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ETHICAL RESPONSE TO CLIMATE CHANGE

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The attitudes that have contributed to climate change are the same attitudes that are retarding an adequate ethical response to that crisis. With a growing understanding of the planet as a self-contained and evolving ecosystem, we realize that we are derivative from and inescapably dependent upon Earth's ecological systems, that it is not possible to have healthy humans on a sick planet. Putting the health of the planet in peril endangers our own survival. While this new awareness encourages a less anthropocentric and more Earth-friendly human culture, vestiges of the thinking that created climate change continue to guide most of our responses to this global problem. This paper will consider ethical principles that might guide effective responses to climate change as well as certain responses to that crisis that are either misguided or inadequate.

The same attitudes that allowed a significant increase in the anthropogenic greenhouse gas (GHG) concentrations that are causing climate change are the same attitudes that are retarding an adequate ethical response to the impact that climate change is having on both human populations and the rest of the planet. The industrialized nations of the West paid little attention during the past three centuries to the impacts that their economies and cultures were having on the environment, both locally and globally. There was an underlying belief that the planet could indefinitely absorb the wastes of manufacturing, and the natural resources that were

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fuelling industrialization were seemingly endless if not actually infinite. But with a growing understanding of both evolution and the planet as a self-contained ecosystem, we have begun to realize that we are derivative from and inescapably dependent upon the ecological systems of the planet. We are recognizing that it is not possible to have healthy humans on a sick planet. To put the health of the planet in peril is to subsequently endanger our own survival.

Yet, while this new awareness heralds an understanding of human culture that can purportedly be less anthropocentric and more Earth friendly, the vestiges of the same thinking that created the crisis of climate change still continue to guide most of our responses to this global problem. Even today, we continue to reject actions that favor the health of the planet if these entail a cost to our own national economies as if we and our economies could survive on a devastated planet. Since we need to understand and correct the global impact of our local actions, we cannot rely on the attitudes and ethics that allowed for the creation of the problem. Since we need to address a planetary problem, we need ethical principles that guide not only our local but also our global responses to climate change. Furthermore, we need a better understanding of the magnitude and dimensions of the problem. Accordingly, this paper will consider the ethical principles that might guide an effective response to climate change as well as certain responses that are either misguided or inadequate. It will consider the impact of climate change on human health so that we can better understand the scope and severity of the crisis.

ETHICAL PRINCIPLES TO GUIDE A RESPONSE TO CLIMATE CHANGE

In 2000, in what was considered a conservative study, excluding many of the more indirect effects of climate change on health, climate change “was estimated to have caused 150,000 deaths and 5.5 million DALYs [disability adjusted life years]” (World Health Organization [WHO] 2003, 31). The majority of these effects are being felt in developing countries, due to increasing incidence of diarrhea, malaria and malnutrition (McMichael 2004). As the effects of climate change continue to grow, the incidence of death and disease have likely increased from the levels of 2000 (Intergovernmental Panel on Climate Change, Working Group II [IPCC WGII] 2007). In fact, in a recent report by the Global Humanitarian Forum, Kofi

Annan stresses that climate change is “the greatest emerging humanitarian challenge of our times” (Global Humanitarian Forum 2009, 2). The report estimates that over 300,000 lives are lost each year due to climate change, with the annual death toll estimated to reach 500,000 by 2030, and that “climate change today seriously impacts on the lives of 325 million people” (Global Humanitarian Forum 2009, 9, 11, 13). Due to indirect effects, climate change not only threatens each person’s fundamental and inalienable “right to life, liberty, and personal security” as guaranteed by the Universal Declaration of Human Rights (United Nations 1948, Article 3), it is already responsible for considerable death and enormous hardship. The factors that cause climate change, and the efforts to both mitigate and adapt to it, raise ethical issues that require ethical responses.

Four principles central to a discussion of an ethical response to climate change are:

1. the principle of non-maleficence, sometimes stated as *primum non nocere* (firstly, do no harm);
2. the principle of equity;
3. the principle of retributive and distributive justice;
4. the principle of free and informed consent.

These four principles will be applied to the issue of climate change and coupled with a less anthropocentric and more ecocentric perspective on ecosystem health in order to provide ethical challenges to four excuses commonly proclaimed by Western governments in order to delay effective responses to climate change, viz.:

1. reducing GHG production will significantly harm a nation’s economy;
2. while uncertainty about climate change continues to exist, it is more prudent to delay any response;
3. until all governments agree on targets and goals for GHG emissions there is no obligation to act, or at the very least, it is strategically imprudent to do so;
4. since future technologies will more effectively resolve the climate change issue, it is best to wait for technological fixes to arrive before acting.

1. The Principle of Non-Maleficence: Primum non nocere (firstly, do no harm)

The notion that each person has a fundamental and primary obligation to avoid doing harm to others was recalled in the 1992 Rio Declaration on Environment and Development. This declaration stated that while states may develop their own resources for their own benefit, they also had “the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction” (United Nations 1992a, Principle 2). In that same year, the nations who ratified the United Nations Framework Convention on Climate Change (UNFCCC) agreed to the “stabilization of green house gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” (United Nations 1992b, Article 2). The signatories to these agreements not only reaffirmed the universal moral norm that we are obliged to act in ways that are not harmful to other people, but they also agreed to act in ways that were not harmful to the Earth’s ecosystems, and this duty of non-maleficence was recognized as owing to both current and future generations (United Nations 1992a, Principle 3; 1992b, Article 3).¹

2. The Principles of Equity and Distributive Justice

The principle of equity and the principle of distributive justice are closely related. Both deal with the fair and just distribution of benefits and burdens within a society, and both can be the subject of many complex and subtle distinctions. For our purposes, they will be considered together.

The principle of equity is often associated with Aristotle’s principle of formal equality which can be summarized as “treat equals equally and unequals unequally” (Beauchamp and Childress 2001, 227). For instance, all things being the same, if two people are equally in need of food, then an equal distribution of food to each person would be fair. On the other hand, if two people have a different need for food, it would generally be assumed that it would be fair to give the person with the greater need the greater share of the food, especially if this could be done without harming the other person. Furthermore, if it is accepted that all people are equal, then it can generally be said that all people have an equal claim on that

which is held in common; none should enjoy a disproportionate share especially if this inequitable distribution would either deny others their fair share or place a burden on them. A sense of fair play also dictates that those who create a problem should be held responsible for rectifying the problem while the innocent should not suffer so that others may prosper at their expense (Beauchamp and Childress 2001, 226–30, 234–9). These common ethical maxims inform two approaches for dealing with the equity and justice issues associated with climate change, namely, the contraction and convergence approach, and the greenhouse development rights framework approach.

Recalling that there is only one planetary atmosphere held in common, and that the atmospheric commons has a limited carrying capacity for GHGs above which the consequent rise in global temperature would wreak ecological havoc, it can be argued that all people have a right to an equal but limited portion of the Earth's ability to absorb GHGs (Baer et al 2000, 2287) or, stated another way, each person has an equal but limited entitlement to emit GHGs (Ikeme 2003, 201). Unlike mineral resources which can be claimed as property by a particular person, company or nation, no single nation, company or person can claim ownership of the atmosphere or any part of it; the atmospheric commons is owned by all people. Similarly, when any single person or nation discharges greenhouse gases into the atmospheric commons, the potential climate effects will be experienced by all. And since the ability of the atmospheric commons to absorb GHG emissions is limited, and since exceeding that limit puts all life at risk (and not just the life of the one who exceeds the limits), each person has an obligation to avoid adding GHG emissions to the atmospheric commons in excess of their fair share.

Not surprisingly, this argumentation has more often been advanced by developing nations rather than developed nations since the latter are generally acknowledged to have utilized more than their fair share of the atmospheric commons. The developing nations argue that national allocations of GHG emissions should be based on per capita. They note that the developed nations have utilized more than their fair share of GHG emission entitlements not just since 1990 (the baseline year used in the Kyoto Protocol) but since the start of the industrial revolution in the late eighteenth century. Distributive justice demands that this disproportionate and prolonged over-utilization of per capita entitlements must be considered

when calculating an equitable distribution of the costs and benefits associated with climate change since this excessive appropriation of per capita GHG entitlements has both contributed more to the adverse effects of climate change while also permitting the developed nations to accumulate their wealth and higher standard of living (Ikeme 2003, 201–2). If the limited GHG absorption capacity of the atmospheric commons has been disproportionately consumed by the developed world, and if little reserve capacity remains, then it can be argued that not only does a much greater portion of the remaining capacity belong to the developing world (assuming there is no need to reduce GHG atmospheric concentrations significantly below current levels) but the developed countries also owe an ecological debt to the developing nations.² Accordingly, the developed countries are obliged to transfer wealth to the developing countries or pay for the latter's costs of climate change adaptation in proportion to their excess utilization of the atmospheric commons.³ This is especially the case, according to this line of reasoning, since some developing countries, which have not remotely utilized their fair share of the GHG emission entitlements, would need to significantly increase their GHG emissions just to meet their basic needs for shelter, food and security, let alone achieve the level of prosperity enjoyed by the developed countries (Shue 1999).

In response, some developed nations have argued that a baseline of 1990 is reasonable since it represents a time from which there are reliable climatic measurements and a time when global awareness of the negative effects of climate change was emerging. Prior to this time, according to this line of reasoning, the industrialized nations were not aware that their actions were so harmful, and present generations should not be held responsible for the ignorance of their ancestors either with regard to the negative effects of industrialization or their excess utilization of the limited atmospheric commons. Any debt associated with the actions of earlier generations died with them (Ikeme 2003, 201). Furthermore, they argue, current emission levels should be recognized as entitlement levels based on past use (Brown et al. 2006, 20).

But, it can be argued, if current generations in the developed countries claim sole ownership to the assets that they have inherited from prior generations, then they are also owners of the liabilities associated with those assets, and they are accountable for the excess use of the atmospheric commons by prior generations. As Bhaskar notes, “if I take an object, not

knowing that it belongs to you, and give it to my daughter, you are surely entitled to reclaim it, even though neither my daughter nor I may be a thief” (1995, 116). Similarly, when one discovers that one has taken more than one’s fair share, one is expected to make some form of reparation to the party or parties who were disadvantaged. Past practices of utilizing more than one’s fair share of a common trust is not justification for continued bad behavior.

To resolve these tensions, the contraction and convergence (C&C) response to climate change challenges seeks a global agreement on the concentration of atmospheric GHGs below which the planet’s temperature will not rise more than two degrees Celsius, whether that concentration is set at 350, 400 or 450 parts per million of CO₂. When this benchmark is set, the planet’s carrying capacity for that concentration of GHGs can then be allocated to nations on a per capita basis. Those countries that are presently emitting more than their allotment (primarily the developed, industrialized countries) will be required to reduce their emissions (contraction) while those countries who are presently emitting less than their share (primarily developing countries) will be temporarily permitted to grow their emissions until, by an agreed date, all countries have reached their equal per capita entitlement (convergence)(den Elzen et al 2005). Developing countries might sell their surplus GHG shares during the adjustment phase which would presumably be completed by 2050 (Global Commons Institute 2008).

For the C&C approach to become operational, the signatories to the UNFCCC must agree on a safe concentration of atmospheric GHGs, the proportional allocation of this limited capacity based on national populations, the fair assessment of current levels of emissions, targets for contraction of those national emissions that exceed allocations⁴ and the concurrent temporary increase in emissions for those countries which have not utilized their full allocation – an enormous undertaking that has thus far been elusive (Bows & Anderson, 2008).⁵ Nevertheless, the proponents of the C&C approach argue that it can provide an equitable and just response to the climate change challenge that can win the support of the developing world since it both protects their ability to develop and obligates the developed world to reduce its excess emissions (Global Commons Institute 2008). They further argue that the date of convergence should be realized as soon as possible since the most vulnerable and

least responsible for climate change are currently bearing a disproportionate and unjust burden created by those who have utilized more than their fair share of the atmospheric commons, and justice demands that this be resolved as soon as possible.

As the planet continues to warm, carbon sinks will decline and more CO₂ will be released. That is, as climate change continues due to the GHGs that have already been released into the atmosphere and which will continue to affect the climate since the lifetime of CO₂ in the atmosphere ranges between 4 to 200 years (IPCC 2001, 38), the ability of Earth's systems to absorb anthropogenic GHG emissions will correspondingly decrease (Friedlingstein 2006). Perhaps at no other time in human history have we become so aware of our profound dependence on and our place within Earth's ecological dynamics. Due to this decreased absorption capacity, the rate of contraction will undoubtedly need to be periodically readjusted. Shifting population sizes will also precipitate calls for allocation adjustments. Although global emissions are allocated on a per capita basis to nations based on their existing populations, future adjustments to such allocations necessitated by shifting populations should not automatically be increased for nations whose populations have grown.⁶ Population growth stresses the limited capacity of the planet, and efforts to reduce the causes and effects of climate change should reward behavior that promotes planetary health and deter that which is potentially problematic (Speidel et al 2009).

Rather than appealing to the notion of a shared atmospheric commons, others have preferred the notion that all have a right to develop and flourish. In keeping with principles of equity and distributive justice, the United Nations Framework Convention on Climate Change (UNFCCC) asserts that the parties to that agreement are bound to protect the environment for the sake of humanity, present and future, "on the basis of equity and in accordance with their common but differentiated *responsibilities* and respective *capabilities*. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof" (United Nations 1992b, Article 3, emphasis added). The UNFCCC also requires the more developed nations to assist developing countries with adaptive responses to the adverse effects of climate change, including the transfer of technologies (United Nations 1992b, Article 4(1)(c), 4(1)(e)). Any approach is not likely to be accepted by the developing countries if efforts to reduce global GHG emissions do not concur-

rently permit developing nations to increase their GHG production while stipulating that the developed countries which have already profited from economies that have produced excess amounts of GHGs will bear a comparable cost of mitigation.

The Greenhouse Development Rights (GDR) framework described by Baer et al (2008a) is guided by these UNFCCC directives and seeks to define the capabilities and responsibilities that would satisfy the requirements of justice. It argues that all people have a right to development in order to realize human flourishing, and that it is possible to define a development threshold⁷ below which people should not be required to bear the costs of responding to climate change since the primary focus of these impoverished people is on survival and achieving a modicum of development in order to overcome the malnutrition, high infant mortality, abbreviated education, and a disproportionate expenditure on food that characterize their impoverished state (Pritchett, 13–17). Furthermore, it is unlikely that they have contributed to climate change in any significant way. Those who have already exercised their right to development and have consequently derived incomes that exceed the development threshold, usually as members of industrialized (Annex I) societies, have an obligation both to preserve the development rights of those who have not yet exercised them (i.e., non-Annex I or developing countries) as well as to bear the costs of climate change mitigation from the wealth (capability) that they have gained while they were adding to the GHG burden of the planet. As Baer et al note, “They must, as their incomes rise, assume a steadily rising share of the costs of curbing the emissions associated with their own consumption, as well as the costs of ensuring that, as those below the threshold rise toward and then cross it, they are able to do so along sustainable low-emission paths” (2009, 1124). All people who have incomes above the development threshold bear these obligations, whether they live in Annex I or Non-Annex I countries. The sum of this income, which excludes income used to attain the development threshold, becomes the nation’s aggregate capability, while the nation’s responsibility for climate change is derived from the cumulative emissions, beginning from an agreed starting date, that would exclude emissions resulting from efforts to attain the development threshold.⁸ The further a nation’s income and emissions exceed the development threshold, the greater is its emission reduction obligations and the greater is its share of the global mitigation requirements. These mitigation requirements can be met both

through domestic reductions as well as through “cap-and-trade” agreements with other nations (Baer 2009, 1126–33). For instance, non-domestic mitigation could also be achieved by claiming reductions in other countries that are “supported and enabled by technology, financing and capacity-building [from the developed country] in a measurable, reportable and verifiable manner” (UNFCCC 2007, 1(b)(ii)). The significant domestic reduction of GHG emissions required of wealthier countries would theoretically liberate some of the limited GHG carrying capacity of the planet for the use of non-Annex I countries, while the transfer of both technology and financial support from industrialized to developing countries could ensure that development happens in a sustainable way that dramatically reduces carbon emissions (i.e., in ways that are mutually enhancing for both humans and the rest of Earth’s ecosystems since human flourishing is impossible without Earth’s flourishing).

Ikeme argues that the developed nations should “transfer wealth, relevant technologies, scientific knowledge, management and adaptation skills” to the less developed nations that are adversely affected by climate change as an act of charity; the rich are morally obligated to help the poor (Ikeme 2003, 203). However, developing nations are just as likely to respond that such transfers are not a matter of charity but a matter of justice; the developing nations are only claiming what is rightly owed to them; they need not wait for the largesse of developed countries. Their claim seeks retributive justice, not just distributive justice. It seeks proportionate compensation for the injustices of the past and present. It requires that “the polluter should, in principle, bear the cost of pollution” (United Nations 1992a, Principle 16). Those who cause harm are responsible in proportion to the harm that they have caused. However, since the emitters of GHGs are not presently compelled either to bear the costs associated with their GHG emissions or to pay compensation to those who are harmed by climate changes, there is no economic incentive for them to mitigate their GHG emissions (Stern 2006, 24).

Regardless of whether one prefers a contraction and convergence approach, or a greenhouse development rights framework, or some other approach for fashioning a just response to climate change,⁹ certain positions remain ubiquitous. For instance, vulnerability to the health effects of climate change is a function of three factors: the existing sensitivity of the population, the exposure of the population to climate related health

risks, and the adaptive capacity or the ability to manage these risks (Kovats 2003, 16). Adaptive capacity is governed by income, equality, type of health care system, and the ability to rapidly access information (Menne 2006, 421). Regrettably, in our present circumstances, those who have contributed the most to climate change are those who are the least vulnerable (least sensitive and least exposed) and the best able to adapt to the impacts of climate change (with, for example, heating and air conditioning, dikes, irrigation, increased health care), while those who have contributed the least are the most vulnerable and the least able to adapt to the consequences of climate change (e.g., drought, desertification, flooding, extreme weather patterns) (Stern 2006, 37). The 2007 Intergovernmental Panel on Climate Change (IPCC) report noted that “poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies” (IPCC WGII 2007, 9). Furthermore, the 2007 UN Human Development Programme (UNHDP) report noted that climate change will bring about “unprecedented reversals in poverty reduction, nutrition, health and education” as the limited resources of vulnerable nations are used to mitigate the droughts, floods and other environmental stressors of climate change rather than dealing with social needs (UNHDP 2007, 16, 18) and is likely to displace hundreds of millions, creating environmental refugees and perhaps leading to conflict (Costello 2009, 1708).

Justice demands that the distribution of limited resources and opportunities for development be guided by either need or merit. The developed nations have the least need for GHG emission allocations and their past behavior of causing harm to the most vulnerable does not demonstrate merit (Brown et al. 2006, 21). Countries with the greatest need should receive new allocations of GHG emissions first and at a level that at least permits them to reach the development threshold. Their circumstances should certainly not be worsened by any international allocation agreements (Rose 1998).

3. The Principle of Free and Informed Consent

It follows from the principle of non-maleficence that no country may put another country or its peoples at grave risk without the consent of the latter. The actions of developed countries are primarily responsible for the

adverse effects of climate change that are being endured disproportionately by the developing countries. To date, the developing countries have generally shared only in the costs of these actions, not the benefits. The developing countries did not consent to being burdened with these adverse effects, nor did they cede their portion of the atmospheric commons to the developed countries that used it for their own ends. Those who acted against the best interests of the developing countries did not seek the latter's informed consent nor did the developing countries give it.¹⁰

Even as efforts are made to rectify excessive GHG emissions, the principle of free and informed consent is still not being sufficiently respected. People and countries that are at risk due to the effects of climate change have a right to participate fully in discussions that determine not only acceptable and unacceptable risks, but responses to deal with the same. Since global emissions of GHGs will probably need to be reduced by 60 to 80 percent from current levels (Stern 2006, xxiii), the methods and interim targets to meet that goal must be decided by all of the stakeholders but particularly by those who are most affected by the adverse effects of climate change. All parties must agree on a fair and equitable distribution of the costs of climate change and any entitlements to emissions of GHGs. However, to date, the developing nations have had less influence than the developed nations when formulating the analysis and response to the causes of GHGs. For instance, these nations have tended to be underrepresented on the IPCC and during the formulation of the UNFCCC (Ikeme 2003, 202). Nor have they had access to the same level of expertise to acquire and analyze data, and to formulate responses that best protect their particular interests.

If all have a right to an equal but limited access to the atmospheric commons, then all should equally participate in the development of adaptation policies either through their own initiative or through the work of NGOs or governments that they have sanctioned to speak on their behalf. The poorest and most marginalized peoples, including those in prosperous countries, must have a voice in formulating responses to climate change issues (Human Rights and Equal Opportunity Commission 2008, 15). Their informed participation, which may require the assistance of expert advisors funded by developed countries, can promote their free and informed consent to emerging responses to climate change issues even if they did not consent to the actions that first brought these adverse ef-

fects into their lives. The developed nations who are causing the adverse effects of climate change cannot formulate responses in isolation from those who are affected by their actions. Actions that have a global impact require global consent.

Article 2 of the seldom referenced United Nations International Covenant on Civil and Political Rights (UNICCPR) notes that when a nation ratifies an international human rights treaty, the nation must ensure that the rights and obligations declared in the treaty are upheld within its territory or by those within its jurisdiction. Furthermore, the UNICCPR also stipulates that a nation must respond to threats to human rights and “must ensure that individuals also have accessible and effective remedies to vindicate those rights” (United Nations 1966, Article 2). Ultimately, as a recent UN commentary on the UNICCPR notes, “cessation of an ongoing violation is an essential element of the right to an effective remedy” (United Nations Human Rights Committee 2004, para. 15). In other words, those whose rights have been threatened or violated have a right to accessible and effective remedies, and when they lack sufficient means to defend their rights, wealthier nations have an obligation not only to assist their defense but to facilitate the cessation of the offense itself. Accordingly, developing countries can rightly demand that the developed countries should not only honor the United Nations agreements pertaining to climate change that they have signed but they should also assist the developing world with their own efforts to defend themselves. As a quote from Archbishop Desmond Tutu in the United Nations Human Development Programme Report for 2007/2008 observes:

No community with a sense of justice, compassion or respect for basic human rights should accept the current pattern of adaptation. Leaving the world's poor to sink or swim with their own meager resources in the face of the threat posed by climate change is morally wrong. Unfortunately, as the *Human Development Report 2007/2008* powerfully demonstrates, this is precisely what is happening. We are drifting into a world of ‘adaptation apartheid.’ (UNHDP 2007, 181)

Of course, Earth has obviously not consented to human practices that have seriously altered the climate systems of the planet, nor could it possibly grant such consent. It would be an extreme form of anthropomorphism to attribute human self-consciousness to the planet itself. However, we are the creature whose profound intellect and self-awareness allow

it to grasp and reflect upon its past, present and future, and to fashion adaptations that allow us to supersede the limitations of our genetic coding and environs. We are not only the species with the greatest freedom of choice when it comes to deciding our present and future, we are the species that can most imperil our future and the future of the rest of the planet (Berry 1999). Accordingly, we are obligated to inform our decision-making and to make choices that do not threaten either our own existence or the existence of the rest of Earth's ecosystems (Wilson 1994).

LETHARGIC RESPONSES TO CLIMATE CHANGE

The lethargy of developed nations to honor their moral and legal responsibility to reduce GHG emissions is arguably assisted by four popular disclaimers that hinder effective responses to climate change. Each of these disclaimers will be examined.

1. Economic Harm

The administration of President George H.W. Bush insisted at the 1992 Rio Earth Summit that since the reduction of GHGs could inflict harm on nations' economies, efforts to reduce GHG emissions should be delayed until such time as it was clear that economic interests would not subsequently suffer (Sussman 2006, 14). This position was defended even while the scientific community was asserting that climate change was increasingly having severe adverse effects on the health of both humans and the planet. As the scientific community's warnings have become even clearer and stronger, this hesitation becomes even more indefensible for at least four reasons (IPCC 2007b; American Association for the Advancement of Science 2007).

Firstly, during this stage of inaction or delayed action, basic human rights to life, health and security are being significantly compromised. As has been noted by the UN Office of the High Commissioner for Human Rights, nations do not have an option to protect these rights, but are compelled to act to protect them (United Nations Office of the High Commissioner for Human Rights 2008). Inaction or inertia is unacceptable, especially since the effects of climate change is "estimated to have caused 150,000 deaths and 5.5 million DALYs [disability adjusted life years]," annually, since 2000 (World Health Organization 2003).

Secondly, the cost to polluters should not determine if or to what ex-

tend polluters must take remedial action. That is, the requirement to act is not dependent on the ability or desire of polluters to bear the economic costs associated with their harmful acts, but is determined by victims' rights to life, health and security (United Nations 1948, Article 3). Using "willingness-to-pay" as a criteria or determinant for action devalues the lives, health and security of those who have unwillingly been placed at risk by climate change. Admittedly, economic cost can be utilized to determine the most cost effective response but it cannot be used to determine if one is obligated to respond at all (Brown et al. 2006, 31).

Thirdly, the argument that one should delay responding to climate change until such time as it will not harm a nation's economy reverses two concepts. A society constructs economic structures to promote the flourishing of humans. That is, economics is a means while human flourishing is an end. The "economic harm" argument for delaying responses to climate change reverses this order since tolerance for continued human suffering becomes the means to achieve the goal of economic prosperity. But no country or company has the right to use other nations or people as a means for achieving economic goals, nor may they endanger the life of others for that same end (Human Rights and Equal Opportunity Commission 2008, 14). Furthermore, prioritizing economic prosperity over human flourishing also favors the human economy over Earth's economy. But since humans are derivative for Earth's evolutionary processes and remain inextricably dependent on them, and since human economic activity is derivative from and dependent upon Earth's economy, it is not possible to have a flourishing human economy on a devastated planet any more than it is possible to have healthy people on a sick planet. Earth's economy is primary while humanity's economy is derivative, not the reverse (Berry 2009).

Fourthly, as the Stern Report has noted, "the evidence shows that ignoring climate change will eventually damage economic growth....Tackling climate change is the pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or poor countries. The earlier effective action is taken, the less costly it will be" (Stern 2006, ii). Delaying action to reduce GHG emissions will actually be more costly to economies in developed countries both in the near and long term. The "economic harm" argument is a misguided and ill-informed prioritization of current investors' interests at the expense of

the welfare of future generations. Ironically, when President H.W. Bush addressed the Rio Earth Summit on June 15, 1992, he noted that, "It's been said that we don't inherit the earth from our ancestors, we borrow it from our children" (Bush 1992). Regrettably, this insight did not inform his response to climate change.

2. Lack of Scientific Certainty

Another disclaimer that has been used to justify delayed and inadequate responses to climate change argues that until there is scientific certainty about the causes and required responses to climate change, nations are not obliged to act. However, as early as 1990, the scientific evidence collected by the IPCC had determined that "emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases..." (IPCC 1990, ix). The scientific consensus of the first IPCC Report (1990) has been repeatedly validated and strengthened as successive reports (1995, 2001, 2007) used increasingly confident language concerning the anthropogenic causes of climate change. Using the strongest language thus far, the most recent IPCC report declares that "warming of the climate system is unequivocal," and "most of the observed increase in globally-averaged temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG concentrations" where the words "very likely" were defined as an assessed probability of occurrence of >90% (Intergovernmental Panel on Climate Change 2007b, 72, 39, 27). Such scientific consensus has not only been forged in the IPCC reports but has also been confirmed by other research bodies, such as the National Research Council (USA) and the American Association for the Advancement of Science.¹¹

With this in mind, the argument that developed nations need not act while scientific uncertainty concerning climate change exists can be discredited on two levels: the degree of scientific certitude needed before action is required, and the different roles for science and ethics. The inevitable vicissitudes of daily living require humans to make the best decisions possible given the best information available; almost none of our decisions are made in the context of total certitude. For instance, we do not wait for certitude when formulating a medical diagnosis or prescribing treatment since such delays could lead to the demise of patients. We act with the best knowledge at hand, especially when a preponderance of evidence favors a particular course of action and indicates that there is an urgent need to

act. Nor do we need to know the exact weight that a baby will have when it is born in order to agree that a woman is presently pregnant (McKibben 1989, 29). Although we do not know the fetus's eventual birth weight, we deny neither its present development nor the mother's pregnancy. When the vast majority of credible experts who have studied climate change unanimously agree that anthropogenic GHGs are directly related to climate change, those who wish to argue otherwise must provide a comparable level of evidence to support their contrary position, especially when current evidence indicates that delays in resolving climate change issues are associated with human mortality and morbidity. To delay an effective response to the adverse effects of climate change until absolute certitude exists and until every climatic mechanism is understood is to demand an unprecedented level of certitude. Given the deaths and DALYs attributable to climate change, advocating delay is both immoral and perverse.

Furthermore, while science determines when a risk is imminent, ethics decides if that risk is acceptable and if a response to the risk is obligated. Waiting for science to resolve all uncertainty related to the risk not only delays any response, it also shifts the decision-making solely to scientists, away from those who are either affected by the risk or are properly equipped to resolve moral questions. Moreover, scientific uncertainty does not absolve the agent from responsibility for the consequences of the action to which some uncertainty is associated. Since humans universally reject actions that seriously endanger basic human rights to life, health and security, the duty to refrain from activities that endanger these rights, including via climate change, is sufficiently strong that appeals to scientific uncertainty cannot overrule the duty to avoid harm.¹² An agent has a duty to avoid harm in direct proportion to the harm that could result from the action of the agent, especially when the consequences will be significant and will be borne by those who have not consented to be put at risk, as is the case with climate change (Brown et al. 2006, 27). Accordingly, the United Nations Framework Convention on Climate Change asserted that the Parties to that agreement should "take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures..." (United Nations 1992b, Article 3).

Developed nations have significantly increased GHG emissions that increase the risk to others—they can no longer claim ignorance, nor have

they been able to do so since the late 1980s. Therefore they are accountable to those who have been harmed, and they must not only provide reparation but also cease causing further harm. They may not demand a level of certitude that significantly exceeds the certitude that we encounter in the rest of our lives. Indeed, the very planetary dynamics that formed the Earth and us, and which continue to evolve and to provide a context for our existence, are characterized by chance and uncertainty (Gould 2002). To demand certitude, scientific or otherwise, contradicts the very pattern of our existence.

3. Lack of Global Consensus

The leaders of some countries—for example, Canada and the USA—have maintained that until all governments agree to reductions of GHG emissions, including in particular the developing countries of China and India, no country is obliged to reduce their GHG emissions. This argument is indefensible for several reasons. Firstly, it ignores the historical pattern of GHG emissions in the developed countries that have permitted them to grow wealthy economies while harming the planet, and would deny that same route to prosperity to developing countries while not resolving the fiscal inequity. Their current approach of maintaining the status quo perpetuates existing inequities and ignores the harm that the more vulnerable countries endure due to the adverse effects of climate change. Secondly, since the developed countries have benefited from their over-utilization of the atmospheric commons, and since they are better able to adapt to climate change and undertake mitigation efforts, the UN-FCCC noted that the signatories to that convention “should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof” (United Nations 1992b, Article 3(1)). The developed countries should not wait until the developing countries can match their response to climate change, nor should they support a status quo that maintains inequitable burdens on the more vulnerable nations (Ikeme 2003, 200). They are in a better position to act since they have greater wealth and technology, the acquisition of which has hastened climate change. Countries like Canada and the USA must defend their

failure to honor the conventions which they have signed, and explain why they maintain practices that harm other countries. The aggrieved are not likely to find comfort in the argument that nations need not cease practices that are harmful to the victims as long as other nations continue to cause similar harm. Nations are accountable for their own actions and may not deflect that accountability with the claim that others are also culpable, as if to say that if many are culpable then none are culpable. Another's immoral activity does not sanction one to engage in the same immoral activity any more than a murderer's crime gives permission or impunity for one to murder.

However, since developing countries will soon surpass developed countries in total GHG emissions—although on a per capita basis developed countries will continue to emit more GHGs—developing countries should endeavor to control their GHG emissions and should receive assistance from developed countries to do so (Brown et al. 2006, 33). But while it is important to measure and manage each country's production of GHGs, this accounting must be scrutinized within the context of the atmospheric commons and the health of planetary climate systems. National production of GHGs does not occur in isolation from planetary systems, and should not be evaluated as if it did. Doing so ignores the serious and negative impacts of humans on the planet as well as the urgency of the environmental crisis. Waiting for human consensus settles for inertia and does not provide an effective way forward. Awakening to the ways that Earth is already critically engaged in responding to climate change, even while we dither, could be a starting point from which to fashion a useful response.

4. Wait for Better technologies

The fourth popular disclaimer used by developed nations to justify a reticence to honor moral and legal requirements to reduce the adverse effects of climate change asserts that until more cost effective technologies are available—and they are expected to be available in the near future—there is no current obligation to mitigate GHG emissions. However, since people and climate systems are presently being harmed, the most effective response currently available must be utilized. Even if more effective technologies might become available in the future, there is a moral obligation to minimize all present harm, now, to the best of our abilities.

Furthermore, since it is generally conceded that the polluter should pay for the harm caused and being caused, as well as all future harm, any delay in mitigating harmful activities only adds to the penalty that must be paid (Brown et al. 2006, 34–5).

CONCLUSION

The causes and challenges associated with climate change are multiple and complex. Efforts to fashion effective and sustainable solutions that neither repeat nor exacerbate the mistakes of the past would be aided by a clear understanding of the relevant ethical principles and a renewed appreciation of the interrelationships between humanity and the rest of the environment.

NOTES

1. Not only nations, but individuals and corporations also have ethical obligations to reduce activities that are contributing to climate change. For instance, see: the World Business Council for Sustainable Development (<http://www.wbcsd.org/>) and the Global Reporting Initiative's Sustainability Reporting guidelines (<http://www.globalreporting.org>) as well as the World Watch Institute (<http://www.worldwatch.org/>), as examples.
2. As Patz notes, "Just as nations often borrow financial resources from the future, creating a national debt, they also essentially borrow assimilative capacity from the future by emitting pollutants faster than Earth can assimilate, creating a 'natural debt'. As with national debt, a bit of natural debt is perhaps not much of a problem, but when it becomes too large, natural debt compromises the capability of future generations to take care of themselves." (Patz et al. 2007, 401)
3. Such wealth could take the form of allocation of monies, forgiveness of debts, transfer of technology and/or expertise.
4. For an evaluation of the mitigation costs associated with the developed countries' contraction of their GHG emissions, see Hof et al (2010) and den Elzen et al (2008).
5. This list is by no means the total sum of the challenges that will need to be overcome if we are to come of a consensus on how to respond to climate change. Some question if it is even possible to fashion an effective response while "fossil fuel capitalism" remains the dominant economic system of the planet. See, for instance, Storm (2009), Markandya (2009), and Li (2009).
6. In the C&C model, the world's population would be stabilized at an agreed size prior to the convergence date in the expectation that this would reduce any incentive for some nations to increase the size of their respective popu-

lations in order to concurrently increase their emissions allocations. This is another area of controversy about which there is no consensus (Bows and Anderson 2008, 284).

7. For a description of how a development threshold might be calculated, see Baer et al (2009, 1124–6).
8. Baer et al (2009) estimate that the United States bears 29.1% of the global burden of responsibility (excess emissions) and capability (income derived from those excess emissions). Assuming that the global climate transition costs to achieve a stable concentration of GHGs that do not threaten the ecological systems of the planet are distributed according to responsibility and capability, and assuming that those costs would represent 1% of gross world product, “the average cost per person above the development threshold in the US would be less than US\$ 3/day. Plainly the rich and the relatively well-off can easily afford to shield the poor from the costs of combating climate change; they can, in other words, afford to honor a meaningful right to development (Baer et al 2009, 1128–9).
9. For a comparison of approaches, including the Multi-Stage approach, the Brazilian Proposal approach, and the C&C approach, see: den Elzen et al (2005), den Elzen (2008), Hof et al (2010).
10. Many countries have banned smoking in public places in order to protect people from involuntary exposure to second-hand cigarette smoke. Such legislation acknowledges that people have a right to be protected from harmful exposure when they have not consented to such exposure. Patz draws a parallel between involuntary exposure to second-hand smoke and involuntary exposure to the effects of climate change. He notes that “climate change, as an environmental hazard operating at the global scale, poses a unique and ‘involuntary exposure’ to many societies, and therefore represents one of the largest health inequities of our time.... In the same vein as cigarette legislation whereby smokers are restricted from harming nonsmokers, countries burning fossil fuels and emitting greenhouse gases must consider the negative health impacts imposed on countries burning far less.” (2007, 398)
11. For example, the National Research Council in the USA noted that “The IPCC’s conclusion that most of the observed warming of the last 50 years is likely to have been due to the increase in greenhouse gas concentrations accurately reflects the current thinking of the scientific community on this issue. The stated degree of confidence in the IPCC assessment is higher today than it was 10, or even 5 years ago...” (CSCC 2001, 3). The American Association for the Advancement of Science in a statement released in 2007 asserted that: “The scientific evidence is clear: global climate change caused by human activities is occurring now, and it is a growing threat to society.... The pace of change and the evidence of harm have increased markedly over the last

five years. The time to control greenhouse gas emissions is now” (American Association for the Advancement of Science 2007).

12. For instance, we will charge a driver with impaired driving even if the driver has not yet collided with pedestrians or other vehicles.

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