The Paris Agreement Has Solved A Troubling Problem

The Paris Agreement on tackling climate change opens for governments to sign this week, four months or so after it was agreed. The momentum created by the new deal, described as a multilateral political triumph, looks set to continue: China and the US are among the 130-odd countries expected to bring the agreement into force by adding their signatures on the first day.

Is this the beginning of the end of the fossil fuel age, as some suggest? Perhaps – its influence is certainly being felt. Peabody Energy, the world's largest coal company, lost 12.6% of its value the day after the Paris deal was agreed. It filed for bankruptcy last week. But even before countries queue to sign, the Paris Agreement could already have solved one of the most troublesome problems in the climate arena, one that has plagued scientists and policy-makers for almost a quarter of a century. And yet almost nobody – scientists included – seems to have noticed.

The Paris Agreement has finally defined the threshold for "dangerous" climate change. It is 1.5C above pre-industrial levels. True, this definition is not explicitly spelled out in the agreement text. It provides it *de facto*. But it is there all the same. And that is hugely significant.

Back in 1992 the world agreed to "prevent dangerous anthropogenic interference with the climate system" by signing up to the UN process on climate. Unfortunately 'dangerous' was left undefined. Politicians asked scientists for an answer and many researchers, me included, batted the question back to them. Dangerous to whom? Climate change disproportionately impacts the poor, the vulnerable and the powerless. Heatwaves tend to kill the very young and very old. Heavy storm events impact those in precarious shanty towns. Of course, high enough emissions will affect everyone, but differentially. Even today's global average temperature of 0.9°C above pre-industrial levels is dangerous for some, even deadly. What risks are acceptable for society? Dangerous, as many have pointed out, is a social and political question of trade-off, justice and ethics that science can inform, but not decide.

From this contested space the figure of 2°C rose up the international agenda. This was chosen by European politicians and their advisors because it was a simple round number, seemed achievable, and would avoid many future catastrophic impacts. By 2010, the UN process noted a 'shared vision' of limiting warming to 2°C. But it was always an arbitrary choice.

At the UN negotiations in Paris in December, a more satisfying solution to the dangerous question, rather obvious in hindsight, slowly emerged. The answer wasn't 2C. And it didn't come from Europe. For low-lying small island states, storm surges and ongoing sea-level rise will make them unviable places to live. Some islands would no longer exist. Whole peoples could become stateless nations. A new grouping of 20 countries in Paris, the Climate Vulnerable Forum, painted dangerous climate change as an existential threat to their very existence. The rallying-cry, "1.5 to stay alive", repeated in forcefully eloquent language in the negotiating sessions, increasingly made sense.

The Marshall Islands then deftly revealed a secret 'high-ambition coalition' at the talks, including many rich and poor countries alike, unravelling old geopolitical alliances, and so allowing a much more ambitious agreement to be reached.

That's a critical part of why China, the US and the rest will this week sign and enter into force a UN legal instrument to hold the mean global surface air temperature to "well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels".

Against the odds, vulnerable states got their message across. Without stringent limits on temperature rises whole nations within the UN system may become stateless, which, self-evidently, is dangerous to those states.

This is good politics, but is it based on good science? Projections of future sea level rise are notoriously uncertain, but on multi-century timescales, unabated emissions would certainly lead to a rise of many metres, as the Greenland and Antarctic ice sheets lose mass. Such losses are non-linear and once begun are essentially irreversible. Recent models suggest much of this could be avoided if

emissions are curbed at 1.5°C. Additionally, climate impacts on staple crops increase drastically after 1.5°C. Scientific evidence is on the side of the small island states.

The emergence of 1.5°C as a serious policy position comes with important lessons for scientists. The global research community has shockingly little to say on the likely impacts of a 1.5°C rise. (The IPCC last week scrambled to commission a special report on the subject.) Most impact studies and future scenario analyses focus on 2°C and higher levels. Few focus on the most vulnerable regions. It is the same bias that neglects the study of diseases that kill millions outside the developed world. Most scientists and most funds for science, after all, are from developed countries, and so tend to follow the agendas of the dominant class of those societies. In this way, science further entrenches inequality.

This bias is also dangerous. And it will continue until more scientists challenge the agenda of their funders and examine their own preferences for research questions to answer.

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