



Extreme weather, like this flood in 2004 that displaced 30 million people in Bangladesh, is predicted to become more frequent as the world continues to warm.

Time to raft up

Climate scientists should learn from the naysayers and pull together to get their message across, says **Chris Rapley**.

I recently discussed climate change with a British right-wing politician. We both claimed the rational and impartial high ground. But our minds did not meet. He offered stock dismissive arguments: the amplifying processes aren't happening; temperature changes won't be significant; humanity will adapt. He saw climate-change mitigation as a threat to economic progress, and deregulated markets as able to solve any problem. His parting shot was triumphalist: "Among key political power-brokers your case has been lost!"

In the United States, Canada and Australia, climate science has been the focus of right-wing political attack for some time. In the United Kingdom, however, this is a new development. Only four years ago, the UK Climate Change Act passed into law with all-party support. And in 2010, the Conservative Prime Minister, David Cameron, said that he wanted the coalition administration

to be the "greenest government ever". Yet recent decisions by the same government will reduce green-energy subsidies, backsliding on previous commitments.

At the international level, the partisan deadlock within the United States has crippled progress towards global emissions reductions. Todd Stern, the US special envoy for climate change, has now suggested that the widely adopted 2°C limit on global warming may have to be abandoned (see go.nature.com/q7gmvo).

Evidently, the voices of dismissal are trumping the messages of science. A significant factor in their success is an effective communications strategy, which the climate-science community has yet to learn or use. An initiative to redress the balance is crucial if policy-making is to be

based on evidence, and if the risks of further prevarication are to be made clear. As political scientists Daniel Sarewitz, Roger Pielke Jr and others have pointed out, from the perspective of policy, "We know enough!"

REALITY CHECK

A first step is to understand how the dismissal of climate change is tenable when the evidence to the contrary is so extensive and compelling. Much has been published on this by social scientists and psychologists, but that does not mean that it has been read, understood or assimilated by the climate-science community. As former director of London's Science Museum, the British Antarctic Survey and the International Geosphere-Biosphere Programme, my experience is that it has not, particularly at senior levels.

Some material has been picked up, such as Naomi Oreskes and Erik Conway's book

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Merchants of Doubt (Bloomsbury, 2010). Its analysis of the political influence of a network of libertarian activists to stall emissions regulation is understood as a plot perpetuated by “evil” vested interests. This offers a simplistic explanation of an otherwise-perplexing situation. But the insightful writings of social and political scientists, explaining the deeper mechanisms at play, remain largely unknown to most natural scientists. This needs to change.

Part of the problem is that researchers are busy and overwhelmed by information. A lead author on one section of the upcoming report by the Intergovernmental Panel on Climate Change (IPCC) told me that more than 800 papers had been published on her subject in a single year, leaving little time to read more broadly. It is understandable, therefore, that there is a tendency to skip material from unfamiliar fields and authors. But to be of value to society, climate scientists need to master ways to communicate their results effectively (see go.nature.com/euzzf7).

There are also some uncomfortable truths to confront. The unauthorized release of e-mails from the Climatic Research Unit at the University of East Anglia in Norwich, UK, in November 2009 — known as ‘Climategate’ — has left an aftermath that still needs to be cleared up. The climate-science leadership, fixated on delivering more of the same research and seemingly oblivious to changing realities, has lost its way. In my opinion, the community is in denial about these issues. We climate scientists — from disciplines both natural and social — need to align our purpose, re-establish our legitimacy, identify and understand our target audiences and decide how best to express our message. Above all, we need to develop a new, coherent initiative to engage collectively and actively in the political and public discourse.

WHY DON'T THEY GET IT?

A great deal is known about why people reject the messages of climate science. According to Daniel Kahneman in his 2012 book *Thinking Fast and Slow* (Penguin), the human mind can believe almost anything. Unconscious values, attitudes and beliefs filter our assimilation of evidence¹. We are influenced by the views of those with whom we identify, and whose esteem we seek.

Once a mindset is established, dissonant facts are met with resistance. As the economist J. K. Galbraith observed, “faced with the choice of changing one’s mind and with proving there is no need to do so, almost everyone gets busy on the proof.” The more an individual has invested in

their position, the more strongly they will seek to justify it². The greater their scientific training, the more effective they will be at doing so.

We know from Oreskes and Conway’s book that vested interests have worked to sow doubt. And the media practice of offering ‘balanced reporting’ has reinforced public perceptions of scientific disagreement, which is a barrier to engagement and belief³. But the misinformation campaigns resonate because they tap into deeper human needs.

People go to great lengths to avoid or eliminate anxiety⁴. The implications of climate change are profoundly worrying, so people discount, disavow or deny the discomfiting news. Blaming or denigrating the messenger is a common next step.

However, anxiety alone does not account for the fervour of those who are dismissive. An association between climate-dismissive attitudes and people with an individualistic outlook and libertarian politics⁵ suggests an ideological root to such beliefs. The implications of climate change challenge fundamental premises about the governance, funding and fuelling of the modern world. Polarized reactions are not surprising. As I have found in my discussions with politicians, far from having been ineffectively communicated, the messages of climate science may have been understood, in a visceral sense, all too clearly — especially by the political right.

NEED TO REGROUP

So what is a climate scientist to do? First, we must recognize and accept that, whether in discussion with decision-makers or the public, we are inextricably embroiled in the policy debate. The science is complex, the projections are uncertain and the social implications

are great. We need to respond to questions that go beyond facts, such as ‘What does this mean for me?’ and ‘What are our options?’.

As Roger Pielke Jr discusses in his book *The Honest Broker* (Cambridge Univ. Press, 2007), we need to choose the role that is most appropriate to a given situation and make that choice clear. To draw attention to the risk to food supplies of an increased

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probability of extreme weather events is to act as an ‘issue advocate’. To lay out the climatic consequences on the global food supply of the broadest possible range of mitigation alternatives is to adopt the role of an ‘honest broker’. There are dangers. To stray into policy-advocacy or activism is to step beyond the domain of science, and risks undermining legitimacy through the perception — or reality — of a loss of impartiality.

However, as Sarewitz⁶ has pointed out, scientists carry authority “in advocating for one particular fact-based interpretation of the world over another”. So acting as a ‘science arbiter’ — explaining the evidence and contesting misinterpretations — is part of the day job.

REBUILDING TRUST

When faced with implacable disagreement, non-experts must decide who to believe. The issue of trust is therefore paramount. And therein lies a problem.

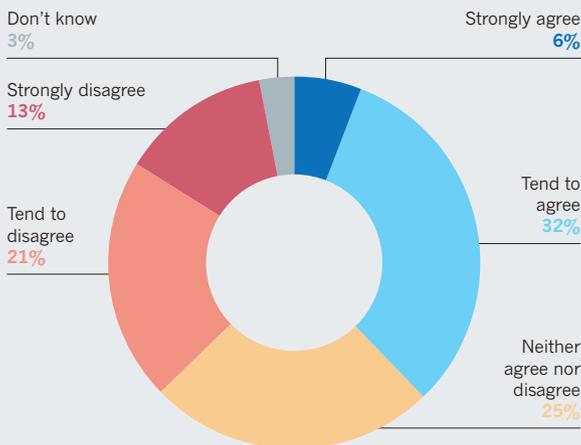
Although levels of trust in scientists are generally high compared to other professions, a study in early 2011 found that only one-third of UK respondents agreed with the statement: “We can trust climate scientists to

tell us the truth about climate change”⁷. One-third disagreed (see ‘Levels of trust’). Such expressions of distrust have been linked with the allegations that followed Climategate, as well as with the assertion by right-wing politicians that climate scientists are perpetrating a ‘hoax’. So the community needs to repair its reputation. But how?

I propose that, as a public statement of our ideals⁸, climate scientists should agree and commit to principles of professional conduct — possibly through an equivalent of the medical profession’s Hippocratic oath. These principles would cover standards of work, issues of impartiality, transparency of process or accessibility of data, and a willingness to engage positively with non-specialists. The 2010 Singapore statement on research integrity offers a framework on which to build (see www.singaporestatement.org). Weaknesses in the peer-review

LEVELS OF TRUST

A recent UK survey found that about one-third of the public agrees with the statement “We can trust climate scientists to tell us the truth about climate change” and that about one-third disagrees. This is concerning in light of other surveys indicating that more than two-thirds of the UK public trust scientists to tell them the truth generally.



process — concerning conflicts of interest and the degree and effectiveness of critical challenge — need to be addressed jointly by scientists and journal editors, and the solutions made transparent and public.

RULES OF ENGAGEMENT

The climate-dismissive think tanks and organizations have been effective because they have understood and put into practice the insights of social science. They deliver simple messages that are crafted to agree with specific value sets and world views. Their flow of commentary is persistent, consistent and backed up with material that provides deeper arguments. Their narrative is spread and amplified by sympathetic sectors of the media and politics that they have nurtured in person.

In contrast, the climate-science community delivers messages to policy-makers and the public that are often highly technical and detailed. These tend to be fragmented, emphasize uncertainty and are oblivious to the emotions and associations that they trigger. There remains a widespread reliance on the flawed information-deficit model, in which non-experts are viewed by experts as empty vessels who can simply be filled with the ‘truth’.

The means of delivering such messages is often through debate, which reinforces partisanship and the impression that established facts remain unresolved. More effective are one-to-one meetings or audience-led dialogue events, such as those developed by the Science Museum’s Dana Centre. This centre engages small discussion groups with experts who cover a range of viewpoints, giving people the opportunity to explore controversial issues and allowing them to make up their own minds⁹.

Regarding the vast body of evidence on which all climate scientists agree, we need to offer a narrative that is persistent, consistent and underpinned by compelling background material. We need to recognize that this is a necessary but insufficient condition for moving political decision-making towards a practical response. We need to appreciate that the things we climate scientists don’t agree on — nuanced disputes at the frontier of our field — are not relevant to policy-making other than to define the current limits of what we know. And we must engage with newspaper editors and politicians in person.

A CALL TO ACTION

Who could organize such an initiative? Climate science extends across many disciplines, represented by no single overarching professional body or voice. One possibility is the Paris-based International Council for Science (ICSU), together with its academic and intergovernmental partners. In March



Influential US senator James Inhofe (Republican, Oklahoma) still claims that climate change is a hoax.

this year, it launched its ten-year strategy, known as Future Earth, which is aimed at revamping its global-change research programmes to better address the needs of society¹⁰.

However, the document disappoints. It provides a vision for a more structured approach with a wider array of partnerships and a closer engagement with decision-makers. But it is written as if Climategate, the rise of the dismissive think tanks and public disengagement had not occurred. These issues are neither acknowledged nor addressed.

Given the need for rapid progress, and with academic leadership focusing elsewhere, a bottom-up approach may provide the way forward.

“There remains a widespread reliance on the flawed information-deficit model.” Experience from the International Polar Year (IPY) in 2007–09 shows how effective this can be. Those of us involved in planning the IPY set out to engage the next generation of polar scientists. We had no clear idea of how this might be done. In the end, the young scientists themselves used social networking to establish the Association of Polar Early Career Scientists (APECS) and to agree and pursue their shared purpose. APECS has become an influential force at the highest levels of polar-science organization and planning.

Similarly, I believe that the Internet provides the forum for like-minded and motivated climate scientists from all disciplines to mobilize and transform the impact of climate science on the public and politics. Such an approach could build on the

work of existing climate-science websites and initiatives, such as Skeptical Science, Real Climate, Carbon Brief, and of course the IPCC, to develop a more coherent, prioritized and tailored set of messages than are currently available.

The warning signals from the planet are clear. Now is the moment for our community to adopt the rallying cry of sea kayakers confronted with conditions too challenging to handle alone: “Time to raft up!” ■

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