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The ethical duty to reduce greenhouse gas emissions in the face of scientific uncertainty

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The Ethical Duty to Reduce Greenhouse Gas Emissions in the Face of Scientific Uncertainty

By DONALD A BROWN on May 19, 2008 6:42 AM | [1 Comment](#)

I. Introduction

This post examines the ethical duty to act to reduce the threat of climate change even if one assumes there is more scientific uncertainty about the causes and impacts of climate change than those identified by the scientific consensus view as articulated most recently by the Intergovernmental Panel on Climate Change (IPCC).

In its fourth assessment in November of 2007, the IPCC made the following key conclusions among many others:

- It is very likely that observed increases in global average temperatures since the mid-20th century have been caused by increases in anthropogenic GHG emissions.
- Warming of the climate system is unequivocal.
- Anthropogenic warming and sea level rise would continue for centuries due to the timescales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized.
- The probability that this is caused by natural climatic processes alone is less than 5 percent.
- World temperatures could rise by between 1.1 and 6.4 °C (2.0 and 11.5 °F) during the 21st century.
- There is high confidence (greater than 90%) that there will be more frequent warm spells, heat waves and heavy rainfall.
- There is a 66 percent confidence level that there will be an increase in droughts, tropical cyclones and extreme high tides.
- Both past and future anthropogenic carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium. (IPCC, 2007)

Despite IPCC's conclusions, a number of scientific "skeptics" have continued to attack this consensus position and others have opposed government action to reduce the threat of climate change based upon the skeptics' scientific attacks. As we shall see, these attacks on the proposed government action appear to be based on the unstated assumption that nothing should be done about the potential serious threats of climate change until damages that are likely to be caused by human-induced climate change have been proven with high levels of scientific certainty. Yet, even if one assumes that there is considerable scientific uncertainty about timing and magnitude of warming and the nature of human-induced climate change impacts, (and in so doing disagrees with IPCC's most recent conclusions), ethical issues arise about the duty to take action in the face of uncertainty. The rest of this post explores these ethical duties to reduce the threat of climate change even if one disagrees with the scientific views articulated by the IPCC.

II. Ethics and Scientific Uncertainty in Environmental Controversies

Climate change scientists around the world have been working to determine the nature of the risk from the climate change threat. From a proposition that a problem like global warming creates a particular threat or risk, one cannot, however, deduce whether that threat is acceptable without first deciding on certain criteria for acceptability. The criteria of acceptability must be understood as an ethical rather than a scientific question. For instance, although science may conclude that a certain increased exposure to solar radiation may increase the risk of skin cancer by one new



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cancer in every hundred people, science cannot say whether this additional risk is acceptable because science describes facts and cannot generate prescriptive guidance by itself. The scientific understanding of the nature of the threat, of course, is relevant to the ethical question of whether the risk is ethically acceptable, but science alone cannot tell society what it should do about various threats. In environmental controversies such as global warming where there is legitimate scientific concern, important ethical questions arise when scientific uncertainty prevents unambiguous predictions of human health and environmental consequences. This is so because decision-makers cannot duck ethical questions such as how conservative "should" scientific assumptions be in the face of uncertainty or who "should" bear the burden of proof about harm. To ignore these questions is to decide to expose human health and the environment to a legitimate risk, that is, a decision to not act on a serious environmental threat could have consequences particularly if waiting until all uncertainties are resolved could increase the harm. Science alone cannot tell us what assumptions or concerns should be considered in making a judgment about potentially dangerous behavior. For this reason, environmental decisions in the face of scientific uncertainty must be understood to raise a mixture of ethical and scientific questions.

III. Ethics, Climate Change, and Scientific Uncertainty

Those relying on the scientific skeptics assertions on climate change often speak as if it is irrational to talk about duties to reduce greenhouse gases until science is capable of proving with high levels of certainty what actual damages will be. The skeptics seem to dismiss the conclusions of the IPCC on the basis that they have not adequately proven that the IPCC's identified impacts will happen as described. This condemnation comes despite the fact that IPCC only claims that their descriptions of global warming impacts are likely or very likely, that is, not proven, consequences of the continuing human release of greenhouse gases.

Of course, there are threshold scientific questions that need to be considered before any human activity can be classified as creating a dangerous threat. That is, not all assertions that a human activity creates a risk are entitled to respect without an adequate scientific grounding. However, the basic physics of why adding greenhouse gases to the atmosphere will warm the planet has never been in question. That is the fact that each greenhouse gas will initially create some initial additional warming in the atmosphere (usually referred to as climate forcing) has been understood with precision since the mid-19th Century. However, what has not been known is the actual amount of global warming that will result from the additional quantities of atmospheric concentrations of greenhouse gases given the need to understand complex interactions between the atmosphere, oceans, and other parts of the biosphere that could create positive and negative feedbacks that could increase or decrease global temperatures.

Any doubt that the problem of climate change passes a threshold test of whether it causes an enormous threat to human civilization was put to rest by Naomi Oreskes in a 2004 Science article that claimed that of 928 abstracts published in refereed scientific journals between 1993 and 2003, 75 percent of the articles either explicitly or implicitly backed the consensus view, while none directly dissented from it. (Oreskes 2004) Oreskes also pointed out in her Science article that in addition to the IPCC all United States scientific institutions with expertise over the subject matter have issued statements supporting the IPCC view including the United States National Academy of Sciences, the American Meteorological Society, and the American Association for the Advancement of Sciences. In addition, in preparation for the 2007 G8 summit, national academies of science from around the world issued a declaration that concluded:

It is unequivocal that the climate is changing, and it is very likely that this is predominantly caused by the increasing human interference with the atmosphere. These changes will transform the environmental conditions on Earth unless counter-measures are taken.

The thirteen signatories to this statement were the science academies of Brazil, Canada, China, France, Germany, Italy, India, Japan, Mexico, Russia, South Africa, the United Kingdom, and the United States. (Potsdam, 2007)

Even if one disagrees with the Oreske's classification of the peer reviewed science articles, it cannot be denied that the peer-reviewed climate change science unequivocally supports the conclusion that climate change is an immense threat given the uncontested number of peer-reviewed articles that support IPCC's conclusions and the fact that the most prestigious scientific organizations with expertise in climate change science have supported the consensus view.

Most of the scientific debate in the last thirty years has not been about whether additional concentrations of greenhouse gases in the atmosphere will tend to warm the planet, but rather what will be the timing and magnitude of this warming. The IPCC has attempted to deal with this uncertainty by putting upper and lower bounds on timing and magnitude of the warming impacts and to identify levels of confidence about these levels.

The skeptics often attack the proponents of government action on climate change on scientific grounds accusing the proponents of climate change action base their positions on "bad" science, that is the unproven assumptions, even though IPCC's conclusions are based upon its review of peer-reviewed climate change science. Yet the skeptics rarely offer scientific proof for their alternative predictions, they usually simply attack the assumptions of the mainstream scientists by offering their own unproven theories about likely timing and magnitude of global warming. By attacking the mainstream scientists' views of likely impacts, the skeptics are implicitly arguing that only proven "facts" should count in the debate.

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A common point of attack of the skeptics is the climate change models that are relied upon by IPCC to predict climate futures by mainstream climate scientists. The skeptics often attack the models for their failure to deal with elements of the climate system that could have an impact on the amount of warming experienced. But given the complexity of the climate system, biosphere interactions, and the carbon cycle system, the only way to make predictions about climate futures is to rely upon models. The skeptics often attack the climate models despite the fact that climate models will probably never be able to prove with high degrees of certainty what future global temperatures will actually be. This is the case because the climate models will for the foreseeable future need to simplify a complex and chaotic climate system, rely on speculation about future population, technology, and use of fossil fuels, and make reasonable guesses about human health and environmental impacts of temperature change through the use of environmental impact science, an inherently uncertain science. Therefore, the skeptics' attack on mainstream climate science on the grounds of its use of unproven assumptions in the climate models hides a very controversial but unstated ethical position, namely that governments should not act until strong scientific proof is in. For this reason, the skeptics' appear to be opposed to the use of science that describes potentially dangerous behavior. In taking this position, those opposing action to reduce the threat of climate change are implicitly arguing that the burden of proof should be on those who may be victims of global warming to show that damages to them will actually occur. At the same time, those relying on the skeptic's arguments to oppose government action appear to be denying that those who are engaged in dangerous behavior have any responsibility to refrain from endangering others.

In response to the skeptics' attack on the science on which proposed global warming policy is based, the mainstream scientists sometimes defend their position on scientific rather than ethical grounds, explaining why their view of the "facts" is scientifically respectable, rather than arguing that ethics demands that highly plausible but unproven consequences should be considered in public policy debates. The public watching this debate between the scientists can be confused by such debates because the actual difference between the contending parties are often different assumptions about when conclusions can be drawn from uncertain science. Unless the contending parties' assumptions about how science should proceed in controversies where consequences are uncertain are visible to the public, an interested party may not be able to discern what the argument is about or mistakenly assume the argument is only about "good" or "bad" science.

From the standpoint of ethics, those who engage in risky behavior are not exonerated because they did not know that their behavior would actually cause damage. Under law that implements this ethical norm, for instance, to be convicted of reckless driving or reckless endangerment, a prosecutor simply has to prove that the defendant acted in a way that he or she should have known to be risky. Many types of risky behavior are criminal because societies believe dangerous behavior is irresponsible and should not be condoned. As a matter of ethics, a relevant question in the face of scientific uncertainty about harmful consequences of human behavior is whether there is a reasonable basis for concluding that serious harm to others could result from the behavior. Yet, as we have seen, in the case of climate change, humans have understood the potential threat from climate change for over one hundred years and the scientific support for this concern has been building with increasing speed over the last thirty years. In fact, for more than 18 years, the IPCC, a scientific body created with the strong support of governments around the world to advise them about the conclusions of peer review climate change science, has been telling the world that the great harm from climate change is not only possible but likely with increasing levels of confidence.

By the end of the 1980s there was widespread understanding among climate change scientists around the world that there was a great threat posed by rising concentrations of atmospheric concentrations of greenhouse gases even though there were considerable uncertainties about timing and magnitude of climate change impacts. The climate science that has been accumulating in the last 20 years has been increasing the confidence about timing and magnitude of climate change impacts according to IPCC as well as reasons for concluding that recent warming is largely human caused notwithstanding considerable natural variability in the climate system.

For this reason, those emitting high levels of greenhouse gases cannot deny that their emissions create a significant risk to human health and the environment around the world even if one disagrees with the specific predictions about timing and magnitude of climate change impacts now being articulated by the IPCC and the international scientific organizations that support the IPCC conclusions even if one believes that the IPCC's conclusions have not been proven with sufficient levels of confidence.

The argument that high emitting nations need not reduce their greenhouse gas emissions because of scientific uncertainty about timing and magnitude of climate change impacts does not withstand minimum ethical scrutiny because of certain additional facts about climate change including:

- The enormous adverse potential impacts on human health and the environment from human induced climate change articulated by the consensus view.
- The disproportionate climate change impacts on the poorest people of the world.
- The real potential for potentially catastrophic climate surprises much greater than often quoted predictions made by IPCC.

- The fact that much of the science of the climate change problem has never or is not now in dispute even if one acknowledges some remaining uncertainty about timing or magnitude of climate change impacts.
- The fact that climate change damage is probably already being experienced by some people, plants, animals, and ecosystems around the world in the form of rising seas and increased strength of tropical storms and more frequent and intense droughts and floods.
- The strong likelihood that serious and irreversible damage will be experienced before all the uncertainties can be eliminated.
- The fact that the longer nations wait to take action, the more difficult it will be to stabilize greenhouse gases at levels which don't create serious damage.
- The fact that those who will be most harmed by climate change have rights to be consulted about decisions based upon scientific uncertainty.

Given these facts about climate change, it is inconceivable that any ethical system would condone an excuse for non action by high emitters based upon scientific uncertainty for not reducing greenhouse gas emissions. This is particularly true because if IPCC is wrong it could be wrong in both directions, that is, climate change impacts could be much worse than the impacts identified by IPCC as well as less harmful.

Despite high levels of certainty expressed by IPCC about many aspects of climate change, it may take decades to resolve some of the remaining major uncertainties in the climate models and by then it will very likely be too late to avoid additional damage caused by inaction.

All major ethical systems would strongly condemn behavior that is much less threatening and dangerous than climate change. That is deontological, utilitarian, justice, ecocentric, biocentric, and relationship based ethics would not condone using scientific uncertainty as justification for not reducing high levels of greenhouse gas emissions. (See Brown, 2002. 141-148.) For this is a problem that if not controlled may cause the death of tens or hundreds of thousands of helpless victims caused by intense storms and heat waves, the death or sickness of millions that may suffer dengue fever or malaria, the destruction of some nations' ability to grow food or provide drinking water, the devastation of forests and personal property, and the acceleration of elimination of countless species of plants and animals that are already stressed by other human activities. In summary, global warming threatens many of the things that humans hold to be of most value, i.e., life, health, family, the ability to make a living, community, and the natural environment. The ethical duty to avoid risky behavior is proportional to the magnitude of the potential harm. Because climate change is likely to cause death to many, if not millions of people, through heat stroke, vector borne disease, and flooding, annihilate many island nations by rising seas, cause billions of dollars in property damage in intense storms, and destroy the ability of hundreds of millions to feed themselves in hotter drier climates, the duty to refrain from activities which could cause global warming is extraordinarily strong even in the face of scientific uncertainty about consequences

Therefore, the nature of the risk from climate change is enormous and using scientific uncertainty as an excuse for doing nothing is ethically intolerable.

The fact that there is wide spread cross-cultural acceptance of the idea that one should not engage in risky behavior that could cause great harm to things which people attach great value to is clear from the acceptance of the "precautionary principle" in a growing number of international treaties including the 1992 United Nations Framework Convention on Climate Change (UN, 1992, Article 3). Under the precautionary principle embedded in the binding climate change convention, nations agreed not to use scientific uncertainty as an excuse for not taking cost-effective action. This is an additional ethical reason why scientific uncertainty cannot now be used by nations as an excuse for refusing to make reductions to their fair share of safe global emissions. That is, in addition to the ethical reasons given above, a nation may not break a promise made to other nations in the United Nations Framework Convention on Climate Change to not use scientific uncertainty as justification for non-action on climate change.

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Richard Treadgold | [May 20, 2008 9:19 AM](#) | [Reply](#)

"...by Naomi Oreskes in a 2004 Science article that claimed that of 928 abstracts published in refereed scientific journals between 1993 and 2003, 75 percent of the articles either explicitly or implicitly backed the consensus view, while none directly dissented from it."

You implicitly ask, with Lawrence Solomon, at <http://network.nationalpost.com/np/blogs/fpcomment/archive/2008/05/17/32-000-deniers.aspx>: How many scientists does it take to establish that a consensus does not exist on global warming?

Would you accept 32,000?

Dr Naomi Oreskes' work was severely criticised by Dr Lenny Peiser of the UK, who found serious anomalies in Oreskes' reported figures, including (as described by Monckton, mentioned below): "More than half of the abstracts did not mention anthropogenic climate change at all and could not, therefore, reasonably be held to have commented either way upon the "consensus" as defined by Oreskes." It would be impossible that 75% backed the consensus view if over half expressed no view at all.

Monckton has neatly summarised these data and the work by Schulte (Schulte 2007) in bringing the research up to February 2007. See http://scienceandpublicpolicy.org/monckton_papers/consensus_what_consensus_among_climate_scientists_the_debate_is_not_over.html

These results, together with new physical observations of atmospheric temperatures, sea levels, tropical storm frequencies, polar ice extents, sea surface temperatures, the tropical "iris" effect and the discovery that water vapour in the tropics is a negative feedback to temperature rise, present severe obstacles to the success of the dangerous AGW theory and are impossible to ignore.

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