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How I stave off despair as a climate scientist

So much warming, so many dire effects, so little action — Dave Reay reveals how dreams of soggy soil and seaweed keep him going.

There's a curve that is quietly plotting our performance as a species. This curve is not a commodity price or a technology index. It has no agenda or steering committee. It is the Keeling curve. It is painfully consistent in its trajectory and brutally honest in its graphical indictment of our society as one that stands ready to stand by as islands submerge, cities burn and coasts flood.

Established by Charles David Keeling in 1958, the curve records how much carbon dioxide is in our atmosphere — fewer than 330 parts per million then, more than 400 today. Each month for the past decade, my geeky addiction has been to scan the latest data. To search for some hint that 'Stabilization Day' will come: when global emissions and global uptake are once more in balance. As yet another 'last-chance' United Nations climate-change meeting draws to a close, emissions are still rising.

In climate science, you can check out of the lab anytime you like, but you can never leave. The overheating Earth that our super-computers model is the one we all share and which our children will inherit. Dynamic, high-resolution representations of warming trends and weather patterns that delight me as a researcher chill my spine as a human being: I stare at the lines curving up and see the people who endure them.

There are days when refining another obscure step on the road towards climate catastrophe gets you down. Some colleagues reach for gallows humour to keep them going — the quip "we're going to need a bigger boat" is common in the face of the latest damning assessment of global inaction. Others seek solace in uncertainty, grasping at the coolest strands of future projections: the green pathways of a rapid and sustained global response. Many of us — my younger self included, as I expounded in my book *Climate Change Begins at Home* — try to wrestle back an iota of control by cutting our personal carbon footprints and spending our salaries on solar panels, super-insulated homes and electric cars. A few of us have foregone air travel and openly questioned how those who work on climate change can justify a high-emissions lifestyle.

Every tonne of carbon emissions avoided does matter, but unless individual actions are replicated globally, we are pissing in a hurricane. By the middle of this century, the world must reach net zero emissions. So, what more is an academic to do? Write more *Nature* papers? Blockade the university car park? Knit our elbow patches from hemp?

For me, the most powerful response is to teach. By educating new waves of practitioners, policymakers and researchers, I can vicariously boost mitigation and adaptation capacity at scales and across time horizons I could never reach alone. On restless nights, when futures of famine and storm-surge devastation play out

behind my eyelids, that's what helps me sleep.

That, and a personal plot to pull a lifetime's worth of carbon out of the atmosphere.

The dream with which I've bored my family to distraction for the past 20 years is going truly 'net zero': paring down emissions to the bare minimum, and then managing a chunk of land to try to sequester the remainder.

Last month, that dream came true. Years of saving, a large dollop of luck and an even larger loan made me and my wife the nervous owners of 28 hectares of rough grassland and wild rocky shores in the west of Scotland. The coming years will see us map every baseline carbon stock and flux, from the soil and vegetation, to the bemused sheep and 'blue carbon' of the seaweed beds. Each gnarled tree trunk will be hugged with a tape measure, every soggy field corner will be probed, sampled and analysed. We'll then plant trees. Lots of them — native tree species that will boost biodiversity, draw down carbon dioxide and withstand the inevitable turbulent decades and centuries to come.

As a research project, it is a chance to verify the science, and test the concepts of climate-smart land use in the teeth of Atlantic storms and hungry deer. As our future home, it is the chance to finish life as we started it: with an atmospheric blank slate.

Of course, this dream of sustainability is not itself sustainable. My family and I are fortunate to be well-off people in a rich country. To replicate this for every person in the world would require many, many times the area of land that is actually available. We are embarking on a

privileged journey that billions could never hope to take, and that, even at its emissions-trapping best, will hardly register in Scotland's national carbon account. Hopefully, my students can magnify its impact — learn from our trials and errors and help to take such carbon-management expertise global.

We've long known that reaching 'net zero' globally will require our emissions to plummet, but that some emissions are unavoidable. Worldwide, this will necessitate large increases in tree planting, soil enhancement and other such carbon-capture strategies.

The Keeling curve might remain a monthly glimpse into the abyss, but alongside it will now be a personal emissions curve that holds a real possibility of hitting the x-axis. Field trips for my climate-change classes are about to get a whole lot more hands-on. As a carbon geek, I've never been so excited to take my work home with me. ■

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REPRESENTATIONS OF
WARMING
TRENDS THAT
DELIGHT ME
AS A RESEARCHER
CHILL MY
SPINE
AS A HUMAN
BEING.