PUTTING THE CLIMATE DEBATE INTO PERSPECTIVE

PLANTS USE CARBON DIOXIDE TO GROW OUR FOOD

The Fair Farming Group

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Policy outcomes from the climate debate may well have enormous, long-term adverse consequences for the economy, food security and our living standards.

The following questions and answers show how carbon dioxide is beneficial for the production of food. The questions also examine the validity of the claim that carbon dioxide drives climate change and global warming. The answers have significant implications for the community and for industry, particularly Agriculture.

1. Why have market gardeners added carbon dioxide to glasshouses for the past 100 years to achieve carbon dioxide levels near 1000ppm?

Carbon dioxide has been added to stimulate plant growth and food production. The atmosphere is now actually carbon dioxide impoverished and at a level (385ppm or 0.0385%) which limits plant growth.

In the past, carbon dioxide was many times the present level. Over geological time the equivalent of 65,000,000 billion tonnes of carbon dioxide has combined with calcium mainly in marine skeletal material to form limestone. This process continues today.

In more recent geological time, some 3,000 billion tonnes of carbon dioxide was captured by plants which have formed fossil fuels. Carbon dioxide levels have fallen from between 2000 and 3000ppm when fossil fuels were formed to the present level of near 385ppm.

2. Would increased carbon dioxide as a consequence of industrialisation improve plant growth and help feed a growing world population?

Yes, modern plants evolved when carbon dioxide levels were many time greater than at present. Plants generally have responded positively to increased carbon dioxide levels. It is estimated there would be an increase of up to approximately 30% in plant growth including pastures by 2050 if current trends continue.

3. Is there any reason to believe that climate would change more than in the past with increasing carbon dioxide in the atmosphere?

No, scientists have established that climate has always changed, with the globe fluctuating between warming and cooling periods independent of carbon dioxide levels. There were at least four Ice Ages in the Earth's history when carbon dioxide levels were higher than at present. During the Holocene Optimum (4,000 to 8,000 years ago, the warmest period since the last Ice Age) temperatures were warmer than now, but carbon dioxide levels were only about 270ppm compared to the current level near 385ppm.

Since the Holocene Optimum, Earth's temperature has tended to cool, fluctuating between warmer and cooler periods lasting several centuries.

The effect of these warm and cold periods was quite dramatic. In the Early Cooling Period (1300 to 800BC) the Tiber River froze over, and during the Little Ice Age (1280 to 1850AD) King Henry 8th held a party on the frozen Thames. In the Medieval Warming Period wheat was cropped in Greenland, which illustrates that an Arctic ice melt may occur without man-induced emissions.

Over a long period in which there is relatively limited climate change overall, there may be wide fluctuations in particular regions. For example, the Arctic was warmer between 1920 and 1940 than it is now, despite carbon dioxide levels being lower. Again, the Murray Darling Basin has experienced extremes of climate since records were kept. This includes the current drought period. However, statistical analysis of the Bureau of Meteorology rainfall records shows there has been no decreasing or increasing trend in rainfall in that area over the past 108 years.

The UK Meteorological Office and satellite measurements have confirmed that temperature has not risen since 1998 as computer models predicted despite carbon dioxide levels increasing over this period.

The above observations provided evidence there has been no consistent relationship between carbon dioxide levels, climate and world temperature. Computer models which forecast global temperature to increase with increasing carbon dioxide levels are therefore not consistent with observed facts.

The simple explanation that carbon dioxide drives temperature fails. It ignores the impact of oceans, which are the major global store of energy and carbon dioxide, solar activity and other relevant influences.

Recent reports underline the uncertainties about "climate science." They include the leaked Hadley emails with the revelation of manipulated tree ring data to support the global warming hypothesis, for example through the now discredited "hockey-stick" graph. This graph purported to show runaway temperature with increasing carbon dioxide levels.

More recently it has been revealed that the UN Intergovernmental Panel on Climate Change (IPCC) 2007 Report, that most of the Himalayan glaciers would melt by 2035, was mere speculation based on an unsupported statement made by an Indian research scientist. The IPCC had claimed that this was "very likely" which by its definition means a probability of greater than 90%.

In a further controversy, the IPCC repeated at the 2009 Copenhagen Conference its 2007 claim wrongly linking global warming to a rise in natural disasters such as hurricanes and floods. This advice to the Conference ignored a 2008 caveat on the relevant report to the IPCC that stated, "we find insufficient evidence to claim a statistical relationship between global temperature increase and catastrophic losses."

Turning to Australia, preliminary findings from the Australian Institute of Marine Science (AIMS) 2010 survey of some of the most vulnerable parts of the Great Barrier Reef show that it is "not at threshold" to bleach as widely reported. The bleaching in 1998 was due to an El Nino episode in the Pacific with hot and still conditions that warmed the reef shelf water to the point where some coral bleaching occurred. This had triggered alarm about the potential for mass bleaching. Although there was another mild bleaching episode during 2002, also associated with an El Nino event, reef corals have largely recovered to pristine levels.

4. Is it possible for temperatures to increase to dangerous levels as forecast?

No, there are two main forces at work which have stabilized temperature during warming periods –

- The ability of carbon dioxide to enhance re-radiation heat causing global warming decreases with increasing concentration. The carbon dioxide is already at a level where the effect is greatly reduced. It has been projected that if hypothetically all the currently known world resources of fossil fuels were burnt carbon dioxide in the atmosphere would about double. This would only cause a small enhancement to the greenhouse effect and for global temperatures to increase by 0.7 degrees centigrade (Earth surface energy budget supported by the University of Chicago MODTRANS radiation calculator).

- Increasing evaporation from the oceans damps temperature increases. Satellite measurements show that the rate of increase of evaporation is 3 times greater than that predicted by computer models. So the computer models may well overestimate temperature increases.

By moderating temperature the above factors also moderate the rise in sea level during warming periods. During the warming period following the Little Ice Age the sea level has risen more or less on a regular trend over the past 300 years at the rate of 10.4 centimeters per century. This is almost all related to glacial melt water. There has been no noticeable increase in this rate following industrial development. Over the same period the global temperature has increased by 2 degrees centigrade.

The current warming period may continue for many years or could change to a stable or cooling period. Some climate experts see the latter as the most prospective. There is more to fear from a cooling period. The analysis of ice cores shows that the ice ages were cold, dry and dusty while the interglacial periods were warm and wet.

5. In the Carboniferous Age when fossil fuels were formed was there dangerous global warming?

When carbon dioxide levels were between 2,000 and 3,000ppm this was a very good time for life on Earth and for growth of the vegetation which subsequently formed fossil fuels. The eminent scientist Professor Richard Dawkins described the period as supporting abundant plant and animal life. At that time carbon dioxide levels were between 5 and 8 times the present level and the evidence shows that these conditions were favourable for life on Earth. These levels are far in excess of danger levels predicted by the IPCC.

6. Is methane from grazing animals a factor causing global warming?

Recent research shows the increase in methane emissions during the 20th Century can be explained by the dramatic increase in natural gas use and leakage from inefficient transmission and distribution systems. Proper maintenance of the Russian pipeline system and replacing cast iron distribution piping by continuous pipe has reduced this source. It is no longer significant. Levels have shown no steady increase since 1990 and have in fact varied in a pattern following El Ninos. This would be a reflection of natural variability.

Agricultural emissions are not causing an increasing trend in atmospheric methane. Grazing animals may account for 20% of annual global methane production but this is balanced by breakdown in the atmosphere to carbon dioxide. Methane emissions from grazing animals are therefore not a cause of global warming.

Grazing animals do not produce carbon; they only release what has been fixed from the atmosphere by the pasture they consume. This process, which recycles carbon over a short term, is carbon neutral. This is the same closed cycle which is recognized to justify biofuels.

7. Will increased carbon dioxide make oceans acid?

No. The ocean is alkaline and ranges from about 7.9 to 8.2 pH (less than 7.0 pH is acidic) depending on location. Minerals dissolved in sea water react with dissolved carbon dioxide to neutralize it and thus safeguard the ocean against significant change in pH levels. This would occur with massive infusions of carbon dioxide well in excess of what is being generated by human activity.

Conclusion

Mankind is simply returning to the atmosphere carbon dioxide which has become deficient and thus limiting to plant growth at a time when more food is required for a growing world population. Carbon dioxide is essential for all plant life and thus not a pollutant. This paper provides evidence the release of carbon dioxide will not cause dangerous global warming. It follows that an Emissions Trading Scheme (ETS) which would impose a severe cost penalty for Agriculture and for the economy overall is not required. From the perspective of food production an ETS would also be inappropriate.

The evidence supports the conclusion we need carbon dioxide rather than fear it.

The Fair Farming Group

The Fair Farming Group advocates fair and reasonable treatment of Australian farmers based on sound science. Formed in 2009 its members have extensive agricultural experience and business and academic backgrounds.

Directors of the Fair Farming Group comprise: Bob Officer, Andrew Miller, Richard Morgan, Mark Rayner & John Chambers. Consultant to the Group, Australian physicist Dr. Tom Quirk.

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