaptation are great, there are also opportunities, especially for those that move more quickly.

Businesses are waking up to the realities of climate change and the need to adapt. Some are already benefiting from first-mover advantage. There are specific opportunities for the UK, building on our strong science base, to develop quality services that not only build resilience at home but can also be exported worldwide. Financial services is a particular UK strength and area of opportunity.

A key takeaway message from the conference is that climate change will pose profound and potentially catastrophic risks to the UK at higher levels of warming. But there are things that society can and should do to respond to the risks now, drawing inspiration from innovative and effective adaptation that is already taking place, both in the UK and globally. And adaptation must take place alongside and together with mitigation.

We have to consider 3°C+ in adaptation planning. There is no doubt however, that it would bring significant damage to people and ecosystems, and it is a world we should try to avoid at all costs.


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