

CLIMATE CHANGE

A Hard or Soft Landing?

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If we are mindful of the recent media hype and overt propaganda about climate change then there is every cause to worry for the future of agriculture and pastoralism in Australia. From every direction we are being assaulted with warnings of the dangers from human caused climate change. These prognostications have generally caused alarm within the community.

Tim Flannery's book, "The Weather Makers" has taken human caused climate change as a scientific fact and, based on computer models of the complex climate system, projects a warmer and more hostile world. He elaborates on the dangerous impacts this would have on the environment and on humankind.

Sir Nicholas Stern, Head of the UK Government Economics Service and Adviser to the UK Government on the economics of climate change and development, has presented his commissioned report to the world. The development of the Stern Review was supported by UK government departments and accorded with UK government policy.

The principal finding of the Stern Review is that it is better to act early to reduce greenhouse gas emissions rather than wait until climate change happens. Early action will be least costly overall then to wait and have to act later, both to drastically cut back on greenhouse gas emissions and also change economic and social systems that are affected by dangerous climate change.

The Stern Review estimates that early action will cost no more than one percent GDP growth against likely 20 percent impact later. However a one-percent reduction in GDP growth is unlikely to be felt evenly across the economy. Reflect on the fact that the current drought has had about a one-percent effect on the Australian GDP but has hit the rural communities almost exclusively. Decarbonisation of the Australian economy will be felt most strongly in transport fuel costs and will also be felt in rural communities.

Former US Vice-President Al Gore launched his academy award winning documentary and accompanying book, both titled "An Inconvenient Truth", to an adoring and largely uncritical media reception. Gore's prophecies of melting ice caps, rising sea levels, more hurricanes and the widespread loss of species, including iconic polar bears and emperor penguins, received wide publicity and has helped to sway public opinion on the need for action to address climate change.

In February the Intergovernmental Panel on Climate Change (IPCC), a UN sponsored body, released its Fourth Assessment of the science of human-caused climate change. The IPCC concluded that it is very likely that most of the global warming of the last half of the 20th century was caused by human activities. Moreover, the report endorsed computer-based estimates of global warming of between 1.4C and 5.8C during the 21st century and sea level rise of up to a half a metre.

In April the IPCC released its latest report on the impacts, adaptations and response strategies necessary to address the projections outlined in the science report. Based largely on data sets collected since 1970, the report concluded that many natural systems are being affected by climate change. By implication the impacts are caused by human activities, especially to fossil fuel burning. In all cases the change is perceived to be detrimental.

From the well-orchestrated media hype following the release of the Flannery and Gore publications, and from the UN assessments, the public would be excused for concluding that people of the developed world are making a mess of the environment and jeopardising the future of humanity. This contrasts with the facts that the cleanest air, the purest drinking water, the most productive lands and the most resilient societies are those of developed countries utilising the technologies of industrialisation.

Is dangerous climate change a reality?

Should western civilisation revert to the so-called environmentally friendly and more natural practices of earlier times through decarbonisation of our western lifestyle?

Or is the danger of human-caused climate change being oversold?

Let us look at some facts.

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There is no doubt that the rate of burning of fossil fuel has increased since the late 1800s, especially oil and gas since the 1950s. Burning of fossil fuels amounts to more than 7 GtC/year

Atmospheric CO₂ was consistently about 280 ppm until industrialisation took off in the late 1800s. It is now about 400 ppm, an increase of nearly 50 percent.

CO₂ is a greenhouse gas. We can conclude that human activities have caused the PAST global temperature rise and further burning of fossil fuels will cause further temperature rise.

To Paraphrase the late TV personality Professor Sumner-Miller, “Is this so?”

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Global mean temperature as measured by instruments has increased since the late 1800s, although the main temperature rise was in two periods, 1910-1940 and 1975-2000. IPCC explains the temperature record as follows:

- The increase from 1910 to 1940 was due to an increase in the Sun’s intensity.
- Even though CO₂ concentrations were increasing sharply post-WWII the temperature did not rise because of the particulate matter coming out of the chimneys that reflected solar radiation back to space.
- Industrialised countries introduced clean air legislation that reduced the emission of dirty particulates and so carbon dioxide began to take effect.

This is a seemingly plausible but, in reality, unlikely explanation.

Reconstruction of Northern Hemisphere temperature over the past 1,000 years, and accepted by IPCC, suggests that temperatures were generally constant or even cooling until the dramatic rise of temperature in the 20th century.

On the face of the evidence presented by the IPCC we have a remarkable correlation during the 20th century:

- Atmospheric CO₂ concentration has increased due to human activities, and
- global temperature has risen.

Let us look more closely at the evidence, particularly of the claim that climate and global temperatures were stable prior to industrialisation.

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An analysis of historical records in the region of the French Alps (Emmanuel Leroy Ladurie – “Times of Feast, Times of Famine”, 1974), especially in the Arve Valley around Chamonix, clearly record the advance of glaciers into the valley during the 15th and 16th centuries. The glaciers persisted in an advanced state during the 17th and 18th centuries before commencing to retreat in the early 19th century.

The duration of glacier advance is a well-documented cold period in Europe known as the Little Ice Age.

Frost Fairs were common on many rivers of Europe and the London diarist John Evelyn records that in 1683-84 the Thames River froze from late December to early February.

Conditions were terrible with men and cattle perishing and the seas locked with ice such that no vessels could stir out or come in. The fowls fish and birds and exotic plants and greens were universally perishing. Food and fuel were exceptionally dear and coal smoke hung so thickly that ‘one could scarcely see across the street and one could scarcely breathe’.

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The advance and retreat of the Great Aletsch Glacier at the head of the Rhone Valley has been analysed by the alternating layers and of variations of peat and sand in the moraine region. Peat grew when the glacier had retreated but sand accumulated as the glacier advanced depositing material scoured from the higher mountains.

The advance and retreat of the glacier over the past 2,000 years corresponds to well-documented periods of European history. The advance of the first millennium following the fall of the Roman Empire corresponds with the Dark Ages. Independent analysis identifies this also as a period when glaciers advanced along the northern Rocky Mountains of Canada and Alaska. The retreat between about 800 AD and 1200 AD corresponds to the Medieval Warm Period when Eric the Red and fellow Norse settled Greenland. The glacier advance of the Little Ice Age and the retreat during the modern period of warmth are also clearly evident in the analysis.

In 1966, before human-caused global warming was a matter of public debate, the English historian Kenneth Clark (in “Civilisation”) wrote the following:

“There have been times in the history of man when the earth seems suddenly to have grown warmer or more radioactive..... I don’t put that forward as a scientific proposition, but the fact remains that three or four times in history man has made a

leap forward that would have been unthinkable under ordinary evolutionary conditions. One such time was about the year 3,000 BC, when quite suddenly civilisation appeared, not only in Egypt and Mesopotamia but in the Indus Valley; another was in the late 6th century BC, when not only was there the miracle of Iona and Greece – philosophy, science, art, poetry, all reaching a point that wasn't reached again for 2,000 years – but also in India in a spiritual enlightenment that has perhaps never been equalled. Another was about the year 1100. It seems to have affected the whole world; but its strongest and most dramatic effect was in Western Europe In every branch of life – action, philosophy, organisation, technology – there was an extraordinary outpouring of energy, an intensification of existence.”

As an example, the Medieval Warm Period was the period of building great stone cathedrals across Europe when surplus food stocks would have been essential to feed the workers.

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We are regularly shown photos of the Arctic Ocean and expanses of open water that we are told represent melting of sea ice due to human-caused global warming. The photos of ice-free parts of the Arctic Ocean are presented as evidence of the retreat of polar sea ice due to global warming.

The fact is, as satellite observations show, there is a very large and natural cycle of polar sea ice growth in winter and melting in summer.

During the Little Ice Age, sea ice of winter extended from Greenland to encompass Iceland and made navigation in the North Sea Hazardous. There are reports from the Little Ice Age period of Eskimos, who are adapted to survival in the harsh polar environment, being sighted on the Faroe Islands.

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The large seasonal oscillation of Arctic sea ice extent has an amplitude of more than 8 million sq km. Over recent decades of satellite monitoring there has been a decrease in the overall extent. This is consistent with warming since the Little Ice Age.

There is no discernible change in Antarctic sea ice extent over this period.

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One of the scare scenarios promulgated by activists is that human-caused global warming is likely to melt the Greenland ice cap, thus raising sea levels by several metres.

- 120,000 years ago the world was warmer than it is today and a large part of the Greenland ice cap did melt and sea level was higher than today.
- Today the Greenland ice cap is melting around the periphery and coastal regions are again settled, just as during the Medieval Warm Period. Greenland became uninhabitable during the Little Ice Age and the last colony collapsed in the middle 16th century. Settlement recommenced with the establishment of a trading post in 1721.
- It is not clear whether the Greenland ice sheet is growing or contracting because ice is accumulating over the high inland and melting around the periphery.

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We are warned that global warming and melting of polar ice caps will lead to dangerous sea level rise and the drowning of low-lying islands and coastal margins.

Satellite derived estimates suggest that recent sea level rise of 2-3 mm/yr is no more than the average for the 20th century. There is significant year-to-year variation but no accelerated rise is evident from observations.

Large sea level rise accompanies El Nino events when the tropical Pacific Ocean surface temperatures warm.

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The Greenland ice core record clearly shows the transition from the Last Glacial Maximum to the present relatively warm Holocene.

20,000 years ago Earth was in the grip of glacial conditions.

- Great ice sheets covered North America and northern Europe, much as Greenland and Antarctica are covered in ice today.
- Over North America the ice sheet boundary extended from Vancouver through St Louis to New York.
- London was at the southern extent of the European ice sheet.

During the last glacial epoch sea level was 130 metres lower than it now is. Tasmania and New Guinea were connected to Australia by a land bridge and the separation from Asia was a waterway about 100 km wide.

Within the Holocene of the last 10,000 years temperatures were generally slightly warmer than now. The recent global temperature variations, including the Medieval Warm period and the Little Ice Age, are small.

Precipitation and snow accumulation increased with the warming.

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A deep ice core from Vostok in Antarctica confirms that Earth has mostly been in glacial conditions for the past 500,000 years, emerging for relatively brief warmer periods approximately every 100,000 years. The glacial cycles are believed to be regulated by Earth's orbital variations around the Sun.

Carbon dioxide concentration increases and decreases following the Earth's temperature variations.

Increased dust accumulations over Antarctica during the glacial conditions confirm that continents, including Australia, were generally dry with extensive desert conditions during the colder glacial periods.

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Satellite monitoring has established increased plant growth over the past few decades that has accompanied global warming. This is especially the case over regions affected by winter ice and snow where the thaw is earlier and growing season is longer.

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Australia's agricultural productivity is mainly affected by rainfall variations, not temperature variations.

Very dry years, with rainfall about two-thirds of average, occur about every 15 years. 'Average rainfall' is more the exception and land and water managers must have plans to deal with flood and drought.

The annual rainfall deficit over southeast Australia during 2006 was not exceptional and certainly not 'the worst in a thousand years' as some politicians claim. Other recent dry years were 1982 and 1967.

Efficient land and water management are not only about rainfall in the current year. Sequences of dry or wet years affect reservoir and soil moisture capacity.

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The accumulated rainfall anomaly tracks sequences of below or above average rainfall.

There was a shift in rainfall pattern over southeastern Australia during the middle 1940s and again about 1990.

In the early half of the 20th century average rainfall was less than in the later half. About 1990 the rainfall returned to the pattern of the early 20th century.

There is no correlation between these shifts in rainfall pattern and carbon dioxide concentrations.

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Australian rainfall is significantly affected by sea surface temperature over the equatorial Pacific Ocean.

The warm tropical oceans that provide heat and moisture to the atmosphere occupy a layer of the ocean surface about 300 metre thick. Below is the cold abyss extending about 5 km deep.

Wind circulations and the internal dynamics of oceans affect the temperature of the surface waters.

During El Nino events, such as 1997-98, warm surface waters spread eastward. Through shifts in the location of deep tropical convection there is an impact on the global climate, including the air circulation and rainfall producing weather patterns of Australia.

During 2006, a drought year, surface water was generally warmer than normal although this was not a typical El Nino pattern.

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The current Pacific Ocean conditions are more favourable for winter rainfall. Warm water is returning to the western Pacific with upwelling and cooler water over the eastern Pacific Ocean. The pattern is not well structured and could quickly revert to more El Nino like conditions.

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For rural industries reliant on land and water management there is no soft landing. Climate is forever changing between extremes.

Future climate states as predicted by computer models are no more than scientific curios. They should not be relied upon for planning purposes. For a traveller in unfamiliar territory, an unreliable map is more of a danger than no map at all.

Environmental propagandists, such as Tim Flannery and Al Gore, insist that laws should be passed to regulate our behaviour and ensure climate returns to what it was in pre-industrial times – just like in Camelot where King Arthur mandates:

*“Its true! Its true” The crown has made it clear!
The climate must be perfect all the year.”* (Lerner and Lowe)

We do not live in Camelot. We can neither control nor predict future climate

Climate variability and change are hazards. If civilisations are to survive then social infrastructures must be sufficiently robust, resilient and adapting to withstand climate extremes, variations and changes.

Fossil fuels are non-renewable resources and the rapid rate of utilisation is a separate and real problem. It has nothing to do with living with the hazards of climate.