

Protecting Life from Climate Change

The need for synergies between policy, ethics, and education

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August 27th, 2008

Abstract:

Harm-minimizing solutions are urgently needed to protect life from current and future climate change impacts. Individual choices are an important aspect of those solutions, but the magnitude of the problem is such that internationally coordinated governmental policies are required. The most important policy necessities are that all major greenhouse gas-emitting nations cooperatively impose costs on GHG emissions and that substantial resources are put into anticipatory adaptation. The problem cannot be reduced to scientific and economic analysis alone—ethics is fundamental. The individual's ethics are crucial to protecting life from climate change because they are a major determinant of both their personal GHG emissions and their political engagement. Education is an essential determinant of the individual's ethical views and education for sustainable development has particular transformative potential. Education, ethical analysis, and policy are all essential and life can best be protected from climate change only through synergies between the three.

Introduction

Driving a car is just one of the many greenhouse gas (GHG)-emitting activities that millions of individuals engage in on any given day. Looked at separately, the impact of each of those activities is quite small. Yet the combined impact of all the GHG-emitting activities undertaken on a daily basis is changing global climatic systems in ways that are causing great harm to life.

In this paper I seek to answer the question of how life can best be protected from climate change-related harm. The question is, of course, tremendously broad and complex. I do not, therefore, attempt to set forth a comprehensive blueprint for action that covers all of the many complicated details that will need to be addressed for real-world progress to take place, nor do I by any means claim to have all the answers. Instead, I aim to suggest the most important avenues for change, as well as key targets and principles that ought to guide progress. I argue that there are two key, interrelated elements to a harm-minimizing solution. The first is an international, policy-based, and ethics-informed effort to rapidly reduce GHG emissions and help vulnerable people and communities prepare for those changes which are now inevitable. The second, essential to opening space for the first, is that individuals develop an awareness of climate change and its ethical implications, thereby acquiring the power to pressure political processes in ways that will spur the necessary policy solutions, as well as reduce their personal GHG emissions. After making a case for the importance of these two elements, I then advance an argument that they can be brought about only through various forms of education and that education for sustainable development has particular potential. I conclude that policy, ethical analysis, and education are all essential and that life can best be protected from harm only through synergies between the three.

The paper is split into four sections. In the first section I briefly describe why climate change poses a huge challenge that urgently needs to be addressed. In the second section I explain the three most crucial policy solutions. In the third section I consider the role of ethics at the policy and individual levels. In the fourth and final section I explain why I see education as crucial to both the systems-level policies and the individual choices I have previously argued are required.

1. The challenge

Because climatic systems and the myriad ways in which they interact with life are tremendously complex, no one can know with certainty exactly how much and what kinds of harm anthropogenic GHG emissions are already causing or will cause in the future. Our knowledge of the sorts of impacts we ought to be responding to and preparing for has, however, grown remarkably in the past decades as mounting evidence has enabled researchers to analyze and predict the impact of rising atmospheric GHG concentrations with increasing, and in many cases very high degrees of confidence. As research has been compiled and synthesized by, among others, the Nobel Prize-winning Intergovernmental Panel on Climate Change (IPCC), and as consensus views have taken shape, a number of things have become clear. First, GHG emissions have already caused a great deal of harm. We do not know exactly how much harm has already been caused, but we do know that it has been substantial—by one estimate, human-induced climate change has already contributed to thousands of deaths and millions of incidents of disease through the direct impacts

of higher temperatures and the indirect effects of environmental changes such as increased flooding (Patz et al. 2005). Second, although deemed highly unlikely in the near term, the potential for abrupt and catastrophic climate change triggered by changes in oceanic circulation cannot be ruled out (IPCC 2007). Third, if GHG emissions continue to increase on their current trajectory, resultant impacts in this century could include steep rises in human morbidity and mortality, widespread loss of livelihood, mass migrations, and the extinction of millions of species (IPCC 2007; Stern 2006). Fourth, due to their vulnerabilities and generally low adaptive capacity, developing countries will bear the brunt of climate change-related harm and the poorest, most vulnerable populations within those countries will be especially hurt (Ibid.). Finally, anticipatory adaptation could help reduce the negative impacts of climate change, but it is very unlikely that it can prevent them. Instead, the severity of climate change-related harm will almost certainly increase in concert with rising GHG emissions (Stern 2006; IPCC 2007).

2. The key policy elements of a harm-minimizing solution

Even if we somehow found a way to completely stop emitting GHGs today, those emitted in the past would still cause harm to life for years to come because of the time scales associated with climatic processes (IPCC 2007). Since there is no way we can ensure that human-induced climate change will cease to cause harm any time soon, there are no ideal solutions to the problem. Thankfully, however, the evidence strongly suggests that bold international action to reduce GHG emissions could avert many of the most harmful impacts projected for a business-as-usual trajectory, if undertaken in the near future (IPCC 2007; Stern 2006).

It is imperative that action be international because GHGs affect everyone, regardless of where they are emitted. Our individual consumptive choices are very important too, but the magnitude of the problem is so enormous, global, and complex that a concerted law- and policy-based international effort that includes all major GHG-emitting nations is an absolute necessity if atmospheric GHG concentrations are to be stabilized in the 450 to 550 parts per million (ppm) carbon dioxide equivalent range that most climate change experts say they ought to be. The importance of such a stabilization target cannot be overstated because the most convincing evidence strongly suggests that the risk of abrupt climate change increases considerably as GHG concentrations rise much past the 550 ppm threshold, that the benefits of keeping GHG concentrations below 550 ppm far outweigh the costs, and that stabilizing GHG concentrations is the single most important requisite of a long-term, harm-minimizing solution to the problem (IPCC 2007; Mackey and Li 2007; Stern 2006).

Because cars, trucks, and other vehicles emit GHGs, governments could conceivably agree to enact policies that outlawed driving as one policy-based means of stabilizing GHG concentrations. But the costs of such an action would almost certainly outweigh the benefits, since many people's livelihoods are currently dependent upon vehicular transportation. And even if such a policy made sense, the GHG reductions resulting directly from the policy would amount to less than 13% of net global GHG emissions if implemented on a global scale (IPCC 2007). Thankfully, there is a way that governments can ensure that GHG emissions substantially decline across emission sectors in the

near future without imposing overbearing controls or unduly jeopardizing livelihoods. They can do so by enacting policies that raise the price of GHG emissions to levels which better capture their full social costs.¹

A large body of research suggests that full-cost pricing of GHG emissions would enable low GHG-emitting technologies to rapidly evolve and that internationally coordinated GHG pricing is almost certainly the single most efficient, least disruptive way in which GHG emissions can be rapidly reduced (Stern 2006). This does not mean that pricing GHGs is on its own an ideal solution or should be implemented as a stand-alone initiative. Targeted incentives and regulations such as fuel, building and appliance efficiency standards and congestion pricing could play a very important role in reducing anthropogenic GHG emissions, as could investments in mass transportation and smart electricity grids. Policies aimed at reducing GHG-emitting land use, land-use change, and forestry, which together currently account for over 25 percent of net anthropogenic GHG emissions (IPCC 2007), are also crucially important, but not easily implemented solely through GHG pricing. There are, in fact, a whole suite of climate change-specific policy solutions that could be useful and are certainly called for. That reality, however, does little to diminish the persuasiveness of the case that the big, overarching, policy necessity is to force polluters to pay the full cost of their emissions. Instead, it suggests that life can best be protected from climate change only through synergies between GHG price signals and the range of related initiatives which would amplify their effectiveness.

The two main ways that GHG emissions can be efficiently priced are through a tax or through a cap-and-trade scheme. A GHG tax simply attaches a monetary cost to GHG emissions by, for example, taxing energy producers for each unit of GHGs emitted. A cap-and-trade scheme such as that employed by the European Union caps the total amount of GHG emissions allowed in a certain region and then gives away or, preferably, auctions emission allowances to major emitters such as power plants which can then trade the allowances based on their ability to meet their targets. Each method has advantages and disadvantages relating to economic efficiency and quantity certainty, but in either case a well designed pricing scheme will lead to rapid, substantial shifts away from high GHG-emitting consumption, technologies, and land use and toward low GHG-emitting consumption and technology, and carbon-sequestering land use. The costs imposed on society by price signals will vary based on many factors such as the precise rate at which new technologies evolve, but according to the IPCC will likely amount to less than 0.1% of GDP per year. The benefits, on the other hand, will include millions of jobs in low GHG-emitting industries such as renewable energy, wide-ranging co-benefits such as reduced air pollution, and a potentially massive reduction in the harm caused by climate change relative to business-as-usual.

¹ Although it is clear that the social cost of GHG emissions is substantial, its precise value cannot be defined with certainty because of the complex, value-laden nature of the assumptions researchers have to make in regard to climate sensitivity, response lags, discount rates, risk and equity, and other key variables. It also depends on the chosen stabilization target. The Stern Review Report on Climate Change Economics, the most comprehensive analysis of climate change economics completed to date, estimates that the social cost of GHG emissions for a 450-550 ppm stabilization target would start in the region of 25-30 dollars per ton of carbon dioxide.

Given vastly differing styles of governance and energy use around the world, effective international cooperation will probably entail a global GHG stabilization target of around 500-550 ppm carbon dioxide equivalent; assign differentiated emission targets on the basis of current emissions, financial and technological capacity, and common responsibility; and allow individual nation-states the freedom to meet their targets by whatever combination of price signals and other GHG reduction methods are best suited to their particular circumstances. Of course, the questions of exactly how emission targets ought to be set and differentiated are hugely contentious and a major reason that the ethical dimensions of the issue discussed in the next section are so important.

Although fundamental, international cooperation and GHG price signals are not the only policy essentials. It is perhaps just as important that we start planning and implementing adaptive measures for those climate changes which are already upon us and those likely to occur soon—increased drought in certain regions of Africa, to name just one example. This sort of anticipatory adaptation contrasts with reactionary adaptation and is of crucial importance because increases in adaptive capacity² reduce the amount of harm that occurs with any given change in climate (IPCC 2007; Swart, Robinson, and Cohen 2003). Adaptation strategies will vary based on location and include initiatives such as expanded rainwater harvesting, erosion control, and storm surge barriers (IPCC 2007). Anticipatory adaptation will not negate the need to stabilize GHG concentrations below 550 ppm carbon dioxide equivalent, but clearly could save many lives and ought to receive considerably more policy attention than it currently does.

It may be important to mention at this point that GHG emissions are not, of course, determined solely or even mostly by climate change-specific policies. Development pathways and consumptive choices are an essential determinant of GHG emissions and would be so with or without climate change-specific policies (IPCC 2007; Swart, Robinson, and Cohen 2003). However, precisely because the manifold links between climate change and development pathways are of such vital importance, to do them justice would require a paper much longer than this one. For present purposes, it must suffice to simply acknowledge that climate change cannot meaningfully be separated from development pathways and the geo-political and economic conditions that underlie them.

In this section I have briefly summarized a large body of research that points to international cooperation, GHG emission price signals, and anticipatory adaptation as the three climate change-specific policy tools most crucial to protecting life from climate change. The details of how those ideas can be translated from theory into practice are, unfortunately, tremendously complex. One crucial question is whether the poor can justifiably be asked to pay the same price for GHG emissions as the rich, and if not how the potential for GHG pricing to disproportionately hurt the poor can be mitigated at both the national and international levels. A second is how anticipatory adaptation should be funded. A third is how national emission targets can be fairly but pragmatically assigned.

² Adaptive capacity can be defined as “the ability of a system to evolve in order to accommodate environmental hazards or policy changes and to expand the range of variability with which it can cope” (Adger 2006, 270).

These questions are just the tip of the iceberg and their difficult, complex, and value-laden nature is such that they cannot be adequately addressed without considering the role of ethics.

3. Ethics is fundamental

Scientific and economic facts have and will continue to play a vital role in the negotiation of climate change policy, as well they should. Without the diligent work of thousands of scientists around the world whose research has shaped our knowledge of climate change, we would have very little understanding of why the world was warming or how to solve the problem. Similarly, were it not for the efforts of economists we would not realize how devastating the costs of climate change are likely to be, nor how strong the economic arguments for acting now to stabilize GHG emissions are. In short, scientific and economic research has offered much to our knowledge of climate change. But there are many climate change-related issues which simply cannot be reduced to scientific and economic analysis alone.

Dealing with climate change brings to bear fundamental questions such as what principles should guide the choice of a GHG stabilization target, who is ethically responsible for damages caused and who, if anyone, has a right to pollute the atmosphere more than someone else which cannot be adequately answered without ethical analysis. Although such questions can be answered with only an implicit consideration of ethics, they can be much more equitably answered if they are addressed through an explicitly ethical lens.

A number of existing international agreements are directly or indirectly linked to climate change and have significant ethical dimensions. One of the most important of these is the United Nations Universal Declaration of Human Rights which, bearing in mind the basic tenets of many of the world's religions and the core values of people and governments, expressly provides that everyone has a right to life, liberty, and personal security (Brown et al. 2006). Because consequences of climate change such as drought and increasing mortality have unequivocally negative implications for life and personal security, any nation which supports the UN Universal Declaration on Human Rights is clearly obligated to confront the problem.

The United Nations Framework Convention on Climate Change (UNFCCC), which was signed by 192 nations in 1992 and is the principle international agreement dealing with climate change, also has important ethical dimensions. In asserting that states have 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" (1992, preface) the UNFCCC reaffirms an ethic of causing no harm also set forth in the Rio Declaration on Environment and Development. Moreover, it establishes ethics of precaution and inter-generational equity, stating that "Parties 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" and that "The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects" (1992, Art. 3). Other international agreements which bear on the ethical dimensions of climate change include the International Law of the Sea, the Convention on Biological Diversity, and the Kyoto Protocol to the

UNFCCC. With respect to policy connections, the Kyoto Protocol is particularly notable for its inclusion of binding emission targets and its reaffirmation of the principle of common but differentiated responsibility espoused in the UNFCCC.

The content of these agreements suggests that the ethical dimensions of climate change should now be comprehensively integrated into concrete climate change policy. Unfortunately, that is not the case. To date, the 192 signatories of the UNFCCC have collectively failed to halt a long-term trend of continually increasing global GHG emissions. As such, the principles of precaution, inter-generational equity, and cause no harm expressed in the UNFCCC have had little pragmatic influence over the few concrete, binding policies which have so far been implemented on its basis. The most important binding action to date, the Kyoto Protocol, mandates GHG reductions much smaller than those needed and was not ratified by the United States, which has the highest average per capita GHG emissions of all the world's major nation-states. There is, in short, a serious gap between the ideas set forth in the UNFCCC and their practice.

Some UNFCCC signatories clearly deserve more blame than others for the gaping hole between the UNFCCC's theory and practice. And the UNFCCC does deserve credit for having initiated a dialogue on how to effectively reduce GHG emissions to safe levels, as well as some action toward that end. But dialogue and limited policy action is far from enough. No matter how responsibility is assigned, humanity's collective failure to not yet seriously address the causes of climate change ought to be viewed as counter to basic principles of human rights and suggests that a more integrated, practical, and transformative consideration of the ethical dimensions of climate change is urgent.

An international declaration defining fundamental principles for sustainable, just and peaceful relations among individuals, states, and the environment could be an important and useful guide for both policymakers and individuals interested to protect life from climate change in an ethical manner. Such a declaration exists and, although it does not focus specifically on climate change, it does contain much of relevance to equitable, ethics-informed climate change solutions. It is called the Earth Charter (EC) and it emerged from the Brundtland Commission's call for a universal declaration of norms to guide the transition to sustainable development. The EC has now been endorsed by over 2,500 organizations around the globe and, although informal and non-binding, it is evolving into the internationally recognized document defining values for a sustainable world that a growing chorus of leaders have suggested is currently lacking (Corcoran et al. 2005). Although each of the 16 principles espoused in the EC are closely linked to climate change-related problems in one way or another, the EC's first and overarching principle, "Respect for Earth and life in all its diversity" and its sixth, "Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach," are particularly relevant.³

The principles espoused in the EC and an ethical analysis of climate change completed by the Collaborative Program on the Ethical Dimensions of Climate Change (EDCC) suggest a number of ethically rooted conclusions that ought to guide climate change policy, three of which are particularly notable. The first and most crucial to protecting life is that GHG emissions ought to be

³ The charter can be viewed in its entirety at:
http://www.earthcharterinaction.org/2000/10/the_earth_charter.html

stabilized at the lowest possible levels so long as atmospheric GHG levels continue to threaten basic human rights. The second is that no one person should be entitled to pollute the atmosphere any more than any other person. The third is that those responsible for harm caused by GHG emissions ought to be held responsible for harm in proportion to their contribution to that harm (Brown et al. 2006).

These three conclusions are not only compatible with the key harm-minimizing policies discussed in the previous section, but essential to their implementation and the maximization of their potential to protect life.

The argument that GHG emissions ought to be stabilized at the lowest possible levels first is where scientific, economic, and ethical analyses of climate change most clearly coincide. All three suggest that GHG emissions ought to be rapidly reduced. The key questions are how to reduce them and how rapidly.

In an absolute sense, the lowest possible levels of GHGs could be achieved if we simply ceased to emit them. But to all of a sudden cease to emit GHGs is not only unrealistic, but highly problematic because to simply stop emitting GHGs would entail a breakdown of economies and essential services so severe that it would cause tremendous harm to billions of people's quality of life, liberties, and access to personal security. So if our goal is to protect life—and why else would we care about climate change?—the lowest possible level of GHG emissions ought to be interpreted as the harm-minimizing level and recognize that protecting life from climate change requires a holistic perspective which considers both the benefits and costs of GHG emissions. Put another way, the determination of a harm-minimizing level of GHG emissions requires recognition of the fact that a certain amount of near-term GHG emissions will benefit many more people than it will hurt, so long as net global emissions are consistent with a long-term GHG concentration stabilization target and equity is explicitly considered in policy.⁴ When both the benefits and costs of GHG reductions are considered, the most convincing evidence suggests that a long-term atmospheric GHG concentration target should be set between 450-550 ppm carbon dioxide equivalent. Reaching such a target will require net global emissions to peak within the next five to twenty years and be 25-70% below present levels by the year 2050 (the precise choice of target has a large influence here).

As discussed earlier, the single most important policy action for stabilizing GHG concentrations in the 450-550 ppm range is the implementation of internationally coordinated GHG price signals. Note the use of the word "signals." That is important because an ethically informed pricing system should entail GHG emission prices that vary between nations-states on the basis of differing emission levels and capacity to pay. And it should be rooted in the concept of "contraction and convergence" (Mackey and Li 2006).

⁴The definition of harm-minimizing utilized here is anthropocentric for two reasons. First, it is impossible to determine a harm-minimizing level of GHG emissions common to all forms of life (some will thrive in a warmer world) and second, the urgency of GHG reductions requires a degree of political expediency. A solution that is harm-minimizing solution for humans is unlikely to be harm-minimizing for many other species but will also undoubtedly be far more protective of the vast majority of life-forms than is the status quo.

Contraction and convergence provides a way for net anthropogenic GHG emissions to decrease while per-capita emissions converge and ensures that pathways to increased living standards available to poor countries are not unduly constrained by climate policy. It does this by providing the basis for GHG pricing frameworks that set a high price on GHGs in high GHG-emitting countries, which will result in a contraction of their emissions (the higher the price, the bigger the contraction) and sets a lower price or no price at all on GHG emissions in developing countries, allowing those countries' emissions to continue to rise for a period before eventually converging with those of currently high-emitting countries.

The key feature that distinguishes contraction and convergence from many other possible frameworks for reducing GHG emissions is its explicit focus on per capita emission equity. The ethical argument for per emission equity, based as it is on the idea that in an equitable world no one should be allowed to pollute more than anyone else, or should at least have to pay a cost that will benefit society if they do, is quite strong. However, the increase in GHG emissions that contraction and convergence would allow to take place in poor nations for a period of years might at first glance appear to contradict the goal of protecting life, given the harm that GHG emissions cause. A closer look reveals otherwise.

GHG emissions always cause some harm. However, as discussed earlier, they also usually benefit society in some way. Currently there are few, if any, systems of production, trade, or services provision that can function without producing at least some GHGs, and that will not change overnight. Many times the benefits those systems provide—employment, food, water sanitation, access to health care, education and so forth—are essential to well being. Because they have limited financial resources and generally lack technological capacity, developing countries are particularly ill-suited to rapidly reorient their economies. To ask them to do so would likely do more harm than good. Thus, there is no real contradiction between protecting life from climate change and a policy of contraction and convergence which does not call for poor countries to immediately reduce their net GHG emissions.

There are many complex details that would have to be addressed in order for contraction and convergence to work in practice. One of the most important of these is how countries that emit a lot of GHGs can impose costs on GHG emissions in a way that does not harm their poor, vulnerable populations, nor distort trade in ways that hurt developing countries. Such questions are difficult, but they can be addressed through a variety of measures such as governmental redistribution of revenues from GHG pricing to citizens who cannot ethically be expected to bear the consumer cost of the price. The details are complex, but complexity ought not to obscure the potential of contraction and convergence to bring us much closer to an equitable and ethically justifiable use of Earth's atmosphere than currently exists.

The question of how to hold those responsible for climate-related harm in proportion to their contribution to that harm is very difficult to answer. In the future, GHG pricing will go a long way toward holding polluters responsible for their emissions, especially if governmental revenues generated from GHG pricing are put toward harm-alleviating uses. But attempting to hold anyone directly responsible for past emissions is extremely problematic. For one thing, it is impossible to

know precisely how much any given individual has contributed to the problem. For another, there was, until recently, enough lack of awareness and uncertainty surrounding climate change that it is entirely possible that many GHG emitters were ignorant about the impact of their emissions or truly believed that GHG emissions were not causing climate change. Even today, there are many people in the world who have never heard about human-induced climate change, although very few large emitters can now claim to be ignorant of the subject. Because of these and many other complications, there is no straightforward way to assign blame or arrange for compensation. Is it legitimate to assign blame to someone for harm that they did not know they were causing? And if so, how exactly can they be held responsible?

Ideologically speaking, it might appear desirable that high GHG-emitting nations and individuals who have refused to take any meaningful steps to reduce their GHG emissions in recent years could somehow be directly held responsible, perhaps in an international court. However, to do so would be virtually impossible for the reasons discussed above. More importantly, even if court-style compensation were technically feasible, it would be pragmatically undesirable because it would risk causing conflict, anger, and resentment, all of which are precisely the opposite of what is needed to best protect life from climate change. A much more constructive way to handle the responsibility issue is to make the provision of compensation for harm caused desirable to those who ought to be providing it by framing the issue in terms of mutual benefit.

Leaving voluntary off-sets and charitable donations aside, compensation for harm caused will need to take place mostly at the nation-state level and it will not be called compensation. Instead it will be framed as, and provided through, international aid, funding for anticipatory adaptation, payment for environmental services, technology transfer and the like. It will not be enough—how could you ever really compensate someone for a relative's death or the loss of their land? It will also be far from perfect. Many of those nations which should be responsible for compensation will provide too little and what they do give will be offered with a large measure of self-interest. In addition, compensation will not always reach those who most deserve it. Nonetheless, well designed and framed means of holding high GHG-emitting nations responsible for their actions would be a considerable improvement on the status quo and substantially reduce the harm that climate change inflicts upon life.

The detail of how theoretical responsibility for harm caused should translate into practical action is complex and currently being debated within many forums. Whatever climate change regime follows the Kyoto Protocol will, of course, play a key role. A few of the most constructive means of addressing the issue include a new, improved, and expanded Clean Development Mechanism; substantial funding for anticipatory adaptation, disbursed to those in need by NGOs, governments, and international aid agencies; payments for avoided deforestation, with benefits flowing as much as possible toward vulnerable forest-dwelling populations; and technology transfer.

There are other possible options for compensation besides the few listed above. What is vital is that wealth and technology transfers between those who have them (and by virtue of their wealth are usually responsible for high quantities of GHG emissions) and those in need take place and that they enhance the ability of particularly vulnerable populations to cope with changes in climate.

Recent climate change negotiations have shown some encouraging progress with respect to the incorporation of ethical principles into climate change policy. The 2007 negotiations in Bali, for instance, saw significant progress in the development of policies through which rich countries can transfer wealth and technology to poor countries and landowners in ways that can protect forests. By itself, payment for avoided deforestation is far from enough. It will, however, help reduce net GHG emissions, and it does provide a means for which rich countries are in a sense compensating poorer countries for the harm that their emissions have caused, are causing, and will cause. Despite fitful progress, however, funding for adaptation is far less than it should be and global net GHG emissions are still rapidly rising.

The big picture international negotiations that this section has so far focused on are primarily conducted by representatives of nation-states. Many of these representatives are undoubtedly well-intentioned, ethically-minded individuals. But they are also all, to varying extents, subject to the constraints of national interest and global politics. Civil society and the majority of individuals who are not directly involved in the negotiations process are, by contrast, neither inherently bound by the constraints of national interest nor under any obligation to accept the status quo of global politics within which negotiators function. This is very important, and tremendously beneficial to meaningful action, because it means that individuals and civil society are free to push boundaries, engage with political processes in ways that redefine what is politically achievable, and expand the role of ethics within formal international negotiations. Individuals also possess tremendous ability to reduce their own personal GHG emissions as well as indirectly reduce those of their relatives and friends. For those reasons, individuals' ethics and the many ways in which they physically manifest themselves can be seen as the single most important means through which the status quo can be transformed and climate change solutions found.

One of the most important ways that individuals can bring forth climate change solutions is through their engagement with politics. Any political system is heavily influenced by its constituents and, by extension, so too are climate change policymakers. The extent to which constituents' voices are actually listened to and incorporated into policy depends on a variety of factors including the scale of a given policy (local, national, regional, or global), the quality of institutions within a society, and the extent of participation and freedom of information within a society. No matter how open and representative a given government is, some citizens will always feel that policies are mismatched with their ethics and few individuals will ever feel that they are perfectly represented. But in all societies individual citizens will have at least some, and in many cases a considerable amount of, influence over the policies imposed upon them, including all those which touch on climate change. In any political system, the more constituents orient their political engagement to encourage effective, ethical climate change policies, the more likely it is that those policies will come into being.

Another way in which individual actions informed by individual ethics are vital to climate change solutions is through their direct influence on GHG emissions. The amount of GHGs that individuals emit varies hugely on the basis of their capacity to consume and, more importantly, how they choose to consume. Consumptive choices will remain essential irrespective of precisely what

actions governments undertake. If enough individuals choose to reduce their personal GHG emissions, it could have a tremendous impact.

To illustrate the importance of consumptive choices, we can imagine two middle-class families. One of these families does not own a car (they use public transportation and commute to school and work on bikes); lives in a small home which is a net producer of renewable energy thanks to thick insulation, solar panels and a wind turbine; eats a vegetarian diet; has planted several trees and a vegetable garden in their modestly sized yard; and vacations only in nearby locations. The other family owns four fuel-inefficient SUVs (both parents drive to work and both teenage children drive to school); lives in a large suburban home with thin insulation; relies upon electricity generated with fossil fuels; and keeps their hot tub set to 104 degrees Fahrenheit at all times. Those two families will, of course, emit very different amounts of GHGs, with the latter emitting well over the global average and the former well below. More importantly, each family's lifestyle and actions will surely influence those of their friends and relatives, whose actions will influence other families and other relatives, and so on. Because of that multiplying effect, the long-term total GHG reductions indirectly linked to the first family could be quite a bit larger than those they were directly responsible for.

In most countries it is an unfortunate reality that few well-off families are currently likely to live like the first family unless they have clear financial incentives for doing so. This helps explain why policy is so essential and why GHG emissions currently tend to be correlated to income. However, the more that individuals and families understand the ethical dimensions of climate change, the more likely they are to make choices that will reduce their own carbon footprint even if they do not necessarily stand to directly benefit financially from doing so. As we saw above, those choices can have a tremendous impact. More crucially, individuals will be much more likely to make decisions that will lead policymakers to enact sound, ethical climate change policies if they know and care about the ethical dimensions of climate change.

This leads to a question of vital importance to protecting life from climate change: What determines an individual's views on climate change in general and its ethical dimensions in particular?

4. It is all about what you know

Whenever our experience in any way affects our understanding of climate and humanity's impact on it, the way we engage with human-induced climate change is thereby shaped and altered. Some kinds of experience, of course, have more of an effect than others. If I see Al Gore give a presentation on climate change, this will likely have significant influence on my conceptualization of the problem. A discussion with a climate change skeptic would, by comparison, have much less of an influence. I would strive to respectfully listen to that person, but I would be unlikely to believe much of what he or she was saying because my experience with the issue has led me to believe deeply in the reality and severity of the harm that climate change is causing. By contrast, the owners of ExxonMobil might listen more closely to a skeptic if they thought it was in their best interest to do so. Similarly, a young, impressionable college student at a university heavily funded and influenced by ExxonMobil would probably listen very closely to a professor who just so

happened to teach that humans are not changing climate, especially if their grade depended on doing so.

The point I am trying to make is that there are many different views on climate change and a lot of people with vested interests in the status quo who seek to maintain it. The complex nature of climate is such that there is an extremely slim possibility that those who either do not believe that humans are changing the climate or argue that policy action to slow GHG emissions is too costly are correct. However, given all the evidence to the contrary, they are almost certainly wrong. Deep down, some of them must know that they are wrong, yet publicly insist that GHGs are not a problem because they personally benefit by doing so.

Each year, more and more people hear about climate change and say that they want to see something done. But those who oppose doing anything about climate change are not going to go away anytime soon and will continue to make their voices heard. Some of them are very powerful, as evidenced by the current situation in the United States where surveys suggest that most U.S. citizens now favor action to address climate change⁵ but some powerful politicians do everything they can to hold meaningful action back. If one listens to those who resist action to protect life from climate change, whether their resistance stems from a genuine belief that climate change is not a problem which demands corrective action or merely self-interest, it is clear that many of them are trying to convince others of their viewpoint's merits. Unless those who believe that action is urgent can win over more hearts and minds than those who seek to maintain the status quo, there is little hope for meaningful transformation.

The most important thing that those of us who think that we urgently need to take action to protect life from climate change can do is to spread awareness of the problem and its solutions as far and widely as possible. A few ideas:

- Bring up climate change and potential solutions while having a cup of coffee with a friend.
- Deliver a presentation about climate change at a high school, college, or university.
- Run for political office and make action to address climate change an important aspect of your platform.
- Vote for representatives who have pledged to work toward policies that will reduce GHG emissions.
- Encourage your family and friends to cut down on their GHG emissions by, for example, switching from incandescent to fluorescent light bulbs and biking or taking public transportation instead of driving to school and work.
- Seek to eliminate your own GHG emissions by, for example, installing a net-energy-producing renewable energy system and opening up your home to others as a model.

⁵ To view the results of one of these surveys see: Podesta, John, Laura Nichols and Daniel Weiss. 2007. "Americans Urgently Want Action on Energy Independence and Global Warming." http://www.americanprogress.org/issues/2007/04/environment_poll.html/#_ftnref3

- Go door-to-door in your neighborhood to spread awareness of the harm that human-induced climate change is causing.
- Join a local organization in a campaign that works to spread public awareness.
- Pressure policymakers to take action on climate change.
- Organize an awareness-building event for a group of school kids.

The above ideas represent just an inkling of what is achievable; there are literally thousands of possibilities.

What unifies the many ways in which one can seek to protect life from climate change is that almost all of them have a formal or informal educational component. There are many forms of education which range in scope from an informal conversation with a friend to a grassroots awareness campaign to a showing a documentary about climate change to a middle school science class. All types of education, both formal and informal, have a central role to play in the search for climate change solutions, but there is a specific type of education called education for sustainable development (ESD) that I believe has particular potential.

According to The United Nations Educational, Scientific, and Cultural Organization (UNESCO), ESD is “fundamentally about values, with respect at the centre: respect for others, including those of present and future generations, for difference and diversity, for the environment, for the resources of the planet we inhabit.” As such, ESD has much in common with the aims of the environmental education centers prevalent in some part of the United States. But in contrast to commonly practiced environmental education approaches, ESD goes beyond addressing values and attitudes of the individual in relation to just the environment, addressing the interconnectedness of social and economic justice to environmental issues and focusing on how to motivate and manage change towards sustainability within organizations and institutions (Tilbury 2004).

With respect to climate change, the great value of ESD is that students not only engage with ethical concepts such as inter-generational equity and learn how to live their own lives in a more sustainable manner, but learn how political and economic systems can be made more sustainable. Because of that strength, ESD education has the potential to empower individuals to orient both their own lives and their engagement with political processes in ways that can facilitate the development of harm-minimizing climate change solutions. Other forms of education can do that too, but ESD is notable for its explicit focus on ethics, sustainability, and systems thinking.

Many recent innovations in the field of ESD are either linked to or inspired by the Earth Charter. The tremendous potential of the EC and ESD to inform solutions to the problems caused by climate change arises because they, like the rationale for protecting life from climate change, are both fundamentally about ethics. However, while the EC as a physical document can on its own powerfully provoke changes in thinking, it is ultimately of little value unless it inspires changes in the physical world too. To address this the Earth Charter Initiative—the global network of people, organizations, and institutions who participate in promoting the EC, and in implementing its principles in practice—has sponsored projects including the creation and dissemination of materials

and curriculum for ESD and supported governmental efforts to formally incorporate ESD and the EC into their education systems. This has led to the opportunity for many school students to learn about not just what sustainable development is, but how it can be achieved.

Although ESD has great potential, its reach is currently limited and it will need to expand considerably before it will make large-scale contributions to climate change awareness. But awareness need not, of course, come about through any one specific educational pathway. Instead, it can and should flow through many different pathways, of which ESD is just one possibility. What is crucial is that we develop a deep concern about climate change and act accordingly, and that we do it soon.

Concern will be most effective when it is channeled into both lifestyle changes and political pressure. Currently, many climate change-related educational efforts focus solely on steps individuals can take to reduce their personal GHG emissions. The scope of such educational efforts urgently needs to expand to include a focus on the role of systems and policy as well. If that does not happen, we risk an “individualization of responsibility” through which the entire onus for change is placed on individuals and governments are let off the hook (Maniates 2001). As described in the first section of this paper, governmental action is essential because it is very difficult to imagine GHG concentrations being stabilized at a harm-minimizing level without it. And time is running out: if governments do not act cooperatively and boldly within the next decade or so, it will become nearly impossible to stabilize global GHG concentrations below 550 ppm carbon dioxide equivalent (Stern 2006).

The potential of personal emission reductions to decrease net GHG emissions is constrained by at least two obstacles. In the first place, GHG emissions tend to come from many different sources and it is difficult to account for all of them, much less cut them all out of your life. Secondly, the GHGs associated with activities such as energy use tend to be very difficult to avoid unless one lives in certain areas, can afford certain technologies, and is extremely motivated.

The limitations of personal choices with respect to climate change do not, of course, imply an argument for inaction. Instead, they suggest how important it is that climate change-related educational efforts highlight not just the importance of lifestyle, but also the need for the sorts of policy solutions I outlined earlier.

Conclusion

Neither climate change policy, ethical analysis, nor education can adequately protect life from climate change on their own. They are all essential, and their interactions are synergistic in that investments in one can multiply the effectiveness of the others. This suggests three main avenues into which those of us who are concerned about climate change ought to channel our efforts. We should not solely pressure politicians to enact sound policies, solely think ethically about the influence of our own lifestyle's on climate change and act accordingly or solely spread awareness through formal and informal educational efforts at every possible opportunity. Instead, we should

do all three. When we do, synergies between our diverse efforts will naturally be put in motion and we can feel confident that we are doing our part to protect life from climate change-related harm.

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