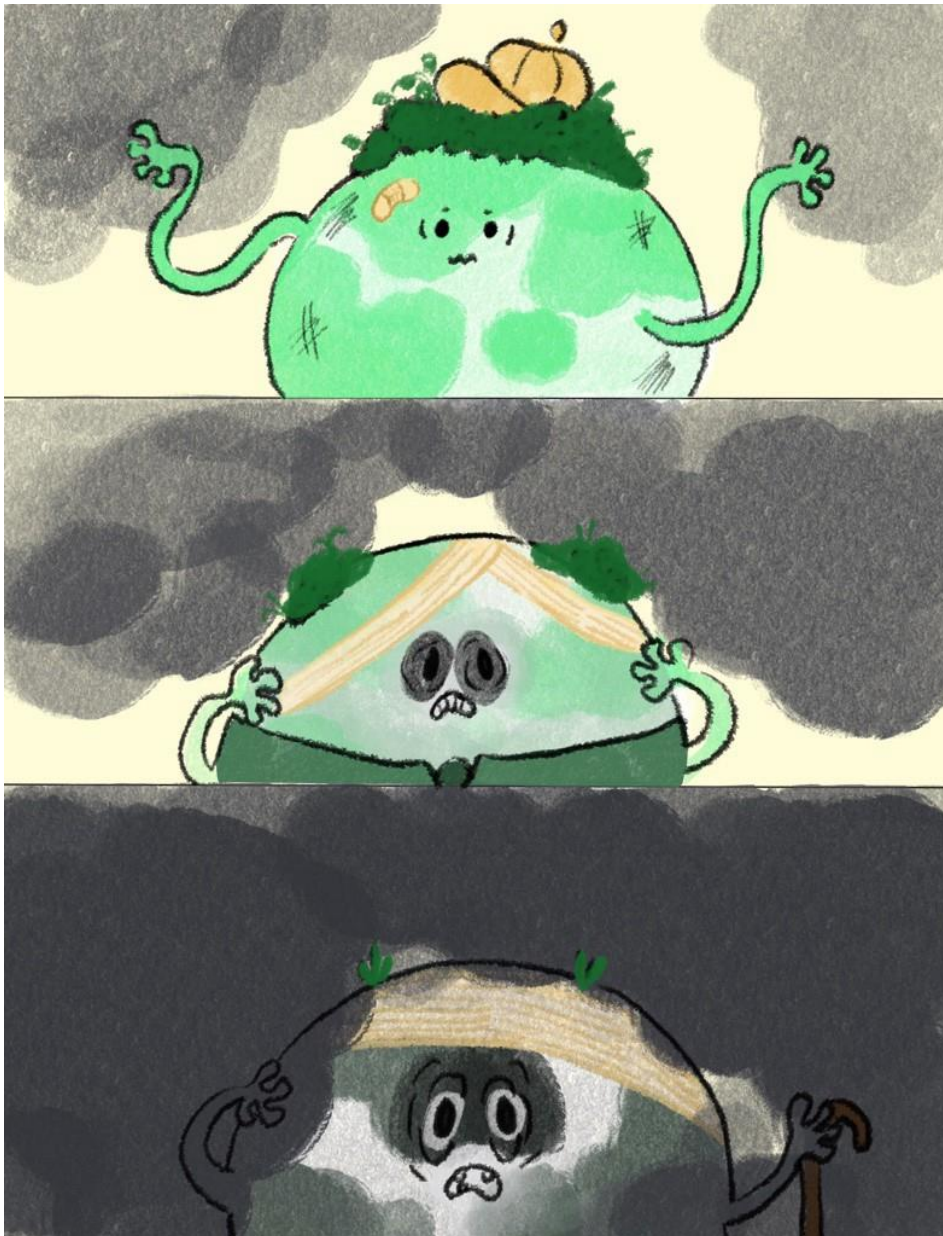


## The world attempts to bend a curve

By Merlin Francis.

*We began 'Climate On Our Mind' on World Environment Day with the word [Resilience](#). It made sense. We are now face-to-face with the crisis. But resilience is the final act — the third of three pillars holding up how we are addressing Climate Change. In today's post — we look at the first two: Mitigation and Adaptation — actions that will determine the future and how we cope with it.*

With [climate change](#), we are at a defining moment in the history of human existence on earth. But where, and when, did you think the story of Climate Change itself begin unfolding?



Increasing levels of Carbon Dioxide in the Atmosphere is threatening the Planet's health. Art by Shayantani Chatterjee, CSTEP

For me, it would be atop Mauna Loa, in 1958, when [Dr Charles Keeling](#) began measuring carbon dioxide levels in the atmosphere. First, he saw [Earth's breathing cycle](#) in the annual variation in

atmospheric carbon dioxide. Exhaling in winter when carbon dioxide levels were high and inhaling in summer when plants used up carbon dioxide.



The Earth has a breathing cycle that naturally removes Carbon Dioxide from the atmosphere during the summer when plants grow.

The first strike on the Keeling graph that emerged from these measurements marks the beginning of the climate change story. The strikes have been adding up ever since, decisively moving upward, ringing the bells, and announcing the climate crisis.



Dr Charles Keeling chose Mauna Loa, a volcanic mountain (Hawaii) to set up a laboratory to study atmospheric Carbon Dioxide.

Scientists like [Eunice Foote](#) and [John Tyndall](#) had established the [warming effect of carbon dioxide \(the greenhouse gas effect\)](#). There was no doubt that rising carbon dioxide levels would increase the earth's temperature.

Finding answers to questions like what began this upward surge and how it would affect us and the planet would form the heart of all our action to limit climate change — first by reducing the gravity of the situation (mitigation) and then by adapting to changes already set in motion (adaptation).

## The First Step: Mitigation

[Mitigation](#) aims to reduce the amount of greenhouse gas released into the atmosphere — by targeting reductions in activities and processes that emit a lot of GHG and by increasing ‘[sinks](#)’ — vegetation on land and in water— which can absorb the excess amount of CO<sub>2</sub> (a repeat of earth inhaling during summer).

The timing of the sharp increase (mid-1700) indicated fossil fuels were present at the scene of the crime. Burning fossil fuel is the only way that such large amounts of carbon dioxide can be added to the atmosphere in such as relatively short time. The third piece of [evidence](#) was the changes in the ratio of the three specific carbon [isotopes](#). Scientists were observing more isotopes that came from burning old terrestrial plants long buried under the ground — firmly pointing the finger at the burning of fossil fuel — a human activity — in contributing to global warming.

Electricity generation and transportation are the biggest consumers of fossil fuels; agricultural activities, on the other hand, emit large amounts of methane and nitrous oxide — two other greenhouse gases contributing to global warming. Mitigation strategies look at how reductions in GHGs from these sectors can be made, use carbon sinks to absorb the excess, and aim to eventually stabilise greenhouse gas levels.

## The Second Step: Adaptation

Mitigation strategies are aimed at bending Keeling’s Curve downward. But the curve turned upward long before we began observing it and has continued to do over the years. In 2013, carbon dioxide levels hit 400 ppm, crossed 400 soon after, and in 2022 stands at 421 ppm. We cannot hide from nature’s reaction to the consequences of the doubling levels of carbon dioxide and the heat it traps within our atmosphere. Where would we go?

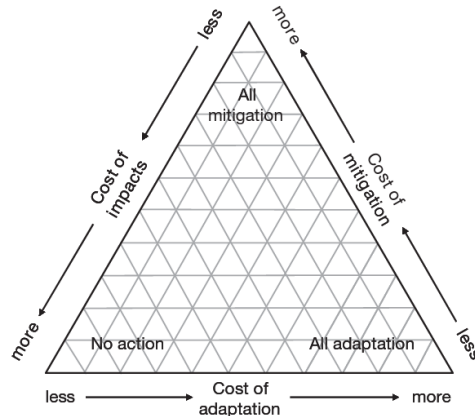
And so, [adaptation](#) — the second pillar of our climate strategy — is critical. Adaptation is about finding ways to live with the upward curve in Keeling’s graph, to adapt to the increasing frequency and intensity of heat waves, floods, droughts, erratic weather changes, ocean acidification, melting glaciers, and rising sea levels.

### Can we choose between the two?

This has been a tempting option for many considering the limited resources at disposal (money matters). Mitigation and adaptation are two very different approaches to climate change. Mitigation addresses the root of the problem, requires global action, and the results, while it will take time to show, will benefit everyone. Adaptation, on the other hand, focuses on dealing with the effects, is rooted in local contexts, and benefits sections of people. For developing countries, mitigation will mean looking at alternative routes for development that will slow development goals like poverty alleviation while having to face the repercussions of activities undertaken by developed countries for their development. Where is the justice in it?

*Tempting as it is, no, we (neither rich nor poor countries) don’t have that choice anymore. We may have had a brief window in the early 1990s, but the unchecked rise in emissions has closed this window. Scientists estimate that if we do not implement strong mitigative action, carbon dioxide levels in the atmosphere will hit [600–900 ppm by 2100](#). We have already crossed important thresholds; we are experiencing some of the effects and others we will be facing soon. By ignoring increasing emissions instead of checking them, the magnitude of climate change will become so big that adapting to it becomes impossible.*





A schematic overview of inter-relationships between adaptation, mitigation and impacts, based on Holdridge's life-zone classification scheme (Holdridge, 1947, 1967; M.L. Parry, personal communication). Source: Klein, R.J.T., S. Huq, F. Denton, T.E. Downing, R.G. Richels, J.B. Robinson, F.L. Toth, 2007: Inter-relationships between adaptation and mitigation. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 745–777.

Secondly, if we simply continue emissions irresponsibly, we are taking away the [future generation's](#) right to life, clean air, and clean water.

But the issue of [climate finance](#) (developed countries contribute to the expenses of mitigative and adaptive action in developing countries) has remained contentious and unresolved with only a fraction of the commitments made being fulfilled.

Meanwhile, we have crossed climate thresholds that do not bode well for the planet we depend on for our survival. Greenhouse gases are at an all-time high; in the last 7 years, we came very close to global temperature increasing beyond 1.5 degrees; ph levels in the ocean are at an all-time low, indicating rapid acidification of the [ocean](#) — something we cannot reverse in this or the next century.

The upward-moving Keeling Curve stands witness to a dying planet and its people. It is impossible not to have climate on our minds.

*On Climate on Our Minds, we discuss the Climate Crisis in the hopes that it can lead to better Climate Action. Follow us on [Twitter](#) for updates on upcoming/ articles.*

*We are also on [LinkedIn](#) and [Instagram](#). Visit us on these platforms to learn about how we are building scientific evidence to support policy decisions.*