Climate change: Let's ask the right question.

By Australia's Chief Scientist Professor Ian Chubb

After his three recent articles on climate change, most recently in Wednesday's *Australian,* it is clear that Maurice Newman and I can agree on a number of things. We can now agree, for example, that climate change is real, not a myth or a delusion. We can agree that he is not a climate scientist; and we would agree that I am not one either. We would, I think, agree that 'climate' is the result of complex interactions of multiple variables, many of them natural – but I would say not all.

We diverge when it comes to the impact of greenhouse gases. While we agree that carbon dioxide is a greenhouse gas, Maurice Newman wrote of 'the myth of anthropological climate change' and suggested that it is one in a list of popular delusions.

Others will doubtless address some of the details he has raised. I start in a different place and ask a simple question. We have so far pumped two trillion tonnes of a greenhouse gas, CO_2, into our atmosphere since the industrial revolution, at a rate faster than ever before. Why would we presume that it would have no effect?

If the answer were simple, we would know it. So we have to use the evidence we have to assess the impact now; and we have to use the data to build models to estimate what the impact might be in the future.

Right now we know that as CO_2 levels in the atmosphere increase, so too does the amount of CO_2 absorbed by the ocean – with the effect of making the water less alkaline (or more acid). Why would we presume that would have no effect on marine life? We also know that the heat content of the oceans has increased consistently although the rise in atmospheric temperature recently is flatter. Why would we presume no effect on the currents, winds and evaporation and a subsequent impact on climate? We know the planet is warmer than pre-industrial times. While some might dismiss this as just a few tenths (0.9°C) of a degree, I wonder if they'd be as sanguine if their core body temperature increased by the same few tenths of a degree.

There will be regional variations. There are differences even within Australia: temperatures in some regions have increased by 2°C over 50 years while others have experienced little or no change. Our average change is 0.7°C.

We know that greenhouse gases in the atmosphere are important. If there were none, it has been estimated that the global temperature would be around -18°C rather than the average near 15°C we currently enjoy.

We also know that the relationship between CO_2 and temperature is not linear. Uncertainty about the sensitivity of the climate to changing CO_2 means models yield different projections. As an editorial in yesterday's Nature opined: *some have argued, in part on the basis of current temperature trends, that climate models tend to overestimate* warming…*but the evidence cuts both ways*. Some seem always to presume the errors only occur in the direction favourable to their argument. Notwithstanding the range, current models point out a direction, and the direction is up.

So we know that climate is a complex, complicated matter and that there are multiple variables. Does that mean that we don't use all the information we have to estimate what might be ahead? Does it mean that we do nothing about one variable over which we have some control – the emission of greenhouse gases? Does it mean that because there are uncertainties we do nothing?

I am sure that Maurice Newman and I would agree that much of what should be a debate has turned into 'low-grade' and often personalised argument. What it should be is a healthy and constructive discussion based on all the empirical evidence, not bits of it, with an eye to the implications for our health, well-being and prosperity in the longer term.